

Multidrug-Resistant Organism & *Clostridioides difficile* Infection (MDRO/CDI) Module

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Background:

Methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant *Enterococcus* spp. (VRE), and certain gram-negative bacilli have increased in prevalence in U.S. hospitals over the last three decades, and have important implications for patient safety. There is concern about these multidrug-resistant organisms (MDROs), as options for treating patients with these infections are often extremely limited, and MDRO infections are associated with increased lengths of stay, costs, and mortality. Many of these traits have also been observed for *Clostridioides difficile* infection (CDI). The Healthcare Infection Control Practices Advisory Committee (HICPAC) has approved guidelines for the control of MDROs.¹ These guidelines are available at <https://www.cdc.gov/infectioncontrol/guidelines/MDRO/index.html>. The MDRO and *C. difficile* module of NHSN can provide a tool to assist facilities in meeting some of the criteria outlined in the guidelines. In addition, many of the metrics used in this module are consistent with “Recommendations for Metrics for Multidrug-Resistant Organisms in Healthcare Settings: SHEA/HICPAC Position Paper.”²

Clostridioides difficile (*C. difficile*) is responsible for a spectrum of *C. difficile* infections (CDI), including uncomplicated diarrhea, pseudomembranous colitis, and toxic megacolon, which can, in some instances, lead to sepsis and even death. Although CDI represents a subset of gastrointestinal tract infections in the current CDC definitions for HAIs, specific standard definitions for CDI³ should be incorporated to obtain a more complete understanding of how *C. difficile* is being transmitted in a healthcare facility.

As outlined in the HICPAC guideline¹, these MDRO and *C. difficile* pathogens may require specialized monitoring to evaluate if intensified infection control efforts are required to reduce the occurrence of these organisms and related infections. The **goal** of this module is to provide a mechanism for facilities to report and analyze these data that will inform infection prevention professionals of the impact of targeted prevention efforts.

This module contains two core reporting options for MDRO and *C. difficile* – Laboratory Identified (LabID) Event reporting and Infection Surveillance reporting. These reporting options function as two separate and independent reporting methods - one focused on laboratory-based reporting and the second on infection criteria based surveillance reporting. Reporting options are summarized in [Table 1](#). Participants may choose either one or both of these reporting options and then may also choose to participate in any of the supplemental monitoring methods described in [Table 1](#).

See [Appendix 3: Differentiating Between LabID Event and Infection Surveillance](#) for key differences between the two options.

Table 1. Core and Supplemental Reporting Choices for MDRO and CDI Module

Reporting Choices	MDRO			CDI
	MRSA or MRSA/MSSA	VRE	CephR-Klebsiella, CRE (<i>E. coli</i> , <i>Enterobacter</i> , <i>Klebsiella</i>), <i>Acinetobacter</i> spp. (MDR)	<i>C. difficile</i>
Core	Method	Method	Method	Method
<u>Proxy Infection Measures</u> LabID Event Choose ≥1 organism	A, B, C, D	A, B, C, D	A, B, C, D	‡A, B, C
AND/OR				
Infection Surveillance Choose ≥1 organism	A, B	A, B	A, B	‡A, B
Supplemental	Method	Method	Method	Method
<u>Prevention Process Measures</u> Options: <ul style="list-style-type: none"> • Hand Hygiene Adherence • Gown and Gloves Use Adherence • Active Surveillance Testing (AST) Adherence 	B	B	B	B
<u>AST Outcome Measures</u> <ul style="list-style-type: none"> • Incident and Prevalent Cases using AST 	B	B	N/A	N/A

N/A – not available or contraindicated

‡No surveillance for *C. difficile* will be performed in Neonatal Intensive Care Units (NICU), Specialty Care Nurseries (SCN), babies in LDRP (Labor, Delivery, Recovery, and Post-partum), well-baby nurseries, or well-baby clinics. And, if conducting facility-wide monitoring (Method C), the denominator counts (admissions, patient-days, encounters) for these locations must be removed.

Reporting Method (must choose to monitor by LabID Event or Infection Surveillance reporting before supplemental methods can also be used for monitoring):

A: Facility-wide by location. Report for each location separately and cover all locations in a facility. This reporting method requires the most effort, but provides the most detail for local and national statistical data.

B: Selected locations within the facility (1 or more). Report separately for one or more specific locations within a facility. This includes reporting individual events and denominator data for each of the selected locations. This reporting method is ideal for use during targeted prevention programs.

***Note:** MDRO “Blood Specimens Only” monitoring is the only MDRO LabID event reporting option for IRF, ED and 24-hr Observation locations. For Inpatient locations other than IRF, ED and 24-hr Observation (examples: IPF, Medical, Surgical, etc.) ‘All Specimens’ monitoring is the only MDRO LabID event reporting option.*

C: Overall facility-wide. Report individual LabID events from each inpatient location and total denominator counts for the entire facility. Options include:

(1) Overall Facility-wide Inpatient (FacWideIN) to cover all inpatient locations where denominator data are collected. When using FacWideIN reporting, facilities must also include location specific reporting for outpatient emergency department (adult and pediatric) and 24-hr Observation location(s).

***Note:** When following FacWideIN, facilities must enter denominators for all inpatient locations physically located in the hospital, as well as denominators for all inpatient locations minus any inpatient rehabilitation facility (IRF) and inpatient psychiatric facility (IPF) locations with separate CCNs. Totals reported should not include facilities affiliated with the hospital that are enrolled separately in NHSN. Additionally, separate denominator data will be required to capture encounters for each mapped emergency department and 24-hr observation location.*

(2) Overall Facility-wide Outpatient (FacWideOUT) to cover all outpatient locations affiliated with the facility where encounters are captured. Facilities may choose to monitor FacWideOUT in addition to FacWideIN monitoring.

D: Overall facility-wide: Blood Specimens Only. This method is available for MDRO LabID Events only and targets the most invasive events. Report individual LabID events from each inpatient location and total denominator counts for the entire facility. Options include:

(1) Overall Facility-wide Inpatient (FacWideIN) to cover all inpatient locations. Using this option, facilities must also include location specific reporting for each outpatient emergency department (specifically, adult and pediatric) and 24-hr observation location(s).

Note: When following FacWideIN, facilities must enter denominators for all inpatient locations physically located in the hospital, as well as denominators for all inpatient locations minus any inpatient rehabilitation facility (IRF) and inpatient psychiatric facility (IPF) locations with separate CCNs. Totals reported should not include facilities affiliated with the hospital that are enrolled separately in NHSN. Additionally, separate denominator data will be required to capture encounters for each mapped emergency department and 24-hr observation location.

- (2) Overall Facility-wide Outpatient (FacWideOUT) to cover all outpatient locations affiliated with the facility. Facilities may choose to monitor FacWideOUT in addition to FacWideIN monitoring.

Section I: Core Reporting

Laboratory-Identified (LabID) Event Reporting

Introduction: LabID Event reporting option allows laboratory testing data to be used without clinical evaluation of the patient, and therefore is a much less labor-intensive method to track MDROs and *C. difficile*. These provide proxy infection measures of MDRO and/or *C. difficile* healthcare acquisition, exposure burden, and infection burden based almost exclusively on laboratory data and limited admission date data, including patient care location. LabID Event reporting is ONLY for collecting and tracking positive laboratory results (for example, positive cultures) that are collected for “clinical” purposes (specifically for diagnosis and treatment). This means that the results of laboratory specimens collected for active surveillance testing (AST) purposes only **should not** be reported as LabID Events.

Key points for LabID Event Reporting:

- LabID Events can be monitored at the overall facility-wide level for inpatient areas (FacWideIN), and/or at the overall facility-wide level for outpatient areas (FacWideOUT).
- At the Overall facility-wide levels and for IRF, ED, and 24-hour observation, MDROs can be monitored for *All Specimen* types or for *Blood Specimens Only*. All other locations can only monitor for *All Specimen* types.
- LabID Events can be monitored for specific locations and require unique denominator data from each of the specific locations (specifically, facility-wide locations monitored separately [Method A] allowing for both facility-wide and location-specific data, or by selected locations only [Method B]).
- A facility choosing to conduct FacWideIN surveillance for LabID Events must also follow location-specific surveillance for that same organism in each outpatient emergency department (pediatric and adult) and 24-hour observation location.

Laboratory and admission data can be used to calculate a variety of distinct proxy measures including: admission prevalence rate and overall patient prevalence rate (measures of exposure burden), MDRO bloodstream infection incidence rate (measure of infection burden and healthcare acquisition), overall MDRO infection/colonization incidence rate (measure of healthcare acquisition), and CD incidence rate (measure of infection burden and healthcare acquisition).

Use NHSN forms to collect all required data, using the definitions of each data field as indicated in the Tables of Instructions. When denominator data are available from electronic databases, these sources may be used only after a validation of a minimum 3 consecutive months proves the data to be within 5% (+/-) of the manually conducted once a day counts.

1A: MDRO LabID Event Reporting

Methodology: Facilities may choose to monitor one or more of the following MDROs: MRSA, MRSA and MSSA, VRE, CephR- *Klebsiella*, CRE, and/or multidrug-resistant *Acinetobacter* spp. (see definitions below). For *S. aureus*, both the resistant (MRSA) and the susceptible (MSSA) phenotypes can be tracked to provide concurrent measures of the susceptible pathogens as a comparison to those of the resistant pathogens in a setting of active MRSA prevention efforts.

Note: No Active Surveillance Culture/Testing (ASC/AST) results are to be included in this reporting of individual results (See [General Key Terms chapter](#)). AST tracking should be recorded under Process & Outcome Measures.

MDRO Definitions: MDROs included in this module are defined below.

- MRSA:** Includes *S. aureus* cultured from any specimen that tests oxacillin-resistant, ceftazidime-resistant, or methicillin-resistant by standard susceptibility testing methods, or any laboratory finding of MRSA (includes but not limited to PCR or other molecular based detection methods).
- MSSA:** *S. aureus* cultured from a specimen testing susceptible to oxacillin, ceftazidime, or methicillin by standard susceptibility testing method.
- VRE:** *Enterococcus faecalis, Enterococcus faecium, or Enterococcus species unspecified (only those not identified to the species level)* that is resistant to vancomycin, by standard susceptibility testing methods or a laboratory finding of VRE (includes but not limited to PCR or other molecular based detection methods).
- CephR-
Klebsiella:** *Klebsiella oxytoca or Klebsiella pneumoniae* testing non-susceptible (specifically, either resistant or intermediate) to ceftazidime, cefotaxime, ceftriaxone, cefepime, ceftazidime/avibactam, or ceftolozane/tazobactam.
- CRE:** Any *Escherichia coli, Klebsiella oxytoca, Klebsiella pneumoniae, Klebsiella aerogenes* or *Enterobacter* spp. testing resistant to imipenem, meropenem, doripenem, ertapenem, meropenem/vaborbactam, or imipenem/relebactam by standard susceptibility testing methods (specifically, minimum inhibitory concentrations of ≥ 4 mcg/mL for doripenem, imipenem, meropenem, meropenem/vaborbactam, and imipenem/relebactam or ≥ 2 mcg/mL for ertapenem) OR by production of a carbapenemase (specifically, KPC, NDM, VIM, IMP, OXA-48) demonstrated using a

recognized test (examples: polymerase chain reaction, metallo- β -lactamase test, modified-Hodge test, Carba-NP). **Note:** For in-plan CRE surveillance, facilities must conduct surveillance for all three organisms CRE-*E.coli*, CRE-*Enterobacter*, **and** CRE-*Klebsiella* (*Klebsiella oxytoca*, *Klebsiella aerogenes* and *Klebsiella pneumoniae*).

MDR-*Acinetobacter*: Any *Acinetobacter* spp. testing non-susceptible (specifically, either resistant or intermediate) to at least one agent in at least 3 antimicrobial classes of the following 6 antimicrobial classes:

Class	Antimicrobial	Class	Antimicrobial
Aminoglycosides:	Amikacin Gentamicin Tobramycin	β-lactam/β-lactam β-lactamase inhibitor combination:	Piperacillin/tazobactam
Carbapenems:	Imipenem Meropenem Doripenem	Cephalosporins:	Cefepime Ceftazidime Cefoxitin Ceftriaxone
Fluoroquinolones:	Ciprofloxacin Levofloxacin	Sulbactam:	Ampicillin/sulbactam

Settings: MDRO LabID Event reporting can occur in any location: inpatient or outpatient.

Requirements: Facilities choose at least one of the reporting methods listed below and report data

Note: Facilities must indicate each reporting choice chosen for the calendar month on the *Patient Safety Monthly Reporting Plan* ([CDC 57.106](#)).

For each MDRO being monitored, all MDRO test results are evaluated using either the algorithm in [Figure 1](#) (*All Specimens*) or [Figure 2](#) (*Blood Specimens only*) to determine reportable LabID events for each calendar month, and for each facility location as determined by the reporting method chosen. If monitoring *all specimens*, all first MDRO isolates (chronologically) per patient, per month, per location are reported as a LabID event regardless of specimen source [EXCLUDES tests related to active surveillance testing] (Figure 1); if a duplicate MDRO isolate is from blood, or if monitoring *blood specimens only*, it is reported as a LabID event only if it represents a unique blood source [specifically, no prior isolation of the MDRO in blood from the same patient and location in less than or equal to 2 weeks, even across calendar months] (Figures 1 & 2). As a general rule, at a maximum, there should be no more than 3 blood isolates reported, which would be very rare. If monitoring *all specimens* and a blood isolate is entered as the first specimen of the month, then no *non-blood* specimens can be entered that month for that patient and location. Report each LabID Event individually on a separate form.

