Laboratory-identified Event Surveillance Protocol for *Clostridioides difficile*
Infection and Multidrug Resistant Organism Events for Long-term Care Facilities

**Background:** Multi-drug resistant bacteria including methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant Enterococci (VRE), and multi-drug resistant Gram-negative bacilli (for example, *Carbapenem-resistant Enterobacteriaceae*) have increased in prevalence in U.S. long-term care facilities (LTCF) over the past several decades.\(^1\) For example, over 35% of nursing home residents are colonized with a multi-drug resistant organism (MDRO).\(^1\) This has important public health implications as MDRO infections are associated with increased number of hospitalizations and hospital readmissions, higher healthcare costs, increased mortality due to more severe illnesses, and increased use of broad-spectrum antibiotics.\(^1\)

*Clostridioides difficile* (*C. difficile*) infection (CDI) is one of the most common healthcare-associated infections in LTCFs and often a consequence of antibiotic overuse.\(^7\) The clinical presentation of CDI ranges from uncomplicated diarrhea to severe pseudomembranous colitis, toxic megacolon, and even death.

It is critical for LTCFs to monitor MDRO and CDI rates using standardized surveillance definitions to obtain a more complete understanding of how these organisms manifest and are transmitted in the long-term care setting. The Laboratory-identified (LabID) Event Module of the NHSN LTCF Component is a tool designed for use in certified skilled nursing facilities and nursing homes (LTC:SKILLNURS) and intermediate/chronic care facilities for the developmentally disabled (LTC:DEVDIS) to help these facilities implement strategies outlined in various prevention and control guidelines.\(^1-6\) The specific goal of the LabID module is to provide a mechanism for facilities to systematically monitor CDIs and MDROs, enabling facilities to identify problems, improve care, and determine progress toward national healthcare-associated infection goals.

**References:**
I. Clostridioides difficile Infection (CDI) Surveillance using LabID Event Methodology

**Methods:** Facilities may choose to monitor *Clostridioides difficile* infections (CDI) using laboratory-identified (LabID) event surveillance. This method allows LTCFs to conduct surveillance using laboratory data without clinical evaluation for signs and symptoms. Proxy measures of CDI and healthcare exposure can then be calculated with limited resident information. NHSN forms should be used to collect all required data, using the definitions of each data field as indicated in the *Table of Instructions*.

**Settings:** CDI LabID Event reporting is currently available for certified skilled nursing facilities/nursing homes (LTC: SKILLNURS) and intermediate/chronic care facilities for the developmentally disabled (LTC: DEVDIS).

Setting includes specimens collected while the resident is physically located in the reporting LTCF, as well as specimens collected during a brief outpatient visit to an emergency department (ED) or medical office and the resident returns to the LTCF within 2 calendar days (specifically, on the day of the visit or the next calendar day). Do not report CDI events collected in the ED, if the resident is subsequently admitted to the acute care facility.

Laboratory results obtained before a resident’s admission to the reporting LTCF or during an admission in another healthcare facility should **NOT** be reported to NHSN.

**Case Scenarios:**

1. Mr. T is a resident in your LTCF. On March 1st, he was transferred to the local ED for evaluation of diarrhea and fever. While in the ED, a loose stool specimen was collected and tested positive for *C. difficile* toxin. He received IV fluids and was transferred back to the LTCF the next calendar day, on March 2nd. Since the specimen was collected in the ED and Mr. T returned to the LTCF within 2 calendar days, the specimen collected in the ED was submitted to NHSN as a CDI LabID Event for the LTCF.

2. Mr. T is a resident in your LTCF. On March 1st, he was transferred to the local ED for evaluation of diarrhea, severe abdominal pain, and fever. While in the ED, a loose stool specimen tested positive for *C. difficile* toxin. He was admitted to the hospital for further treatment. Since the resident was admitted to the hospital as an inpatient and did not return to the LTCF within 2 calendar days, the specimen collected in the ED was not submitted to NHSN as a CDI LabID Event for the reporting LTCF.

**Requirements:** Only laboratory assay results for unformed stool specimens or specimens conforming to the shape of the specimen container should be submitted to NHSN.
New for 2020 reporting: Facilities must submit all positive *C. difficile* laboratory assays collected from a resident while he/she is physically housed in the reporting LTCF (see Settings for additional information about reportable events).

A *NHSN Monthly Reporting Plan* for the LTCF ([CDC 57.141](https://www.cdc.gov/nhsn/)) must be completed for each calendar month in which a facility plans to submit data to NHSN. NHSN will not save event data without a corresponding monthly reporting plan. For data to be included in analysis reports and the [LTCF Data Dashboard](https://www.cdc.gov/nhsn/ltcf/lcdd.html), both numerator and denominator (see Numerator and Denominator Data section below) must be reported for the entire facility, referred to as facility-wide inpatient (FacWideIN), for the participating calendar month.

**Note:** Facilities are encouraged to report for at least six consecutive months to provide meaningful measures for analysis.

