

Staphylococcus aureus Colonization in Children With Community-Associated Staphylococcus aureus Skin Infections and Their Household Contacts

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Objectives: To measure prevalence of *Staphylococcus aureus* colonization in household contacts of children with acute *S aureus* skin and soft tissue infections (SSTI), determine risk factors for *S aureus* colonization in household contacts, and assess anatomic sites of *S aureus* colonization in patients and household contacts.

Design: Cross-sectional study.

Setting: St Louis Children's Hospital Emergency Department and ambulatory wound center and 9 community pediatric practices affiliated with a practice-based research network.

Participants: Patients with community-associated *S aureus* SSTI and *S aureus* colonization (in the nose, axilla, and/or inguinal folds) and their household contacts.

Outcome Measures: Colonization of household contacts of pediatric patients with *S aureus* colonization and SSTI.

Results: Of 183 index patients, 112 (61%) were colonized with methicillin-resistant *S aureus* (MRSA); 54 (30%), with methicillin-sensitive *S aureus* (MSSA); and 17 (9%), with both MRSA and MSSA. Of 609 household contacts, 323 (53%) were colonized with *S aureus*: 115 (19%) with MRSA, 195 (32%) with MSSA, and 13 (2%) with both. Parents were more likely than other household contacts to be colonized with MRSA (odds ratio, 1.72; 95% CI, 1.12 to 2.63). Methicillin-resistant *S aureus* colonized the inguinal folds more frequently than MSSA (odds ratio, 1.67; 95% CI, 1.16 to 2.41), and MSSA colonized the nose more frequently than MRSA (odds ratio, 1.75; 95% CI, 1.19 to 2.56).

Conclusions: Household contacts of children with *S aureus* SSTI had a high rate of MRSA colonization compared with the general population. The inguinal fold is a prominent site of MRSA colonization, which may be an important consideration for active surveillance programs in hospitals.

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OUTBREAKS OF *STAPHYLOCOCCUS aureus* infections have been reported to occur within households¹⁻⁵ and *S aureus* transmission may occur through close contact.^{6,7} Few studies have evaluated the prevalence of *S aureus* colonization in household contacts of patients with *S aureus* skin and soft tissue infections (SSTI). Asymptomatic *S aureus* colonization in a household member may serve as a reservoir for transmission to other household contacts.⁸ Children treated for an *S aureus* infection might reacquire the organism from colonized household contacts.

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Traditionally, *S aureus* colonization has been reported to occur most frequently in the anterior nares.⁹ *S aureus* colonization

has also been reported to occur in the axilla, perineum, rectum, and throat.¹⁰⁻¹⁵ However, the prevalence of contemporary *S aureus* colonization at extranasal body sites among individuals in the community has not been well described. Colonization with *S aureus* is a demonstrated risk factor for subsequent SSTI.¹⁶⁻¹⁸ However, the relationship between *S aureus* colonization of household contacts and development of *S aureus* infections in index patients is unknown. These relationships must be understood to devise appropriate prevention and treatment guidelines and to implement measures to prevent *S aureus* transmission and infections within households.

The primary objectives of this study were to measure the prevalence of and determine risk factors for *S aureus* colonization in household contacts of pediatric index patients with acute community-associated (CA) *S aureus* SSTI. We also

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evaluated multiple anatomic sites of *S aureus* colonization in index patients and their household contacts.

METHODS

PARTICIPANT RECRUITMENT

We are currently conducting a randomized controlled trial comparing decolonization of all household members with decolonization of the index patient alone in eradication of *S aureus* carriage from index patients. From May 2008 to December 2009, patients aged 6 months to 20 years presenting with acute SSTI that required incision and drainage were screened for study participation. Patients were screened from the St Louis Children's Hospital Emergency Department and ambulatory wound center and 9 community pediatric practices affiliated with the Washington University Pediatric and Adolescent Ambulatory Research Consortium, a practice-based research network in metropolitan St Louis, Missouri. Patients with a permanent indwelling catheter or percutaneous medical device, with post-operative wound infection, undergoing dialysis, or residing in a long-term care facility (traditional risk factors for health care-associated *S aureus* infections) were excluded from screening. At the time of screening, 3 separate culture swabs (BBL CultureSwab Liquid Stuart; Becton Dickinson) to detect colonization were collected from the bilateral anterior nares, axillae, and inguinal folds of the index patient. To assess presence of an *S aureus* infection, wound culture results were subsequently obtained from the St Louis Children's Hospital microbiology laboratory or from the patient's pediatrician.

