



# FOOD SAFETY AND COMMUNITY HEALTH

Changes in food animal production have resulted in the proliferation of industrial scale, and densely populated animal production operations. In fact, much of the world's animal protein comes from such operations. While these operations may increase the outputs of animal protein as compared to other production methods, producing animals under such conditions has been shown to be responsible for numerous public health concerns for consumers of animal products

and for people living in rural communities where animals are produced.

Among the many public health concerns related to high density livestock production, the generation and transmission of harmful pathogens from animal production sites is an important public health problem. In addition, people who live near animal production sites may face an array of exposures to hazardous pollutants.

## Background

---

When industrial food animal production methods are used, large numbers of animals are raised in close proximity under unhygienic conditions, a situation that has been well-documented to be an ideal breeding ground for bacterial and viral pathogens. To make matters worse, it is common for these operations to rely upon the regular use of antibiotics (and other

antimicrobials), in part to compensate for unhygienic production methods. When these drugs are used, bacteria present in animals and in the production environment may become antibiotic-resistant, which means that infections caused by these bacteria will become difficult or impossible to treat with antibiotics.

## Transport of antibiotic-resistant bacteria

---

Scientific research has demonstrated that bacteria from animal production sites leave through a variety of channels and can come into contact with people and cause infections. The most common means by which people come into contact with these bacteria is

through contact with contaminated meat. Less commonly considered, however, are occupational, fence-line and community exposures to resistant bacteria from animal production sites.

## WHY GO GLOBAL?

Reducing our intake of animal products across the world can have positive global impacts: improved health, more stable ecosystems and climate, and safer food. The simple, easy-to-execute message of Meatless Mondays can foster collaboration—and create change—among diverse groups, ranging from nonprofit organizations, local institutions, and influential figures such as chefs, celebrities, and politicians. Even a small change—like cutting meat from your diet once a week—can make a difference!

## WHAT IS MEATLESS MONDAY?

The goal of the Meatless Monday Campaign is to encourage people to refrain from eating meat one day a week. Meatless Monday seeks to reduce the prevalence of preventable illnesses and the environmental impacts associated with meat production and excessive meat consumption. Meatless Monday was originally promoted by the U.S. government during both World Wars by urging families to reduce consumption of key staples. It was reintroduced as a public health awareness campaign in 2003 by former ad man turned health advocate Sid Lerner, in association with the Johns Hopkins Bloomberg School and the Center for a Livable Future. Since 2003, Meatless Monday has grown into a global movement powered by a network of participating individuals, schools, hospitals, worksites and restaurants around the world.

## Resistant bacteria on animal products

In the U.S., meat from the grocery store has been shown through university research and government surveillance programs to carry antibiotic-resistant bacteria. When animal products carry resistant bacteria, people can be exposed when they mishandle or undercook meats or when they do not properly sanitize food preparation surfaces used for prepara-

tion of raw animal products. According to the United States Centers for Disease Control and Prevention (CDC), one-third of the twelve resistant pathogens categorized as a “serious” threat to public health are found in food, and 22 percent of the antibiotic-resistant infections in the U.S. every year are linked to foodborne pathogens.<sup>i</sup>

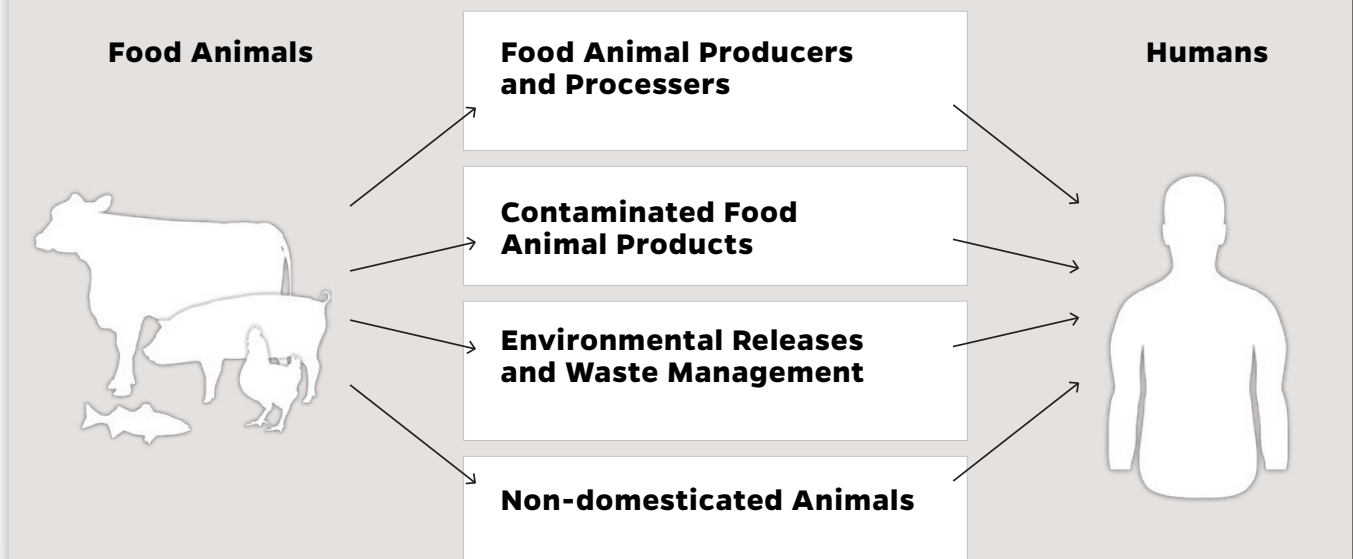
## Transmission of pathogens into surrounding communities