FIGURE 1. MDRO TEST RESULT ALGORITHM FOR ALL SPECIMENS LABORATORY-IDENTIFIED (LABID) EVENTS

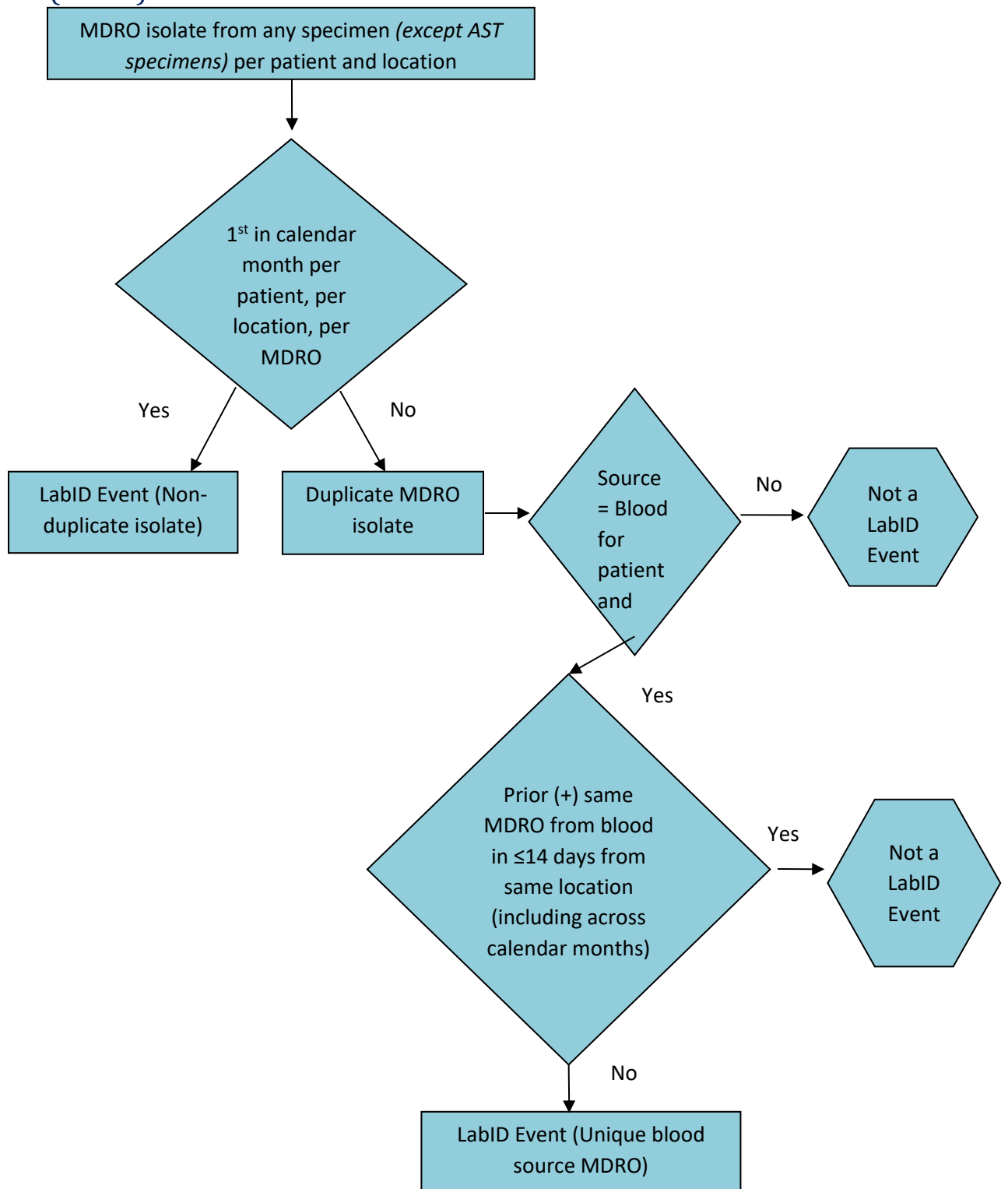


Figure 2. MDRO Test Result Algorithm for *Blood Specimens Only* Laboratory-Identified (LabID) Events

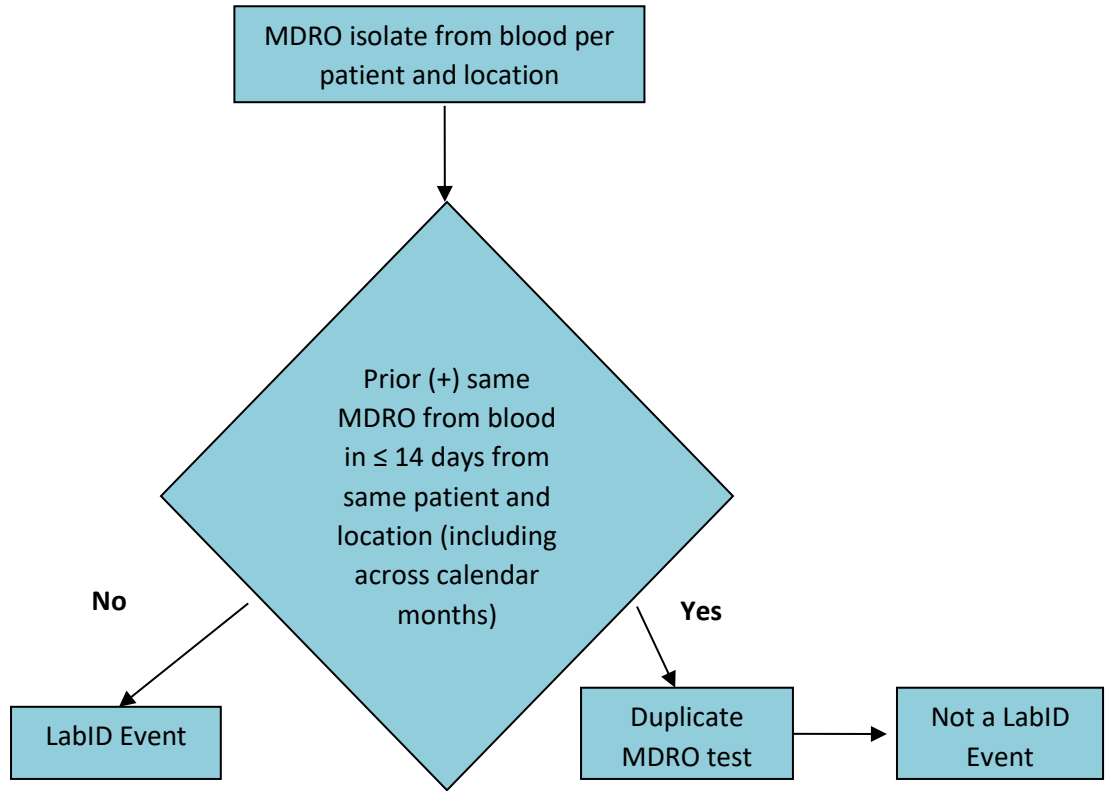


Table 2: Reporting Options for the MDRO Module (non-CDI)

Method	Numerator Data Reporting by Location	Denominator Data Reporting
Facility-wide by location Note: Must monitor <i>All Specimen</i> sources	Enter each MDRO LabID Event reported by location	Report separate denominators for each location in the facility as specified in the NHSN Monthly Reporting Plan
Selected locations Note: Must monitor <i>All Specimen</i> sources with the exception of IRF units, 24-hour observation, and emergency department	Enter each MDRO LabID Event reported by selected locations	Report separate denominators for each Selected location(s) monitored as specified in the NHSN Monthly Reporting Plan
Overall Facility-wide Inpatient (FacWideIN), <i>All Specimen</i>	Enter each MDRO LabID Specimen Event from all inpatient locations AND separately for outpatient emergency department, and 24-hour observation location(s)	Report <u>total</u> denominator data for all inpatient locations physically located in the hospital (for example, total number of admissions and total number of patient days), as well as denominators for all inpatient locations minus inpatient rehabilitation facility and inpatient psychiatric facility locations with separate CCNs <ul style="list-style-type: none"> • Separate denominators should be entered for each mapped outpatient emergency department and 24-hour observation location(s)
Overall Facility-wide Outpatient (FacWideOUT), <i>All Specimen</i>	Enter each MDRO LabID Event from all affiliated outpatient locations separately	Report <u>total</u> denominator data for all outpatient locations (for example, total number of encounters, including ED and OBS encounters in addition to other outpatient locations)
Overall Facility-wide Inpatient (FacWideIN), <i>Blood Specimen Only</i>	Enter each MDRO LabID Blood Specimen Event from all inpatient locations AND separately for outpatient emergency department, and 24-hour observation location(s)	Report <u>total</u> denominator data for all inpatient locations physically located in the hospital (for example, total number of admissions and total number of patient days), as well as denominators for all locations minus inpatient rehabilitation facility and inpatient psychiatric facility locations with separate CCNs <ul style="list-style-type: none"> • Separate denominators should be entered for each mapped outpatient emergency department and 24-hour observation location(s)

Definitions:

MDRO Isolate: Any specimen, obtained for clinical decision making, testing positive for an MDRO (as defined above). **Note:** Excludes tests related to active surveillance testing.

Duplicate MDRO Isolate: If monitoring *all specimens*, any subsequent MDRO isolate from the same patient and location after the first isolate of the specific MDRO during a calendar month, regardless of specimen source, except unique blood source (Figure 1).

For blood isolates:

- Any MDRO blood isolate from the same patient and location, following a previous MDRO blood isolate within 14 days across calendar months & readmission to the same location.
- There should be 14 days with no blood isolates for the patient and specific location before another blood event is entered into NHSN for the patient and location.
- The date of specimen collection is considered Day 1.

EXAMPLE: On January 2, a newly admitted ICU patient has a positive MRSA urine culture. The following week, while still in the ICU, the same patient has MRSA cultured from an infected decubitus ulcer. The MRSA wound culture is considered a duplicate MDRO isolate, since it is the second non-blood MRSA isolate collected from the same patient and location during the same calendar month.

Unique Blood Source: A MDRO isolate from blood in a patient with no prior positive blood culture for the same MDRO and location in less than or equal to 14 days, even across calendar months and different facility admissions (Figure 2). There should be 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 for *blood specimen only* monitoring. All unique blood source isolates must be reported to NHSN (if your facility chooses this type of surveillance); however, not all unique blood source isolates will be counted in the FacWideIN Standardized Infection Ratio (SIR) and analysis reports. Refer to page 20 of this protocol for information about which LabID events are counted in the SIRs. Additionally, if following *all specimens*, the first MDRO for the patient, month, and location should be reported. The date of specimen collection is considered Day 1.

Note: NHSN recommends that facilities keep an internal line listing log of all positive isolates for reference in LabID event reporting which will assist in decision making around the 14-day reporting rule which is location specific.

EXAMPLE:
Monitoring *Blood Specimens only* with multiple isolates from same location

On January 1, an ICU patient has a positive MRSA urine culture which is **not entered** into NHSN because blood specimens only are being monitored. On January 2, while in the same location (ICU), the same patient has a positive MRSA blood culture which **is entered** into NHSN. This starts the 14-day count. On January 5, while in the same location (ICU), the same patient has another positive MRSA blood culture which is **not entered** into NHSN because it has not been 14 days since the original positive MRSA blood culture while in the same location. The January 5 positive blood culture starts a new 14-day count. On January 19, while in the same location (ICU), the same patient has another positive MRSA blood culture. The January 19 MRSA blood culture **is entered** into NHSN because it has been more than 14 days since the patient's most recent positive blood culture (January 5) while in the **same** location (January 19 is day 15).

Date	Location	Specimen Body Site	Reportable?	
1-Jan	ICU	Urine – MRSA isolate	NO	
2-Jan	ICU	Blood – MRSA isolate	YES	
3-Jan	ICU			
4-Jan	ICU			
5-Jan	ICU	Blood – MRSA isolate	NO	1
6-Jan	ICU			2
7-Jan	ICU			3
8-Jan	ICU			4
9-Jan	ICU			5
10-Jan	ICU			6
11-Jan	ICU			7
12-Jan	ICU			8
13-Jan	ICU			9
14-Jan	ICU			10
15-Jan	ICU			11
16-Jan	ICU			12
17-Jan	ICU			13
18-Jan	ICU			14
19-Jan	ICU	Blood – MRSA isolate	YES	15

Annotations:
 - Non-blood isolate (points to 1-Jan)
 - <14 days from prior blood isolate -- no new blood isolate can be reported (points to 5-Jan)
 - >14 days -- new blood isolate should be reported (points to 19-Jan)

EXAMPLE:
Monitoring *All Specimens* with multiple isolates from same location

On January 1, an ICU patient has positive MRSA urine culture which **is entered** into NHSN because it is the first MDRO isolate of the month for this patient. On January 2, while in the same location (ICU), the same patient has a positive MRSA blood culture which **is entered** into NHSN because it is the first positive MRSA blood isolate for the month. *No other non-blood MRSA isolates should be reported for the month for this patient and location as these would represent duplicate isolates.* Any additional MRSA positive blood isolates for the month should be reported following the same 14-day rule as when reporting *Blood Specimens only*. Subsequent months should be reported in the same manner.