**Definitions:** The following definitions apply to CDI LabID Event reporting:

**CDI Laboratory-identified (LabID) Event:** (1) *C. difficile* positive laboratory assay collected from a resident while physically located in the LTCF at the time of specimen collection; or (2) *C. difficile* positive laboratory assay collected from a resident during a brief outpatient (OP) visit (not admission) to an emergency department (ED) or medical office when the resident returns to the LTCF on the same calendar day or the next calendar day (see Settings).

**C. difficile** positive laboratory assay: (1) An unformed/loose stool that tests positive for *C. difficile* toxin A and/or B. This includes molecular assays (PCR) and/or toxin assays; or (2) A toxin-producing *C. difficile* organism detected in an unformed/loose stool sample by culture or other laboratory means.

**Duplicate CDI Laboratory-identified (LabID) Event:** (1) *C. difficile* positive laboratory assay collected from a resident while physically housed in the LTCF at the time of specimen collection when the resident had a previous CDI LabID Event submitted from the reporting facility within the past two weeks (specifically, less than 15 days); **OR** (2) *C. difficile* positive laboratory assay collected from a resident during a brief outpatient (OP) visit (not admission) to an emergency department (ED) or medical office when the resident returns to the LTCF on the same calendar day or the next calendar day (see Settings) when the resident had a previous CDI LabID Event submitted from the reporting facility within the past two weeks (specifically, less than 15 days).

NEW for 2020: LTCFs must submit all CDI LabID Events to NHSN, including duplicate CDI events with positive laboratory assays.
Case Scenarios:

1. Mr. T is a long-term resident in your facility. On December 30th, he developed diarrhea and abdominal pain. On January 1st, a loose stool specimen was collected and tested positive for *C. difficile* toxin. A CDI LabID Event was submitted to NHSN for 1/1. Over the next week, Mr. T seemed to improve, and the diarrhea resolved. On January 10th, he had several more episodes of diarrhea, and another loose stool specimen tested positive for *C. difficile* toxin. This positive specimen was also entered in NHSN as a CDI LabID Event for 1/10.

2. Ms. Smith was admitted to your LTCF today. According to her chart she was recently treated for CDI but continues to have episodes of diarrhea. The attending physician ordered a *C. difficile* test and the specimen was collected on the following day. The results were positive for *C. difficile* toxin A, so a CDI LabID Event was submitted to NHSN for Ms. Smith.

3. Mrs. Anttila is admitted to your skilled nursing facility for rehab following a motor vehicle accident. According to her chart, she recently tested positive for CDI and is admitted to your facility on treatment. You do not submit a CDI LabID Event for Mrs. Anttila since she was not tested while physically housed in your LTCF.

Key Points to Remember:

1. **NEW for 2020** – ALL CDI LabID Events must be submitted to NHSN, including duplicate CDI events with positive laboratory assays.
2. A CDI LabID Events must be submitted to NHSN, even if the resident has a prior history of CDI or when the specimen was collected within the first three days of admission to the LTCF. In other words, if the positive specimen is collected within your facility, you must submit a CDI LabID Event.
   
   Note: This practice is important to understand the burden of CDI in the LTCF.
3. CDI LabID Event rules apply to specimens collected while the resident was physically housed in the reporting LTCF or when a resident had a specimen collected during a brief visit to an outpatient setting, such as an ED or medical clinic.
4. Laboratory results obtained before a resident’s admission to the LTCF or during an admission in another facility should not be submitted as a CDI LabID Event for the reporting LTCF.
5. If a specimen is collected while the resident is receiving care in an ED or OP setting, the *Resident Care Location* and *Primary Resident Service Type* should indicate the resident’s primary LTCF location and service type prior to the ED or OP visit.
6. When performing LabID Event reporting for CDI, the facility must identify and report from all locations within the LTCF, referred to as FacWideIN.
Numerator and Denominator Data

NHSN provides users with forms and accompanying instructions that can be used to collect the required LabID Event data (numerator data), as well as the required monthly summary data (denominator data). The forms include all required data elements that must be submitted in the NHSN application. Facilities may also choose to customize these forms to better accommodate individual surveillance programs.

**Numerator:** Laboratory-identified **MDRO or CDI Event for LTCF** form (CDC 57.138) is used to collect and report each CDI LabID Event. The Table of Instructions for Completion of the LTCF Laboratory-identified (LabID) MDRO or CDI Event form includes brief instructions for collection and entry of each data element on the form. Report one event per form.

**Denominator:** Monthly totals for resident admissions, resident days, number of admissions on *C. difficile* treatment, and CDI treatment starts are used for denominator data. Data are collected using the **MDRO and CDI LabID Event Reporting Monthly Summary Data for LTCF** form (CDC. 57.139). The Table of Instructions for Completion of the MDRO and CDI Monthly Monitoring for Long-term Care Facility form includes brief instructions for collection and entry of data elements on the form. Facilities may also choose to use the optional Denominators for LTCF form (CDC 57.142) to collect daily denominator data, keeping in mind that only the monthly totals are submitted to NHSN. For form CDC 57.142, the following Table of Instructions for Completion of the LTCF Component Denominators for LTCF are available.

- **Resident admissions** refer to total number of residents admitted to the facility including both new and re-admissions (specifically, a resident was out of the facility for more than two (2) calendar days and then returned).