Patients both colonized and infected with *S aureus* (methicillin-resistant *S aureus* [MRSA] or methicillin-sensitive *S aureus* [MSSA]) were eligible for enrollment into this study. Skin and soft tissue infections and colonization cultures did not have to be concordant for study participation (the detection of any *S aureus* in both cultures was sufficient). To assess colonization status of household contacts of the index patients, cultures were self-obtained by household contacts.¹⁹ At the time of screening, the culturing procedure for the anterior nares, axillae, and inguinal folds was demonstrated to the index patient's parent or guardian. In addition, a packet was mailed to the home of each index patient that included a set of culture swabs (BBL CultureSwab Liquid Amies; Becton Dickinson) for each household contact as well as a diagram and directions for obtaining the cultures. A household contact was defined as an individual who spent more than half of his or her time each week in the primary household of the index patient. The culture swabs from household contacts were subsequently returned to the study team by the index patient at the time of study enrollment. The median time from index patient screening to obtaining culture swabs from household contacts was 21 days (interquartile range, 15-31 days).

This study was approved by the Washington University Human Research Protection Office. Verbal informed parental consent was obtained at the time of initial screening, and written informed parental consent was obtained at the enrollment visit for the index patient. Written informed consent was also obtained for each household contact. Participant assent was obtained for minors of a developmentally appropriate age (typically ≥ 7 years).

DATA COLLECTION

At enrollment, a standardized questionnaire was administered to each index patient and his or her parent or guardian. Characteristics of the index patient, including demographics, medical history and exposure to health care facilities, household fac-

tors, hygiene practices, and other activities were recorded. For each household contact, age and relationship to the index patient were recorded.

LABORATORY METHODS

Culture swab samples were incubated in tryptic soy broth with sodium chloride, 6.5% (BBL; Becton Dickinson), overnight at 35°C.²⁰ An aliquot of broth was plated to trypticase soy agar with 5% sheep blood (BBL; Becton Dickinson) and incubated overnight. *S aureus* isolates were identified based on Gram staining, catalase activity, and results of a rapid latex agglutination test for *S aureus* identification (Staphaurex; Remel). Resistance to ceftoxitin, as determined by disk diffusion testing on Mueller-Hinton agar (BBL; Becton Dickinson), was used to classify isolates as MRSA, in accordance with Clinical and Laboratory Standards Institute procedures.²¹ Swabs collected at home by household contacts all yielded normal flora, suggesting that cultures were indeed representative of the appropriate body sites.

STATISTICAL METHODS

Statistical analyses were performed with SPSS version 17.0 (IBM SPSS) and SAS version 9.2 (SAS Institute Inc). We used χ^2 tests or Fisher exact tests to compare categorical variables and *t* tests to analyze normally distributed continuous variables. All tests of significance were 2-tailed. Odds ratios (ORs) were considered significant if the 95% confidence interval did not include 1; mean differences were significant if the 95% confidence interval did not cross 0. To control for differences in household size, when evaluating the relationship between colonization strains of index patients and their household members, we calculated the proportion of colonized household contacts in each household. Risk factors for MRSA colonization in household contacts were assessed with mixed logistic regression models using the SAS procedure PROC GLIMMIX. A random effect was included for household. Each risk factor was first examined separately in univariate analysis. "Colonization density" was calculated as the proportion of household contacts, excluding the individual of interest, colonized with MRSA or MSSA. Multivariable models were built in a manual backward stepwise fashion including factors significant in univariate analysis or factors thought a priori to be associated with the outcome of interest. Variables remaining in the final model were significant at the $P \leq .05$ level.

RESULTS

STUDY POPULATION: INDEX PATIENTS

Of 495 patients with acute SSTI screened for study participation, 135 (27%) were not eligible for study participation because they were not infected ($n=43$) or not colonized ($n=92$) with *S aureus*. Of the 360 eligible patients, 177 (49%) declined study enrollment or could not be contacted. The remaining 183 index patients were enrolled in this study. Index patient characteristics are displayed in **Table 1**. Among 183 index patients with *S aureus* SSTI, MRSA was the infecting strain in 144 (79%) and MSSA, in 39 (21%). The buttocks were the most common site of SSTI (Table 1). Sites of SSTI did not differ between patients infected with MRSA and MSSA.