Date	Location	Specimen Body Site	Reportable?	
1-Jan	ICU	Urine – MRSA isolate	YES	
2-Jan	ICU	Blood – MRSA isolate	YES	
3-Jan	ICU			
4-Jan	ICU			
5-Jan	ICU	Blood – MRSA isolate	NO	1
6-Jan	ICU			2
7-Jan	ICU			3
8-Jan	ICU			4
9-Jan	ICU			5
10-Jan	ICU			6
11-Jan	ICU			7
12-Jan	ICU			8
13-Jan	ICU			9
14-Jan	ICU			10
15-Jan	ICU			11
16-Jan	ICU			12
17-Jan	ICU			13
18-Jan	ICU			14
19-Jan	ICU	Blood – MRSA isolate	YES	15

Annotations:
 - 1st MRSA isolate of the month (points to 1-Jan)
 - 1st MRSA blood isolate of the month (points to 2-Jan)
 - <14 days from prior blood isolate -- no new blood isolate can be reported (points to 5-Jan)
 - >14 days -- new blood isolate should be reported (points to 19-Jan)

Laboratory-Identified (LabID) Event: All non-duplicate MDRO isolates from any specimen source and unique blood source MDRO isolates. [EXCLUDES tests related to active surveillance testing]. Even if reporting at the Facility Wide level (FacWideIN or FacWideOUT), all reporting must follow rules by location for reporting.

Note: A [LabID Event calculator](#) is available on the NHSN website to help with data entry decision making around the 14-day rule, which is location specific.

EXAMPLE #1: Monitoring <i>Blood Specimens only</i> with isolates from ED & inpatient location	If monitoring blood specimens for FacWideIN (which requires surveillance in the emergency department and 24-hour observation locations), a patient has a positive MRSA laboratory isolate while in the emergency department (ED). This specimen represents a MRSA LabID Event and should be entered for the outpatient emergency department. The next calendar day, the same patient is admitted to ICU and three days later, has a second positive MRSA blood specimen. This specimen also represents a unique LabID Event, because it is the first positive blood specimen in <i>this location</i> (ICU). Note: while this patient has two LabID Events, the second specimen taken from the ICU will be removed from most analysis reports.
EXAMPLE #2: Monitoring <i>All Specimens</i>	If monitoring <i>all specimens</i> , on January 2, a newly admitted ICU patient with no previous positive laboratory isolates during this admission has a positive MRSA urine culture. This specimen represents a LabID Event since it is the first MRSA isolate for the patient, the location, and the calendar month.
EXAMPLE #3: Monitoring <i>All Specimens</i> with isolates from ED & inpatient location	If monitoring <i>all specimens</i> for FacWideIN surveillance, on January 2, a VRE wound culture is collected from the facility's own ED. The patient is then admitted to 4W the next calendar day. The ED culture result must be entered as an outpatient LabID event for the ED location for January 2, as the ED location is included in FacWideIN surveillance and reporting.
EXAMPLE #4: Monitoring <i>Blood Specimens only</i> with multiple blood isolates	If monitoring <i>blood specimens only</i> , on January 26, a newly admitted ICU patient with no previous positive laboratory isolates during this admission has a positive MRSA urine culture which is not entered as a LabID Event since <i>blood specimens only</i> are being monitored. The following day, while in the same location, the same patient has a positive MRSA blood culture. This specimen represents a LabID Event since it is a unique blood source (the first MRSA blood isolate for the same patient and same location). While remaining in ICU, the same patient has another positive blood culture on February 5. This does not represent a new LabID Event since it has not been more than 14 days since the most recent MRSA positive blood isolate for this patient and location.

Reporting Instructions:

- All LabID Events must be reported by location
- LabID event reporting is separate and independent of events reported through MDRO Infection Surveillance reporting and/or HAIs reported through the Device-associated and/or Procedure-associated Modules.
- For instructions on unique reporting scenarios, see [Appendix 1. Guidance for Handling MDRO and CDI Module Infection Surveillance and LabID Event Reporting When Also Following Other NHSN Modules](#)
- For additional reporting information, see [Appendix 3. Differentiating Between LabID Event and Infection Surveillance](#)

Numerator Data: Data will be reported using the *Laboratory-identified MDRO or CDI Event* form (CDC [57.128](#)).

Denominator Data: Patient days and admissions (for inpatient locations), and encounters (for outpatient locations) are reported using the *MDRO and CDI Monthly Denominator Form* (CDC [57.127](#)).

Reporting FacWideIN Denominators:

Line 1: Facilities will enter total patient days and total patient admissions to reflect all inpatient locations physically located in the hospital.

Line 2: The second line of denominator data entry should reflect all inpatient locations minus inpatient rehabilitation units (IRF units) and inpatient psychiatric units (IPF units) with a separate CCN.

Line 3: The third line of denominator data entry should reflect all inpatient locations minus inpatient rehabilitation units (IRF units) and inpatient psychiatric units (IPF units) with a separate CCN minus baby-based locations (for example, NICU, well baby nursery, etc.). The totals should not include other facility types within the hospital that are enrolled and reporting separately (for example, LTAC). See [Table of Instructions](#) for completion instructions.

Note: For Acute Care Hospitals completing FacWideIN surveillance, additional guidance on denominator reporting is available here: <https://www.cdc.gov/nhsn/pdfs/cms/acutecare-mrsa-cdi-labiddenumerator-reporting.pdf>. A quick learn instructional video is available here: <https://www.youtube.com/watch?v=p917TeQfV8c>.

FacWideOUT, Emergency Departments, 24 hour observation units, and other outpatient units: monthly denominator data are reported as encounters. An encounter is defined as any patient visit to an outpatient location. Each patient counts once regardless of time spent in the location.

Note: For NHSN reporting purposes, the 'date admitted to the facility' is HD 1. When determining a patient's admission dates to both the facility and specific inpatient location, the NHSN user must take into account any days spent in an inpatient location, as these days contribute to exposure risk. NHSN defines an inpatient as any patient cared

for/housed on an inpatient location. Local status may differ from NHSN definition; all days spent in an inpatient unit, regardless of local admission status and/or billing status are included in the counts of admissions and inpatient days for the facility and specific location; **for NHSN reporting purposes, the date admitted to the facility is the calendar date that the patient physically locates to an inpatient location.** For further information on counting patient days and admissions, see [Appendix 2: Determining Patient Days for Summary Data Collection: Observation vs. Inpatients.](#)

MDRO Data Analysis:

All event and summary (denominator) data that are entered into NHSN can be analyzed. After a user generates analysis datasets in the application, all data entered for the facility up until that time are made available in the analysis reports. The data in NHSN can be visualized and analyzed in various ways. For example, descriptive analysis reports for numerator (LabID Events) and denominator (for example, patient days, admissions) data, such as line lists, frequency tables, and bar and pie charts are available. In addition, measures of MDRO incidence and prevalence are available in rate tables and SIR reports.

Categorizing MDRO LabID Events

Based on data provided on the LabID Event form, each event will be categorized by NHSN. Refer to the “Onset” variable in the NHSN Line List. Onset is assigned based on the location of specimen collection, the date admitted to facility, and date specimen collected, as applicable.

- **Community-Onset (CO):** LabID Event specimen collected in an outpatient location or an inpatient location less than or equal to 3 days after admission to the facility (specifically, days 1, 2, or 3 of admission).
- **Healthcare Facility-Onset (HO):** LabID Event specimen collected more than 3 days after admission to the facility (specifically, on or after day 4). Thus, all HO LabID Events will have occurred more than 48 hours after admission.

Rate Tables

Rate tables are available for each organism in the MDRO Module. Various prevalence and incidence rates can be calculated at the month-level or higher.

Note: Incomplete records in NHSN will trigger an “Alert” on the facility’s homepage. All records identified by an “Alert” will be excluded from the rate tables until the Alert is resolved.

The following section describes the various rates calculated for MDRO LabID event surveillance.

Note: FacWideIN MDRO rates utilize the FacWideIN denominators (patient days and admissions) reported for the facility minus admissions and patient days from inpatient rehabilitation facility (IRF) and inpatient psychiatric facility (IPF) locations with unique CCNs. This represents the patient days and admissions entered on Line 2 of the FacWideIN denominator form. For NHSN reporting purposes, IRFs/IPFs located within an acute care hospital (ACH) are recognized as an inpatient location for the ACH; therefore,

admissions/discharges from ACH to IRF/IPF and vice versa are considered ‘transfers’, specifically, the hospitalization is considered a ‘continuous’ stay for event reporting.

Proxy Measures for Exposure Burden of MDROs – All specimens:

Inpatient Reporting:

- Admission Prevalence Rate = Number of 1st LabID Events per patient per month identified less than or equal to 3 days after admission to the location (if monitoring by inpatient location), or the facility (if monitoring by overall facility-wide inpatient=FacWideIN) / Number of patient admissions to the location or facility x 100
- Location Percent Admission Prevalence that is Community-Onset = Number of Admission Prevalent LabID Events to a location that are CO / Total number Admission Prevalent LabID Events x 100
- Location Percent Admission Prevalence that is Healthcare Facility-Onset = Number of Admission Prevalent LabID Events to a location that are HO / Total number of Admission Prevalent LabID Events x 100
- Overall Patient Prevalence Rate = Number of 1st LabID Events per patient per month regardless of time spent in location (specifically prevalent + incident, if monitoring by inpatient location), or facility (specifically, CO + HO, if monitoring by overall facility-wide inpatient=FacWideIN) / Number of patient admissions to the location or facility x 100

Outpatient Reporting:

- Outpatient Prevalence Rate = Number of 1st LabID Events per patient per month for the location (if monitoring by outpatient location), or the facility (if monitoring by overall facility-wide outpatient = FacWideOUT) / Number of patient encounters for the location or facility x 100

Measures for MDRO Bloodstream Infection: Calculated when monitoring either *all specimens* or *blood specimens* only. **Note:** Except for certain locations (specifically, inpatient rehabilitation facilities, emergency departments, and 24-hour observation locations), the *blood specimens only* option can only be used at the FacWideIN and FacWideOUT levels.

Inpatient Reporting:

- MDRO Bloodstream Infection Admission Prevalence Rate = Number of all unique blood source LabID Events per patient per month identified less than or equal to 3 days after admission to the location (if monitoring by inpatient location), or facility (if monitoring by overall FacWideIN) / Number of patient admissions to the location or facility x 100
 - **Note:** For MRSA Bacteremia FacWideIN surveillance, this is the CO rate that is used in the risk adjustment calculations of the MRSA bacteremia SIR. The numerator excludes any event in which the patient had a prior positive event in the previous 14 days.

- MDRO Bloodstream Infection Incidence Rate = Number of all unique blood source LabID Events per patient per month identified more than 3 days after admission to the location (if monitoring by inpatient location), or facility (if monitoring by overall facility-wide inpatient=FacWideIN) / Number of patient admissions to the location or facility x 100
- MDRO Bloodstream Infection Incidence Density Rate = Number of all unique blood source LabID Events per patient per month identified more than 3 days after admission to the location (if monitoring by inpatient location), or facility (if monitoring by overall facility-wide inpatient=FacWideIN) / Number of patient days for the location or facility x 1,000
- MDRO Bloodstream Infection Overall Patient Prevalence Rate = Number of 1st Blood LabID Events per patient per month regardless of time spent in location (specifically, prevalent + incident, if monitoring by inpatient location), or facility (specifically, CO + HO, if monitoring by overall facility-wide inpatient=FacWideIN) / Number of patient admissions to the location or facility x 100

MRSA Bloodstream Reporting for CMS-certified Inpatient Rehabilitation Facilities (IRFs) mapped as units within a hospital:

- Inpatient MRSA Bacteremia Incidence Density Rate for IRF units: Number of all incident blood source MRSA LabID events identified > 3 days after location admission to an IRF unit and where the patient had no positive MRSA bacteremia LabID Events in the prior 14 days in any CMS-certified IRF unit / Total number of patient days for IRF unit(s) x 1,000

Outpatient Reporting:

- Combined MRSA Bloodstream Infection Outpatient Prevalence Rate for ED and 24 hour Observation Locations = Number of unique blood source MRSA LabID events identified in an ED or 24 hour observation location / Total patient encounters in ED and 24 hour observation location(s) x 100
 - Note: For MRSA Bacteremia FacWideIN surveillance, this outpatient rate is used in the risk adjustment calculations of the MRSA bacteremia SIR. The numerator excludes any event in which the patient had a prior positive event in the previous 14 days in an ED or 24-hour observation location.
- MDRO Bloodstream Infection Outpatient Prevalence Rate = Number of all unique blood source LabID Events per patient per month for the location (if monitoring by outpatient location), or the facility (if monitoring by overall facility-wide outpatient=FacWideOUT) / Number of patient encounters for the location or facility x 100

Measures for MDRO-CRE surveillance: The above incidence and prevalence rates are calculated separately for each species of CRE (specifically, *Klebsiella*, *E.coli*, and *Enterobacter*) as well as for all species combined. The following additional metric is available for CRE LabID event reporting:

Percent Positive for Carbapenemase: number CRE positive for carbapenemase / number CRE tested for carbapenemase x 100

Proxy Measures for MDRO Healthcare Acquisition:

- Overall MDRO Infection/Colonization Incidence Rate = Number of 1st LabID Events per patient per month among those with no documented prior evidence of previous infection or colonization with this specific organism type from a previously reported LabID Event, and identified more than 3 days after admission to the location (if monitoring by inpatient location), or facility (if monitoring by overall facility-wide inpatient=FacWideIN) / Number of patient admissions to the location or facility x 100
- Overall MDRO Infection/Colonization Incidence Density Rate = Number of 1st LabID Events per patient per month among those with no documented prior evidence of previous infection or colonization with this specific organism type from a previously reported LabID Event, and identified >3 days after admission to the location (if monitoring by inpatient location), or facility (if monitoring by overall facility-wide inpatient=FacWideIN) / Number of patient days for the location or facility x 1,000

MRSA Bacteremia LabID Event SIR Reports

SIRs are only available for FacWideIN surveillance of MRSA bacteremia and *C. difficile*. Unit-specific SIRs are not available. The section below is specific to the MRSA SIR. Information about the *C. difficile* SIR is available on [page 29](#).

