

Methicillin Resistant *Staphylococcus aureus* (MRSA) Best Practices Guidelines for Hospitals

Developed and sponsored by a task force of the Infection Control Professionals of Southern New England (ICPSNE) in cooperation with Infectious Disease Physicians from Rhode Island, and in collaboration with representatives from: the Rhode Island Department of Health (HEALTH), The Hospital Association of Rhode Island (HARI), and Rhode Island Quality Improvement Partners.

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Methicillin Resistant *Staphylococcus aureus* (MRSA):

Best Practice Guidelines for Hospitals

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Introduction:

These guidelines are established in response to and recognition of recent nationwide increases in nosocomial acquisition of Methicillin Resistant Staphylococcus aureus (MRSA). A performance improvement task force of Rhode Island Infection Control professionals was created to develop an epidemiological model of statewide consistent infection control practices which could reduce the spread of MRSA. This model encompasses screening protocols, isolation techniques, methods of cohorting positive patients, decolonization issues, post exposure follow up, Microbiology procedures, and standardized surveillance methodologies. These “Best Practice Guidelines” include three (3) categories of recommendations (Level I, II, III) which define priority levels based upon availability of scientific data. The guidelines are sanctioned by the local Infection Control and Infectious Disease Community, and the Rhode Island Department of Health.

Definitions of Priority Levels:

Priority Level I - Strongly recommended and strongly supported by well-designed epidemiological studies and experience.

Priority Level II - Highly recommended and viewed as effective by experts in the field, and supported by strong rationale and suggestive evidence.

Priority Level III - Moderately recommended; should be considered based on theoretical risk and supported by limited studies involving innovative approaches to infection control interventions.

Note: Priority levels are listed after each practice. In some instances, there may be choices of priority levels. Decisions should be made, dependent on individual facility approaches to the control of MRSA.

Best Practices for Hospitals:

- I. SCREENING PROTOCOLS** - for identification of patients at risk of having MRSA
 - A. Candidates for screening - Refer to **Tables I** and **II**.
 1. Long term care facility residents, within 24 – 48 hours of admission to hospital. **[Level I]**
 2. Patients from other acute care facilities, within 24 – 48 hours of admission. **[Level I]**
 3. Admissions to Rehabilitation Units (facilities), within 24 – 48 hours of admission. **[Level I]**
 4. Renal (Dialysis) patients within 24 – 48 hours of admission. **[Level I]**

5. Re-admissions to the hospital ≤ 30 days of previous discharge. *[Level I]*
 6. Periodic prevalence studies of admissions and/or transfers to and discharges from an Intensive Care Unit (ICU). *[Level I]*
 7. Periodic prevalence studies of preoperative patients.
 - a. Those having major surgical procedures to include: *[Level III]*
 - Vascular procedures
 - Orthopedic procedures
 - Cardiac/Thoracic procedures
 - Neurosurgical procedures
 - b. Screen preoperative patients if MRSA is known to be a causative agent among major surgical procedures *[Level I]*
 8. Consider gathering baseline data to study:
 - a. Residents of Assisted Living Facilities within 24 – 48 hours of admission to the hospital. *[Level III]*
 - b. Residents of Group Homes within 24 – 48 hours of admission to the hospital. *[Level III]*
- B. Screening Cultures (Anatomical sites) - Refer to TABLE I.
1. Recommendations for **Long Term Care Residents and Patients Transferred from Other Acute Care Facilities (Hospitals)**
 - Bilateral anterior nares, utilizing one (1) culturette for both nares. (Minimum requirement for screening). *[Level I]*
 - Any open skin lesions, draining wounds, to include surgical sites, when noted on admission to the hospital. *[Level I]*
 2. Recommendations for **admissions to Rehabilitation Units (facilities)**
 - Bilateral anterior nares *[Level I]*
 - Draining wounds *[Level II]*
 3. Recommendations for **Renal (Dialysis) patients**
 - Bilateral anterior nares *[Level I]*
 - Draining wounds *[Level II]*
 4. Recommendations for **Re-admitted patients ≤ 30 days since previous discharge**
 - Bilateral anterior nares *[Level I]*