Research has shown that antibiotic-resistant bacteria and other harmful pollution can be spread from animal production sites, affecting workers, fence-line neighbors, and residents of rural communities that are home to industrial food animal production. Industrial food animal production provides the ideal conditions for animal-to-human spread of an array of pathogens, including influenza, Q-fever, methicillin-resistant *Staphylococcus aureus* (MRSA), and *E.coli*, all of which have important consequences for public health. At greatest risk for exposure are animal production site workers, their families and those living close by who may come into contact with contaminat-

ed animals, soil, water and manure and other animal waste products.<sup>ii,iii,iv</sup>

Beyond infectious disease concerns, these operations have been shown to elicit health concerns related to respiratory illnesses, stress and other sicknesses among nearby residents of industrial food animal production operations. There is also evidence of reports of poorer quality of life for those individuals.<sup>v</sup> Biological contaminants that can make people sick, such as endotoxins and cow allergens emitted from industrial farms have been found in outdoor and indoor dust samples of homes as far as three miles

## Pathways for Transmission of Antibiotic Resistant Bacteria from Food Animal Production to Humans



away from industrial food animal production facilities.<sup>vi</sup> Additionally, there have been health concerns with contaminated drinking water near industrial food animal production (IFAP) sites due to large amounts of manure being spread in small areas that may leach into the ground water and be transported by runoff into surface waters. Communities living near or down-

stream from IFAP operations may be exposed to a range of waterborne contaminants from the manure, including nitrates, bacterial and viral pathogens, veterinary pharmaceuticals, heavy metals, and hormones. People may be exposed from drinking contaminated ground water and from contact with contaminated surface waters.

## Health consequences and societal burden of infections with resistant bacteria

---

Antibiotic-resistant infections are more expensive and challenging to treat. They are more likely to result in longer hospital stays and increased likelihood of various illnesses and death compared to infections that are susceptible or respond to antibiotics. It is estimated that a large percent of the global use of antimicrobial drugs is in the animal sector. In the

U.S., for example, nearly 70 percent of all medically important antimicrobials sold in 2012 were for animal use.<sup>vii</sup> This may suggest that food animal antibiotic use is responsible for a significant fraction of the overall burden of drug-resistant infections, which have been predicted to reach an estimated 10 million deaths/year and a cumulative cost of \$100 trillion by 2050.<sup>viii</sup>

## References

---

- i. *Antibiotic resistance threats in the United States, 2013*. Centers for Disease Control. September 2013
- ii. Graham, J. P., Leibler, J. H., Price, L. B., Otte, J. M., Pfeiffer, D. U., Tiensin, T., & Silbergeld, E. K. (2008). *The Animal-Human Interface and Infectious Disease in Industrial Food Animal Production: Rethinking Biosecurity and Biocontainment*. *Public Health Reports*, 123(3), 282–299.
- iii. Understanding and Managing Zoonotic Risk in the New Livestock Industries; *Environ Health Perspect* 121:873–877 (2013). <http://dx.doi.org/10.1289/ehp.1206001>
- iv. Adapted from So A., Shah T., Roach S., Ling Chee Y., Nachman K.; *An Integrated Systems Approach is Needed to Ensure the Sustainability of Antibiotic Effectiveness for Both Humans and Animals*; *Journal of Law, Medicine & Ethics*; Special Issue: SYMPOSIUM: Antibiotic Resistance, Volume 43, Issue S3, pages 38–45, Summer 2015
- v. Casey JA, Kim BF, Larsen J, Price LB, Nachman KE. *Industrial Food Animal Production and Community Health*. *Curr Environ Health Rep*. 2015 Sep;2(3):259-71. doi: 10.1007/s40572-015-0061-0. Review. PMID: 26231503
- vi. Williams, D., Mc Cormack M., et al., Cow allergen (Bos d2) and endotoxin concentrations are higher in the settled dust of homes proximate to industrial-scale dairy operations, *Journal of Exposure Science and Environmental Epidemiology* (2016) 26, 42–47; doi:10.1038/jes.2014.57; published online 20 August 2014
- vii. 2012 Summary Report on Antimicrobials Sold or Distributed for Use in Food-Animal Production. Food and Drug Administration, Department of Health and Human Services, September, 2014 <http://www.fda.gov/downloads/ForIndustry/UserFees/AnimalDrugUserFeeActADUFA/UCM416983.pdf>. Accessed July 1, 2016
- viii. Review on Antimicrobial Resistance. Antimicrobial Resistance: Tackling a crisis for the health and wealth of nations. 2014; [https://amr-review.org/sites/default/files/AMR%20Review%20Paper%20-%20Tackling%20a%20crisis%20for%20the%20health%20and%20wealth%20of%20nations\\_1.pdf](https://amr-review.org/sites/default/files/AMR%20Review%20Paper%20-%20Tackling%20a%20crisis%20for%20the%20health%20and%20wealth%20of%20nations_1.pdf), Accessed June 27, 2016