The standardized infection ratio (SIR) is calculated by dividing the number of observed events by the number of predicted events. The number of predicted events is calculated using probabilities estimated from negative binomial models constructed from 2015 NHSN data, which represents the baseline population. P-values and 95% confidence intervals are calculated in NHSN using a mid-P Exact Test to provide a statistical comparison between the number of observed events and the number of predicted events. In the NHSN application, the number of predicted events is referred to as “numPred”. The SIR will be calculated only if the number of predicted events (numPred) is greater than or equal to 1 to help enforce a minimum precision criterion.

Note: Incomplete records in NHSN will trigger an “Alert” on the facility’s homepage. All records identified by an “Alert” will be excluded from the SIRs until the Alert is resolved.

Separate MRSA SIR reports exist in NHSN for each facility type:

For acute care hospitals (ACHs), critical access hospitals (CAHs), long-term acute care hospitals (LTACHs), and PPS-exempt cancer hospitals (PCHs):

- *FacWideIN MRSA Bacteremia SIR* = Number of all unique blood source MRSA LabID Events identified in a non-IRF/IPF inpatient location more than 3 days after admission to the facility (specifically, HO MRSA blood events with no prior MRSA blood event for that patient in the previous 14 days) / Number of predicted HO MRSA blood LabID Events

- **Notes:** An HO MRSA bacteremia LabID event will *not* be counted in the SIR if the same patient had a prior positive MRSA bacteremia in the previous 14 days. This 14-day de-duplication crosses calendar months. More information about which events are counted in the numerator of the FacWideIN SIR can be found here: https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/mrsacdi_tips.pdf
- The acute care hospital MRSA SIR is only calculated on the quarter-level or higher, due to the requirements for risk adjustment*.
- **The MRSA SIR reports located in the CMS Reports folder for LTACHs will not contain any data beyond 2018 Q3. See page 31 of this protocol, and the June 2019 NHSN Newsletter, for more information.**

For free-standing inpatient rehabilitation facilities (IRFs):

- *FacWideIN MRSA Bacteremia SIR* = Number of all unique blood source MRSA LabID Events identified in a non-IPF location in which specimen collection occurred greater than 3 days after admission to the facility (specifically, HO MRSA blood events with no prior MRSA blood event for that patient in the previous 14 days) / Number of predicted HO MRSA blood LabID Events
 - **Notes:** An HO MRSA bacteremia LabID event will *not* be counted in the SIR if the same patient had a prior positive MRSA bacteremia in the previous 14 days. This 14-day de-duplication crosses calendar months. More information about which events are counted in the numerator of the FacWideIN SIR can be found here: https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/mrsacdi_tips.pdf
 - **The MRSA SIR reports located in the CMS Reports folder for IRFs will not contain any data beyond 2018 Q3. See page 33 of this protocol, and the June 2019 NHSN Newsletter, for more information.**

For IRF units located within a hospital:

- *MRSA Bacteremia SIR for IRF Units* = Number of all unique blood source MRSA LabID Events identified more than 3 days after location admission to the IRF unit and where the patient had no positive MRSA bacteremia LabID Event in the prior 14 days in any CMS-certified IRF unit / Number of predicted MRSA blood LabID Events in the IRF unit(s)
 - **Notes:** A MRSA bacteremia LabID event from the IRF unit will *not* be counted in the SIR if the same patient had a prior positive MRSA bacteremia in the previous 14 days in an IRF unit. This 14-day de-duplication crosses calendar months. Data from all IRF Units within the hospital are combined. More information about which events are counted in the numerator of the IRF Unit SIR can be found here: https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/mrsacdi_tips.pdf
 - **The MRSA SIR reports located in the CMS Reports folder for IRFs will not contain any data beyond 2018 Q3. See page 33 of this protocol, and the June 2019 NHSN Newsletter, for more information.**

The CMS IRFQR and LTCHQR Programs no longer requires submission of data for MRSA bacteremia starting with 2018 Q4 data. However, IRFs and LTACHs may still be required to report MRSA bacteremia data in response to a state or local reporting mandate, or may choose to continue this surveillance

voluntarily. The SIR reports located in the general MDRO/CDI – LabID Event analysis folder will contain all data reported, beyond 2018 Q3.

*For more information on the SIR, its methodology, and the MRSA and/or CDI parameter estimates, please see the SIR guide: <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sir-guide.pdf>.

NHSN Group Analysis:

NHSN Group Users can perform the same analysis as facility level users in NHSN. A few helpful tools in NHSN for groups are listed in the resources below. These tools are guides on how to start and join a Group; how to create a template to request data from facilities; how to determine the level of access granted by the facility following the previous steps, and how to analyze the facilities data.

Group Analysis Resources:

NHSN Group Users Page: <https://www.cdc.gov/nhsn/group-users/index.html>

Group User's Guide to the Membership Rights Report: <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/GroupAnalysisWebinar.pdf>

Group User's Guide to the Line Listing- Participation Alerts: <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/group-alerts.pdf>

Additional Analysis Resources

- CMS reporting resources (checklists, etc.): <https://www.cdc.gov/nhsn/cms/index.html>
- Keys to Success with NHSN Data: <https://www.cdc.gov/nhsn/ps-analysis-resources/keys-to-success.html>
- NHSN Training Website: <https://www.cdc.gov/nhsn/training/index.html>
- NHSN Analysis Resources: <https://www.cdc.gov/nhsn/ps-analysis-resources/index.html>

1B: *Clostridioides difficile* (*C. difficile*) LabID Event Reporting

Methodology: Facilities may choose to monitor *C. difficile* where *C. difficile* testing in the laboratory is performed routinely only on unformed (specifically, conforming to the shape of the container) stool samples. *C. difficile* LabID events may be monitored from all available inpatient locations, emergency departments and 24 hour observation locations as well as all available affiliated outpatient locations where care is provided to patients post discharge or prior to admission (for example, outpatient clinics and/or physician offices using the same patient identification system for the patient as the admitting facility).

Settings: *C. difficile* LabID Event reporting can occur in any location: inpatient or outpatient. Surveillance will NOT be performed in NICU, SCN, babies in LDRP, well-baby nurseries, or well-baby clinics. If LDRP locations are being monitored, baby counts must be removed when compiling total facility counts.

Requirements: All *C. difficile* test results are evaluated using the algorithm in Figure 3.

Facilities must choose one or more of the reporting choices listed in Table 3 below and report data accordingly.

Figure 3. *C. difficile* Test Result Algorithm for Laboratory Identified (LabID) Events

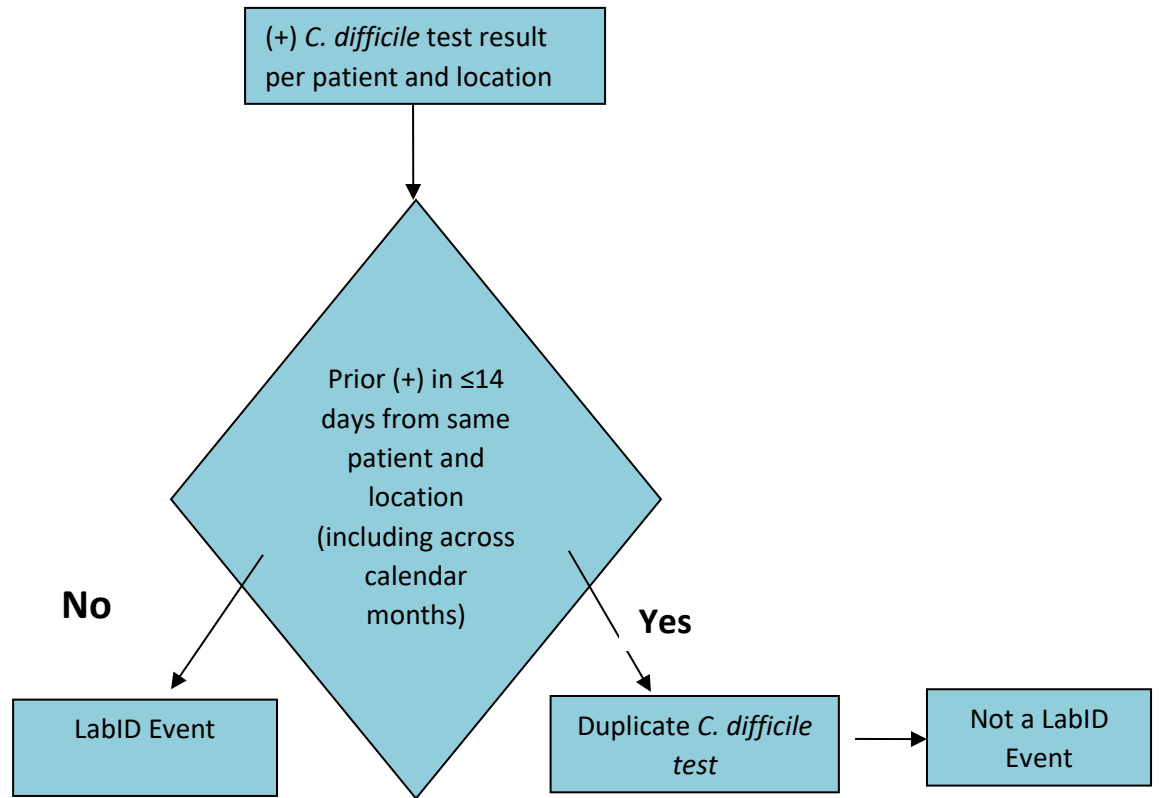


Table 3: Reporting Options for *C. difficile* LabID Event

Method	Numerator Data Reporting by Location	Denominator Data Reporting
Facility-wide by location	Enter each CDiff LabID Event reported by location	Report <u>separate</u> denominators for each location in the facility as specified in the NHSN Monthly Reporting Plan
Selected locations	Enter each CDiff LabID Event reported by selected locations	Report <u>separate</u> denominators for selected locations monitored as specified in the NHSN Monthly Reporting Plan
Overall Facility-wide Inpatient (FacWideIN)	Enter each CDiff LabID Event from all inpatient locations <u>AND</u> separately for outpatient emergency department and 24-hour observation location(s)	Report <u>total</u> denominator data for all inpatient locations physically located in the hospital (for example, total number of admissions and total number of patient days), minus inpatient rehabilitation facility and inpatient psychiatric facility locations with unique CCNs <ul style="list-style-type: none"> • Separate denominators should be entered to capture encounters for each mapped outpatient emergency department and 24-hour observation location(s)
Overall Facility-wide Outpatient (FacWideOUT)	Enter each CDiff LabID Event from all affiliated outpatient locations separately	Report total denominator data for all outpatient locations (for example, total number of encounters including ED and OBS encounters in addition to other outpatient locations)

Note: Facilities must indicate each reporting choice chosen for the calendar month on the *Patient Safety Monthly Reporting Plan* (CDC [57.106](#)).

Definitions:

CD-positive laboratory assay:

A positive laboratory test result for *C. difficile* toxin A and/or B, (includes molecular assays [PCR] and/or toxin assays) tested on an unformed stool specimen (must conform to the container)




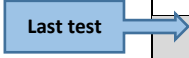
OR

A toxin-producing *C. difficile* organism detected by culture or other laboratory means performed on an unformed stool sample (must conform to the container).

Note:

- When using a multi-step testing algorithm for CDI on the same unformed stool specimen, the finding of the last test performed on the specimen that is documented in the patient medical record will determine if the CDI positive laboratory assay definition is met.

Examples of Multi-step Testing Interpretations (does not consider prior positives):

Multi-step Testing Same Specimen	Testing Step	Testing Method	Documented Findings	Eligible LabID Event?
Example A 	Test 1	NAAT	Negative	Yes
	Test 2	GDH	Positive	
	Test 3	EIA	Positive	
Example B 	Test 1	NAAT	Positive	No
	Test 2	GDH	Positive	
	Test 3	EIA	Negative	
Example C 	Test 1	GDH	Positive	Yes
	Test 2	EIA	Negative	
	Test 3	NAAT	Positive	
Example D 	Test 1	GDH	Positive	No
	Test 2	EIA	Positive	
	Test 3	NAAT	Negative	

Duplicate *C. difficile*-positive test:

- Any *C. difficile* toxin-positive laboratory result from the same patient and location, following a previous *C. difficile* toxin-positive laboratory result within 14 days even across calendar months and readmissions to the same facility location.
- There should be 14 days with no *C. difficile* toxin-positive laboratory result for the patient and specific location before another *C. difficile* LabID Event is entered into NHSN for the patient and location.
- The date of specimen collection is considered Day 1.

Note: NHSN recommends each facility keep an internal line listing log of all positive specimens as a reference in LabID event reporting to ensure the 14-day rule is applied correctly. The 14-day rule for LabID event reporting is specific to the location and resets each time a patient transfers to a new inpatient location.

