



Methicillin-Resistant *Staphylococcus aureus*: The Effects Are More Than Skin Deep

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Objectives To assess the psychosocial effects of a methicillin-resistant *Staphylococcus aureus* (MRSA) diagnosis on the households of children with MRSA skin and soft tissue infection (SSTI).

Study design We constructed and administered an interview to the primary caregiver within the home of a child with a history of MRSA SSTI.

Results Seventy-six households were enrolled. Survey responses were analyzed and grouped into 4 themes: health behavior changes, disclosure, social interactions, and knowledge/awareness. The most common theme was disclosure; 91% of participants reported sharing their child's MRSA diagnosis with someone outside of the household. Forty-two percent of respondents reported a change in the manner in which household contacts interacted as a result of the index patient's MRSA diagnosis, including isolating the index patient from other children in the household. Many households reported adopting enhanced personal hygiene behaviors and environmental cleaning routines. Thirty-eight percent of participating households reported altering how they interact with people outside of their home, largely to avoid spreading MRSA to vulnerable individuals. In addition, many participants perceived that others regarded them with caution, especially at daycare, whereas other affected households were excluded from family gatherings.

Conclusion Primary caregivers of children with MRSA SSTI reported changing their health behaviors, altering their interactions with people outside of their home, and feeling isolated by others in response to their child's MRSA diagnosis. The findings of our study highlight a need for community interventions and education to prevent the negative psychosocial repercussions associated with MRSA. (*J Pediatr* 2018;199:158-65).

From leprosy to tuberculosis to HIV, individuals afflicted by infectious diseases have long perceived stigmatization.¹⁻³ Understanding and addressing psychosocial effects is an integral facet of infectious disease treatment and prevention, because concern for judgement and social isolation can inhibit people from seeking treatment.

Methicillin-resistant *Staphylococcus aureus* (MRSA) emerged in the early 1960s and manifests itself in a variety of clinical entities, ranging from skin and soft tissue infection (SSTI) to invasive disease (eg, osteomyelitis, pneumonia, bacteremia).^{4,5} Within hospitals, the implementation of contact precautions (ie, wearing a gown and gloves when entering the patient's room) is a recommended intervention to combat MRSA transmission.⁶ Several studies have evaluated patients' perspectives regarding the impact of contact precautions on their well-being while hospitalized, noting an inverse association between contact precautions and interactions with hospital staff (eg, staff enter rooms of patients on contact precautions less frequently), as well as patient perceptions of decreased communication with physicians, lack of respect for their needs and preferences, and symptoms of depression and anxiety.⁷⁻⁹

Over the past 2 decades, hypervirulent strains of MRSA have emerged in community settings, termed community-associated MRSA (CA-MRSA), affecting otherwise healthy individuals.^{4,5} Despite CA-MRSA's establishment as a community pathogen, few studies have evaluated its psychosocial impact outside of the hospital setting. Because CA-MRSA infections are known to cluster within households and have a recurrence rate as high as 50% within 1 year,^{10,11} the emotional impact of this disease on both patients and family members can be extreme. Anecdotal case narratives have highlighted situations in which patients with MRSA infections were no longer allowed to interact physically with other family members or were forced to move into the home's garage or to a different home.¹² It is essential to include impressions of family members and reactions to a patient's MRSA

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CA-MRSA	Community-associated methicillin-resistant <i>Staphylococcus aureus</i>
MRSA	Methicillin-resistant <i>Staphylococcus aureus</i>
SSTI	Skin and soft tissue infection

diagnosis in the analysis of psychosocial effects, because the family social unit can dramatically affect a patient's ability to heal.^{13,14}

The objective of the present mixed-methods study was to better understand the psychosocial effects of a MRSA diagnosis on the households of children with CA-MRSA SSTI. Specifically, we sought to explore changes in health behaviors, effects on relationships and social interactions both within and outside of the household, and knowledge and awareness expressed by caregivers of children diagnosed with CA-MRSA SSTI.

Methods

The population for this study was derived from a larger observational cohort study, HOME: Household Observation of MRSA in the Environment, which was conducted between January 2012 and October 2016 and aimed at discerning MRSA household transmission dynamics. Recruitment took place at St. Louis Children's Hospital, Cardinal Glennon Children's Hospital, and 11 community pediatric practices in metropolitan St. Louis affiliated with the Washington University Pediatric and Adolescent Ambulatory Research Consortium. The HOME study enrolled 150 otherwise healthy pediatric patients with a culture-confirmed CA-MRSA SSTI and their household contacts (defined as individuals sleeping in the home ≥ 4 nights per week), followed by 4 consecutive study visits over 1 year.

