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

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. A primary reason for concern about these multidrug-resistant organisms (MDROs) is that 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 *Clostridium difficile* infection (CDI). The Healthcare Infection Control Practices Advisory Committee (HICPAC) approved guidelines for the control of MDROs.[1] These are available at (http://www.cdc.gov/ncidod/dhqp/pdf/ar/mdroGuideline2006.pdf). The MDRO and CDI module of the 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]

Clostridium difficile is responsible for a spectrum of *C. difficile* infections (CDI) [originally referred to as *C. difficile*-associated disease or CDAD], including uncomplicated diarrhea, pseudomembranous colitis, and toxic megacolon which can, in some instances, lead to sepsis and even death. Current CDC definitions for healthcare-associated infections (HAIs), while adequate for the site of infection, do not take into account the special characteristics of disease caused by *C. difficile*. Although CDI represents a subset of gastroenteritis and gastrointestinal tract infections, specific standard definitions for CDI [3] should be incorporated to obtain a more complete understanding of how *C. difficile* is being transmitted in a healthcare facility. Please note the term CDI is replacing CDAD. Both terms represent the same illness and are used interchangeably. We are transitioning this module to the newer terminology.

As outlined in the HICPAC guideline[1], 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 control staff of the impact of targeted prevention efforts. This module contains two options, one focused on MDROs and the second on CDI. Reporting options are summarized in Table 1, below.

Table 1. Required and Optional Reporting Choices for MDRO and CDI Module

Reporting Choices	**MRSA or MRSA/MSSA**	**VRE**	***Klebsiella* spp. (CephR or CRE), *E. coli* (CRE), *Acinetobacter* spp. (MDR)**	***C. difficile***
Required	**Method**	**Method**	**Method**	**Method**
Infection Surveillance (*Location Specific for ≥ 3 months) Choose ≥ 1 organism	A, B	A, B	A, B	±A, B
OR				

Proxy Infection Measures [§]Laboratory-Identified (LabID) Event (*Location Specific for ≥ 3 consecutive months) Choose ≥ 1 organism	A, B, C, D	A, B, C, D	B,C, D	[±]A, B, C
Optional	**Method**	**Method**	**Method**	**Method**
Prevention Process Measures Options: Hand Hygiene Adherence Gown and Gloves Use Adherence Active Surveillance Testing (AST) Adherence	 B B B	 B B B	 B B N/A	 B B N/A
AST Outcome Measures Incident and Prevalent Cases using AST	B	B	N/A	N/A

*Location: Patient care area selected for monitoring and reported in Monthly Reporting Plan.
N/A – not available or contraindicated

[±]No surveillance for CDI will be performed in Neonatal Intensive Care Units (NICU), 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.

[§] LabID Events can be reported Overall facility-wide for all inpatient areas and/or Overall facility-wide for all outpatient areas. Additionally events can be reported Facility-wide by location to cover all inpatient areas or by Selected locations.

Method (minimum requirement is 3 months for Infection Surveillance or 3 consecutive months for LabID Event reporting using one of the methods below):
A – Facility-wide by location. Requires the most effort but provides the most detail for local and national statistical data.
B – Selected locations within the facility (1 or more). Acceptable method, ideal for use during targeted prevention programs.

C – Overall facility-wide. Acceptable method, ideal for CDI or MDRO infrequently encountered, or smaller hospitals. Options include Overall Facility-wide Inpatient (FacWideIN) to cover all inpatient locations or Overall Facility-wide Outpatient (FacWideOUT) to cover all outpatient locations.
D – Overall facility-wide: Blood Specimens Only. Available for MDROs only (no CDI). Targets the most invasive events. Options include Overall Facility-wide Inpatient (FacWideIN) to cover all inpatient locations or Overall Facility-wide Outpatient (FacWideOUT) to cover all outpatient locations.

I. MDRO Option

Methodology: Facilities may choose to monitor one or more of the following MDROs: MRSA, MRSA and MSSA, VRE, CephR- *Klebsiella* spp., CRE-*Klebsiella* spp., CRE-*E. coli*, and multidrug-resistant *Acinetobacter* spp. (See definitions in Section A, Option 1). 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 prevention efforts targeted at the resistant pathogen.
Participants must choose 1 or both of the 2 required reporting options described below and then may also choose to participate in either or both of the 2 additional optional monitoring methods described below (see Table 1):

Required Reporting Options:

- MDRO infection surveillance, i.e., for each patient care area selected, surveillance for all NHSN-defined healthcare-associated infections caused by at least one MDRO.
  AND/OR
- LabID Event reporting of proxy infection measures of MDRO healthcare acquisition, exposure burden, and infection burden by using primarily laboratory data. Laboratory testing results can be used without clinical evaluation of the patient, allowing for a much less labor-intensive means to track MDROs. These can be monitored facility-wide for inpatient areas – FacWideIN or facility-wide for outpatient areas – FacWideOUT (Method C – all specimens or Method D – blood specimens only) or for specific locations (Method A or B with unique denominator data), allowing for both location-specific and facility-wide measures.

Additional Optional Monitoring Methods:

- Prevention process measures that allow facilities to systematically collect data on hand hygiene and gown and gloves use adherence, and for those conducting active surveillance testing (AST), adherence to obtaining AST.
- AST outcome measures that can be reported if AST is performed, providing incidence and prevalence rates for selected MDROs.

