

PRACTICE

## Empowering your patients in the fight against methicillin-resistant *Staphylococcus aureus*

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Methicillin-resistant *Staphylococcus aureus* (MRSA); community acquired MRSA; hospital-acquired MRSA.

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### Abstract

**Purpose:** To provide patient teaching points for primary care management and control of methicillin-resistant *Staphylococcus aureus* (MRSA) through application of the latest research regarding transmission of this bacteria.

**Data sources:** Case reports, scientific literature, and the recommendations of expert professional groups.

**Conclusions:** MRSA is a well studied yet continually evolving superbug. There is a paucity of literature regarding detailed home management and containment of MRSA. This review acknowledges the critical importance of patient education regarding MRSA infections and empowers patients with knowledge that can positively impact treatment outcomes.

**Implications for practice:** Awareness of transmission modes and recognition of sources for relapse of infectious states can curb the spread of MRSA in the community.

Few people can resist the warm, wet kisses of a puppy. But how many realize that this and other forms of affection between humans and animals can spread methicillin-resistant *Staphylococcus aureus* (MRSA) (Baptiste et al., 2005)? New research has demonstrated that dogs, among other pets, have been found to suffer from (Leonard et al., 2006) and become colonized with MRSA (Malik, Coombs, O'Brien, Peng, & Barton, 2006; van Duijkeren et al., 2004). Research by Manian (2003) has shown that pets have the potential to transfer MRSA to humans. Another study by O'Mahony et al. (2005) has also shown that the strains of MRSA isolated in domestic animals were identical to human strains. MRSA has been cultured in dogs, cats, rabbits, horses, as well as a single seal and an African grey parrot (Manian; O'Mahony et al.).

MRSA is a global health problem (Vandenesch et al., 2003) and continues to flourish despite years of research and the development of new antibiotics to eradicate it (Siegel, Rhinehart, Jackson, Chiarello, & Healthcare Infection Control Practices Advisory Committee for the Centers for Disease Control and Prevention, 2006). The problem is so serious that MRSA has been listed by the Infectious

Diseases Society of America as a "superbug" and is further described as "one of the six top-priority dangerous, drug-resistant microbes" (Baragona, 2006). In the United States, MRSA is now the number one offender in nosocomial infections (Baragona).

With the continued virulence of MRSA, patient teaching becomes a critical component in the management of patients in the home setting. Thorough teaching can empower patients with proactive measures to eradicate MRSA from their homes, avoid reinfections, and prevent further spreading. These efforts in teaching will support patient autonomy, enable patients to make healthy lifestyle choices, and alleviate anxiety. Eradication of MRSA is complicated and will require the comprehensive, knowledgeable efforts of primary healthcare providers and patients in order to be effective in the home or other settings.

### Purpose

The purpose of this review is to provide clinical practice recommendations for patient teaching in the primary care

setting, which are based on current evidence and the recommendations of professional societies. The latest trend in MRSA infection as well as the newest MRSA research involving MRSA transmission through pets is highlighted. A quick reference for factors associated with MRSA infections is included, as well as a patient teaching guideline to assist the primary care practitioner in the management of patients with MRSA infections in the home setting.

## Background

There are two types of MRSA, community-acquired MRSA (CA-MRSA) and hospital-acquired MRSA (HA-MRSA). The oldest of these is HA-MRSA, first discovered in the 1960s. It requires a compromised host and is no stranger to hospital intensive care units. Over time, it has demonstrated resistance to multiple drugs in the hospital setting (Baggett et al., 2003; Centers for Disease Control and Prevention [CDC], 2002) and has been associated with acute and nonacute healthcare facilities (CDC, 2005a). In these inpatient settings, HA-MRSA has been associated with pneumonias, urinary tract infections, bloodstream infections, and wound infections (CDC, 2005c). Refer to Table 1 for further delineation of factors associated with HA-MRSA.