On completion of their participation in the HOME study, 105 study families continued in an interventional trial (HOME2) consisting of 5 additional study visits over a 1-year period. Between January 2015 and February 2017, 82 HOME2 households were invited to engage in a qualitative interview interrogating the psychosocial effects of MRSA; 76 households agreed to participate. The Washington University Human Research Protection Office and Institutional Animal Care and Use Committee approved the study procedures. Informed consent and assent were obtained for all household members and pets.

Data Collection

For the HOME observational study, 5 study visits took place in participants' homes over the course of 12 months (at enrollment and 3, 6, 9, and 12 months). Detailed information on medical history, including *S aureus* infections, activities, and hygiene practices, was collected at the enrollment visit. Culture swabs for detection of *S aureus* from the household members, pet dogs and cats, and up to 21 household surfaces (from the bedroom, bathroom, kitchen, and living area) were collected by the study team to investigate their potential role in household *S aureus* transmission, as described previously.¹⁵ Questionnaires were administered at each follow-up study visit to collect information about the development of new SSTIs subsequent to the previous visit. At the 12-month study visit, each household was given a printout of the *S aureus* colonization results from each culture swab collected over the 1-year observational study. In addition, households were randomized into a decolonization trial (HOME2; ClinicalTrials.gov NCT

01814371) at the time of the 12-month visit, followed by 5 longitudinal study visits (at 13, 15, 18, 21, and 24 months).

At the 13-month study visit, a trained study team member administered a qualitative interview (described below) to the primary caregiver of the index patient. This survey was constructed to gather information regarding the psychosocial effects of having a child with a history of CA-MRSA infection in the household. The survey was administered at the 13-month visit to give families adequate time to process the colonization prevalence results provided to them at the 12-month visit, and to allow them to pose questions regarding these results to the study team. Interviews were audio recorded with the participants' written consent. All interviews were transcribed and double-checked against the audio recording by a second team member to detect any content errors.

Measures

The principal constructs measured in the present study were health behavior changes, disclosure, social interactions, and knowledge/awareness surrounding having a child with CA-MRSA infection. We also aimed to evaluate CA-MRSA's effect on the health and social behaviors of the primary caregiver (ie, the household member asked to participate in the interview) and the family's psychosocial functioning. Due to the paucity of information regarding family functioning and psychosocial effects in pediatric CA-MRSA diagnoses, we chose to gather information using methods that allowed responses to be probed and otherwise explored (eg, a survey with open-ended questions).

Survey Construction

A 13-question qualitative interview to assess the study participants' perceptions of being socially isolated by others, changes in health and social behaviors, and awareness was constructed. The survey was assembled by the senior author based on her experience as a clinician working with families afflicted by CA-MRSA infection and the existing literature regarding MRSA and other acquired infections, complemented by a collaborator's methodologic expertise in qualitative research (given the lack of available validated instruments). The resulting survey instrument consisted of 10 dichotomous (yes/no) questions with a secondary, open-ended probe for elaboration of each answer (eg, "If yes, in what way?") (**Figure 1**); an open-ended question regarding the respondent's reaction to the presence or absence of *S aureus* in their household environment (**Figure 2, A**); and two 5-point Likert scale questions, specifically, "How concerned are you about future infections for yourself or your family members?" and "How worried are you about spreading MRSA to other people?" (**Figure 2, B**). These questions were selected to explore how MRSA might have affected the study participants and their families within and outside of their homes.

Statistical and Content Analyses

Statistical analyses were performed using SPSS version 23 (IBM, Armonk, New York). For the dichotomous questions, univariate analyses were conducted using the χ^2 test. A *P* value $< .05$