The data collections in the MDRO Option will enable participating facilities and CDC to calculate several measures, depending on which reporting methods the facility chooses to follow (see Table 2 at the end of this chapter). NHSN forms should be used to collect all required data, using the definitions of each data field as outlined in this protocol and in the "Instructions for Completion of MDRO/CDI Forms". When denominator data are available from electronic databases, these sources may be used as long as the counts are not substantially different (+ or – 5%) from manually collected counts.

Active, patient-based, prospective surveillance of the chosen MDRO infections by a trained infection preventionist (IP) is required for MDRO infection surveillance. This means that the IP shall seek to confirm and classify infections caused by the MDRO(s) chosen for monitoring during a patient's stay in at least one patient care location during the surveillance period. Some process measures require direct observation as described in Section IB. Personnel other than the IP may be trained to perform these observations and collect the required data elements.

A. Required Reporting

Option 1. MDRO Infection Surveillance – (MRSA, MRSA/MSSA, VRE, CephR-*Klebsiella* spp., CRE-*Klebsiella* spp., CRE-*E. coli* spp., and MDR-*Acinetobacter* spp.).

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, stepdown units, wards, and long term care units.

Requirements: Surveillance for all types of NHSN-defined healthcare-associated infections (HAIs) of the MDRO selected for monitoring in at least one location in the healthcare facility for at least 3 months in a calendar year as indicated in the *Patient Safety Monthly Reporting Plan* (CDC 57.106).

Definitions: MDROs included in this module are defined below. Refer to Chapter 17 for infection site criteria. Refer to Key Terms for assistance with variable definitions.

MRSA: Includes ***S. aureus*** cultured from any specimen that tests oxacillin-resistant, cefoxitin-resistant, or methicillin-resistant by standard susceptibility testing methods, or by a positive result from molecular testing for mecA and PBP2a; these methods may also include positive results of specimens tested by any other FDA approved PCR test for MRSA.
MSSA: ***S. aureus*** cultured from any specimen testing intermediate or susceptible to oxacillin, cefoxitin, or methicillin by standard susceptibility testing methods, or by a negative result from molecular testing for mecA and PBP2a.
VRE: Any ***Enterococcus* spp.** (regardless of whether identified to the species level), that is resistant to vancomycin.
CephR-*Klebsiella*: Any ***Klebsiella* spp**. testing non-susceptible (i.e., resistant or intermediate) to ceftazidime, cefotaxime, ceftriaxone, or cefepime.
CRE-*Ecoli*: Any ***E. coli*** testing non-susceptible (i.e., resistant or intermediate) to imipenem, meropenem, or doripenem.
CRE-*Klebsiella*: Any ***Klebsiella* spp**. testing non-susceptible (i.e., resistant or intermediate) to imipenem, meropenem, or doripenem.
MDR-*Acinetobacter:* Any ***Acinetobacter*** spp. testing non-susceptible (i.e., resistant or intermediate) to at least one agent in at least 3 antimicrobial classes of the following 6 antimicrobial classes:

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

Location of Attribution and Transfer Rule applies – See Key Terms.

Numerator Data: Number of healthcare-associated infections (HAIs), by MDRO type. Infections are reported on the appropriate NHSN forms: *Primary Bloodstream Infection, Pneumonia, Urinary Tract Infection, Surgical Site Infection, or MDRO or CDI Infection Event (CDC 57.108, 57.111, 57.114, 57.120, and 57.126, respectively.) (See Tables of Instructions, Tables 2, 2a, 4, 5, 12, and 19, respectively, for completion instructions.)*

Denominator Data: Number of patient days. Patient Days are reported using the *MDRO and CDI Prevention Process and Outcome Measures Monthly Monitoring* form (CDC 57.127). (See Tables of Instructions, Table 21, for completion instructions.)

Data Analysis: Data are stratified by time (e.g., month, quarter, etc.) and patient care location.
MDRO Infection Incidence Rate = Number of HAIs by MDRO type/ Number of patient days X 1000

Option 2. Laboratory-Identified (LabID) Event

Introduction: To calculate proxy measures of MDRO infections, exposures, and healthcare acquisition facilities may choose to monitor laboratory-identified MDRO events. This method allows the facility to rely almost exclusively on easily obtained data from the clinical microbiology laboratory. However, some data elements, such as date admitted to the patient care location and facility may require other data sources. Please be aware that the LabID Event reporting is ONLY for collecting and tracking positive cultures that are taken for "clinical" purposes (i.e., for diagnosis and treatment), which means that NO Active Surveillance Culture/Testing (ASC/AST) results are to be included in this reporting of individual results. Do NOT enter surveillance nasal swabs or other surveillance cultures as reports of LabID Events. AST tracking should be recorded under Process & Outcome Measures.

Laboratory and admission data elements can be used to calculate four distinct proxy measures including: admission prevalence rate and overall patient prevalence rate based on clinical testing (measures of exposure burden), MDRO bloodstream infection incidence rate (measure of infection burden), and overall MDRO infection/colonization incidence rate (measure of healthcare acquisition). MDRO positive laboratory results can be reported for one or more organisms. 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 prevention efforts targeted at the resistant pathogen.

