



Center for a Livable Future Congressional Briefing
Antibiotic Resistance: A Multi-Billion Dollar Health Care Crisis

December 2, 2009





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The Johns Hopkins Center for a Livable Future (CLF) is pleased to share with you highlights and additional information from our December 2009 Congressional Briefing addressing the economic and public health effects of non-therapeutic antibiotics in food animal production.

Our distinguished panel featured leading government officials, policy experts and researchers:

The Honorable Louise Slaughter (D-NY)

U.S. House of Representatives

Michael Blackwell, DVM, MPH

Former Vice Chair, Pew Commission on Industrial Farm Animal Production

Assistant Surgeon General, USPHS (ret.)

Former Dean, College of Veterinary Medicine, University of Tennessee, Knoxville, TN

Robert Lawrence, MD

Director, the Johns Hopkins Center for a Livable Future

Johns Hopkins Bloomberg School of Public Health, Baltimore, MD

Ramanan Laxminarayan, PhD, MPH

Senior Fellow, Center for Disease Dynamics, Economics, and Policy

Resources for the Future, Washington, DC

Robert Martin

Senior Officer, Pew Environmental Group

Former Executive Director, Pew Commission on Industrial Farm Animal Production, Washington, DC

Lance Price, PhD

Director, Center for Metagenomics and Human Health

Translational Genomics Research Institute, Flagstaff, AZ

For more information on the issue of antibiotic resistance or to speak with one of our expert panelists, please contact Chris Stevens at dcstevens@jhsph.edu.



Antibiotic Resistance: An Overview

The use of antibiotics for growth promotion began in the 1940's when the poultry industry discovered that the [use of tetracycline fermentation byproducts resulted in improved growth](#). Though the mechanism of this action was never fully understood, the practice of adding low levels of antibiotics to animal feed to speed growth has expanded and persisted over the ensuing half-century. Although the current level of antibiotic use in livestock is uncertain due to a lack of industry reporting, as of 2001, a staggering 70% of all antimicrobial use in the U.S. was for agricultural purposes, according to a [recent estimate by The Union of Concerned Scientists](#). These uses include widespread application in the production of cattle, poultry and swine, as well as uses in aquatic animal feed.

In the 1990s, the public became aware of the threat of antimicrobial resistance. While antimicrobial resistance has been observed almost since the discovery of penicillin, a recent rise in the number of drug-resistant infections in humans points to a growing public health crisis. A decade later, the [World Health Organization expressed alarm at the spread of multidrug-resistant infectious disease agents](#) and noted that a major source of antimicrobial-resistant bacteria was livestock production.

Antibiotics in livestock feed are not administered at sufficient doses to eliminate disease. Rather, the continual "non-therapeutic" low-doses are only capable of eliminating the more susceptible bacteria; in a contest of "survival of the fittest," this inadvertently promotes the reproduction of antibiotic-resistant strains. These strains can reach humans through food borne exposures, and through contact with air, water or soil in the environment. Once a resistant infection occurs, treatment becomes more costly, if not impossible.

Numerous classes of antibiotics that are used to treat life-threatening infections in humans, such as penicillins and tetracyclines, are allowed in animal feeds to promote animal growth. Livestock producers have virtually unrestricted access to these pharmaceuticals without a prescription or veterinarian oversight. By promoting the reproduction of antibiotic-resistant bacteria, these practices erode the effectiveness of longstanding medical treatments, contributing to a growing public health and economic crisis that weighs heavily upon our nation.



A Growing Epidemic

The health impacts of antibiotic resistance are staggering. The CDC estimates that [2 million people in the U.S. contract resistant infections annually and of those, 90,000 die](#). Annual [U.S. deaths from drug-resistant *Staphylococcus aureus*](#), a painful and often disfiguring skin infection, outnumber those from AIDS. The Infectious Disease Society of America (ISDA) has appropriately [declared antibiotic-resistant infections to be an epidemic in the United States](#). Globally, [antimicrobial-resistant bacterial infections now account for much of the problem of emerging infectious disease](#).

