METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA)

Infection Control Guidelines for Long-Term Care Facilities

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The presence of antibiotic resistant bacteria, such as MRSA, is not a problem limited to hospitals. MRSA was first recognized in the United States in the 1970s. According to the Centers for Disease Control and Prevention's (CDC) National Nosocomial Infections Surveillance System (NNIS), the proportion of *Staphlyococcus aureus* isolates resistant to methicillin in participating hospitals increased from approximately 29% in the early 1990's to 47% in 1998. Infected and colonized residents may serve as potential sources for the spread of MRSA in long-term care facilities. Elderly residents are at increased risk for colonization with MRSA, in addition to having the potential to carry MRSA for long periods of time. It is not known how common MRSA is in long-term care facilities, but according to some estimates as many as 80,000 patients a year acquire MRSA infections after they enter a hospital.

Infection or colonization with MRSA is not grounds for denial of admission to a long-term care facility. In 1989, 105 CMR 150.000: The Rules and Regulations for the Licensing of Long-Term Care Facilities were amended. Section 105 CMR 150.003(D)(1)-(3)(a-d), the section that allowed long-term care facilities to restrict admission to persons who had a "contagious disease in a communicable form . . . ", was **deleted in its entirety**.

Infectious Agent: A strain of *S. aureus* that is resistant to methicillin, oxacillin, nafcillin, and other antimicrobials.

Reservoir: Colonized and infected patients. The anterior nares are a common colonization site. To a lesser degree, colonized healthcare workers may also serve as a reservoir.

Modes of Transmission: Person-to-person contact, for example, via transiently colonized hands of staff. Fomites such as bed linens or environmental surfaces are not thought to play a major role in transmission except in special populations, such as patients in burn units or intensive care units. Cleaning and disinfection of these items is necessary, however, to reduce bacterial load and risk of transmission. Hands of staff appear to be the most likely mode of transmission of MRSA from patient to patient. Droplet-borne transmission is less common but may be important in patients with tracheostomies who are not able to control their secretions. MRSA can be found on the skin, in the nose, and in blood and urine.

Incubation Period: Variable

MRSA Infection: Invasion and multiplication of MRSA in a body site accompanied by clinical signs and symptoms of infection (e.g., fever, lesions, wound drainage) or increased white blood

cell count. **Infection warrants treatment.**

MRSA Colonization: MRSA is present in or on a body site; no clinical signs or symptoms of illness or infection are present. **Colonization may not warrant treatment, but a colonized patient may transmit MRSA to others.**

Common risk factors for acquiring MRSA:

- Hospitalization or confinement in a setting where MRSA is endemic
- prolonged hospital stay
- multiple hospitalizations
- age over 65 years
- invasive devices (e.g., catheters, gastric/endotracheal tubes, surgical drains, sumps)
- open wound
- severe underlying illness
- treatment with multiple broad-spectrum antibiotics
- close proximity to patients colonized or infected with MRSA
- inpatient in a neonatal or surgical ICU
- inpatient in a burn unit

Diagnosis: MRSA infection can be diagnosed by positive culture together with signs/symptoms of infection. In this case, MRSA is usually cultured from blood, wounds, respiratory secretions, urine, or surgical specimens. Common sites of infection (and colonization) include wounds, tracheostomy sites, respiratory tract of intubated patients, and IV catheter sites. Colonization can be detected by culture of the organism from an asymptomatic patient. In this case, MRSA is usually cultured from the skin, nares, or rectum. After *S. aureus* is identified, antibiotic susceptibility testing should be performed.

Certain patient populations, such as hemodialysis patients, intravenous drug users, those with dermatological diseases such as eczema, and patients with insulin-dependent diabetes mellitus, have increased rates of staphylococcal carriage.

Treatment: The antibiotic of choice for MRSA **infections** is vancomycin given intravenously. Many minor MRSA infections can be successfully treated with trimethoprim-sulfamethoxazole, if susceptibility is established by testing. **Avoid unnecessary use of antibiotics with all patients.** This reduces the survival advantage of MRSA and other resistant bacteria.