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

Requirements: Facilities choose at least 1 of 4 reporting methods: (A) Facility-wide by location: report location-specific data for the entire facility, requiring separate denominator submissions for each location; (B) Selected locations: report location-specific data for only selected locations; and (C or D) Overall facility-wide (Options include Overall Facility-wide Inpatient for all inpatient locations, and/or Overall Facility-wide Outpatient for all outpatient locations.) report only one denominator for the entire facility and either all specimens(Method C) or blood specimens only (Method D) (see protocol Table 1). Facilities must indicate each reporting choice chosen for the calendar month as indicated in the *Patient Safety Monthly Reporting Plan* (CDC 57.106). Facilities can report using Methods A & C or D, B & C or D, or A, B, C, or D (but not A & B). Surveillance for positive laboratory results must be reported for 3 consecutive months to provide meaningful measures.

For each MDRO being monitored, all MDRO test results are evaluated using the algorithm in Figure 1 to determine reportable LabID events for each calendar month, for each facility location as determined by the reporting method chosen. 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); if a duplicate MDRO isolate is from blood, it is reported as a LabID event only if it represents a unique blood source (i.e., no prior isolation of the MDRO in blood from the same patient and location in ≤ 2 weeks, even across calendar months) (Figure 1). As a general rule, at a maximum, there should be no more than 2 blood isolates reported,(which would be very rare), and 1 first MDRO isolate (specimen other than blood) reported on any patient during a calendar month for each location chosen for reporting. If 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 a single LabID Event per form.

Definitions:

MDRO Isolate: Any specimen obtained for clinical decision making testing positive for a MDRO (as defined above). (EXCLUDES tests related to active surveillance testing)

Duplicate MDRO Isolate: Any MDRO isolate from the same patient and location after an initial isolation of the specific MDRO during a calendar month, regardless of specimen source except unique blood source (Figure 1).

Laboratory-Identified (LabID) Event: All non-duplicate MDRO isolates from any specimen source and unique blood source MDRO isolates, including specimens collected during an Emergency Department or other outpatient clinic visit, if collected the same day as patient admission (EXCLUDES tests related to active surveillance testing).

Unique Blood Source: A MDRO isolate from blood in a patient with no prior positive blood culture for the same MDRO and location in ≤ 2 weeks, even across calendar months (Figure 1). There should be a full 14

days with no positive blood culture result from the laboratory for the patient, MDRO, and location before another Blood LabID Event is entered into NHSN for the patient, MDRO, and location.

Numerator Data: Data will be reported using the *Laboratory-identified MDRO or CDI Event* form (CDC 57.128). (See Tables of Instructions, Table 20, for completion instructions.)

Denominator Data: Patient days, admissions, (for inpatient locations) and encounters (for ER and outpatient locations) are reported using the *MDRO and CDI Prevention Process and Outcome Measures Monthly Monitoring* form (CDC 57.127). (See Tables of Instructions, Table 21, for completion instructions.) When determining a patient's admission dates to both the facility and specific inpatient location, the NHSN user must take into account all such days, including any days spent in an inpatient location as an "observation" patient before being officially admitted as an inpatient to the facility, as these days contribute to exposure risk. Therefore, all such days are included in the counts of admissions and patient days for the facility and specific location, and facility and admission dates must be moved back to the first day spent in the inpatient location. For further information on counting patient days and admissions, go to NHSN website>Resource Library>NHSN Guides>Determining Patient Days for Summary Data Collection: Observation vs. Inpatients.

Data Analysis: Based on data provided on the LabID Event form, each event can be categorized by NHSN to populate different measures. Of note, NHSN will categorize LabID Events as healthcare facility-onset vs. community-onset to ensure that all healthcare facility-onset cases have been hospitalized at least a full 48 hours before specimen collection. Considering: 1) variable times of day that admissions occur and 2) the absence of clinical data to confirm if cultures represent infection incubating at the time of admission, this is operationalized by classifying positive cultures obtained on day 1 (admission date), day 2, and day 3 of admission as community-onset (CO) LabID Events and positive cultures obtained on or after day 4 as healthcare facility-onset (HO) LabID Events.

The following categorizations and prevalence and incidence calculations are built into the analysis capabilities of NHSN, and are based on timing of admission and specimen collection, and location where specimen was collected. Descriptions are provided to explain how the categories and metrics are defined in NHSN.

Categorizing MDRO LabID Events – Based on Date Admitted to Facility and Date Specimen Collected:

Community-Onset (CO): LabID Event specimen collected as an outpatient or an inpatient ≤ 3 days after admission to the facility (i.e., days 1, 2, or 3 of admission).

Healthcare Facility-Onset (HO): LabID Event specimen collected > 3 days after admission to the facility (i.e., on or after day 4).

Proxy Measures for Exposure Burden of MDROs – All specimens:

Inpatient Reporting:
Admission Prevalence Rate = Number of 1st LabID Events per patient per month identified ≤ 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 (i.e., prevalent + incident, if monitoring by inpatient location), or facility (i.e., 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

Proxy Measures for MDRO Bloodstream Infection: (Calculated when monitoring either All specimens or Blood specimens only.) Remember, 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 ≤ 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 or Incidence Density Rate = Number of all unique blood source LabID Events per patient per month 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 admissions to the location or facility x 100 or 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 (i.e., prevalent + incident, if monitoring by inpatient location), or facility (i.e., CO + HO, if monitoring by overall facility-wide inpatient=FacWideIN) / Number of patient admissions to the location or facility x 100

Outpatient Reporting:
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

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 > 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

B. Optional 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). Ideally, 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 (i.e., 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 Prevention Process and Outcome Measures Monthly Monitoring* form (CDC 57. 127). (See Tables of Instructions, Table 21, for completion instructions.)