Of 183 index patients, 112 (61%) were colonized with MRSA only; 54 (30%), with MSSA only; and 17 (9%) were colonized with both MRSA and MSSA at different ana-

Table 1. Characteristics of 183 Index Patients

Characteristic	No. (%)
Age, y, median (range)	2.8 (0.5-20)
Sex	
M	77 (42)
F	106 (58)
Race	
African American	106 (58)
White	76 (42)
Other	1 (0.5)
Medicaid or no health insurance	107 (58)
Experienced SSTI in year prior to study enrollment	79 (44)
Site of SSTI	
Buttocks	63 (34)
Lower extremity	43 (24)
Trunk	23 (13)
Upper extremity and axilla	23 (13)
Groin or labia	18 (10)
Head and neck	13 (7)

Abbreviation: SSTI, skin and soft-tissue infections.

tomic sites. Of the 144 patients with MRSA SSTI, 110 (76%) were colonized with MRSA only; 18 (13%), with MSSA only; and 16 (11%), with both MRSA and MSSA. Of the 39 patients with MSSA SSTI, 36 (92%) were colonized with MSSA only; 2 (5%), with MRSA only; and 1 (3%), with both MRSA and MSSA. Patients with MRSA SSTI were more likely to be colonized with MRSA compared with patients with MSSA SSTI (OR, 84.0; 95% CI, 23.4 to 301.3). Conversely, patients with MSSA SSTI were more likely to be colonized with MSSA compared with patients with MRSA SSTI (OR, 58.8; 95% CI, 13.7 to 250.0).

HOUSEHOLD CONTACTS: PREVALENCE OF AND RISK FACTORS FOR *S AUREUS* COLONIZATION

The 183 index patients had a total of 661 eligible household contacts. The median number of individuals in each household (including the index patient) was 4 (range, 2-12). The median age of household contacts was 22 years (range, newborn to 88 years) and 58% were female. Forty-two percent of household contacts were parents or step-parents of the index patient, 38% were siblings or step-siblings, 7% were grandparents or great-grandparents, and 13% were reported as "other" (eg, aunt, cousin, or friend).

Of the 661 eligible household contacts, 609 (92%) (from 179 households) provided colonization swabs. Of these, 323 (53%) were colonized with *S aureus*: 115 (19%) with MRSA only, 195 (32%) with MSSA only, and 13 (2%) with both MRSA and MSSA. Index patients colonized with MRSA had a higher proportion of household contacts colonized with MRSA (27.3%) in comparison with index patients with MSSA colonization (8.9%; mean difference, 18.4%; 95% CI, 10.3% to 26.6%) (Figure). Conversely, index patients colonized with MSSA had a higher proportion of household contacts colonized with MSSA (44.4%) compared with index patients with MRSA colonization (24.4%; mean difference, 20.0; 95% CI, 8.1% to 31.8%) (Figure).

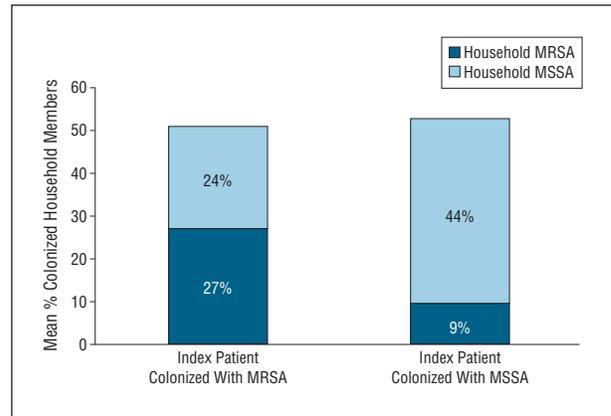


Figure. Proportion of household contacts (n=609) colonized with methicillin-resistant *Staphylococcus aureus* (MRSA) or methicillin-sensitive *S aureus* (MSSA) by index patient (n=162) colonization with MRSA or MSSA. The analysis excluded 17 index patients colonized with both MRSA and MSSA and 4 patients for whom household colonization information was not available.

Risk factors for MRSA colonization in household contacts identified by univariate analyses are described in **Table 2**. Independent risk factors for household contact MRSA colonization in multivariable analysis included SSTI experienced by the individual household contact of interest in the year prior to study enrollment (adjusted OR [AOR], 2.63; 95% CI, 1.57 to 4.38), being a parent of the index patient (AOR, 3.76; 95% CI, 1.37 to 10.30), being within 5 years of age of the index patient's age (AOR, 2.78; 95% CI, 0.96 to 8.05) or differing in age 10 or more years from the index patient's age (AOR, 2.95; 95% CI, 1.00 to 8.73), index patient colonized at 2 or 3 sites (vs none) (AOR, 3.89; 95% CI, 1.62 to 9.34 and AOR, 6.05; 95% CI, 2.13 to 17.23, respectively), and higher household MRSA colonization density (increase of 10%: AOR, 1.11; 95% CI, 1.01 to 1.23).

