Everybody’s Crying MRSA

The spread of MRSA in hospitals and in the community is a serious concern.

While *Staphylococcus aureus* has been a troublesome pathogen in hospitals and long-term care facilities worldwide for decades, community-acquired methicillin-resistant *S. aureus* (MRSA) has been making news recently, with outbreaks in schools causing the most concern (see In the News, January).

A Gram-positive coccus of the family Micrococccaceae, *S. aureus*—commonly known as “staph”—is “one of the most common causes of skin infections in the United States,” according to the Centers for Disease Control and Prevention (CDC).1 *S. aureus* doesn’t usually cause serious infection except in people who are ill or immunocompromised. Most *S. aureus*-related skin infections are minor (with symptoms such as pimples and boils) and can be treated without antibiotics. About 25% to 30% of people in the United States are colonized with staph—that is, they carry staph bacteria without active infection—and colonization usually occurs on nasal mucous membranes, on skin (particularly in hair follicles), and in the respiratory and gastrointestinal tracts. *S. aureus* produces a variety of toxins, including exotoxins that can cause toxic shock syndrome and an enterotoxin associated with food poisoning; other associated infections include furunculosis, cellulitis, pneumonia, endocarditis, osteomyelitis, and wound suppuration.

MRSA, first described in 1961 as an important human pathogen and documented in an outbreak in 1968,2,3 is resistant to a class of antibiotics called β-lactams, which includes penicillin, oxacillin, and amoxicillin.4 Bacteria may develop resistance as a result of mutation or by acquiring resistance genes from other bacteria. All antibiotic use, both in agriculture and in the treatment of human disease, contributes to the problem of spreading antibiotic resistance. For this reason, it’s particularly important that antibiotics be used properly and sparingly. (For more on antibiotic resistance, see “Is Your Patient Taking the Right Antimicrobial?” and “Acute Respiratory Infections and Antibacterial Resistance,” June.)

**Prevalence.** The Association for Professionals in Infection Control and Epidemiology (APIC) reported in 2007 that an estimated 1.2 million hospitalized patients acquire a MRSA infection each year in the United States, and another 423,000 are colonized.4 According to the CDC, roughly 1% of the general population is colonized with MRSA.4 But in a study of samples taken from the nares of 758 patients admitted on five hospital units, Davis and colleagues reported that 26 (3.4%) were colonized with MRSA.5 Furthermore, five (19%) of those colonized with MRSA on admission developed MRSA infection, and three (25%) of those who became colonized while hospitalized (n = 12) developed MRSA infection (394 were tested). The same study also cites data from the National Nosocomial Infections Surveillance System in which 35% to 50% of *S. aureus* isolates that caused infection in ICUs from 1995 through 1999 were methicillin resistant; that percentage had risen to 57% by 2003.6

**Risk factors.** People with an immature or weakened immune system, such as young children, older adults, and those with HIV or AIDS, may be more susceptible to community-acquired MRSA infection because they lack the antibodies to fight off microbes.1 In addition, participation in contact sports increases risk because MRSA can be spread through skin-to-skin contact; open cuts and abrasions pose particular risk of infection. Sharing personal items such as razors or towels and living in crowded or unsanitary conditions can also increase risk.

**Testing.** The costs and turnaround times associated with different MRSA tests vary. Standard methods of culturing require a minimum of 48 to 72 hours to...
**Prevention Strategies**

Make sure your patients understand what they can do to prevent the transmission of methicillin-resistant *Staphylococcus aureus*. As described on an informational Web site from the Mayo Clinic (www.mayoclinic.com/health/mrsa/DS00735/DSECTION=prevention), patients can take the following precautions:

1. **Perform hand hygiene.** Wash hands after the skin comes in contact with other people or shared surfaces or equipment. Wash hands with soap and water for 15 to 20 seconds or, if hands are not visibly soiled, use alcohol-based hand gel or sanitizer with at least 60% alcohol. Use hand lotion frequently to keep skin from drying out and cracking.

2. **Bathe or shower regularly,** especially after using shared equipment (such as gym equipment).

3. **Do not share personal items** such as razors, towels, or clothing.

4. **Keep wounds covered.** Clean cuts and abrasions immediately and cover with bandages until they are healed.

5. **Sanitize linens.** Wash gym clothing (after each use) and towels and bed linens, with bleach if possible, and dry in a hot dryer.

6. **Get medical attention** if a skin infection does not heal or if pus is draining.

