

More Challenges in the Prevention and Management of Community-Associated, Methicillin-Resistant *Staphylococcus aureus* Skin Disease

S*taphylococcus aureus* is and has long been a common cause of community-associated skin infections, transmitted mainly by close (skin-to-skin) contact. Methicillin-resistant *S. aureus* (MRSA), previously seen almost exclusively in association with health care, emerged in the 1990s as a cause of community-associated skin infection (1). In the United States, a single pulsed-field gel electrophoresis type, USA300, has caused most community-associated MRSA infections (2). Outbreaks of *S. aureus* skin infection have occurred in settings conducive to transmission because of crowding, frequent skin-to-skin contact, compromised skin surfaces, sharing of potentially contaminated personal items, and barriers to maintaining hygiene and cleanliness (3–5).

Community-associated MRSA is typically susceptible to multiple classes of antimicrobial agents (1). When antimicrobial therapy is desired as an adjunct to incision and drainage for uncomplicated skin infections, several oral treatment options are generally available. Although data from controlled clinical trials are lacking, treatment options have included clindamycin, trimethoprim-sulfamethoxazole, and tetracyclines (6). Although susceptibility to agents other than β -lactams and macrolides is still the most common profile, resistance to other agents has been documented in USA300 and other community-associated MRSA types (7–10). In an extreme example, resistance to at least 4 classes of non- β -lactam antimicrobials has been described in community-associated MRSA isolates from children in Taiwan and adults in the United States (7, 8, 10).

In this issue, Diep and colleagues (11) present the results of analyses exploring the epidemiology of MRSA USA300 isolates that contain the conjugative plasmid pUSA03. This plasmid contains genes conferring resistance to erythromycin, clindamycin, and mupirocin, and it has the potential to acquire additional resistance elements (7). The authors refer to pUSA03-positive MRSA strains as “multidrug-resistant USA300.” Diep and colleagues build 2 bodies of epidemiologic evidence to suggest that men who have sex with men may be at increased risk for skin infection with a pUSA03-positive strain of MRSA USA300. First, in an ecological analysis performed in San Francisco, Diep and colleagues found a higher incidence of pUSA03-positive MRSA USA300 in residents of areas with a relatively high proportion of male same-sex couples. Second, cross-sectional retrospective analyses of patients with MRSA USA300 skin infections attending an HIV clinic in San Francisco and a community health clinic in Boston suggest that identifying oneself as a man who has sex with men is associated with an increased risk for having a pUSA03-positive isolate.

Diep and colleagues suggest that MRSA, in particular pUSA03-positive USA300, might be sexually transmitted among men who have sex with men. The authors base this hypothesis on the high proportion of infections involving the buttocks, genitals, and perineum (25% and 37% at the San Francisco and Boston clinics, respectively) and recent reports of MRSA skin infections in heterosexual and homosexual partners (12, 13). Because *S. aureus* is known to be transmitted through skin-to-skin contact, the frequency and duration of intimate skin-to-skin contact occurring with sexual activity may increase the risk for cutaneous transmission of *S. aureus*. However, the buttocks and groin are common sites for *S. aureus* infection in adults and children (14, 15), and infection in these areas does not imply acquisition via sexual contact. As the authors acknowledge, they did not assess specific sexual practices and therefore could not determine the relative importance of particular sexual practices in genital or perianal MRSA colonization and infection. Furthermore, they do not assess 2 important parameters in defining an infection as sexually transmitted (16): whether sexual activity is the predominant mode of transmission in these populations and whether mucosal (genital, anal, oral) contact is specifically implicated.

Diep and colleagues confirm that pUSA03-positive strains of MRSA USA300 have emerged in certain communities of men who have sex with men in San Francisco and Boston. We reviewed isolates submitted to the Centers for Disease Control and Prevention (CDC) as part of the Active Bacterial Core Surveillance system for invasive MRSA infections and found that strains bearing this plasmid are rare (CDC. Unpublished data.). The hosts of these strains are not limited to men who have sex with men: Two of 8 pUSA03-positive MRSA USA300 isolates were from women. Information on sexual orientation is not collected in this surveillance system.