Data Analysis: Data are stratified by time (e.g., 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 (includes hematology/oncology wards, bone marrow transplant units, inpatient dialysis units, solid organ transplant units, long term acute care areas), (3) neonatal intensive care units (NICU), and (4) any other inpatient care location in the institution (e.g., 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 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 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 the patient for which gown and gloves had been donned 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 Prevention Process and Outcome Measures Monthly Monitoring* form (CDC 57.127). (See Tables of Instructions, Table 21, for completion instructions.)

Data Analysis: Data are stratified by time (e.g., month, quarter, etc.) and patient care location.
Gown and Glove Use Percent Adherence = Number of contacts for which gown and gloves were used / 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 (includes hematology/oncology wards, bone marrow transplant units, inpatient dialysis units, solid organ transplant units, long term acute care areas), (3) neonatal intensive care units (NICU), and (4) any other inpatient care location in the institution (e.g., 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 applying timing rules relating to when AST specimens are obtained, classify admission specimens as those obtained on day 1 (admission date), day 2, or day 3 (i.e., ≤ 3 days). Classify discharge/transfer AST specimens as those collected on or after day 4 (i.e., > 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 (i.e., 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 ≤ 3 days after admission,
OR
Both = Specimens for AST obtained ≤ 3 days after admission and, for patients' stays of > 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 > 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 Prevention Process and Outcome Measures Monthly Monitoring* 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, Table 21, 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 ≤ 3 days after admission,
AND/OR
Discharge/Transfer AST Performed = For patients' stays > 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 > 3 days AND negative if tested on admission.

Data Analysis: Data are stratified by patient care location and time (e.g., 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 areas (includes hematology/oncology wards, bone marrow transplant units, inpatient dialysis units, solid organ transplant units, long term acute care areas), (3) neonatal intensive care units (NICU), and (4) any other inpatient care location in the institution (e.g., 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 applying timing rules relating to when AST specimens are obtained, classify admission specimens as those obtained on day 1 (admission date), day 2, or day 3 (i.e., ≤ 3 days). Classify discharge/transfer AST specimens as those collected on or after day 4 (i.e., > 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 (i.e., 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 the ICU 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 ≤ 3 days after admission or from clinical specimen obtained ≤ 3 days after admission (i.e., MRSA or VRE cannot be attributed to this patient care location).

AST Incident case: A patient with a stay > 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 ≤ 3 days after admission (i.e., patient without positive specimen),
AND
With MRSA or VRE isolated from a specimen collected for AST or clinical reasons > 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 wards or deaths).

MRSA colonization: Carriage of MRSA without evidence of infection (e.g., 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 (i.e., 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 ≤ 3 days after admission,
OR
Both = Specimens for AST obtained ≤ 3 days after admission and, for patients' stays of > 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 > 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 Prevention Process and Outcome Measures Monthly Monitoring* 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 Table 21, 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:

- Known Positive
- Admission AST or Clinical Positive = Cases ≤ 3 days after admission

Denominator: Total number of admissions

Incident Case:
Numerator: Discharge/transfer AST or Clinical Positive = Cases > 3 days after admission

Denominator: Total number of patient days

NOTE: For research purposes calculating patient-days at risk (i.e., 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 (e.g., 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

II. *Clostridium difficile* Infection (CDI) Option

Methodology: The CDI Option also allows for a choice between two required reporting options and additional optional monitoring methods. As with MDRO monitoring, if a facility chooses to monitor *C. difficile* it must use at least one of the following reporting options: Infection Surveillance and/or Laboratory-identified (LabID) Event reporting. Process measure reporting is optional (but available only for hand hygiene and gown and gloves use – no AST). See Table 1.

C. difficile Infection (CDI) Surveillance, reporting on all NHSN-defined healthcare-associated CDIs from at least one patient care area, is one surveillance option for *C. difficile* (i.e., part of your facility's Monthly Reporting Plan). These data will enhance the ability of NHSN to aggregate national data on CDIs. This method requires active, patient-based, prospective surveillance of healthcare-associated *C. difficile* infections by a trained infection preventionist (IP). This means that the IP shall seek to confirm and classify

infections caused by *C. difficile* during a patient's stay in at least one patient care location during the surveillance period.

Laboratory-identified (LabID) Events reporting is the second surveillance option and allows laboratory testing data to be used without clinical evaluation of the patient, allowing for a much less labor intensive method to track *C. difficile*. These provide proxy measures of *C. difficile* healthcare acquisition, exposure burden, and infection burden based solely on laboratory data and limited admission date data. Reporting of LabID Events for the entire facility (Method C – All specimens) (i.e., Overall facility-wide inpatient – FacWideIN and Overall facility-wide outpatient – FacWideOUT) can provide easily obtainable and valuable information for the facility. LabID Events can also be monitored for specific locations with unique denominator data required from each specific location (i.e., Facility-wide by location – Method A or Selected locations – Method B). This allows for both location-specific and facility-wide measures.

