

# Household MRSA contamination may fuel repeat infections

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Robert Roos | News Writer | CIDRAP News | May 11, 2016

Patients who were recently treated for a community-associated methicillin-resistant *Staphylococcus aureus* (CA-MRSA) infection face a higher risk of recurrent infections if their households are contaminated with the same MRSA strain, a small study published this week in *JAMA Internal Medicine* suggests.

Researchers at Columbia University Medical Center (CUMC) in New York City report that patients had about twice the risk of a recurrent infection if objects in their household harbored the same clinical MRSA isolate they had the first time, compared with patients from households without the same isolate in the environment.

The implication, the authors said, is that environmental decontamination should be considered as a way to prevent future MRSA infections, especially in households already struck by the pathogen.

## 30-year rise in CA-MRSA cases

The number of CA-MRSA cases has risen sharply over the past 30 years, with 5% to 10% of them life-threatening, and households have been the primary MRSA reservoir in the community, says the report by Justin Knox, MPH, and colleagues.

Environmental contamination has been increasingly recognized as a potential contributor to MRSA cases and spread in households, and its role "is further supported by the mixed success of body-site decolonization interventions designed to prevent recurrent infections within the household, with recurrent infections often occurring despite best efforts," they wrote.

To address the question, the authors recruited patients treated for CA-MRSA infections at CUMC between November 2011 and June 2014. Of 262 patients who had had skin or soft-tissue MRSA infections and fit other study criteria, 83 agreed to participate, with their 214 household members. They were followed up for 6 months, with 62 of the 83 households (75%) completing the follow-up period.

On initial home visits, the researchers interviewed the index patients to gather demographic and risk-factor information. In addition, they gathered environmental samples and collected nasal, throat, and inguinal (groin) samples from the other household members for testing.

The environmental sampling included 11 items, such as TV remotes, light switches, bathroom sinks, and toilet seats. The aim was to find the same MRSA strain as had infected the patient, meaning "the identical staphylococcal protein A and staphylococcal chromosomal cassette *mec* type or antibiogram type."

## MRSA strain found in 20% of households

Eighty-two of the 83 index patients completed at least some portion of follow-up, of whom 53 (65%) were female and 59 (72%) were Hispanic, with a mean age of 30. Forty-nine of the 61 MRSA cases with available clinical isolates involved the epidemic strain USA300.

The researchers said they found the clinical isolate in 20 of the 82 households (24%). They gathered specimens from 884 environmental items in the 82 households, of which 129 (15%) tested positive for *S aureus*, and 40 isolates were identified as the clinical isolate.

Of the 82 patients, 35 (43%) reported a recurrent infection during follow-up, and 15 (43%) of them required hospitalization. Thirteen recurrent infections were from the 20 households with environmental contamination (65%),

while 22 were from the 62 households without it (35%), a significant difference ( $P = .04$ ).

## Contamination linked to doubled risk of recurrence

Considering differences in follow-up time, the authors calculated that the incidence of repeat infections in contaminated households was 0.15 per month of follow-up, compared with 0.08 per month in the uncontaminated households. Thus the incidence of repeat infections was 2.05 times higher (95% confidence interval, 1.03 to 4.10;  $P = .04$ ) in the households with environmental contamination.

In other findings, 25 of 82 index patients (30%) were colonized with the clinical isolate when they were interviewed. Colonization was more common among households with "concordant environmental contamination" than those without it (15 of 20 [75%] versus 10 of 62 [16%];  $P < .001$ ).

In addition, at least one person other than the patient was found to be colonized by the clinical isolate in 19 of 82 households (23%). This also was more common in households that had environmental contamination with that isolate (11 of 20 [55%] versus 8 of 62 [13%];  $P < .001$ ).

To identify possible confounding variables, the authors looked for associations of potential confounders, such as skin conditions in the patient or other household members, with environmental contamination and with recurrent infection. They found that all associations were nonsignificant.

The researchers said they found that colonization with the clinical isolate in either the index patient or other household members did not independently increase the risk for recurrent infection. "This finding suggests that the contamination of household surfaces plays a role in recurrent CA-MRSA infection," they wrote.

## Evidence piling up

Their findings add to growing evidence that environmental contamination contributes to the spread of *S aureus* in the community by creating a reservoir for infection in households, they added. For example, one study showed that environmental contamination with the clinical isolate was linked to a greater likelihood of *S aureus* transmission among household members.

"Our findings suggest the importance of considering environmental contamination when designing interventions aimed at reducing recurrent CA-MRSA infections," the authors conclude. "Further research is needed to determine whether effective decolonization of the household environment of MRSA-infected patients reduces the risk for subsequent infection."

**Knox J, Sullivan SB, Urena J, et al.** Association of environmental contamination in the home with the risk for recurrent community-associated, methicillin-resistant *Staphylococcus aureus* infection. *JAMA Intern Med* 2016 (published online May 9) [[Full text](#)]