

Antibiotics Overuse in Animal Agriculture: A Call to Action for Health Care Providers

Recently, the World Health Organization called antimicrobial resistance “an increasingly serious threat to global public health that requires action across all government sectors and society.”¹

Of all antibiotics sold in the United States, approximately 80% are sold for use in animal agriculture; about 70% of these are “medically important” (i.e., from classes important to human medicine).² Antibiotics are administered to animals in feed to marginally improve growth rates and to prevent infections, a practice projected to increase dramatically worldwide over the next 15 years.³ There is growing evidence that antibiotic resistance in humans is promoted by the widespread use of nontherapeutic antibiotics in animals. Resistant bacteria are transmitted to humans through direct contact with animals, by exposure to animal manure, through consumption of undercooked meat, and through contact with uncooked meat or surfaces meat has touched.⁴

The practice of medicine and the state of public health would be catastrophically affected if antibiotics were not generally effective in treating bacterial illnesses. Physicians and health care institutions are regularly cautioned to avoid unnecessary or incomplete treatment in an effort to stem potential antibiotic resistance, and antibiotic prescriptions are increasingly scrutinized as part of antimicrobial stewardship programs. However, the inappropriate overuse of antibiotics in animals also should be addressed as another important source of antibiotic resistance. To the degree

that antibiotic overuse in food animals exacerbates problems with resistance, this overuse is a factor contributing to the increased costs to treat antibiotic-resistant infections in humans. According to the Infectious Diseases Society of America, longer, more expensive hospital stays for treating antibiotic resistance cost the US health care sector an estimated \$21 to \$34 billion and eight million additional hospital days annually.

LEGISLATION AND REGULATIONS

Many countries have already restricted antibiotic use in animal agriculture. In 2006, the European Union banned the use of antimicrobial growth promoters in animal food and water. Denmark, the world’s largest exporter of pork, has further restricted use of antibiotics for growth promotion and for the routine prevention of diseases caused by overcrowded and unsanitary feedlot conditions. Researchers documented a subsequent decrease in antibiotic resistance in Danish livestock and retail meat, and within the general Danish population. For example, after Denmark banned avoparcin, an antibiotic similar to vancomycin that was only used in food animal production, levels of vancomycin-resistant enterococci found in Danish livestock and humans dropped within two years. Moreover, there have been no adverse effects on Danish pork production levels because of restrictions on antibiotic use.⁵

In the United States, progress in restricting antibiotic use in livestock has been slow at the

federal level. The Preservation of Antibiotics for Medical Treatment Act (PAMTA), a bill that would phase out the use in animal feed of eight classes of medically important antibiotics—aminoglycosides, cephalosporins, lincosamides, macrolides, penicillins, streptogramins, sulfonamides, and tetracyclines—has routinely stalled in Congress. The US Food and Drug Administration has finally issued guidance documents for industry to follow in volunteering to no longer sell their antibiotic products for “growth promotion” (effective December 2016). However, the routine use of identical or nearly identical antibiotic feed additives in the same dose range to prevent disease will still be permitted.

In 2014, in response to recommendations from the President’s Council of Advisors on Science and Technology (PCAST), the White House released the National Strategy to Combat Antibiotic-Resistant Bacteria. Although it acknowledges the antibiotic resistance crisis, the Strategy fails to set national targets to reduce antibiotic use in animal agriculture and does not mandate the collection of antibiotic usage data. It also defers to the voluntary guidelines set by the Food and Drug Administration that allow routine use of antibiotics for disease prevention.

Because the actions of federal legislators and regulators remain insufficient, it is time for the health care sector to expand its stewardship over these life-saving drugs beyond clinical practice.

HOSPITAL FOOD PROCUREMENT: AN AVENUE FOR ACTION

Individuals and institutions can discourage the use of nontherapeutic antibiotics in animal agriculture by only purchasing meats from animals raised without the use of nontherapeutic antibiotics. Now is the time for health care providers to leverage our substantial professional and economic clout. We should encourage, persuade, and even pressure our health care institutions to phase out the purchase of meat from animals raised with nontherapeutic antibiotics.

The primary arguments against implementing such actions relate to (1) the availability of meat from animals not subject to routine, nontherapeutic antibiotics, and (2) potential cost increases. However, if individuals and institutions favor meats raised without antibiotics, the supply and availability of these meats will grow to meet the demand, and cost differences will narrow over time. In 1998 the National Research Council estimated that eliminating nontherapeutic use of antibiotics in the United States would cost less than \$10 per person annually (in 2015 dollars).⁶ Costs can also be kept down by reducing the amount of meat served, which will have added health and environmental benefits.⁷

BUILDING ON PAST ACHIEVEMENTS

Health care providers and institutions have previously taken the lead in areas such as exposure to secondhand smoke and the risks of nuclear weapons, where the health of individuals and the general population has been at risk. These actions are easily

justified because health care providers have an ethical imperative to promote health and prevent illness in both individuals and the population. This ethical imperative should now guide health care providers to push for restrictions by health care institutions on the purchase of meat raised with nontherapeutic antibiotics. This action will stimulate similar action by other individuals, institutions, and government agencies.

