

Troubleshooting the MRSA Bacteremia and CDI LabID Event SIR

We suggest that you review the [General Tips for NHSN Analysis](#) document before reviewing this troubleshooting guide any further. **This guide assumes recent dataset generation and no 'Alerts' on the home screen.**

MRSA Bacteremia and *C. difficile* (CDI) LabID Event SIR general information:

- The default MRSA and *C. difficile* SIR reports will use the updated baseline time period of 2015. LabID event SIRs calculated under the 2015 baseline are available for acute care hospitals, critical access hospitals, long-term acute care hospitals, and inpatient rehabilitation facilities.
 - NOTE: SIRs under the original baseline time period (2010–2011) are available for acute care hospitals and can be found at the following analysis folder pathway: Baseline Set 1 > MDRO/CDI-LabID Events

➤ **Problem #1: How can I tell which events are being counted in the numerator of the SIR?**

Solution:

- **MRSA Bacteremia** - Run a “Line Listing for all MRSA LabID events” limited to the appropriate time period, and review the appropriate indicator variable on the line list (see table below for the names of indicator variables). This variable will = 1 on the line list for all events that are counted in the numerator of the SIR. See page 3 of this document for more information about the algorithms used to determine which events are counted in the SIR.
- **CDI** - Run the “Line Listing for all CDIF LabID events” limited to the appropriate time period, and review the appropriate indicator variable on the line list (see table below for the names of indicator variables). This variable will = 1 for all events that are counted in the numerator of the SIR. See page 3 of this document for more information about the algorithms used to determine which events are counted in the SIR.

Facility Type	MRSA SIR Indicator Variable	CDI SIR Indicator Variable
<i>Acute Care Hospital</i>	FWMRSA_bldIncCount	FWCDIF_facIncHOCCount
<i>CMS-certified Inpatient Rehabilitation (IRF) unit located within a hospital</i>	MRSA_IRFbldIncCount	CDIF_IRFIncCount
<i>Critical Access Hospital</i>	FWMRSA_bldIncCount	FWCDIF_facIncHOCCount
<i>Long-term Acute Care Hospital</i>	FWMRSA_bldIncCount	FWCDIF_facIncHOCCount
<i>Free-standing Inpatient Rehab Facility</i>	FWMRSA_bldIncCount	FWCDIF_facIncHOCCount



➤ **Problem #2: My LabID event SIRs are not being calculated.**

Solution:

- **Step 1:** The number of predicted infections must be ≥ 1 for the MRSA and CDI SIRs to be calculated. If you have less than 1 predicted infection, your data are still considered “complete” and will still be sent to CMS provided all other requirements are met. However, in this situation, an SIR, p-value, and 95% confidence interval will not be calculated.
- **Step 2: (applies to CDI SIRs for all facility types):** You may not have completed denominator data entry for the entire quarter. Summary data for all three months of the quarter must be complete before the SIR for that quarter is calculated. This is because the CDI test type used in the SIR calculation is selected on the FacWideIN or IRF unit’s summary data record for the 3rd month of each quarter (i.e., March, June, September, December). Until the CDI test type is reported for the last month of the quarter, the SIR cannot be calculated.

Note: In this situation, you will see a second table in the SIR output titled “Months Excluded from the SIR” that will display your entered data for those months.

- **Step 3: (applies to CDI SIRs for acute care hospitals):** You may have an outlier prevalence rate for a quarter. In this case, a second table in the SIR output will display the outlier prevalence rate; ensure that the number of admissions and the number of community-onset LabID events for the quarter are accurately reflected. The CDI community-onset admission prevalence rate outlier (cut-off) value is 2.6 per 100 admissions. Any quarter with a CDI community-onset admission prevalence rate greater than 2.6 will not have a calculated SIR due to the statistical properties of the risk adjustment model. However, the data will still be sent to CMS provided all other requirements are met.
- **Step 4: (applies to CDI SIRs for all facility types, and MRSA SIRs for acute care hospitals):** The LabID event SIRs can only be calculated on the quarter-level or higher. If you have the ‘Group by’ option set to summaryYM (to run data by month) on the modification screen, the SIR will not be calculated.
- **Step 5:** If you are reviewing the CMS SIR report for Quality Reporting, confirm that your monthly reporting plans and monthly summary data list ‘FacWideIN’ (or applicable IRF unit) as the location designation for MRSA and CDI LabID event surveillance.