TABLE I: SCREENING PROTOCOLS FOR IDENTIFICATION OF PATIENTS WITH MRSA

WHO	WHEN	SITE(s)	PRIORITY LEVEL
LTCF Residents	24 - 48 hrs of admission	Nares, draining wounds	I
Patients from other Acute Care Facilities	24 – 48 hrs. of admission	Nares	I
		Draining wounds	II
Admissions to Rehab. Units	24 – 48 hours of admission	Nares	I
		Draining wounds	II
Dialysis Patients	24 – 48 hours of admission	Nares	I
		Draining wounds	II
Re-admitted Patients ≤ 30 days since previous hospital discharge	24 – 48 hours of admission	Nares	I

C. Periodic Prevalence Studies (Anatomical sites) - Refer to **TABLE II**

1. Recommendations **for admissions and/or transfers to and discharges from an ICU**

- Bilateral anterior nares (minimum requirement for screening) *[Level I]*
- Sputum, in the presence of productive cough and/or suctioning *[Level II]*

2. Recommendation for **Preoperative patients, patients from Assisted Living Facilities, and Patients from Group Homes** *[Level III]*

- Bilateral anterior nares

2a. If MRSA is known to be a causative agent among identified surgical procedures, screen (nares culture) preoperative patients. *[Level I]*

3. Recommendations for Health Care Workers (HCWs). (Refer to **II. Culturing/Screening Health Care Workers** and **TABLE II**) *[Level I]*

4. Recommendations for Patients exposed to other patients who are MRSA positive (Refer to **III. Post Exposure Follow Up** and **TABLES II and III**) *[Level II]*

TABLE II: PERIODIC PREVALENCE STUDIES

WHO	WHEN	SITE(s)	PRIORITY LEVEL
ICU Patients	Admit/transfer to ICU	Nares	I
		Sputum	II
	Discharge from ICU	Nares	I
		Sputum	II
Preoperative Patients (Major: ORTH., CARD., THORACIC, VASC., NEURO.)	Pre-admission Testing (PAT)	Nares	III
	If MRSA is known to be a causative agent	Nares	I
Patients from Assisted Living Facilities	24 – 48 hrs. of admission	Nares	III
Patients from Group Homes	24 – 48 hrs. of admission	Nares	III
Health Care Workers (HCW's)	During outbreak and/or case clusters only, as defined by biotyping MRSA isolates	Nares	I
Patients exposed to un-isolated, unknown MRSA positive patient	See Algorithm, TABLE III	Nares	II

II. CULTURING/SCREENING HEALTH CARE WORKERS (HCWs)

A. Do not routinely culture HCWs, as this practice is usually not cost effective.

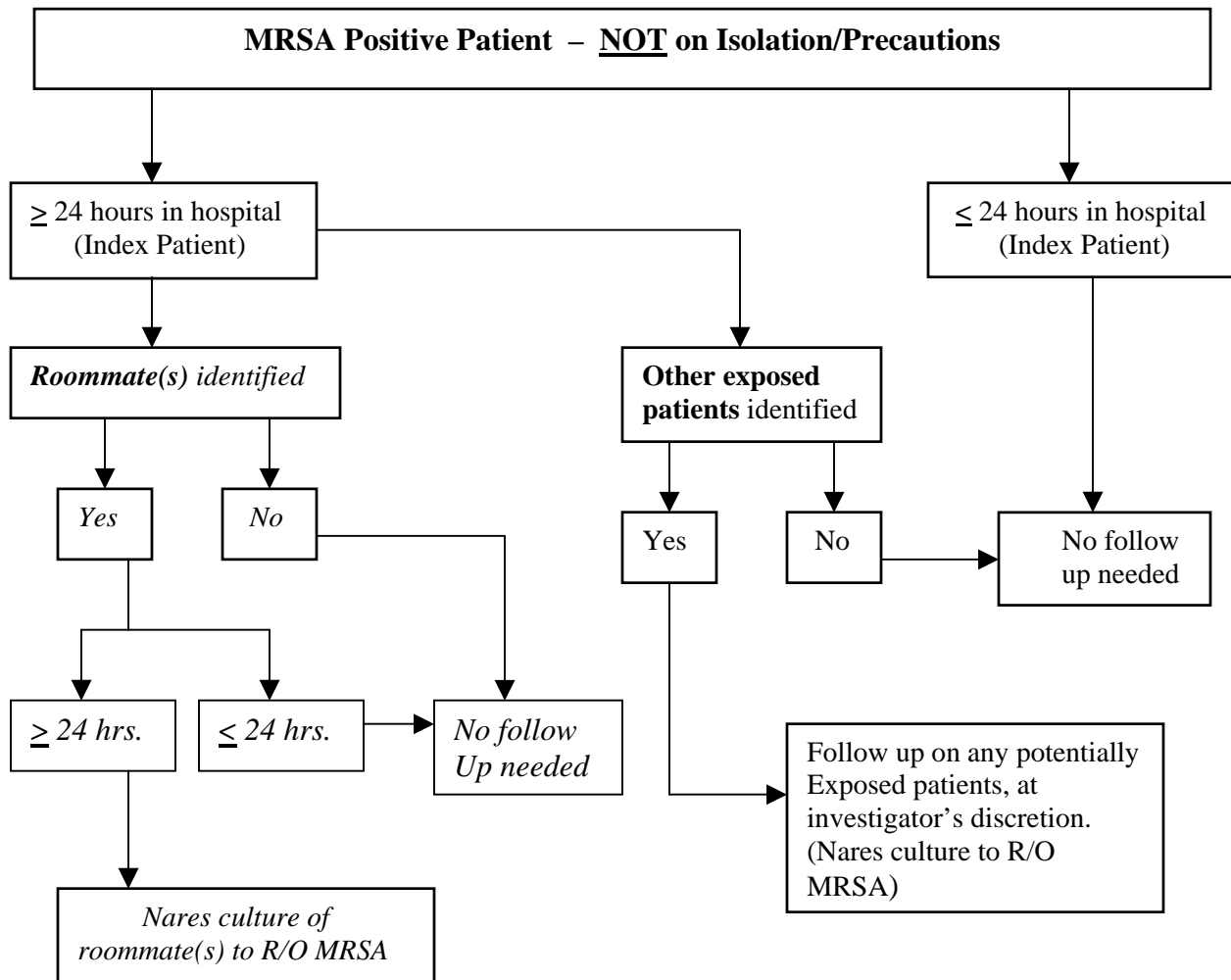
[Level I]