Incision and drainage is the primary therapy for uncomplicated MRSA skin infections. Available evidence suggests that most uncomplicated MRSA skin infections respond well to drainage alone (17). It has not been established through controlled studies whether certain patients benefit from ancillary antimicrobial therapy (18); however, experts have recommended that clinicians consider administering antimicrobial therapy in addition to drainage on the basis of such factors as patient age, immunosuppression, severity of local symptoms, and presence of fever (19). Several oral treatment options are available for patients in whom the clinician feels that antibiotics are required, even if the infecting isolate is pUSA03-positive. For example, isolates with tetracycline resistance (typically conferred by the *tetK* gene, located on a separate plasmid),

generally retain in vitro susceptibility to minocycline and doxycycline (8). Resistance to trimethoprim–sulfamethoxazole is rare in MRSA USA300. Despite these available treatment options, we should be alert for isolates that are resistant to antimicrobials, because genetic elements encoding resistance to antimicrobial agents, such as trimethoprim, aminoglycosides, and vancomycin, are easily integrated into the pUSA03 genome (7). For this reason, we should monitor antimicrobial susceptibilities in *S. aureus* isolates in populations where pUSA03-positive strains are prevalent, even after empirical therapy has been modified to provide MRSA coverage.

Optimizing strategies for prevention and control of community-associated MRSA is a continuing task in which the lessons also apply to skin infections acquired by men who have sex with men. Improved hygiene and meticulous wound care seem to have been effective at controlling transmission in outbreak settings (4, 5). These same strategies should help at-risk individuals avoid cutaneous transmission of pUSA03-positive MRSA to close contacts, including sexual partners. In particular, people should avoid contact with infected skin and potentially contaminated objects. No medical authority has recommended postexposure prophylaxis for asymptomatic contacts of MRSA-infected persons. Similarly, participants in a CDC-convened, experts' meeting did not recommend routine use of screening for MRSA colonization or agents to suppress or eliminate colonization for infected persons or their contacts (19); the potential role of these interventions in specific at-risk populations is being evaluated (20). Because antibiotic exposure may facilitate the acquisition of drug-resistant strains of *S. aureus*, clinicians should use antimicrobial agents prudently. Although these general MRSA prevention principles apply to any MRSA infection, some strategies for community-associated MRSA prevention and control may be unique to specific populations—such as prisoners, athletes, day care attendees, and men who have sex with men—indicating a need to customize interventions and rigorously establish their efficacy in these populations.

We currently lack evidence that *S. aureus*, including MRSA, is a sexually transmitted infection as judged by the 2 classic criteria (sex as a predominant mode of transmission and transmission through genital, anal, or oral mucosal contact). We know that *S. aureus* is transmitted primarily by direct skin-to-skin contact, which includes skin-to-skin contact during sexual activity. Furthermore, although the propensity of *S. aureus* to cause infection in the buttocks and groin areas does not imply sexual transmission, contact of these infected areas of skin during sexual activity could result in cutaneous transmission. We do not know whether the mucosal contact that can occur with specific sexual practices imparts an independent risk for transmission.

From a clinician's standpoint, the principles of evaluating and treating MRSA skin infections have not changed. Specifically, when empirical antimicrobial therapy is indicated for a possible *S. aureus* skin infection, treatment

should be selected on the basis of local epidemiology and susceptibility patterns. In communities where resistance to certain non- β -lactam agents is prevalent in MRSA isolates from specific patient groups, such as men who have sex with men, that information should guide empirical therapy. Finally, clinicians must take the time to teach all patients with skin infections, regardless of the site of infection, about wound care and wound containment, which are the foundation of efforts to limit further transmission.

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Disclaimer: The opinions expressed in this editorial are those of the authors, and do not necessarily represent the views of the Centers for Disease Control and Prevention.

Potential Financial Conflicts of Interest: None disclosed.

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Ann Intern Med. 2008;148:310-312.

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