EXAMPLE: On January 1, an ICU patient has a *C. difficile* toxin-positive laboratory result which **is** entered into NHSN. On January 4, while in the same location (ICU), the same patient has another positive *C. difficile* toxin-positive laboratory result which is **not** entered into NHSN because it is a duplicate for the patient and location (has not been more than 14 days since the original *C. difficile* toxin-positive laboratory result while in the same location). On January 16, while in the same location (ICU), the same patient has another *C. difficile* toxin-positive laboratory result. While it has been more than 14 days since the initial positive *C. difficile* toxin-positive laboratory result was entered into NHSN (January 1) for the same patient and same location, it has not been more than 14 days since the patient's most recent *C. difficile* toxin-positive laboratory result (January 4) while in the same location. Therefore, the *C. difficile* toxin-positive laboratory result for January 16 is **not** entered into NHSN. On January 31, the patient has another *C. difficile* toxin-positive laboratory result while in the same location (ICU). Since it has been more than 14 days since the patient's most recent *C. difficile* toxin-positive laboratory result (January 16) while in the same location, this event **is** entered into NHSN.

Laboratory-Identified (LabID) Event: All non-duplicate *C. difficile* toxin-positive laboratory results. Even if reporting at the facility-wide level (FacWideIN or FacWideOUT), all reporting must follow rules by location for reporting.

Notes:

- A [LabID Event calculator](#) is available on the NHSN website to help with data entry decision making around the location specific 14-day rule.
- If a facility is participating in FacWideIN surveillance and reporting, the facility must also conduct separate location-specific surveillance in all outpatient emergency department and 24-hour observation locations. This means LabID Events for the same organism and LabID Event type must be reported from these locations even if the patient is not subsequently admitted to an inpatient location during the same encounter.
- All emergency department and 24-hour observation locations must be identified and mapped as outpatient locations within NHSN. For more information about mapping locations, see [Chapter 15](#) in the NHSN manual.

Reporting Instructions: All *C. difficile* LabID Events must be reported by location and separately and independently of Events reported using the *C. difficile* Infection Surveillance reporting option and/or HAI reporting.

Numerator: Data will be reported using the [Laboratory-Identified MDRO or CDI Event form](#) (CDC 57.128).

Denominator Data: Patient days and admissions (for inpatient locations), and encounters (for outpatient locations) are reported using the [MDRO and CDI Monthly Denominator Form](#) (CDC 57.127).

Reporting FacWideIN Denominators:

Line 1: Facilities will enter total patient days and total patient admissions to reflect all inpatient locations physically located in the hospital.

Line 2: The second line of denominator data entry should reflect all inpatient locations minus inpatient rehabilitation units (IRF units) and inpatient psychiatric units (IPF units) with a separate CCN.

Line 3: The third line of denominator data entry should reflect all inpatient locations minus inpatient rehabilitation units (IRF units) and inpatient psychiatric units (IPF units) with a separate CCN minus baby-based locations (for example, NICU, well baby nursery, etc.). The totals should not include other facility types within the hospital that are enrolled and reporting separately (for example, LTAC). See [Table of Instructions](#) for completion instructions.

Note: For Acute Care Hospitals completing FacWideIN surveillance, additional guidance on denominator reporting is available here: <https://www.cdc.gov/nhsn/pdfs/cms/acutecare-mrsa-cdi-labiddominator-reporting.pdf>

Primary CDI Test Method:

The response for the primary test type used to identify CDI should reflect the testing method used on the majority (more than 50%) of stool specimens tested during the quarter. The primary test type is reported on the FacWideIN and CMS-certified IRF unit denominator forms on the third month of each quarter (March, June, September, and December). See below for a list of hypothetical scenarios on how to determine the accurate CDI test method to report to NHSN.

Example 1: At Facility A, the laboratory used either NAAT or EIA when testing specimens for CDI during the quarter. The decision to use either NAAT or EIA for a particular specimen was made based on pre-determined criteria set by the facility. For all specimens tested during this quarter, the facility noted that NAAT was used in 75% of specimens tested. EIA was used in 25% of specimens tested. Regardless of testing selection criteria, the appropriate response for primary test type for this quarter is NAAT because NAAT was used for the majority of specimens.

Example 2: At Facility B, the laboratory uses “GDH plus EIA for toxin, followed by NAAT for discrepant results” as the standard testing process for specimens during the quarter. In a single quarter, GDH plus EIA was used in 55% of specimens tested. The remaining specimens (45%) had

discrepant results between GDH and EIA, and thus were reflexed to NAAT. The appropriate response for the primary test type for this quarter is “GDH antigen plus EIA for toxin” since the majority of specimens were *not* tested by NAAT.

FacWideOUT and ED/24-hour Observation locations reporting: Denominator data is provided using encounters. An encounter is defined as a patient visit to an outpatient location for care. Each visit counts as one encounter.

For NHSN reporting purposes, the ‘date admitted to the facility’ is HD 1. When determining a patient’s admission dates to both the facility and specific inpatient location, the NHSN user must take into account any days spent in an inpatient location as these days contribute to exposure risk. NHSN defines an inpatient as any patient cared for/housed on an inpatient location. Local status may differ from NHSN definition; all days spent in an inpatient unit, regardless of local admission status and/or billing status are included in the counts of admissions and inpatient days for the facility and specific location; for NHSN reporting purposes, the date admitted to the facility is the calendar date that the patient physically locates to an inpatient location.

For further information on counting patient days and admissions, see [Appendix 2: Determining Patient Days for Summary Data Collection: Observation vs. Inpatients](#)

C. Difficile (CDI) Data Analysis:

All CDI event and summary (denominator) data that are entered into NHSN can be analyzed. After a user generates analysis datasets in the application, all data entered for their facility up until that time are made available in the analysis reports. The data in NHSN can be visualized and analyzed in various ways. For example, descriptive analysis reports for numerator (CDI Events) and denominator (for example, patient days, admissions) data, such as line lists, frequency tables, and bar and pie charts are available. In addition, measures of CDI incidence and prevalence are available in rate tables and SIR reports.

CDI Event Categorization

Based on data provided on the CDI LabID Event form, each event will be categorized by NHSN. Refer to the “Onset” variable in the NHSN Line List. Onset is assigned based on the location of specimen collection, the date admitted to facility, date of specimen collection, and previous discharge, as applicable.

- Community-Onset (CO): LabID Event meeting one of the following criteria:
 - A) collected in an outpatient location in which the patient was not previously discharged from an inpatient location within the same facility less than or equal to 28 days prior to current date of specimen collection
 - B) collected in an inpatient location less than or equal to 3 days after admission to the facility (specifically, days 1, 2, or 3 of admission).
- Community-Onset Healthcare Facility-Associated (CO-HCFA): CO LabID Event collected from an inpatient or an outpatient location from a patient who was discharged from the facility less than

or equal to 28 days prior to current date of stool specimen collection. The previous discharge must have been from an inpatient location within the same facility (in other words, an outpatient visit does not qualify as “admitted”, and therefore is not used to set the timeline for CO-HCFA).

- **Healthcare Facility-Onset (HO):** LabID Event collected from an inpatient location more than 3 days after admission to the facility (specifically, on or after day 4).

In addition to the onset categorization, CDI LabID Events are further categorized by NHSN as Incident or Recurrent. Refer to the the ‘cdiAssay’ variable in the NHSN Line List.

- **Incident CDI LabID Event:** Any CDI LabID Event from a specimen obtained more than 56 days after the most recent CDI LabID Event (or with no previous CDI LabID Event documented) for that patient. Note: the date of first specimen collection is considered day 1.
- **Recurrent CDI LabID Event:** Any CDI LabID Event from a specimen obtained more than 14 days and less than or equal to 56 days after the most recent CDI LabID Event for that patient. Note: the date of first specimen collection is considered day 1.
- CdiAssay will be unassigned, or “blank”, for any CDI LabID event that was collected less than or equal to 14 days after the most recent CDI LabID event for that patient.

Note: Beginning in 2015, for FacWideIN surveillance, cdiAssay is assigned based on Events from inpatient locations, emergency departments, and 24-hour observation locations. For data reported prior to 2015, cdiAssay was assigned based on events from within the same setting only. For example, in 2014, if performing both FacWideIN and FacWideOUT surveillance, cdiAssay of inpatient CDI LabID Events was determined by a review of previously-entered CDI LabID Events from inpatient locations only.

Rate Tables

FacWideIN and location-specific rate tables are available for CDI. Various prevalence and incidence rates can be calculated at the month-level or higher.

Note: Incomplete records in NHSN will trigger an “Alert” on the facility’s homepage. All records identified by an “Alert” will be excluded from the rate tables until the Alert is resolved.

Note: FacWideIN CDI rates utilize the FacWideIN denominators (patient days and admissions) reported for the facility minus admissions and patient days from the following: IRF and IPF locations with unique CCNs separate from the reporting facility, neonatal ICUs, special care nurseries, and well-baby locations. This represents the patient days and admissions entered on Line 3 of the FacWideIN denominator form. For NHSN reporting purposes, IRFs/IPFs located within an acute care hospital (ACH) are recognized as an inpatient location for the ACH; therefore, admissions/discharges from ACH to IRF/IPF and vice versa are considered ‘transfers’, specifically, the hospitalization is considered a ‘continuous’ stay for event reporting.

The following section describes the various measures calculated for CDI LabID event surveillance.

CDI Prevalence Rates:

- Inpatient Admission Prevalence Rate = Number of non-duplicate CDI LabID Events per patient per month identified less than or equal to 3 days after admission to the location (if monitoring by inpatient location), or facility (if monitoring by overall facility-wide inpatient=FacWideIN) (includes CO and CO-HCFA events) / Number of patient admissions to the location or facility x 100
 - Note: See “CDIF_admPrevRate” in the NHSN Rate Tables.
- Community-Onset Admission Prevalence Rate = Number of inpatient CDI LabID events that are CO, per month, in the facility / Number of patient admissions to the facility x 100
 - Note: See “CDI_COprevRate” in the NHSN Rate Tables. This calculation is only accurate for overall FacWideIN reporting. For CDI FacWideIN surveillance, this is the CO rate that is used in the risk adjustment calculations of the CDI SIR.
- Inpatient Percent Admission Prevalence that is Community-Onset = Number of Admission Prevalent LabID Events to a location that are CO / Total number Admission Prevalent LabID Events x 100
 - Note: See “CDIF_pctAdmPrevCO” in the NHSN Rate Tables. This percentage is available for unit-specific CDI surveillance and is calculated separately for each applicable unit. The numerator in this formula does not include CDI LabID events labeled as CO-HCFA.
- Inpatient Percent Admission Prevalence that is Community-Onset Healthcare Facility-Associated = Number of Admission Prevalent LabID Events to a location that are CO-HCFA / Total number Admission Prevalent LabID Events x 10
 - Note: See “CDIF_pctAdmPrevCOHCFA”. This percentage is available for unit-specific CDI surveillance and is calculated separately for each applicable unit.
- Inpatient Percent Admission Prevalence that is Healthcare Facility-Onset = Number of Admission Prevalent LabID Events to a location that are HO / Total number of Admission Prevalent LabID Events x 100
 - Note: See “CDIF_pctAdmPrevHO” in the NHSN Rate Tables. This percentage is available for unit-specific CDI surveillance and is calculated separately for each applicable unit.
- Inpatient Overall Patient Prevalence Rate = Number of 1st CDI LabID Events per patient per month regardless of time spent in location (specifically, prevalent + incident, if monitoring by inpatient location), or facility (specifically, CO + CO-HCFA + HO, if monitoring by FacWideIN) / Number of patient admissions to the location or facility x 100
 - Note: See “CDIF_prevRate” in the NHSN Rate Tables.
- Outpatient Prevalence Rate = Number of all non-duplicate CDI LabID Events per patient per month for the location (if monitoring by outpatient location), or the facility (if monitoring by

overall facility-wide outpatient= $\text{FacWideOUT} / \text{Number of patient encounters for the location or facility} \times 100$

- Combined Outpatient Prevalence Rate for ED and 24 hour Observation Locations = Total number of unique CO CDI LabID events identified in an ED or 24 hour observation location / Total patient encounters in ED and 24 hour observation location(s) x 100
 - Note: The numerator excludes any event in which the patient had a prior positive CDI event in the previous 14 days in an ED or 24-hour observation location. Date of first specimen collection is considered “Day 1”.

CDI Incidence Rates

- Inpatient Location CDI Incidence Rate = Number of Incident CDI LabID Events per month identified more than 3 days after admission to the location / Number of patient days for the location x 10,000
 - Note: See “CDIF_incRate” in the NHSN Rate Tables. This rate is only available for location-specific CDI surveillance.
- Inpatient Facility CDI Healthcare Facility-Onset Incidence Rate = Number of all Incident HO CDI LabID Events per month in the facility / Number of patient days for the facility x 10,000
 - Note: See “CDIF_HOIncRate” in the NHSN Rate Tables. (This calculation is only available for FacWideIN reporting.)
- Inpatient Facility CDI Combined Incidence Rate = Number of all Incident HO and CO-HCFA CDI LabID Events per month in the facility / Number of patient days for the facility x 10,000
 - Note: See “CDIF_facIncRate” in the NHSN Rate Tables. (This calculation is only available for FacWideIN reporting.)
- Inpatient CDI Incidence Density Rate for IRF units: Number of all incident CDI LabID events identified more than 3 days after location admission to an IRF unit and where the patient had no positive CDI LabID events in the prior 14 days in any CMS-certified IRF unit / Total number of patient days for IRF units x 10,000
 - Note: See “CDIF_IRFIncRate” in the NHSN Rate Tables. This rate is only available for CMS-certified IRF units located within an acute care or critical access hospital

CDI LabID Event SIR Reports

SIRs are only available for FacWideIN surveillance of MRSA bacteremia and *C. difficile*. Unit-specific SIRs are not available. The section below is specific to the CDI SIR. For more information about the MRSA SIR, refer to [page 20](#).

