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COMMENTARY May 11, 2009

# Assessing the Full Cost of CAFOs

By David Wallinga, M.D.

What do the worldwide epidemics of the new swine flu and MRSA have in common? Both are connected to swine. And for years public health leaders have been calling for changes to animal agriculture that could help prevent them.

Mexican health officials have identified a 5-year-old boy from La Gloria village in Veracruz state as the first case of this new flu. The boy's community has been protesting air and water pollution from a nearby million-pig operation run by Granjas Carroll de Mexico, a joint venture half-owned by Virginia-based Smithfield Foods, Inc. Public health authorities are investigating whether there is a link between the flu outbreak and the hog operation.



David Wallinga, M.D.

Last week, top genetic researchers and the Center for Disease Control reported that the genetic traits of the current swine flu can be traced back to a 1998 swine flu originating in North Carolina—the second largest hog-producing state and a region where Smithfield is heavily invested.<sup>1</sup>

The idea of a swine factory as the possible breeding ground for a new, deadly flu or bacterial epidemic isn't new. Three years ago, I co-authored an article, "The Potential Role of Concentrated Animal Feeding Operations in Infectious Disease Epidemics and Antibiotic Resistance," that appeared in *Environmental Health Perspectives*, a journal published by the National Institutes of Health (NIH).<sup>2</sup>

The article points out that the concentration of huge numbers of animals in factory-like conditions—the confined animal feeding operations (CAFOs) pork companies like Smithfield create in Mexico and the U.S.—can serve as a breeding ground for new, more infectious or more drug-resistant microbes. These facilities also enhance the likelihood that new superbugs will be transmitted to (and will infect) other animals or people in the surrounding communities.

The article came out of a 2005 NIH-sponsored conference at the University of Iowa that predicted that poultry and/or swine production someday likely will help create a new flu pandemic. Whether we now are at the beginning of that pandemic remains to be seen.

Proximate production of hogs and poultry occurs in parts of the U.S. (including North Carolina) and in Asia; it is unclear to what extent this occurs in Mexico, but it is a critical question for investigators, since this new flu strain has picked up DNA from birds and humans, as well as from pigs. This triple hybrid nature is what enables the flu to jump easily across species, and eventually from person to person. By concentrating huge numbers of animals, factory-scale animal production can speed up the mixing of viruses of swine, poultry and human origin, and the possible transmission of whatever new viruses emerge from the mix.

Where does MRSA factor in? Mega farm animal factories routinely use antibiotics in the animals' feed, both to make them grow faster but also to offset the greater risk of disease that comes from concentrating animals at high density. We now know this completely unnecessary practice has spurred more "community-acquired" bacterial infections that are resistant to multiple antibiotics, as is MRSA.

Resistance gets transmitted from animals directly to farmers or veterinarians, for example, as well as from people eating meat contaminated with drug-resistant bacteria. In the U.S., the possibility of MRSA originating from hog farms has been barely investigated. But a University of Iowa study published three months ago detected a farm-related strain of MRSA in 49 percent of swine and 45 percent of swine workers on large hog confinement operations in Illinois and Iowa, the latter being the largest hog-producing state in the United States.<sup>3</sup>

Rising problems with MRSA and other bacteria resistant to multiple drugs underscore the need to better protect our current arsenal of antibiotics in medicine. We know any overuse of antibiotics, whether in hospitals or hog farms, undercuts the effectiveness of antibiotics for treating infections in sick animals or people. Our 2006 article therefore recommended that the practice of feeding routine, non-therapeutic antibiotics to pigs and other food animals be phased out in the United States, as it has been in the European Union. Legislation—the Preservation of Antibiotics for Medical Treatment Act—has been introduced in Congress to do exactly that.<sup>4</sup>

Effective antibiotics also are needed to address today's flu crisis. Flu is caused by a virus, which doesn't respond to antibiotics. As in Mexico, however, flu victims who die often do so because pneumonia or other bacterial infection took advantage of their depressed immune system. That's how otherwise healthy young adults can die in flu epidemics.

As the human population increases, the risks grow that infectious diseases will evolve, emerge or spread readily among a concentrated populace. At the same time, the number of large-scale industrial meat and poultry operations has grown dramatically in the U.S. and around the world.

This concentration of animals may augment the risk of zoonoses—diseases transmissible from animals to humans—and undercut the effectiveness of antibiotics to treat these infections. We can no longer afford to view industrial animal operations strictly in economic terms. Instead, we need to incorporate the infectious disease risks to animals and humans alike.

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## Notes

<sup>1</sup>Trifonov V, Khiabani H, Greenbaum B, Rabadan R. The origin of the recent swine influenza A(H1N1) virus infecting humans. *Euro Surveill.* 2009;14(17):pii=19193. Available at: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19193>. Accessed on May 11, 2009.

<sup>2</sup>Gilchrist M, Greko C, Wallinga D, Beran G, Riley D, Thorne P. The potential role of concentrated animal feeding operations in infectious disease epidemics and antibiotic resistance. *Environ Health Perspect.* 2007;115(2). Available at: <http://www.ehponline.org/members/2006/8837/8837.html>. Accessed on May 11, 2009.

<sup>3</sup>Smith TC, et al. Methicillin-resistant staphylococcus aureus (MRSA) strain ST398 is present in midwestern U.S. swine and swine workers. *PLoS ONE* 2009; 4(1): e4258 doi:10.1371/journal.pone.0004258.

<sup>4</sup>Preservation of Antibiotics for Medical Treatment Act. Available at: <http://www.thomas.gov/cgi-bin/bdquery/D?d111:1:./temp/~bdtgVs:|/bss/111search.html>. Accessed on May 11, 2009.