BODY SITES OF COLONIZATION

Overall, of 505 colonized participants (index patients plus household contacts), 343 (68%) were colonized with *S aureus* in the anterior nares; 171 (34%), in the axilla; and 289 (57%), in the inguinal folds (**Table 3**). Methicillin-sensitive *S aureus* colonization occurred more frequently in the nose than MRSA colonization (72% vs 59%; OR, 1.75; 95% CI, 1.19 to 2.56), and MRSA colonization was more frequent in the inguinal folds than MSSA colonization (62% vs 50%; OR, 1.67; 95% CI, 1.16 to 2.41) (Table 3). Participants younger than 4 years were more likely to be colonized with MRSA in the inguinal folds (51%) compared with participants 4 years and older (23%; OR, 3.44; 95% CI, 2.27 to 5.21). Of 505 colonized participants, 283 (56%) were colonized with *S aureus* at only 1 body site, 146 (29%) carried *S aureus* at 2 body sites, and 76 (15%) carried *S aureus* at all 3 sampled body sites (Table 3). The number of sites of colonization did not differ between those colonized with MRSA (mean, 1.55) and those colonized with MSSA (mean, 1.52; mean difference, 0.03; 95% CI, -0.10 to 0.16). If only the anterior nares had been sampled, *S aureus* colonization would not have been de-

Table 2. Univariate Risk Factors for MRSA Colonization in 609 Household Contacts^a

Risk Factor	No./Total No. (%)		OR (95% CI)
	Colonized With MRSA (n = 128)	Not Colonized With MRSA (n = 481)	
Age of household contact, y, median (range)	26 (1-78)	21 (0.1-88)	1.01 (0.99-1.02)
Age of index patient, y, median (range)	2.5 (0.6-20.0)	2.8 (0.5-19.6)	0.97 (0.93-1.02)
Female	78/128 (61)	284/481 (59)	1.16 (0.75-1.78)
MRSA colonization density, ^b mean (SD)	53.4 (28.7)	30.8 (28.6)	1.28 (1.20-1.37)
MSSA colonization density, ^b mean (SD)	22.2 (27.1)	39.6 (33.5)	0.85 (0.78-0.92)
Household contact SSTI in past year ^c	44/122 (36)	77/463 (17)	2.97 (1.79-4.93)
Other household member with SSTI in past year ^d	90/128 (70)	321/480 (67)	1.05 (0.61-1.78)
Index patient No. of MRSA colonized sites			
0	15/127 (12)	177/478 (37)	1 [Reference]
1	48/127 (38)	195/478 (41)	2.85 (1.39-5.85)
2	45/127 (35)	79/478 (17)	6.72 (3.08-14.66)
3	19/127 (15)	27/478 (6)	9.73 (3.59-26.37)
Index patient MRSA colonization	113/128 (88)	304/481 (63)	4.38 (2.25-8.53)
Index patient MSSA colonization	26/127 (21)	219/478 (46)	0.31 (0.17-0.54)
Index patient SSTI organism			
MSSA	9/128 (7)	136/481 (28)	1 [Reference]
MRSA	119/128 (93)	345/481 (72)	4.97 (2.25-10.99)
Household crowding ^e	32/128 (25)	122/481 (25)	0.92 (0.48-1.77)
Place of residence			
House	84/128 (66)	357/481 (74)	1 [Reference]
Apartment, condominium, townhome, shelter, or trailer	44/128 (34)	112/481 (26)	1.48 (0.85-2.61)
Relationship to index patient ^f			
Parent	68/128 (53)	202/481 (42)	1.72 (1.12-2.63)
Sibling	37/128 (29)	190/481 (40)	
Grandparent	8/128 (6)	31/481 (6)	
Aunt or uncle	9/128 (7)	33/481 (7)	
Cousin, niece, or nephew	5/128 (4)	19/481 (4)	
Friend or other	1/128 (1)	6/481 (1)	
Household contact age and relationship combined ^g			
Parent	68/74 (92)	202/267 (76)	4.07 (1.61-10.33)
Other household contact with age difference <5 y from index patient's age	29/35 (83)	121/186 (65)	2.82 (1.05-7.59)
Other household members with age difference ≥10 y from index patient's age	25/31 (81)	91/156 (58)	2.87 (1.04-7.92)

Abbreviations: MRSA, methicillin-resistant *Staphylococcus aureus*; MSSA, methicillin-sensitive *Staphylococcus aureus*; OR, odds ratio; SSTI, skin and soft-tissue infections.