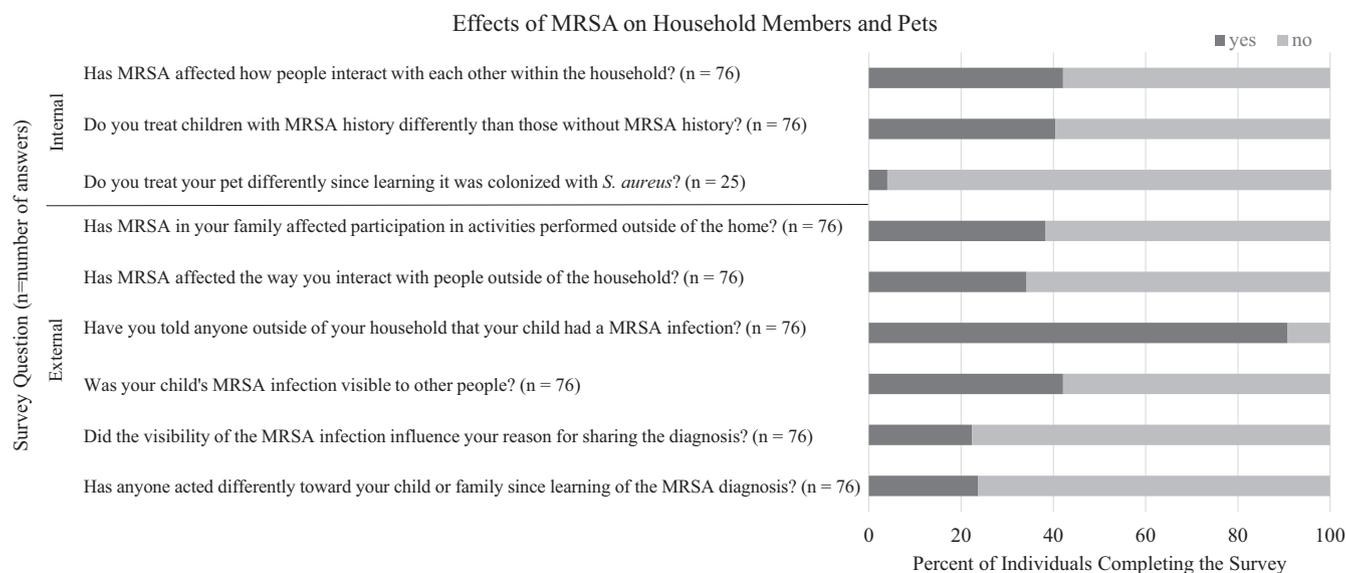


Figure 1. Effects of MRSA on household contacts and pets. Shown are the survey questions answered by study participants. n denotes the number of responses. The bar graph on the right indicates the percentages of “yes” and “no” responses.

was considered significant. Content analyses of the interview transcripts were entered into NVivo software v11 (QSR International, Victoria, Australia). Analyses involved 3 types of coding: open, axial, and selective. Open coding involved the development of an extensive list of broad labels, referred to as nodes in NVivo. Axial coding involved a cross-comparison of labels and categories, examining similarities and differences in concepts that emerged within and across households. Finally, selective coding consisted of a review of the transcripts in NVivo to refine the initial list of codes into final themes based on the study objectives. The analytical team reviewed the codes at each step to achieve clarity and accuracy, explicate code relevance, and standardize code definitions.

Results

Seventy-six households with a child diagnosed with MRSA SSTI (ie, index patients) were enrolled. The primary caregivers were 97% female and had a median age of 35 years (range, 23-55 years), and many had completed at least some college (85%) (Table I). The majority of the index patients (67%) had a history of SSTI before the infection that prompted enrollment in the observational cohort study; 54% percent of index patients also experienced a recurrent SSTI during the longitudinal study period and 74% had at least 1 household contact, in addition to the index patient, with a history of SSTI before study enrollment; of these households, 51% of household contacts experienced at least 1 SSTI during the longitudinal study. Specifically, 21% of primary caregivers experienced at least 1 SSTI during the longitudinal study.

Qualitative Themes

The qualitative results of this study (taken from the open-ended probes to the dichotomous questions) are presented in

accordance with 4 major themes: health behavior changes, disclosure, social interactions, and knowledge/awareness. A summary of the themes with definitions and exemplar text is provided in Table II.