- **Resident-days** are calculated using the daily census of residents in the facility each day of the month. The monthly total is submitted to NHSN.

- **Number of admissions on *C. difficile* treatment** is calculated by counting the number of residents who are receiving antibiotic therapy for *C. difficile* infection at the time of admission to your facility during the current calendar month.

- **Number of CDI treatment starts** is the total count of new prescriptions for an antibiotic/medication given to residents suspected or diagnosed with having a *C. difficile* infection in the facility for the calendar month and includes treatment with or without a positive laboratory test.

Categorizations of CDI LabID Events

All CDI LabID Events must be submitted to NHSN. Based on submitted event data, NHSN will categorize events to populate different measures. Because of variability in documenting time of admission to the LTCF, calendar days are used to categorize LabID Events.
I. Duplicate CDI LabID Events will appear in the NHSN line list and will be marked as a “duplicate” event based on the following definition:

- **Duplicate CDI LabID Event**: Any CDI LabID Event submitted for the same resident following a previous CDI LabID Event within the past two weeks (<15 days). **Important**: Duplicate CDI LabID Events will be excluded from rate calculations.

II. Non-duplicate CDI LabID Events will be categorized as *Incident* or *Recurrent* based on the specimen collection date of each CDI LabID Event submitted for an individual resident in the reporting facility. **Note**: The date of specimen collection is considered as day 1.

- **Incident CDI LabID Event**: Either the first CDI LabID Event ever submitted for an individual resident in the LTCF, or a subsequent LabID Event submitted > 56 days (8 weeks) after the most recent CDI LabID Event reported for an individual resident in the LTCF.

- **Recurrent CDI LabID Event**: Any CDI LabID Event submitted more than 14 days (2 weeks) and less than 57 days (8 weeks) after the most recent CDI LabID Event reported for an individual resident in the LTCF.

**EXAMPLE**: NHSN Classification of CDI LabID Events as Incident or Recurrent

<table>
<thead>
<tr>
<th>Resident ID</th>
<th>Current Admit Date</th>
<th>CDI Event Date (specimen collection date)</th>
<th>NHSN Categorization</th>
</tr>
</thead>
<tbody>
<tr>
<td>1111</td>
<td>09/01/2019</td>
<td>09/02/2019</td>
<td>Incident</td>
</tr>
<tr>
<td>1111</td>
<td>09/01/2019</td>
<td>09/10/2019</td>
<td>Duplicate -no further categorization</td>
</tr>
<tr>
<td>1111</td>
<td>09/01/2019</td>
<td>09/25/2019</td>
<td>Recurrent</td>
</tr>
<tr>
<td>1111</td>
<td>09/01/2019</td>
<td>11/28/2019</td>
<td>Incident</td>
</tr>
</tbody>
</table>

III. NHSN will further categorize incident and recurrent CDI LabID Events based on the following: (1) date of *current admission to the facility*; (2) date specimen collected (event date); and (3) *date of last transfer from acute care to your facility*.

- **Community-onset (CO) LabID Event**: Date specimen collected ≤ 3 calendar days after date of current admission to the facility (specifically, days 1, 2, or 3 of current admission).

- **Long-term Care Facility-onset (LO) LabID Event**: Date specimen collected > 3 calendar days after current admission date (specifically, on or after day 4).
  
  - LO LabID Events can be further sub-classified as:
    - **Acute Care Transfer-Long-term Care Facility-onset (ACT-LO)**: LTCF-onset (LO) LabID Event with date specimen collected ≤ 4 weeks following...
date of last transfer from an Acute Care Facility (specifically from a hospital, long-term acute care hospital, or acute inpatient rehabilitation facility) to the LTCF.

<table>
<thead>
<tr>
<th>Admission date</th>
<th>June 4&lt;sup&gt;th&lt;/sup&gt;</th>
<th>June 5&lt;sup&gt;th&lt;/sup&gt;</th>
<th>June 6&lt;sup&gt;th&lt;/sup&gt;</th>
<th>June 7&lt;sup&gt;th&lt;/sup&gt;</th>
<th>June 8&lt;sup&gt;th&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>day 1</td>
<td>day 2</td>
<td>day 3</td>
<td>day 4</td>
<td>day 5</td>
</tr>
<tr>
<td>Case Scenarios:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Ms. T was first admitted to the LTCF on June 4<sup>th</sup>. On June 5<sup>th</sup> she developed diarrhea, and on June 6<sup>th</sup> a loose stool specimen was collected and tested positive for C. difficile toxin. A CDI LabID Event was entered for June 6<sup>th</sup> (date of specimen collection). This event was considered a non-duplicate event and categorized as **Community-onset (CO)** since the specimen was collected within the first 3 days of her current admission into the facility. If the specimen had been first collected four or more days (June 7<sup>th</sup> or later) after her current admission date, the NHSN application would have categorized the LabID Event as **Long-term Care Facility-onset (LO)**.

2. Ms. Smith was transferred to your facility from an acute care facility on July 1<sup>st</sup> and had a loose stool collected on July 10<sup>th</sup> that tested positive for C. difficile toxin. A CDI LabID Event was submitted to NHSN and subsequently categorized as incident, **Acute Care Transfer-Long-term Care Facility-onset (ACT-LO)** since the specimen was collected more than 3 days after her current admission and she was transferred to your facility from an acute care facility in the previous 4 weeks.