Emergence of MRSA in the community was noted sporadically in the 1970s and 1980s and was initially believed to be just the spread of HA-MRSA to the community via colonized HA-MRSA patients and healthcare workers. The significance of CA-MRSA was not fully recognized until 1999, when a strain claimed the lives of four young, healthy children in North Dakota (CDC, 1999). Subsequently, CA-MRSA has spawned outbreaks around the globe among healthy persons in the community setting. Laboratory testing was developed using DNA technology and molecular epidemiological studies which enabled researchers to prove that genetically different strains of MRSA were involved in the outbreaks of HA-MRSA and CA-MRSA (King et al., 2006). The CDC (2005a) acknowledges that three different strains of MRSA in the United States have been found in CA-MRSA outbreaks.

Historically in the United States, outbreaks of CA-MRSA have occurred among certain ethnic groups including Pacific Islanders and Midwestern and Alaska Native Americans (Baggett et al., 2003; CDC, 2004; Stemper, Shukla, & Reed, 2004), in newborn nurseries (CDC, 2006), and in day care centers (Iyer & Jones, 2004). This version of MRSA (CDC, 2005c) has been primarily associated with soft tissue and skin infections but in some cases has led to more serious conditions requiring hospitalization or even deaths (Gonzales et al., 2005). Table 1 shows further details with regard to factors associated with CA-MRSA.

**Table 1** Factors associated with MRSA infections

CA-MRSA	HA-MRSA
Female gender <sup>a</sup>	Recent antibiotic use <sup>h</sup>
Other than Caucasian <sup>a</sup>	Family member with HA-MRSA <sup>i</sup>
IV drug abuse <sup>b</sup>	Recent hospitalization <sup>h</sup>
Incarceration <sup>c</sup>	Hemodialysis <sup>h</sup>
Roommate with CA-MRSA <sup>d</sup>	Implanted medical device <sup>h</sup>
Gym/sports team member <sup>e</sup>	Living in long-term care facility <sup>h</sup>
Member of uniformed services <sup>d</sup>	Recent surgery <sup>h</sup>
Family/friend employed in health care <sup>d</sup>	
Antibiotic use within 6 months <sup>b</sup>	
Hospitalization within 12 months <sup>a</sup>	
Diabetes <sup>b</sup>	
Active skin disease <sup>b</sup>	
Current malignancies <sup>b</sup>	
Tattoo recipient <sup>f</sup>	
Crowded living conditions <sup>g</sup>	
Poor hygiene <sup>g</sup>	
Cuts or abrasions <sup>g</sup>	

<sup>a</sup>King et al. (2006).

<sup>b</sup>Iyer and Jones (2004).

<sup>c</sup>Centers for Disease Control and Prevention. (2001). Methicillin-resistant *Staphylococcus aureus* skin and soft tissue infections in a state prison—Mississippi, 2000. *Morbidity and Mortality Weekly Report*, 50(42), 919–922.

<sup>d</sup>Campbell, K. M., Vaughn, A. F., Russell, K. L., Smith, B., Jimenez, D. L., Barrozo, C. P., et al. (2004). Risk factors for community-acquired methicillin-resistant *Staphylococcus aureus* infections in an outbreak of disease among military trainees in San Diego, in 2002. *Journal of Clinical Microbiology*, 42(9), 4050–4053.

<sup>e</sup>Centers for Disease Control and Prevention (2003a).

<sup>f</sup>Centers for Disease Control and Prevention. (2006). Methicillin-resistant *Staphylococcus aureus* skin infections among tattoo recipients—Ohio, Kentucky, and Vermont, 2004–2005. *Morbidity and Mortality Weekly Report*, 55(24), 677–679.

<sup>g</sup>Centers for Disease Control and Prevention (2005b).

<sup>h</sup>Gorwitz et al. (2006).

<sup>i</sup>Calfee et al. (2003).