Process measure monitoring includes optional reporting aspects that allow facilities to systematically report information on *C. difficile* prevention process measures for hand hygiene and gown and gloves use. These measures require direct observation and are described in Sections I.B.1.a. and I.B.1.b. (MDRO Option - Prevention Process Measures). Personnel other than the IP may be trained to perform these observations and the collection of data elements.

Use NHSN forms to collect all required data, using the definitions of each data field as indicated in the Tables of Instructions (Tables, 19, 20, and 21). When denominator data are available from electronic databases, these sources may be used as long as the counts are not substantially different (+ or – 5%) from manually collected counts.

A. Required Reporting

Option 1. *Clostridium difficile* Infection Surveillance

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), stepdown units, wards, and long term care units. Surveillance will NOT be performed in Neonatal Intensive Care Units (NICU) or Well Baby Nurseries.

Requirements: Surveillance for CDI should be performed in at least one location in the healthcare institution for at least 3 calendar months as indicated in the *Patient Safety Monthly Reporting Plan* (CDC 57.106).

Definitions:
Report all healthcare-associated infections where *C. difficile* is the associated pathogen. Refer to specific definitions (Chapter 17) for gastroenteritis (GI-GE) or gastrointestinal tract (GI-GIT) infections criteria.

Cases of CDI (i.e., *C. difficile* pathogen identified with a positive toxin result) that are not present or incubating at the time of admission (i.e., meets criteria for a healthcare-associated infection) should be reported as gastroenteritis (GI-GE) or gastrointestinal tract (GI-GIT) infections, whichever is appropriate.

Report the pathogen as *C. difficile* on the *MDRO or CDI Infection Event* form (CDC 57.126). If the patient develops both GI-GE and GI-GIT CDI, report only GI-GIT using the date of onset as that of GI-GE CDI. (This CDI HAI reporting corresponds to surveillance for healthcare-onset, healthcare facility-associated CDI in recently published recommendations[3], which is considered the minimum surveillance for CDI.)

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

Location of Attribution and Transfer Rule applies – See Key Terms.

Numerator and Denominator Data: The numerator data are reported on the *MDRO or CDI Infection Event* form (CDC 57.126). (See Tables of Instructions, Table 19, for completion instructions). The patient day denominator data are reported using the *MDRO and CDI and Outcome Measures Monthly Monitoring* form (CDC 57.127). (See Tables of Instructions, Table 21, for completion instructions.)

C. Difficile Infections:
Numerator*:* The total number of HAI CDI cases identified during the surveillance month.

Denominator*:* The total number of patient days during the surveillance month.

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

C. difficile Infection rate = Number of HAI CDI cases / Number of patient days X 10,000

Option 2. *Clostridium difficile* Laboratory-identified Event

Settings: LabID Event reporting can be performed either Overall facility-wide inpatient (FacWideIN), Overall facility-wide outpatient (FacWideOUT), or in multiple locations, where *C. difficile* testing in the laboratory is performed routinely only on unformed (i.e., conforming to the shape of the container) stool samples. Consider including *C. difficile* toxin-positive laboratory assays from all available inpatient locations as well as all available outpatient locations where care is provided to patients post discharge or prior to admission (e.g., emergency departments, outpatient clinics, and physician offices that submit samples to the facility's laboratory.) Surveillance will NOT be performed in Neonatal Intensive Care Units (NICU), Well Baby Nurseries, or Well Baby Clinics.

Requirements: Facilities must choose one or more of three reporting choices: (Method A) report LabID Events for the entire facility, but by each location (Facility-wide by location), requiring separate denominator submissions for each location, (Method B) report LabID Events for only Selected locations, and (Method C) Overall facility-wide (with only one denominator for the entire facility) (Options include

Overall Facility-wide Inpatient – FacWideIN or Overall Facility-wide Outpatient – FacWideOUT) (See Table 1). Facilities must indicate each reporting choice chosen for the calendar month indicated in the *Patient Safety Monthly Reporting Plan* (CDC 57.106). Facilities reporting Overall facility-wide, which allows for the most complete data acquisition, can also report by Selected locations (i.e., (C) and (B)); otherwise, facilities must choose between choice (A) alone, (B) alone, or (C) alone (See Table 1). Surveillance for LabID Events must be reported for 3 consecutive months to provide meaningful measures.

Definitions:

CDI-positive laboratory assay:
A positive laboratory test result for *C. difficile* toxin A and/or B,
OR
A toxin-producing *C. difficile* organism detected by culture or other laboratory means performed on a stool sample.

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 the past two weeks (14 days). There should be a full 14 days with no *C. difficile* toxin-positive laboratory result for the patient and location, before another *C. difficile* LabID Event is entered into NHSN for the patient and location.

Laboratory-Identified (LabID) Event*:* All non-duplicate *C. difficile* toxin-positive laboratory results. Can include specimens collected during an Emergency Department or other outpatient clinic visit, if collected same day as patient admission. (See Algorithm Figure 2.)

Numerator: Data will be reported using the *Laboratory-Identified MDRO or CDI Event* form (CDC 57.128). (See Tables of Instructions, Table 20, for completion instructions.)

