Infection Prevention and NHSN Webinar Series
National Healthcare Safety Network (NHSN):
MRSA Bacteremia – Surveillance identification and Analysis
February 19, 2019
Agenda

• Welcome & FHA Mission to Care HIIN Overview
  – Cheryl Love, RN, BSN, BS-HCA, MBA, LHRM, CPHRM, Director of Quality and Patient Safety and Improvement Advisor, FHA

• CDI TAP Strategy
  – Nychie Q. Dotson MPH, CIC, CPHQ, HAI Prevention Program Manager, Florida Department of Health

• NHSN: MRSA Bacteremia – Surveillance Identification and Analysis
  – Linda R. Greene, RN, MPS, CIC, FAPIC, Manager of Infection Prevention, UR Highland Hospital, Rochester, NY

• Q&A

• Upcoming HIIN Events and Opportunities

• Evaluation Survey & Continuing Nursing Education
HIIN Core Topics – Aim is 20% reduction

- Adverse Drug Events (ADE)
- Catheter-associated Urinary Tract Infections (CAUTI)
- Clostridium Difficile Infection (CDI)
- Central line-associated Blood Stream Infections (CLABSI)
- Hospital-onset MRSA Bacteremia
- Injuries from Falls and Immobility
- Pressure Ulcers (PrU)
- Sepsis
- Surgical Site Infections (SSI)
- Venous Thromboembolisms (VTE)
- Ventilator-Associated Events (VAE/IVAC/PVAP)
- Readmissions (12% reduction)
- Worker Safety
MDRO Resources, Trainings and Tools

- Mission to Care Website
- HRET HIIN Website

Hospital-Acquired Infections (HAIs)

Multi-Drug Resistant Organisms (MDRO)

Multi-drug resistant organisms (MDROs) are microorganisms, predominantly bacteria, that create infections which are resistant to one or more antimicrobial agents. Common MDROs include:

- Methicillin-resistant Staphylococcus aureus (MRSA)
- Staphylococcus aureus with resistance to vancomycin (VISA/VRSA)
- Vancomycin-resistant Enterococci (VRE)
- Extended spectrum beta-lactamase-producing gram-negative bacilli (ESBLs)
- Multidrug-resistant Streptococcus pneumoniae (MDRSP)
- Carbapenem-resistant enterobacteriaceae (CRE)
- Multidrug-resistant Acinetobacter

Resources to prevent MDRO:

- MDRO Change Package
- MDRO Checklist
- Acute Care Facility MDROs Control Activity Tool
- CDC MRSA Infections Presentation
- Watch Past Virtual Trainings
- HRET HIIN Resource Library
- SOAP UP
Designed to reduce multiple forms of harm with simple, easy-to-accomplish activities that cut across several topics to decrease harm.

Focused on four components:

- **SOAP UP**: Hardwire Hand Hygiene
- **GET UP**: Mobilize Patients
- **WAKE UP**: Prevent Over-sedation
- **SCRIPT UP**: Optimize Inpatient Medications
FHA Mission to Care Update: MRSA Rates

Source: HRET Comprehensive Data System, February 19, 2019
MRSA: Surveillance, Identification and Analysis

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Objectives

- Identify the difference between colonization and infection
- Discuss the MRSA Lab ID event
- Describe methods to analyze data to maximize effectiveness
Colonization vs Infection
Definitions

Colonization

Growth and Multiplication without Disease

Infection

Clinical or subclinical response
MRSA

- *Staphylococcus aureus*- Resistant to Antibiotics Normally used to treat staph infections

- Microbiology – Gr+ cocci with many virulent factors
- Frequent nosocomial- and community-acquired pathogen
- Mode of transmission – contact
- Clinical manifestations:
  - Skin and soft tissue infections
  - Pneumonia
  - Osteomyelitis / Arthritis
  - Bacteremia / Sepsis
  - Endocarditis
  - Toxin-mediated disease
Where does MRSA reside?

- Epidemiologic niche:
  - Nasal carriage (anterior nares)
  - GI tract (rectal)
  - Perineal
  - Throat

- Nasal carriage – 30% of adults
  - 20% Persistent carriers
  - 60% Transient carriers
  - 20% Never carriers

- Nosocomial transmission – transient hand carriage
How does resistance develop?