The economic burden of antibiotic resistance is borne on the shoulders of the American people. The cost of treating a resistant infection [has been estimated at \\$6,000 to \\$10,000 more](#), per hospital visit, than treating a non-resistant infection. A decade ago, the Institute of Medicine estimated that antimicrobial resistance [costs the United States between \\$4 and \\$5 billion annually](#), and these costs are certainly higher now as the problem of resistance has grown and intensified worldwide.

Studies have identified how use of low-level antibiotics in food animal production can lead to human exposures through the diet and the environment, to antibiotic-resistant bacteria. [Antimicrobial-resistant bacteria have been found in high concentrations](#) both inside and downwind of industrial food animal production (IFAP) facilities, but not upwind. There is strong [evidence linking antimicrobial-resistant bacteria in groundwater and private drinking wells](#) to upstream livestock feeding facilities. An estimated [75% of antimicrobials are excreted in animal wastes, much of which is spread over crop fields](#). Methods of stockpiling poultry litter have been [demonstrably ineffective in eliminating resistant bacteria](#) before land application. These findings illustrate the environmental progression and critical health risks facing the communities, particularly those around large-scale industrial farms sites. Furthermore, [antibiotic-resistant bacteria have been detected in retail meat products](#), potentially serving as a source of exposure to the general public.

Opportunity amidst Crisis: Achieving a Win-Win

Supporters of the use of antibiotics as growth promoters maintain that their use results in more affordable meat products for consumers, decreased production costs, and less impact on the environment, as fewer animals are required to produce a unit of meat product. However, it has been demonstrated that the [use of antimicrobials in food animal production is cost-ineffective](#) for the animal production industry. Several large-scale studies conducted in poultry and swine operations have demonstrated that the cost of antimicrobials as feed additives outweigh any marginal increase in profits, and that [improvements in growth and disease prevention can be accomplished by increasing the hygienic conditions in which animals are held](#).



Denmark 's livestock industry, a model example, has [demonstrated a safe and profitable transition](#) after a ban on non-therapeutic antibiotics was instituted. Following the ban, researchers observed major reductions in antibiotic-resistance among bacteria, fewer animal deaths and continued gains in productivity.

These examples illustrate the potential for a win-win scenario: The livestock industry has an opportunity to work alongside government agencies and NGOs to achieve a highly cost-effective means of reducing the public health risks of industrial farm animal production.



Taking Action to Address the Crisis

In 2008, the [Pew Commission on Industrial Food Animal Production](#) produced a series of policy recommendations in the report “Putting Meat on the Table: Industrial Farm Animal Production in America.” The report examines the public health and environmental effects of large-scale industrial farms sometimes referred to as confined animal feeding operations (CAFOs) or industrial food animal production (IFAP) facilities, finding that the level of antibiotics used as growth promoters in the U.S. food supply represents a major risk to human health and that this practice is not sustainable.

Among other recommendations, the Commission’s experts advised phasing out the use of antimicrobials added to feed in food animal production in order to preserve antibiotics for treatment of infectious diseases in people.

To address the issue of antibiotics resistance, the Commission called for policy action to:

1. Eliminate the non-therapeutic use of antimicrobials in food animal production to reduce the risk of antimicrobial resistance to medically important antibiotics;
2. Clarify antimicrobial definitions to provide clear estimates of use and facilitate clear policies on antimicrobial use;
3. Improve monitoring and reporting of antimicrobial use in food animal production in order to accurately assess the quantity and methods of antimicrobial use in animal agriculture;
4. Improve monitoring and surveillance of antimicrobial resistance in the food supply, the environment, and animal and human populations in order to refine knowledge of antimicrobial resistance and its impacts on human health; and
5. Increase veterinary oversight of all antimicrobial use in food animal production to prevent overuse and misuse of antimicrobials.