Denominator: Patient days, admissions, (for inpatient locations) and encounters (for ER and outpatient locations) are reported using the *MDRO and CDI Prevention Process and Outcome Measures Monthly Monitoring* form (CDC 57.127). (See Tables of Instructions, Table 21, for completion instructions.) When performing facility-wide inpatient (FacWideIN) or facility-wide outpatient (FacWideOUT) LabID Event surveillance, denominator counts from neonatal intensive care units, well baby nurseries, and well baby clinics should NOT be included. Therefore, the specific *C. difficile* denominator variables should be used for FacWide reporting. When determining a patient's admission dates to both the facility and specific inpatient location, the NHSN user must take into account all such days, including any days spent in an inpatient location as an "observation" patient before being officially admitted as an inpatient to the facility, as these days contribute to exposure risk. Therefore, all such days are included in the counts of admissions and patient days for the facility and specific location, and facility and admission dates must be moved back to the first day spent in the inpatient location. For further information on counting patient days and admissions, go to NHSN website>Resource Library>NHSN Guides>Determining Patient Days for Summary Data Collection: Observation vs. Inpatients.

CDI Data Analysis: Data are stratified by time (e.g., month, quarter, etc.), incident or recurrent, and either aggregated across the entire facility or stratified by patient care location.

Categorization Based on Current Date Specimen Collected and Prior Date Specimen Collected of a previous CDI LabID Event:

Incident CDI Assay: Any LabID Event from a specimen obtained > 8 weeks after the most recent LabID Event (or with no previous LabID Event documented) for that patient.

Recurrent CDI Assay: Any LabID Event from a specimen obtained > 2 weeks and ≤ 8 weeks after the most recent LabID Event for that patient.

The incident and recurrent CDI LabID Events are further categorized within NHSN. The following categorizations and prevalence and incidence calculations are built into the analysis capabilities of NHSN, and are based on timing of admission and specimen collection, location where specimen was collected, and previous discharge. Descriptions are provided to explain how the categories and metrics are defined in NHSN.

Categorizing CDI LabID Events – Based on Date Admitted to Facility and Date Specimen Collected:

Community-Onset (CO): LabID Event collected as an outpatient or an inpatient ≤ 3 days after admission to the facility (i.e., days 1, 2, or 3 of admission).

Community-Onset Healthcare Facility-Associated (CO-HCFA): CO LabID Event collected from a patient who was discharged from the facility ≤ 4 weeks prior to current date of stool specimen collection.

Healthcare Facility-Onset (HO): LabID Event collected > 3 days after admission to the facility (i.e., on or after day 4).

Calculated CDI Prevalence Rates:

Inpatient Reporting:
Admission Prevalence Rate = Number of non-duplicate CDI LabID Events per patient per month 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 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 (Note: The numerator in this formula does not include Admission Prevalent LabID Events that are CO-HFCA.)

Location 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 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 CDI LabID Events per patient per month regardless of time spent in location (i.e., prevalent + incident, if monitoring by inpatient location), or facility (i.e., CO + CO-HCFA + 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 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=FacWideOUT) / Number of patient encounters for the location or facility x 100

Calculated CDI Incidence Rates: (see categorization of Incident, HO, and CO-HCFA above).

Location CDI Incidence Rate = Number of Incident CDI LabID Events per month identified > 3 days after admission to the location / Number of patient days for the location x 10,000

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 (this calculation is only accurate for Overall Facility-wide Inpatient reporting)

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 (this calculation is only accurate for Overall Facility-wide Inpatient reporting)

B. Optional Reporting

Prevention Process Measures Surveillance (Hand Hygiene and Gown and Gloves Use Only)
See Sections I.B.1.a. and I.B.1.b. under the MDRO Option.

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[1]HICPAC, Management of Multidrug-Resistant Organisms in Healthcare Settings. <http://www.cdc.gov/NCIDOD/DHQP/hicpac_pubs.html>.

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

[3]McDonald LC, et al. *Infect Control Hosp Epidemiol* 2007; 28:140-145.

