

Antibiotic Resistance and Agricultural Overuse of Antibiotics

What Health Care Food Systems Can Do

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Introduction

Over the last century, Western medicine has made tremendous advances in fighting infectious disease. One of the keys to success has been the development of antibiotics—compounds that kill disease-causing bacteria or inhibit their reproduction. Unfortunately, effective antibiotics are threatened by a global crisis in antibiotic resistance. As bacteria become increasingly resistant to one or multiple antibiotics, treatments for common bacterial infections will become “increasingly limited and expensive—and, in some cases, nonexistent.”¹ Not only will it become harder to treat community-acquired infections, but key medical procedures—including chemotherapy, transplantation, and surgery—will also face far greater challenges. Already, more than 60,000 Americans die from resistant infections each year.²

Because antibiotic resistance is caused in part by overuse of antibiotics in agriculture, health care food systems can help by establishing a procurement policy under which they seek to purchase meat, poultry, dairy, and seafood products produced with fewer antibiotics, as further discussed below.

What is Antibiotic Resistance?

As noted by the Centers for Disease Control and Prevention (CDC), “Antibiotic use promotes development of antibiotic-resistant bacteria. Antibiotic resistance occurs when bacteria change in some way that reduces or eliminates the effectiveness of drugs designed to cure or prevent infections. The bacteria survive and continue to multiply causing more harm. Widespread use of antibiotics promotes the spread of antibiotic resistance.”³

Unlike higher organisms, bacteria can readily transfer genetic material not only to their own offspring, but also to completely unrelated types of bacteria. Along with the rapid reproduction of bacteria, this means resistance genes can be widely distributed in short order. Some bacteria, which the media have termed “superbugs,” end up resistant to multiple antibiotics - even the most powerful ones.

Is Resistance Truly a Concern?

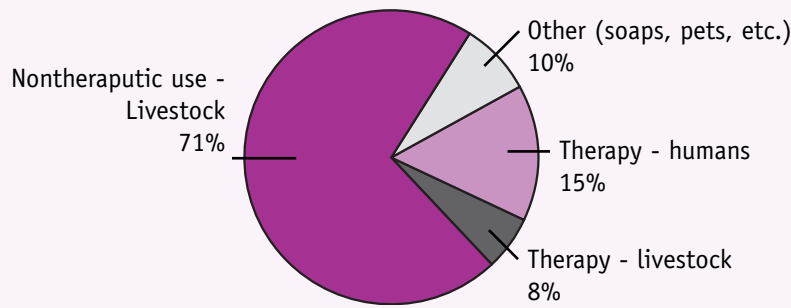
CDC says that antibiotic resistance is among its “top concerns.”⁴ As the Infectious Disease Society of America notes, “a perfect storm is brewing in the field of infectious diseases,” both because bacteria are increasingly resistant and because the pipeline of new antibiotics is drying up as pharmaceutical companies find it far more profitable to develop drugs to treat chronic conditions rather than bacterial infections.⁵

Thus, preserving the effectiveness of existing antibiotics—by minimizing their overuse—is vital. Such overuse occurs in human medicine as well as in agriculture. Just as steps are being taken to reduce overuse in human medicine, so too is it important to take all feasible steps to reduce agricultural overuse as well.

Food Production and Antibiotic Resistance

Massive quantities of antibiotics are used in agriculture—in fact, an estimated 70% of the total quantity of antibiotics consumed in the US are used as feed additives for poultry, swine, and beef cattle.⁶ These antibiotic feed additives are not treatments for illness; rather, they are used for “nontherapeutic” purposes, i.e., to promote slightly faster growth and to compensate for poor animal-husbandry conditions that would

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otherwise cause disease. Half of those antibiotics belong to classes of drugs used in human medicine. Because development of resistance to one antibiotic within a particular class can promote resistance to other antibiotics in the same class, it's important to minimize use not only of the antibiotics that are directly used in human medicine, but also others in the same class.

In addition, some antibiotics used in treating sick animals are of particular concern—notably fluoroquinolones, a class that includes the human-use antibiotic Cipro. In October 2000, the Food and Drug Administration proposed to ban use of fluoroquinolones in treating poultry, because of data linking such use of increases in Cipro resistance by bacteria that cause severe food poisoning (specifically *Campylobacter*). While FDA's regulatory process is so cumbersome that the ban has not yet been finalized, several leading poultry producers have already stated that they have ended use of fluoroquinolones in poultry produced for human consumption.