THE UNIVERSITY OF CALIFORNIA, SAN FRANCISCO

The University of California, San Francisco (UCSF) has taken a leadership role in the movement toward limiting the use of meat raised with excessive antibiotic use. In 2013, UCSF's Academic Senate passed a resolution calling for a phase-out of the purchase of meat raised with nontherapeutic antibiotics. Responding to this resolution, the hospital's Food and Nutrition Services convinced a major food distributor to carry new sustainably raised meat products, and is currently purchasing chicken breasts, eggs, and ground beef that have been raised without the routine use of antibiotics. In addition, the Academic Senate resolution generated media attention and highlighted within and outside the university the issues related to nontherapeutic uses of antibiotics in animal agriculture. Other institutions, including the University of California, Los Angeles, are following suit.

The above actions taken by UCSF have not drawn attention or emphasis away from the ongoing efforts to control antibiotic use in clinical settings at UCSF. In fact, at UCSF and around the country some of the strongest proponents

of similar policies have been leaders of antimicrobial stewardship programs.

A CALL TO ACTION

The current indiscriminate use of antibiotics for animal agriculture is irresponsible and misguided. In order to prevent adverse consequences to public health, health care providers and health care institutions can and should logically, ethically, and culturally take responsibility to reduce nontherapeutic use of antibiotics in animal agriculture. Health care providers and health care institutions can start this process by refusing to buy meat raised with nontherapeutic antibiotic use. Health care providers can also encourage their individual patients to purchase meat that is sustainably raised without the overuse of antibiotics. ■

*Michael J. Martin, MD, MPH, MBA
Sapna E Thottathil, PhD
Thomas B. Newman, MD, MPH*

About the Authors

Michael J. Martin is with the Department of Epidemiology and Biostatistics, University of California, San Francisco. Sapna E Thottathil is with Supply Chain Programming, School Food FOCUS, a program of the Tides Center, San Francisco. Thomas B. Newman is with the Department of Epidemiology and Biostatistics and the Department of Pediatrics, University of California, San Francisco.

Correspondence should be sent to Michael J. Martin, Assistant Clinical Professor, Department of Epidemiology & Biostatistics, Mission Hall: Global Health & Clinical Sciences Building, 550 16th Street, 2nd floor, San Francisco, CA 94158-2549 (e-mail: MichaelMartin@cal.berkeley.edu). Reprints can be ordered at <http://www.ajph.org> by clicking the "Reprints" link.

This editorial was accepted August 12, 2015.

doi:10.2105/AJPH.2015.302870

Contributors

All of the authors contributed substantially and significantly to this editorial.

M. J. Martin wrote most of the article and coordinated with the other authors to incorporate their contributions. S. E. Thottathil wrote portions of the article and provided editorial comments and input throughout the writing process. She also was helpful in gathering some of the key references. T. B. Newman wrote portions of the article and provided editorial comments and input throughout the writing process.

Acknowledgments

We thank Amy J. Markowitz, JD, for her editorial support. We also thank David Wallinga, MD, MPH, senior health officer at the Natural Resources Defense Council, Health Program for his input to the article.

References

1. Antimicrobial resistance. April 2015. Available at: <http://www.who.int/mediacentre/factsheets/fs194/en>. Accessed September 14, 2015.
2. Summary Report On Antimicrobials Sold or Distributed for Use in Food-Producing Animals. 2014. Available at: <http://www.fda.gov/downloads/ForIndustry/UserFees/AnimalDrugUserFeeActADUFA/UCM338170.pdf>. Accessed June 15, 2015.
3. Van Boeckel TP, Brower C, Gilbert M, et al. Global trends in antimicrobial use in food animals. *Proc Natl Acad Sci U S A*. 2015;112:5649–5654.
4. Antibiotic Resistance from the Farm to the Table. September 11, 2014. Available at: <http://www.cdc.gov/foodsafety/from-farm-to-table.html>. Accessed September 14, 2015.
5. Levy S. Reduced antibiotic use in livestock: how Denmark tackled resistance. *Environ Health Perspect*. 2014;122:A160–A165.
6. The Use of Drugs in Food Animals. Benefits and Risks 1998. Available at: http://www.nap.edu/openbook.php?record_id=5137&page=184. Accessed March 13, 2015.
7. Scientific Report of the 2015 Dietary Guidelines Advisory Committee. Office of Disease Prevention and Health Promotion, 2015. Available at: <http://www.health.gov/dietaryguidelines/2015-scientific-report>. Accessed June 15, 2015.