

Nursing Organizations Call for Phase-Out of Agricultural Practices That Promote Antibiotic Resistance

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The use of antibiotics in agriculture is considered a contributing factor to the problem of antibiotic resistance. A majority of antibiotics and related drugs produced in the United States are not used to treat the infirm, but rather are used as feed additives for agricultural animals to promote growth and compensate for stressful and crowded growing conditions. Significant efforts must be made to decrease inappropriate overuse in animals and agriculture. Several leading health and political organizations have begun to address the issue. The American Nurses Association has established policies that call on Congress, the U.S. Food and Drug Administration, and meat producers to promptly phase out the agricultural practices that promote antibiotic resistance.

Keywords: antibiotic resistance; agricultural practices/policy; environmental health; food safety/policy; American Nurses Association

Nurses are well aware that the “widespread use of antibiotics contributes to the spread of antibiotic resistance” (Centers for Disease Control and Prevention [CDC], 2001). However, what many nurses may not know is that the great majority of antibiotics and related drugs produced in the United States are not used to treat sick people, but rather are used as feed additives for agricultural animals to promote growth and compensate for stressful and crowded growing conditions. In fact, the World Health Organization (WHO) considers the use of antibiotics in agriculture a contributing factor to the problem of resistance (WHO, 2002). The Institute of Medicine’s 2003 report on *Microbial Threats to Health* concluded, “Clearly, a decrease in the inappropriate use of antimicrobials in human medicine alone is not enough. Substantial efforts must be made to decrease inappropriate overuse in animals and agriculture as well.” In response, the American

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Nurses Association (ANA), Health Care Without Harm (an international coalition of 443 health care and other organizations), many state nurses associations, and other advocacy organizations are calling on politicians, the U.S. Food and Drug Administration (FDA), and meat producers to make policy changes that promptly phase out the agricultural practices that promote antibiotic resistance.

To slow the development and spread of antibiotic-resistant bacteria, it is essential to take action now to avoid unnecessary antibiotic use in both medical and agricultural settings whenever possible. Even outside the clinical setting, nurses and other health care providers can provide leadership in encouraging measures to prolong the effectiveness of existing antibiotics. Nursing and other health care organizations are currently taking steps to promote change at both the state and national levels.

GROWING RISKS FROM DRUG-RESISTANT PATHOGENS

A federal interagency task force cochaired by the CDC, FDA, and the National Institutes of Health (NIH) recently affirmed that "drug-resistant pathogens are a growing menace to all people, regardless of age, gender, or socioeconomic background" (Interagency Task Force on Antimicrobial Resistance [ITFAR], 2001). Increased incidence of antibiotic-resistant infections amplifies the risk of therapeutic failures during the treatment of these infections, which can result in increased treatment costs, lengthier illnesses, lengthier hospitalizations, and possibly death. Children, the elderly, and the immuno-compromised are particularly vulnerable because of their increased susceptibility to bacterial infections. ITFAR (2001) concluded that if action to address the problem is not taken, "drug choices for the treatment of common infections will become increasingly limited and expensive—and in some cases, nonexistent."

DEVELOPMENT OF RESISTANCE IN ANIMALS

If antibiotics are given in doses that are insufficient to kill all of the bacteria infecting a host,

which is often the case with the antibiotics given to the animals in their feed or water, the bacteria that survive and reproduce are those that will be most resistant to the effects of the antibiotics. Research has linked the use of antibiotics in agriculture to the emergence of antibiotic-resistant strains of disease-causing bacteria. These bacteria, which are known to cause illness or disease in humans, include *Salmonella*, *Campylobacter*, and *Escherichia coli*. Bacteria are thought to acquire antibiotic resistance in the intestines of animals (Salyers, 1999). Resistant strains are then transferred to humans through food (i.e., contaminated meat) and water (from farm runoff) or direct contact with animals and/or animal waste (U.S. General Accounting Office, 1999). It is important to note that once acquired, antibiotic resistance can be transferred between different species of bacteria, thereby augmenting the spread of resistance. As a result, resistance in many types of bacteria, not just foodborne types, can result from agricultural uses of antibiotics. The FDA Web site has a brief downloadable animation of how bacteria develop antimicrobial resistance (<http://www.fda.gov/cvm/antimicrobial/antiresistvideo.htm>).