CLF researchers have joined with other leading experts to raise awareness about the major threat the antibiotic-resistant bacteria poses to the health of the public and to encourage policymakers to move quickly to phase out and ban the use of antimicrobials for non-therapeutic use in food animal production. The *Preservation of Antibiotics for Medical Treatment Act* (H.R. 1549/S. 619) is an important step in this direction. Introduced by Congresswoman Louise Slaughter and the late Senator Edward Kennedy, this legislation would curtail such non-therapeutic use and instead save antibiotics for therapeutic purposes only.

CLF looks forward to continuing this important discussion with all stakeholders involved on the health and safety of the nation’s food system and the role of antibiotics in our food supply.

Biographies of Briefing Panelists

Congresswoman Louise Slaughter (D-NY)

One of the most powerful women in the U.S. House of Representatives, Congresswoman Louise McIntosh Slaughter has achieved a significant level of leadership as the Chairwoman of the influential House Committee on Rules, making her the first woman in history to hold this position. A member of the House Democratic Leadership, she serves on the prestigious Democratic Steering & Policy Committee. She is the Democratic Chair of two very prominent congressional caucuses: the Congressional Arts Caucus and the Bipartisan Congressional Pro-Choice Caucus.



In November 2008, Rep. Slaughter was elected to her twelfth term in Congress as U.S. Representative for the 28th Congressional District of New York State. Her diverse district includes the cities of Rochester, Buffalo and Niagara Falls. Her constituents know her to be a strong proponent of progressive causes and a fighter for the employment concerns and the economic development of Western New York. She has earned a reputation for her dedication to constituent service.

A microbiologist with a master's degree in public health, Rep. Slaughter is intensely involved in health issues. She is the leading expert in Congress on genetics issues and her cutting-edge legislation to protect Americans from discrimination by health insurance providers and employers based on genetic makeup is now law. Rep. Slaughter's Genetic Information Nondiscrimination Act (GINA) passed the House and the Senate and was signed into law by President Bush in May 2008. The bill has been called "the first civil rights legislation for the 21st century." In 1997, Rep. Slaughter was awarded the American Public Health Association Distinguished Public Health Legislator Award for her work on health and genetics issues.

During her tenure in Congress, Rep. Slaughter has won numerous awards for her leadership and dedication to public service. She was the first Member of Congress to receive the Sidney R. Yates National Arts Advocacy Award, presented by the National Assembly of State Arts Agencies. In 2003 she was awarded the Humane Legislator of the Year by the American Humane Association. In January 1999, she was named "Lay Educator of the Year" by the Rochester Chapter of Phi Delta Kappa International, the professional fraternity for men and women in education. In 2004, Women in Film and Vision honored her with its Woman of Vision award for her work on women's and arts issues.

Elected in 1986, Rep. Slaughter holds a Bachelor of Science degree (1951) in Microbiology and a Master of Science degree (1953) in Public Health from the University of Kentucky. Prior to entering Congress, she served in the New York State Assembly (1982-86) and the Monroe County (N.Y.) Legislature (1976-79); and as regional coordinator to then-Secretary of State Mario Cuomo (1976-78) and to then-Lt. Gov. Mario Cuomo (1979-82).

A native of Harlan County, Kentucky, Congresswoman Slaughter has lived most of her life in Rochester's suburb of Fairport. She is married to Robert Slaughter and has three daughters and seven grandchildren.

Michael Blackwell, DVM, MPH—former Vice Chair, Pew Commission on Industrial Farm Animal Production; Assistant Surgeon General, USPHS (ret.); Former Dean, College of Veterinary Medicine, University of Tennessee, Knoxville, TN.



