# NATIONAL QUALITY FORUM

**Measure Submission and Evaluation Worksheet 5.0**

This form contains the information submitted by measure developers/stewards, organized according to NQF's measure evaluation criteria and process. The evaluation criteria, evaluation guidance documents, and a blank online submission form are available on the submitting standards web page.

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| **NQF #:** 1716 **NQF Project:** Patient Safety Measures-Complications Project |
| (for Endorsement Maintenance Review)<br>**Original Endorsement Date:** **Most Recent Endorsement Date:** **Last Updated Date:** Sep 14, 2011 |
| **BRIEF MEASURE INFORMATION** |
| **De.1 Measure Title:** National Healthcare Safety Network (NHSN) Facility-wide Inpatient Hospital-onset Methicillin-resistant Staphylococcus aureus (MRSA) Bacteremia Outcome Measure |
| **Co.1.1 Measure Steward:** Centers for Disease Control and Prevention |
| **De.2 Brief Description of Measure:** Standardized infection ratio (SIR) of hospital-onset unique blood source MRSA Laboratory-identified events (LabID events) among all inpatients in the facility |
| **2a1.1 Numerator Statement:** Total number of observed hospital-onset unique blood source MRSA LabID events among all inpatients in the facility |
| **2a1.4 Denominator Statement:** Total number of expected hospital-onset unique blood source MRSA LabID events, calculated by multiplying the number of inpatient days for the facility by the hospital-onset MRSA LabID event rate for the same types of facilities (obtained from the standard population). |
| **2a1.8 Denominator Exclusions:** Data from patients who are not assigned to an inpatient bed are excluded from the denominator counts. These include outpatient clinic and emergency department visits. |
| **1.1 Measure Type:** Outcome<br>**2a1. 25-26 Data Source:** Electronic Clinical Data, Electronic Clinical Data : Electronic Health Record, Electronic Clinical Data : Laboratory, Paper Records<br>**2a1.33 Level of Analysis:** Facility, Population : National, Population : State<br><br>**1.2-1.4 Is this measure paired with another measure?** No<br><br>**De.3 If included in a composite, please identify the composite measure** (*title and NQF number if endorsed*): |

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| **STAFF NOTES** (*issues or questions regarding any criteria*) |
| Comments on Conditions for Consideration: |
| Is the measure untested? Yes☐ No☐ If untested, explain how it meets criteria for consideration for time-limited endorsement: |
| 1a. Specific national health goal/priority identified by DHHS or NPP addressed by the measure (*check De.5*):<br>5. Similar/related endorsed or submitted measures (*check 5.1*):<br>Other Criteria: |
| Staff Reviewer Name(s): |

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| 1. IMPACT, OPPORTUNITY, EVIDENCE - IMPORTANCE TO MEASURE AND REPORT |

Importance to Measure and Report is a threshold criterion that must be met in order to recommend a measure for endorsement. All three subcriteria must be met to pass this criterion. See guidance on evidence.
*Measures must be judged to be important to measure and report in order to be evaluated against the remaining criteria.* (evaluation criteria)

**1a. High Impact:**      H☐ M☐ L☐ I☐
(*The measure directly addresses a specific national health goal/priority identified by DHHS or NPP, or some other high impact aspect of healthcare.*)

**De.4 Subject/Topic Areas** (*Check all the areas that apply*):   Infectious Diseases
**De.5 Cross Cutting Areas** (*Check all the areas that apply*):   Safety : Healthcare Associated Infections

**1a.1 Demonstrated High Impact Aspect of Healthcare:**  Affects large numbers, A leading cause of morbidity/mortality, Patient/societal consequences of poor quality, Severity of illness

**1a.2 If "Other," please describe:**

**1a.3 Summary of Evidence of High Impact** (*Provide epidemiologic or resource use data*):
MDROs, including MRSA, have been shown to be associated with increased mortality, length of stay, and cost (1)

Proportion of S. aureus isolates for all healthcase-associated infections entered into National Nosocomial Infection Surveillance System that were MRSA increased from 35.9% to 64.4% from 1992-2003 (2)

56.8% of all central line-associated bloodstream infections reported to NHSN in 2006-07 caused by S. aureus were MRSA (3)

**1a.4 Citations for Evidence of High Impact cited in 1a.3:**  (1) Siegel, JD, et al., Guideline for Management of Multidrug-Resistant Organisms In Healthcare Settings, 2006.  Available at http://www.cdc.gov/hicpac/pdf/guidelines/MDROGuideline2006.pdf.

(2) Klevens, RM, et al., Changes in the Epidemiology of Methicillin-Resistant Staphylococcus aureus in Intensive Care Units in US Hospitals, 1992–2003.  Clin Inf Dis, 2006.  42(3):389-391.

(3) Hidron, AI et al., Antimicrobial-Resistant Pathogens Associated With Healthcare-Associated Infections: Annual Summary of Data Reported to the National Healthcare Safety Network at the Centers for Disease Control and Prevention, 2006-07.  Infect Control Hosp Epidemiol, 2008. 29(11):996-1101.

**1b. Opportunity for Improvement:  H☐ M☐ L☐ I☐**
(*There is a demonstrated performance gap - variability or overall less than optimal performance*)

**1b.1 Briefly explain the benefits (improvements in quality) envisioned by use of this measure:**
The SIR compares a healthcare facility´s performance compared to a national baseline.  Facilities are able to see whether the number of LabID events that they have reported compares to the number that would be expected, given national data.  The measure can then be used to drive prevention practices that will lead to improved outcomes, including the reduction of patient morbidity and mortality.

**1b.2 Summary of Data Demonstrating Performance Gap** (*Variation or overall less than optimal performance across providers*):
[*For Maintenance – Descriptive statistics for performance results for this measure - distribution of scores for measured entities by quartile/decile, mean, median, SD, min, max, etc.*]
Hospital-onset MRSA blood LabID event rates vary among different facility types.