Health Behavior Changes. Caregivers adopted new behaviors in their daily lives in an attempt to prevent future infections. Overall, 42% of survey respondents expressed that their child’s MRSA diagnosis caused a change in how household contacts interacted with one another. Forty percent of caregivers stated that they personally treated their child(ren) with a history of MRSA infection differently than their child(ren) who had not experienced MRSA SSTI (Figure 1). Specifically, they reported limiting physical contact with the affected child; isolating the child from other children in the household, especially during active outbreaks; and being more vigilant about inspecting their children for potential recurrent infections (Table II). Primary caregivers with at least some college education were more likely to report changes in household interactions due to the MRSA diagnosis compared with primary caregivers with no college education (48% vs 9%; $P = .02$). In addition, most caregivers changed their handwashing behaviors, specifically adding the use of alcohol-based hand sanitizers as a result of their child having a MRSA infection (Table II). Twenty-five households (33%) had a pet from which *S aureus* had been recovered from the nose or dorsal fur; only 1 of these households reported treating the colonized pet differently (eg, limiting physical contact with the pet’s nose and face). Most often, the reason for not treating pets differently was that the pet “won’t allow you to; they do what they want.”

Behaviors surrounding environmental cleaning practices also changed. An increase in cleaning frequency and the use of bleach products were the most common changes (Table II).

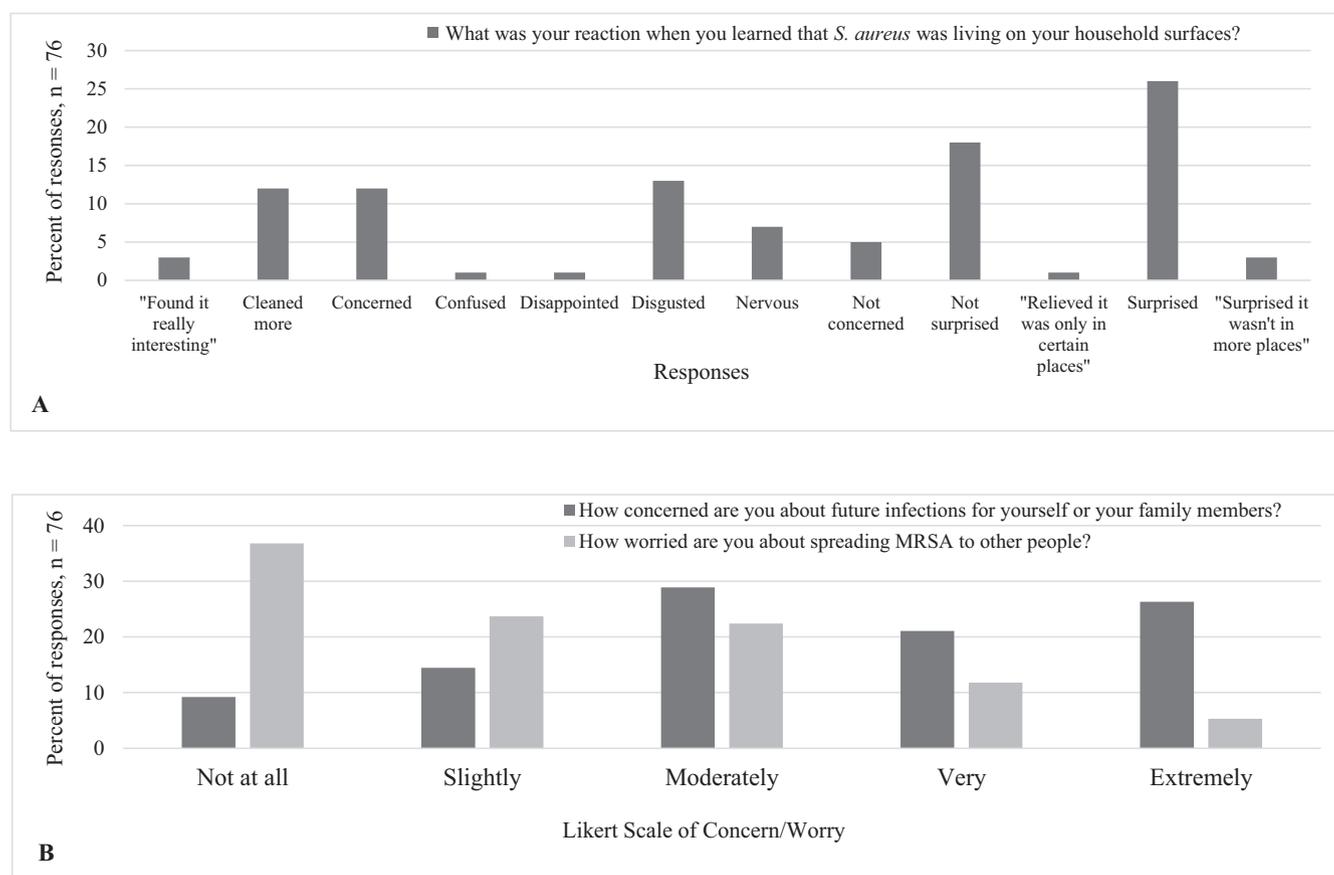


Figure 2. Concern and worry about MRSA recurrence and spread. **A**, The answer responses to the open-ended question asked to study participants and the distribution of responses. The responses presented in quotation marks denote exact quotes pulled from the interview transcripts of study participants. **B**, The Likert Scale answer options to 2 survey questions posed to study participants and the distribution of responses.

