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**Provincial**  
**Methicillin-Resistant *Staphylococcus aureus* (MRSA)**  
**Infection Prevention and Control Guidelines**

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ISBN: 978-0-7785-6611-3

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## ACKNOWLEDGMENTS

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## 1.1 Purpose

The purpose of the Provincial Methicillin-Resistant *Staphylococcus aureus* (MRSA) Infection Prevention and Control Guidelines is to define infection prevention and control (IPC) best practices to reduce the transmission of MRSA and to outline the management of patients infected or colonized with MRSA across healthcare and community settings. Patients should not be denied access to service because of colonization or infection with MRSA. For the purpose of the document, except where specifically stated, patient refers to clients, patients or residents as well inmates of correctional facilities.

MRSA colonization and infection is a growing problem that:<sup>1</sup>

- adversely affects patients' health and safety;
- increases the economic burden through additional costs for personal protective equipment (PPE) precautions and surveillance to identify colonized patients; and
- results in increased morbidity and mortality.

Effective management and control of MRSA is vital to the sustainability of the health system. Consistent messaging across the province provides the greatest opportunity for adherence to recommended practices / procedures and optimal patient care delivery.

## 1.2 Target Audience

The Provincial Methicillin-Resistant *Staphylococcus aureus* (MRSA) Infection Prevention and Control Guidelines were developed for use by health professionals who have accountability / responsibility for IPC issues pertaining to MRSA; however, other healthcare professionals may benefit from and should be encouraged to use the guidelines.

## 1.3 Process for Guidelines Development

A provincial MRSA Working Group (WG) was comprised of IPC experts from each region as well as First Nations and Inuit Health Branch (FNIHB) of Health Canada, the Provincial Public Health Laboratory ([PPHL] previously known as the Provincial Laboratory of Public Health), and Council of Medical Officers of Health (COMOSH). It was established to develop MRSA infection prevention / control guidelines for Alberta acute care settings or hospitals, long-term care (LTC) and community. The MRSA WG shared and discussed Regional Health Authority (RHA) MRSA IPC guidelines and resources, identified key components of the Provincial Methicillin-Resistant *Staphylococcus aureus* (MRSA) Infection Prevention and Control Guidelines, conferred on best practices, and identified

outstanding issues for consideration by Alberta Health and Wellness (AHW) such as implementation challenges, standardized communication and evaluation.

The terms and definitions used for this document are familiar, practical and useable.

## 2.1 MRSA

*Staphylococcus aureus* is a Gram positive coccus distinguished by its tendency to cluster under microscopic examination and its positive result on coagulase testing. It thrives on human skin and mucous membranes, grows rapidly under either aerobic or anaerobic conditions, and can be carried on its host for a long period of time without causing clinical consequences.<sup>2</sup>

Methicillin susceptible *Staphylococcus aureus* (MSSA) are isolates with an oxacillin minimum inhibitory concentration (MIC)  $\leq 2$   $\mu\text{g/ml}$ , and are reported as susceptible to oxacillin / methicillin.<sup>3</sup>

Methicillin resistant *Staphylococcus aureus* (MRSA) are isolates that carry the *mecA* gene, or that produce penicillin binding protein (PBP) 2a (the *mecA* gene product) and should be reported as oxacillin / methicillin resistant. If MIC tests are performed, isolates with an oxacillin MIC  $\geq 4$   $\mu\text{g/ml}$  are resistant to oxacillin / methicillin.

Ten different “epidemic clones” labeled CMRSA 1 to CMRSA 10 have been identified in Canada through molecular typing using pulse field gel electrophoresis (PFGE). CMRSA 1 to CMRSA 6 and CMRSA 8 and 9 strains are typical healthcare-associated strains with multi-drug resistant phenotypes. CMRSA 7 and CMRSA 10 strains have recently emerged and are typically community associated.<sup>4, 5</sup> (See Appendix A: MRSA Typing Nomenclature)

Some infections caused by *S. aureus* include: cellulitis, pustules, furuncles, carbuncles, impetigo, bacteremia, endocarditis, wound infections, and less commonly pneumonia. *S. aureus* also produces toxins which can cause gastroenteritis (following ingestion of contaminated foods) and in rare instances, toxic shock syndrome.

*S. aureus* is transmitted primarily through direct person-to-person contact, especially through the hands of healthcare workers. Nasal carriage of *S. aureus* is very common and may be due to hand-to-nose transmission. A nasal carrier often contaminates his / her own hands by hand-to-nose contact, then transmits the organism in the course of routine activities. Since skin-to-skin contact is the most significant mode of transmission, hand hygiene is of primary importance in preventing its spread.

Strains of *S. aureus* resistant to methicillin were first identified in Europe in the early 1960's. Over the past three decades, MRSA has been recognized world-wide as a major healthcare-associated pathogen.<sup>6</sup>

Once introduced into the hospital environment, MRSA can be extremely difficult to eradicate. Antimicrobial use and proximity to a patient harbouring MRSA have been linked to MRSA acquisition. Other risk factors associated with acquiring MRSA in the hospital environment include chronic underlying diseases, prolonged hospitalization, broad spectrum antibiotic therapy and presence of invasive devices.<sup>7</sup>

### 2.2 Community-Associated MRSA

Community-associated (CA MRSA) is an increasingly prevalent pathogen among patients without established risk factors for MRSA infection. CA MRSA strains are genetically different than healthcare-associated MRSA (HA MRSA), generally have greater antibiotic susceptibility and are well adapted for survival and spread within the community.<sup>8</sup>

The classification of CA MRSA and HA MRSA is imprecise as it is often impossible to accurately identify the point of transmission. As hospital strains move into the community and community strains spread within hospitals it may be increasingly difficult to define strains as HA MRSA or CA MRSA. For this reason the term community-associated MRSA is used in this document rather than community-acquired.

CA MRSA strains show resistance to fewer antimicrobial classes than HA MRSA does. CA MRSA often exhibits the presence of Panton-Valentine leukocidin (*pvl* gene) which is associated with more serious infections, particularly skin and soft tissue infections and pneumonia.<sup>9</sup>

Most frequently involving skin and soft tissue infections, spread of CA MRSA is primarily through direct person-to-person contact with a colonized or clinically infected person. Self infection (from nose to a break in the skin) is also common. People with draining lesions or purulent infections are more infectious and have been associated with epidemic spread. CA MRSA infections often present as abscesses or “spider bites” and outbreaks have occurred in various groups including: sports teams, correctional facilities, military recruits, day care and institutional centres, newborn nurseries, and in men who have sex with men (MSM). These patients are often healthy individuals with no known risk factors for HA MRSA acquisition.<sup>10</sup> [See Table 2a: Risk Factors for Community Associated Methicillin Resistant *Staphylococcus aureus* (CA MRSA) Infections]

Factors that contribute to CA MRSA transmission have been termed the 5 C’s – cleanliness, crowding, contact, sharing contaminated items, and compromised skin – thus making people in communal settings vulnerable (e.g., day care, schools, work camps, sports teams, correctional facilities, homeless shelters and institutional settings).<sup>11</sup>

**Table 2a: Risk Factors for Community-Associated Methicillin-Resistant *Staphylococcus aureus* (CA MRSA) Infections**

Reproduced with permission, *Can J Infect Dis Med Microbiol* 2006;17(Suppl C):4C-24C.<sup>8</sup>

Risk Categories and Factors	References
<b>High Risk Populations</b>	
Young People	Age distribution for CA MRSA younger than for HA MRSA <sup>12</sup> High rate of CA MRSA in children younger than 2 years <sup>13</sup> CA MRSA more common in Canadian children than in adults <sup>14</sup>
<b>Minority Populations</b>	
Native or Aboriginal and African-American people	Higher risk in Aboriginal communities in mid-western US <sup>15</sup> Higher risk in Alaskan natives <sup>16</sup> More common in African-Americans <sup>17</sup> Aboriginal communities in Canada <sup>18</sup>
Athletes-Mainly Those Involved in Contact Sports	Outbreaks in football teams <sup>19</sup> Outbreak in wrestling team <sup>20</sup> Outbreaks in other competitive sports <sup>21</sup>
Intravenous Drug Users	San Francisco intravenous drug users <sup>22</sup> Western Canadian report of USA 300 strain outbreak documents higher risk in intravenous drug users <sup>23</sup>
Men Who Have Sex with Men	CA MRSA described in HIV positive population of men who have sex with men <sup>24</sup>
Military Personnel	3% of US army soldiers colonized <sup>25</sup>
Inmates of Correctional Facilities	Reports of outbreaks in US prisons <sup>26</sup> Two outbreaks (total of 10 inmates) in Hamilton, Ontario <sup>27</sup>
<b>Previous Positive MRSA Cultures</b>	
MRSA Carriage	Colonized Soldiers more likely to get CA MRSA disease
Past MRSA Infection	Prior abscess a risk factor for CA MRSA <sup>28</sup>
<b>Medical History</b>	
Chronic Skin Disorder	Dermatologic condition most common underlying medical disorder for CA MRSA infection Classroom contact of an index CA MRSA case had chronic dermatitis <sup>29</sup>
Recurrent or Recent Antibiotic Use	Antibiotic use associated with CA MRSA infection in rural Alaska
<b>Environmental Risks</b>	
Low Socioeconomic Status	Medically underserved populations at higher risk of CA MRSA
Overcrowding	Close contact implicated in jail outbreak, neonatal intensive care unit transmission <sup>30</sup>
Contact With Colonized Pet	Family dog a source of recurrent infection <sup>31</sup>
Veterinary Work	Cases documented in veterinarians working with horses, small animal veterinarians and pig farmers <sup>32</sup>

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(Adapted from Health Canada, Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care, 1999).<sup>33</sup>

## 3.1 Transmission

In a healthcare setting, the primary mechanism for transmission of MRSA from one patient to another is via healthcare workers (HCWs) whose hands have become transiently colonized. Hands may become contaminated after direct contact with colonized or infected patients while performing patient care, when removing gloves, or touching contaminated surfaces. On occasion, patients may acquire MRSA from direct contact with contaminated surfaces.

## 3.2 Assessing Risk of Transmission

There are important differences between acute care hospitals and long-term care facilities (LTCFs) with respect to infection control recommendations. A LTCF is a resident's home and precautions must be balanced with promoting an optimal healthy lifestyle. Evidence to date has shown that LTCF residents who are colonized or infected with MRSA do not endanger the health of HCWs or other residents, especially if HCWs consistently perform Routine Practices including hand hygiene. Special attention should be paid to handling, cleaning and disinfection of shared equipment to avoid cross contamination.<sup>34</sup>

The risk of transmission of MRSA can be reduced by compliance with hand hygiene and Contact Precautions in acute care but the risk is never zero. Many colonized patients are unknown reservoirs for MRSA and transmission risk varies according to the patient setting.

Healthcare practices must be evaluated against accepted standards and new information should be considered as it becomes available.

