

## **Question 6. Do you currently assess or identify the source of MRSA bloodstream infections (vascular catheter, surgical site, skin/soft tissue, etc.) to help focus MRSA prevention strategies?**

You indicated that you do not currently assess the source of MRSA bloodstream infections. MRSA bacteremia can originate from a variety of source infections (e.g., surgical site, skin/soft tissue, vascular catheters). Assessing the source of infection is important, as it can help to target and prioritize MRSA prevention strategies. Since MRSA bacteremia can arise from a variety of underlying infections, MRSA bloodstream infections may be a marker for problems with other HAIs or how patients receive care. Identifying and isolating these sources are critical to preventing future MRSA infections.

### A. Conducting MRSA Primary Source Assessments

MRSA bloodstream infections are associated with substantial morbidity and mortality, and can arise from a variety of underlying infections and from any number of deficiencies in patient care practices. Therefore, a rapid investigation of such events should proceed as soon as MRSA is identified in a blood culture and thought to be hospital acquired. Prioritize prevention efforts depending on the identified gaps in patient care.

- The most common primary sources of MRSA bloodstream infections are:
  - Vascular catheters, including but not limited to peripheral intravenous catheters, central venous catheters and peripherally inserted central catheters
  - Pulmonary
  - Skin and soft tissue
  - Surgical Site
  - Urinary tract
  - Bone or joint
- Data to consider using in MRSA Risk Assessments include:
  - Individual case reviews of patients with MRSA bacteremia. Reviews of individual MRSA bloodstream infection cases can help to prioritize infection prevention interventions to reduce the risk of other patients developing an infection as well as identify opportunities for improvement. Case reviews can identify specific patient populations, hospital locations, materials/supplies and/or practices that may put patients at risk for MRSA bacteremia and warrant immediate attention and intervention.
  - At a minimum, individual case reviews should include assessments of compliance with existing infection prevention policies and protocols on the unit(s) the patient is or has been on. This should include the emergency department (ED), operating room (OR) and radiology. Make sure to assess compliance of the following:
    - Hand hygiene; include ancillary staff such as physical therapy (PT), occupational therapy (OT), phlebotomy, etc.

- Personal protective equipment (PPE) and Contact Precautions use; include ancillary staff such as PT, OT, phlebotomy, etc.
  - Environmental cleaning, making sure to include cleaning of equipment between patients (e.g., mobile vital sign machines); include ancillary staff such as PT, OT, phlebotomy, etc. since they often use equipment between patients.
  - Compliance with prevention bundles, such as CLABSI and CAUTI bundles.
  - Injection practices (e.g., double-dipping of multidose lidocaine solutions, common source flush solutions).
  - Sterilization/disinfection practices for procedural equipment.
  - Procedural practices (if a procedure has been done) such as aseptic technique, proper skin prep procedure, practice of immediate-use steam sterilization or flashing in the OR.
  - Consider supply contamination risks for supplies used on the patient such as ultrasound gel, implants, skin prep solutions and glove box.
  - Others processes and procedures depending on the specific case and course of care.
- Aggregate and compiled MRSA bacteremia case reviews. A review of such cases over time (months or year(s)) may reveal patterns of infection, pointing to the root causes.
    - Obtain culture data from your microbiology lab and review your MRSA cases.
    - Your microbiology lab can help you understand susceptibility patterns from each infection. The hospital's infection preventionist is an expert and can guide these assessments, along with infectious disease physicians or consultants that may be available.
  - Estimate the facility's MRSA burden (include direct or proxy measures of transmission):
    - **Antibiogram:** Proportion of *S. aureus* isolates that are methicillin-resistant. Most hospital laboratories produce an antibiogram at least once per year, and these can be helpful in identifying changes in the prevalence of MRSA over time. Some hospitals provide antibiogram data for specific areas within the hospital, such as the ICU or oncology units.
    - **MRSA Patient Line Lists:** Hospital infection prevention maintain lists of MRSA-positive patients, which may be useful in determining incidence and prevalence rates and identifying locations and populations in which there is a larger MRSA burden. These lists will also help identify patients with MRSA that may have been physically located close to a patient with MRSA bacteremia or may have been in that hospital room before that patient. This listing of key variables such as patient characteristics, unit location, therapeutic factors, etc., can assist with developing a "picture" of MRSA

bacteremia cases, pointing toward unifying characteristics and helping to target prevention interventions.