The standardized infection ratio (SIR) is calculated by dividing the number of observed events by the number of predicted events. The number of predicted events is calculated using probabilities estimated from negative binomial models constructed from 2015 NHSN data, which represents the baseline population. P-values and 95% confidence intervals are calculated in NHSN using a mid-P Exact Test to provide a statistical comparison between the number of observed events and the number of predicted events. In the NHSN application, the number of predicted events is referred to as “numPred”. The SIR will be calculated only if the number of predicted events (numPred) is greater than or equal to 1 to help enforce a minimum precision criterion. Note: Incomplete records in NHSN will trigger an “Alert” on the facility’s homepage. All records identified by an “Alert” will be excluded from the SIRs until the Alert is resolved.

The CDI SIRs are only calculated at the quarter level or higher in order to account for the quarterly-reporting of CDI test type. Note that SIRs will not be calculated for a quarter until the CDI test type has been reported. The risk adjustment model for some facility types also utilizes a quarterly community-onset prevalence rate, which requires that all 3 months of data entry are complete in NHSN before an SIR is calculated. When the FacWideIN or IRF Unit MDRO denominator form is completed for the last month of each quarter, users are asked to report the primary type of test that was used to identify CDI in the hospital for that quarter. That test type is then used in the calculation of the FacWideIN or IRF Unit CDI SIR for that quarter. The test type selected should reflect the testing methodology used for clinical decision making.

Separate CDI SIR reports exist in NHSN for each facility type:

For acute care hospitals (ACHs), critical access hospitals (CAHs), long-term acute care hospitals (LTACHs), and PPS-exempt cancer hospitals (PCHs):

- *FacWideIN CDI SIR* = Number of all incident CDI LabID Events identified in a non-IRF/IPF location more than 3 days after admission to the facility) / Number of predicted Incident HO CDI LabID Events
 - Note: More information about which events are counted in the FacWideIN CDI SIR can be found here: https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/mrsacdi_tips.pdf

For free-standing Inpatient Rehabilitation Facilities:

- *FacWideIN CDI SIR* = Number of all incident CDI LabID Events identified in a non-IPF location more than 3 days after admission to the facility/ Number of predicted Incident HO CDI LabID Events
 - **Note:** More information about which events are counted in the FacWideIN CDI SIR can be found here: https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/mrsacdi_tips.pdf

For CMS-certified Inpatient Rehabilitation Facility Units located within a hospital:

IRF units within a hospital that participate in the CMS Inpatient Rehabilitation Facility Quality Reporting Program will be given a CDI SIR separate from the FacWideIN SIR for the acute care hospital. The SIR will be sent to CMS on behalf of IRF units participating in the CMS IRF Quality Reporting Program.

- *CDI SIR for IRF units:* Number of all CDI LabID events identified more than 3 days after location admission to an IRF unit and where the patient had no positive CDI LabID events in the prior 14 days in any CMS-certified IRF unit / Number of predicted CDI LabID events in the IRF unit(s)
 - **Note:** This SIR is only available for CMS-certified IRF units located within an acute care or critical access hospital. The CDI SIR for IRF Units is only calculated at the quarter level or higher in order to account for the quarterly-reporting of CDI test type. Note that SIRs will not be calculated for a quarter until the CDI test type has been reported. When the IRF Unit's MDRO denominator form is completed for the last month of each quarter, users are asked to report the primary type of test that was used to identify CDI for that quarter. That test type is then used in the calculation of the IRF Unit's CDI SIR for that quarter. More information about which events are counted in the IRF Unit's CDI SIR can be found here: https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/mrsacdi_tips.pdf

*For more information on the SIR, its methodology, and the MRSA and/or CDI parameter estimates, please see the SIR guide: <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sir-guide.pdf>.

NHSN Group Analysis:

NHSN Group Users can perform the same analysis as facility level users in NHSN. A few helpful tools in NHSN for groups are listed in the resources below. These tools are guides on how to start and join a Group; how to create a template to request data from facilities; how to determine the level of access granted by the facility following the previous steps, and how to analyze the facilities data.

Group Analysis Resources:

NHSN Group Users Page: <https://www.cdc.gov/nhsn/group-users/index.html>

Group User's Guide to the Membership Rights Report: <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/GroupAnalysisWebinar.pdf>

Group User's Guide to the Line Listing- Participation Alerts: <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/group-alerts.pdf>

Additional Analysis Resources

- CMS reporting resources (checklists, etc.): <https://www.cdc.gov/nhsn/cms/index.html>
- Keys to Success with NHSN Data: <https://www.cdc.gov/nhsn/ps-analysis-resources/keys-to-success.html>
- NHSN Training Website: <https://www.cdc.gov/nhsn/training/index.html>
- NHSN Analysis Resources: <https://www.cdc.gov/nhsn/ps-analysis-resources/index.html>

Table 4: Measures Delivered to CMS For Facilities Participating in Quality Reporting Programs MRSA Bloodstream Infection and *C. difficile* LabID Events

<u>Facility Type</u>	<u>CMS Quality Reporting Program</u>	<u>MRSA Bloodstream Infection LabID Event Measure Sent to CMS</u>	<u><i>C. difficile</i> LabID Event Measure Sent to CMS</u>
General Acute Care Hospitals	Inpatient Quality Reporting Program	FacWideIN MRSA Bacteremia SIR	FacWideIN CDI SIR
Long Term Care Hospitals (referred to as Long Term Acute Care Hospitals in NHSN)	Long Term Care Hospital Quality Reporting Program	NONE*	FacWideIN CDI SIR
Inpatient Rehabilitation Facilities (IRFs)	Inpatient Rehabilitation Facility Quality Reporting Program	IRF units within a hospital: NONE*	IRF units within a hospital: CDI SIR for IRF Units
		Free-standing IRFs: NONE*	Free-standing IRFs: FacWideIN CDI SIR
PPS-Exempt Cancer Hospitals (PCHs)	PPS-Exempt Cancer Hospital Quality Reporting Program	FacWideIN MRSA Bacteremia SIR	FacWideIN CDI SIR

*Starting with 2018 Q4 data, CMS removed the requirement for IRFs and LTACs to report MRSA bacteremia LabID Events as part of the CMS Quality Reporting Program. However, MRSA bacteremia LabID Event analysis reports, including the SIR, are still available to all facilities.

Infection Surveillance Reporting

Introduction: The Infection Surveillance reporting option for MDRO and *C. difficile* infections enables users to utilize the CDC/NHSN healthcare-associated infections definitions for identifying and reporting infections associated with MDROs and/or *C. difficile*. Surveillance must occur from at least one patient care area and requires active, patient-based, prospective surveillance of the chosen MDRO(s) and/or *C. difficile* infections (CDIs) by a trained Infection Preventionist (IP). This means that the IP shall seek to confirm and classify infections caused by the chosen MDRO(s) and/or *C. difficile* for monitoring during a patient's stay in at least one patient care location during the surveillance period. These data will enhance the ability of NHSN to aggregate national data on MDROs and CDIs.

2A. MDRO Infection Surveillance Reporting

Methodology: Facilities may choose to monitor one or more of the following MDROs: MRSA, MRSA and MSSA, VRE, CephR- *Klebsiella*, CRE (CRE-*Klebsiella*, CRE-*E. coli*, and CRE-*Enterobacter*), and multidrug-resistant *Acinetobacter* spp. (See definitions in Section I, Option 1A). For *S. aureus*, both the resistant (MRSA) and the susceptible (MSSA) phenotypes can be tracked to provide concurrent measures of the susceptible pathogens as a comparison to those of the resistant pathogens in a setting of active MRSA prevention efforts. **Note:** No Active Surveillance Culture/Testing (ASC/AST) results are to be included in this reporting of individual results.

Settings: Infection Surveillance can occur in any inpatient location where such infections may be identified and where denominator data can be collected, which may include critical/intensive care units (ICU), specialty care areas (SCA), neonatal units, step-down units, wards, and chronic care units. In Labor, Delivery, Recovery, & Post-partum (LDRP) locations, where mom and babies are housed together, users must count both mom and baby in the denominator. If moms only are being counted, then multiply moms times two to include both mom and baby in denominators.

Requirements: Surveillance for all types of NHSN-defined healthcare-associated infections (HAIs), regardless if HAI is included in “in-plan” or “off- plan” surveillance, of the MDRO selected for monitoring in at least one location in the healthcare facility as indicated in the [Patient Safety Monthly Reporting Plan \(CDC 57.106\)](#).

Definitions: MDROs included in this module are defined in Section I, Option 1A. Refer to [CDC/NHSN Surveillance Definitions for Specific Types of Infections](#) for infection site criteria.

Location of Attribution and Transfer Rule applies – See Identifying HAIs in NHSN chapter ([Chapter 2](#)).

Reporting Instructions: If participating in MDRO/CDI Infection Surveillance and/or LabID Event Reporting, along with the reporting of HAIs through the Device-Associated and/or Procedure-Associated Modules, see [Appendix 1: Guidance for Handling MDRO/CDI Module Infection Surveillance and LabID Event Reporting When Also Following Other NHSN Modules](#), for instructions on unique reporting scenarios.

Numerator Data: Number of healthcare-associated infections, by MDRO type. Infections are reported on the appropriate NHSN forms: *Primary Bloodstream Infection, Pneumonia, Ventilator-Associated Event, Urinary Tract Infection, Surgical Site Infection, or MDRO or CDI Infection Event (CDC 57.108, 57.111, 57.112, 57.114, 57.120, and 57.126, respectively)*. See the *Table of Instructions*, located in each of the applicable chapters, for completion instructions.

Denominator Data: Number of patient days and admissions. Patient days and admissions are reported by location using the [MDRO and CDI Monthly Denominator Form](#) (CDC 57.127). See [Table of Instructions](#) for completion instructions.

Data Analysis: Data are stratified by time (for example, month, quarter, etc.) and patient care location.

MDRO Infection Incidence Rate = Number of HAIs by MDRO type / Number of patient days x 1000

2B. *Clostridioides difficile* Infection Surveillance Reporting

Methodology: *C. difficile* Infection (CDI) Surveillance, reporting on all NHSN-defined healthcare-associated CDIs from at least one patient care area, is one reporting option for *C. difficile* (part of your facility's Monthly Reporting Plan). These data will enhance the ability of NHSN to aggregate national data on CDIs.

Settings: Infection Surveillance will occur in any inpatient location where denominator data can be collected, which may include critical/intensive care units (ICU), specialty care areas (SCA), step-down units, wards, and chronic care units. Surveillance will NOT be performed in Neonatal Intensive Care Units (NICU), Specialty Care Nurseries (SCN), babies in LDRP, or well-baby nurseries. If LDRP locations are being monitored, baby counts must be removed.

Requirements: Surveillance for CDI must be performed in at least one location in the healthcare institution as indicated in the [Patient Safety Monthly Reporting Plan](#) (CDC 57.106).

Definitions: Report all healthcare-associated infections where *C. difficile*, identified by a positive toxin result including toxin producing gene [PCR]), is the associated pathogen, according to the Repeat Infection Timeframe (RIT) rule for HAIs (See [Identifying HAIs in NHSN chapter](#)). Refer to specific definitions in [CDC/NHSN Surveillance Definitions for Specific Types of Infections](#) chapter for *C. difficile* gastrointestinal system infection (GI-CDI).

HAI cases of CDI that meet criteria for a healthcare-associated infection should be reported as *Clostridioides difficile* gastrointestinal system infection (GI-CDI). Report the pathogen as *C. difficile* on the [MDRO or CDI Infection Event form](#) (CDC 57.126). If the patient develops GI-CDI, and GI-GE or GI-GIT, report the GI-CDI and the GI-GE or GI-GIT only if additional enteric organisms are identified and applicable criteria are met. **Note:** CDI laboratory-identified event (LabID Event) categorizations (for example, recurrent CDI assay, incident CDI assay, healthcare facility-onset, community-onset, community-onset healthcare facility-associated) do **not** apply to HAIs including *C. difficile* associated gastrointestinal system infections (GI-CDI). Each new GI-CDI must be reported according to the HAI rules outlined in [Identifying HAIs in NHSN](#) chapter 2.

CDI Complications: CDI in a case patient within 30 days after CDI symptom onset with at least one of the following:

1. Admission to an intensive care unit for complications associated with CDI (for example: for shock that requires vasopressor therapy);
2. Surgery (for example, colectomy) for toxic megacolon, perforation, or refractory colitis
AND/OR
3. Death caused by CDI within 30 days after symptom onset and occurring during the hospital admission.

Location of Attribution and Transfer Rule apply to Infection Surveillance – See [Identifying HAIs in NHSN](#) chapter.

Numerator Data: Number of healthcare-associated *C. difficile* infections. Infections are reported on the [MDRO or CDI Infection Event form](#) (CDC 57.126). See [Tables of Instructions](#) for completion instructions.

Denominator Data: Number of patient days and admissions by location are reported using the *MDRO and CDI Monthly Denominator Form* (CDC 57.127). See [Tables of Instructions](#) for completion instructions.