Dr. Michael J. Blackwell, President and CEO of Blackwell Consulting, LLC, has enjoyed a productive and successful career, serving in diverse positions. Dr. Blackwell earned a doctor of veterinary medicine degree in 1975 from Tuskegee University. In 1981, Dr. Blackwell earned a master of public health degree from Loma Linda University. Over his career, he has held a number of supervisory, management and administrator positions. His duties in these assignments included the management of technical and professional personnel, complex budgets and programs, and special projects. Additionally, he has served on a national Pew Charitable Trusts Commission, the national American Veterinary Medical Association One-Health Initiative Taskforce, as well as Boards and Committees, providing him with a wealth of experience, and a multitude of contacts. He earned the rank of Assistant Surgeon General (Rear Admiral) of the U.S. Public Health Service Commissioned Corps after only 20 years on active duty.

From 2000 to 2008 Dr. Blackwell served as dean of the College of Veterinary Medicine, University of Tennessee. As chief executive officer of the college, he managed an annual operating budget of more than \$35 million and over 350 personnel and 300 students.

From 1999 to 2000, Dr. Blackwell served as the Chief of Staff, Office of the Surgeon General. Prior to this he served for 20 years as an official of the Food and Drug Administration (FDA). His career with the FDA covered major mission areas, in both human and veterinary medicine. While with the FDA Center for Devices and Radiological Health, Dr. Blackwell served as Chief of the Restorative Devices Branch, and later as Chief of the Investigational Device Exemptions Staff. In this latter role, he served as gatekeeper for significant outgoing FDA correspondences regarding human clinical trials involving medical devices. In his last five years with FDA, Dr. Blackwell served as Deputy Director of the Center for Veterinary Medicine. In this role, he provided oversight of the day-to-day operations of the approval and compliance processes. Dr. Blackwell also has had more than 15 years of experience as a private veterinary practitioner. This diverse background has prepared Dr. Blackwell to assist with providing solutions to many of today's public health challenges.

From 1994 to 1998, Dr. Blackwell served as the Chief Veterinarian of the United States Public Health Service (USPHS). In this role he was the chief advisor to the Surgeon General of the United States. Dr. Blackwell had an advisory role with all Surgeons General from C. Everett Koop to David Satcher (1987-2000).

Dr. Blackwell has received numerous awards. Most notable are the Distinguished Service Medal, the highest personal honor award of the USPHS, and the Meritorious Service Medal, the second highest personal honor award. In addition, Dr. Blackwell twice received the Surgeon General's Exemplary Service Medal. In 2007, Dr. Blackwell was awarded the FDA's Distinguished Alumni Award.

Robert Lawrence, MD—Director, The Johns Hopkins Center for a Livable Future, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD. Robert is Professor of Health Policy and Management, and Professor of Environmental Health Sciences at the Johns Hopkins Bloomberg School of Public Health. In 1996 he became the founding director of Johns Hopkins Center for a Livable Future (CLF).

Robert is a graduate of Harvard College and Harvard Medical School, and trained in internal medicine at the Massachusetts General Hospital in Boston, Massachusetts. He served for three years as an epidemic intelligence service officer at the Centers for Disease Control, U.S. Public Health Service.



He is a Master of the American College of Physicians and a Fellow of the American College of Preventive Medicine, a member of the Institute of Medicine of the National Academy of Sciences, the Association of Teachers of Preventive Medicine, the American Public Health Association, and Physicians for Human Rights. From 1970 to 1974, he was a member of the faculty of medicine at the University of North Carolina at Chapel Hill where he helped develop a primary health care system funded by the Office of Economic Opportunity. In 1974, he was appointed as the first director of the Division of Primary Care at Harvard Medical School where he subsequently served as the Charles S. Davidson Associate Professor of Medicine and Chief of Medicine at the Cambridge Hospital until 1991. From 1991 to 1995, he was the director of health sciences at the Rockefeller Foundation.