3. Mr. Tom was transferred to your facility from home on August 5<sup>th</sup>. He was on treatment for a *C. difficile* infection at the time of admission but seemed to be doing well. On August 10<sup>th</sup>, the on-call doctor ordered a *C. diff* stool test that subsequently returned positive for *C. difficile* toxin. You submit a CDI LabID Event for Mr. Tom and NHSN categorized the event as **Incident, Long-term Care Facility Onset** CDI LabID Event. This scenario represents a trade-off between reduced surveillance burden associated with LabID Event reporting and decreased specificity.

**Data Analyses**

All event and summary (denominator) data that are submitted to 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 within the analysis reports. These data can be visualized and analyzed in various ways. For example, line listing reports provide detailed line by line listing of events reported and rate table reports provide summarized monthly data with calculated rates and denominator data. Users can also generate frequency tables, bar charts, and pie charts. Additionally, the LTCF Dashboard, located on the NHSN Home Page, allows users to quickly visualize data found in the rate tables and line listings in the form of interactive bar charts and line graphs. For additional information about the LTCF Dashboard, please review the [CDC Guidance Document – Dashboard](#).

### Calculated CDI Rates and Metrics

The following section describes the various measures calculated for CDI LabID Event surveillance that are generated as part of the reports within the analysis section of NHSN. Only non-duplicate CDI LabID events are included in analysis.

<table>
<thead>
<tr>
<th>Calculated Metrics</th>
<th>Calculations</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total CDI Rate per 10,000 resident days</td>
<td>[Number of CDI LabID Events / Total resident – days] x 10,000</td>
<td>Includes CO and LO LabID Events</td>
</tr>
<tr>
<td><em>Percent of CO CDI LabID Events</em></td>
<td>[Number of CO CDI LabID Events / Total number of CDI LabID Events] x 100</td>
<td>Includes incident and recurrent CDI LabID Events</td>
</tr>
<tr>
<td><em>Percent of LO CDI LabID Events</em></td>
<td>[Number of LO CDI LabID Events / Total number of CDI LabID Events] x 100</td>
<td></td>
</tr>
<tr>
<td>o Percent of ACT-LO CDI LabID Events</td>
<td>[Number of ACT − LO CDI LabID Events / Total number of LO CDI LabID Events] x 100</td>
<td></td>
</tr>
<tr>
<td>CDI LO Incidence Rate per 10,000 resident-days</td>
<td>[Number Incident LO CDI LabID Events / Total resident – days] x 10,000</td>
<td>Excludes recurrent CDI LabID Events</td>
</tr>
<tr>
<td>CDI Treatment Prevalence on Admission</td>
<td>Number of residents on CDI treatment on admission to facility / Total number of admissions</td>
<td></td>
</tr>
<tr>
<td>Calculated Metrics</td>
<td>Calculations</td>
<td>Comments</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>CDI Treatment Ratio</td>
<td>Number of CDI medication treatment starts for CDI</td>
<td>When the CDI treatment ratio is &lt;1, there are <strong>fewer</strong> reported medication starts for CDI than CDI events submitted to NHSN;</td>
</tr>
<tr>
<td></td>
<td>Total number of CDI LabID Events</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>when the CDI treatment ratio equals 1, there are the <strong>same</strong> number of new medication starts for CDI events submitted;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>when the CDI treatment ratio is &gt;1, there are <strong>more</strong> reported medication starts for CDI than CDI events submitted to NHSN.</td>
</tr>
</tbody>
</table>
I. Multi-drug Resistant Organism Surveillance using LabID Event Methodology

Laboratory-identified (LabID) Event reporting allows laboratory data to be used without clinical evaluation of the resident for signs or symptoms, creating a less labor-intensive method to track MDROs. This method provides proxy measures of MDRO infections, and healthcare exposure based solely on laboratory data and limited resident admission/transfer data.

The data collected will enable participating facilities and the CDC to calculate several measures, depending on which MDROs the facility chooses to track. NHSN forms are available and should be used to collect all required data, using the definitions of each data field as indicated in the *Table of Instructions*.

**Methods:** Facilities may choose to monitor one or more of the following MDROs using laboratory-identified (LabID) event surveillance: *Staphylococcus aureus*, both methicillin-resistant (MRSA) and methicillin-susceptible (MSSA), vancomycin-resistant *Enterococcus spp.* (VRE), cephalosporin-resistant *Klebsiella spp.*, Carbapenem-resistant *Enterobacteriaceae* (CRE), and multidrug-resistant *Acinetobacter spp.* This method allows LTCFs to conduct surveillance using laboratory data without clinical evaluation for signs and symptoms. Proxy measures of MDROs and healthcare exposure can then be calculated with limited resident information. NHSN forms should be used to collect all required data, using the definitions of each data field as indicated in the *Table of Instructions*.

**Note:** No Active Surveillance Culture/Testing (ASC/AST) results are to be included in LabID Event reporting.

**Setting:** MDRO LabID Event reporting is available for certified skilled nursing facilities and nursing homes (LTC: SKILLNURS) and intermediate/chronic care facilities for the developmentally disabled (LTC: DEVDIS).