CONTRIBUTING FACTORS

Agricultural practices. An estimated 70% (25 million pounds) of antibiotics and related drugs produced in the United States are given to cattle, pigs, and chicken—not for disease treatment but rather to promote growth and to compensate for crowded, stressful conditions under which many animals are now raised (see Figure 1). Many of those antibiotics belong to classes of drugs that are also used for human treatment; examples include penicillins, tetracyclines, and macrolides (Mellon, Benbrook, & Benbrook, 2001). Prescriptions are not required and the antibiotics are typically given to animals via their feed at low doses for extended periods, in what is often termed *nontherapeutic* use. For example, nontherapeutic use of antibiotics in poultry is estimated to have increased from 2 million pounds in 1985 to 10.5 million pounds by the late 1990s (a 307% increase per bird; Mellon et al., 2001). Few measures have been taken to address overuse of antibiotics as agricultural feed additives.



Figure 1: Pork Farm Confinement

Corporate connections. Farming has changed dramatically in recent years. There are increasing numbers of industrial-scale “factory farms” that confine thousands of hogs, chickens, and cows inside buildings or on feedlots. Such facilities have largely replaced small, family-owned livestock farms. Indoor conditions, routine movement of animals between facilities, and the high concentration of animals and untreated manure waste in these facilities can all contribute to heightened infection risk among these animals. On these factory farms, operators often raise animals under contract to corporations that own the final product and that typically control feeding practices; it is not unusual for these operators to administer antibiotic-laden feed to animals for prophylaxis and/or growth enhancement.

RESPONDING TO THE THREAT

Global response. In 1998, the European Union (EU) prohibited the use as growth promoters of all antibiotics that are used in human medicine. The EU is currently considering proposals to extend its ban on growth promotion to include all antibiotics (European Union, 2001). In addition, WHO has stated that “there is clear evidence of the human health consequences due to resistant organisms resulting from non-human usage of antimicrobials.” In June 2000, WHO called for the end of the use of medically important antibiotics as growth promoters unless they are shown to be safe (WHO & Food and Agriculture Organization [FAO], n.d.).

U.S. response. The United States has not adopted such a policy. However, legislation has been introduced. In April 2005, U.S. Senator Olympia Snowe (R-ME) and four bipartisan cosponsors introduced legislation that would phase out the use of medically important antibiotics as feed additives for farm animals to preserve the effectiveness of medically important antibiotics. In May 2005, U.S. Representative Sherrod Brown (D-OH) introduced a companion bill in the House. Key features of the legislation, entitled the Preservation of Antibiotics for Medical Treatment Act of 2005 (2005a, 2005b), include the following:

- Two years after the bill’s enactment, seven classes of antibiotics now used in human medicine would be barred from use as nontherapeutic feed additives unless the FDA first determined that their continued use will not contribute to antibiotic resistance affecting humans. The seven classes are penicillins, tetracyclines, macrolides, lincosamides, streptogramins, aminoglycosides, and sulfonamides.
- Manufacturers of agricultural antibiotics would be required to submit annual reports to the Secretary of Health and Human Services on quantities of antibiotics sold for use in agricultural animals. Currently, governmental data on antibiotic use in agriculture are not collected.
- Authorization of transition payments to farmers to assist in phasing out use of antibiotic feed additives.

FDA regulatory actions. The FDA’s Center for Veterinary Medicine (CVM) oversees the use of animal antibiotics. In 2003, the CVM released Guidance 152, a nonbinding document that outlines the FDA’s current belief on how antibiotics can safely be used in agriculture. Guidance 152 contains a detailed procedure for assessing risk and specific risk-management criteria; analysis of the document reveals that use of medically important antibiotics as feed additives for chicken, swine, and beef cattle violates the safety criteria. Regrettably, Guidance 152 fails to establish a timeline for reevaluating the existing FDA approvals of these drugs. In April 2005, five major medical and environmental groups, including The American Academy of Pediatrics and The American Public Health Association, responded by filing a formal Citizen Petition with the FDA urging the agency

to apply its own safety criteria as set forth in Guidance 152 and phase out these uses (Environmental Defense, 2005).

In addition to concern about use of medically important antibiotics as nontherapeutic feed additives, some therapeutic (disease treatment) uses of antibiotics in agriculture are also of concern. The FDA has determined that use of Baytril, a fluoroquinolone antibiotic nearly identical to Cipro used to treat outbreaks of respiratory disease in poultry, causes the development of fluoroquinolone-resistant *Campylobacter* in poultry (FDA, 2000). Fluoroquinolones are administered to entire poultry flocks via their drinking water when some birds in the flock are sick, as they are often packed into buildings that may contain tens of thousands of chickens or turkeys, a practice that creates ideal conditions for resistance to develop. *Campylobacter* can be transferred from the intestines to the meat, giblets, and liver when an infected bird is slaughtered. More than half of the raw chicken in the U.S. market has *Campylobacter* on it (CDC, 2003). Resistant bacteria may then be transmitted to humans via contaminated food and is a significant cause of the development of fluoroquinolone-resistant *Campylobacteriosis* in humans. Data from the CDC show that the prevalence of Cipro-resistant *Campylobacter* in humans increased from 13% in 1997 to 19% in 2001, whereas such resistance was negligible before Cipro-like drugs were first approved for use in poultry in 1995 (Gupta et al., 2004).