Ramanan Laxminarayan, PhD, MPH— Ramanan Laxminarayan is a senior fellow at Resources for the Future, where he directs the Center for Disease Dynamics, Economics, and Policy, and a visiting scholar and lecturer at Princeton University. His research deals with the integration of epidemiological models of infectious diseases and drug resistance into the economic analysis of public health problems. He has worked to improve understanding drug resistance as a problem of managing a shared global resource.

Laxminarayan has worked with the World Health Organization (WHO) and the World Bank on evaluating malaria treatment policy, vaccination strategies, the economic burden of tuberculosis, and control of non-communicable diseases. He has served on a number of advisory committees at WHO, Centers for Disease Control and Prevention, and the Institute of Medicine. In 2003-04, he served on the National Academy of Science/Institute of Medicine Committee on the Economics of Antimalarial Drugs and subsequently helped create the Affordable Medicines Facility for malaria, a novel financing mechanism for antimalarials. His work has been covered in major media outlets including Associated Press, BBC, CNN, the Economist, LA Times, NBC, NPR, Reuters, Science, Wall Street Journal, and National Journal.

Laxminarayan received his undergraduate degree in engineering from the Birla Institute of Technology and Science in Pilani, India, and his master's degree in public health (Epidemiology) and doctorate in economics from the University of Washington in Seattle.

Robert Martin – Senior officer, Pew Environmental Group. Bob Martin previously was the Executive Director of the Pew Commission on Industrial Farm Animal Production, a two year study funded by The Pew Charitable Trusts by a grant to Johns Hopkins Bloomberg School of Public Health. The charge to the Commission was to recommend solutions to the problems caused by concentrated animal feeding operations in the areas of public health, the environment, rural communities, and animal welfare. The Commission’s final report, *Putting Meat on the Table: Industrial Farm Animal Production in America*, was release on April 28, 2008.



Martin, a native of Kansas, grew up in South Dakota and is a Phi Beta Kappa graduate of the University of South Dakota. After graduation, he worked as a general assignment newspaper report in Pennsylvania and then for the Kansas Farmers Union. He has more than 30 years experience in public policy and politics at both the federal and state levels. Previously, he worked for former South Dakota Senators George McGovern, Jim Abourezk, Tom Daschle, and current Senator Tim Johnson. In addition, he worked for then Kansas Congressman Dan Glickman, as well as for members of the Kansas Senate Democratic Caucus.



Lance Price, PhD– *Director, Center for Metagenomics and Human Health, Translational Genomics Research Institute, Flagstaff, AZ.* Dr. Price received his BS in Microbiology and MS in Biology from Northern Arizona University, then led the bacterial genetics research group in Dr. Paul Keim’s molecular genetics laboratory. In 2000, Dr. Price moved to Baltimore and worked as a research scientist for Intralytix, Inc. before matriculating to the Johns Hopkins Bloomberg School of Public Health. In 2003, Dr. Price became a Center for a Livable Future Pre-doctoral Fellow characterizing public health risks associated with industrial food-animal production. In 2007, Dr. Price completed his PhD in Environmental Health Science and joined the research faculty at the Johns Hopkins School of Medicine. As the Director of Pathogenesis

and Molecular Diagnosis of Infectious Diseases, Dr. Price worked with his colleagues at Johns Hopkins to characterize the complex bacterial communities that colonize chronic wounds and burns. Today, Dr. Price is the director of Center for Metagenomics and Human Health at the Translational Genomics Research Institute (TGen; a non-profit biomedical research institute in Arizona). At TGen, Dr. Price is using novel molecular tools to characterize the complex microbial communities that form the human microbiome as well as continuing his work to characterize the human health risks associated with antibiotic use in food animal production. In addition to his position at TGen, Dr. Price serves as a Scientific Advisor to the Johns Hopkins Center for a Livable Future and as a Senior Scientist for the Interdisciplinary Health Policy Institute at Northern Arizona University.



Join the Conversation with CLF

CLF welcomes your comments, questions and requests to share our expertise.

Contact us through one of channels below:

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