

Bacteria Fly from the Sty

Amy Chapin and her research team discover that hog farms send more than an odor into the air.

AMY CHAPIN'S CAREER PATH HAS TAKEN her to huge hog farms around the country. For several years, Chapin, with training in biology and public health, has been studying how these sites affect the environment and, consequently, human health. An HHMI predoctoral fellow when interviewed this spring, Chapin expected to receive her Ph.D. in environmental health sciences in May from the Bloomberg School of Public Health at the Johns Hopkins University.

"Wherever I go," she says, "I end up working on swine issues," which apparently have an ambience and staying power all their own. "It's definitely very stinky work," she admits. Her research equipment and notebooks exude hog odors for up to a year.

But the smell is the least of her concerns. Chapin now believes the foul breeze wafting from large-scale hog farms carries antibiotic-resistant bacteria, posing risks to the people who work or live nearby, especially those with compromised immune systems. When she and her colleagues at Johns Hopkins took air samples in the barns of one facility, for

example, they found 137 types of gut bacteria—98 percent of them resistant to at least two antibiotics.

The group reported its results in the February 2005 issue of *Environmental Health Perspectives*. "The level of resistant bacteria found in the air was quite striking," says Marilyn C. Roberts, a microbiologist at the School of Public Health at the University of Washington in Seattle, who was not involved in Chapin's study. That's especially troubling because air is so difficult to control.

The main sources of the problem are the antibiotics hog farmers feed to their animals to treat infections, prevent illnesses, and improve growth. That practice causes bacteria in a hog's gut—often the same kinds that cause disease in humans—to be dominated by antibiotic-resistant variants. Such "superbugs" have been found in pork products and in nearby groundwater and soils, according to other studies. No one had fully investigated whether such bacteria could become airborne, in large part because farmers were reluctant to open their barn doors to researchers.

Getting access to the farm for their study took Chapin's team about a year-and-a-half, she says. They then made two site visits one month apart.

More barn doors—plus a few stockyard gates—may well open for Chapin once she has her Ph.D. in hand. After writing a paper this summer characterizing her work on the resistance-conferring genes in certain airborne bacteria from large-scale hog farms, she wants to expand her studies to poultry farms and cattle yards. "I think it's important to find out how far the bacteria at these sites travel and whether communities nearby may be exposed," she says. ■

- Karen F. Schmidt -

HOG FARMERS FEED ANTIBIOTICS TO THEIR ANIMALS TO TREAT INFECTIONS, PREVENT ILLNESS, AND IMPROVE GROWTH. TROUBLE IS, THAT PRACTICE LEADS TO THE DEVELOPMENT OF ANTIBIOTIC-RESISTANT BACTERIA THAT CAN CAUSE ILLNESS IN HUMANS.

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