Although some households implemented drastic forms of cleaning (eg, cleaning all surfaces of the house with bleach), others perceived that simple changes, such as limiting shared spaces or no longer sharing personal hygiene items, were sufficient (Table II). Overall, most households reported adopting more cautious personal hygiene behaviors in addition to changes in their environmental cleaning routines.

The majority (91%) of participants shared their child's MRSA diagnosis with people outside of their household. Disclosure was the most dominant theme emerging from our survey, with 90% of households discussing disclosure in relation to the nature of their interactions with other people. Primary caregivers with at least some college education were more likely to disclose their child's diagnosis than those with no college education (95% vs 64%; $P = .001$). The most common reasons cited for disclosing the MRSA diagnosis to others (eg, health care providers, teachers, coaches) were to help monitor for possible recurrent infection, to educate others and promote awareness within their social network, and to gain support and assistance from family members (Table II). The few caregivers who were reluctant to disclose their child's MRSA diagnosis stated that they only told others on a "need to know

basis," but they were more willing to disclose to close/immediate family members. Just under one-half (42%) of caregivers reported that the location of their child's infection was visible to others (eg, on the face, arm, or leg), a factor that influenced the likelihood that caregivers would share the MRSA diagnosis ($P = .001$).

Most households indicated that their child's MRSA diagnosis did not limit activities performed outside the home, such as going to the gym or participating in school activities/sports/social functions (62%), or how they interacted with people outside of their household, such as avoiding physical contact with other people, not going to another person's home, or not sitting near another person (66%) (Figure 1). Moreover, primary caregivers with a diagnosed mood disorder were less likely to alter their interactions with people outside of the household compared with primary caregivers without a diagnosed mood disorder (6% vs 42%; $P = .008$). Of the 38% of households that reported changing their interactions, most did not want to expose vulnerable individuals, including infants or older adults, to MRSA (Table II). Although most households did not initiate changes in their interactions with others outside the household, many participants reported feeling

Table I. Participant and household characteristics (n = 76)

Characteristics	Value
Age of index patient [†] , y, median (range)	4 (1-17)
Sex of index patient [†] , n (%)	
Male	35 (46)
Female	41 (54)
Age of primary caregiver [†] , y, median (range)	35 (23-55)
Sex of primary caregiver [†] , n (%)	
Male	2 (3)
Female	74 (97)
Latino/Hispanic ethnicity of primary caregiver ^{†,‡} , n (%)	
Yes	5 (7)
No	71 (93)
Race of primary caregiver ^{†,‡} , n (%)	
Caucasian	55 (72)
African American	17 (22)
Multiracial [§]	4 (5)
Health insurance status of primary caregiver [†] , n (%)	
Private	58 (76)
Medicaid/state-sponsored	15 (20)
Tricare/Veterans Administration	2 (3)
None	1 (1)
Highest level of education of primary caregiver [†] , n (%)	
Some high school	2 (3)
High school diploma/GED	9 (12)
Some college	21 (28)
College degree	30 (39)
Graduate degree	14 (18)
Mood disorder in primary caregiver [†] , n (%)	16 (21)
No. of individuals per household, median (range)	4 (2-13)
<i>S aureus</i> infection and/or SSTI in index patient [*] before enrollment [¶] , n (%)	51 (67)
<i>S aureus</i> infection and/or SSTI in primary caregiver [†] before enrollment [¶] , n (%)	24 (32)
<i>S aureus</i> infection and/or SSTI in any household contact ^{**} before enrollment [¶] , n (%)	56 (74)
SSTI in index patient [*] during the longitudinal study period, n (%)	41 (54)
No. of SSTIs during longitudinal study period, median (range) ^{††}	2 (1-5)
SSTI in primary caregivers [†] during the longitudinal study period, n (%)	16 (21)
No. of SSTIs during longitudinal study period, median (range) ^{††}	1 (1-2)
SSTI in household contact ^{**} during the longitudinal study period, n (%)	39 (51)
No. of SSTIs during longitudinal study period, median (range) ^{††}	2 (1-4)

GED, general education development.