**1b.3 Citations for Data on Performance Gap:** [*For Maintenance – Description of the data or sample for measure results reported in 1b.2 including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included*]
(unpublished internal analysis)

**1b.4 Summary of Data on Disparities by Population Group:** [*For Maintenance –Descriptive statistics for performance results for this measure by population group*]
Incidence rates of invasive hospital-onset MRSA infection vary by age group and race (1)

**1b.5 Citations for Data on Disparities Cited in 1b.4:** [*For Maintenance – Description of the data or sample for measure results reported in 1b.4 including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included*]
(1)Klevens, RM, et al., Invasive Methicillin-Resistant Staphylococcus aureus Infections in the United States. JAMA, 2007. 298(15):1763-1771.

**1c. Evidence** (*Measure focus is a health outcome OR meets the criteria for quantity, quality, consistency of the body of evidence.*)
Is the measure focus a health outcome?   Yes☐  No☐     If not a health outcome, rate the body of evidence.

Quantity:  H☐ M☐ L☐ I☐    Quality:  H☐ M☐ L☐ I☐    Consistency:  H☐ M☐ L☐ I☐

| Quantity | Quality | Consistency | Does the measure pass subcriterion1c? |
|---|---|---|---|
| M-H | M-H | M-H | Yes☐ |
| L | M-H | M | Yes☐ IF additional research unlikely to change conclusion that benefits to patients outweigh harms: otherwise **No**☐ |
| M-H | L | M-H | Yes☐ IF potential benefits to patients clearly outweigh potential harms: otherwise **No**☐ |
| L-M-H | L-M-H | L | No ☐ |

| Health outcome – rationale supports relationship to at least one healthcare structure, process, intervention, or service | Does the measure pass subcriterion1c? Yes☐ IF rationale supports relationship |
|---|---|

**1c.1 Structure-Process-Outcome Relationship** (*Briefly state the measure focus, e.g., health outcome, intermediate clinical outcome, process, structure; then identify the appropriate links, e.g., structure-process-health outcome; process- health outcome; intermediate clinical outcome-health outcome*):
Clinical guidelines for the management of multidrug resistant organisms, including MRSA, have been published.  Adherence to the recommendations in the guidelines can result in decreased rates of MDRO transmission and infection.  Decreasing rates of infection will result in a lower SIR, which indicates improving performance.

**1c.2-3 Type of Evidence** (*Check all that apply*):
Clinical Practice Guideline, Systematic review of body of evidence (other than within guideline development)

**1c.4 Directness of Evidence to the Specified Measure** (*State the central topic, population, and outcomes addressed in the body of evidence and identify any differences from the measure focus and measure target population*):
A wide ranging variety of studies examining hospital-onset MRSA bacteremia infection rates and process measures exist.  In 2006, the Healthcare Infecton Control Practices and Advisory Committee (HICPAC) published a clinical guideline for managing MDROs in the healthcare setting, which is where this measure is focused.

**1c.5 Quantity of Studies in the Body of Evidence** (*Total number of studies, not articles*):  The 2006 HICPAC guideline, Management of Multidrug-Resistant Organisms In Healthcare Settings, included results from over 400 studies.

**1c.6 Quality of Body of Evidence** (*Summarize the certainty or confidence in the estimates of benefits and harms to patients across studies in the body of evidence resulting from study factors. Please address: a) study design/flaws; b) directness/indirectness of the evidence to this measure (e.g., interventions, comparisons, outcomes assessed, population included in the evidence); and c) imprecision/wide confidence intervals due to few patients or events*):  The 2006 HICPAC guideline for management of MDROs in healthcare settings provides recommendations for the reduction of transmission of infections within healthcare facilities.  As is standard with all HICPAC guidelines, recommendations were categorized on the basis of existing scientific data, theoretical rationale, applicability, and economic impact.

**1c.7 Consistency of Results across Studies** (*Summarize the consistency of the magnitude and direction of the effect*): The recommendations in the 2006 HICPAC guideline can consistently be used to reduce the incidence and transmission of infections with MDROs in healthcare facilities.  If there is contradictory evidence of efficacy of a prevention practice, a recommendation is not

made.

**1c.8 Net Benefit** *(Provide estimates of effect for benefit/outcome; identify harms addressed and estimates of effect; and net benefit - benefit over harms)*:
The body of evidence reviewed in the preparation of the 2006 HICPAC guideline indicates that following the recommended prevention practices can reduce incidence and transmission of MDROs including MRSA in healthcare settings.

**1c.9 Grading of Strength/Quality of the Body of Evidence.** Has the body of evidence been graded?  Yes

**1c.10 If body of evidence graded, identify the entity that graded the evidence including balance of representation and any disclosures regarding bias:**  The Centers for Disease Control and Prevention´s Healthcare Infection Control Practices Advisory Committee

**1c.11 System Used for Grading the Body of Evidence:**  Other

**1c.12 If other, identify and describe the grading scale with definitions:**  The CDC/HICPAC system for categorizing recommendations is as follows:

Category IA - strongly recommended for implementation and strongly supported by well-designed experimental, clinical, or epidemiologic studies.

Category IB - strongly recommended for implementation and supported by some experimental, clinical, or epidemiologic studies and a strong theoretical rationale.

Category IC - required for implementation, as mandated by federal and/or state regulation or standard.

Category II - suggested for implementation and supported by suggestive clinical or epidemiologic studies for a theoretical rationale.

No recommendation - unresolved issue.  Practices for which insufficient evidence or no consensus regarding efficacy exists.

**1c.13 Grade Assigned to the Body of Evidence:**  The body of evidence is not assigned a grade as a whole.  Individual recommendations are graded as shown in 1c.12.