C. difficile Infections:

Numerator: The total number of HAI CDI cases identified during the surveillance month for a location.

Denominator: The total number of patient days and admissions during the surveillance month for a location.

Data Analysis: Data are stratified by time (for example, month, quarter, etc.) and by patient care location.

C. difficile Infection Incidence Rate = Number of HAI CDI cases / Number of patient days x **10,000**

Section II. Supplemental Reporting

1. Prevention Process Measures Surveillance

a. Monitoring Adherence to Hand Hygiene

Introduction: This option will allow facilities to monitor adherence to hand hygiene after a healthcare worker (HCW) has contact with a patient or inanimate objects in the immediate vicinity of the patient. Research studies have reported data suggesting that improved after-contact hand hygiene is associated with reduced MDRO transmission. While there are multiple opportunities for hand hygiene during patient care, for the purpose of this option, only hand hygiene after contact with a patient or inanimate objects in the immediate vicinity of the patient will be observed and reported. (<http://www.cdc.gov/handhygiene/>)

Settings: Surveillance will occur in any location: inpatient or outpatient.

Requirements: Surveillance for adherence to hand hygiene in at least one location in the healthcare institution for at least one calendar month as indicated in the [Patient Safety Monthly Reporting Plan](#) (CDC 57.106). This should be done in patient care locations also selected for Infection Surveillance or LabID Event reporting.

In participating patient care locations, perform at least 30 different unannounced observations after contact with patients for as many individual HCWs as possible. For example, try to observe all types of HCWs performing a variety of patient care tasks during the course of the month, not only nurses, or not only during catheter or wound care. No personal identifiers will be collected or reported.

Definitions:

Antiseptic handwash: Washing hands with water and soap or other detergents containing an antiseptic agent.

Antiseptic hand-rub: Applying an antiseptic hand-rub product to all surfaces of the hands to reduce the number of microorganisms present.

Hand hygiene: A general term that applies to either: handwashing, antiseptic hand wash, antiseptic hand rub, or surgical hand antisepsis.

Handwashing: Washing hands with plain (specifically, non-antimicrobial) soap and water.

Numerator: Hand Hygiene Performed = Total number of observed contacts during which a HCW touched either the patient or inanimate objects in the immediate vicinity of the patient and appropriate hand hygiene was performed.

Denominator: Hand Hygiene Indicated = Total number of observed contacts during which a HCW touched either the patient or inanimate objects in the immediate vicinity of the patient and therefore, appropriate hand hygiene was indicated.

Hand hygiene process measure data are reported using the *MDRO and CDI Monthly Denominator Form* (CDC 57.127). See Tables of Instructions for completion instructions.

Data Analysis: Data are stratified by time (for example, month, quarter, etc.) and patient care location.

Hand Hygiene Percent Adherence = Number of contacts for which hand hygiene was performed / Number of contacts for which hand hygiene was indicated x 100

b. Monitoring Adherence to Gown and Gloves Use as Part of Contact Precautions

Introduction: This option will allow facilities to monitor adherence to gown and gloves use when a HCW has contact with a patient or inanimate objects in the immediate vicinity of the patient, when that patient is on Transmission-based Contact Precautions. While numerous aspects of adherence to Contact Precautions could be monitored, this surveillance option is only focused on the use of gown and gloves. (http://www.cdc.gov/ncidod/dhqp/gl_isolation_contact.html)

Settings: Surveillance can occur in any of 4 types of inpatient locations: (1) intensive care units (ICU), (2) specialty care areas, (3) neonatal intensive care units (NICU), and (4) any other inpatient care location in the institution (for example, surgical wards).

Requirements: Surveillance for adherence to gown and gloves use in at least one location in the healthcare institution for at least 1 calendar month as indicated in the [Patient Safety Monthly Reporting Plan](#) (CDC 57.106). Ideally, this should be done in patient care locations also selected for Infection Surveillance or LabID Event reporting.

Among patients on Transmission-based Contact Precautions in participating patient care locations, perform at least 30 unannounced observations. A total of thirty different contacts must be observed monthly among HCWs of varied occupation types. For example, try to observe all types of HCWs performing a variety of patient care tasks during the course of the month, not only nurses, or not only during catheter or wound care. Both gown and gloves must be donned appropriately prior to contact for compliance. No personal identifiers will be collected or reported.

Definitions:

Gown and gloves use: In the context of Transmission-based Contact Precautions, the donning of both a gown and gloves prior to contact with a patient or inanimate objects in the immediate vicinity of the patient. Both a gown and gloves must be donned appropriately prior to contact for compliance.

Numerator: Gown and Gloves Used = Total number of observed contacts between a HCW and a patient or inanimate objects in the immediate vicinity of a patient on Transmission-based Contact Precautions for which gown and gloves had been donned appropriately prior to the contact.

Denominator: Gown and Gloves Indicated = Total number of observed contacts between a HCW and a

patient on Transmission-based Contact Precautions or inanimate objects in the immediate vicinity of the patient and therefore, gown and gloves were indicated.

Gown and gloves use process measure data are reported using the [MDRO and CDI Monthly Denominator Form](#) (CDC 57.127). See [Tables of Instructions](#) for completion instructions.

Data Analysis: Data are stratified by time (for example, month, quarter, etc.) and patient care location. *Gown and Glove Use Percent Adherence* = Number of contacts for which gown and gloves were used appropriately / Number of contacts for which gown and gloves were indicated x 100

c. Monitoring Adherence to Active Surveillance Testing

Introduction: This option will allow facilities to monitor adherence to active surveillance testing (AST) of MRSA and/or VRE, using culturing or other methods.

Settings: Surveillance will occur in any of 4 types of inpatient locations: (1) intensive care units (ICU), (2) specialty care areas, (3) neonatal intensive care units (NICU), and (4) any other inpatient care location in the institution (for example, surgical wards).

Requirements: Surveillance of AST adherence in at least one location in the healthcare facility for at least one calendar month as indicated in the [Patient Safety Monthly Reporting Plan](#) (CDC 57.106). A facility may choose to report AST for MRSA and/or VRE in one or multiple patient care locations, as the facility deems appropriate. Ideally, this should be done in patient care locations also selected for Infection Surveillance or LabID Event reporting. To improve standardization of timing rules for AST specimen collection, classify admission specimens as those obtained on day 1 (admission date), day 2, or day 3 (specifically, less than or equal to 3 days). Classify discharge/transfer AST specimens as those collected on or after day 4 (specifically, more than 3 days).

Definitions:

AST Eligible Patients: Choose one of two methods for identifying patients that are eligible for AST:

All = All patients in the selected patient care area regardless of history of MRSA or VRE infection or colonization.

OR

NHx = All patients in the selected patient care area who have NO documented positive MRSA or VRE infection or colonization during the previous 12 months (as ascertained by either a facility's laboratory records or information provided by referring facilities); and no evidence of MRSA or VRE during stay in the patient care location (specifically, they are not in Contact Precautions).

Timing of AST: Choose one of two methods for reporting the timing of AST:

Adm = Specimens for AST obtained less than or equal to 3 days after admission,

OR

Both = Specimens for AST obtained less than or equal to 3 days after admission and, for patients'

stays of more than 3 days, at the time of discharge/transfer. Discharge/transfer AST should include all discharges (including discharges from the facility or to other wards or deaths) and can include the most recent weekly AST if performed more than 3 days after admission to the patient care location. Discharge/transfer AST should not be performed on patients who tested positive on AST admission.

Numerator and Denominator Data: Use the [MDRO and CDI Monthly Denominator Form](#) (CDC 57.127) to indicate: 1) AST was performed during the month for MRSA and/or VRE, 2) AST-eligible patients, and 3) the timing of AST. No personal identifiers will be collected or reported. See Tables of Instructions for completion instructions.

Numerator: For each month during which AST is performed:

Admission AST Performed = Number of patients eligible for admission AST who had a specimen obtained for testing less than or equal to 3 days after admission,
AND/OR

Discharge/Transfer AST Performed = For patients' stays more than 3 days, the number of discharged or transferred patients eligible for AST who had a specimen obtained for testing prior to discharge, not including the admission AST.

Denominator: For each month during which AST is performed:

Admission AST Eligible = Number of patients eligible for admission AST (All or NHx),
AND/OR

Discharge/Transfer AST Eligible = Number of patients eligible for discharge/transfer AST (All or NHx) AND in the facility location more than 3 days AND negative if tested on admission.

Data Analysis: Data are stratified by patient care location and time (for example, month, quarter, etc.), according to AST-eligible patients monitored and the timing of AST.

Admission AST Percent Adherence = Number of patients with admission AST Performed / Number of patients admission AST eligible x 100

Discharge/transfer AST Percent Adherence = Number of patients with discharge/transfer AST performed / Number of patients discharge/transfer AST eligible x 100

2. Active Surveillance Testing Outcome Measures

Introduction: This option will allow facilities to use the results of AST to monitor the prevalent and incident rates of MRSA and/or VRE colonization or infection. This information will assist facilities in assessing the impact of intervention programs on MRSA or VRE transmission.

Settings: Surveillance will occur in any of 4 types of inpatient locations: (1) intensive care units (ICU), (2) specialty care, (3) neonatal intensive care units (NICU), and (4) any other inpatient care location in the institution (for example, surgical wards).

Requirements: Surveillance for prevalent and/or incident MRSA or VRE cases in at least one location in the healthcare facility for at least one calendar month as indicated in the [Patient Safety Monthly Reporting Plan](#) (CDC 57.106). This can be done ONLY in locations where AST adherence is being performed. A minimum AST adherence level will be required for the system to calculate prevalence and incidence. A facility may choose to report AST for MRSA and/or VRE in one or multiple patient care locations, as the facility deems appropriate. Ideally, this should be done in patient care locations also selected for Infection Surveillance or LabID Event reporting. To improve standardization of timing rules for AST specimen collection, classify admission specimens as those obtained on day 1 (admission date), day 2, or day 3 (specifically, less than or equal to 3 days). Classify discharge/transfer AST specimens as those collected on or after day 4 (specifically, more than 3 days). Only the first specimen positive for MRSA or VRE from a given patient in the patient care location is counted, whether obtained for AST or as part of clinical care. If an Admission AST specimen is not collected from an eligible patient, assume the patient has no MRSA or VRE colonization.

Definitions:

AST Admission Prevalent case:

Known Positive = A patient with documentation on admission of MRSA or VRE colonization or infection in the previous 12 months (specifically, patient is known to be colonized or infected as ascertained by either a facility's laboratory records or information provided by referring facilities). (All MRSA or VRE colonized patients currently in a location during the month of surveillance should be considered "Known Positive"),

OR

Admission AST or Clinical Positive = A patient with MRSA or VRE isolated from a specimen collected for AST less than or equal to 3 days after admission or from clinical specimen obtained less than or equal to 3 days after admission (specifically, MRSA or VRE cannot be attributed to this patient care location).

AST Incident case: A patient with a stay more than 3 days:

With no documentation on admission of MRSA or VRE colonization or infection during the previous 12 months (as ascertained either by the facility's laboratory records or information provided by referring facilities); including admission AST or clinical culture obtained less than or equal to 3 days after admission (specifically, patient without positive specimen),

AND

With MRSA or VRE isolated from a specimen collected for AST or clinical reasons more than 3 days after admission to the patient care location or at the time of discharge/transfer from the patient care location (including discharges from the facility or to other locations or deaths).

MRSA colonization: Carriage of MRSA without evidence of infection (for example, nasal swab test positive for MRSA, without signs or symptoms of infection).

AST Eligible Patients: Choose one of two methods for identifying patients' eligible for AST:

All = All patients in the selected patient care area regardless of history of MRSA or VRE infection or colonization,

OR

NHx = All patients in the selected patient care area who have NO documented positive MRSA or VRE infection or colonization during the previous 12 months (as ascertained either by the facility's laboratory records or information provided by referring facilities); and no evidence of MRSA or VRE during stay in the patient care location.

Timing of AST: Choose one of two methods for reporting the timing of AST:

Adm = Specimens for AST obtained less than or equal to 3 days after admission,

OR

Both = Specimens for AST obtained less than or equal to 3 days after admission and, for patients' stays of more than 3 days, at the time of discharge/transfer. Discharge/transfer AST should include all discharges (including discharges from the facility or to other wards or deaths) and can include the most recent weekly AST if performed more than 3 days after admission to the patient care location. Discharge/transfer AST should not be performed on patients who tested positive on AST admission.

Numerator and Denominator Data: Use the [MDRO and CDI Monthly Denominator Form](#) (CDC 57.127) to indicate: 1) AST outcomes monitoring and adherence was performed during the month for MRSA and/or VRE, 2) AST eligible patients, and 3) the timing of AST. No personal identifiers will be collected or reported. See [Tables of Instructions](#) for completion instructions.

If only admission AST is performed, only prevalent cases of MRSA or VRE can be detected in that patient care location. If both admission and discharge/transfer AST are performed, both prevalent and incident cases can be detected. No personal identifiers will be collected or reported.

Admission Prevalent Case:

Numerator Sources: (1) Known Positive; (2) Admission AST or Clinical Positive = Cases less than or equal to 3 days after admission

Denominator Source: Total number of admissions

Incident Case:

Numerator: Discharge/transfer AST or Clinical Positive = Cases more than 3 days after admission and without positive test result(s) on admission

Denominator: Total number of patient days

Note: For research purposes calculating patient-days at risk (specifically, excluding patient-days in which patients were known to be MRSA or VRE colonized or infected) may be a preferable denominator, but for surveillance purposes and ease of aggregating, total number of patient days is required for this module.