B. Attempts to identify MRSA carriers should be considered in the presence of noted outbreaks and/or clusters of MRSA positive cultures among patients, as defined by Pulse Field Gel Electrophoresis (PFGE) or other biotyping method. *[Level I]*

III. FOLLOW UP FOR EXPOSURE TO NON-ISOLATED MRSA POSITIVE PATIENTS - refer to TABLE III

When a non-isolated patient is identified as having a positive MRSA culture, has been in the hospital ≥ 24 hours, and there is a potential for the positive patient to have exposed other patients to MRSA, a follow up investigation is indicated. *[Level I]*

TABLE III: ALGORITHM FOR POST EXPOSURE FOLLOW UP [Level I]



IV. ISOLATION/PRECAUTIONS PRACTICES

- A. Category – Contact Precautions, with additional requirements for controlling the spread of resistant organisms. *[Level I]*
- B. Candidates for Isolation/Precautions
 1. All patients with MRSA infection, any anatomical site. *[Level I]*
 2. All patients with MRSA colonization, any anatomical site. *[Level I]*
- C. Criteria for practicing appropriate precaution techniques
 1. Gloves - required for all persons entering the isolation room/area. *[Level I]*
 - 2a. Gowns - required for all persons providing direct care and/or having contact with the patient or the patient's environment. *[Level I]*
 - 2b. Gowns - recommended for all persons entering the isolation room/area. *[Level II]*

- 3a. Masks - required for all persons entering the isolation room when MRSA has been found in the patient's respiratory secretions (i.e. sputum or bronchoscopy specimens), and/or when entering the room of ventilated patients. **[Level I]**
- 3b. Masks - recommended for all persons entering the isolation room/area, of any MRSA positive patient. **[Level II]**

D. Isolation Room

- 1. Private room for all MRSA positive patients, whether infected or colonized **[Level I]**
 - a. Exception: De-colonization protocol in use on patient with MRSA positive nares only. **[Unresolved issue]**
- 2. Patient should be restricted to room, except when in need of diagnostic or therapeutic services. **[Level I]**
- 3. Procedure for patient coming out of isolation room:
 - a. Patient must have freshly laundered clothing/gown and must have practiced hand hygiene, (Refer to Section E. below) prior to coming out of room. **[Level I]**
 - b. Patient wears mask, if sputum positive for MRSA. When patient cannot tolerate a mask, the Health Care Worker should wear a mask. **[Level I]**
 - or
 - c. Patient wears mask if nares positive MRSA. **[Level III]**