Thus far, CA-MRSA has not demonstrated the multiple drug resistance patterns of HA-MRSA, but it is no less of a threat to health care than HA-MRSA. CA-MRSA does not require a weakened host and therefore can spread readily in the community setting. Although phenotypically the two types of MRSA differ, it is becoming more difficult to distinguish between them clinically. It is possible to find both types of MRSA in the community and hospital settings. The labels of CA-MRSA and HA-MRSA are becoming misnomers as trends in MRSA research show that strains of CA-MRSA are now being found in substantial nosocomial cases of MRSA (Maree, Daum, Boyle-Vavra, Matayoshi, & Miller, 2007; Seybold et al., 2006; Skiest et al., 2006). For patient teaching purposes, it is not necessary to distinguish between the two types of MRSA. Distinguishing between types is critical, however, for the

purposes of prescribing appropriate antimicrobials in the primary care setting, conducting research, for public health tracking of strains in outbreaks and surveying local resistance patterns.

### Modes of transmission

In order to impact patient teaching, the healthcare professional and patients must recognize methods of containment and transmission. According to the CDC (2005c), MRSA is primarily spread in the community setting via unwashed hands. Hand contamination occurs through contact with infected persons/wounds, body sites of colonized persons, or contact with inanimate surfaces/objects exposed to body fluid from infected or colonized persons (CDC, 2003b).

It is critical to note that people can remain asymptomatic carriers or become colonized with MRSA. The CDC acknowledges that it is possible to develop nasal colonization for MRSA after exposure, but the incidence is extremely low compared to the colonization of non-MRSA. Patients who are colonized may or may not have been treated for past infections involving MRSA. Even after resolution of symptomatic MRSA infections, some patients remain colonized for months (van Duijkeren, Wolfhagen, Heck, & Wannet, 2005; Weese et al., 2006). It has been cultured in the nose, throat, perineum, and skin lesions of asymptomatic human subjects (van Duijkeren et al., 2004). At present, the CDC (2000) does not recommend routine random screening of humans to determine MRSA colonization upon admission to hospitals.

The most recently discovered means of transmission is the family pet. Although the rate of MRSA infections for treated animals remains low (Malik et al., 2006), MRSA incidence has not been exhaustively studied in this population. Historically, MRSA in animals had only been seen infrequently in postoperative infections (Morris, Rook, Shofer, & Rankin, 2006). The unsuspected emergence of both HA-MRSA and CA-MRSA strains in the domestic animal population as a primary cause of non-postoperative infections will bear watching more closely in the future.

Isolated cases of protracted or recurrent MRSA infections in the human outpatient setting have been linked to pets in the home being colonized. Until the family pet was suspected, cultured and treated along with human occupants of the home, the infection remained refractory to treatments (Manian, 2003; van Duijkeren et al., 2004; 2005). A case of a pet therapy dog that developed positive MRSA cultures after visiting gerontology wards in a hospital in the United Kingdom raises further concerns for human to animal transmission of MRSA (Enoch et al., 2005).

Transmission of MRSA via shared equipment or surfaces has been documented among athletes having close contact during sports or sharing showers, towels, or equipment (CDC, 2003a). One study by Dietze, Rath, Wendt, and Martiny (2001) demonstrated that MRSA could live on the external wrap of sterile packaging for more than 38 weeks. Its ability to survive outside of the human body has made it an elusive foe of hospitals for decades.

### Importance of teaching

The clinician should consider all MRSA infections as contagious as impetigo. By taking this perspective, the importance of strict personal hygiene, housekeeping, and hand washing regimens will become important focal points in patient teaching designed to help curb the spread of MRSA within the household or community. Patient teaching for anyone with an MRSA infection should also include specific instructions for home care regarding the laundering, wound covering, sharing rules, and pet concerns. These of course, would be in addition to medications, wound care, and follow-up care instructions, and any other instructions specific to their individual case.