Data Analysis: Data are stratified by patient care location and time (for example, month, quarter, etc.) according to the eligible patients monitored and timing of AST.

AST Admission Prevalence rate =

For Eligible patients = All:

Number of admission AST or clinical positive / Number of admissions x 100

For Eligible patients = NHx:

Number of admission AST or clinical positive + Number of known positive / Number of admissions x 100

AST Incidence rate =

Number of discharge/transfer AST or clinical positive / Number of patient days x 1000

¹HICPAC, Management of Multidrug-Resistant Organisms in Healthcare Settings.
<<https://www.cdc.gov/hicpac/index.html>>.

²Cohen AL, et al. *Infection Control and Hospital Epidemiology*. Oct 2008; 29:901-913.

³McDonald LC, Coignard B, Dubberke E, Song X, Horan T, Kutty PK. Recommendations for surveillance of Clostridium difficile-associated disease. *Infection Control Hospital Epidemiology* 2007; 28:140-5.

⁴ Clinical Practice Guidelines for Clostridium difficile Infection in Adults and Children: 2017 Update by the Infectious Diseases Society of America (IDSA) and Society for Healthcare Epidemiology of America (SHEA); L Clifford McDonald, Dale N Gerding, Stuart Johnson, Johan S Bakken, Karen C Carroll, Susan E Coffin, Erik R Dubberke, Kevin W Garey, Carolyn V Gould, Ciaran Kelly, Vivian Loo, Julia Shaklee Sammons, Thomas J Sandora, Mark H Wilcox; *Clinical Infectious Diseases*, Volume 66, Issue 7, 19 March 2018, Pages 987–994,

Appendix 1. Guidance for Handling MDRO and CDI Module Infection Surveillance and LabID Event Reporting When Also Following Other NHSN Modules

If a facility is monitoring CLABSIs, CAUTIs, VAPs, or VAEs within the Device-Associated Module and/or SSIs within the Procedure-Associated Module and is also monitoring MDROs (for example, MRSA) in the MDRO and CDI Module, then there are a few situations where reporting the infection or LabID event may be confusing. The following scenarios provide guidance to keep the counts and rates consistent throughout your facility and between all of the NHSN Modules. *These rules apply to the reporting of “Big 5” infections (BSI, UTI, PNEU, VAE, and SSI) caused by an MDRO selected for monitoring.*

Device-Associated Module with MDRO and CDI Module

Scenario 1: Facility is following CLABSI, CAUTI, VAP, or VAE along with MDRO Infection Surveillance and possibly LabID Event Reporting in the same location:

Healthcare-associated Infection identified for this location.

1. Report the infection (BSI, UTI, PNEU, or VAE).
2. Answer “Yes” to the MDRO infection question.

This fulfills the infection reporting requirements of both modules in one entry and lets the NHSN reporting tool know that this infection should be included in both the Device-Associated and the MDRO infection datasets and rates.

3. If following LabID event reporting in the same location, report also (separately) as a LabID Event (if meets the MDRO protocol criteria for LabID event).

Scenario 2: Facility is following BSI (CLABSI), UTI (CAUTI), PNEU/VAP, or VAE along with MDRO Infection Surveillance and possibly LabID Event Reporting in multiple locations:

The event date for the infection is the day of patient transfer from one location (the transferring location) to another location (the new location), or the next day.

1. Report the infection (BSI, UTI, PNEU and VAE) and attribute to the transferring location, if transferring location was following that Event Type (BSI, UTI, PNEU, VAE) on the day of Event, which occurred on the date of transfer, or the following day.
2. Answer “Yes” to the MDRO infection question, if the transferring location was following that MDRO on the day of Event, which occurred on the date of transfer, or the following day.
3. If, on the date of culture collection, the new location is following LabID event reporting, report also (separately) as a LabID Event and attribute to the new location (if meets the MDRO protocol criteria for LabID event).

Procedure-Associated Module with MDRO and CDI Module

Note: SSIs are associated with a procedure and not a patient location, but MDROs are connected with the patient location.

Scenario 3: Facility is following SSI along with MDRO Infection Surveillance and possibly LabID Event Reporting:

Patient has surgery, is transferred to a single unit for the remainder of the stay, and during the current stay acquires an SSI.

1. Report the infection (SSI) and attribute to the post-op location.
2. Answer “Yes” to the MDRO infection question, if the post-op location is following that MDRO during the month of the date of event.
3. If following LabID event reporting in the post-op location, report also (separately) as a LabID Event (if meets the MDRO protocol criteria for LabID event).

Scenario 4: Facility is following SSI along with MDRO Infection Surveillance and possibly LabID Event Reporting:

Patient has surgery, is either discharged immediately (outpatient) or transferred to a unit (inpatient), is discharged, and subsequently is readmitted with an SSI.

1. Report the infection (SSI) and attribute to the discharging (post-op) location (not the readmission location).
2. Answer “Yes” to the MDRO infection question, if the discharging (post-op) location was following that MDRO during the Date of Event.
3. If following LabID event reporting in the readmitting location or outpatient clinic where the specimen was collected, report also (separately) as a LabID Event (if meets the MDRO protocol criteria for LabID event).

Appendix 2: Counts Involving Observation Patients

In response to questions regarding counting “observation” patients, the following guidance is offered.

For the purpose of NHSN surveillance and reporting, an “observation” location (for example, 24-hour observation area) is considered an outpatient unit, and time spent in this type of unit does not ever contribute to any inpatient counts (specifically, patient days, device days, admissions). Stays in such outpatient units represent “encounters” for the purposes of outpatient surveillance for LabID Event monitoring in the MDRO/CDI module.

The NHSN instructions for recording the number of patients in an inpatient unit state that for each day of the month selected, at the same time each day, the number of patients on the unit should be recorded. This procedure should be followed regardless of the patient’s admission status as an observation patient or an inpatient.

Key point -- it is the patient’s physical location and NOT the patient’s admission status as an “observation” patient that determines whether the patient counts for an inpatient location or the 24 hour observation location

1. Observation patient in **observation location**:

When an observation patient is housed in a location that is mapped as a 24-hr Observation area, they should not be included in any inpatient counts. These areas are considered outpatient locations.

2. Observation patient in **inpatient location**:

a. If an observation patient is transferred to an inpatient location:

- LabID event reporting -- Only patient days in the inpatient location are to be included in patient day counts for the location or FacWideIN. These counts should be inclusive of all patients housed in the inpatient location, regardless of their status as an observation patient.
- Device-associated surveillance -- Device-day denominator data accrue beginning when the patient arrives in any inpatient location where surveillance is occurring, in accordance with the location’s device-count methods.

b. If an observation patient is admitted to an inpatient location, the patient must be included in all surveillance events designated in the monthly reporting plan and included in patient and device day counts. The patient is being housed, monitored, and cared for in an inpatient location and therefore is at risk for acquisition of an HAI. The facility assignment of the patient as an observation patient or an inpatient has no bearing for the purpose of counting.

Below is an example of attributing patient days to a patient admitted to an inpatient location, regardless of whether the facility considers the patient an observation patient or an inpatient.

The examples show counts taken at: A) 12:00 am and B) 11:00 pm.

A. Count at 12:00 am (midnight):

Date	Mr X Pt Day	Mr Y Pt Day
01/01	Mr X admitted at 8:00 pm Mr X not counted because the count for 01/01/10 was taken at 12:00 am on 01/01 10 and he was not yet admitted X	Mr Y admitted at 12:00 am Mr Y is counted because the count for 01/01 was taken at 12:00 am and that is when he was admitted 1
01/02	1	2
01/03	2	3
01/04	3	4
01/05	Mr X discharged at 5:00 pm 4 Counted for 01/05 because he was in the hospital at 12:00 am on 01/05 when the count for that day was taken	Mr Y discharged at 12:01 am 5 Counted for 01/05 because he was in the hospital at 12:00 am on 01/05 when the count for that day was taken
Total	4 patient days	5 patient days

If we use the same admission dates and times for Mr. X, but a different time is selected for the patient day count, say 11:00 pm, the total number of days in the count will be the same; they will simply be coming from different dates.

When converting from one electronic counting system to another electronic counting system, the new electronic system should be validated against manual counts as above. If electronic counts for the new electronic system are not within 5% of manual counts, resume manual counting and continue working with IT staff to improve design of electronic denominator data extraction (while reporting manual counts) until concurrent counts are within 5% for 3 consecutive months.

Note: This guideline is important because validating a new electronic counting system against an existing electronic system can magnify errors and result in inaccurate denominator counts.

B. Count at 11:00 pm:

Date	Mr X	Pt Day
01/01	Mr X admitted at 8:00 am	Counted because the count for 01/01 is taken at 11:00 pm on 01/01 and he is in the hospital at that time 1
01/02		2
01/03		3
01/04		4
01/05	MR X discharged at 5:00 pm	Not counted for 01/05 because he was not in the hospital at 11:00 pm on 01/05 when the count for that day was taken X
Total		4 patient days

Determining Admission Counts for Summary Data Collection:

In response to questions regarding how to count number of admissions, the following guidance is offered. How you operationalize this guidance will depend on how you are obtaining the data for your counts.

Recognizing that there are a variety of ways in which patient day and admission counts are obtained for a facility and for specific locations, this guidance is offered to assist with standardization within and across facilities. It is most important that whatever method is used by a facility, it should be used each and every month for consistency of data and metrics.

If admissions are calculated electronically, the data must be checked to ensure that all appropriate patients are included or excluded from those counts and that, for three consecutive months, your electronic data are within +/- 5% of the number obtained by manual counts. If these counts are more than 5% discrepant, then you will need to evaluate and discuss with your IT staff to determine the cause of the discrepancies and methods to address them. The main goal is to accurately count patients in the denominators that may contribute to the numerator.

See below for specific examples:

1. Facility-Wide Inpatient Admission Count: Include any new patients that are assigned to a bed in any inpatient location within the facility regardless of billing status. Qualification as a new patient means that the patient was not present on the previous calendar day. The daily admission counts are summed at the end of the calendar month for a monthly facility-wide inpatient admission count.
2. Inpatient Location-Specific Admission Count: Include any new patients that are assigned to a bed in the specific inpatient location. Qualification as a new patient means that the patient was not present

in the specific inpatient location on the previous calendar day. The daily admission counts are summed at the end of the calendar month for a monthly inpatient location-specific admission count.

Any patient who meets criteria for new inclusion should be counted, regardless of whether they are coded by the facility as an inpatient or as an observation patient.

Below is an example of manually counting location-specific and facility-wide admission counts related to a patient admitted to an inpatient location and transferred to multiple patient locations during his hospital stay. The example show counts taken at 11:00 pm.

Example: Counts at 11:00 pm:

Unit	Date/Time Mr. X Placed on Inpatient Unit	Date/Time Mr. X Transferred Out of Inpatient Unit	Inpatient Location-Specific Admission Count	Inpatient Facility-Wide Admission Count
SICU	10/08 – 10:00am (facility admission)	10/13 – 9:00am	1 Adm for SICU	1 Adm for FacWideIN
MICU	10/13 – 9:15am	10/13 – 11:00am	Not present and so not counted	Same Adm, and also not present so not counted
Surgical Ward	10/13 – 11:30am	10/25 – 1:00pm	1 Adm for Surgical Ward	Same Adm so not counted
Medical Ward	10/25 – 1:30pm	10/26 – 10:00am (facility discharge)	1 Adm for Medical Ward	Same Adm so not counted

Appendix 3: Differentiating Between LabID Event and Infection Surveillance

	LabID Event	Infection Surveillance (using HAI surveillance definitions)
Protocol	LabID Event protocol in Chapter 12 of NHSN manual	Infection Surveillance protocol in Chapter 12 of NHSN manual <u>and</u> HAI site-specific definitions in NHSN manual (for example, BSI, UTI, SSI, PNEU, VAE, and GI-CDI and other HAI definitions)
Signs & Symptoms	NONE. Laboratory and admission data, without clinical evaluation of patient	Combination of laboratory data and clinical evaluation of patient (signs/symptoms)
Surveillance Rules	<ul style="list-style-type: none"> HAI and POA do NOT apply Transfer Rule does NOT apply Location = location of patient at time of specimen collection Event date = specimen collection date 	<ul style="list-style-type: none"> HAI and POA do apply Transfer Rule applies See NHSN protocol for details regarding location and date of event
Denominator Reporting	<ul style="list-style-type: none"> Number of patient days and admissions Can be reported by specific location or facility-wide, depending on reporting option(s) selected Inpatient and/or outpatient 	<ul style="list-style-type: none"> Device days and patient days must be collected separately for each monitored location Inpatient reporting only
Categorization of Infections	<ul style="list-style-type: none"> Events categorized based on inpatient or outpatient and admission and specimen collection dates <ul style="list-style-type: none"> Healthcare Facility-Onset (HO) Community-Onset (CO) Community-Onset Healthcare Facility-Associated (CO-HCFA) for <i>C. difficile</i> only HO,CO, and CO-HCFA (if applicable) LabID Events must be reported to NHSN Additional categorizations are applied to <i>C. difficile</i>, which include Incident CDI event and Recurrent CDI event. Both must be reported to NHSN. 	<ul style="list-style-type: none"> HAI protocols used Events are either HAI or not, <u>therefore LabID Event categorizations do not apply</u> Only HAIs are reported to NHSN