Setting includes specimens collected while the resident is physically located in the reporting LTCF, as well as specimens collected during a brief outpatient visit to an emergency department (ED) or medical office and the resident returns to the LTCF within 2 calendar days (specifically, on the day of the visit or the next calendar day). **Do not** report MDRO events collected in the ED, if the resident is subsequently admitted to the acute care facility.

Laboratory results obtained before a resident’s admission to the reporting LTCF or during an admission in another healthcare facility should **NOT** be reported to NHSN.
Case Scenarios:

1. Mr. T is a resident in your LTCF. On March 1st, he was transferred to the ED for evaluation of a foot ulcer. While in the ED, the wound was cultured and tested positive for MRSA. Antibiotics were ordered and Mr. T was transferred back to the LTCF on the same calendar day. Since the MRSA positive wound culture was collected in an outpatient setting and Mr. T returned to the LTCF within 2 calendar days, the specimen was submitted as an NHSN MRSA LabID Event for the LTCF.

2. Mr. T is a resident in your LTCF. On March 1st, he was transferred to the ED for evaluation of a foot ulcer. While in the ED, the wound was cultured and tested positive for MRSA. He was admitted to the hospital for IV antibiotics. Since Mr. T was admitted to as an inpatient and did not return to the LTCF within 2 calendar days, the specimen collected in the ED was **not** submitted as an NHSN MRSA LabID Event for the LTCF.

Requirements

**New for 2020 reporting**: Facilities must submit all MDRO positive isolates when collected from a resident while he/she is physically housed in the reporting LTCF (see Setting for additional information about reportable events).

An *NHSN Monthly Reporting Plan* for the LTCF ([CDC 57.141](https://www.cdc.gov/hai/prevention/nhsn-ltcf.html)) must be completed for each calendar month in which a facility plans to enter data into NHSN. NHSN will not save event data without a corresponding monthly reporting plan. For data to be included in analysis reports and the *LTCF Data Dashboard*, both numerator and denominator (see Numerator and Denominator Data section below) data must be reported for the entire facility, referred to as facility-wide inpatient (FacWideIN), for the participating calendar month.

**Note**: Facilities are encouraged to report for at least six consecutive months to provide meaningful measures for analysis.

**Available Reportable Organisms**: The following MDROs can be selected for tracking in the NHSN LabID Event module:

**Gram-stain positive organisms**:

- MRSA: *S. aureus* cultured from any specimen source that tests resistant to oxacillin, methicillin, or cefoxitin, by standard susceptibility testing methods, or any laboratory finding of MRSA (includes, but not limited to PCR or other molecular detection methods).
• MSSA: *S. aureus* cultured from any specimen source testing intermediate or susceptible to oxacillin, methicillin, or cefoxitin by standard susceptibility testing methods. **Note:** MSSA is only an option when surveillance includes MRSA.

• 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).

**Gram-stain negative organisms:**

• CephR-*Klebsiella* Any *Klebsiella species* testing non-susceptible (specifically, resistant or intermediate) to cephalosporin antibiotics like ceftazidime, cefotaxime, ceftriaxone, or cefepime.

• CRE- Any *Escherichia coli* (E. coli), *Klebsiella species*, or *Enterobacter species* testing resistant to imipenem, meropenem, doripenem, or ertapenem by standard susceptibility testing methods (specifically, minimum inhibitory concentrations of ≥4 mcg/mL for doripenem, imipenem and meropenem or ≥2 mcg/mL for ertapenem) OR by production of a carbapenemase (specifically, KPC, NDM, VIM, IMP, OXA-48) demonstrated using a recognized test (for example, polymerase chain reaction, metallo-β-lactamase test, modified-Hodge test, Carba-NP). **Note:** CRE surveillance requires facilities to monitor and report for all three organisms (CRE-*E. coli*, CRE-*Klebsiella spp.*, and CRE-*Enterobacter spp.*).

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

<table>
<thead>
<tr>
<th>Antimicrobial Class</th>
<th>Antimicrobial Agents</th>
</tr>
</thead>
<tbody>
<tr>
<td>β-lactams and β-lactam/β-lactamase inhibitor combinations</td>
<td>Piperacillin, Piperacillin/tazobactam</td>
</tr>
<tr>
<td>Sulbactam</td>
<td>Ampicillin/sulbactam</td>
</tr>
<tr>
<td>Cephalosporins</td>
<td>Cefepine, Ceftazidime</td>
</tr>
<tr>
<td>Carbapenems</td>
<td>Imipenem, Meropenem, Doripenem, Ertapenem</td>
</tr>
<tr>
<td>Aminoglycosides</td>
<td>Amikacin, Gentamicin, Tobramycin</td>
</tr>
<tr>
<td>Fluoroquinolones</td>
<td>Ciprofloxacin, Levofloxacin</td>
</tr>
</tbody>
</table>

Updated January 2020
Definitions

MDRO Laboratory-identified (LabID) Event: (1) MDRO positive isolate collected from a resident while physically housed in the reporting LTCF at the time of specimen collection, regardless of specimen source (examples include blood, sputum, and urine); or (2) MDRO positive isolate collected from a resident during a brief outpatient visit (not admission) to an emergency department or medical office when the resident returns to the reporting LTCF on the same calendar day or the next calendar day. (see Setting).