- Beta-lactams are antibiotics that prevent SA (and other germs) from producing cell walls. That's generally bad news for the bacteria. (i.e. penicillin, cephalosporins, monbactams, carbapenems)

- Some SA have a gene, however, that allows them to form an enzyme called beta-lactamase. The enzyme destroys beta-lactams before the beta-lactams can destroy the bacterium.
Staphylococcus *aureus* is a frequent colonizer of the skin and mucosa and can cause a broad range of clinical manifestations. Risk factors for complications of *S. aureus* infection include community acquisition of bacteremia, presence of a prosthetic device, and underlying medical conditions including immunosuppression.
Clinical Significance

Clinical manifestations of *S. aureus* infection include skin and soft tissue infection, bacteremia, and associated conditions (including infective endocarditis, cardiac device infection, intravascular catheter infection, and toxic shock syndrome).
Clinical Significance

Bacteremia may develop as a complication of a primary *S. aureus* infection (such as skin and soft tissue infection). Bacteremia may also lead to subsequent *S. aureus* infection at a previously sterile site (such as vertebral osteomyelitis).
Clinical Significance

Development of back or joint pain should raise the suspicion of an occult site of infection in patients with current or recent S. aureus bacteremia. In adults, hematogenous osteomyelitis most commonly presents in the form of vertebral involvement.
Risk Factors

- Historical Risk Factors
- Prolonged hospitalization
- Prolonged antimicrobial use
- Stay in an intensive care or burn unit
- Exposure to a colonized/infected person
- Residence in a nursing home
- Age >65

- Common infections include surgical wound infections, urinary tract infections, bloodstream infections, and pneumonia
Background

If participating in CMS Inpatient Quality Reporting (IQR) Program, CMS Long Term Care Hospital Quality Reporting (LTCHQR) Program, CMS Inpatient Rehabilitation Facility Quality Reporting (IRFQR) Program or CMS PPS-Cancer Exempt Hospital Quality Reporting (PCHQR) Program...

**Must report MRSA Bacteremia and *C. difficile* LabID Events at Facility-wide Inpatient (FacWideIN)* level**

*FacWideIN includes Emergency Departments And 24-hour Observation locations

**Each **QUARTER** NHSN sends to CMS analysis of your facility data**
MRSA

Prevention and control of methicillin-resistant Staphylococcus aureus (MRSA) infection is an important challenge in infection prevention.

Invasive MRSA infections are associated with significant morbidity and mortality.

The MRSA Lab ID module was designed to identify the incidence of hospital-onset bacteremia by an objective, laboratory-based metric that was highly associated with invasive disease and did not require chart review to estimate infection burden.
MRSA Bacteremia Reporting

- Lab ID Event reporting allows laboratory testing data to be used without clinical evaluation of the patient, allowing for a much less labor intensive method to track MDROs such as MRSA

- This is a proxy infection measure of healthcare Acquisition, exposure burden and infection burden based primarily on admission and laboratory data
Definition: *MRSA* Bacteremia LabID Event

- Any *MRSA* blood specimen obtained for clinical decision making purposes (excludes screening cultures, such as those used for active surveillance testing)

- *MRSA* positive blood specimen for a patient in a location with no prior *MRSA* positive blood specimen result collected **within 14 days** for the patient and location (*includes across calendar months for Blood Specimen Only reporting*)

- **LabID Event** = First *MRSA*+ blood for the patient in the location; all initial *MRSA* blood isolates for the location, excluding tests related to active surveillance testing.
MDRO Test Result for Blood Specimens Only LabID Events

**MDRO Isolate from blood per patient and location**

Prior (+) same MDRO from blood in ≤2 weeks from same patient and location (including across calendar months)

YES

NOT A LABID EVENT

Duplicate MDRO test

LabID Event (non-duplicate isolate)

NO
**Definition: Unique Blood Source**

- There should be a full 14 days with no positive blood culture result for the patient, MDRO, and location before another Blood LabID Event is entered into NHSN for the patient, MDRO, and location.

- Blood isolates collected within 14 days for the same patient, MDRO and location are considered duplicates.

- If following all specimens, the first MDRO for the patient, month, and location should be reported.

**NOTE:** The date of specimen collection is considered Day 1.
Exception

Special Case Exception for FacWideIN LabID Event Reporting

Specimens collected from an affiliated* outpatient location (excluding ED and 24-hour observation locations) can be reported for the inpatient admitting location IF collected on the same calendar day as inpatient admission.