Although research on MRSA abounds, there is a paucity of definitive guidelines for in-home treatment/containment of MRSA, other than a few instructions for the public on the CDC (2005b) Web site. Therefore, after reviewing all current, pertinent recommendations (CDC Strategies for Clinical Management of MRSA in the Community, March 2006; CDC's Management of Multi-drug Resistant Organisms in Healthcare, 2006; CDC Guideline for Hand Hygiene in Health-Care Settings, 2002; and the Society for Health Care Epidemiology of America Guideline for Preventing Nosocomial Transmission of Multidrug-Resistant Strains of *Staphylococcus aureus* and *Enterococcus*, 2003), an easy patient teaching guideline was created. It is based on the latest available evidence for the inpatient populations of acute and nonacute settings to address possible best practice for home care of patients with MRSA infection. Table 2 outlines the components of this teaching protocol which is detailed in the remainder of this article.

### Hand hygiene

Perhaps, the most powerful weapon in averting transmission of MRSA in the community as well as in health-care settings is proper hand hygiene. But how often do practitioners give patients concrete stepwise instructions for this basic but important task? Hand washing instructions encourage patients to develop techniques supported by the CDC (2002). In addition to the steps listed in Table 2, patients should be advised *when* to wash their hands. Hand hygiene should be performed after contact

**Table 2** Patient teaching guidelines

Domain	Components
Hand washing	<ul style="list-style-type: none"> <li>Wet hands before applying soap</li> <li>Use warm, not hot, water</li> <li>Wash hands using plain or preferably antimicrobial household soaps</li> <li>Lather hands covering all surfaces for a total of 15 s</li> <li>Rinse hands well</li> <li>Use towels to dry hands and turn off faucet</li> <li>Single-use towels are highly recommended</li> </ul>
Housekeeping	<ul style="list-style-type: none"> <li>Segregate contaminated bedding or clothing</li> <li>Recognize/clean shared surfaces (e.g., keyboards, remote controls)</li> <li>Use moisture barriers on mattresses if wound drainage is present</li> <li>Segregate patient bathroom from others' use</li> <li>Disinfect shared tub/showers with 1:100 bleach solution between users</li> <li>Segregate contaminated cleaning utensils</li> <li>Clean with disposable clothes or sponges</li> <li>Disinfect toys regularly</li> </ul>
Laundry	<ul style="list-style-type: none"> <li>Wash contaminated laundry in <i>hot</i> water</li> <li>Use bleach whenever possible in the laundry</li> <li>If unable to bleach, add disinfectant solutions per label instructions</li> <li>Dry in dryer on hot setting rather than air drying</li> <li>Wash contaminated items separate from other laundry</li> <li>Before next load, run washer on hot, adding bleach.</li> </ul>
Wounds	<ul style="list-style-type: none"> <li>Wounds must be covered whenever drainage is present</li> <li>Use barrier over all wounds when in close contact with people or pets</li> <li>Cover all wounds before intimate contact</li> <li>Minimize intimate contact with wounds on buttocks/genitals/perineum</li> </ul>
Sharing rules	<ul style="list-style-type: none"> <li>Do not share towels</li> <li>Do not share razors, clippers, tweezers, etc.</li> <li>Do not share clothing with infected persons</li> <li>Disinfect and air-dry shared equipment between uses</li> <li>Keep cloth barrier between skin and shared equipment (e.g., weight bench)</li> </ul>
Pet concerns	<ul style="list-style-type: none"> <li>Provide regular bathing per veterinarian advice</li> <li>Prompt veterinarian treatment for wounds/signs of infection in pet(s)</li> <li>Wash hands after contact with pets</li> <li>Avoid letting animals lick people</li> <li>Keep pets away from wounds or any likely wound contaminated surfaces</li> <li>Clean up any pet soiling promptly with hot water and bleach/disinfectants</li> <li>Dispose of pet waste promptly to avoid zoonotic transmission of infection</li> <li>Advise medical provider of any pets that are regularly in contact with you</li> <li>In relapsing/spreading MRSA infections, pet may need to be tested/treated</li> <li>Make veterinarian aware of past or present MRSA infection in household</li> </ul>