NEW for 2020: LTCFs must submit all MDRO LabID Events

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

Case Scenarios:

1. Mr. T is a long-term resident in your facility. On December 2\textsuperscript{nd}, he developed a fever and complained of several pain during urination. A urine culture was collected on 12/2 and subsequently returned positive for MRSA. A MRSA LabID Event was submitted to NHSN for 12/2 (date of specimen collection). Over the next week, Mr. T seemed to improve, and the pain resolved. On December 25\textsuperscript{th}, he had purulent discharge around his penis and another urine culture was collected on the same day and subsequently tested positive for MRSA. The MRSA was also entered in NHSN as a MRSA LabID Event for 12/25.

2. Ms. Smith was admitted to your LTCF today, on May 1. According to her chart she was recently treated for VRE in a surgical wound but continues to have episodes of pain and copious discharge. The attending physician ordered a culture of the wound and the specimen was collected on the following day, on May 2. The results were positive for VRE, so a VRE LabID Event was submitted to NHSN for Ms. Smith.

3. Over the next several days, Ms. Smith’s condition seemed to worsen, as she developed a fever that would not respond to medication. A blood, urine, and wound culture were ordered. The specimens were collected on May 10 and came back with the following results: Blood +VRE; Wound +VRE and +MRSA; Urine +VRE. A LabID Event was entered for each MDRO: (1) VRE-Blood; (2) VRE – Wound; (3) MRSA Wound: and VRE-Urine.

4. Mrs. Anttila is admitted to your skilled nursing facility for rehab following a motor vehicle accident. According to her chart, she recently tested positive for multidrug resistant acinetobacter and was admitted to your facility on antibiotics. You do not submit an MDR-Acinetobacter LabID Event for Mrs. Anttila since she was not tested while physically bedded in your LTCF.
5. While reviewing her chart, you also notice that a nasal swab was obtained as part of your MRSA active surveillance program. The culture was positive. Since the positive MRSA was collected as part of an active surveillance program, you do not submit a MRSA LabID Event for Mrs. Anttila.

Key Points

1. MDRO LabID Event reporting is ONLY for collecting and tracking isolates from positive cultures that are taken for "clinical" purposes (specifically, for diagnosis and treatment), which means that Active Surveillance Culture/Testing (for example, nasal swabs for MRSA or perirectal swabs for VRE) results are not reported as MDRO LabID Events.

2. **NEW for 2020** – ALL MDRO LabID Events must be submitted to the NHSN.

3. MDRO LabID Event rules apply to specimens collected while resident is physically bedded in the reporting LTCF. The only exception is when a specimen was collected during a brief outpatient visit (not admission) to an emergency department or medical office visit.

4. Laboratory results obtained before a resident’s admission to the LTCF or during an admission in another facility are excluded from MDRO LabID Event reporting.

5. If a specimen is collected while the resident is receiving care from an ED or OP setting, the Resident Care Location and Primary Resident Service Type should indicate the resident’s primary LTCF location and service type prior to the ED or OP visit.

6. When performing LabID Event reporting for MDROs, the facility must report the selected MDRO(s) from all specimen sources, and from all locations within the reporting LTCF, referred to as FacWideIN.

Numerator and Denominator Data

NHSN provides users with forms and accompanying instructions that can be used to collect the required LabID Event data (numerator data), as well as the required monthly summary data (denominator data). Facilities may also choose to customize these forms to better accommodate individual surveillance programs.

**Numerator:** Data for each MDRO LabID Event will be reported using the *Laboratory identified MDRO or CDI Event for LTCF* form (CDC 57.138). The *Table of Instructions for Completion of the LTCF Laboratory-identified (LabID) MDRO or CDI Event form* includes instructions for collection and entry of each data element on the form. Report one event per form.

**Denominator:** Monthly totals for resident admissions and resident days. Data are collected using the *MDRO and CDI LabID Event Reporting Monthly Summary Data for LTCF* form (CDC, 57.139). The *Table of Instructions for Completion of the MDRO and CDI Monthly Monitoring for*
**Long-term Care Facility** form includes brief instructions for collection and entry of data elements on the form. Facilities may also choose to use the optional *Denominators for LTCF* form ([CDC 57.142](#)) to collect daily denominator data, keeping in mind that only the monthly totals are submitted to NHSN. For form CDC 57.142, the following *Table of Instructions for Completion of the LTCF Component Denominators for LTCF* are available.

*Resident admissions* refer to total number of residents admitted to the facility including both new and re-admissions (specifically, a resident was out of the facility for more than two (2) calendar days and then returned).

*Resident-days* are calculated using the daily census of residents in the facility each day of the month. The daily total is submitted to NHSN.

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**Categorizations of MDRO LabID Events**

All MDRO LabID Events must be submitted to NHSN. Based on event data submitted, NHSN will categorize events to populate different measures. Because of variability in documenting time of admission to the LTCF, calendar days are used to categorize LabID Events.