**1c.14 Summary of Controversy/Contradictory Evidence:**  None

**1c.15 Citations for Evidence other than Guidelines** *(Guidelines addressed below)*:
Citations are included in the HICPAC guideline "Management of Multidrug-Resistant Organisms In Healthcare Settings, 2006." Citations for over 400 studies reviewed in preparation of the guideline on pages 54-70 of the guideline.  Guideline can be accessed at http://www.cdc.gov/hicpac/pdf/guidelines/MDROGuideline2006.pdf.

**1c.16 Quote verbatim, <u>the specific guideline recommendation</u>** *(Including guideline # and/or page #)*:
Specific guideline recommendations are provided in the 2006 HICPAC guideline that can be found at http://www.cdc.gov/hicpac/pdf/guidelines/MDROGuideline2006.pdf on pages 34-48.  One specific overall guideline recommendation is not provided.

**1c.17 Clinical Practice Guideline Citation:**  Siegel, JD, et al., Guideline for Management of Multidrug-Resistant Organisms In Healthcare Settings, 2006.  Available at http://www.cdc.gov/hicpac/pdf/guidelines/MDROGuideline2006.pdf.

**1c.18 National Guideline Clearinghouse or other URL:**  http://www.cdc.gov/hicpac

**1c.19 Grading of Strength of Guideline Recommendation.** Has the recommendation been graded?  Yes

**1c.20 If guideline recommendation graded, identify the entity that graded the evidence including balance of representation and any disclosures regarding bias:**  CDC´s Healthcare Infection Control Practices Advisory Committee assigned categories to

all recommendations in the guideline.

**1c.21 System Used for Grading the Strength of Guideline Recommendation:** Other

**1c.22 If other, identify and describe the grading scale with definitions:** See 1c.12

**1c.23 Grade Assigned to the Recommendation:** There is no overall grade assigned to the guideline, which contains many recommendations. Individual recommendations are graded as shown in 1c.12.

**1c.24 Rationale for Using this Guideline Over Others:** HICPAC is a federal advisory committee made up of 14 external infection control experts who provide advice and guidance to the Centers for Disease Control and Prevention (CDC) and the Secretary of the Department of Health and Human Services (HHS) regarding the practice of health care infection control, strategies for surveillance and prevention and control of health care associated infections in United States health care facilities.

The committee has liaison representatives from professional organizations and other federal agencies - including the Association for Professionals of Infection Control and Epidemiology Inc., the Society for Healthcare Epidemiology of America (SHEA), the Association of Peri-Operative Registered Nurses, the Center for Medicaid and Medicare Services, the Food and Drug Administration; and such other non-voting liaison representatives as the Secretary deems necessary to effectively carry out the functions of the Committee.

HICPAC guidelines are routinely published by CDC and SHEA, two internationally recognized organizations in healthcare-associated infection surveillance and prevention.

**Based on the NQF descriptions for rating the evidence, what was the developer's assessment of the quantity, quality, and consistency of the body of evidence?**
**1c.25** Quantity: High   **1c.26** Quality: High**1c.27** Consistency: High
**1c.28** Attach evidence submission form:
**1c.29** Attach appendix for supplemental materials:

**Was the threshold criterion, *Importance to Measure and Report*, met?**
(*1a & 1b must be rated moderate or high and 1c yes*)   Yes☐  No☐
Provide rationale based on specific subcriteria:

For a new measure if the Committee votes NO, then STOP.
For a measure undergoing endorsement maintenance, if the Committee votes NO because of 1b. (no opportunity for improvement),  it may be considered for continued endorsement and all criteria need to be evaluated.

## 2. RELIABILITY & VALIDITY - SCIENTIFIC ACCEPTABILITY OF MEASURE PROPERTIES

Extent to which the measure, as specified, produces consistent (reliable) and credible (valid) results about the quality of care when implemented. (evaluation criteria)
Measure testing must demonstrate adequate reliability and validity in order to be recommended for endorsement. Testing may be conducted for data elements and/or the computed measure score. Testing information and results should be entered in the appropriate field.  Supplemental materials may be referenced or attached in item 2.1. See guidance on measure testing.

**S.1 Measure Web Page** *(In the future, NQF will require measure stewards to provide a URL link to a web page where current detailed specifications  can be obtained)*. Do you have a web page where current detailed specifications for this measure can be obtained? Yes

**S.2 If yes, provide web page URL:** http://www.cdc.gov/nhsn

**2a. RELIABILITY. Precise Specifications and Reliability Testing:**   H☐ M☐ L☐ I☐

**2a1. Precise Measure Specifications.** (*The measure specifications precise and unambiguous.*)

**2a1.1 Numerator Statement** *(Brief, narrative description of the measure focus or what is being measured about the target*

*population, e.g., cases from the target population with the target process, condition, event, or outcome)*:
Total number of observed hospital-onset unique blood source MRSA LabID events among all inpatients in the facility

**2a1.2 Numerator Time Window** *(The time period in which the target process, condition, event, or outcome is eligible for inclusion)*:
Cases are included if MRSA is identified from a unique blood culture that is classfied as a hospital-onset LabID event and is collected from an inpatient in the facility during a month in which the facility chose to perform surveillance.  It is necessary to have sufficient sample size to generate an SIR – given low numbers of expected infections, the time window will be longer than monthly.

**2a1.3 Numerator Details** *(All information required to identify and calculate the cases from the target population with the target process, condition, event, or outcome such as definitions, codes with descriptors, and/or specific data collection items/responses*:
1. Definition of MRSA – Includes Staphylococcus aureus cultured from any specimen that tests oxacillin-resistant, cefoxitin-resistant, or methicillin-resistant by standard susceptibility testing methods, or by a positive result from molecular testing for mecA and PBP2a; these methods may also include positive results of specimens tested by any other FDA approved PCR test for MRSA

2. Definition of MRSA isolate - Any specimen obtained for clinical decision making testing positive for MRSA. This excludes any tests related to active surveillance testing/culturing.

