

Antibiotics and biocidal cleaners may spread multidrug resistance in MRSA

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Methicillin-resistant *Staphylococcus aureus*. Credit: NIH/NIAID

Antibiotic use on people or pets, and use of biocidal cleaning products such as bleach, are associated with multidrug resistance in *methicillin-resistant Staphylococcus aureus* (MRSA) in the home. This contamination of the home environment may contribute to reinfection of both humans

and animals with *MRSA*, and to subsequent failure of treatment. The research is published September 22nd in *Applied and Environmental Microbiology*, a journal of the American Society for Microbiology.

Multidrug resistance to *MRSA* and reinfection with *MRSA*, said corresponding author Jonathan Shahbazian, MPH, were the most important in this study. The study also showed that whether used in humans or companion animals, the antibiotic clindamycin was not associated with the risk of multi-drug resistant bacteria in the home.

Treatment with mupirocin, an antibiotic used to treat skin infections and to eradicate *MRSA* from the nasal passages in order to prevent its spread from sneezes, is weakly associated with mupirocin resistance in the household environment. That "could complicate decolonization efforts that rely on use of nasal mupirocin ointment," said Mr. Shahbazian, who conducted the study while finishing his masters in public health at Johns Hopkins Bloomberg School of Public Health, Baltimore. ("Decolonization" refers to treatment to eradicate potentially disease-causing bacteria from human carriers.)

Additionally, Mr. Shahbazian said that 100 percent of *MRSA* isolates the investigators obtained from rural homes were multidrug resistant, "suggesting living in a rural household may be a risk factor for [multidrug resistance](#)."

"We also found the presence of domestic pets was associated with multidrug resistant *MRSA* in the home environment, while the presence of unwanted pests, such as mice or cockroaches, was associated with non-multidrug resistant *MRSA* strains," said Mr. Shahbazian.

In the study, the investigators collected samples from the home environments and companion animals of households enrolled in a large randomized controlled trial, which took place over a 14 month period.

They tested whether household-wide efforts to eradicate *MRSA*—which included daily use of nasal mupirocin ointment and chlorhexidine body wash—were successful in reducing recurrence of *MRSA* among adults and children who had previously been diagnosed with a *MRSA* skin or soft tissue infection. They repeated sampling in 65 homes three months after the residents had been treated for *MRSA*, or, as a control, after they had been educated about *MRSA*.

"Based on the evidence, we strongly suspect that environmental contamination of the home with *MRSA* contributes to recurrence," said Mr. Shahbazian. The investigators also suspect that household-wide selective pressures on the home environmental reservoir of *MRSA* promote persistence of multidrug resistant strains. "We hypothesize that infected or colonized people and [companion animals](#) shed *MRSA* into the home environment," which then re-infect household members.

The investigators concluded that a better understanding of what causes home environmental *MRSA* to become multidrug resistant, and thus harder to treat, could help in identifying which households are more likely to harbor multidrug resistant *MRSA*, so that these could be targeted for eradication of the pathogen.

The investigators are involved in One Health research. One Health examines health problems from a multidisciplinary perspective that includes physicians, veterinarians, environmental experts, and others.

Provided by American Society for Microbiology

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