with a wound/adjacent wound surfaces, soiled clothing/dressings, or after contacting shared surface that may be contaminated, for example, the family dog, doorknobs to bedrooms, or electric toothbrush handles. In addition to soap and water methods, hand hygiene can also be effectively performed using alcohol-based hand sanitizing gels, which have gained popularity in the community. Gel dispensers now exist in some public facilities, such as in many athletic clubs. CDC (2002) recommendations for healthcare providers include avoidance of false nails, chipped polish and fingernails longer than one-quarter inch should also be included. Inform patients that nails should be cleaned each time hands are washed and nails brushed or use nail sticks as necessary. Make certain patients understand that harsh scrubbing of hands or nails is not recommended because it leads to skin breakdown and increased risk of the transmission of infection.

Any nailbrushes, nail files, or clippers from an infected patient (CDC, 2003b) should be cleaned with either a 1:100 bleach solution (Gorwitz Jernigan, Jernigan, & Participants in the CDC-convened experts' meeting on management of MRSA in the community, 2006) or 70% isopropyl alcohol (Muto et al., 2003). This recommended ratio for bleach cleaning solution equates to one tablespoon of household bleach to one quart of water.

More importantly, patients need to think of the world outside their home as also posing a potential for reinfection. They need to carry alcohol gels or foams with them in their automobile to use after sharing surfaces such as doorknobs, check out counters, money, or shopping cart handles. This portable hand washing method can be pivotal in controlling the spread of MRSA. The recommended strength of alcohol gels, foams, or lotions should be 70% alcohol by weight. Patients should know that they should continue rubbing hands together until the hand surfaces are dry and they must never use the alcohol preparations in place of soap and water when there is visible soiling of hands (CDC, 2002).

Lastly, they need to understand that the frequency of hand washing recommended will necessitate emollients for hands to avoid excessive drying or chapping (Muto et al., 2003). This should be an oil-based product applied at least twice a day. Explain that small cracks in skin tissue of hands will make them even more vulnerable to infection and protecting hands with an emollient is vital to successfully avoiding further transmission of infections.

Practitioners may need to assist patients in identifying the shared surfaces that wounds and wound drainage may touch. These areas need frequent cleaning. Parents need to recognize that shared toys, doorknobs, waste cans, refrigerator, or cupboard doors may harbor these bacteria. Frequently, tub and shower surfaces as well as bedding

can become reservoirs for spreading MRSA. Once patients are aware of this, they can take actions to limit the number of exposed surfaces in the home.

### Comingling

With children, it may be necessary to stop sharing the bed with a sibling or to refrain from swimming in a shared pool until the children are declared free of all signs of MRSA by a clinician. In the case of very young children, it may be necessary to keep them home from day care centers to avoid contamination of others until active infections are resolved.

If reusable cleaning towels or sponges must be used, advise the patient to soak them in the bleach solution mentioned earlier for at least 20 min prior to hot water washing (Hospital aims to put public in hot water, 2005). When available, using a clothes dryer is preferred to help kill bacteria prior to reusing such items elsewhere in the house (CDC, 2005b).

### Disinfecting other fomites

When MRSA occurs in very young children, toys that cannot be decontaminated by using a 1:100 bleach solution or household disinfecting detergents, laundered in hot water, or dried in a hot dryer should be thrown out. Using the phrase, *when in doubt throw it out*, may help patients and their families to better identify and eliminate potentially colonized items/surfaces in their homes.

Encourage clients to discard makeup or bathing sponges that were used prediagnosis and to use only disposable alternatives for makeup during treatment until they are declared free of MRSA by their healthcare provider. Likewise loofahs and bath mitts or other devices from the bath or shower should not be used unless the patient is willing to disinfect these on a regular basis using aforementioned laundry and bleach techniques.