I. Duplicate MDRO LabID Events will be appear in the NHSN line list and will be marked as a “duplicate” event based on the following definition:

- **Duplicate MDRO LabID Event**: (1) Any subsequent *non-blood* source MDRO positive isolate collected from the same resident after the first positive isolate of the same MDRO during a calendar month; or (2) Any subsequent *blood source* MDRO positive isolate collected from the same resident after the first positive isolate of the same MDRO during the previous two weeks (<15 calendar days), including across calendar months and admissions. However, if the first MDRO specimen for a calendar month is a blood source specimen, it will not be considered as a non-duplicate even if the same MDRO was reported within the previous 2 weeks. **Important**: Duplicate MDRO LabID Events will be excluded from rate calculations.

II. Nonduplicate MDRO LabID Events will be categorized based on the following: (1) *date of current admission to the facility*; (2) *date specimen collected (event date)*; and (3) *date of last transfer from acute care to your facility*.

- **Community-onset (CO) LabID Event**: Date specimen collected ≤ 3 calendar days after date of current admission to the facility (specifically, days 1, 2, or 3 of admission).

- **Long-term Care Facility-onset (LO) LabID Event**: Date specimen collected > 3 calendar days after date of current admission to the facility (specifically, on or after day 4).
  - LO LabID Events can be further sub-classified as:
    - **Acute Care Transfer-Long-term Care Facility-onset (ACT-LO):** LTCF-
onset (LO) LabID Event with date specimen collected ≤ 4 weeks following date of last transfer from an Acute Care Facility (hospital, long-term acute care hospital, or acute inpatient rehabilitation facility only) to the LTCF.

**EXAMPLE:** Ms. T was first admitted to the LTCF on June 4\(^{th}\). On June 6\(^{th}\), a foot ulcer tested positive for MRSA. A MRSA LabID Event was submitted to NHSN June 6\(^{th}\) (date of specimen collection). NHSN categorized the LabID Event as Community-onset since the specimen was collected within the first 3 days of her current admission into the facility. If the specimen had been first collected four or more days (June 7\(^{th}\) or later) after her current admission date into the facility, the NHSN application would have categorized the LabID Event as Long-term Care Facility-onset.

<table>
<thead>
<tr>
<th>Admission date</th>
<th>June 4(^{th})</th>
<th>June 5(^{th})</th>
<th>June 6(^{th})</th>
<th>June 7(^{th})</th>
<th>June 8(^{th})</th>
</tr>
</thead>
<tbody>
<tr>
<td>day 1</td>
<td></td>
<td></td>
<td></td>
<td>day 4</td>
<td>day 5</td>
</tr>
</tbody>
</table>

**Case Scenarios:**

1. Ms. T was first admitted to the LTCF on June 4\(^{th}\). On June 5\(^{th}\) she complained of burning during urination and had a low-grade fever, and on June 6\(^{th}\) a urine culture specimen was collected and tested positive for MRSA. A MRSA LabID Event was entered for June 6\(^{th}\) (date of specimen collection). This event was considered a non-duplicate event and categorized as **CO** since the specimen was collected within the first 3 days of her current admission into the facility.

2. Ms. Smith was transferred to your facility from an acute care facility on July 1\(^{st}\) and had a urine culture collected on July 10\(^{th}\) that tested positive for VRE. A VRE LabID Event was submitted to NHSN and subsequently categorized as **ACT-LO** since the specimen was collected more than 3 days after her current admission and she was transferred to your facility from an acute care facility in the previous 4 weeks.

3. Mr. Tom was transferred to your facility from home on August 5\(^{th}\). He was on treatment for a MRSA urinary tract infection at the time of admission but seemed to be doing well. A MRSA LabID Event does NOT get submitted to NHSN since the culture was not collected while he was bedded in the LTCF. On August 10\(^{th}\), the on-call doctor ordered a urine culture after Mr. Tom developed a fever and discharge around his penis; the test results returned positive for MRSA and VRE. You must submit two LabID Events for Mr. Tom--a MRSA LabID Event and a VRE LabID Event. NHSN categorizes both events as **LO**. This scenario represents a trade-off between reduced surveillance burden associated with
LabID Event reporting and decreased specificity.

III. All positive MDRO specimens must be submitted. However, the NHSN method for categorizing non-duplicate MDRO blood sources is different compared to non-blood specimen sources.

**Non-duplicate blood source MDRO LabID Event:** NHSN will categorize a submitted MDRO blood source LabID Event as a non-duplicate if one of the following are true: (1) the first MDRO positive isolate in a calendar month for a resident is a blood specimen, even if the same resident had the same MDRO blood isolate reported in the previous 2 weeks (<15 days) across calendar months; **OR** (2) A MDRO isolate identified in a resident with no prior positive blood culture for the same MDRO in the past 2 weeks (<15 days). Even across calendar months and admissions. This includes scenarios in which the same MDRO was previously reported from a non-blood source during the same month or past two weeks.

**Case Scenario: Ms. T**

1. A new resident, Ms. T complained of burning during urination on June 12th, and on June 15th a urine culture specimen was collected and tested positive for MRSA. A MRSA LabID Event was entered for June 15th. NHSN categorized the event as non-duplicate MRSA LabID Event since it was the first MRSA reported for Ms. T for the calendar month of June.

