



## METHICILLIN RESISTANT STAPHYLOCOCCUS AUREUS (MRSA)

### Cause/Epidemiology

*Staphylococcus aureus* is an aerobic or facultative anaerobic coagulase- positive organism. It appears as gram-positive clusters on gram stain. *S. aureus* colonizes the skin of humans, which leads to localized, superficial, self-limiting abscesses when the skin is disrupted.

These highly resistant organisms deserve special attention in healthcare facilities. Although the name describes resistance to only one agent (e.g., *Methicillin* resistant), these pathogens are frequently resistant to most available antimicrobial agents. Methicillin resistant *S. aureus* is resistant to methicillin and other beta lactamase-resistant penicillins and cephalosporins.

Prevalence of MRSA varies temporally, geographically, and by healthcare setting. The type and level of care also influence the prevalence of MRSA. ICUs, especially those at tertiary care facilities, may have a higher prevalence than do non-ICU settings. Antimicrobial resistance rates are also strongly correlated with hospital size, tertiary-level care, and facility type (e.g., LTCF). The frequency of clinical infection caused by these pathogens is low in LTCFs. Nonetheless, MRSA infections in LTCFs can cause serious disease and mortality, and colonized or infected LTCF residents may serve as reservoirs and vehicles for MRSA introduction into acute care facilities.

During the last several decades, the prevalence of MRSA in U.S. hospitals and medical centers has increased steadily. MRSA was first isolated in the United States in 1968. In 1999, MRSA accounted for >50% of *S. aureus* isolates from patients in ICUs in the National Nosocomial Infection Surveillance (NNIS) system; in 2003, 59.5% of *S. aureus* isolates in NNIS ICUs were MRSA. MRSA is now one of the leading causes of nosocomial pneumonia and surgical site infection, and the second leading cause of nosocomial blood stream infections.

Increased lengths of stay, costs, and mortality also have been associated with MRSA. In 1999, MRSA treatment costs were estimated to be 6-10% more than treating a methicillin sensitive *S. aureus* (MSSA) infection, and the attributable death rate of MRSA was 21% as compared to 8% in MSSA.

MRSA is also found in the community. This type of MRSA has been designated as community acquired MRSA (CA-MRSA). Initially there were scattered reports, but now, CA-MRSA is being isolated at higher rates around the world. At least 5% of the strains are rapid spreading and virulent. CA-MRSA may also be resistant to different antibiotics than hospital associated MRSA. CA-MRSA has been linked most often with skin abscesses (boils) but has also been linked with



deaths in young people due to necrotizing MRSA pneumonia following respiratory viral infections and with outbreaks of skin and invasive infections.

Preventing infections will reduce the burden of MRSA in healthcare settings. Prevention of antimicrobial resistance depends on incorporating appropriate clinical practices into all routine care. These include optimal management of vascular and urinary catheters, prevention of lower respiratory tract infection in intubated patients, accurate diagnosis of infectious etiologies, and judicious antimicrobial selection and utilization.

### **Clinical Presentation**

Methicillin resistant *S. aureus* infections occur the same as Methicillin Sensitive *S. aureus* (MSSA) infections. Common sites for infections include skin, respiratory and urinary tract. Common infections include impetigo, folliculitis, furuncles, carbuncles, abscesses and infected lacerations.

Systemic symptoms are unusual but when microorganisms are invasive and widespread fever, malaise, headache and anorexia may develop. More serious complications such as pneumonia, lung abscess, osteomyelitis, sepsis, endocarditis, meningitis or brain abscess may occur when microorganisms are invasive.

Staphylococci conjunctivitis may occur in the elderly. Staphylococcal bacteremia may result from the use of invasive devices.

### **Incubation**

The incubation period is variable and indefinite. Occurs commonly around 4 - 10 days.

### **Transmission**

Known risk factors for colonization and/or infection with MRSA include:

- Use of broad spectrum antibiotics (e.g., levofloxacin, aminoglycosides, second and third generation cephalosporins, quinolones and some synthetic penicillins)
- Decubitus ulcers
- Poor functional status
- Prolonged hospitalization
- Proximity to another resident with MRSA
- Greater number and longer duration of antibiotic use



- Surgical wounds
- Admission to a high risk unit (e.g., ICU, burn unit, hemodialysis unit)

MRSA most frequently colonizes the nares and wounds. It also colonizes the throat, skin, and rectum.

Within institutions, healthcare workers' hands and the environment are the most common means of spreading MRSA. In the case of staphylococcal pneumonia, droplet transmission can spread MRSA. Healthcare workers, though rarely the reservoir, have been associated with outbreaks.

MRSA may invade the blood and cause potentially serious complications such as bacteremia, septic shock, and serious metastatic infections (endocarditis, pneumonia, osteomyelitis, and arthritis).

### **Infection Prevention & Control Practices**

The management of drug resistant organisms such as MRSA presents many challenges in long term care (LTC) facilities. In this homelike setting, patients/residents come into contact with each other daily through social activities, rehabilitation services and family interactions, which are necessary for enhanced physical and emotional functioning. Implementing precautions in the homelike setting of a long term care facility must consider the autonomy and rights of the individual patient/resident as well as the practices that best serve the facility as a whole.

Follow Routine Practices. Additional Precautions shall be implemented on individual bases.

Refer to the Manitoba Guideline for the Management of Antibiotic Resistant Organisms (AROs) (January 2007)

Refer to Contact Precautions in the Additional Precautions section 5.

Refer to the Personal Care Home/ Long term Care Facility Infection Prevention and Control Operational Directive: Management of Methicillin resistant *S. aureus* (MRSA).

### **Occupational Health**

#### **Definition of Occupational Exposure**

A healthcare worker who has had direct or indirect contact of non-intact skin or mucous membranes with MRSA colonized or infected body sites, or wound



drainage during the period of communicability, which varies widely, but continues as long as purulent lesions drain or a carrier state persists.

#### A Healthcare Worker Exposed to MRSA

- No modifications to work practices or work restrictions required
- Healthcare worker specimens for culture are not routinely obtained

#### A Healthcare Worker Symptomatic or Infected with MRSA

- Physician confirmed diagnosis
- Inform the Infection Prevention and Control/designate immediately if suspected or confirmed case of MRSA.
- Health care workers shall be referred to Occupational Health /designate for clinical management.
- Work restrictions and reassignments may be considered until appropriate decolonization therapy is completed

Pregnant healthcare workers can work with patients who are colonized/infected with MRSA provided they adhere to Routine Practices and Additional Precautions for the specific situation. Pregnant healthcare workers who have concerns regarding working with patients who are colonized/infected with MRSA should be referred to Occupational Health/designate for further management.