Medical Impacts of Agricultural Antibiotics

There is a strong consensus among independent experts that antibiotic use in agriculture contributes to resistance affecting humans:

- U.S. Institute of Medicine/National Academy of Science: "Clearly, a decrease in antimicrobial use in human medicine alone will have little effect on the current [antibiotic-resistant] situation. Substantial efforts must be made to decrease inappropriate overuse in animals and agriculture as well."⁷
- World Health Organization: "There is clear evidence of the human health consequences due to resistant organisms resulting from non-human usage of antimicrobials.⁸ These consequences include infections that would not have otherwise occurred, increased frequency of treatment failures (in some cases death) and increased severity of infections."⁹
- Alliance for Prudent Use of Antibiotics: "[E]limination of non-therapeutic use of antimicrobials in food animals and agriculture will lower the burden of antimicrobial resistance...with consequent benefits to human and animal health."¹⁰
- More than 300 organizations, including the American Medical Association, American Public

Health Association, and Health Care Without Harm, have advocated ending the nontherapeutic use of medically important antibiotics as feed additives.¹¹

What Can Be Done?

Nontherapeutic use of medically important antibiotics as feed additives is unnecessary. The practice has been banned in Denmark, the world's largest exporter of pork. A recent study by the World Health Organization documented Denmark's success in phasing out such use without adverse effects on food safety, consumer meat prices, or animal welfare.¹² The European Union has also sharply restricted use of antibiotics as feed additives.

Are Alternatives Available and What Is Their Cost?

Chicken produced without nontherapeutic use of medically important antibiotics is widely available at no cost premium in the U.S. In fact, McDonald's purchases only chicken produced without use of medically important antibiotics as growth promoters,¹³ while the major food-service company Bon Appetit purchases only chicken produced without any nontherapeutic use of medically important antibiotics.¹⁴ Other meats raised under such conditions are also available, albeit on a more limited basis.¹⁵ Establishment of a purchase preference for such meats will stimulate producers to provide even more of these alternatives at lower cost.

What Actions Can Health Care Facilities Take?

- **Educate your staff** - Many health care professionals are unaware of the relationship between food production and antibiotic resistance. Without knowledge there will be no action. Use your internal email system, newsletter, grand rounds and other means to educate your colleagues.
- **Enlist medical staff and infection control support** - Medical staff and especially infection control professionals appreciate the threat of drug resistant disease. Enlist their expertise to help provide support for protective food procurement policies.
- **Adopt attached procurement guidelines** - By adopting the attached food procurement guidelines, your facility can signal your commitment to antibiotic safety to your food purveyor, your local community and the broad health care community. Once you have adopted the guidelines, let your Group Purchasing Organization (GPO), local media, professional organizations and others know. Spread the word and help build national support.
- **Ask your GPO to comply** - Frequently, health care purchasing decisions are dictated by what is available from your GPO. If your GPO does not supply meat raised without non-therapeutic use of antibiotics, let them know that you want it. Communicate with other facilities in your GPO and let them know of your interest.

For more information, see Health Care Without Harm's full "Sample Procurement Policy: Purchasing Meat, Poultry, Dairy and Seafood Produced Without Inappropriate Antibiotic Use," available online at <http://www.noharm.org/details.cfm?ID=893&type=document>. Also visit www.noharm.org and www.keepantibioticsworking.com.

Notes

1. Interagency Task Force on Antimicrobial Resistance. *A Public Health Action Plan to Combat Antimicrobial Resistance*. p. 9. Available at www.cdc.gov/drugresistance/actionplan/aractionplan.pdf, accessed on February 9, 2004.
2. Centers for Disease Control (CDC) "Campaign to Prevent Antimicrobial Resistance in Healthcare Settings," Atlanta, GA. Available at <http://www.cdc.gov/drugresistance/healthcare/problem.htm>. Accessed June 3, 2004. CDC notes that 90,000 patients die as a result of hospital-acquired infections, and that more than 70% of the bacteria that cause hospital-acquired infections are resistant to at least one of the drugs most commonly used to treat them.
3. Centers for Disease Control (CDC). *Background on Antibiotic Resistance*. Atlanta, GA. Available at www.cdc.gov/drugresistance/community. Accessed on February 9, 2004.
4. Centers for Disease Control (CDC). *Background on Antibiotic Resistance*. Atlanta, GA. Available at www.cdc.gov/drugresistance/community. Accessed on February 9, 2004.
5. Infectious Diseases Society of America (2003). Backgrounder: Bad Bugs, No Drugs—Defining the Antimicrobial Availability Problem." Available at <http://www.idsociety.org/Template.cfm?Section=Home&CONTENTID=7455&TEMPLATE=/ContentManagement/ContentDisplay.cfm>. Accessed May 18, 2004.
6. Mellon et al. *Hogging It: Estimates of Antimicrobial Abuse in Livestock*. Union of Concerned Scientists: Cambridge MA. 2000.
7. Institute of Medicine, Board on Global Health (2003). *Microbial Threats to Health: Emergence, Detection, and Response*. National Academy of Sciences Press, Washington, DC. Available at: <http://books.nap.edu/books/030908864X/html/R1.html#pagetop>. Accessed Jan. 30, 2004.
8. The term "antimicrobial" includes antibiotics and other compounds that kill microbes or keep them from reproducing.
9. Joint WHO/FAO/OIE Expert Workshop on Non-human Antimicrobial Usage and Antimicrobial Resistance, Geneva, 1 - 5 December 2003, Executive Summary. Available at: <http://www.who.int/foodsafety/micro/meetings/nov2003/en/>. Accessed Jan. 30, 2004.
10. Alliance for Prudent Use of Antibiotics (2002). *The Need to Improve Antimicrobial Use in Agriculture: Ecological and Human Health Consequences*. Clinical Infectious Diseases, Volume 34 Supplement 3. Available at: <http://www.tufts.edu/med/apua/Ecology/faair.html>. Accessed Jan. 30, 2004.
11. These organizations have endorsed legislation (S.1460/H.R. 2932) that would phase out nontherapeutic use of medically important antibiotics. See http://www.keepantibioticsworking.com/library/uploadedfiles/Endorsements_for_The_Preservation_of_Antibiotics.doc. Accessed April 28, 2004.
12. World Health Organization (2003). *Impact of antimicrobial growth promoter termination in Denmark*. WHO/CDS/CPE/ZFK/2003.1. Available at: <http://www.who.int/salmsurv/en/Expertsreportgrowthpromoterdenmark.pdf>.
13. McDonald's Corporate Press Release, June 19, 2003. "McDonald's Calls for Phase-out of Growth Promoting Antibiotics in Meat Supply, Establishes Global Policy on Antibiotic Use." Available at <http://www.mcdonalds.com/usa/news/current/conpr06192003.html>. Accessed Jan. 30, 2004.
14. Bon Appétit's Policy on Antibiotics Use in Food Animals, November 18, 2003. Available at: <http://www.bamco.com/pressrelease/pdfs/antibioticpolicymaster1032003.pdf>. Accessed Jan. 30, 2004.
15. Numerous such suppliers, for example, are listed at www.EatWellGuide.org.