3. Definition of unique MRSA blood isolate - An MRSA isolate from blood in a patient that is the first MRSA isolate from any specimen for the patient in the location in that month or an MRSA isolate from blood in a patient with no prior positive blood culture for MRSA in the current inpatient location in <= 2 weeks.

4. Definition of MRSA LabID event - All non-duplicate unique blood source MRSA isolates, including specimens collected during an emergency department or other outpatient clinic visit, if collected the same day as patient admission to the facility.

5. Definition of hospital-onset LabID event – LabID event with specimen collected >3 days after admission to the hospital (i.e. on or after calendar day 4 of admission, where date of admission = day 1)

6. Definition of inpatient - A patient who is located in an inpatient location for care and treatment at the time of specimen collection.

**2a1.4 Denominator Statement** *(Brief, narrative description of the  target population being measured)*:
Total number of expected hospital-onset unique blood source MRSA LabID events, calculated by multiplying the number of inpatient days for the facility by the hospital-onset MRSA LabID event rate for the same types of facilities (obtained from the standard population).

**2a1.5 Target Population Category** *(Check all the populations for which the measure is specified and tested if any)*:  Adult/Elderly Care, Children's Health

**2a1.6 Denominator Time Window** *(The time period in which cases are eligible for inclusion)*:
A facility-wide number of inpatient days and admissions is collected for the surveillance period.  An expected number of hospital-onset unique blood source MRSA LabID events for the facility is calculated using the standard population's baseline data from 2009-2010.  It is necessary to have sufficient sample size to generate an SIR – given low numbers of expected infections, the time window will be longer than monthly.

**2a1.7 Denominator Details** (*All information required to identify and calculate the target population/denominator such as definitions, codes with descriptors, and/or specific data collection items/responses)*:
1. Number of inpatient days for the facility for the time period under surveillance.  The number of inpatient days is obtained by summing the daily count of patients occupying beds in each inpatient location in the facility over the time period under surveillance. The count of patients occupying inpatient beds is collected at the same time each day.

2. Hospital-onset MRSA LabID event rate per 1,000 patient days for similar facility types, obtained from the standard population from 2009-2010.

3. Facility information, including facility type, bedsize, and affiliation with a medical school (see 4 below)

4. Medical school affiliation categories:
a. Major – a hospital that is an important part of the teaching program of a medical school and the majority of medical students rotate through multiple clinical services
b. Graduate – a hospital used by the medical school for graduate trainings only (residency and/or fellowships)
c. Limited – a hospital that is used in the medical school's teaching program to a limited extent

5. The CMS case mix index is also being investigated as a potential factor in determining expected number of LabID events

**2a1.8 Denominator Exclusions** *(Brief narrative description of exclusions from the target population)*:
Data from patients who are not assigned to an inpatient bed are excluded from the denominator counts. These include outpatient clinic and emergency department visits.

**2a1.9 Denominator Exclusion Details** *(All information required to identify and calculate exclusions from the denominator such as definitions, codes with descriptors, and/or specific data collection items/responses)*:
Definition of inpatient - A patient who is located in an inpatient location for care and treatment at the time of the daily inpatient census count.

**2a1.10 Stratification Details/Variables** *(All information required to stratify the measure results including the stratification variables, codes with descriptors, definitions, and/or specific data collection items/responses )*:
The measure will not be stratified, as it is an overall facility-wide summary measure. Facility characteristics will be used for risk adjustment, described in 2a1.13.

**2a1.11 Risk Adjustment Type** *(Select type. Provide specifications for risk stratification in 2a1.10 and for statistical model in 2a1.13)*: Other   **2a1.12 If "Other," please describe:** Standardized Infection Ratio

**2a1.13 Statistical Risk Model and Variables** *(Name the statistical method - e.g., logistic regression and list all the risk factor variables. Note - risk model development should be addressed in 2b4.)*:
The SIR is a method of indirect standardization that summarizes HAI experience across a series of groups of data. The SIR compares a facility's observed number of unique hospital-onset blood MRSA LabID events for a given time period to the 2009-2010 standard population's experience, which can be used to calculate an expected number of LabID events. Dividing observed by expected numbers of LabID events produces the SIR.

The rate of unique hospital-onset blood MRSA LabID events identified per 1,000 patient days from the standard population is used to calculate the number of expected unique hospital-onset blood MRSA LabID events for a given facility. These rates are adjusted by facility-specific factors, including facility type, facility bedsize, teaching status, medical school affiliation (major, graduate, or limited, see 2a1.7), and possibly CMS case mix index.

**2a1.14-16 Detailed Risk Model Available at Web page URL** (or attachment). Include coefficients, equations, codes with descriptors, definitions, and/or specific data collection items/responses. Attach documents only if they are not available on a webpage and keep attached file to 5 MB or less. NQF strongly prefers you make documents available at a Web page URL. Please supply login/password if needed:
URL
No such URL. Refer to 2a1.20
N/A

**2a1.17-18. Type of Score:** Ratio

**2a1.19 Interpretation of Score** *(Classifies interpretation of score according to whether better quality is associated with a higher score, a lower score, a score falling within a defined interval, or a passing score)*: Better quality = Lower score

**2a1.20 Calculation Algorithm/Measure Logic***(Describe the calculation of the measure score as an ordered sequence of steps including identifying the target population; exclusions; cases meeting the target process, condition, event, or outcome; aggregating*

data; risk adjustment; etc.):
1. Identify number of observed unique hospital-onset blood MRSA LabID events for a given time period by adding the total number of observed events across the facility
2. Calculate the number of expected hospital-onset blood MRSA LabID events for the facility by multiplying the number of inpatient days observed by the hospital-onset MRSA blood LabID event rate for similar facilities (using data from the 2009-2010 standard population) and dividing by 1,000.
3. Divide the number of observed hospital-onset blood MRSA LabID events (1 above) by the number of expected hospital-onset blood MRSA LabID events (2 above) to obtain the SIR.
4. Perform a Poisson test to compare the SIR obtained in 3 above to the nominal value of 1. P-value and confidence interval will be calculated, which can be used to assess significance of SIR.