^aOther factors included in the univariate analysis but not found to be significant for household contact MRSA colonization: health care worker in household, prison worker in household, index patient with eczema, index patient with Medicaid or no health insurance, or presence of pets in the home.

^bColonization density: percentage of people in the household colonized with MRSA or MSSA (excluding the individual of interest); OR reflects a 10% increase in colonization density.

^cExperienced in the past year by the individual household contact of interest.

^dExperienced in the past year by any household member (including index patient) other than the individual household contact of interest.

^eMore than 2 people per bedroom per household.

^fComparison of parents vs all other household contacts.

^gComparator group: household contacts other than parents whose age differs 5 to 10 years from the index patient's age.

tected in 67 of 183 index patients (37%) and 95 of 323 colonized household contacts (29%).

COMMENT

In this study evaluating *S aureus* colonization in household contacts of pediatric patients with community-associated *S aureus* SSTI and colonization, we determined that more than half of household contacts were also colonized with *S aureus*. The prevalence of MRSA colonization (21% overall) among these household members was substantially higher than previously published national rates (0.8%-1.5%) for MRSA colonization in community populations.^{22,23} On a local level, a community-

based prevalence survey performed by our group from 2005 to 2006 detected MRSA nasal colonization in 2.5% of the pediatric population in metropolitan St Louis.²² In comparison, in the present study, 13% of children living with an index patient were colonized with MRSA in the nares.

A higher proportion of other colonized individuals in the home (ie, MRSA colonization density²⁴) led to a higher risk of MRSA colonization in the present study. In addition, parents of index patients were more likely than other household contacts to be colonized with MRSA. Several smaller studies have also documented this relationship between *S aureus* colonization of parents and their children.²⁵⁻²⁷ In a study by Zafar and colleagues²⁵ of pa-

Table 3. Site of Colonization for Index Patients Plus Household Contacts

Body Site	No. (%)			OR (95% CI) ^b
	Total <i>S aureus</i> Colonization (n = 505)	MRSA Colonization ^a (n = 226)	MSSA Colonization ^a (n = 249)	
Overall colonization ^c				
Anterior nares	343 (68)	134 (59)	179 (72)	0.57 (0.39-0.84)
Axilla	171 (34)	75 (33)	76 (31)	1.13 (0.77-1.66)
Inguinal folds	289 (57)	141 (62)	124 (50)	1.67 (1.16-2.41)
Colonized at only 1 site	283 (56)	133 (59)	150 (60)	0.94 (0.65-1.36)
Nares only	148 (29)	53 (24)	95 (38)	0.50 (0.33-0.74)
Axilla only	31 (6)	19 (8)	12 (5)	1.81 (0.86-3.82)
Inguinal folds only	104 (21)	61 (27)	43 (17)	1.77 (1.14-2.75)
Colonized at >1 site	222 (44)	93 (41)	99 (40)	1.06 (0.73-1.53)
Nares + axilla	37 (7)	13 (6)	18 (7)	0.78 (0.38-1.64)
Nares + inguinal folds	82 (16)	37 (16)	35 (14)	1.20 (0.73-1.98)
Axilla + inguinal folds	27 (5)	12 (5)	15 (6)	0.88 (0.40-1.91)
Nares + axilla + inguinal folds	76 (15)	31 (14)	31 (12)	1.12 (0.66-1.91)

Abbreviations: MRSA, methicillin-resistant *S aureus*; MSSA, methicillin-sensitive *S aureus*; OR, odds ratio; *S aureus*, *Staphylococcus aureus*.

^aExcluded from analysis: 30 participants colonized with both MRSA and MSSA.

^bOdds ratios are comparisons of MRSA colonization vs MSSA colonization.