The following table (3a: Risk Factors for MRSA Transmission After Exposure to Infected or Colonized Source Patient) of risk factors should be considered when making decisions regarding patient placement and the selection of personal protective equipment (PPE) when providing care.

**Table 3a: Risk Factors for MRSA Transmission After Exposure to Infected or Colonized Source Patient**

(Adapted from Health Canada, Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care, 1999)

	Higher Risk of Transmission	Lower Risk of Transmission
PATIENT	<ul style="list-style-type: none"> <li>• Draining skin lesions or wounds not covered by dressings</li> <li>• Respiratory secretions (uncontrolled)</li> <li>• Patient requiring extensive hands-on care</li> <li>• Patient has invasive devices</li> <li>• Poor compliance with hygienic practices and infection control precautions, e.g., confused patient</li> <li>• Incontinence of stool or urine (not contained)</li> <li>• Exfoliating skin conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Skin lesions or wounds covered by dressing</li> <li>• Able to control respiratory secretions</li> <li>• Capable of self care</li> <li>• Good hygiene</li> <li>• Able to comply with infection control precautions</li> <li>• Continent</li> </ul>
MICROORGANISMS	<p>MRSA characteristics that promote transmission:</p> <ul style="list-style-type: none"> <li>• Spread by contact</li> <li>• Able to survive in the environment</li> <li>• Able to colonize invasive devices</li> <li>• Propensity for asymptomatic/carrier state</li> </ul>	
ENVIRONMENT	<ul style="list-style-type: none"> <li>• Inadequate housekeeping</li> <li>• Shared patient care equipment without cleaning between patients (e.g., thermometer bases, commodes)</li> <li>• Crowded facilities</li> <li>• Shared facilities (e.g., rooms, toilets, bath, sinks)</li> <li>• High patient-nurse ratio</li> </ul>	<ul style="list-style-type: none"> <li>• Appropriate housekeeping</li> <li>• Dedicated equipment</li> <li>• Adequate spacing between beds</li> <li>• Dedicated bathroom facilities</li> <li>• Low patient-nurse ratio</li> </ul>
HOST PATIENT	<ul style="list-style-type: none"> <li>• Requiring extensive hands-on care.</li> <li>• Have invasive procedures or devices</li> <li>• Non-intact skin</li> <li>• Exfoliating skin conditions</li> <li>• Debilitated, severe underlying disease</li> <li>• Extremes of age</li> <li>• Recent antibiotic therapy</li> <li>• Immunosuppression</li> </ul>	<ul style="list-style-type: none"> <li>• Able to do self-care</li> <li>• No indwelling devices</li> <li>• Intact skin and mucous membranes</li> </ul>

# DECREASING RISK OF TRANSMISSION

## Section

# 4

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## 4.1 Routine Practice and Additional Precautions

The components of Routine Practices for decreasing the transmission risk for MRSA are: hand hygiene, use of personal protective equipment (PPE), accommodation, patient care equipment, the general environment and patient transport. These are tailored to the characteristics of the patients and their environment. Among hospitalized patients who acquire MRSA, 30-60% may develop a MRSA infection. However, unlike hospitalized patients, only 5-15% of residents in LTCF are likely to develop infection following acquisition of MRSA.

Precautions will vary according to the site of infection / colonization and the care setting accepting the individual. Unnecessary barrier precautions, e.g., gowns, gloves, or masks, may signal to the receiving setting, unnecessary danger or concern. Messages of particular relevance include:

- precautions should reflect transmission risk; and
- PPE required during transfer between settings may vary because of potential transmission risks in the receiving setting (e.g., acute care, LTCF).

**Principles of MRSA transmission including direct and indirect contact, must guide practice in the various settings.** Direct contact is the most common route of transmission of MRSA; therefore, Contact Precautions should be used in addition to Routine Practices for MRSA positive patients in the acute care setting. For all other settings, the utilization of PPE should be based on risk assessment for transmission. (Table 4a: Precautions and Table 4b: Patient Placement and Accommodation)

**Table 4a: Precautions**

<b>PRECAUTIONS</b>	<b>ROUTINE PRACTICES / STANDARD PRECAUTIONS</b>	<b>CONTACT PRECAUTIONS in addition to ROUTINE PRACTICES / STANDARD PRECAUTIONS</b>
<b>Hand hygiene</b>	If contact with patient, patient items or equipment.	If contact with patient, patient items or equipment.
<b>Wear gloves</b>	If contact with infectious materials (blood and body fluids) is anticipated.	When entering room and contact is anticipated with patient and patient items.
<b>Wear gown</b>	If contact with infectious materials (blood and body fluids) is anticipated.	When entering room and contact is anticipated with patient and patient items.
<b>Wear mask</b>	Wear surgical mask if within three feet of patient with respiratory infection.	Not required routinely for MRSA. Consider mask use if staff risk of nasal colonization is high or patient has superimposed viral respiratory infection.
<b>Patient Accommodation</b> <i>(see table 4b)</i>	Single room preferred. Perform risk assessment.	Single room preferred. May cohort patients with identical MRSA strain. Place with a “low risk” roommate.
<b>Patient Care Equipment</b>	Non-critical equipment is to be cleaned between patients. Discard single use items. Toys, personal supplies and lotions should not be shared between patients.	Dedicate use of non-critical equipment for the use of one patient or Use single use items and discard after use. Clean and disinfect equipment before use on another patient (e.g., stethoscope, BP cuff). Minimize supplies in the room.
<b>General Environment</b>	Clean high touch areas (e.g., taps, light switches, doorknobs) at least daily and when soiled. Sufficient quantity of detergent-disinfectant in the correct concentration, applied with a clean cloth, is essential for an effective cleaning process. Comply with contact time on manufacturer’s label and workplace safety requirements. Facilities should establish standards and cleaning frequencies. The home environment should be regularly (when visibly soiled) cleaned with a standard household detergent. Deposit laundry into hamper – avoid touching outside areas. Garbage contained and not leaking. Regular dishes and utensils may be used – wash dishes in hot soapy water or correctly functioning dishwasher.	After discharge clean room thoroughly including bed, cubicle curtains and high touch surfaces.  Deposit laundry into hamper – avoid touching outside areas. Double bagging not required.  Disposable dishes not necessary.
<b>Patient Transport</b>	Patient must have open wounds / lesions covered. Use a clean blanket to cover a patient on a stretcher. Patient MUST wash their hands.	Notify area receiving patient. Patients MUST wash their hands, wear a clean gown.

**Table 4b: Patient Placement / Accommodation**

<p><b>Preference 1:</b> Assign priority to known or suspected MRSA colonization or infection.</p>	<p>Single room with a separate bathroom and sink. Give highest priority to patients who have conditions that may facilitate transmission, e.g., uncontained excretions or secretions.</p> <p>In areas with only cubicles, e.g., emergency, dialysis, etc., the patient must be isolated in a cubicle with the curtain drawn.</p>
<p><b>Preference 2:</b> Consult with IPC, if possible, to assess the risk associated with other placement options (e.g., co-horting, keeping the patient with existing roommates).</p>	<p>Cohort patients with identical strains of MRSA.</p> <p>Perform risk assessment. If a multi-bed room is used, place with a patient at lower risk (Table 1 Risk factors).</p> <p>In multi-bed rooms &gt; 3 feet spatial separation between beds is advised to reduce the opportunities for sharing of items.</p>
<p><b>Discontinuation of Precautions</b></p>	<p>Discontinue Contact Precautions after at least two consecutive negative specimens obtained one week apart.</p> <p>If patient is identified as consistently colonized with MRSA and there is no decolonization prescribed, use Contact Precautions for duration of stay while in acute care.<sup>36</sup> If in LTC, review and modify care plan to reduce transmission rates.</p>

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To provide consistent practice between regions and across settings (including non-traditional settings), precautions should reflect transmission risk. The use of PPE may be more prevalent in acute care settings than in any other setting. (See Appendix B: Transfers)

During transfers between settings if the source of the organism is contained (e.g., wound covered and contained by a clean dressing) the risk of transmission is reduced. Transport personnel should choose PPE according to the care being provided and the assessed risk of transmission.

## 5.1 Transport Personnel Procedures

Transport personnel should identify and follow the general principles of infection prevention and control; this includes Routine Practices required during transfer, according to the care provided, and the assessed risk of transmission, which are adapted where necessary to their unique environment. Transfer begins when patient is picked up and ends when patient is accepted into care at the receiving facility.

Transport procedures to be considered:

- Hand hygiene is the most important precautionary measure when dealing with MRSA colonized and infected patients, since the major emphasis is prevention of patient-to-patient transmission and self-contamination. Encourage / assist patient to perform hand hygiene before leaving the room.
- Routine Practices (e.g., hand hygiene and PPE such as gloves, gowns, masks, and eye protection when handling body secretions).
- Prior to transferring, the patient must have any open wounds / lesions covered. Use a clean blanket taken to the room to cover a patient on a stretcher.
- Linen should be changed between all patients regardless of disease status.
- PPE should be removed and disposed of safely at point of care.
- Clean PPE should be worn for ambulance / vehicle cleaning.
- Clean / disinfect the following with a detergent, standard (facility grade) housekeeping product or cleaning product specified by the equipment manufacturer:
  - equipment used in the transferring or testing of the patient;
  - patient contact surfaces; and

- equipment touched by the HCW within the vehicle (e.g., blood pressure cuff, monitors and stretcher).

### **5.2 Communication**

The following communication steps should be taken by a facility transferring an individual infected or colonized with MRSA.

- Sending facility must notify the receiving facility of the patient's MRSA status prior to transfer.
- Reasons for any Additional Precautions other than Routine Practices must be given to the transfer personnel and they can perform a risk assessment based on that information.

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There is a small window of opportunity in Alberta to decrease the impact of MRSA. Surveillance is an important tool in the effort to slow the increasing prevalence of MRSA, thus decreasing the risk for infection and increasing patient health and safety. This surveillance should also provide relevant information regarding emerging MRSA problems to Alberta stakeholders in order to facilitate efforts to control the emergence and prevalence of this organism.

To determine the prevalence / incidence of MRSA and to promote proactive public health action and effective targeting of resources, MRSA molecular typing is recommended on the first MRSA isolate (clinical and / or screening) for each patient. MRSA molecular typing is necessary to identify new MRSA positive clinical and / or screening isolates.

## 6.1 Provincial Surveillance Goals

The goal of this surveillance is to:

- determine the burden of MRSA illness;
- to prevent endemicity of this emerging pathogen by defining: burden and epidemiological trends (trends and severity of illness), risk groups, and interventions; and
- provide data by which interventions can be evaluated.

Surveillance includes:

- screening of specific populations for the presence of MRSA (refer to Section 7: Screening); and
- culturing of clinical isolates for diagnostic purposes.