If MRSA infections occur in facial areas, any makeup products or applicators used prior to or during diagnosis of MRSA infections should be discarded and new ones obtained after the MRSA has been eradicated. Abstaining from wearing makeup with active MRSA infections is advised by this author as the products can become a reservoir for MRSA. In addition, makeup counters in department stores where the same pallet is used by multiple persons are also potential reservoirs of MRSA reinfection.

### Gaining laundry leverage

Another issue in deterring transmission is handling of clothing and linens that may be exposed to drainage from wounds or have been in contact with dry wounds. Hot water usage and hot dryer settings are recommended.

Patients need to be selective about which items in their wardrobe will be worn during this infectious state and keep exposure limited to those durable items that lend themselves to aforementioned disinfecting steps. Again, encourage patients to remember the phrase, *when in doubt, throw it out*. Make it explicitly clear that giving such items to charity would not be a sound idea because it would lead to further spread within the community.

### Wound coverings and personal hygiene

Patients with MRSA must consider their wounds and body surfaces as transmission zones whether or not they see drainage and take appropriate precautions. Wound covering becomes especially important in children too young to take on this responsibility. The infected patient should be encouraged to take hot showers daily and prior to any anticipated close contact with others such as sports or intimacy. Wound coverings should also be changed at these times unless otherwise directed by the primary care provider.

Hot showers by the infected person prior to contact and clean wound dressings are recommended. Hot showers for both partners after intimate contact are also recommended. If the location of the source wound allows for a thin layer of clothing to remain intact during intimate contact, this is recommended, for example, leaving a tube sock on over the dressing of a calf or foot wound. Wash razor heads in 70% isopropyl alcohol (Muto et al., 2003) and allow to air dry after each use to disinfect them. Using disposable razors during a time of infection would be best because the nares, pharynx, axilla, and perineum are body areas associated with MRSA colonization (Gorwitz et al., 2006, Graham, Lin, & Larson, 2006).

### Sharing rules

Strict adherence to no sharing rules must be made clear to all patients to avoid transmission or contraction of MRSA in the community setting. Avoid contact with another person's clothing or items of intimate personal hygiene. Encourage hand washing after each contact with these items.

Team events such as football or fencing where equipment may be shared needs to be addressed (CDC, 2003a). Parents and members of all teams should be aware of how easily CA-MRSA can be transmitted to others through use of shared equipment if not properly cleaned. Best practice would be not sharing of equipment; however, that is not always feasible.

In sharing signs of affection, patients should be advised that it is safe to embrace their friends and loved ones but to have loved ones wash their hands after contact with the infected patient (CDC, 2000). Lovemaking or kissing is

permitted unless there is obvious risk of transmission such as MRSA infection from intimate sites such as mouth, face, or genitals/perineum (Gorwitz et al., 2006). These situations will need to be handled on an individual basis, with a personalized home care plan.

### Practitioner challenges

Practitioners are faced with a complex battle in treating MRSA in the community. Research by Calfee et al. (2003) screened community contact persons and household individuals of HA-MRSA infected or colonized individuals and found a 15% rate of transmission of the bacteria. This same study found that individuals in close contact with infected or colonized persons had 7.5 times the risk of becoming colonized with MRSA in the community setting. Because infections caused by MRSA are not part of mandatory reporting in most of the United States, the incidence of overall MRSA and transmission rates of MRSA in the outpatient setting may be grossly underestimated in current research. Practitioners need to become aware of the incidence and prevalence of MRSA in their own communities as well as trends in antimicrobial resistance in order to be effective in managing their patients. Research shows these trends are dependent upon geographic locations. Local public health officials can lend invaluable support in these areas of inquiry.