**2a1.21-23 Calculation Algorithm/Measure Logic Diagram URL or attachment:**
URL
no such URL. Refer to 2a1.20
N/A

**2a1.24 Sampling (Survey) Methodology.** If measure is based on a sample (or survey), provide instructions for obtaining the sample, conducting the survey and guidance on minimum sample size (response rate):
No sampling methodology is used in calculating the metric

**2a1.25 Data Source** (*Check all the sources for which the measure is specified and tested*). If other, please describe:
Electronic Clinical Data, Electronic Clinical Data : Electronic Health Record, Electronic Clinical Data : Laboratory, Paper Records

**2a1.26 Data Source/Data Collection Instrument** (*Identify the specific data source/data collection instrument, e.g. name of database, clinical registry, collection instrument, etc.*): NHSN Laboratory-identified MDRO or CDI Event form and NHSN MDRO and CDI Prevention Process and Outcome Measures Monthly Monitoring Form

**2a1.27-29 Data Source/data Collection Instrument Reference Web Page URL or Attachment:** URL
http://www.cdc.gov/nhsn/forms/57.128_LabIDEvent_BLANK.pdf,
http://www.cdc.gov/nhsn/forms/57.127_MDROMonthlyReporting_BLANK.pdf

**2a1.30-32 Data Dictionary/Code Table Web Page URL or Attachment:**
URL
http://www.cdc.gov/nhsn/forms/instr/57_128_Instructions.pdf, http://www.cdc.gov/nhsn/forms/instr/57_127_Instructions.pdf

**2a1.33 Level of Analysis** (*Check the levels of analysis for which the measure is specified and tested*): Facility, Population : National, Population : State

**2a1.34-35 Care Setting** (*Check all the settings for which the measure is specified and tested*): Behavioral Health/Psychiatric : Inpatient, Dialysis Facility, Hospital/Acute Care Facility, Post Acute/Long Term Care Facility : Nursing Home/Skilled Nursing Facility, Post Acute/Long Term Care Facility : Rehabilitation

**2a2. Reliability Testing.** (*Reliability testing was conducted with appropriate method, scope, and adequate demonstration of reliability.*)

**2a2.1 Data/Sample** (*Description of the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included*):
The standard populations´ hospital-onset MRSA rates that were used in the SIR calculation came from all inpatient locations reporting MRSA blood LabID events to NHSN for 2009 and 2010. 562 facilities reported MRSA blood LabID events during that time period. A total of 58 inpatient location types reported MRSA blood LabID events during that time period.

The numerators for each of the locations range from 0 to 48 MRSA blood LabID events, and the denominators range from 61 to 175,499 patient days.

For 360 of the 562 reporting facilities, at least 10,000 patient days were reported (internal, unpublished NHSN analysis). Therefore, we conclude that the standard population´s rates are robust enough to use for determining the expected number of MRSA blood LabID events in the SIR calculation.

**2a2.2 Analytic Method** *(Describe method of reliability testing & rationale)*:
The SIR is the ratio of the number of observed unique MRSA blood LabID events to the number of expected unique MRSA blood LabID events, given the experience of the standard population described in 2a2.1. The SIR is very similar in concept to the standardized mortality ratio (SMR), which is a commonly used and accepted metric in public health.

If the number of observed events is equal to the number of expected events based on the standard population, then the SIR will equal 1.0. If a greater number of events are observed than what would be expected, the SIR will be greater than 1 (i.e, an SIR of 2.0 indicates that twice as many events are observed than what would be expected given the standard population). If fewer events are observed than what would be expected, the SIR will be less than 1 (i.e, an SIR of 0.5 indicates that half as many events are observed than what would be expected).

**2a2.3 Testing Results** *(Reliability statistics, assessment of adequacy in the context of norms for the test conducted)*:
The baseline rates of the standard population will remain the same for the purposes of calculating the number of expected events in the denominator of the SIR calculation. The number of inpatient days reported by the facility will be multiplied by the standard population´s rate of MRSA blood LabID events to obtain an expected number of events. Because the standard population´s rates will remain constant, reliable and reproducible SIRs will be produced into the future, allowing comparison the the baseline period to assess progress in reducing incidence.

**2b. VALIDITY. Validity, Testing, <u>including all Threats to Validity</u>:    H☐ M☐ L☐ I☐**

**2b1.1 Describe how the measure specifications** *(measure focus, target population, and exclusions)* **are consistent with the evidence cited in support of the measure focus (** *criterion 1c* **) and identify any differences from the evidence:**
Clinical guidelines for the management of multidrug resistant organisms, including MRSA, have been published. Adherence to the recommendations in the guidelines can result in decreased rates of MDRO transmission and infection.

The numerator of the SIR measure is the observed number of unique MRSA blood LabID events for a given time period, which serves as a proxy for an infection event. Improving prevention practices as prescribed in the existing clinical guideline should result in a decrease in the number of observed MRSA blood LabID events. This will result in a lower SIR, which indicates improving performance.

**2b2. Validity Testing.** (*Validity testing was conducted with appropriate method, scope, and adequate demonstration of validity.*)

**2b2.1 Data/Sample** *(Description of the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included)*:
Data used to construct the standard population are described in 2a2.1.

**2b2.2 Analytic Method** *(Describe method of validity testing and rationale; if face validity, describe systematic assessment)*:
The SMR, upon which the SIR is based, is a widely accepted method for summarizing mortality experience. Therefore, we conclude that the SIR has inherent face validity.