Figure 1. MDRO Test Result Algorithm for Laboratory-Identified (LabID) Events

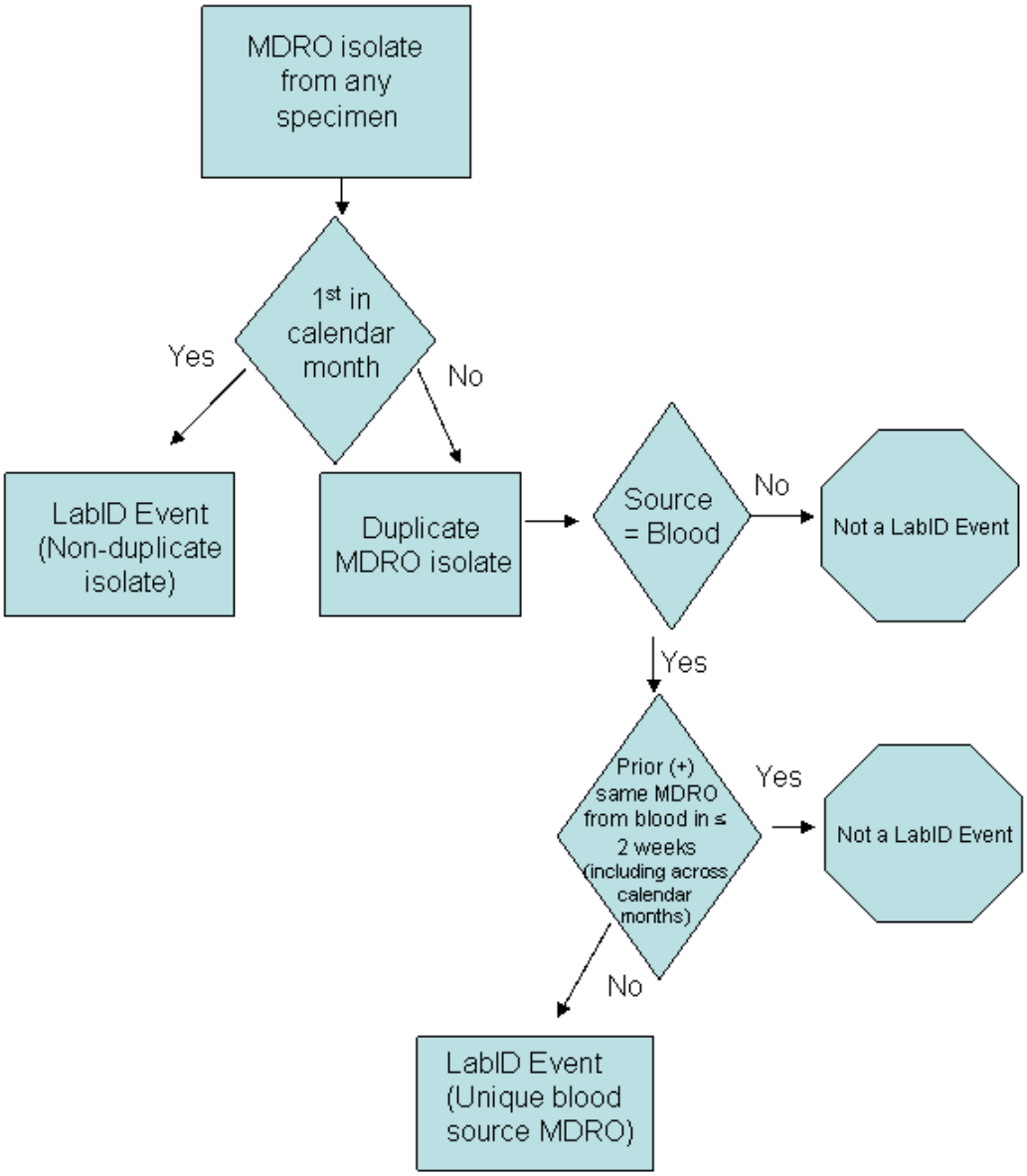

Figure 2. C. difficile Test Result Algorithm for Laboratory Identified (LabID) Events

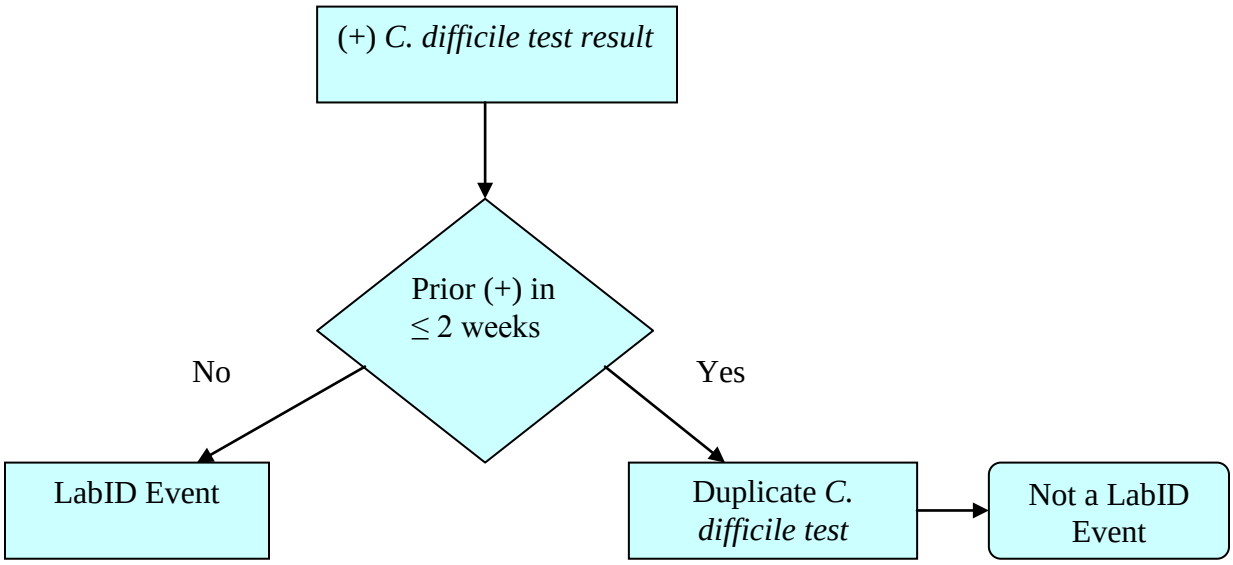

Table 2. Rates and Measures Derived from Various MDRO and CDI Protocol Surveillance Methods