## 6.2 Provincial Surveillance Data

Surveillance data will provide:

- distribution of MRSA subtypes in Alberta;
- trends over time including: rate changes, changes in affected populations and severity of illness;

## SURVEILLANCE

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- data needed for infection control and public health action, resource allocation, and quality improvement processes;
- an evaluation and direction for resources and evaluation of MRSA infection prevention and control measures, e.g., hand hygiene, environmental cleaning, compliance with written policies;
- assistance to infection prevention and control (IPC) personnel to direct resources towards early identification and isolation of infectious patients;
- information to advise on policy and strategic direction in healthcare delivery planning, and to facilitate upstream, downstream and lateral communication;
- detection of strains of national importance with an impact on our provincial healthcare system;
- resistance profiling and detection of vancomycin resistant *Staphylococcus aureus* emergence;
- information for clinical decision making and empiric therapy; and,
- detection of outbreaks and clusters.

At the provincial level MRSA surveillance will be developed and coordinated with other infection control activities. A provincial plan for MRSA surveillance is under development.

### 6.3 Regional Surveillance

Surveillance is a critically important component of an infection control program, allowing detection of newly emerging pathogens, monitoring epidemiologic trends, and measuring the effectiveness of interventions. The aim of MRSA surveillance is to meet the clinical and epidemiological challenges unique to each healthcare facility and health region. The surveillance of MRSA at the unit, facility and regional level should be based on local needs with the support of epidemiologists and infection prevention and control practitioners. This support can be provided at the local, regional or provincial level. Surveillance data should be used to set priorities, identify outbreaks, set benchmarks and evaluate the effectiveness of IPC efforts.

Specific local and regional objectives for MRSA surveillance will be determined by each of the health regions based on sound methodology and must align with the provincial goals for MRSA surveillance.

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Targeted screening should be linked to specific risk groups and planned interventions. Screening of target populations and instituting Contact Precautions for patients identified as colonized or infected with MRSA is a cost effective method to prevent unexpected exposures and ongoing transmission.<sup>35</sup>

Screening will:

- identify patients who are MRSA positive so that infection prevention and control measures can be implemented;
- collect epidemiologic information to detect clusters or transmission in specific populations;
- obtain further epidemiologic data on new emerging strains of MRSA, and determine particular strain behaviour / characteristics such as some strains being more easily transmissible or more virulent;
- identify new MRSA strains; and
- determine the prevalence of MRSA in a particular population for quality improvement / evaluative purposes.

## 7.1 Admission Screening Recommendations

Patients with a history of hospitalization or of being institutionalized (e.g., mental health, LTC, corrections) for 24-48 hours or more, within the past 6 months should routinely be screened on admission to an acute care facility.

**Patient's previously identified as MRSA positive should be screened on re-admission.**

- Regional screening recommendations may vary based on review of local epidemiology and evidence from prior admission or specialized screening programs [e.g., dialysis patients, community outbreaks, when indicated for clinical investigation (re-screening)].
- Admission screening policies should be reassessed every six months for yield.

## 7.2 Unit Contacts

Unit contacts should be screened if a patient is discovered to be MRSA positive and not isolated. Initially screen close contacts (e.g., roommates), and if those screening results are positive for MRSA, additional screening may be required (e.g., patients in adjacent rooms). Consultation with Infection

## SCREENING

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Prevention and Control (IPC) or Infectious Disease Specialist is recommended prior to extensive contact screening or screening of staff.

### 7.3 Sites to Screen

Studies suggest that cultures of the nares identify most patients with MRSA and peri-rectal and wound cultures can identify additional carriers (See Appendix C: Specimen Collection).

Screen a maximum of two sites including anterior nares and one of the following:

- rectum (peri-anal) or groin,<sup>36</sup>
- skin lesions / open wounds (including surgical incision),
- invasive device sites (e.g., intravenous lines, feeding tubes or tracheostomies),<sup>37</sup>
- a urine specimen may be sent if a urinary catheter is present,
- umbilicus if patient is a neonate.<sup>38</sup>

Notes: Screening sites for newly emerging strains may differ from those above.

The issue of rapid testing / identification for MRSA is relatively new and has not been addressed in this document. However, this may be considered in the future, as the impact of rapid testing on the effectiveness of active surveillance as a prevention strategy is fully determined.

### 7.4 Screening on Previous Positives or Re-Screening

In an individual where consistent colonization is present, discontinue weekly cultures and test monthly if receiving healthcare services.

### 7.5 Discontinuation of Precautions

Contact Precautions may be discontinued after at least two consecutive negative specimens are obtained one week apart. The culture should be taken no less than 48 hours after antibiotic / decolonization treatment has ceased, and the second no less than 7 days after the first.

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An outbreak is defined in the *Communicable Disease Regulation*, under the *Alberta Public Health Act*, as: “a distribution of cases of communicable disease that is unusual in terms of time, place or persons affected” or “an increase in frequency of disease above the background occurrence of the disease”.

MRSA outbreaks can be characterized by rapid spread to involve many patients. When identified early, outbreaks due to a single strain can be traced readily and controlled by prompt application of multiple infection control measures. Identification, management and minimization of MRSA outbreaks are important functions to reduce morbidity, mortality and healthcare costs.<sup>39</sup>

Outbreak management is a dynamic process which must be adapted for each setting after considering the following:

- the number of suspected colonized / infected persons;
- the number and vulnerability of the persons at risk;
- the physical set-up of the facility or geographic location; and
- the availability of resources to be used in managing the outbreak.

An MRSA outbreak should be suspected when there is:

- identification of newly acquired MRSA from even one patient in a facility or special unit with a highly vulnerable patient population (e.g., an ICU, NICU, burn unit) that had previously not experienced MRSA transmission;
- an increase in the severity of MRSA illness or a change in the clinical presentation of persons with MRSA (e.g., toxic shock syndrome);
- a change in epidemiology or MRSA subtype; or
- a failure to decrease the prevalence or incidence of MRSA (e.g., incidence of resistant clinical isolates) despite infection control efforts to stop its transmission.

Consultation with an ICP, MOH, Infectious Disease Specialist, and / or a laboratory manager is strongly recommended when dealing with a suspected MRSA outbreak in order to assess, and evaluate the effectiveness of control measures currently in use.

The *Public Health Act* (2004) Section 26: Notification of epidemics and other threats, states “ a physician, a health practitioner, a teacher or a person in charge of an institution who knows or has reason to suspect the existence of: a) a communicable disease in epidemic form, b) another illness or health condition occurring at an unusually high rate or c) a communicable disease or another illness or health condition that is caused by a nuisance or other threat to the public health, shall immediately notify the medical officer of health of the regional health authority by the fastest means possible.”

If an outbreak is suspected or confirmed, additional control measures may be required in addition to the general measures outlined in the Provincial Methicillin-Resistant *Staphylococcus aureus* (MRSA) Infection Prevention and Control Guidelines. New measures may be selected serially to further enhance control efforts and then be evaluated for impact / effectiveness. (See Appendix D: Outbreak Checklist)

### 8.1 Defining an MRSA Outbreak

An MRSA outbreak case definition is different for each situation. When constructing an outbreak case definition consider:

- MRSA (screening and clinical) isolates as determined by microbiology laboratory result (see Section 13: Glossary of Terms);
- person: age, gender, underlying risk factors;
- place;
- time;
- clinical presentation; and
- subtyping information and / or antibiotic resistance profiles.

### 8.2 MRSA Outbreak Control Measures

The selection of control measures should be individualized according to local considerations and settings. Measures described here apply most directly to inpatient settings, but principles can be applied in the community.

The following is a summary of measures that may be taken to identify new cases, manage existing cases and prevent the spread of MRSA to others (See Appendix D: Outbreak Checklist):

- Calculate and analyze prevalence and incidence rates of MRSA infection and colonization in populations at risk.
- When possible, distinguish colonization and infection.
- Finding cases during the course of an outbreak in a health facility may require screening of patients at risk:
  - Contact screening,
  - Prevalence screening (unit specific),

- Discharge screening (unit specific).
- Count patients not isolates to avoid double counting.
- Use a tracking tool such as a line list of cases to assist with data collection and case review.
- Describe the distribution of cases over time and place (epidemiologic curve).
- Evaluate healthcare system factors for their role in MRSA transmission such as:
  - adherence to recommended infection control measures;
  - staffing levels;
  - education and training;
  - availability of consumable and durable resources (e.g., gloves, gowns, waterless hand cleanser);
  - management of the physical environment and equipment;
  - communication processes; and
  - policies and procedures.
- Develop, implement and monitor action plans to reduce transmission.
- Consider culture surveys to assess effectiveness of control measures (unit specific prevalence screening, and / or discharge screening).

### **8.3 Healthcare Workers and Outbreak Management**

Colonized or infected healthcare workers are rarely the source of ongoing transmission, and screening cultures should be reserved for settings in which specific healthcare workers have been epidemiologically implicated in the transmission of MRSA. Screening of personnel may be warranted as part of an outbreak investigation at the discretion of IPC, and in conjunction with the investigation of other possible sources of transmission. Discussion between Occupational Health and Safety (OHS), IPC, diagnostic laboratories, and the MOH is recommended prior to proceeding with staff screening.

Decolonization should be considered for the employee(s) only if an outbreak investigation epidemiologically links employees to ongoing patient transmission. These employees should be referred for medical assessment, laboratory investigation with molecular typing and appropriate antibiotic therapy.

### **8.4 Communication**

Updates should be provided to HCWs, administrators, laboratory managers, patients and families, as appropriate, on the progress and effectiveness of intensified interventions (e.g., care practice reviews) during outbreak management.

More frequent educational sessions should be provided for healthcare personnel, especially for those who work in areas in which MRSA is not decreasing.

Information can also be provided for family and visitors.

### **8.5 Consider Additional Infection Control Measures**

Additional measures can include implementing precautions as described in Section 4: Decreasing Risk of Transmission. If transmission continues despite adherence to Routine Practices and Contact Precautions and cohorting, consider assigning dedicated nursing and ancillary service staff to the care of only MRSA patients.

Consideration can be given to discontinuing, deferring or restricting new admissions to the facility if transmission continues despite implementation of additional control measures.

### **8.6 Enhanced Environmental Measures**

The following enhanced environmental measures may be used during an outbreak.

- Intensify and reinforce training of environmental cleaning / housekeeping staff.
- Monitor cleaning performance to ensure consistent cleaning and disinfection of surfaces in close proximity to the patient.
- Vacate units for environmental assessment and intensive cleaning when efforts to eliminate environmental reservoirs have failed.
- Consider environmental cultures only if there is epidemiologic evidence that an environmental surface is associated with ongoing MRSA transmission as directed by IPC in consultation with the laboratory.

### **8.7 Laboratory Role in MRSA Outbreaks**

Provincial Public Health Laboratory (PPHL) services are available for MRSA outbreak detection and management including: providing expert laboratory advice, consultation with regional laboratory manager / staff, IPC, MOH and Infectious Disease physicians, assigning an Exposure Investigation (EI) number on request and coordinating specimen testing and reporting, advising regional labs on isolate storage, etc.