In light of this information, the FDA CVM proposed a withdrawal of approval on the use of fluoroquinolones in poultry in 2000 (FDA, 2000). Finally, in 2005, the FDA issued a final decision marking the agency's first-ever decision to restrict the use of an agricultural antibiotic because of concerns about antibiotic resistance affecting humans. Bayer, the maker of Baytril, and the only remaining producer of a fluoroquinolone for poultry, asserts that the antimicrobial is critical for poultry production, even though most top producers including Tyson and Perdue have announced that they now raise broiler chickens without its use.

Corporate response. Several U.S. businesses have voluntarily begun initiatives to combat antibiotic

overuse in agriculture. In June 2003, McDonald's adopted a policy requiring its poultry suppliers to end the use of medically important antibiotics as growth promoters; the policy also establishes a purchase preference for pork and beef suppliers that reduce overall antibiotic use (McDonald's Corporation, 2003). In November 2003, Bon Appetit (a major food-service company) adopted a similar but further-reaching policy that bars use of medically important antibiotics in poultry for any nontherapeutic purpose (Bon Appetit, 2003); as with the McDonald's policy, Bon Appetit also created a purchase preference for suppliers of other meats that reduce antibiotic use. In addition to these actions by large-volume meat purchasers, growing numbers of farmers are producing meat and poultry products without nontherapeutic antibiotics. The online Eat Well Guide provides searchable listings of more than 5,000 farms and stores carrying such products (www.eatwellguide.com).

HEALTH PROFESSION ACTION

The American Medical Association, American Public Health Association, American Academy of Pediatrics, and Health Care Without Harm are among the more than 380 organizations that have endorsed the Preservation of Antibiotics for Medical Treatment Act of 2005. The ANA along with more than 20 of its State Constituent Member Associations, the Academy of Medical-Surgical Nurses, American Academy of Ambulatory Care Nursing, American Association of Critical Care Nurses, American Holistic Nurses Association, American Society of Plastic Surgical Nurses, National Association of Pediatric Nurse Practitioners, National Association of School Nurses, National Gerontological Nursing Association, and the Oncology Nursing Society are among the professional nursing organizations who have also endorsed the federal legislation.

Keep Antibiotics Working (KAW): The Campaign to End Antibiotics Overuse, is a coalition of health and other advocacy groups made up of more than 9 million members dedicated to eliminating the inappropriate use of antibiotics in food animals. KAW has been a leader in providing resources, working with politicians, and assisting businesses to establish sound purchasing policies.

In 2004, Health Care Without Harm also began working with hospitals to adopt food purchasing preference policies for meat suppliers that reduce antibiotic use. Kaiser Permanente, the nation's largest HMO encompassing 30 medical facilities and 431 medical offices, has also established a preferable purchasing policy for meat and dairy from animals who were not routinely administered "subtherapeutic" antibiotics (Garske, 2005).

In June 2004, the ANA House of Delegates (HOD) voted overwhelmingly to pass a resolution that urges Congress, meat producers, and bulk purchasers of meat to promptly phase out the nontherapeutic use of medically important antibiotics and to ban the use of fluoroquinolones in poultry. This resolution also calls for the education of nurses about the potential risks from using medically important antibiotics as nontherapeutic feed additives. At such a critical time when antibiotic-resistant bacteria and infectious diseases are on the rise, it is important that all nurses work to raise awareness of this threat to public health and encourage others to take action (see Appendix). As patient advocates and health professionals, it is critical that nurses work to maintain the efficacy of antibiotics, which are one of the few public health tools that protect us from the deadly epidemics of the past.

APPENDIX

What can nurses do?

1. Work with state nurses associations to educate fellow nurses, other health professionals, policy makers, and the public about the risks from using medically important antibiotics as nontherapeutic feed additives and from using fluoroquinolones in poultry.
2. Call on your Congress members to support the Preservation of Antibiotics for Medical Treatment Act of 2005. To contact senators, call 202-224-3121 for the Senate switchboard or access <http://www.senate.gov>. To contact representatives, call 202-225-3121 for the House switchboard or access <http://www.house.gov/>.
3. Contact Health Care Without Harm at <http://www.noharm.org/food/issue> about establishing a preferable purchasing policy in your workplace.
4. If you have had personal experience in attempting to treat foodborne resistant illnesses, tell your story at <http://www.keepantibioticsworking.com/new/experience.cfm>.

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