However, validity studies of the SIR are ongoing. The American Recovery and Reinvestment Act of 2009 provided funding to CDC which was used to support validity studies at the state health department level, among other tasks. Validation methods have been descibed in annual public reports of healthcare-associated infection data in at least three states - New York (http://www.health.state.ny.us/statistics/facilities/hospital/hospital_acquired_infections/), South Carolina (http://www.scdhec.gov/health/disease/hai/), and Pennsylvania (http://www.portal.state.pa.us/portal/server.pt/community/healthcare_associated_infections/14234). Other states continue to work on validation of healthcare associated infection surveillance data and metrics.

**2b2.3 Testing Results** *(Statistical results, assessment of adequacy in the context of norms for the test conducted; if face validity, describe results of systematic assessment)*:

The SMR, upon which the SIR is based, is a widely accepted method for summarizing mortality experience.  Therefore, we conclude that the SIR has inherent face validity.

**POTENTIAL THREATS TO VALIDITY**.  (*All potential threats to validity were appropriately tested with adequate results.*)

**2b3. Measure Exclusions.**  (*Exclusions were supported by the clinical evidence in 1c or appropriately tested with results demonstrating the need to specify them.*)

**2b3.1 Data/Sample for analysis of exclusions** (*Description of the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included*):
There are no exclusions in the measure.  All inpatient hospital-onset MRSA blood LabID events are included in the numerator of the measure.  A facility´s total number of inpatient days is used to calculate the denominator of the measure.

**2b3.2 Analytic Method** (*Describe type of analysis and rationale for examining exclusions, including exclusion related to patient preference*):
N/A

**2b3.3 Results** (*Provide statistical results for analysis of exclusions, e.g., frequency, variability, sensitivity analyses*):
N/A

**2b4. Risk Adjustment Strategy.**  (*For outcome measures, adjustment for differences in case mix (severity) across measured entities was appropriately tested with adequate results.*)

**2b4.1 Data/Sample** (*Description of the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included*):
Data used to construct the standard population are described in 2a2.1.

**2b4.2 Analytic Method (***Describe methods and rationale for development and testing of risk model or risk stratification including selection of factors/variables*):
The SIR is an internally risk-adjusted measure that can be used to produce a risk-adjusted summary statistic for a facility.  Expected numbers of events are calculated based on factors that lead to different levels of risk.  Risk adjustment methods and stratification variables used in the creation of this measure can be found in 2a1.13 and 2a2.1.

**2b4.3 Testing Results** (*Statistical risk model: Provide quantitative assessment of relative contribution of model risk factors; risk model performance metrics including cross-validation discrimination and calibration statistics, calibration curve and risk decile plot, and assessment of adequacy in the context of norms for risk models.  Risk stratification: Provide quantitative assessment of relationship of risk factors to the outcome and differences in outcomes among the strata*):
All 562 facilities that were used to construct the standard population reported their facility type.  496 facilities (88%) were general acute care facilities.  31 facilities (5.5%) were long term acute care facilities.  The remaining 6.5% of facilities were one of the other NHSN-defined facility types.

All 562 facilities that were used to construct the standard population reported their facility´s bedsize.  360 facilities (64%) had less than or equal to 200 beds, 172 facilities (31%) had between 201 and 500 beds, and 30 facilities (5%) had more than 500 beds.

414 facilities (74%) used to construct the standard population reported that they were non-teaching facilities.  The remaining 148 facilities (26%) indiciated that they were affiliated with a medical school to some extent.  Of these 148 facilities, 50 (34%) identified themselves as being a major teaching facility, 52 (35%) identified themselves as having a graduate teaching affiliation with a medical school, and 46 (31%) identified themselves as having a limited affiliation with a medical school (see definitions in 2a1.7).

**2b4.4 If outcome or resource use measure is not risk adjusted, provide rationale and analyses to justify lack of adjustment:**  N/A

**2b5. Identification of Meaningful Differences in Performance**.  (*The performance measure scores were appropriately analyzed and discriminated meaningful differences in quality.*)

**2b5.1 Data/Sample** (*Describe the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included*):

CDC has used the SIR as a metric to identify differences in performance and potential improvement over time.  State-specific SIRs for central line-associated bloodstream infection data reported to NHSN from 2006-2009 has been reported at http://www.cdc.gov/HAI/surveillance/statesummary.html.

**2b5.2 Analytic Method** *(Describe methods and rationale  to identify statistically significant and practically/meaningfully differences in performance)*:
The SIR identifies variation from an expected rate of occurence of an infection or event based on the experience of a standard population, as well as a sense of the magnitude of that variation (i.e. an SIR of 4 indicates a level of occurence four times higher than what would be expected).  The SIR is presented with a confidence interval that can be used to assess the likelihood that the SIR occurs within a specified range.

**2b5.3 Results** *(Provide measure performance results/scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningfully differences in performance)*:
 The SIR is calculated and presented with its 95% confidence interval.  This can be plotted graphically to assess its relationship with the nominal value of 1, where observed=expected.  The SIR and confidence interval can also be plotted over time to compare SIR values for the same facility over a series of time periods.

**2b6. Comparability of Multiple Data Sources/Methods.** (*If specified for more than one data source, the various approaches result in comparable scores.*)

**2b6.1 Data/Sample** *(Describe the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included)*:
All facilities participating in NHSN and reporting LabID events to the MDRO module follow the same protocol for reporting events using similar laboratory and admission/discharge/transfer data sources.