When clusters of infection occur, examination of antimicrobial susceptibility and molecular typing patterns of the isolated strains may help determine the extent and source of the outbreak.

In addition, antibiogram information on subsequent isolates can be used to monitor for changes in known resistance patterns that might signal emergence or transmission of newly emerging strains.<sup>36</sup>

### **8.8 Declaring an Outbreak Over**

An outbreak is considered over when the incidence of new cases has returned to pre-trigger levels. In some situations, MRSA incidence may not revert to baseline levels and may become an

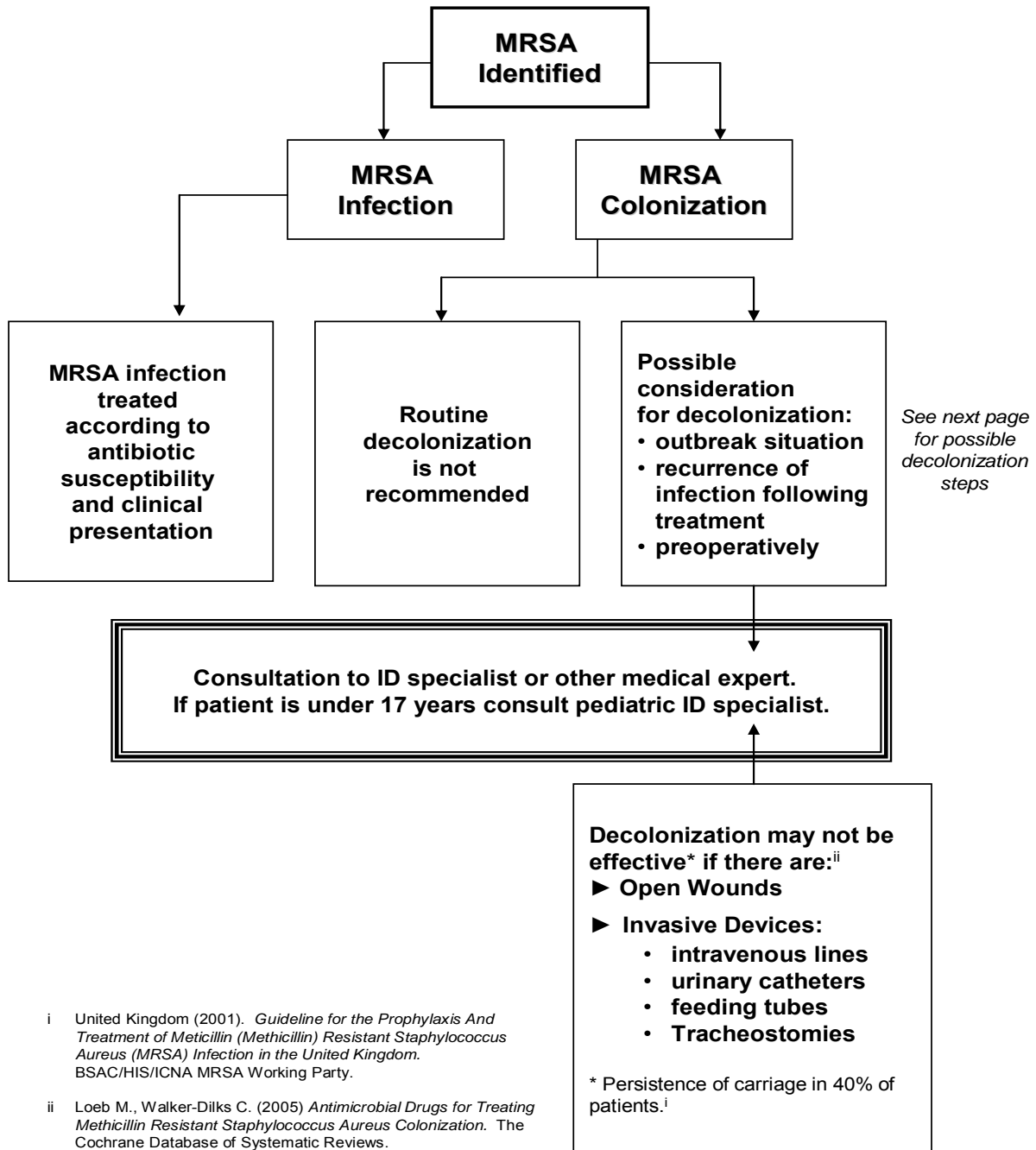
established endemic pathogen. The strategy for ongoing management should be reassessed in consultation with IPD, MOH, and an infectious disease specialist and / or a laboratory manager.

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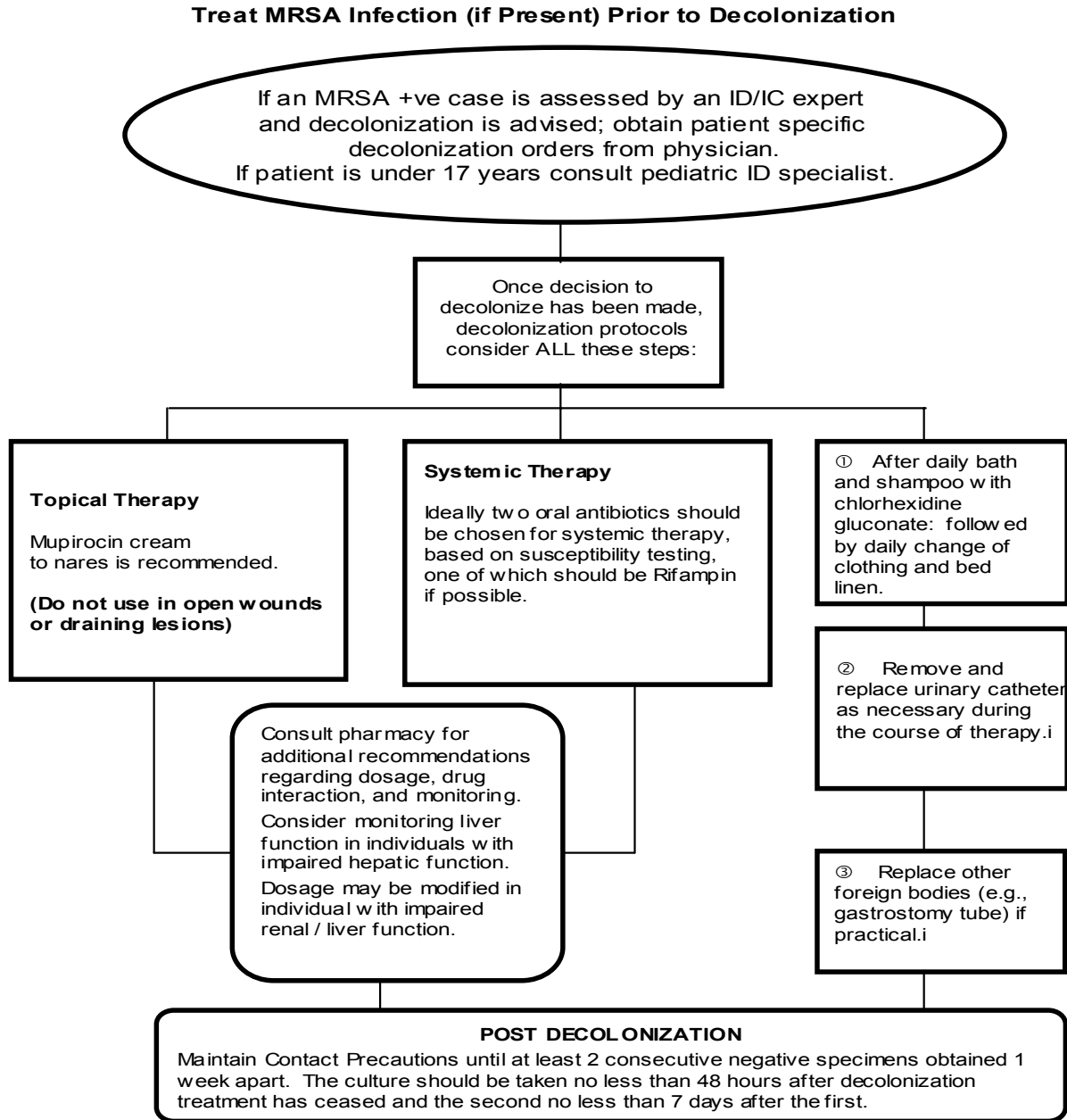
Decolonization therapy refers to topical and / or systemic antimicrobial treatment administered for the purpose of eradicating MRSA carriage from the skin, nose or other mucosal surfaces.

- a. **Routine decolonization is not recommended** because: <sup>40</sup>
- it is not demonstrated to be consistently effective as the ability of topical and / or systemic therapy to eradicate MRSA may vary depending on the situation (e.g., wounds, presence of indwelling catheters);
  - there is potential for serious adverse events from the use of the therapy; and
  - antimicrobial resistance can develop as a result of decolonization therapy.
- b. Decolonization may be recommended for:
- control of outbreaks; (see Section 8: Outbreaks)
  - recurrent MRSA infection after appropriate treatment; and
  - pre-operatively to reduce the risk of MRSA peri-operative infections.
- c. **A decision to attempt decolonization must be made by the individual's physician and evaluated on an individual basis.** It is suggested that an infectious disease (ID) physician should be consulted prior to the decision to decolonize. In rural regions, general internists familiar with MRSA may be consulted. In the absence of an ID physician, infection control personnel can assist with decision making regarding decolonization.
- d. If decolonization is undertaken, follow-up cultures must be performed and documented to establish successful eradication. (See Figure 9a: MRSA Decolonization Decision Algorithm and Figure 9b: MRSA Decolonization Process Algorithm)
- e. Decolonization should commence only when the infection with MRSA, if present, has been successfully treated. If an open wound or indwelling device is colonized with MRSA, decolonization is very unlikely to be successful and is thus not recommended.

Figure 9a: MRSA Decolonization Decision Algorithm



**Figure 9b: MRSA Decolonization Process Algorithm**



I Muto C, M Jernigan J, Ostorowsky B, Richet H, Jarvis W, Boyce J, Farr M (2003). *SHEA guideline for Preventing Nosocomial Transmission of Multi-drug – Resistant Strain of Staphylococcus Aureus and Enterococcus*. Infection Control and Hospital Epidemiology.

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The communication of risk associated with communicable disease transmission is important. It is consistent with the principle of surveillance that allows for dissemination of information to those who need to take appropriate action in keeping with the general rule in privacy legislation of providing information on a 'need to know' basis. Communication of patient MRSA status is important between HCWs, from patient to HCWs, from HCWs to patient, from setting to setting (e.g., hospital to continuing care) and from region to region.

Identification and knowledge of MRSA status is an important part of a risk assessment, health protection and patient safety. There are several situations in which those responsible for providing healthcare to a person must be made aware of MRSA status.

