

Connecticut Department of Public Health

Central Line-Associated Bloodstream Infection (CLABSI) Surveillance in a Medical, Medical-Surgical and Pediatric Intensive Care Unit

1. Types of hospitals to report:

Connecticut general acute-care hospitals and pediatric hospitals.

2. Reporting Requirements

a. National Healthcare Safety Network

The Connecticut Advisory Committee on Healthcare Associated infections selected the Centers for Disease Control and Prevention (CDC), National Healthcare Safety Network reporting system to meet the requirements of the CT Public Act 06-142, "Act Concerning Hospital Acquired Infections". This is the CDC system for quality monitoring of hospital acquired infections.

Hospitals must use the NHSN reporting procedures and follow the Patient Safety Protocols for identifying and reporting infections to CT Department of Health (DPH). Description of procedures, protocols, and definitions can be found in the NHSN Manual: Patient Safety Protocols

http://www.cdc.gov/ncidod/dhqp/pdf/nhsn/NHSN_Manual_PatientSafetyProtocol_CURRENT.pdf

b. CT HAI Program Reporting Requirements:

1. CLABS infection surveillance will be performed monthly in one intensive care unit for each hospital as defined by the CDC NHSN system for the following "Locations":

- Adult Medical Intensive Care Unit
- Adult Medical/Surgical Intensive Care Unit
- Pediatric Medical Intensive Care Unit
- Pediatric Medical/Surgical Intensive Care Unit

Not every hospital will have different types of intensive care units. Hospitals decide which type of ICU they have by measuring the type of patients that are cared for in that area and applying what is called the *80% Rule*. For instance, the medical ICU serves non-surgical patients, so if a facility finds that 80 percent of their critical care patients are non-surgical, that facility would have a medical ICU according to NHSN definitions.

2. Reporting to CT Department of Public Health (DPH)

- The total number of central line days and the total number of CLABS infections for each hospital's ICU will be electronically submitted monthly to DPH using NHSN.
- Reports must be submitted to DPH, via NHSN, within 30 days of the end of the reporting month per NHSN protocol.

3. Optional Tools to Collect Data

The following forms were developed by NHSN to capture CLABSI related information and may be used to collect the required data:

- Patient Data Form (CDC 57.75C)
- Primary Bloodstream Infection (BSI) Form (CDC 57.75D)
- Denominators for Intensive Care Unit (ICU)/Other Locations (not NICU or SCA) Form (CDC 57.75L)

These forms can be found at:

http://www.cdc.gov/ncidod/dhqp/nhsn_PSforms.html

3. Surveillance Methodology

This element requires active, patient-based, prospective surveillance of device-associated infections and their corresponding denominator data by a trained infection control professional (ICP). This means that the ICP shall seek out infections during a patient's stay by screening a variety of data sources, such as laboratory, pharmacy, admission/discharge/transfer, radiology/imaging, and pathology databases, and patient charts, including history and physical exam notes, nurses/physicians notes, temperature charts, etc. Others may be trained to screen data sources for these infections, but the ICP must make the final determination. Laboratory-based surveillance should not be used alone, unless all possible criteria for identifying an infection are solely determined by laboratory evidence. Retrospective chart reviews should be used only when patients are discharged before all information can be gathered. To minimize the ICP's data collection burden, others may be trained to collect the denominator data. These data should be collected at the same time each day (see definition for Central Line-Days).

NOTE: It is not required to monitor for CLAB infections after the patient is discharged from the facility, however, if discovered, they should be reported to NHSN.

4. Central Line Bloodstream Infections (CLABSI)

a. Central Line Associated Bloodstream Infection: Definition

A CLABSI is a primary bloodstream infection (BSI) in a patient that had a central line or umbilical catheter in place at the time of the onset of the event, or was in place within 48 hours before the onset of the event.

NOTE: There is no minimum period of time that the central line must be in place for the BSI to be considered central line-associated.