7. **Use antibiotics appropriately.** Complete the course of antibiotics if you are given a prescription to treat an infection. Contact your health care provider if the infection doesn’t improve after a few days of taking an antibiotic. Don’t stop taking the antibiotic until the course is finished even if the infection improves, and don’t share the medication with others.

Writing in a joint position statement, the Society for Healthcare Epidemiology of America and APIC said that they “do not support legislation to mandate use of active surveillance cultures to screen for MRSA” but do “support continued development, validation, and application of efficacious and cost-effective strategies for the prevention of infections caused by MRSA.”

**Health care–associated vs. community-acquired MRSA.**

The MRSA strain circulating in health care facilities differs from the strain seen in the community. The health care–associated MRSA strain typically is classified as the USA100, while the community strain has the USA300 pattern (as identified in pulse-field gel electrophoresis). The health care–associated strain may lead to invasive diseases such as bloodstream infection and ventilator-associated pneumonia and multidrug resistance. In contrast, the community-acquired infection has appeared primarily in young, healthy people who have no recent contact with the health care system (although Huang and colleagues noted that nearly half the community-acquired MRSA cases in their study population were injection drug users and speculated that this subpopulation could be an important reservoir of the community-acquired MRSA strain). While these strains are usually susceptible to antibiotics that aren’t β-lactams, most have genes for the expression of several exotoxins, such as Panton–Valentine leukocidin, and various enterotoxins, which may make them more virulent.

**Legislation.** With the rising number of MRSA infections occurring in health care settings and in the community, many state legislatures have tried to address the problem. As of June eight states had enacted laws regarding the reporting of or screening for MRSA or other MRSA-related programs (or some combination of these), and six states (including two that have already passed MRSA-related laws) had pending legislation on screening or reporting or both (see www.apic.org/am/images/maps/mrsa_map.gif).

**Treatment.** Many state public health departments have published guidelines on the treatment of community-acquired MRSA skin and soft tissue infections, and in March 2006 the CDC published *Strategies for Clinical Management of MRSA in the Community*, which summarizes the recommendations of a panel of more than 30 MRSA experts. Clinicians should refer to this document for complete treatment guidelines.

The panel’s recommendations include the following:

- In patients with mild-to-moderate infections, incision and drainage of abscesses,
without antimicrobial therapy, may be sufficient treatment.

• For infections that can’t be managed with incision and drainage alone, or in patients with systemic or serious infections, antimicrobial therapy may be appropriate.

• Use of antimicrobial therapy should be guided by the susceptibility of locally predominant *S. aureus* strains and modified on the basis of culture and sensitivity test results.

• Antimicrobial therapy may include trimethoprim–sulfamethoxazole (Bactrim and others), minocycline (Minocin and others), doxycycline (Vibramycin and others), or clindamycin (Cleocin and others); courses typically range from seven to 10 days, depending on the severity of infection and the clinician’s judgment.

• Tetracyclines are not recommended for pregnant patients and children under the age of eight years. Consult an infectious disease specialist as needed.

Intravenous vancomycin (Vancocin) has been the drug of choice to treat health-care–associated MRSA.15 But some hospitals have already experienced some degree of vancomycin-resistant MRSA with its increased use. Linezolid (Zyvox), a synthetic antibiotic in a new class of antimicrobials called the oxazolidinones, was approved by the FDA in 2000 and is effective against resistant Gram-positive cocci, including MRSA.15 Linezolid should not be used routinely as empiric treatment because of the potential for antimicrobial resistance and toxicity. There are no recommended guidelines on treating MRSA colonization. In cases of suspected colonization, such as MRSA recurrences or several infections in a household, consultation with an infectious disease specialist is highly recommended. Regimens may include mupirocin ointment 2% (Bactroban Nasal) and an antiseptic body wash such as a chlorhexidine bath.15

**Prevention.** MRSA infection spreads through contact with contaminated hands or equipment. Studies have found staphylococci throughout the hospital environment, on surfaces such as patient charts, laminated tabletops, and curtains, for up to 11 days from the time of contamination.4 Therefore, the best prevention strategy is for health care workers to practice good hand hygiene and to disinfect medical equipment between uses. CDC guidelines recommend contact precautions for patients either infected or colonized with multidrug-resistant organisms, including MRSA (for more on contact precautions, see [www.cdc.gov/ncidod/dhqp/gl_isolation_contact.html]).18 Unfortunately, a recent review of the literature verifies what most nurses already know: “Overcrowding and understaffing have had a negative effect on patient safety and quality of care,” Clements and colleagues write, “evidenced by the flourishing of health-care–acquired MRSA infections in many countries, despite intense efforts to control and prevent these infections.”14

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**REFERENCES**