**In this circumstance, the admitting inpatient location is used for location attribution. This is the only exception to LabID attribution rule.

***Affiliated outpatient location is an outpatient location where the same patient identifier is used and the positive specimen is tracked across services using this identifying number.
Polling Question 1

Ms. Rainbow Johnson was admitted to ICU on 12/05/17. While on ICU she had a positive MRSA blood culture collected on 12/9. After a one week stay in ICU she was transferred to IRF on 12/11/2017 for strengthening. While on IRF she had another positive MRSA unique blood specimen collected on 12/21/2017. Based on this information is this a LabID event for ICU?

1. Yes

2. No
Polling Question 2

After a one week stay in ICU she was transferred to IRF on 12/11/2017 for strengthening. While on IRF she had another positive MRSA blood culture collected on 12/21/2017.
Based on this information is this a LabID event for IRF?

1. Yes
2. No
Definition

- CO (Community onset) – occurs on day 1-3 of admission to inpatient location. Admission day is always day 1.
- HO (Healthcare Onset) – occurs day 4 or after of admission
Advantages and Disadvantages

**Advantages:**
- Identify vulnerable populations
- Estimate infection burden
- Estimate exposure burden
- Standardized definitions allow for consistency across healthcare settings

**Disadvantages:**
- No patient evaluation
- Pre-existing infections on admission may have positive blood culture results later in admission
- Follow up Blood cultures more than 14 days after initial culture may be necessary resulting in new HO
Prevention Activities

- Hand Hygiene: monitor and report compliance
- PPE use: Monitoring compliance
Polling Question 3

Do you screen for MRSA?

1. No
2. Select surgical patients
3. ICU
4. 2, 3 and/or others
Blood Culture Analysis

- Use lab ID events to identify opportunities for improvement
- Identify preventable vs. non preventable events
- Line list of all bloods
- Begin by looking at source of infection
Polling Question 4

What is your major challenge related to MRSA bloodstream infections?

1. Line infections
2. Timing of blood draws
3. Transfer to other units
4. Other
The Line List

- Device-Associated (DA) Module
- Procedure-Associated (PA) Module
- HAI Antimicrobial Resistance (DA+PA Modules)
- Antimicrobial Use and Resistance Module
- MDRO/CDI Module - LABID Event Reporting
  - All LabID Events
  - All MRSA LabID Events
  - Line Listing for All MRSA LabID Events
<table>
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<tr>
<th>MR#</th>
<th>Organism</th>
<th>UNIT</th>
<th>Prev Position</th>
<th>Admit date</th>
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<th>Comments</th>
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## Analysis

From the line list what are the preventable opportunities?

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<th>Prev</th>
<th>Posonset</th>
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<td>New unit</td>
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SIR
MRSA Bloodstream SIR

- 2016H1: 0.93
- 2016H2: 0.00
- 2017H1: 0.50
- 2017H2: 0.44
- 2018H1: 0.48
- 2018H2: 0.00
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<td>93099</td>
<td>0.235</td>
<td>0.0893</td>
<td>0.012, 1.161</td>
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Prevention Activities

Infection Control and Hospital Epidemiology  July 2014, Vol. 35, No. S2

Shea/Idsa Practice Recommendation

Strategies to Prevent Methicillin-Resistant Staphylococcus aureus Transmission and Infection in Acute Care Hospitals: 2014 Update

David P. Calfee, MD, MS;1,  Cassandra D. Salgado, MD, MS;1,  Aaron M. Milstone, MD;3  Anthony D. Harris, MD, MPH;4  David T. Kuhar, MD;5  Julia Moody, MS;6  Kathy Aureden, MS, MT, CIC;7  Susan S. Huang, MD, MPH;8  Lisa L. Maragakis, MD, MPH;8  Deborah S. Yokoe, MD, MPH9
Institute basic practices
- Conduct an MRSA risk assessment
- Educate healthcare personnel regarding MRSA
- Ensure compliance with hand hygiene recommendations
- Ensure proper cleaning and disinfection of equipment and environment
- Ensure compliance with contact precautions for MRSA-colonized and -infected patients
- Implement an MRSA monitoring program
  - Implement an MRSA line list
  - Implement a laboratory-based alert system so that healthcare personnel are immediately notified of new cases of MRSA
  - Implement an alert system that identifies readmitted or transferred MRSA-colonized or -infected patients