The Location of the Attribution of the CLABSI is the location where the patient was assigned on the date where the BSI was identified. For example:

- Example: Patient has a central line inserted in the Emergency Department and then is admitted to the MICU. Within 24 hours of admission to the MICU, patient meets criteria for BSI. This is reported to NHSN as a CLABSI for the

MICU, because the Emergency Department is not an inpatient location and no denominator data are collected there.

- Example: Patient on the urology ward of Hospital A had the central line removed and is discharged home a few hours later. The ICP from Hospital B calls the next day to report that this patient has been admitted to Hospital B with a BSI. This CLABSI should be reported to NHSN for Hospital A and attributed to the urology ward. No additional catheter days are reported.
1. **EXCEPTION:** If a CLABSI develops within 48 hours of transfer from one inpatient location to another in the same facility, the infection is attributed to the transferring location. This is called the **Transfer Rule**.
 2. Example: Patient with a central line in place in the SICU is transferred to the surgical ward. Thirty six (36) hours later, the patient meets the criteria for BSI. This is reported to NHSN as a CLABSI for the SICU.
 3. Example: Patient is transferred to the medical ward from the MSICU after having the central line removed. Within 24 hours, patient meets criteria for a BSI. This is reported to NHSN as a CLABSI for the MSICU.
 4. Example: Patient with a central line in place is transferred from the medical ward to the coronary care ICU (CCU). After 4 days in the CCU, the patient meets the criteria for a BSI. This is reported to NHSN as a CLABSI for the CCU.

b. Laboratory Confirmed Bloodstream Infection (LCBI) Reporting Criteria

LCBI criteria 1 and 2 may be used for patients of any age, including patients ≤ 1 year of age.

LCBI must meet one of the following three criteria:

Criterion 1: Patient has a recognized pathogen cultured from one or more blood cultures

and

organism cultured from blood is not related to an infection at another site (See Notes 1 and 2 below).

Criterion 2: Patient has at least one of the following signs or symptoms: fever ($>38^{\circ}\text{C}$), chills, or hypotension

and

signs and symptoms and positive laboratory results are not related to infection at another site

and

common skin contaminant (e.g., diphtheroids [*Corynebacterium* spp.], *Bacillus* [not *B. anthracis*] spp., *Propionibacterium* spp., coagulase-negative staphylococci

[including *S. epidermidis*], viridans group streptococci, *Aerococcus spp.*, *Micrococcus spp.*) is cultured from two or more blood cultures drawn on separate occasions. (See Notes 3 and 4 below.)

Criterion 3: Patient < 1 year of age has at least one of the following signs or symptoms: fever (>38°C, rectal), hypothermia (<37°C, rectal), apnea, or bradycardia

and

signs and symptoms and positive laboratory results are not related to an infection at another site

and

common skin contaminant (e.g., diphtheroids [*Corynebacterium spp.*], *Bacillus* [not *B. anthracis*] spp., *Propionibacterium spp.*, coagulase-negative staphylococci [including *S. epidermidis*], viridans group streptococci, *Aerococcus spp.*, *Micrococcus spp.*) is cultured from two or more blood cultures drawn on separate occasions. (See Notes 3, 4, and 5 below.)

Notes:

1. In criterion 1, the phrase “1 or more blood cultures” means that at least 1 bottle from a blood draw is reported by the laboratory as having grown organisms (ie, is a positive blood culture).
2. In criterion 1, the term “recognized pathogen” does not include organisms considered common skin contaminants (see criteria 2 and 3 for a list of common skin contaminants). A few of the recognized pathogens are *S. aureus*, *Enterococcus spp.*, *E. coli*, *Pseudomonas spp.*, *Klebsiella spp.*, *Candida spp.*, and others.
3. In criteria 2 and 3, the phrase “2 or more blood cultures drawn on separate occasions” means:
 - (1) that blood from at least 2 blood draws were collected within 2 days of each other (eg, blood draws on Monday and Tuesday or Monday and Wednesday would be acceptable for blood cultures drawn on separate occasions, but blood draws on Monday and Thursday would be too far apart in time to meet this criterion) and
 - (2) that at least 1 bottle from each blood draw is reported by the laboratory as having grown the same common skin contaminant organism (i.e., is a positive blood culture). (See Note 4 for determining sameness of organisms.)
 - a. For example, an adult patient has blood drawn at 8 AM and again at 8:15 AM of the same day. Blood from each blood draw is inoculated into 2 bottles and incubated (4 bottles total). If 1 bottle from each blood draw set is positive for coagulase-negative staphylococci, this part of the criterion is met.
 - b. For example, a neonate has blood drawn for culture on Tuesday and again on Saturday, and both grow the same common skin contaminant. Because the time between these blood cultures exceeds the 2-day period for blood draws stipulated in criteria 2 and 3, this part of the criteria is not met.
 - c. A blood culture may consist of a single bottle for a pediatric blood draw because of volume constraints. Therefore, to meet this part of the criterion, each bottle from 2 or more draws would have to be culture positive for the same skin contaminant.

4. There are several issues to consider when determining sameness of organisms.
 - a. If the common skin contaminant is identified to the species level from 1 culture, and a companion culture is identified with only a descriptive name (i.e., to the genus level), then it is assumed that the organisms are the same. The speciated organism should be reported as the infecting pathogen (see examples in Table 2).
 - b. If common skin contaminant organisms from the cultures are speciated but no antibiograms are done or they are done for only 1 of the isolates, it is assumed that the organisms are the same.
 - c. If the common skin contaminants from the cultures have antibiograms that are different for 2 or more antimicrobial agents, it is assumed that the organisms are *not* the same (see examples in Table 3).
 - d. For the purpose of NHSN antibiogram reporting, the category interpretation of intermediate (I) should not be used to distinguish whether 2 organisms are the same.

Table 2. Examples of “sameness” by organism speciation

Culture	Companion Culture	Report as.
S epidermidis	Coagulase-negative staphylococci	S epidermidis
Bacillus spp (not anthracis)	B cereus	B cereus
S salivarius	Strep viridans	S salivarius

Table 3. Examples of “sameness” by organism antibiogram

Organism Name	Isolate A	Isolate B	Interpret as.
S epidermidis	All drugs S	All drugs S	Same
S epidermidis	OX R CEFAZ R	OX S CEFAZ S	Different
Corynebacterium spp	PEN G R CIPRO S	PEN G S CIPRO S	Different
Strep viridans	All drugs S	All drugs S Except ERYTH R	Same

c. Specimen collection considerations

Ideally, blood specimens for culture should be obtained from 2 to 4 blood draws from separate venipuncture sites (e.g., right and left antecubital veins), not through a vascular catheter. These blood draws should be performed simultaneously or over a short period of time (ie, within a few hours). If your facility does not currently obtain specimens using this technique, you may still report BSIs using the criteria and notes above, but you should work with appropriate personnel to facilitate better specimen collection practices for blood cultures.

d. Reporting instructions

- Purulent phlebitis confirmed with a positive semi-quantitative culture of a catheter tip, but with either negative or no blood culture is considered a CVS-VASC, not a BSI.
- Report organisms cultured from blood as BSI–LCBI when no other site of infection is evident.

5. Intensive Care Unit: Definition

CDC NHSN defines an “*Intensive Care Unit*” as a nursing care area that provides intensive observation, diagnosis, and therapeutic procedures for adults and/or children who are critically ill. An ICU excludes nursing areas that provide step-down, intermediate care or telemetry only. Specialty care areas are also excluded. The type of ICU is determined by the kind of patients cared for in that unit. That is, if 80% of patients are of a certain type (e.g., patients with trauma), then that ICU is designated as that type of unit (in this case, trauma ICU). When a unit houses roughly equal populations of medical and surgical patients, it is called a medical/surgical unit.

Surveillance for infections will occur in only one of the four types of NHSN defined inpatient locations, i.e., Intensive care units (ICU). CDC NHSN defines an “Inpatient Location” as the patient care area to which a patient is assigned while receiving care in the healthcare facility.