➤ **Problem #3: One or more months is missing from my SIR.**

Solution:

- **Step 1:** Confirm that Summary data for the ‘FacWideIN’ (or applicable IRF unit) location, including all required fields for patient days and admissions, have been entered for every month in the quarter.
- **Step 2:** If reviewing the CMS SIR Report for Quality Reporting, confirm that MRSA (All Specimens or Blood Only) and/or *C. difficile* is listed in your monthly reporting plan for each month of the quarter, under the location designation of ‘FacWideIN’ (or applicable IRF unit). Any mapped ED and/or Observation locations should also be listed on your reporting plan for both MRSA and *C. difficile*.
- **Step 3:** If no LabID events for an organism were identified, the ‘Report No Events’ boxes should be checked for each month, as necessary. The ‘Report No Events’ boxes can be found on the summary data entry screen.



- **Step 4:** Note that the MRSA bacteremia SIR report for IRFs, located in the “CMS Reports” analysis folder, will not contain any data beyond 2018 Q3.

➤ **Problem #4: The number of events listed in the SIR is not accurate.**

Solution:

- **Step 1:** Ensure that all 3 months of the quarter are being included in the SIR (see problem #3 above for troubleshooting steps).
- **Step 2:** Review event line lists to look at details of the MRSA Bacteremia and/or *C. difficile* LabID events entered in NHSN. Be sure you are counting the appropriate events (see algorithms starting on page 3).

➤ **Problem #5: Is my SIR being risk-adjusted for the correct CDI test type?**

The CDI laboratory test type used in the SIR calculations (if applicable) is taken from the value selected on the FacWideIN or IRF unit’s MDRO monthly denominator form, for the last month of the quarter. The CDI test type used in your facility’s SIR calculation is also listed in the SIR output from NHSN, in the table titled “Risk Adjustment Factors for FacWideIN CDI SIR”.

CDI test methods are grouped into three categories for risk adjustment shown below. Refer to the SIR Guide to see how each CDI test type category contributes to the number of predicted events.

NAAT-level risk adjustment:

- NAAT (nucleic acid amplification test, including PCR)
- GDH plus NAAT (2-step algorithm)
- GDH plus EIA for toxin, followed by NAAT for discrepant results

EIA-level risk adjustment:

- Enzyme immunoassay (EIA) for toxin
- GDH antigen plus EIA for toxin (2-step algorithm)
- NAAT plus EIA, if NAAT positive*

OTHER- level risk adjustment:

- Cell cytotoxicity neutralization assay
- Toxigenic culture (CDI culture followed by detection of toxins)
- “Other”

*Prior to 2018, the CDI test method of “NAAT plus EIA, if NAAT positive” was included in the NAAT-level risk adjustment category. Due to a 2018 NHSN protocol change, the CDI test method of “NAAT plus EIA, if NAAT positive” is now included in the EIA-level risk adjustment category for 2018 data and forward. More information is available in the December 2017 NHSN Newsletter.

Algorithms for Determining Which LabID Events are Counted in the Numerator of the SIR

Section 1: Acute Care Hospital (ACH), Critical Access Hospital (CAH), Long-term Acute Care Hospital (LTACH), and Free-standing Inpatient Rehabilitation Facility (IRF)



The following algorithms are used to determine which LabID events are counted in the numerator of the SIR sent to CMS for participation in CMS Quality Reporting Programs*, beginning with 2017 data:

MRSA:

1. Positive MRSA LabID event was identified from a blood specimen.
2. Specimen was collected in an inpatient location. For ACHs and CAHs, the location must **NOT** be a CMS-certified inpatient rehabilitation (IRF) or inpatient psychiatric (IPF) location with a separate CCN.
3. Specimen is classified as “healthcare facility-onset” or “HO”. This means the specimen collection date is > 3 days after the patient’s facility admission date, where the facility admission date is Day 1.
4. The patient did not have any prior positive MRSA *blood specimen* LabID events in the previous 14 days in any inpatient location (including IRF/IPF units), emergency department, or 24-hour observation location. Specimen collection date is considered Day 1.**
 - a) If a patient’s second MRSA bacteremia event is on Day 14 or earlier (where the first specimen date is considered Day 1), the second event will not be counted in the SIR. This 14-day deduplication crosses calendar months. See the example below, from an acute care hospital:

Patient’s MRSA bacteremia Event	Date of specimen collection	Location	Onset	Counted in the FacWideIN SIR?
1 st event	1/25/2019	Medical ICU	Healthcare-onset (HO)	Yes
2 nd event	1/30/2019	Step-down Unit	HO	No - previous event exists within 14 days
3 rd event	2/8/2019	Medical Ward	HO	No - previous event exists within 14 days

- b) If a patient has two positive specimens that were collected on the same date, the algorithm will treat the first event *entered* into NHSN as the patient’s first event.