*The child with the culture-confirmed MRSA SSTI prompting study enrollment.

†The household member participating in the interview.

‡Race and ethnicity were self-reported.

§Multiracial participants were African American and Caucasian.

¶This does not include the infection that prompted enrollment into the study.

**Individuals sleeping in the index patient's home ≥4 nights per week, excluding the index patient.

††Of those with at least 1 SSTI.

isolated and ostracized by family and friends because of the MRSA diagnosis. As one shared, "My family treated us like we had the plague for 3 months. . .not wanting to come around. . . They would not come to my house. In fact, I was supposed to go with my sister to a wedding, and she asked me not to go" (Table II). Other participants shared feelings of being treated cautiously by daycare and school personnel (Table II). Caucasian primary caregivers were nearly 3 times more likely to perceive being treated differently on disclosing their child's MRSA diagnosis than African American or biracial primary caregivers (29% vs 10%; $P = .07$), a finding that trended toward significance.

In 73 of the 76 households (96%), *S aureus* was recovered from at least 1 household environmental surface. The 3 most frequent reactions when finding out that *S aureus* was living on the participants' household surfaces were "surprised" (26%), "not surprised" (18%), and "disgusted" (13%) (Figure 2, A). Within the households that did not show surprise or concern about their results, the most common explanation was because they had deduced that MRSA is everywhere and thus were not inclined to radically change their behaviors (Table II). Neither the level of education of the primary caregiver nor the bioburden of *S aureus* recovery (ie, the proportion of colonized surfaces) was found to be associated with a specific reaction to finding *S aureus* on household surfaces. Of the 3 households in which *S aureus* was not recovered, 2 respondents were "surprised" *S aureus* was not recovered, and 1 respondent was "not surprised."

Several caregivers reported that incomplete knowledge regarding MRSA resulted in angst (Table II). When asked about concerns about spreading MRSA to others, 37% of primary caregivers reported being "not worried at all," and 5% reported being "extremely worried" (Figure 2, B). When asked about concerns regarding future infections, 26% of primary caregivers reported being "extremely concerned" and 9% were "not at all concerned" (Figure 2, B). No associations were found between a previous history of SSTI in the index patient or household contacts and increased concern about spreading MRSA to other individuals or experiencing future infections. In addition, the number of recurrent infections within the household during the longitudinal study period was not associated with either increased concern about future infections or worry about spreading MRSA to others.

Discussion

Discrimination, fear, and isolation attached to a diagnosis of MRSA may have negative effects on the psychosocial well-being of patients, their caregivers, and their family members.^{14,16} Our broad investigation examined the psychosocial impact of a MRSA diagnosis in households of children with CA-MRSA SSTIs in the community setting. In the present study, 38% of participants reported limiting their activities and interactions with people outside of the home because of their MRSA history. Some participants attributed this to negative feelings expressed by others in their interviews with us, and other participants indicated that it was self-imposed by their own desire to isolate themselves out of fear of spreading MRSA. There were also reports that unaffected household contacts of children with a history of MRSA infection were approached with caution by institutions and individuals outside of their household. In fact, some caregivers reported being asked by childcare providers to provide documentation ensuring that the siblings of the index patient were not infectious despite their own lack of MRSA history. In a few cases, a letter from a physician accompanied by medical literature did not suffice, and families had to search for new childcare options. Thus, the social burden of MRSA infections persists after the infection has resolved.

