MedicalXpress

Hog workers carry drug-resistant bacteria even after they leave the farm

September 8 2014

A new study suggests that nearly half of workers who care for animals in large industrial hog farming operations may be carrying home livestock-associated bacteria in their noses, and that this potentially harmful bacteria remains with them up to four days after exposure.

Researchers had believed that livestock-associated bacteria would clear from the noses of hog workers quickly – within 24 hours. But this small study of hog workers in North Carolina, reported online Sept. 8 in the journal *Occupational and Environmental Medicine*, suggests it can stick around longer. Much of the *Staphylococcus aureus* bacteria they carried were antibiotic resistant, likely due to the use of drugs both to treat sick hogs and to promote hog growth to ready them for market sooner. The longer the bacteria stick around in workers' noses, the researchers say, the greater the opportunity for them to potentially spread to hog workers' families, their communities and even into hospitals, where the bacteria have been associated with an increased risk of staph infections.

"Before this study, we didn't know much about the persistence of livestock-associated strains among workers in the United States whose primary full-time jobs involve working inside large industrial hog-confinement facilities," says study author Christopher D. Heaney, PhD, MS, an assistant professor in the departments of Environmental Health Sciences and Epidemiology at the Johns Hopkins Bloomberg School of Public Health. "Now we need to better understand not only how persistence of this drug-resistant bacteria may impact the health of the workers themselves, but whether there are broader public health

implications."

In Europe, the children of livestock workers have been treated for infections caused by a new livestock-associated strain of MRSA (methicillin-resistant *Staphylococcus aureus*) that doesn't match the more widely found community- or hospital-associated strains. This suggests the children may have been exposed to MRSA strains through their family members who worked on livestock farms. Evidence of persistent carriage of this new livestock-associated strain and its drug resistance has led to restrictions on the non-therapeutic use of antibiotics in livestock overseas.

Statistics on the number of hog workers are tough to come by, but census data from 2007 suggest that there are roughly 292,000 livestock workers in the United States. In North Carolina, where the study was conducted, there are roughly 6,400 workers employed at 938 hog operations that reported hired labor.

The study, done in conjunction with researchers from the University of North Carolina Gillings School of Global Public Health and the Statens Serum Institute and community organizers from the Rural Empowerment Association for Community Help (REACH), involved 22 hog workers in North Carolina. Between June and August 2012, researchers recruited industrial hog workers to be studied for two weeks. In the first week, the goal was for workers to have at least a 24-hour stretch off from work. During that week, each participant collected nasal swabs in the morning before going to work and again in the evening, whether they worked that day or not. On the 14th day, they took two more nasal swabs. The longest time spent away from the farm was four days, with an average of two days among workers. Researchers later analyzed 327 separate nose swabs to see what kind of Staph bacteria they found, whether the strains were traditionally found in livestock or humans and whether the bacteria were drug resistant.

Eighty-six percent of the hog workers – 19 of them – carried at least one type of *Staphylococcus aureus* at some point during the study period, while 16 of them (73 percent) carried the livestock-associated strain at some point. In contrast, only about one-third of the general population carry a strain of *Staphylococcus aureus* associated with humans.

But 10 of the 22 workers (46 percent) were what the researchers call persistent carriers of livestock-associated Staph, meaning they had these strains in their noses all or all but one of the times they provided samples, even after leaving work at the animal confinements. Six of them persistently carried the multi-drug resistant kind of *S. aureus*, while one persistently carried MRSA.

Researchers found that even after up to four days away from the hog operation, the bacteria were still present in workers' noses.

Garden-variety staph are common bacteria that can live in our bodies without consequence. When they do cause infection, most aren't life threatening and appear as mild infections on the skin, like sores or boils. But staph can also cause more serious skin infections or infect surgical wounds, the bloodstream, the lungs or the urinary tract. Strains of staph like MRSA, which are resistant to some antibiotics, can be the most damaging because they can be very hard to treat.

MRSA is particularly dangerous in hospitals where the bacteria are hard to get rid of and the people there are the most vulnerable.

Heaney and the team are doing more research to see whether hog workers with persistent drug-resistant bacteria are spreading it to their family members and communities.

"We're trying to figure out if this is mainly a workplace hazard associated with hog farming or is it a threat to public health at large," he

says. "To do that we need to learn more not just about how long workers carry bacteria in their noses, but how it relates to the risk of infection and other health outcomes in workers, their families, and communities."

More information: "Persistence of livestock-associated antibiotic-resistant Staphylococcus aureus among industrial hog operation workers in North Carolina over 14 days," by Maya Nadimpalli et al. *Occupational and Environmental Medicine*, 2014.

Provided by Johns Hopkins University Bloomberg School of Public Health