^cMay be colonized at more than 1 site.

tients with CA-MRSA infections, parents of index patients were at highest risk for MRSA colonization compared with other household members. Similarly, in a Taiwanese study of children presenting with CA-MRSA infections, mothers and grandparents had the highest frequency of MRSA nasal carriage.²⁶ In addition to relationship of a household contact to the index patient, we also evaluated the age of household contacts. While the absolute age of a household contact did not influence risk for MRSA colonization, his or her age relative to the age of the index patient was revealing. We observed a bimodal age distribution of MRSA colonization, such that contacts closest in age (within 5 years) and those more distant in age (≥ 10 years) were more likely to be colonized than household contacts whose age differed within 5 to 10 years of the index patient. We propose that these household contacts may have had more intimate interactions with the index patient, facilitating staphylococcal transmission. For example, we hypothesize that household contacts closest in age may share a bed or a bath with the index patient or share toys or personal hygiene items. Close person-to-person contact and contaminated environmental surfaces and fomites are proposed mechanisms of *S aureus* transmission in outbreak settings^{6,28-30} and may also be important vectors in *S aureus* transmission among household members, although this supposition warrants further study. Further, those more distant in age from the index patient may constitute older siblings or other individuals participating in the care of the index patient (eg, feeding or bathing). This conjecture is supported by a study by Nerby and colleagues³¹ that demonstrated that household contacts assisting in bathing case patients with a recent CA-MRSA infection were at significant risk for MRSA colonization.

Historically, the anterior nares have been considered the most frequent site of *S aureus* colonization.⁹ Active surveillance guidelines to identify MRSA carriers in health care settings recommend that surveillance cultures al-

ways include samples from the anterior nares.³² Therefore, many centers sample only the anterior nares for surveillance purposes.^{12,33} However, several studies conducted in health care settings have revealed substantially increased sensitivity in detecting MRSA colonization by including extranasal screening sites, including the throat, axilla, and rectum.^{10,12,13} For example, Eveillard and colleagues¹⁰ found that rectal and axillary sampling identified an additional 27% of MRSA-colonized inpatients compared with sampling the anterior nares alone. In the present study, conducted in the outpatient setting, we also detected a high rate of *S aureus* colonization in the inguinal folds and axilla in addition to the anterior nares. Nearly one-quarter of all study participants were colonized with *S aureus* exclusively in the inguinal folds, a finding that may be driven by diapering of a younger population. Interestingly, colonizing strains of MRSA were more likely to be recovered from the inguinal folds than MSSA strains in patients with CA SSTI.

The CA-MRSA strains that have emerged over the past decade are clinically and genetically distinct from traditional MSSA or health care-associated MRSA strains.³⁴ The finding of CA-MRSA preferentially colonizing the inguinal folds suggests that CA-MRSA strains may possess molecular characteristics that favor distinct colonization patterns, which may account for the high incidence of SSTI in the groin and lower extremities.¹⁴ Given recent reports of CA-MRSA transmission within health care settings,³⁵⁻³⁷ our finding that CA-MRSA colonization is prevalent in the inguinal folds indicates that current active surveillance practices (eg, nares sampling) may be insufficient to detect important reservoirs of MRSA carriage in hospitalized patients. In addition, consideration should be given to expanding decolonization strategies from the current practice of intranasal mupirocin ointment to also target the groin and lower extremities (eg, dilute bleach water baths or the application of mupirocin to the perianal area). Because rectal *S aureus* colo-

nization has also been recently described,¹⁴ continual contamination of the groin and perineum from this source may be resistant to brief decolonization regimens. We speculate that an ongoing decolonization approach might be more effective, though resistance to topical antimicrobials might develop with prolonged use.³⁸

This study has several limitations. Because the data analyzed were cross-sectional, directionality of *S aureus* transmission among index patients and household contacts cannot be determined. Transmission dynamics would be further illuminated by molecular typing of the strains recovered from the index patients and household contacts, especially over a longitudinal period. We also did not sample household surfaces, which may facilitate transmission.³⁰ Lastly, we may not have detected individuals who were transient or intermittent *S aureus* carriers with this single sampling nor did we sample the rectum or pharynx in this study. We did, however, achieve a high rate of participation by the household contacts of the index patients. By monitoring multiple body sites, we identified a greater number of colonized individuals than if we had only sampled the anterior nares, and we highlighted the importance of the inguinal area as a reservoir for contemporary MRSA carriage.

Household contacts of patients with *S aureus* infections are not routinely sampled for *S aureus* colonization, and failure to identify all colonized household members may facilitate persistent colonization or recurrent infections. In addition, household environmental surfaces and shared objects represent potential reservoirs for *S aureus* transmission. However, there are no data to indicate whether routine household sampling or decolonization would be practical or cost-effective. Longitudinal studies are needed to illuminate *S aureus* transmission dynamics between household members and their home environment. Effective methods to reduce CA-MRSA colonization and infection are lacking, and these studies will inform the interventions needed to interrupt staphylococcal transmission and ultimately prevent disease.

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