C. difficile (CDI):

1. Specimen was collected in an inpatient location. For ACHs and CAHs, the location must **NOT** be a CMS-certified inpatient rehabilitation (IRF) or inpatient psychiatric (IPF) location with a separate CCN.
2. Specimen is classified as “healthcare facility-onset”, or “HO”. This means the specimen collection date is > 3 days after the patient’s facility admission date, where the facility admission date is Day 1.
3. Positive CDI LabID event is classified as “Incident” by NHSN, meaning that the event occurred > 56 days after the most recent CDI LabID Event for that patient that occurred in any inpatient location (including IRF/IPF units), emergency department, or 24-hour observation location. If a patient has two positive specimens that were collected on the same date, the algorithm will treat the first event *entered* into NHSN as the patient’s first event. Note: the date of first specimen collection is considered Day 1.**



*The CMS IRFQR and LTCHQR Programs no longer require submission of data for MRSA bacteremia starting with 2018 Q4 data. However, IRFs and LTACHs may still be required to report MRSA bacteremia data to NHSN in response to a state or local reporting mandate, or may choose to continue this surveillance voluntarily. The MRSA bacteremia SIR analysis report, located in the general MDRO/CDI – LabID Event analysis folder within NHSN, is still available to IRFs and LTACHs and will use the algorithms above.

**History of changes to LabID algorithms: Prior to 2017, the first positive specimen collection date for a patient was considered Day 0, and CMS-certified IRF/IPF units were not considered in the 14 day window for subsequent events from the same patient. Prior to 2017, “Incident” CDI events were classified as > 55 days after the most recent CDI event for that patient. Events from CMS-certified IRF/IPF units were removed from the ACH and CAH SIRs starting in 2015, and 2015 was the initial year of required reporting of LabID event data from emergency departments and 24-hour observation units from ACHs and CAHs.

Section 2: CMS-certified Inpatient Rehabilitation (IRF) Units Located within a Hospital

The following algorithms are used to determine which *C. difficile* or MRSA Bacteremia LabID events from an IRF unit are counted in the numerator of the IRF unit’s SIR sent to CMS for participation in CMS IRF Quality Reporting Program*.

MRSA:

1. Positive MRSA LabID event was identified from a blood specimen.
2. Specimen was collected in a CMS-certified IRF unit. Refer to the Locations Chapter of the NHSN Manual to determine proper set-up of a CMS-certified IRF unit.
3. The specimen collection date is > 3 days after the IRF unit admission date, where the IRF unit admission date is considered Day 1.
4. The patient did not have any prior positive MRSA *blood specimen* LabID events in the previous 14 days in any CMS-certified IRF unit. Specimen collection date is considered Day 1.**
 - a. If a patient’s second MRSA bacteremia event in the IRF unit is on Day 14 or earlier (where the first specimen date in the IRF unit is considered Day 1), the second event will not be counted in the IRF SIR.

C. difficile (CDI):

1. Specimen was collected in a CMS-certified IRF unit. Refer to the Locations Chapter of the NHSN Manual to determine proper set-up of a CMS-certified IRF unit.
2. The specimen collection date is > 3 days after the IRF unit admission date, where the IRF unit admission date is considered Day 1.
3. The patient did not have any prior positive CDI LabID events in the previous 14 days in any CMS-certified IRF unit. Specimen collection date is considered Day 1.**
 - a. If a patient’s second CDI LabID event in the IRF unit is on Day 14 or earlier (where the first specimen date in the IRF unit is considered Day 1), the second event will not be counted in the IRF SIR.



*The CMS IRFQR Program no longer requires submission of data for MRSA bacteremia starting with 2018 Q4 data. However, IRFs may still be required to report MRSA bacteremia data to NHSN in response to a state or local reporting mandate, or may choose to continue this surveillance voluntarily. The MRSA bacteremia SIR analysis report, located in the general MDRO/CDI – LabID Event analysis folder within NHSN, is still available to IRF units and will use the algorithms below.

***Prior to 2017, the first positive specimen collection date for a patient was considered Day 0.*

Additional Resources

1. NHSN's Guide to the SIR: <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sir-guide.pdf>
2. NHSN December 2017 Newsletter: <https://www.cdc.gov/nhsn/pdfs/newsletters/nhsn-nl-dec-2017-508.pdf>
3. Mapping Locations in NHSN: http://www.cdc.gov/nhsn/pdfs/pscmanual/15locationsdescriptions_current.pdf
4. NHSN Analysis Resources: <http://www.cdc.gov/nhsn/ps-analysis-resources/index.html>
5. How to Run and Interpret MRSA/CDI LabID Event SIRs: http://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/sirtables_labidevents.pdf
6. Resources for Reporting NHSN Data for Participation in CMS Quality Reporting Programs: <http://www.cdc.gov/nhsn/cms/index.html>