MRSA status should be communicated to persons who are authorized to receive the information and need to take appropriate action. MRSA information should be treated confidentially to respect the patient's privacy. When it is necessary to disclose identifiable MRSA information to people outside of one's organization this may be done without the person's consent if it is done in accordance with the *Health Information Act* and *Public Health Act*.

Health information is to be used and disclosed by healthcare professionals on a 'need to know' basis. Transferring and receiving personnel need to know a person's MRSA status to provide ongoing care to the individual.

If there is an infection control need to provide this information to a regional health authority or another custodian such as a physician, this information may be provided to manage the spread of the communicable disease and public health surveillance.

The use of flagging and alerts on computer systems and infection control signage should be discussed with regional information access and privacy offices. Consideration should be given to who will act on the information and what actions are relevant. For example, signage indicating the use of Contact Precautions rather than identifying MRSA status may be appropriate in some care settings and provides some protection of patient privacy while protecting staff and visitors.

## **10.1 Informing the Patient**

Risks due to MRSA and relevant disclosure should be managed in a similar way to disclosing other risks in care settings and other communicable disease risks. Informing patients of the risk of exposure to communicable diseases and contact with infectious organisms such as MRSA should be

## DISCLOSURE

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considered. A legal obligation may arise to inform patients of an exposure and provide advice regarding appropriate follow-up testing and care.

The patient should be advised of their MRSA status by a qualified HCW providing advice about management, follow-up and care as per regional policy.

Discussions with patients should be documented in accordance with the policy of the organization. Informing patients of communicable diseases may be linked with education and activities that can be performed to reduce the risk of ongoing transmission.

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Messages must be consistent. Education is important for HCWs, patients, families and visitors. Education may include reinforcing hand washing / hand hygiene (e.g., education, audit tools) and staff, family and visitor information.

## **11.1 Client, Visitor and Family Information**

Client and family education should include methods to prevent the transmission of MRSA including hand hygiene. Visitors should be informed about infection prevention and control measures in place with emphasis on hand hygiene before and after visiting. An education pamphlet is available for clients, visitors and families. (See Appendix E: Education - Client/Visitor/Family Information Pamphlet)

## **11.2 Screening Protocols**

Patients who require screening should be informed of the process. A patient pamphlet is available for patient's being screened and for patients who are colonized or infected (test positive) with MRSA. (See Appendix E: Education - Patient Information Screening for MRSA and Patient Information You Have Tested Positive for MRSA)

## **11.3 Healthcare Worker Information**

HCWs should be familiar with routes of transmission and infection prevention and control practices. An MRSA fact sheet is available addressing frequently asked questions about MRSA. (See Appendix E: Education - Hospital/Facility Staff Information Pamphlet and Public Health Staff or Community-Based Healthcare Workers (HCWs) Information Pamphlet)

## **11.4 Clients in the Community**

Information for clients in the community should cover methods to prevent the transmission of MRSA in the community including hand hygiene. (See Appendix E: Education - Community Information Pamphlet)

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## 12.1 Occupational Health and Safety Legislation

Alberta's Occupational Health and Safety (OHS) legislation sets out employer and worker responsibilities at all provincially regulated work sites across Alberta. The legislation requires the employer to keep exposure to harmful substances as low as reasonably practicable.<sup>41</sup>

***Staphylococcus aureus* is considered a harmful substance under the legislation.**<sup>42</sup>

The employer is required to identify work site hazards and to manage and control the hazard to minimize exposure. Because MRSA is spread through direct or indirect contact, hand hygiene is the key to prevention. (See Section 3: Assessment of Risk and Section 4 for Decreasing Risk of Transmission).

## 12.2 HCWs Exposed to MRSA

Workers exposed to MRSA are not routinely screened for MRSA. There are no modifications to work practices, or work restrictions for HCWs exposed to MRSA.

## 12.3 HCWs Infected with MRSA

HCWs with confirmed diagnosis of MRSA infection should be referred for clinical management.

HCWs with symptoms of infections caused by MRSA (carbuncle, furuncle) may be excluded from work or have alternate work placement until therapy for treatment is completed, lesions have resolved, medical assessment is complete, appropriate control measures and fitness for work have been decided. Decisions regarding work modifications and restrictions should be decided on a case-by-case basis in collaboration between infectious disease specialists, public health, OHS, IPC and HR, if necessary. Assessment of the situation should include the type of infection, physical setting, hygiene practices, risk control measures that can be implemented, type of patient care delivery as well as employee fitness for work. Follow-up is on an individual basis taking into consideration job description and clinical condition.

## 12.4 HCWs Colonized with MRSA

HCWs may rarely introduce MRSA into a patient care unit. HCWs occasionally become persistently colonized with an MRSA, but these HCWs have a limited role in transmission unless other factors are present. Factors that can facilitate MRSA transmission include chronic sinusitis, upper respiratory infection and dermatitis.

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<b>Acute Care</b>	A hospital where lengths of stay average < 30 days, and where a variety of services are provided, which may include surgery and intensive care.
<b>Antimicrobial Agent</b>	A product that kills or suppresses the growth of microorganisms.
<b>Antimicrobial Resistance</b>	A condition in a microorganism in which a certain antimicrobial agent becomes ineffective in killing or inhibiting the organism's growth.
<b>Antiseptic</b>	A product with antimicrobial activity that is designed for use on skin or other superficial tissues, removes some transient and resident flora. The term is used for preparations applied to living tissue.
<b>Carrier</b>	An individual who is found to be persistently colonized (culture-positive) for a particular organism, at one or more body sites, but has no symptoms of infection.
<b>Cohort</b>	Two or more patients colonized or infected with the same organism who are separated physically from other patients who are not colonized or infected with that organism.
<b>Cohort Staffing</b>	The practice of assigning specified personnel to care only for patients known to be colonized or infected with the same organism. Such personnel would not participate in the care of patients who are not colonized or infected with that organism.
<b>Colonization</b>	Occurs when bacteria are present on or in the body without causing illness. MRSA can colonize the nose, skin and moist areas of the body.
<b>Communicable</b>	Capable of being transmitted from one person to another synonymous with "infectious" and "contagious."
<b>Community – associated MRSA (CA MRSA)</b>	Community-associated MRSA (CA MRSA) defines a MRSA strain that is detected within 72 hours of hospital admission or if the isolate is obtained from a community laboratory specimen, or if the isolate is referred by the medical examiner and excludes risk factors such as hospital transfer, long-term care patient, patient previously identified as MRSA positive (within the past 12 months) or patient hospitalized within the past 12 months. <sup>43</sup>

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<b>Contact (Direct)</b>	Direct contact transmission occurs when transfer of microorganisms results from direct physical contact between an infected or colonized individual and a susceptible host (body surface to body surface).
<b>Contact (Indirect)</b>	Indirect contact involves passive transfer of microorganisms to a susceptible host via an intermediate object, such as contaminated hands that are not washed between patients or contaminated instruments or other inanimate objects in the patient's immediate environment.
<b>Contact Precautions</b>	Contact Precautions are a set of practices used to prevent transmission of infectious agents that are spread by direct or indirect contact with the patient or the patient's environment. Contact Precautions also apply where the presence of excessive wound drainage, fecal incontinence, or other discharges from the body suggest an increased transmission risk.
<b>Decolonization</b>	Refers to topical and/or systemic antimicrobial treatment administered for the purpose of eradicating MRSA carriage from the skin, nose and other mucosal surfaces.
<b>Hand Hygiene</b>	Refers to the process of removing or reducing the number of microorganisms on hand surfaces with soap and water or through the use of waterless antiseptic hand rubs.
<b>Handwashing</b>	The process of washing hands with soap and water to remove transient soil and transient microorganisms from the hands.
<b>Healthcare Worker (HCW)</b>	HCWs are those whose functions are essential to the provision of patient care, and who may have the potential for acquiring or transmitting infectious agents during the course of their work.
<b>Healthcare-associated MRSA (HA MRSA)</b>	Healthcare-associated MRSA defines a MRSA strain that is detected more than 72 hours after admission and <sup>44</sup> is isolated from a patient with risk factors such as a history of hospitalization, surgery, dialysis, or residence in a LTCF, or previous history of MRSA.
<b>Infection</b>	Occurs when bacteria get past the person's normal defenses and cause disease (e.g., skin bacteria getting into the bloodstream via an intravenous catheter). Infections with MRSA may be minor, such as pimples and boils, but serious infections may also occur, such as surgical wound infections and pneumonia.
<b>Infectious</b>	Caused by infection or capable of being transmitted.
<b>Long-Term Care Facility (LTCF)</b>	Also called nursing homes and auxiliary hospitals, provide professional nursing care for residents with unpredictable and complex needs who require a high level of care / or increased monitoring of complex health challenges. Nursing homes are governed by the "Nursing Homes Act" and auxiliary hospitals are governed under the "Hospitals Act".

<b>Methicillin Resistant <i>Staphylococcus aureus</i> (MRSA)</b>	<i>Staphylococcus aureus</i> isolates that carry the <i>mecA</i> gene, or that produce PBP 2a (the <i>mecA</i> gene product), should be reported as oxacillin / methicillin resistant. If MIC tests are performed, isolates with an oxacillin MIC $\geq 4$ $\mu\text{g/ml}$ are resistant to oxacillin / methicillin.
<b>Methicillin Susceptible <i>Staphylococcus aureus</i> (MSSA)</b>	<i>S. aureus</i> isolates with an oxacillin MIC $\leq 2$ $\mu\text{g/ml}$ , and are reported as susceptible to oxacillin / methicillin.
<b>Minimum Inhibitory Concentration (MIC)</b>	The minimum concentration of a drug required to inhibit visible growth of the organism in vitro. <sup>45</sup>
<b>Outbreak</b>	An outbreak is defined in the <i>Communicable Disease Regulation</i> , under the Alberta <i>Public Health Act</i> as: “a distribution of cases of communicable disease that is unusual in terms of time, place or persons affected” <sup>46</sup> or an increase in frequency of disease above the background occurrence of the disease. <sup>47</sup>
<b>Personal Protective Equipment (PPE)</b>	Equipment or clothing worn by a person to prevent transmission of organisms to self or others.
<b>Precautions</b>	Interventions implemented to reduce the risk of transmission of microorganisms from patient to patient, patient to healthcare worker, and healthcare worker to patient.
<b>Routine Practices and Additional Precautions</b>	The term used by Health Canada to describe an IPC system, including precautions, to reduce the risk of transmission of organisms in healthcare. A synonymous term in the US and some jurisdictions in Canada is Standard Precautions. Routine Practices should be used for all patients and three categories of Transmission Based Precautions should be used for specific infections that warrant additional measures. The three categories of additional precautions are based on known or presumed rates of transmission (airborne, droplet, contact) and patient characteristics.
<b>Surveillance</b>	The ongoing systematic collection, analysis, and interpretation of healthcare data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those contributing data or to other interested groups who need to know. <sup>48</sup>
<b>Waterless Antiseptic Hand Rub</b>	An antiseptic agent that does not require use of water (e.g., alcohol preparations of $>60\%$ ethanol or isopropanol). After applying such an agent, the hands are rubbed together until the agent has dried <sup>49</sup> .