2. A week later, Ms. T spiked a high fever in which a blood culture was collected and positive for MRSA. A MRSA LabID event was entered for June 22. Since Ms. T had not had a reported positive MRSA blood isolate in the past 2 weeks (<15 calendar days), NHSN categorized the MRSA blood as a non-duplicate MRSA LabID Event.

3. On July 2, another blood culture was collected from Ms. T. It returned positive for MRSA. A MRSA LabID Event was submitted to NHSN for July 2. Since this was the first MRSA positive isolate in a new calendar month for Ms. T, NHSN categorized the MRSA LabID Event as a non-duplicate even though it was less than 15 since the last submitted MRSA LabID Event for Ms. T.

4. On July 10, a urine culture and a blood culture were collected from Ms. T. Both specimens were positive for MRSA, and therefore reported as two individual MRSA LabID Events (one for the urine and one for the blood). NHSN categorized both LabID Events as duplicate events. The MRSA urine since it was not the first MRSA specimen for Ms. T in the month of July; and the MRSA blood since it was less than 15 days since the last MRSA blood was reported to NHSN.
### Line List Scenarios for Resident ID 202000

<table>
<thead>
<tr>
<th>Specimen Collection Date</th>
<th>Specimen Source</th>
<th>Result</th>
<th>Submit LabID Event to NHSN?</th>
<th>NHSN Classification as Duplicate or Non-Duplicate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/1</td>
<td>Urine</td>
<td>VRE</td>
<td>YES</td>
<td><strong>Non-duplicate</strong> since this is the first VRE LabID Event reported for the resident in January.</td>
</tr>
<tr>
<td>1/14</td>
<td>Urine</td>
<td>MRSA</td>
<td>YES</td>
<td><strong>Non-duplicate</strong> since this is the first MRSA LabID Event reported for the resident in January.</td>
</tr>
<tr>
<td>1/20</td>
<td>Abscess</td>
<td>VRE</td>
<td>YES</td>
<td><strong>Duplicate</strong> since this is a non-blood source and a VRE LabID Event has already been reported for this resident in January.</td>
</tr>
<tr>
<td>1/25</td>
<td>Blood</td>
<td>VRE</td>
<td>YES</td>
<td><strong>Non-duplicate</strong> since this is the first VRE LabID Event reported for the resident in February.</td>
</tr>
<tr>
<td>2/19</td>
<td>Abscess</td>
<td>VRE</td>
<td>YES</td>
<td><strong>Duplicate</strong> since a VRE LabID Event has already been reported for this resident in February.</td>
</tr>
<tr>
<td>2/26</td>
<td>Blood</td>
<td>VRE</td>
<td>YES</td>
<td><strong>Non-duplicate</strong> since it has been more than two weeks (&gt;14 days) since the last MRSA blood source LabID Event was reported for this resident.</td>
</tr>
<tr>
<td>3/1</td>
<td>Wound</td>
<td>VRE</td>
<td>YES</td>
<td><strong>Non-duplicate</strong> since this is the first VRE LabID Event reported for the resident in March.</td>
</tr>
<tr>
<td>3/3</td>
<td>Blood</td>
<td>VRE</td>
<td>YES</td>
<td><strong>Duplicate</strong> since this was not the first VRE LabID Event reported for March, and it has been less than two weeks (&lt;15 days) since the most recent VRE blood source LabID Event was reported for this resident.</td>
</tr>
</tbody>
</table>
Data Analyses

All event and summary (denominator) data that are submitted to 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 within the analysis reports. These data can be visualized and analyzed in various ways. For example, line listing reports provide detailed line by line listing of events reported and rate table reports provide summarized monthly data with calculated rates and denominator data. Users can also generate frequency tables, bar charts, and pie charts. Additionally, the LTCF Dashboard, located on the NHSN Home Page, allows users to quickly visualize data found in the rate tables and line listings in the form of interactive bar charts and line graphs. For additional information about the LTCF Dashboard, please review the CDC Guidance Document – Dashboard.

Calculated MDRO Rates and Metrics:

The following section describes the various metrics calculated for MDRO LabID Event surveillance that are generated as part of the reports within the analysis section of NHSN. *Only non-duplicate LabID Events are included in calculated metrics.*

<table>
<thead>
<tr>
<th>Calculated Metrics</th>
<th>Calculations</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Total MDRO Rate per 1,000 resident days | \[
\frac{\text{Number of MDRO LabID Events}}{\text{Total resident days}} \times 1,000
\] | Includes CO and LO LabID Events per month |
| **Percent** of MDRO CO LabID events | \[
\frac{\text{Number of CO MDRO LabID Events}}{\text{Total number of MDRO LabID Events}} \times 100
\] | |
| **Percent** of MDRO LO LabID events | \[
\frac{\text{Number of LO MDRO LabID Events}}{\text{Total number of MDRO LabID Events}} \times 100
\] | |
| MDRO LO Rate per 1,000 resident days | \[
\frac{\text{Number of LO MDRO LabID Events}}{\text{Total resident days}} \times 1,000
\] | |