### When to refer

Practitioners should inform patients of the possible need for further cultures, referrals to specialists, or for having other household members tested for MRSA infections or colonization. Patients need to understand that infections involving joints, deep muscle, near the eyes/mastoid, or between mouth and nose need to be watched more closely and may require the involvement of an infectious disease specialist. Practitioners should also recognize the need for infectious disease referrals when there is evidence of chronic or relapsing infections that are refractory to treatment. The spread of MRSA to new household members or significant others, or where an outbreak pattern presents among other contacts such as a sporting team is of greater concern. It is highly recommended that these cases be referred to an infectious disease specialist and possibly local public health officials if mandated by local health laws (Muto et al., 2003).

### Decolonization

Increasing numbers of experts are suggesting further vigilance involving tracking strains, resistance patterns, and prevalence of outbreaks, and identifying colonized individuals to gain control over MRSA both nationally and

internationally (Gorwitz et al., 2006). To date, no definitive data with repetitive studies of CA-MRSA have clearly defined distinct risk factors. No reliable clinical research can be cited to demonstrate the efficacy of decolonization of MRSA patients on a large scale (Gorwitz et al.; Muto et al., 2003). The CDC (2000) does not support random screening for all patients in the hospital setting. However, it does offer the option to healthcare providers for screening high-risk patients prior to hospital admission.

### Unusual collaboration

Practitioners may need to work with veterinarians in cases where relapsing infections occur and a pet coexists in the home. The pet should be ruled out as a possible reservoir and either the veterinarian or the local health department can collect isolates from the pet. These measures are critical to maintain local surveillance of strains and their virulence and transmission rates. Patients should tell any veterinary provider treating their pet that they are being treated for MRSA (CDC, 2005b). In light of the newest pet research, they should also be advised to tell their veterinarian if their pet becomes ill.

Providers should maintain an awareness of the potential MRSA transmissions between animals and humans in all settings including pet therapy dogs, trained assistive animals, and household pets. Lastly, the practitioner must maintain a suspicion for an undetected source of CA-MRSA in a patient's environment if relapsing or chronic infection ensues. In this case, the patient and cohorts need to be screened for nasal colonization. Muto et al. (2003) recommend that an infectious disease consult be made for any attempts at eradicating colonization of MRSA or decolonization.

### Conclusions

The data reviewed in this discussion are only a small portion of existing literature on MRSA. There is additional research regarding transmission of MRSA between humans and domestic animals and this area is being further explored. Healthcare providers will need to keep abreast of new research for indications of practice changes.

The research on CA-MRSA is still in its early stages and few definitive data exist to date in this area. Trends show that it has a disproportional incidence among children, homeless persons, and persons with HIV at this time. The reasons for this are not yet fully understood.

The evidence-based data are clear; MRSA is not well controlled throughout the globe. Finland and Denmark are exceptions, where rates of infection in hospitals remain at or below 1% (Muto et al., 2003). The highly vigilant programs used by healthcare systems in these countries

have not, however, been supported or adopted by other larger and more densely populated countries. High prevalence rates of MRSA (28%–63%) have been found in certain areas of the United States and other countries among *Staphylococcus* specimens isolated in hospital laboratories (Zinn, Westh, Rosdahl, & Sarisa Study Group, 2004). This clearly indicates the scope of the MRSA problems among the inpatient populations globally.

Most experts agree that the approach to MRSA will require a multifaceted plan. This plan must include educating those involved in the transmission of MRSA, biological surveillance of outbreaks and trends to identify reservoirs and antimicrobial resistance patterns, and possibly decolonization of selected individuals (Muto et al., 2003; Noggle et al., 2006; Siegel et al., 2006; Talbot et al., 2006). Antibiotic stewardship is also a significant concern, and responsible prescribing habits must be emphasized (Muto et al., 2003; Siegel et al., 2006; Talbot et al., 2006).

The easy to follow patient teaching guideline described here addressed issues important to managing outpatients with MRSA infections and potential to curb the spread of MRSA. Best practice has been identified, citing expert panels' recommendations or current research. This prototype should serve as a useful tool in building patient teaching literature in the primary care setting.

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