Surveillance Method	Forms	Rate	Measures
MDRO Infection Surveillance	Numerator: *1)Primary Bloodstream Infection* *2) Pneumonia* *3) Urinary Tract Infection* *4) Surgical Site Infection* *5) MDRO Infection Event* Denominator: *MDRO and CDI Prevention Process & Outcome Measures Monthly Monitoring*	Data are stratified by time (e.g., month, year) and patient care location. MDRO Infection Incidence Rate = Number of healthcare-associated infections by MDRO type/ Number of patient days X 1000	Direct HAI MDRO Incidence Rate
MDRO Laboratory Identified Event	Numerator: *Laboratory Identified MDRO or CDI Event* Denominator: *MDRO and CDI Prevention Process & Outcome Measures Monthly Monitoring*	Inpatient Reporting: Admission Prevalence Rate = Number of 1st LabID Events per patient per month identified ≤ 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 (i.e.,	Proxy Measures for MDRO Exposure Burden

Surveillance Method	Forms	Rate	Measures
		prevalent + incident, if monitoring by inpatient location), or facility (i.e., 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	
		Inpatient Reporting: MDRO Bloodstream Infection Admission Prevalence Rate = Number of all unique blood source LabID Events per patient per month 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 admissions to the location or facility x 100 MDRO Bloodstream Infection Incidence OR Incidence Density Rate = Number of all unique blood source LabID Events per patient per month 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 admissions to the location or facility x 100 OR 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 (i.e., prevalent + incident, if monitoring by	Proxy Measures for Bloodstream Infection Admission Prevalence and Incidence

Surveillance Method	Forms	Rate	Measures
		inpatient location), or facility (i.e., CO + HO, if monitoring by overall facility-wide inpatient=FacWideIN) / Number of patient admissions to the location or facility x 100 Outpatient Reporting: 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	
		Overall MDRO Infection/Colonization Incidence Rate = Number of 1st LabID Events per patient per month among those with no documented prior evidence of a previous LabID Event with this specific organism type 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 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 a previous LabID Event with this specific organism type 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	Proxy Measures for MDRO Healthcare Acquisition
Prevention Process Measures:	Numerator & Denominator: *MDRO and CDI Prevention Process &*	Hand Hygiene Percent Adherence = Number of contacts for which hand hygiene	Direct Adherence Percent: Hand Hygiene

Surveillance Method	Forms	Rate	Measures
Hand Hygiene	*Outcome Measures Monthly Monitoring*	was performed / Number of contacts for which hand hygiene was indicated X 100	
Gown & Gloves Use		Gown & Glove Use Percent Adherence = Number of contacts during which gown and gloves were used /Number of contacts for which gown and gloves were indicated X 100.	Gown & Gloves Use
Active Surveillance Testing (AST) (MRSA & VRE only)		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.	Admission AST Discharge/Transfer AST
Active Surveillance Testing Outcome Measures (MRSA & VRE Only)	Numerator & Denominator: *MDRO and CDI Prevention Process & Outcome Measures Monthly Monitoring*	Eligible patients = All (All patients regardless of history of MDRO) AST Admission Prevalence rate = Number of admission AST or clinical positive / Number of admissions X 100 Eligible patients = NHx (No history) AST Admission Prevalence rate = Number of admission AST or clinical positive + Number of known positive / Number of admissions X 100.	Direct Admission Prevalence Rates of MDRO by AST Eligibility
		AST Incidence Rate = Number of discharge/transfer AST or clinical positive cases / Number of patient days X 1000	Direct MDRO Healthcare Acquisition

Surveillance Method	Forms	Rate	Measures
CDI Infection Surveillance	Numerator: *CDI Infection Event* Denominator: *MDRO and CDI Prevention Process & Outcome Measures Monthly Monitoring*	<u>*C. Difficile* Infection rate</u> = Number of *C. difficile* healthcare-associated infections/ Number of patient days X 10,000	Direct HAI CDI Incidence Rate
CDI Laboratory Identified Event	Numerator: *Laboratory-Identified MDRO or CDI Event* Denominator: *MDRO and CDI Prevention Process & Outcome Measures Monthly Monitoring*	<u>Inpatient Reporting</u>: <u>Admission Prevalence Rate</u> = Number of non-duplicate CDI LabID Events per patient per month 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 admissions to the location or facility x 100 <u>Location Percent Admission Prevalence that is Community-Onset</u> = Number of Admission Prevalent LabID Events to a location that are CO / Total number Admission Prevalent LabID Events x 100 <u>Location Percent Admission Prevalence that is Community-Onset Healthcare Facility-Associated</u> = Number of Admission Prevalent LabID Events to a location that are CO-HCFA / Total number Admission Prevalent LabID Events x 100 <u>Location Percent Admission Prevalence that is Healthcare Facility-Onset</u> = Number of Admission Prevalent LabID Events to a location that are HO / Total number of Admission Prevalent LabID Events x 100 <u>Overall Patient Prevalence Rate</u> = Number of 1st CDI LabID Events per patient per month regardless of time spent in location (i.e., prevalent + incident, if monitoring by inpatient location), or facility (i.e., CO +	Proxy Measures for CDI Exposure Burden

Surveillance Method	Forms	Rate	Measures
		CO-HCFA + 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 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=FacWideOUT) / Number of patient encounters for the location or facility x 100	
		Location CDI Incidence Rate = Number of Incident CDI LabID Events per month identified > 3 days after admission to the location / Number of patient days for the location x 10,000 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 (this calculation is only accurate for Overall Facility-wide Inpatient reporting) 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 (this calculation is only accurate for Overall Facility-wide Inpatient reporting)	Proxy Measures for CDI Healthcare Acquisition