# MRSA TYPING NOMENCLATURE



PROVINCIAL PUBLIC HEALTH  
LABORATORY (MICROBIOLOGY)

## Appendix

# A

The ProvLab and Calgary Laboratory Services in Alberta have adopted the pulsed-field gel electrophoresis (PFGE) nomenclature of MRSA strains used by the Canadian Nosocomial Infection Surveillance Program (CNISP) at the National Microbiology Laboratory (NML). Molecular fingerprinting of over 14,000 MRSA strains collected through CNISP since 1995 has identified the emergence of 10 different “epidemic clones” labeled CMRSA 1 to CMRSA 10. Each of these epidemic strains has been observed at five or more hospital sites and / or three or more geographically distinct areas in Canada.<sup>(1, 2, 3)</sup> These epidemic strains account for about 80% of all MRSA observed at CNISP hospital sites. CMRSA 1 to CMRSA 6 strains are typical nosocomial strains with multi-drug resistant phenotypes.<sup>(2)</sup> CMRSA 7 to CMRSA 10 strains have been recently identified as “epidemic” strains and have emerged only within the last several years in Canada ([www.nml-lnm.gc.ca/english/entericsARN\\_MRSA\\_e.htm](http://www.nml-lnm.gc.ca/english/entericsARN_MRSA_e.htm)). CMRSA 8 and CMRSA 9 are also typical of nosocomial MRSA strains, and comprise approximately 3% of the total epidemic strains observed to date at the CNISP study sites. CMRSA7 and CMRSA10 strains, also known as USA 400 and USA 300, respectively, are typically labeled as community-associated (CA-). Similar to reports from other countries, CMRSA 7 and CMRSA 10 have been associated with community related outbreaks in Canada.<sup>(4, 5, 6)</sup> These CA-MRSA strains are generally more susceptible to many classes of antimicrobials and often carry a toxin (Panton-Valentine leukocidin, PVL) not typically found in nosocomial MRSA strains. More recently, CMRSA 7 and CMRSA 10 strains are beginning to be observed in some acute care facilities (*personal communication, S. Elsayed and “Community Acquired MRSA in Alberta Exposure Investigation (EI)-#286 Provincial Outbreak Investigation Protocol”, Alberta Health and Wellness 2005.*

CNISP surveillance uses “retrospective” assignment of PFGE profiles to strains with the potential for epidemic spread as defined above. In general, the criteria for assigning patterns to a particular epidemic clone are based on guidelines as described by Tenover et al.<sup>(7)</sup> Although Tenover's guidelines for PFGE interpretation are intended for use in analyzing discrete sets of isolates during potential outbreaks spanning relatively short time periods, it is also suggested that these criteria may be modified in light of parallel epidemiological information to allow flexibility when determining relatedness between strains collected over more extended time periods.

Not all MRSA strains typed in Alberta will have an assigned PFGE profile using the NML/CNISP nomenclature. The “not assigned” profiles will refer to strains with new PFGE patterns, i.e., unique profiles that are not the same as any of the NML prototype strains. When ProvLab identifies a new MRSA strain that is a cause of an arising clone, a representative strain will be forwarded to the NML

## MRSA TYPING NOMENCLATURE

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for further characterization, and comparison to the national MRSA PFGE database. NML will assign a CMRSA-prototype number accordingly. Although in Alberta, ProvLab has identified several new clones, a few of which appears to have arisen from the community, these clones have not yet been assigned a national prototype designation (*personal communication, M. Louie*).

The *mecA* gene is located on a mobile element, *Staphylococcal Cassette Chromosome* (SCC), on the chromosome of MRSA. Several SCC types have been identified; SCC Type I to SCC Type III, have been associated with hospital-acquired strains that tend to be more multi-resistant to antibiotics. SCC Type IV and V have been associated with community-acquired strains that tend to be more susceptible to antibiotics than hospital-acquired strains.<sup>(8, 9)</sup> However, as community-acquired strains become established and endemic within hospital settings, the utility of designating a MRSA strain using SCC typing as either community- versus nosocomially-acquired may be lost. The Pantone-Valentine leukocidin (PVL) is a toxin more often associated with community-acquired MRSA strains. Most of the Alberta CMRSA 7 and CMRSA 10 strains are SCC Type IV and PVL positive.

The following table compares the Canadian prototype nomenclature of epidemic clones with those used in the United States (USA) and Europe (E); and with typing by multilocus sequence typing (MLST).

<b>NML Type</b>	<b>Other PFGE Names</b>	<b>MLST</b>
CMRSA1	USA600	ST45
CMRSA2	USA100/800 / New York	ST5
CMRSA3		ST241
CMRSA4	USA200 / EMRSA16	ST36
CMRSA5	USA500	ST8
CMRSA6		ST239
CMRSA7	USA400 / MW2	ST1
CMRSA8	EMRSA15	ST22
CMRSA9		ST8
CMRSA10	USA300	ST8

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*MRSA Typing Nomenclature updated May 21 2007.doc*

# TRANSFERS

Appendix

B

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Please see following page.

## Transfer Steps for Individuals with MRSA Across the Care Continuum For use by transport personnel

### RECEIVE REPORT FROM ORIGINATING SITE



#### Questions to Ask?

- Any Personal Protective Equipment (PPE) currently being used?
- Any uncontained wounds? (All open wounds should be covered)
- Any coughing, vomiting, diarrhea?
- Any invasive devices?

### WHAT TO WEAR TO PICK UP PATIENT



- Follow PPE Recommendations of originating site when entering the room
- Remove PPE on exiting room.
- Hand hygiene
- Place clean blanket on patient.

In most cases you don't need PPE outside patient's room to transport patient to vehicle \*

### WHAT TO WEAR INSIDE VEHICLE



#### Routine Practice:

*Choose PPE based on type of care needed during transport*

- Casual Contact: hand hygiene.
- Direct Skin Care: gloves plus hand hygiene.
- Risk of Spray or Splash: gown, eye protection, mask, gloves, hand hygiene.

### ON LEAVING THE VEHICLE



- remove PPE;
- perform hand hygiene
- place another clean blanket on patient if PPE used in transit

In most cases you don't need PPE outside vehicle to transport patient to room \*

### PROVIDE REPORT TO RECEIVING SITE



- describe the health history of patient

### AFTER TRANSPORTING PATIENT TO ROOM / BED



- Remove PPE if used and complete hand hygiene

### CLEAN VEHICLE



- dispose of laundry in available laundry hamper
- clean stretcher and patient contact surfaces
- complete hand hygiene

\* If PPE used during transport through facility (based on risk assessment)  
**Avoid** contact of gloved hands with door / elevator controls.

# SPECIMEN COLLECTION

## Appendix

# C

<b>Follow Regional Laboratory Protocols</b>	<p>Complete Laboratory Requisition</p> <ul style="list-style-type: none"> <li>○ Name, date, time of collection</li> <li>○ Write MRSA screen (or check off if box available)</li> <li>○ Note the swab site [nose, rectum/perianal, groin, umbilicus (neonate) or wound]</li> </ul>
<b>Equipment Required</b>	<ul style="list-style-type: none"> <li>○ Swab kit</li> <li>○ Laboratory requisition</li> <li>○ Disposable non-sterile gloves</li> </ul>
<b>Procedure</b>	<ul style="list-style-type: none"> <li>○ Collect specimen at time of admission</li> <li>○ Screen a maximum of two sites [nose, rectum/perianal, groin, umbilicus (neonate) or wound]. (Cultures of nares identify most patients with MRSA and perirectal and wound cultures can identify additional carriers<sup>50</sup>)</li> <li>○ Consider urine specimen if patient has an indwelling catheter</li> <li>○ Cultures should be taken no less than 48 hours after antibiotic/ decolonization treatment has ceased</li> <li>○ In an individual where consistent colonization is present test monthly if receiving health services</li> <li>○ <b>Wash hands prior to collecting specimen and after task completion</b></li> </ul>
<b>Nose</b>	<ul style="list-style-type: none"> <li>○ Use sterile clear transport media swab (1 swab both nares)</li> <li>○ Consider pre-moistening swab with clear transport media</li> <li>○ Insert swab into each nostril no further than the length of the cotton bud and rotate gently around inner surface of nostril</li> <li>○ Return swab into transport media</li> </ul>
<b>Groin</b>	<ul style="list-style-type: none"> <li>○ Use sterile clear media transport media swab</li> <li>○ Consider pre-moistening swab with clear transport media</li> <li>○ Rotate swab while moving side-to-side in each groin</li> <li>○ Return swab into transport media</li> </ul>
<b>Wound Swab (draining wounds)</b>	<ul style="list-style-type: none"> <li>○ Cleanse wound with sterile saline to remove surface organisms</li> <li>○ Use sterile clear media transport media swab</li> <li>○ One swab per wound – no size limit to wound</li> <li>○ Rotate swab while moving side to side, wound edge to wound edge across the wound beginning at one end of the wound and ending at the other end</li> <li>○ Return swab into transport media</li> </ul>
<b>Rectal Swab</b>	<ul style="list-style-type: none"> <li>○ Use sterile clear media transport media swab</li> <li>○ Consider pre-moistening swab with clear transport media</li> <li>○ Gently insert the swab through the anus and advance 1 cm for infants and 4 cm for adults</li> <li>○ While withdrawing the swab rotate it in order to sample a large area of the rectal mucosa</li> <li>○ Return swab into transport media</li> </ul>

# OUTBREAK CHECKLIST

Appendix

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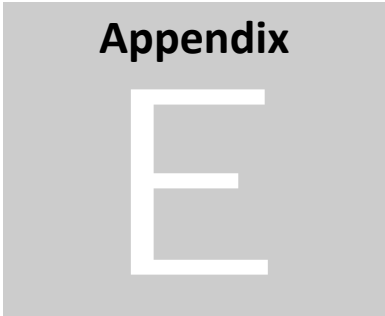
This outbreak checklist, adapted from the Association for Professionals in Infection Control and Epidemiology, Inc. (APIC) Text section 4.2, is provided as a general tool describing the outbreak investigation process. Established region specific outbreak reporting processes and management should be followed whenever possible.

The initial step is to confirm that an outbreak is suspected by defining an outbreak case and verifying reported cases. The next steps often occur simultaneously in an outbreak investigation.

