

Some hog workers developing drug-resistant skin infections

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New Johns Hopkins Bloomberg School of Public Health-led research suggests that some workers at industrial hog production facilities are not only carrying livestock-associated, antibiotic-resistant bacteria in their noses, but may also be developing skin infections from these bacteria.

The findings are published Nov. 16 in *PLOS ONE*.

"Before this study, we knew that many hog workers were carrying livestock-associated and multidrug-resistant *Staphylococcus aureus* strains in their noses, but we didn't know what that meant in terms of worker health," says study leader Christopher D. Heaney, PhD, an assistant professor at the Bloomberg School's departments of Environmental Health and Engineering, and Epidemiology. "It wasn't clear whether hog workers carrying these bacteria might be at increased risk of infection. This study suggests that carrying these bacteria may not always be harmless to humans."

Because the study was small, the researchers say there is a need to confirm the findings, but the results highlight the need to identify ways to protect workers from being exposed to these bacteria on the job, and to take a fresh look at antibiotic use and resistance in food [animal production](#). Hogs are given antibiotics in order to grow them more quickly for sale, and the overuse of antibiotics has been linked to the development of bacteria that are resistant to many of the drugs used to treat staph infections.

The researchers, involving collaborators at the University of North Carolina at Chapel Hill, the Rural Empowerment Association for Community Help in Warsaw, NC, and the Statens Serum Institut in Copenhagen, enrolled 103 hog workers in North Carolina and 80 members of their households (either children or other adults) to have their noses swabbed to determine whether they were carrying strains of *S. aureus* in their nasal passages. Each person was also shown pictures of

skin and soft tissue infections caused by *S. aureus* and asked if they had developed those symptoms in the previous three months.

The researchers found that 45 of 103 hog workers (44 percent) and 31 of 80 [household members](#) (39 percent) carried *S. aureus* in their noses. Nearly half of the *S. aureus* strains being carried by hog workers were multidrug-resistant and nearly a third of *S. aureus* strains being carried by household members were. Six percent of the hog workers and 11 percent of the children who lived with them reported a recent skin and soft tissue infection (no adult household members reported such infections).

Those hog workers who carried livestock-associated *S. aureus* in their noses were five times as likely to have reported a recent skin or soft tissue infection as those who didn't carry those bacteria in their noses. The association was stronger among hog workers who carried multidrug-resistant *S. aureus* in their noses, who were nearly nine times as likely to have reported a recent skin or soft tissue infection. Multidrug-resistant *S. aureus* infections can be difficult to treat because the antibiotic drugs that doctors typically prescribe don't work. Researchers are concerned about what might happen if these bacteria develop the capacity to spread more broadly between animals and humans.

While the study is small, Heaney says the findings suggest that more work is needed to figure out how to mitigate *S. aureus* exposure and the risk of infection among workers and to track the extent to which these livestock-associated bacteria may spread into the community at large. Since the study found that those hog workers who never wore protective masks over their nose and mouth were more likely to be carriers of the bacteria than those who did, Heaney says recommendations about wearing personal protective equipment might be prudent.

Heaney says 89 percent of the hog workers in the study were Hispanic and that many are likely without health insurance. Studies like this, he says, can help focus on risks to a population that is vulnerable and may otherwise fall through the cracks. According to a Duke University analysis of U.S. Bureau of Labor Statistics data, roughly 327,350 people were employed in hog farming in the United States in 2012.

Most evidence about the burden of human infections associated with drug-resistant *S. aureus* nasal colonization comes from studying strains that circulate in hospital settings, where patients are often tested upon admission so that medical staff can take precautions. Less is known about whether generally healthy people in the community, such as hog workers, are at increased risk of developing *S. aureus* infections.

The rise of multidrug-resistant [bacteria](#) - often called superbugs - is a global crisis according to the World Health Organization and the use of antibiotics in food animal production has been highlighted as an important contributor. Roughly 80 percent of antibiotics sold in the United States are used in animals, with heavy nontherapeutic uses in food animal production.

"This issue isn't going away and there are many more research questions that need to be answered," he says.

More information: "Livestock-associated, antibiotic-resistant *Staphylococcus aureus* nasal carriage and recent skin and soft tissue infection among industrial hog operation workers" *PLOS ONE*, 2016.

Provided by Johns Hopkins University Bloomberg School of Public Health

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