**2b6.2 Analytic Method** *(Describe methods and rationale for  testing comparability of scores produced by the different data sources specified in the measure)*:
N/A

**2b6.3 Testing Results** *(Provide statistical results, e.g., correlation statistics, comparison of rankings; assessment of adequacy in the context of norms for the test conducted)*:
N/A

**2c. Disparities in Care:**  H☐ M☐ L☐ I☐  NA☐ (*If applicable, the measure specifications allow identification of disparities.*)

**2c.1 If measure is stratified for disparities, provide stratified results** *(Scores by stratified categories/cohorts)*: N/A

**2c.2 If disparities have been reported/identified (e.g., in 1b), but measure is not specified to detect disparities, please explain:**
N/A

**2.1-2.3 Supplemental Testing Methodology Information:**

**Steering Committee: Overall, was the criterion, *Scientific Acceptability of Measure Properties*, met?**
(*Reliability and Validity must be rated moderate or high*)  Yes☐  No☐
Provide rationale based on specific subcriteria:

If the Committee votes No, STOP

## 3. USABILITY

Extent to which intended audiences (e.g., consumers, purchasers, providers, policy makers) can understand the results of the measure and are likely to find them useful for decision making. (evaluation criteria)

**C.1** Intended Actual/Planned Use *(Check all the planned uses for which the measure is intended)*:  Payment Program, Public Health/Disease Surveillance, Public Reporting, Quality Improvement with Benchmarking (external benchmarking to multiple organizations)

**3.1** Current Use *(Check all that apply; for any that are checked, provide the specific program information in the following questions)*:  Public Reporting, Public Health/ Disease Surveillance, Quality Improvement with Benchmarking (external benchmarking to multiple organizations), Quality Improvement (Internal to the specific organization)

**3a. Usefulness for Public Reporting:**  H☐ M☐ L☐ I☐
(*The measure is meaningful, understandable and useful for public reporting.*)

**3a.1.** Use in Public Reporting - disclosure of performance results to the public at large *(If used in a public reporting program, provide name of program(s), locations, Web page URL(s)).* If not publicly reported in a national or community program, state the reason AND plans to achieve public reporting, potential reporting programs or commitments, and timeline, e.g., within 3 years of endorsement:  [*For Maintenance – If not publicly reported, describe progress made toward achieving disclosure of performance results to the public at large and expected date for public reporting; provide rationale why continued endorsement should be considered.*]

The standardized infection ratio for healthcare-associated infections is identical in concept to the standardized mortality ratio, which is a widely accepted measurement tool in public health.  In 2005, NHSN introduced an SIR measure for surgical site infections (SSI), and in 2009, an SIR measure for central line associated bloodstream infections (CLABSI) was implemented in NHSN as well.

Facilities have been able to use the SIR for internal performance tracking for many years.  In recent years, laws that require facilities to report healthcare-associated infections to state health departments using NHSN for public reporting have led to increased use of the SIR at the state level.  Several states have produced public reports of healthcare-associated infection data using the SIR for both CLABSI and SSI.  Examples include:
-Pennsylvania (http://www.portal.state.pa.us/portal/server.pt?open=18&objID=848541&mode=2)
-Tennessee (http://health.state.tn.us/Downloads/TROHAI2011.pdf)
-South Carolina (http://www.scdhec.gov/health/disease/hai/reports.htm)

**3a.2.** Provide a rationale for why the measure performance results are meaningful, understandable, and useful for public reporting. If usefulness was demonstrated (e.g., focus group, cognitive testing), describe the data, method, and results:  The SIR provides a single summary statistic that can be used to represent the HAI experience for a given facility.  This differs from rate data produced by NHSN.  For example, CLABSI rates are only reported out by location in NHSN to maximize risk adjustment.  It is not possible to provide a risk-adjusted overall CLABSI rate for a facility.  The SIR is internally risk-adjusted to allow for presentation as a single summary statistic for public consumption.

The structure of the SIR as the number of observed events divided by the number of expected events given a national baseline allows for simple interpretation of the metric.  If the value is greater than 1, a facility identified more infections than what would be expected.  If the value is less than 1, a facility identified fewer infections than what would be expected.

**3.2** Use for other Accountability Functions (payment, certification, accreditation).  If used in a public accountability program, provide name of program(s), locations, Web page URL(s):  Hospital-onset MRSA bacteremia has been added to the Center for Medicare and Medicaid Services´ Hospital Inpatient Quality Reporting (IQR) Program for events identified starting in January 2013.  Facilities that are eligible for the IQR program that do not participate and report required data have their Medicare annual payment update reduced.  The SIR will be the outcome measure used for the hospital-onset MRSA bacteremia reporting requirement in the IQR program.

**3b.** Usefulness for Quality Improvement:  H☐ M☐ L☐ I☐
(*The measure is meaningful, understandable and useful for quality improvement.*)

**3b.1.** Use in QI. If used in quality improvement program, provide name of program(s), locations, Web page URL(s):
[*For Maintenance – If not used for QI, indicate the reasons and describe progress toward using performance results for improvement*].
Several state-based prevention collaboratives are using the standardized infection ratio as a metric to track progress towards reducing healthcare-associated infections.  States that have implemented prevention collaboratives using funds allocated by CDC

can be found at http://www.cdc.gov/HAI/stateplans/HAIstatePlans-map.html.

**3b.2. Provide rationale for why the measure performance results are meaningful, understandable, and useful for quality improvement.** Ifusefulness was demonstrated *(e.g., QI initiative),* describe the data, method and results:
Facilities can track monthly, quarterly, or yearly SIRs to examine if the prevention practices implemented by the collaborative have resulted in reduced numbers of infections (indicated by a decreasing SIR).

**Overall, to what extent was the criterion,** *Usability*, met? H☐ M☐ L☐ I☐
**Provide rationale based on specific subcriteria:**

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## 4. FEASIBILITY

Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. **(evaluation criteria)**

**4a. Data Generated as a Byproduct of Care Processes: H☐ M☐ L☐ I☐**

**4a.1-2 How are the data elements needed to compute measure scores generated?** *(Check all that apply).*
Data used in the measure are:
Abstracted from a record by someone other than person obtaining original information (e.g., chart abstraction for quality measure or registry), Other
LabID events and denominator data can be collected manually by trained hospital staff or via electronic data capture from hospital laboratory and ADT systems. The SIR is automatically calculated by the NHSN web application.