The effectiveness of decolonization (i.e., treating colonized patients to eradicate their MRSA) is questionable. Use of topical agents such as mupirocin, and antibacterial soaps have had some efficacy in the absence of foci of active infection. The decision to attempt decolonization must be made by the patient's physician and should be evaluated on an individual basis. Factors to consider are immune status and likelihood of transmission to others.

Control: As with vancomycin-resistant enterococci, an individual with MRSA can be either infected (showing clinical signs/symptoms, e.g. fever, lesions, wound drainage) or colonized (MRSA is present in or on a body site without clinical signs/symptoms), and in either case is capable of transmitting it to others.

Precautions: Isolation precautions (e.g. contact precautions) should be implemented according to the type of MRSA infection or colonization. Standard precautions should be practiced at all times, regardless of MRSA status. Transmission-based isolation precautions should be continued for as long as the resident continues to have secretions or excretions that cannot be contained. When the condition of a resident changes (e.g. wound drainage is contained), transmission-based isolation precautions can be modified or discontinued.

Gloves: Gloves should be worn when providing care that involves substantial personal contact (e.g. changing clothes, toileting, bathing) or contact with items that may be contaminated by MRSA (e.g. bedding). If, during the course of patient care, gloves become soiled with potentially infectious material (e.g. urine, stool), they should be changed before further contact with clean surfaces, the patient, or other staff. Remove the gloves after caring for the patient and wash hands with an antibacterial soap before leaving the room. Gloves alone do not guarantee prevention of transmission.

Gowns: Gowns should be worn if the caregiver's clothing is likely to have substantial contact with a MRSA-positive resident in the course of care (e.g. bed baths, lifting). Gowns should be removed immediately after care and the caregiver's hands should be washed prior to leaving the resident's room. Gowns are not necessary for feeding or measuring vital signs.

Masks: MRSA is not known to be transmitted through the airborne route. However, masks are recommended when the patient has MRSA bronchitis or tracheitis, lower bronchial colonization or a tracheostomy, and during care of MRSA-infected burns. If extensive splattering is expected, protective eyewear may be warranted.

Hand hygiene: Strict adherence to hand hygiene protocols must be maintained. Staff and visitors should wash their hands with an antibacterial soap (soap is not as effective in removing transient carriage) after glove removal, after patient care, and prior to leaving the room of a MRSA-positive resident. Hands should be dried with a dry, disposable paper towel, and faucets should be turned off using a paper towel. Hands should be washed after touching body fluids, secretions, excretions, and contaminated items, whether or not gloves are worn. Educate staff and residents about the importance of hand hygiene. If residents can not wash their own hands after bathroom use, their hands should be washed for them. Recent studies have shown that the use of a waterless, alcohol-based hand antiseptic is as effective as antimicrobial soaps, is not harmful to hands, and may improve compliance. However, these products are not a substitute for handwashing in the event of visible contamination.

Linens: Minimal handling of soiled linens should be stressed. Staff involved with stripping beds or otherwise having direct contact with these materials should wear gloves and gowns. Soiled linens should be bagged in the resident's room.

Environmental Cleaning: Routine cleaning of the resident's surroundings should be done **daily** to reduce bacterial load. Sharing of noncritical equipment (such as electronic thermometers, blood pressure cuffs, and intravenous poles) should not be permitted. Cleaning supplies should be dedicated to the room. Discard all contaminated disposable supplies after the resident leaves the room, and keep disposable supplies in the room to a minimum. Only plastic, vinyl, or leather-coated furniture that can be wiped down with a disinfectant should go in the room. Bath tubs, whirlpools, and hydrotherapy tubs should be cleaned and disinfected after each use. Solutions of 5.25% sodium hypochlorite (household bleach) diluted to 1:64 with water (1/4 cup bleach to one gallon of water) are acceptable for disinfection of environmental surfaces. Always consult your facility's housekeeping protocols first. There are several other disinfectant products on the market. However, only those that are registered by the Environmental Protection Agency (EPA) as a hospital-grade disinfectant should be used. A list of EPA registered disinfectants may be obtained by calling the Antimicrobial Complaint System at 1-800-447-6349 or by visiting the National Antimicrobial Information Network (NAIN) at http://nain.orst.edu/lists.htm. There are four lists: List A-agents, described as sterilants; List B-agents, effective against Mycobacterium (TB); List C-agents, effective against HIV-1; and List D-agents, effective against Hepatitis B Virus and HIV-1. The lists are maintained by Texas Tech University, which also operates an EPA-sponsored hotline, and are updated annually.