E. Hand Hygiene

- 1. The practice of handwashing or application of alcohol- based, waterless product must be conducted after caring for a MRSA positive patient. **[Level I]**
- 2. Hands must be washed or effectively be treated with alcohol based waterless product immediately following removal of gloves. **[Level I]**
- 3. Gloves must be removed before leaving room followed by handwashing with antimicrobial soap or a waterless alcohol-based antiseptic agent. **[Level I]**
- 4. Moisturizing hand lotions should be compatible with cleansing products and with type(s) of glove materials being utilized. **[Level II]**

F. Visitors of patients on Isolation/Precautions

- 1. Visitors shall wear personal protective attire while visiting a patient on MRSA precautions and/or while assisting a patient to walk:
 - a. Gloves – worn by all visitors. **[Level I]**
 - b. Mask – if MRSA in the patient's sputum. **[Level I]**
 - c. Gown – if having direct contact with the patient and/or the patient's environment. **[Level I]**
 - or
 - d. Gown – for all entering room regardless of contact **[Level III]**
- 2. Visitors should be instructed on removal of personal protective attire and instructed on handwashing before leaving isolation room. **[Level I]**

G. Transporting MRSA positive patients

- 1. Limit the movement and transport of the patient from the room to essential diagnostic and/or therapeutic purposes. **[Level I]**

2. The patient should wear freshly laundered attire and if MRSA positive in sputum or nares, wears a surgical mask (if tolerated), during transport. **[Level III]**
3. Staff members wear regular attire and have gloves available during transport. **[Level II]**
4. Stretchers are made up with clean linen and pillow. The patient's bed linens should not travel with the patient on the stretcher. **[Level I]**

TABLE IV: PERSONAL PROTECTIVE ATTIRE AND PRACTICES FOR ISOLATION/PRECAUTIONS

WHO/ACTIVITY	GLOVES	GOWN	MASK	HAND HYGIENE
Health Care Workers (HCWs)	Before entering room I	Direct Care/contact with patient or environment I	If MRSA positive sputum and/or on ventilator with MRSA I	Before and after contact I
		Before entering room II	Before entering room II	
Visitors	Before entering room I	Direct contact with patient or environment I	If MRSA positive sputum and/or on ventilator with MRSA I	Before and after contact I
		Before entering room II	Before entering room II	
Patient: walking or transported Outside room	None I	Freshly laundered clothing/gown and Linens I	If MRSA positive sputum and can tolerate mask I	Before leaving room I
			If MRSA positive nares II	
HCW or Visitor with Patient, outside room	Available for direct contact I	Only for direct patient contact I NOTE: Transporters do not need gowns to push stretchers/wheel chairs. II	If MRSA positive sputum and patient is not masked	Before and after contact I
			If patient MRSA positive nares and patient is not masked III	

V. DECOLONIZATION OF PATIENTS

A. Attempts should be made to decolonize patients with MRSA carriage in the nares only.

1. Preoperative patients, at least 24 – 48 hours prior to surgery. **[Level I]**
2. All other patients with positive nares. **[Level III]**
3. Patients with MRSA carriage should be bathed with Chlorhexidine or Hexachlorophene for 3 - 5 consecutive days, if tolerated. **[Level III]**
4. Re-culture patient for MRSA carriage no sooner than 24 - 48 hours after completion of decolonization protocol(s). **[Level I]**

B. Sites having MRSA colonization other than nares should not routinely be decolonized. **[Level III]**

VI. MICROBIOLOGY PROCEDURES

- A. Cultures to screen for MRSA
 - 1. When screening for MRSA a full culture work up is not necessary. Do Oxacillin sensitivity testing only to determine presence or absence of MRSA. *[Level I]*
 - 2. Vancomycin sensitivity testing should be done when monitoring resistance trends is indicated. *[Level II]*
- B. Clinical Cultures
 - 1. Cultures being processed for a clinical work up should have full sensitivity testing, as per laboratory protocol. *[Level I]*
- C. Notification of newly positive MRSA cultures
 - 1. There should be a procedure for the Microbiology laboratory to notify the Infection Control Department and the in patient nursing unit/area, when a new MRSA isolate is identified. *[Level I]*
- D. Periodic testing for Mupirocin sensitivity is recommended and encouraged.
[Level II]