**4b. Electronic Sources: H☐ M☐ L☐ I☐**

**4b.1 Are the data elements needed for the measure as specified available electronically** *(Elements that are needed to compute measure scores are in defined, computer-readable fields)*: ALL data elements are in a combination of electronic sources

**4b.2 If ALL data elements are not from electronic sources, specify a credible, near-term path to electronic capture, OR provide a rationale for using other than electronic sources:**

**4c. Susceptibility to Inaccuracies, Errors, or Unintended Consequences: H☐ M☐ L☐ I☐**

**4c.1 Identify susceptibility to inaccuracies, errors, or unintended consequences of the measurement identified during testing and/or operational use and strategies to prevent, minimize, or detect. If audited, provide results:**
Laboratory and other clinical data must be reviewed to determine if the patient meets the criteria for a LabID event. It is possible that medical record reviewers will miss positive cultures or important dates that would indicate that a LabID event should be recorded. Similarly, reviewers might miss data in the medical record that would indicate a positive culture should not result in a LabID event. It is also possible that data abstractors could intentionally underreport LabID events.

Business logic is built into the NHSN application to minimize incorrect entry of LabID events. Additionally, agencies including state health departments and others have indicated interest in performing validation of LabID event surveillance as they have for other healthcare-associated infections, such as central line-associated bloodstream infections.

**4d. Data Collection Strategy/Implementation: H☐ M☐ L☐ I☐**

**A.2 Please check if either of the following apply** (*regarding proprietary measures*):
**4d.1 Describe what you have learned/modified as a result of testing and/or operational use of the measure regarding data collection, availability of data, missing data, timing and frequency of data collection, sampling, patient confidentiality, time and cost of data collection, other feasibility/implementation issues** *(e.g., fees for use of proprietary measures)*:
The NHSN Multidrug Resistant Organism and C. difficile Infection (MDRO/CDI) module has been available for facilities to use since 2009. The ability to perform facility-wide surveillance with a single denominator was introduced in 2010, reducing data collection burden on participating facilities. The ability to perform facility-wide surveillance for MRSA LabID events from blood specimens only was also introduced in 2010. To further reduce case finding and data entry burden on facilities, LabID event reporting for MRSA is now able to be performed electronically via NHSN's Clinical Document Architecture import function.

**Overall, to what extent was the criterion,** *Feasibility*, met? H☐ M☐ L☐ I☐

**Provide rationale based on specific subcriteria:**

## OVERALL SUITABILITY FOR ENDORSEMENT

**Does the measure meet all the NQF criteria for endorsement?** Yes☐ No☐
**Rationale:**

If the Committee votes No, STOP.
If the Committee votes Yes, the final recommendation is contingent on comparison to related and competing measures.

## 5. COMPARISON TO RELATED AND COMPETING MEASURES

If a measure meets the above criteria and there are endorsed or new related measures (either the same measure focus or the same target population) or competing measures (both the same measure focus and the same target population), the measures are compared to address harmonization and/or selection of the best measure before a final recommendation is made.

**5.1** If there are related measures *(either same measure focus or target population)* or competing measures *(both the same measure focus and same target population)*, list the NQF # and title of all related and/or competing measures:

**5a. Harmonization**

**5a.1** If this measure has EITHER the same measure focus OR the same target population as [NQF-endorsed measure(s)]:
Are the measure specifications completely harmonized?

**5a.2** If the measure specifications are not completely harmonized, identify the differences, rationale, and impact on interpretability and data collection burden:

**5b. Competing Measure(s)**

**5b.1** If this measure has both the same measure focus and the same target population as NQF-endorsed measure(s):
Describe why this measure is superior to competing measures *(e.g., a more valid or efficient way to measure quality)*; OR provide a rationale for the additive value of endorsing an additional measure. *(Provide analyses when possible)*:
N/A

## CONTACT INFORMATION

**Co.1 Measure Steward (Intellectual Property Owner):** Centers for Disease Control and Prevention, 1600 Clifton Rd NE, Mailstop A24, Atlanta, Georgia, 30333

**Co.2 Point of Contact:** Daniel, Pollock, MD, Surveillance Branch Chief, Division of Healthcare Quality Promotion, CDC, dpollock@cdc.gov, 404-639-4237-

**Co.3 Measure Developer if different from Measure Steward:** Centers for Disease Control and Prevention, 1600 Clifton Rd NE, Mailstop A24, Atlanta, Georgia, 30333

**Co.4 Point of Contact:** Daniel, Pollock, MD, Surveillance Branch Chief, Division of Healthcare Quality Promotion, CDC, dpollock@cdc.gov, 404-639-4237-

**Co.5 Submitter:** Daniel, Pollock, MD, Surveillance Branch Chief, Division of Healthcare Quality Promotion, CDC, dpollock@cdc.gov, 404-639-4237-, Centers for Disease Control and Prevention

**Co.6 Additional organizations that sponsored/participated in measure development:**

**Co.7 Public Contact:** Daniel, Pollock, MD, Surveillance Branch Chief, Division of Healthcare Quality Promotion, CDC,

dpollock@cdc.gov, 404-639-4237-, Centers for Disease Control and Prevention

| ADDITIONAL INFORMATION |
|---|
| Workgroup/Expert Panel involved in measure development<br>Ad.1 Provide a list of sponsoring organizations and workgroup/panel members' names and organizations. Describe the members' role in measure development. |
| Ad.2 If adapted, provide title of original measure, NQF # if endorsed, and measure steward. Briefly describe the reasons for adapting the original measure and any work with the original measure steward: |
| Measure Developer/Steward Updates and Ongoing Maintenance<br>Ad.3 Year the measure was first released:  2009<br>Ad.4 Month and Year of most recent revision:  05, 2010<br>Ad.5 What is your frequency for review/update of this measure?  Annually and as needed<br>Ad.6 When is the next scheduled review/update for this measure?  01, 2012 |
| Ad.7 Copyright statement: |
| Ad.8 Disclaimers: |
| Ad.9 Additional Information/Comments: |
| Date of Submission (*MM/DD/YY*):  09/14/2011 |