## OUTBREAK CHECKLIST

MRSA Outbreak Checklist		
1.	<b>Assess Need for Outside Consultation/Report to MOH:</b> Confirm the existence of an outbreak through consultation with an experienced Infection Prevention Control Professional and/or Infectious Disease Specialists. If an outbreak is confirmed, communicate with relevant stakeholders (MOH, Prov Lab, regional lab(s), ICP, administration)	<input type="checkbox"/>
2.	Establish an outbreak case definition: Consider screening and clinical isolates; person-age, gender, underlying risk factors; place; time; clinical presentation; and subtyping information and/or antibiotic resistance profiles	<input type="checkbox"/>
3.	<b>Case Finding:</b> Establish possible source, event or setting. Seek additional cases and collect critical data and specimens, a) encourage immediate reporting of new cases; b) search for other cases e.g., lab reports, medical records, patient charts, physicians and nursing staff; c) use a specific data collection form (line list).	<input type="checkbox"/>
4.	Formulate hypothesis based on epidemic curve, common vs. propagated source, summarize common host factors and exposures, the hypothesis should explain the majority of cases.	
5.	<b>Institute Appropriate Early Control Measures:</b> Evaluate healthcare system factors for their role in MRSA transmission such as: adherence to recommended infection control measures; staffing levels; education and training; availability of consumable and durable resources; management of the physical environment and equipment; communication processes; and policies and procedures. Develop, implement and monitor action plans to reduce transmission.	<input type="checkbox"/>
6.	<b>Confirm that specimens will be held until the investigator requests or releases them:</b> Verify outbreak cases by submitting specimens for PFGE molecular typing. In addition antibiogram information about subsequent isolates can be used to determine if isolates are related to the outbreak strain. Include all positive MRSA results of clinical and screening origin as both are important in MRSA transmission. Rapid detection methods such as PCR may be used to identify positive/negative MRSA patients and allow more effective patient placement and use of precautions.	<input type="checkbox"/>
7.	<b>Compare incidence with usual or baseline incidence:</b> Continue surveillance. Characterize cases of disease, a)time- exact period of outbreak, period of exposure, record date of onset of illness for cases; draw an epidemic curve, b) place, e.g., population at risk, clustering of cases, c) person, e.g., patient characteristics, evaluation of possible exposures, evaluation of therapeutic modalities. Calculate rates. Once known cases have been identified, surveillance of potential contacts is indicated and may include: current or past roommates still in the facility; current unit or ward residents/ patients; current home care case load clients. The extent of the potential contacts to be screened is dependent on the type of care provided in the area (amount of direct hands on care involved), potential environmental contamination (cleaning practices for shared equipment). Contact screening will identify new cases, define the scope of the outbreak, and direct management plans.	<input type="checkbox"/>
8.	Evaluate effectiveness of control measures, e.g., cases cease to exist to occur or return to endemic level, no change occurs and use opportunity of an outbreak to review and correct other hospital practices.	<input type="checkbox"/>
9.	End of outbreak. Communicate findings, e.g., oral or written reports reviewing outbreak. Recommend changes if indicated.	<input type="checkbox"/>

# EDUCATION



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Please see following pages.

(NOTE: Hand hygiene information should be attached to each information pamphlet.)



## HAND HYGIENE

***IS THE BEST WAY TO PREVENT THE SPREAD OF MRSA!***

**Follow these simple instructions when washing your hands with plain soap and water\*:**

1. Wet with warm water.
2. Apply soap and rub for 15 seconds – all surfaces including front and back of hands, between fingers, around nails (especially cuticles), thumbs and wrists.
3. Rinse well.
4. Dry with a paper towel.
5. Turn off faucet without re-contaminating hands, for example, use towel to turn off taps.

**Follow these simple instructions when using a waterless hand sanitizer (minimum 60 percent alcohol):**

1. Apply a measured pump (or nickel size) of the product to your open palm.
2. Rub into hands covering all surfaces including front and back of hands, between fingers, around nails (especially cuticles), thumbs and wrists.
3. Rub until dry (approximately 15 seconds).

For more information, visit [www.dobugsneeddrugs.org](http://www.dobugsneeddrugs.org)

- \* If there is visible soiling, hands should be washed with soap and water. If soap and water are unavailable, cleanse hands first with detergent-containing towelettes to remove visible soil prior to using hand rubs.

Thank you for helping to prevent the spread of MRSA!

## Methicillin Resistant *Staphylococcus aureus* (MRSA)

### Client/Visitor/Family Information Pamphlet

#### What you need to know when visiting an individual who is infected with MRSA...

##### What is MRSA?

*Staphylococcus aureus* is a bacteria that may commonly live on the skin, or in the noses of healthy people. MRSA is the term for *Staphylococcus aureus* bacteria that have become resistant to semi-synthetic penicillins such as cloxacillin and methicillin. It can also acquire resistance to other classes of antibiotics. However, MRSA infections can be more difficult to treat and drugs commonly used for treatment of other strains of *Staphylococcus aureus* are not always effective.

Traditionally, MRSA is seen in people who are taking antibiotics and those individuals who are receiving medical care. MRSA, like *S. aureus*, may also live on the skin or in the noses of people.

More recently, MRSA has been found in people who have no contact with the health care system. This is referred to as community-associated MRSA (CA MRSA). In the community, MRSA most commonly causes skin and soft tissue infections (e.g., boils or abscesses on arms, legs or elsewhere). These are treatable with drainage and antibiotics. Rarely, MRSA can cause severe invasive infections such as pneumonia and bloodstream infections. These severe infections require urgent medical treatment.

##### How is MRSA spread?

MRSA bacteria are spread through direct person-to-person contact with a colonized or infected person. It can be passed from hands that are not clean to any person, object or surface they touch. When hands are washed thoroughly or rubbed with alcohol-based hand products, MRSA will likely be removed.

However, if the immediate environment is not clean, hands can very quickly become soiled again. Frequent hand cleaning is necessary to either prevent spreading MRSA to others, or to prevent picking it up from others.

##### What do colonization and infection mean?

Colonization: Colonization occurs when bacteria are present on or in the body without causing illness. MRSA can colonize the nose, skin and moist areas of the body.

Infection: Infection occurs when bacteria get past the person's normal defenses and cause disease (e.g., skin bacteria getting into the bloodstream via an intravenous catheter). Infections

with MRSA may be minor, such as pimples and boils, but serious infections may also occur, such as surgical wound infections and pneumonia.

### **Can I touch the person I am visiting?**

Yes, you can still have close contact, such as hugging, kissing and handholding. Just remember to clean your hands properly before entering and leaving an infected person's home or hospital room.

### **What can I as a visitor or patient do to help?**

Clean your hands before and after your visit. Follow directions of nursing staff, e.g., you may be asked to wear a gown or gloves when visiting.

## Methicillin Resistant *Staphylococcus aureus* (MRSA)

### Patient Information

### Screening for MRSA

#### What you need to know...

#### What is MRSA?

*Staphylococcus aureus* is a bacteria which can be found on human skin, in the nose, and / or the intestines (bowels). Occasionally, *Staphylococcus aureus* can get into the body and cause infections. Several antibiotics can treat *Staphylococcus aureus*, but one type is harder to treat-it is called MRSA. MRSA is the term for *Staphylococcus aureus* bacteria that have become resistant to semi – synthetic penicillins such as cloxacillin and methicillin.

If a healthy person gets MRSA, it may or may not cause an infection. If a person has MRSA on their skin, or inside their body, it can be spread to other people. Special precautions are usually taken in the hospital to prevent the spread of MRSA to others.

If an ill patient gets MRSA, it can be very serious.

#### Can we test you for MRSA?

If you agree, these tests may include:

- a swab of the inside of your nose;
- a swab of the skin on your groin or rectum
- a swab of drainage from your wounds; or,
- a urine sample from a catheter.

Results should be available within a week.

Your healthcare provider will let you know if special precautions need to be taken and can provide more information about MRSA.

Thank you for your cooperation.

## Methicillin Resistant *Staphylococcus aureus* (MRSA)

### Patient Information You Have Tested Positive for MRSA

#### What you need to know...

Please read the following pamphlet to learn more, and ask your healthcare provider if you have any questions.

#### What is MRSA?

*Staphylococcus aureus* is a bacteria that may commonly live on the nose, skin and moist areas of the body. MRSA is the term for *Staphylococcus aureus* bacteria that have become resistant to semi-synthetic penicillins such as cloxacillin and methicillin. It can also acquire resistance to other classes of antibiotics. MRSA infections can be difficult to treat and drugs commonly used for treatment of other strains of *Staphylococcus aureus* are not always effective.

If a person has MRSA on their nose, skin, or inside their body, it can be spread to other people. So, special precautions are usually taken in the hospital to prevent the spread of MRSA to others. If an ill patient gets MRSA, it can be very serious.

#### I have MRSA, but why is it not causing an infection?

MRSA can live on the nose, skin and moist areas of the body without causing illness -- this is called colonization and the individual colonized is a carrier.

#### Will I get an MRSA infection?

Infection occurs when bacteria get past the person's normal defenses and cause disease (e.g., skin bacteria getting into the bloodstream via an intravenous catheter). Infections with MRSA may be minor, such as pimples and boils, but serious infections may also occur, such as surgical wound infections and pneumonia.

#### How can the spread of MRSA be prevented in the hospital?

It is important to note that a person colonized or infected with MRSA can spread the bacteria to others.

In hospital, you may be placed on special precautions. This means that healthcare providers, family and visitors will take measures to prevent the bacteria from spreading throughout the hospital.

#### What do I need to do to protect others?

Remember that cleaning your hands with plain soap and water or waterless hand sanitizer (as long as your hands are not visibly soiled) is always important both in the hospital and at home.

### **What are these special precautions in hospital?**

You may be asked to stay in your room unless you have a test or procedure.

If you need to leave your room for a test or procedure, you must first wash your hands. A staff member will make sure any wounds you may have are covered, and may ask you to wear a mask if you are coughing.

Persons caring for you will wash their hands and put on gloves and hospital gowns before entering your room, and remove their gloves and gowns before leaving the room. They may also wear a mask.

All people should wash their hands with plain soap and water or use a waterless hand sanitizer before and after leaving your room. A special precautions card to alert staff will be placed on your door.

A cart with all necessary supplies will be placed outside your door.

### **How long do I have to stay on these precautions?**

Depending on your situation, you may be retested for MRSA. If the tests are negative (two, one week apart), you will be told when it is safe for these precautions to be discontinued.

### **Family and Visitors**

Family and friends may visit. They will be instructed by your healthcare provider about the use of precautions, proper hand hygiene and respiratory etiquette (e.g., use of a tissue to cover coughs and sneezes and hand hygiene). It is very important that they clean their hands before entering and leaving your room.

### **What if I am admitted again?**

If you are admitted again, it is important for you to alert your healthcare provider that you had previously tested positive for MRSA. On any future admissions you may be put in a private room and placed on special precautions. Swabs from certain parts of your body may be taken to check for MRSA.

### **What can I do to help?**

1. Clean your hands frequently and please remind others to do the same. Cover your cough/sneeze (if it is with your hands, clean your hands after).
2. Ask your healthcare provider to answer any questions you may have.
3. If you go to another healthcare facility, **or if you are readmitted to the same facility**, inform them that you have **or had** MRSA.