VII. SURVEILLANCE METHODOLOGIES

- A. Hospitals should monitor nosocomial MRSA rates using a denominator of “Patient Days”. *[Level I]*
- B. “Observation Days” should be factored into the patient days denominator, when observation patients are held on in patient units. *[Level I]*
- C. Nosocomial MRSA rates among patients having Outpatient Services may be monitored using a denominator of “Out Patient Days”. *[Level III]*
- D. Unit-specific rates of nosocomial MRSA should be monitored to provide feedback to staff. *[Level I]*
- E. Nosocomial MRSA rates should be evaluated whenever feasible according to “infection” versus “colonization” with the MRSA organism. *[Level II]*
- F. When a patient is transferred from one hospital to another, and is identified as MRSA positive, the referring facility should be notified. *[Level I]*

VIII. IDENTIFICATION OF PATIENTS KNOWN TO BE MRSA POSITIVE

- A. There should be a reliable method of identifying previously positive MRSA patients on readmission to a facility, e.g. computer based “flagging” system. *[Level I]*
- B. Patients may have MRSA flags removed when:
 - 1. There is documentation of two consecutive negative nares cultures and two consecutive negative cultures from previously positive site(s). Cultures should be taken no sooner than 48 hours after completion of decolonization and/or clinical treatment. The two consecutive negative cultures should be obtained at least 5 days apart. *[Level II]*

2. During prolonged hospital stay or upon readmission, there is documentation of one negative nares culture and one negative culture from previously positive site(s), obtained 30 days after the noted positive culture(s). **[Level III]**

IX. DISCONTINUING ISOLATION

- A. Patients may come off isolation/precautions procedures when:
 1. There is documentation of two consecutive negative nares cultures and two consecutive negative cultures from previously positive site(s). Cultures should be obtained no sooner than 48 hours after completion of decolonization and/or clinical treatment; consecutive cultures should be at least 5 days apart. **[Level II]**
 2. There is documentation of one negative nares culture and one negative culture from previously positive site(s) obtained no sooner than 48 hours after completion of decolonization and/or clinical treatment. **[Unresolved Issue]**

X. COHORTING POSITIVE PATIENTS

- A. It may be necessary to cohort MRSA positive patients in the same room, when private rooms are not available. **[Level I]**
- B. The same isolation/precautions protocols (as outlined above in **IV Isolation/Precautions Practices**) for cohorted patients. **[Level I]**
- C. Patients should be cohorted according to specific criteria, based on risk or probability of transmission from one patient to another. **[Level I]**

XI. OUTPATIENT SERVICES

- A. Isolation/precautions procedures should be implemented (as in **IV Isolation/Precautions Practices**) in outpatient service areas. **[Level I]**
- B. When feasible, out patients who are “flagged” as MRSA positive should have procedures/appointments scheduled at the end of the work day. **[Level III]**
- C. “Flagged” MRSA positive patients may wait in common waiting areas for outpatient services. **[Level III]**

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GLOSSARY

CARRIER	A person who harbors a specific pathogenic organism, has no discernible signs and symptoms and is potentially capable of spreading the organism to others
COLONIZATION	Presence of microorganisms at a body site not associated with active infection
CONTACT PRECAUTIONS	Isolation practices for using personal protective attire and other environmental procedures, designed to prevent transmission of serious illnesses or epidemiologically important infections/colonization that are easily transmitted by contact with the patient or with items in the patient's environment.
CONTAMINATION	The presence of microorganisms on inanimate objects
DECOLONIZATION	Removal of organisms at a body site(s), through use of topical and/or other treatment with antimicrobial agents
DISINFECTION	A process that eliminates many or all microorganisms except spores
ENDEMIC	The usual or expected occurrence of disease in a population
EPIDEMIC	An excess over the expected incidence of disease within a geographic area during specified time period; disease attacks many people at the same time
EXPOSURE	Contact with an infectious agent or a non-isolated infectious person
GUIDELINE	An instructional guide or reference to indicate a course of action in a specified situation
INCIDENCE	Number of new cases of disease in a population over a time period
INFECTION	Condition in a host resulting from the presence and invasion by microorganisms
NOSOCOMIAL	Infection that was not present or incubating at the time of admission
OBSERVATION DAYS	A coding classification for admissions, usually defined as less than a 24 hour stay on an inpatient unit.
OUTBREAK	The sudden increase in the incidence of a disease or condition in a specific area
PREVALENCE	Number of cases of disease in a population at a certain point in time
RATE	Number of cases in a time period divided by the population at risk
SCREENING	Examination of a population to detect the existence of a particular disease or potential for developing a disease