Continue to monitor MRSA rates
- Develop a system to regularly report MRSA-related data to relevant stakeholders, physicians, nurses, staff, and other hospital leaders
- Hold appropriate individuals and groups accountable for implementing and complying with basic prevention measures

Determine if MRSA has been effectively controlled

MRSA effectively controlled
- Continue basic practices
- Continue to monitor MRSA rates
- Continue MRSA reporting and accountability system

MRSA NOT effectively controlled
- Ensure compliance with basic practices

MRSA effectively controlled
- Continue special approach(es)
- Continue to monitor MRSA rates
- Continue MRSA reporting and accountability system

MRSA NOT effectively controlled
- Institute one or more special approaches
  - Conduct active surveillance testing for MRSA colonization among patients
  - Ensure compliance with active surveillance testing program
  - Implement MRSA decolonization therapy
    - Targeted therapy (mupirocin +/- CHG) with active surveillance testing
    - Universal therapy among high-risk patients (CHG +/- mupirocin)
  - Implement universal gowns and gloving
  - Continue to monitor MRSA rates
  - Continue MRSA reporting and accountability system

Determine if MRSA has been effectively controlled

MRSA effectively controlled
- Continue special approach(es)
- Continue to monitor MRSA rates
- Continue MRSA reporting and accountability system

MRSA NOT effectively controlled
- Ensure compliance with special approach(es)
- Assess need to intensity or expand previously implemented special approach(es)
- Consider additional special approaches
- Continue to monitor MRSA rates
- Continue MRSA reporting and accountability system
Another Thought

Do you screen for MRSA?

What about surgical patients?

CHG baths?

Decolonization strategies?
Key Questions

- Do you monitor and provide feedback on hand hygiene?
- Do you monitor and provide feedback on PPE donning and doffing?
- Do you track MRSA Infections from other sources (SSIs)?
- Do you share resistance data with key stakeholders? (antibiograms)
Questions
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<td>Oct. 23, 2018</td>
<td>NHSN: SSI Surveillance Identification and Analysis</td>
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<td>Nov. 20, 2018</td>
<td>SSI-Colon: How to Assess Root Cause and Prevention Strategies</td>
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<td>Dec. 18, 2018</td>
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<td>VAE: How to Assess Root Cause and Prevention Strategies</td>
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<td>Feb. 19, 2019</td>
<td>NHSN: MRSA Bacteremia Surveillance Identification and Analysis</td>
<td>Event archive will be available online*</td>
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*Access Event Archives ([Recordings | Slides](https://cc.readytalk.com/r/duycwubuqgve&eom)) on the Mission to Care HIIN Website*
Upcoming Virtual Events

Feb. 20 - Neonatal Abstinence Syndrome (NAS) Definitions, Coding & Report
Feb. 25 - FHA HIIN Leveraging HIIN Data through Visual Tools
Feb. 26 - NAS Definitions, Coding and Report (REPEAT)
Feb. 27 - Tools & Resources to Care for Babies with NAS
Feb. 28 – Safety Culture: Actions Create Transformation
Mar. 1 - Readmissions Multi Visit Patient (MVP) Webinar #6
Mar. 6 - FHA Monthly Quality Hot Topics Virtual Meeting #5
Mar. 11 - TeamSTEPPS Implementation Check-In Webinar
Mar. 12 - CAUTI Fishbowl #4
Mar. 22 - Readmissions Multi Visit Patient (MVP) Webinar #7
Mar. 22 - Antibiotic Stewardship: Conquering Measurement
Mar. 26 - MRSA Bacteremia: How to Assess Root Cause & Prevention Strategies

Check the weekly MTC HIIN Upcoming Events for details and registration
Eligibility for Nursing CEU requires submission of an evaluation survey for each participant requesting continuing education: [https://www.surveymonkey.com/r/IP-NHSN-021919](https://www.surveymonkey.com/r/IP-NHSN-021919)

- Share this link with all of your participants if viewing today’s webinar as a group ([Survey closes Mar. 1, 2019](https://www.surveymonkey.com/r/IP-NHSN-021919))
- Be sure to include your contact information and Florida nursing license number
- FHA will report 1.0 credit hour to CE Broker and a certificate will be sent via e-mail (Please allow at least 2 weeks after the survey closes)
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