NOTE: Only locations where patients are housed overnight (i.e., inpatient locations) and where denominator data are collected can be used when monitoring events in the Central Line Associated Bloodstream Infection (CLABSI) or also known as the Device-associated Module. This means that operating rooms (including cardiac cath labs, c-section rooms, and interventional radiology) and outpatient locations are not valid locations when monitoring events in the CLABSI or Device-associated Module Monthly Reporting Plan.

6. Protocol

The requirements for the CLABS infection surveillance component for ICUs are:

- All patients, in a medical, medical/surgical, or pediatric ICU that meets the definition of an ICU, are monitored for healthcare-associated CLABS infections.
- Numerator (number of infections) data and denominator (number of central line-days) data will be collected on ICUs being monitored.
- A separate monthly report form should be completed for each ICU surveyed during the month.

a. Numerator Data

1. Infection criteria: see definitions for primary bloodstream infection (BSI), laboratory confirmed bloodstream infection (LCBI), and clinical sepsis (CSEP). Note: CSEP may be used only to report a primary BSI in neonates and infants.
2. Report the number of laboratory-confirmed primary bloodstream infections (BSIs) beginning in intensive care unit patients while a central line (CL) is in place or within 48 hours after the CL was discontinued and within 48 hours after being transferred out of the intensive care unit.
3. For CLABS infections, only inpatient locations where denominator data can be collected are eligible for monitoring (e.g. ICU, ward). Examples of locations not eligible: operating room, interventional radiology, emergency dept, etc.

4. All patients are followed for CLAB infections for 48 hours after they are transferred from the ICU to a hospital ward.
5. If a patient is transferred from the ICU at the end of a month and a CLABS infection related to the ICU stay becomes apparent within 48 hours, but in the next month, then the date of transfer is recorded as the infection date. Thus, the infection would be counted for the month that the patient was in the ICU population being monitored.
6. The Primary Bloodstream Infection (BSI) Form (CDC 57.75D) is used to collect and report each CLABSI that is identified during the month selected for surveillance. The Primary BSI form includes patient demographic information on whether a central line was present, and, if so, the type of central line the patient had as appropriate to the location; these data will be used to calculate line specific infection rates. Additional data include the specific criteria met for identifying the primary BSI, whether the patient died, the organisms isolated from blood cultures, and the organisms' antimicrobial susceptibilities.

b. Denominator Data

1. Adult and Pediatric ICU:
 - a. For each day, at the same time each day, record the number of patients who have one or more central line(s). Some patients may have more than one line, however, for NHSN/DPH purposes, **count each patient with a central line once**, regardless of the number of central lines, and record the information on the Denominators for Intensive Care Unit (ICU)/Other Locations (Not NICU or Specialty Care Area (SCA) (CDC 57.75L).
 - b. On the last day of the month, the total number of central line-days should be recorded on the monthly report form specific to the ICU (CDC# 57.75L: "Denominators for Intensive Care Unit (ICU)/Other Locations (Not NICU or Specialty Care Area (SCA)".

7. Instructions for Completing The NHSN Forms

a. Adult and Pediatric ICU Denominator Form

The information on this form will provide you with the monthly central-line days needed to complete the monthly "CDC 57.75L Denominator Form".

1. Record the Facility ID#, the month and year for the data being collected.
2. Record the type of ICU being monitored.
3. For each day of the month record the number of patients with one or more central line(s) (count one line per patient).
4. Establish a routine so that you obtain a count of the number of patients with one or more central line(s) every day at the same time of day.
5. At the end of the month, sum the numbers to obtain the total number of central line-days.
6. Enter these totals into the NHSN (CDC# 57.75L: "Denominators for ICU" form)

8. Data Analysis

The CLABSI rate per 1000 central line days is calculated by dividing the number of CLABSI by the number of central-line days and multiplying the result by 1000. The Central Line Utilization Ratio is calculated by dividing the number of central-,line days by the number of patient days. These calculations will be performed separately for different types of ICUs.