Room Placement: A private room is not necessary unless the patient has a condition that would increase the likelihood of transmission (e.g., eczema, a large MRSA-infected or colonized burn, or lower respiratory tract infection). However, when placing residents with MRSA in multiple-bed rooms, their roommates should not be severely immunocompromised or have indwelling lines or open wounds.

Group Activities: A long-term care facility is generally considered a resident's home. A MRSA-positive resident should be allowed to ambulate, socialize as usual, and participate in therapeutic and group activities as long as contaminated body substances are contained. When residents leave their room, they should have their hands cleaned. In addition, they should have clean, dry dressings and wear clean clothes. Where appropriate, enhanced barrier protection to contain a contaminated body substance is preferred over restriction of the resident.

Staff education: All staff working in a long-term care facility should receive education and training regarding MRSA and the importance of control. Education should be provided on a regular basis, at least annually. Additionally, inservice training in infection control should be

provided in response to any increase in MRSA frequency within the facility.

OUTBREAK CONTROL

An outbreak may be defined as the occurrence of a disease or condition in excess of what is normally expected. Each case of MRSA in a resident should be closely monitored as previously described. However, the following should be conducted in **outbreak** situations:

1. Individual cases of MRSA are not presently reportable to the Massachusetts Department of Public Health. However, in outbreak situations, notify the Department of Public Health, Division of Health Care Quality at (617) 753-8000 and the local board of health. You should also contact the Division of Epidemiology and Immunization at (617) 983-6800 for additional advice.

2. Reinforce infection control procedures throughout the facility (e.g., handwashing and isolation precautions).

3. Establish a cohort of MRSA-positive residents. Staff should be restricted to caring for **only one cohort** of residents. **Restrict floating of staff.**

4. Culture all residents in the affected units. Staff with signs of staphylococcal infection should be cultured. Asymptomatic staff who have had contact with MRSA-positive residents should also be cultured. Culture-positive staff should be assessed on a case-by-case basis following the employee health guidelines of the institution.

5. Institute appropriate isolation precautions for the MRSA-positive cohort immediately.

6. Conduct an epidemiological investigation to the best of your ability. Focus on collecting the following information for each MRSA-positive patient (case):

   (a) the patient's location in the facility (before and after cohorting)
   (b) date(s) of the patient's original and most recent admissions to the facility
   (c) dates(s) of recent admissions/discharges to/from other acute and long-term care facilities
   (d) which caregivers in the current facility had "hands-on" contact with the patient
   (e) body site(s) of infection/colonization of the patient
   (f) age, sex, and ethnicity of the patient
   (g) diagnosis and underlying conditions of the patient
   (h) treatments given to cases

7. Decolonization of residents or staff is **not** routinely recommended. This has not proven to be an effective control measure for large populations because recolonization occurs. However, in an outbreak situation, if an individual can be identified as the source of transmission (e.g.,

a healthcare worker with several patients having identical strains of MRSA and phage typing of the outbreak strain and this healthcare worker's being identical), then s/he **should** be removed from work while efforts are made to achieve MRSA decolonization (with adequate infection control consultation).

8. It is not necessary to restrict admissions or discharges to the facility unless it is determined (through a complaint registered with DHCQ or from the results of the facility's annual certification survey) that the facility is not following the proper protocols for those residents who are currently in the facility.

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