Table II. Coding summary: themes, definitions, subthemes, and exemplar texts

Theme	Definition	Subtheme	Exemplar text
Health behavior changes	Preventative health behaviors and description of health behavior changes in response to MRSA diagnosis within the household unit	Handwashing	<i>I'm more conscious of making sure my hands are washed when I'm touching the kids, you know, when they're sick and stuff.</i>
		More vigilance	<i>I am cautious of what they touch and I take hand sanitizer. . . with me.</i>
		Cleaning changes	<i>I think the only thing it could have changed would be possibly the way that we look at the kids and when they have a skin abrasion or cut or something on their body.</i>
		Sharing reduction	<i>My reaction was a deep cleaning of. . . our entire house. I scrubbed. I disinfected. I cleaned like nobody's business.</i> <i>I think at the beginning it did [change our behaviors], but now that we know that it's kind of everywhere, I don't think it does anymore.</i> <i>I change a hand towel at least once during the day, if not twice, and then they only bathe with their own towel, and before it was kind of a free-for-all.</i> <i>We are more conscientious about sharing things such as deodorant. We used to share deodorant before. . . we don't do that anymore. We don't share towels. I think we are much more conscientious about that kind of stuff.</i> <i>There is a greater emphasis in maintaining a little personal space. . . "Please don't share that." "Let's wipe that off." "Get your own towel." "No, don't use that washcloth." There's a lot more attention paid to not sharing things.</i>
Disclosure	Decision and rationale for sharing the MRSA diagnosis with individuals outside of the household	Diligence	<i>Because they need to be diligent about it and to understand what it is and what's going on and how easily, you know, it can be transferred from one person to the next.</i>
		Education	<i>I wanted to make sure that they [other parents] were aware that this could happen. And like, other people with MRSA, I wanted them to know that I understood what they were going through.</i> <i>Her mother, my mother, immediate family. . . People that would potentially watch her or spend time with her. . . just to make sure they, you know, make sure they paying more attention to her too when she's with them.</i>
Social interactions	Notable changes to physical and social behaviors with others in response to the MRSA diagnosis	Self-isolation	<i>I'm self-conscious about spreading it around and to other people. . . I don't want to have that on my conscience since how badly it's been sometimes, I don't want anybody else to have to go through that.</i> <i>I limit who he has contact with because I don't want him to spread it [MRSA] to other kids or babies or anyone like that.</i> <i>There have been things that we've not gone to or we have cancelled because either they are sick or like my grandparents are really frail. So it's like we were afraid for the first few months to take him over there because we didn't want him to infect or them get infected because of exposure or whatever.</i> <i>I don't hug everybody like I used to you know. . . If you go to the restroom, after you wash your hands, I take a tissue to touch the door to go out, because it's kind of defeating the purpose to wash your hands and still touch that door. Same way at work, I just try to be more cautious with hand sanitizers.</i> <i>[During an MRSA SSTI episode] we would, um, we had to excuse ourselves from our obligations for like six weeks. . . So play groups, nursery groups.</i>
		Isolated by others	<i>We have that one friend of ours who was completely disgusted by the fact that we had had that [MRSA infection]. And I do think they're a little different now, especially since they have a little one. I think they definitely feel on edge when they're here or around us.</i> <i>My family treated us like we had the plague for three months. . . not wanting to come around. . . They would not come to my house. In fact, I was supposed to go with my sister to a wedding and she asked me not to go.</i> <i>My father who visits now, just never takes a shower at our house. . . He's here for three days. He says, "I don't sweat that much." Then he's gone. But he never takes a shower here.</i> <i>When my friend had her baby. . . she didn't want me to come to the hospital when he was a newborn. The daycare was concerned. I literally had to bring letters to show he was safe with having bandages on him and that he wasn't spreading it to anyone else.</i> <i>If she [sibling of index patient] had any cuts or anything like that, they [the daycare] wanted her covered over with Band-Aids. She didn't have it [MRSA] and she's never had it. She's fine. Understand he's [index patient] got it but she doesn't.</i> <i>Well we were talking about wrestling. . . It [MRSA] took him off for a whole year. Um, it limited—he had a couple outbreaks during warm weather—he couldn't go swimming and do other things like that.</i>
Knowledge	Information acquisition and dissemination about MRSA infection	Knowledge	<i>Of course I freaked out, you know. You know, you freak out, you try to become diligent in combatting it and, you know, educating other people as well, so.</i> <i>Well, because I was not educated I was very upset. I was like oh my gosh. We have this disease and no one is going to like us. We are going to be alienated. We are going to be outcasts. Then I got educated and started educating people. My family, I started educating them.</i>
Awareness	Apprised of MRSA on the household surface	Awareness	<i>I was a little bummed. . . concerned. . . especially when you think you're cleaning appropriately and maybe you could have done something to prevent it, maybe you couldn't have, but wipe the surface down, even whether it be with bleach or whatever, and you think "ok, I'm good." But you might not be.</i>