SAMPLE FOOD PROCUREMENT GUIDELINES

Purchasing Meat, Poultry, Dairy and Seafood Produced Without Inappropriate Antibiotic Use

A. Responsibilities

To minimize inappropriate use of antibiotics, personnel involved in food purchasing decisions will use these guidelines when making food-purchasing decisions involving meat, poultry, dairy, and seafood.

B. Purchasing Guidelines

In complying with this policy, [INSTITUTION] will strive to make purchases as follows:

1. [Institution] will regularly and consistently inform suppliers of meat, poultry, dairy, and seafood products of their preference for purchasing products that have been produced without nontherapeutic use of antibiotics, particularly those that belong to classes of compounds approved for use in human medicine.
2. Opportunities will be prioritized as follows:
 - a. Unless these products are not available to the institution because of local supply constraints, chicken will only be purchased if it has been produced:
 - i. without the nontherapeutic use of antibiotics that belong to classes of compounds approved for use in human medicine; and
 - ii. without any use of fluoroquinolone antibiotics.
 - b. Poultry other than chicken will receive a purchase preference if it has been produced without the nontherapeutic use of antibiotics, particularly those that belong to classes of compounds approved for use in human medicine.

- c. Meat, dairy, and seafood products will receive a purchase preference if they have been produced without the nontherapeutic use of antibiotics, particularly those that belong to classes of compounds approved for use in human medicine.

3. [INSTITUTION] will also encourage its meat, poultry, dairy, and seafood suppliers to minimize use of antibiotics, particularly those that belong to classes of compounds approved for use in human medicine, for disease therapy and non-routine disease prevention to the extent practicable.

Definitions

Antibiotic: This policy uses the term antibiotic to have the same meaning as the more technical term "antimicrobial." Antimicrobials are substances of natural or synthetic origin that kill or inhibit the growth or multiplication of bacteria (adapted from *American Veterinary Medical Association Judicious Therapeutic Use of Antimicrobials*, <http://www.avma.org/scienact/jtua/jtua98.asp>). However, the term antibiotic does not include ionophores or other compounds from classes of drugs not used in human medicine that are used as coccidiostats.

Nontherapeutic: This policy uses the term "nontherapeutic" to mean administration of antibiotics to an animal or groups of animals for purposes other than disease therapy or non-routine disease prevention as defined herein.

Disease Therapy: This policy uses the term "disease therapy" to mean the use of antibiotics, under the direction of a certified veterinarian, for the specific purpose of treating animals with an

established disease or illness. Once the treatment is over and the animal is cured, the application of the antibiotic ceases. (Adapted from the World Veterinary Association's *Prudent Use of Antibiotics Global Basic Principles and Canadian Committee on Antibiotic Resistance*, <http://www.ccar-ccra.org/agriglos-e.htm>.)

Non-routine Disease Prevention: This policy uses the term "non-routine disease prevention" to mean the use of antibiotics where it can be shown that a particular disease is present on the premises or is likely to occur because of a specific non-customary situation. (Adapted from *WHO Global Principles for the Containment of Antimicrobial Resistance in Animals Intended for Food*, http://www.who.int/emc/diseases/zoo/who_global_principles.html.)



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