- **Other HAI Surveillance Data:** Other HAI surveillance require the documentation of positive bacterial cultures to confirm an infection. Therefore, data from HAIs like CLABSIs, surgical site infections and CAUTIs can be used to estimate MRSA burden among specific device and procedure-related infections.

#### B. Strategies for Success

- MRSA bacteremia cases need urgent investigation, so it is essential that the infection preventionist communicate such cases quickly up the chain of command to nursing, medical and risk management leadership, in addition to mandatory reporting to the health department if your state requires it. This can drive support for the time and resources needed to investigate these deadly infections quickly internally. Reporting all MRSA bacteremia infections to your health department quickly can assist them in detecting community outbreaks as well.
- Your hospital is already collecting and reporting a variety of HAI surveillance metrics as part of national and state requirements, so use this surveillance data to guide efforts, rather than collecting new measures.
- Utilize nurse and physician champions. Work with your infection prevention champions, such as your nursing and physician champions, to recruit different unit staff to help with the chart reviews from their units.

### Tools, Resources and Further Reading

- STRIVE Content:
  - [MRSA Tier 1 Course, Risk Assessment and Monitoring](#) (MRSA 102)
- [CDC Acute Care Facility Multidrug-resistant Organism Control Activity Assessment Tool](#)
- APIC Guide to the Elimination of Methicillin-Resistant *Staphylococcus aureus* (MRSA) Transmission in Hospital Settings, 2nd Edition. Arlington, VA: APIC, 2010. Available at: [http://www.apic.org/Resource/\\_EliminationGuideForm/631fcd91-8773-4067-9f85-ab2a5b157eab/File/MRSA-elimination-guide-2010.pdf](http://www.apic.org/Resource/_EliminationGuideForm/631fcd91-8773-4067-9f85-ab2a5b157eab/File/MRSA-elimination-guide-2010.pdf)
- Anderson DJ, Moehring RW, Sloane R, et al. Bloodstream infections in community hospitals in the 21st century: A multicenter cohort study. *PLoS One*. 2014; 9(3): e91713.
- Austin ED, Sullivan SB, Whittier S, et al. Peripheral intravenous catheter placement is an under recognized source of *Staphylococcus aureus* bloodstream infection. *Open Forum Infect Dis*. 2016; 3:ofw072.
- Calfee DP, Salgado CD, Milstone AM, et al. Strategies to prevent methicillin-resistant *Staphylococcus aureus* transmission and infection in acute care hospitals 2014 update. *Infect Control Hosp Epidemiol*. 2014; 35: 772-96.
- CDC. Vital Signs: Preventing Antibiotic-Resistant Infections in Hospitals — United States, 2014. *MMWR* 2016; 65 (No. 9, March 11):235-41.

- Epstein L, Mu Y, Belflower R, et al. Risk factors for invasive methicillin-resistant *Staphylococcus aureus* infection after recent discharge from an acute-care hospitalization, 2011–2013. *Clin Infect Dis*. 2016; 62(1):45–52.
- Simor AE, Pelude L, Golding G, et al. Determinants of outcome in hospitalized patients with methicillin-resistant *Staphylococcus aureus* bloodstream infection: Results from national surveillance in Canada, 2008-2012. *Infect Control Hosp Epidemiol*. 2016; 37: 390-7.
- Yasmin M, El Hage H, Obeid R, et al. Epidemiology of bloodstream infections caused by methicillin-resistant *Staphylococcus aureus* at a tertiary care hospital in New York. *Am J Infect Control*. 2016; 44(1):41-6.