The findings in the present study correlate with studies conducted in hospital settings examining the emotional impact and psychosocial repercussions of a MRSA diagnosis. A study conducted in Baltimore exploring the knowledge, awareness, and attitudes of 100 caregivers of hospitalized children with a history of MRSA colonization or infection found that 51% were worried about spreading MRSA to other people. Moreover, caregivers with a perceived incomplete knowledge about MRSA, as well as those with children with a newly identified positive MRSA status, reported worry and anxiety about their child.¹⁴ Anxiety resulting from such a perception of incomplete knowledge regarding MRSA was also revealed during the present study, which highlights an opportunity for clinicians to provide education regarding MRSA acquisition, transmission, and prevention, thus empowering patients and caregivers. In another study conducted in 2009, 13 Swedish adults with MRSA colonization were interviewed to explore their experiences and understanding of their MRSA status. In addition to feelings of guilt and shame, many participants reported experiencing limitations in their day-to-day lives because they feared spreading MRSA to other people. Furthermore, those interviewed said that they feared isolation and negative judgment from other people if their colonization status was shared.¹⁷ These perceptions are concerning, given that social networks are important for overall health and have been associated with decreased rates of hospital readmissions.¹⁶

Within the hospital setting, contact precaution policies, instituted to prevent the transmission of antibiotic-resistant organisms, can incite feelings of isolation and discrimination. Contact precautions include confining patients to their hospital room and requiring healthcare workers to don gowns and gloves when entering the patient's room. These practices, although shown to help reduce the risk of transmission, also have been shown to reduce patient and healthcare worker interactions, resulting in feelings of isolation and anxiety.⁷⁻⁹ The Centers for Disease Control and Prevention recognizes these potential adverse outcomes and recommends that hospitals in which patients are placed in contact precautions take measure to "counteract possible adverse effect on patient anxiety, depression, and other mood disturbances; perceptions of stigma; reduced contact with clinical staff; and increases in preventable adverse events."¹⁸ As evidenced by the present study, clinicians in community settings also need to be cognizant of the feelings of isolation associated with a MRSA diagnosis when counseling their patients. In addition, consideration of the education level and medical history of the primary caregiver, particularly the presence of a mood disorder, could better inform clinicians how to counsel individual families about the potential psychosocial impact of MRSA and provide guidance regarding behavior changes, disclosure, and self-isolation. Community educational campaigns in addition to other strategies may alleviate the negative associations and fears experienced by children diagnosed with CA-MRSA and their household contacts.

Fear of isolation, negative judgments, and other repercussions from disclosing MRSA status not only seem to influence clinical and social interactions, but also may have implications for family and child development. Early work de-

fining social isolation among children identified the frequency and type of interactions with peers and family as critical indicators of isolation.¹⁹ Results from the present study suggest that children with MRSA often are subjected to controlled or limited interactions with peers and family. These constraints may have serious developmental and psychological consequences for the child and their family. Furthermore, this study revealed that the family unit might negotiate its social and family interactions based on fears of being judged and of spreading MRSA. These fears could potentially act as a stressor on family members and the household atmosphere. Understanding the developmental impact and potential psychological outcomes of a MRSA diagnosis on the family unit is critical.

Several limitations of this study should be considered when interpreting the results. Because this is a new field of study, a validated instrument to measure outcomes of interest was not available, and thus the interview administered was created de novo by the principal investigator based on clinical experience and existing literature. Because the survey respondents had participated in a year-long study of MRSA within the household, we were unable to fully assess the degree of their MRSA knowledge before study participation. In addition, the previous research relationship between the participants and some members of the research team (excluding the principal investigator) may have introduced a social desirability response bias; however, the principal investigator and study personnel played no role in the patients' clinical care, which minimized the likelihood of bias. The study households were mostly Caucasian or African American, with few of Latino or Hispanic background; lived in a single metropolitan area; and received private healthcare insurance, and most primary caretakers had some college education. These factors limit the ability to generalize our findings to other populations.

Strengths of the study include a focus on the psychosocial effects of a MRSA diagnosis within the household and community setting. Furthermore, multiple team members independently reviewed the survey transcripts and categorized the answers into the overarching themes to reach consensus in an effort to reduce bias.

Considering the negative psychosocial impact of a MRSA diagnosis, we need to understand how to ameliorate these concerns and burdens so that clinicians can be equipped with educational resources to provide more effective care and treatment plans for patients and their social networks. The findings of our study highlight the need for interventions to combat the negative psychosocial repercussions of a MRSA diagnosis in the community. These essential interventions will inform guidelines for clinicians to best counsel patients and their caregivers about these effects. ■

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