

Face masks may protect hog farm workers and their household members from staph bacteria

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Face masks appear to provide important protection against drug-resistant *Staphylococcus aureus* bacteria for hog farm workers and for household members to whom they might otherwise transmit the bacteria, according to a study led by scientists at Johns Hopkins Bloomberg School of Public Health.

In the study, which is published on December 13 in *Environmental Health Perspectives*, the scientists tracked 101 hog farm workers and 79 [household members](#) for four months, taking [nasal swabs](#) and asking questions about face mask use. They found that for workers who reported using face [masks](#) on the job consistently during the four-month study, there was a 50 to 70 percent reduction in the likelihood of finding dangerous, livestock-derived *S. aureus* strains in their swabs—and an 80 to 90 percent reduction in the likelihood that household members' swabs would test positive for such strains.

"Face masks and other [personal protective equipment](#) (PPE) could be effective in reducing occupational exposure to livestock-associated *S. aureus* and preventing the spread of these bacteria to workers and their families," says study senior author Christopher D. Heaney, Ph.D., an associate professor in the Department of Environmental Health and Engineering at the Bloomberg School.

In the U.S. and many other developed countries, hogs are raised in dense

populations on industrial-scale farms, and are fed antibiotics to treat and prevent diseases, which also promotes animal growth. This chronic use of antibiotics encourages the proliferation of antibiotic-resistant bacterial strains, including strains that can cause serious illness or death when they infect people. The U.S. Centers for Disease Control and Prevention estimates that just one dangerous *S. aureus* strain, known as methicillin-resistant Staphylococcus aureus (MRSA), causes about 80,000 severe infections in people per year, of which about 11,000 are fatal.

The spread of drug-resistant *S. aureus* from livestock to farm workers has been noted in prior studies, and is recognized by many scientists as a potentially serious public health issue. However, there has been conflicting evidence about the utility of face masks and other personal protective equipment for preventing the spread of bacteria from animals to farm workers. Also, no study has yet examined whether such protective measures might also effectively prevent members of farm workers' households from becoming exposed if workers bring these microbes home. Although livestock workers tend to be younger and may be less susceptible to invasive staph infections, they may have family members who are young children, elderly or otherwise especially vulnerable.

In the hope of clarifying the issue of face masks' utility, Heaney and colleagues, with the help of the North Carolina-based Rural Empowerment Association for Community Help (REACH) and the UNC Gillings School of Public Health, recruited the 101 hog [farm workers](#) and 79 household members from the top 10 hog-producing counties in North Carolina. The team took nasal swabs to detect bacterial colonization, and administered questionnaires to the participants, every two weeks over four months. The results suggested that wearing face masks had a strong protective effect.

One key comparison was between workers reporting consistent face mask use—defined as use for more than 80 percent of their [work hours](#) during the study—and those reporting inconsistent face mask use. For the consistent users, the chances of detecting multidrug-resistant *S. aureus*, tetracycline-resistant *S. aureus* and other *S. aureus* strains associated with livestock in their nasal swabs were reduced by 69 percent, 68 percent and 50 percent, respectively.

When workers reported consistent face mask use, the chances of detection of these *S. aureus* strains in nasal swabs from household members also appeared to be greatly reduced—by 80 to 90 percent for the tetracycline-resistant and other livestock-associated strains, and by about 33 percent for multidrug-resistant *S. aureus*, although cases of the latter were so few that the figure was not statistically significant.

Heaney notes that this was an observational study, and ideally would be followed up by a larger, observational or a randomized trial-type study of hog [worker](#) mask use to confirm and expand upon the current study findings. "More studies like this are needed because concentrated animal feeding operations are a potential entry point for drug-resistant bacteria into the community," he says. Nora Pisanic, Ph.D., an assistant scientist at the Bloomberg School who also worked on the study, adds that "following workers and their household members longer, for example 1 or 2 years, might reveal relationships with livestock-associated staph infections."

Federal regulations already require certain farm operators to provide respirators to workers who are exposed to harmful dusts, gases, smoke or sprays. But the use of face masks or other forms of PPE to reduce the transmission of microbes from animals may not fall under those regulations, and is far from universal. As Heaney points out, "When workers are issued [face masks](#) they may find it hard to breathe adequately while wearing the masks, especially when doing strenuous

tasks in hot conditions. We need to come up with solutions to better protect workers."

More information: "Face Mask Use and Persistence of Livestock-associated *Staphylococcus aureus* Nasal Carriage among Industrial Hog Operation Workers and Household Contacts, USA" *Environmental Health Perspectives* (2018).

Provided by Johns Hopkins University Bloomberg School of Public Health

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