# Methicillin Resistant *Staphylococcus aureus* (MRSA)

## Hospital/Facility Staff Information Pamphlet

### What you need to know about MRSA...

#### What is MRSA?

*Staphylococcus aureus* is a bacteria that may commonly live on the skin, or in the noses of healthy people. MRSA is the term for *Staphylococcus aureus* bacteria that have become resistant to semi-synthetic penicillins such as cloxacillin and methicillin. It can also acquire resistance to other classes of antibiotics. MRSA infections can be difficult to treat and drugs commonly used for treatment of other strains of *Staphylococcus aureus* are not always effective.

#### How is it spread?

MRSA is spread by contact. If staff do not clean their hands before and after direct patient care, or remove their gloves between patients/residents/individuals, they can pass the microorganism from a person who has it to another person. It can also be spread on equipment that hasn't been cleaned between patient uses. This is why hand hygiene before and after direct patient care is very important.

#### What do colonization and infection mean?

Colonization: Colonization occurs when bacteria are present on or in the body without causing illness. MRSA can colonize the nose, skin and moist areas of the body.

Infection: Infection occurs when bacteria get past the person's normal defenses and cause disease (e.g., skin bacteria getting into the bloodstream via an intravenous catheter). Infections with MRSA may be minor, such as pimples or boils, but serious infections may also occur, such as surgical wound infections and pneumonia.

#### What can staff do to decrease the spread of MRSA?

##### 1. Hand Hygiene:

Hand hygiene is one of the most important measures for preventing the spread of MRSA.

- Waterless, alcohol – based (minimum 60 percent alcohol) antiseptic hand rubs are effective for hand hygiene and should be readily available. If there is visible soiling, hands should be washed with soap and water. If soap and water are unavailable, cleanse hands first with detergent-containing towelettes to remove visible soil prior to using hand rubs.
- Patients, care givers and visitors should be instructed in proper hand hygiene.

- Avoid recontaminating hands.
- Use facility supplied hand lotion AFTER performing hand hygiene.

### 2. Routine Practices:

The term Routine Practices is synonymous with Standard Precautions and encompasses the old terminology of Universal Precautions and Body Substance Isolation. Routine Practices refers to interventions such as hand hygiene, patient placement, and the use of barriers such as gloves, gowns, masks and face shields, to be used for all patients regardless of diagnosis, and tailored to the characteristics of the patients and their environment. Contact transmission is the most common route of transmission of microbes from symptomatic to asymptomatic patients in hospitals. Routine Practices and Contact Precautions should be used for MRSA positive patients in hospital settings, while in other settings a risk assessment should guide barrier selection.

### 3. Equipment:

If not dedicated, shared equipment must be cleaned and disinfected between patients / residents / clients.

### 4. Cleaning:

All surfaces in patient rooms are cleaned daily. Environmental services protocol for Contact Precautions is followed when additional precautions are discontinued.

## When will Additional Precautions be discontinued?

Contact Precautions may be discontinued after at least two consecutive negative specimens are obtained one week apart. The culture should be taken no less than 48 hours after antibiotic / decolonization treatment has ceased, and the second no less than 7 days after the first. In an individual where consistent colonization is present, discontinue weekly cultures and test monthly if receiving healthcare services.

## Can staff become colonized?

Colonization is usually for a short duration and about 3% of staff who come in contact with MRSA may become colonized. Strict adherence to hand hygiene before and after every patient/resident contact, after removing gloves and handling used equipment will decrease the risk of becoming colonized. It is also recommended to use a facility supplied hand lotion in order to maintain healthy skin on the hands.

## Do staff need to be screened to see if they are colonized?

No, this is not done often. If there is an outbreak in an area, the Medical Officer of Health or designate may ask that the staff be cultured. If a person is found to be a carrier, this information is kept confidential and you may be referred for treatment.

## Is there a greater risk of MRSA colonization if the person is pregnant or immunocompromised?

No, the risk is the same for all staff and it is very low.

## Methicillin Resistant *Staphylococcus aureus* (MRSA)

### Public Health Staff or Community-Based Healthcare Workers (HCWs) Information Pamphlet

#### What you need to know about MRSA...

##### What is MRSA?

*Staphylococcus aureus* is a bacteria that may commonly live on the skin, or in the noses of healthy people. MRSA is the term for *Staphylococcus aureus* bacteria that have become resistant to semi-synthetic penicillins such as cloxacillin and methicillin. It can also acquire resistance to other classes of antibiotics.

MRSA infections can be difficult to treat and drugs commonly used for treatment of other strains of *Staphylococcus aureus* are not always effective.

Traditionally, MRSA is seen in people who are taking antibiotics and those individuals who are receiving medical care. More recently, MRSA has been found in people who have no contact with the health care system. This is referred to as community-associated MRSA (CA MRSA).

In the community, MRSA most commonly causes skin and soft tissue infections (e.g., boils or abscesses on arms, legs or elsewhere). **These are treatable with drainage and antibiotics.** Rarely, MRSA can cause severe invasive infections such as pneumonia and bloodstream infections. These severe infections require urgent medical treatment.

##### How is MRSA spread?

MRSA bacteria are spread through direct person-to-person contact with a colonized or infected person. It can be passed from hands that are not clean to any person, object or surface they touch. When hands are washed thoroughly or rubbed with alcohol-based hand products, MRSA will likely be removed or destroyed.

However, if the immediate environment is not clean, hands can very quickly become soiled again. Frequent hand cleaning is necessary to either prevent spreading MRSA to others, or to prevent picking it up from others.

There are 5 C's that describe risk factors for CA-MRSA infections:

- **crowded** conditions
- close **contact**
- lack of **cleanliness**
- sharing **common** personal items, e.g., towels, and
- having **compromised** or broken skin.

### What do colonization and infection mean?

Colonization: Colonization occurs when bacteria are present on or in the body without causing illness. MRSA can colonize the nose, skin and moist areas of the body.

Infection: Infection occurs when bacteria get past the person's normal defenses and cause disease (e.g., skin bacteria getting into the bloodstream via an intravenous catheter). Infections with MRSA may be minor, such as pimples or boils, but serious infections may also occur, such as surgical wound infections and pneumonia.

### What can staff do to decrease the spread of MRSA?

#### Hand Hygiene:

Hand hygiene is one of the most important measures for preventing the spread of MRSA.

Waterless alcohol – based (minimum 60 percent alcohol), antiseptic hand rubs are effective for hand hygiene and should be readily available. If there is visible soiling, hands should be washed with soap and water. If soap and water are unavailable, cleanse hands first with detergent-containing towelettes to remove visible soil prior to using hand rubs.

Patients, care givers and visitors should be instructed in proper hand hygiene.

Avoid recontaminating hands.

#### Equipment:

If not dedicated, shared equipment must be cleaned and disinfected between clients.

### What can patients do to decrease the spread of MRSA? <sup>51</sup>

- Clean hands regularly with soap and water or alcohol-based hand sanitizer. If hands are visibly soiled, soap and water works best. Antibacterial soaps are NOT recommended for most situations.
- Always clean hands immediately after touching skin or any item that has come in direct contact with a draining wound.
- Keep wounds that are draining covered with clean, dry bandages.
- If unable to keep a wound covered with a clean, dry bandage at all times, patients should not participate in activities where there is skin-to-skin contact with other persons (such as athletic activities) until the wound is healed.
- Maintain good general hygiene with regular showering.
- Do not share personal items that may become contaminated with wound drainage, such as towels, clothing, bedding, bar soap, razors, and athletic equipment that touches the skin.

## EDUCATION

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- Wash clothing using regular laundry soap in the usual wash cycle of a household washing machine.
- Clean shared items e.g., sports equipment or environmental surfaces with over the counter detergent/disinfectant (e.g., Lysol) that are suitable for the type of surface being cleaned.
- If there are signs of an infection, seek appropriate medical care promptly.

## Methicillin Resistant *Staphylococcus aureus* (MRSA)

### Community Information Pamphlet

#### What you need to know about MRSA...

##### What is MRSA?

*Staphylococcus aureus* is a bacteria that may commonly live on the skin, or in the noses of healthy people. MRSA is the term for *Staphylococcus aureus* bacteria that have become resistant to semi-synthetic penicillins such as cloxacillin and methicillin. It can also acquire resistance to other classes of antibiotics.

MRSA infections can be difficult to treat and drugs commonly used for treatment of other strains of *Staphylococcus aureus* are not always effective.

Traditionally, MRSA is seen in people who are taking antibiotics and those individuals who are receiving medical care. More recently, MRSA has been found in people who have no contact with the health care system. This is referred to as community-associated MRSA (CA MRSA).

In the community, MRSA most commonly causes skin and soft tissue infections (e.g., boils or abscesses on arms, legs or elsewhere). **These are treatable with antibiotics.** Rarely, MRSA can cause severe invasive infections such as pneumonia and bloodstream infections. These severe infections require urgent medical treatment.

##### How is MRSA spread?

MRSA bacteria are spread through direct person-to-person contact with a colonized or infected person. It can be passed from hands that are not clean to any person, object or surface they touch. When hands are washed thoroughly or rubbed with alcohol-based hand products, MRSA will likely be removed.

However, if the immediate environment is not clean, hands can very quickly become soiled again. Frequent hand cleaning is necessary to either prevent spreading MRSA to others, or to prevent picking it up from others.

There are 5 C's that describe risk factors for CA-MRSA infections:

- **crowded** conditions
- close **contact**
- lack of **cleanliness**
- sharing **common** personal items, e.g., towels, and
- having **compromised** or broken skin.

### What do colonization and infection mean?

Colonization: Colonization occurs when bacteria are present on or in the body without causing illness. MRSA can colonize the nose, skin and moist areas of the body.

Infection: Infection occurs when bacteria get past the person's normal defenses and cause disease (e.g., skin bacteria getting into the bloodstream via an intravenous catheter). Infections with MRSA may be minor, such as pimples and boils, but serious infections may also occur, such as surgical wound infections and pneumonia.

### What can people do to decrease the spread of MRSA? <sup>52</sup>

- Clean hands regularly with soap and water or alcohol-based (minimum 60 percent alcohol), hand sanitizer. If hands are visibly soiled, soap and water works best. Antibacterial soaps are NOT recommended in most situations.
- Always clean hands immediately after touching skin or any item that has come in direct contact with a draining wound.
- Keep wounds that are draining covered with clean, dry bandages.
- If unable to keep wound covered with a clean, dry bandage at all times, do not participate in activities where there is skin-to-skin contact with other persons (such as athletic activities) until your wound is healed.
- Maintain good general hygiene with regular showering.
- Do not share personal items that may become contaminated with wound drainage, such as towels, clothing, bedding, bar soap, razors, and athletic equipment that touches the skin.
- Wash clothing using regular laundry soap in the regular wash cycle of a household washing machine.
- Clean shared items e.g., sports equipment or environmental surfaces with over-the-counter detergent / disinfectant (e.g., Lysol) that are suitable for the type of surface being cleaned.
- If there are signs of an infection, seek appropriate medical care promptly.

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