CHIPRA Measure 19: Pediatric Central-Line Associated Bloodstream Infections
Centers for Disease Control and Prevention

Description

The rate of central line-associated blood stream infections (CLABSI) identified during periods selected for surveillance as a function of the number of central line catheter days selected for surveillance in pediatric and neonatal intensive care units. The central line associated bloodstream infection is an infection in a patient that had a central line inserted within the 48-hour period before the onset of infection.

Definitions

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<tr>
<th>Intensive Care Unit</th>
<th>A nursing care area in which at least 80% of the patients require intensive observation, diagnosis, and therapeutic procedures.</th>
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<tr>
<td>Central line</td>
<td>An intravascular catheter that terminates at or close to the heart or in one of the great vessels which is used for infusion, withdrawal of blood, or hemodynamic monitoring. The following are considered great vessels for the purpose of reporting central-line BSI and counting central-line days: Aorta, pulmonary artery, superior vena cava, inferior vena cava, brachiocephalic veins, internal jugular veins, subclavian veins, external iliac veins, common femoral veins, and in neonates, the umbilical artery/vein. NOTE: Neither the insertion site nor the type of device may be used to determine if a line qualifies as a central line. The device must terminate in one of these vessels or in or near the heart to qualify as a central line.</td>
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<td>Infusion</td>
<td>The introduction of a solution through a blood vessel via a catheter lumen. This may include continuous infusions such as nutritional fluids or medications, or it may include intermittent infusions such as flushes or IV antimicrobial administration, or blood, in the case of transfusion or hemodialysis.</td>
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<td>Umbilical catheter</td>
<td>A central vascular device inserted through the umbilical artery or vein in a neonate</td>
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<td>Temporary central line</td>
<td>A non-tunneled catheter</td>
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<td>Permanent central line</td>
<td>Includes tunneled catheters, including certain dialysis catheters and implanted catheters (including ports)</td>
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Exclusions

Hospitals with fewer than 50 central line days a year

Specifications

Anchor Date
Cases of they are healthcare-associated and their infection dates are during the timeframe of selected surveillance

Numerator
Total number of observed healthcare-associated CLABSI among patients in ICUs and NICUs

CLABSI Criteria:
• Laboratory-confirmed bloodstream infection (LCBI):
  Must meet one for the following 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.
  Criterion 2: Patient has at least one of the following signs or symptoms: fever (>38 degrees Celsius), chills, or hypotension and signs and symptoms and positive laboratory results are not related to an infection at another site and common skin contaminant (i.e., 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.
  Criterion 3: Patient < 1 year of age has at least one of the following signs or symptoms: fever (>38 degrees Celsius core) hypothermia (<36 degrees Celsius core), apnea, or bradycardia and signs and symptoms and positive laboratory results are not related to an infection at another site and common skin contaminant (i.e., 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.

Denominator
Total number of expected CLABSI, calculated by multiplying the number of central line device days for each location under surveillance for CLABSI during the period by the CLABSI rate for the same types of
locations obtained from the standard population. Central line device- day denominator data that are collected differ according to the location of the patients being monitored..

1. Number of appropriate device days for locations under CLABSI surveillance during the period
2. CLABSI rate per 1000 device days for the same location types from the identified population
3. Definition of device days: Device days are used for denominators. Device day denominator data that are collected differ according to the location of the patients being monitored.
   a. For ICUs, the number of patients with one or more central lines of any type is collected daily, at the same time each day during the month. The totals for the month are entered.
   b. In NICUs, because of differing infection risks, the number of patients with central lines and those with umbilical catheters is collected daily, at the same time each day, during the month. If a patient had both an umbilical catheter and a central line, count the day only as an umbilical catheter day. For the NICU infants, patients are further stratified by birth weight in five categories since risk of BSI also varies by birthweight.

The ratio is calculated as follows:
1. Identify the number of CLABSI in each location type
2. Total these numbers for an observed number of CLABSI's
3. Obtain the number of expected number of CLABSI's in the same location types for a standard population using the NHSN data report (http://www.cdc.gov/nhsn/PDFs/dataStat/2009NHSNReport.PDF)
4. Identify the number of expected CLABSI's for the facility based on its location types and numbers of central line device days:
   a. For each location type, multiply the number of central line device days experienced, by the expected CLABSI rate for that location
   b. Sum the number of expected CLABSI's from all locations
5. Divide the total number of observed CLABSI events ("2" above) by the "expected" number of CLABSI rates ("4.c." above).
6. Result = rate

(The NHSN analysis tool will perform the calculations once the patient infection data and denominator
information are entered into the system.)

Tests of significance are needed to tell us whether the number of infections in a hospital is unusually high or low relative to the number of infections in a reference group (all NHSN hospitals reporting the same procedure). A p-value provides one method for significance testing. The p-value is a probability that weighs the evidence for determining whether an infection rate is unusually high or low in comparison to the reference group. If the p-value is small (less than .05), there is sufficient evidence to suggest that the infection rates are either higher or lower than the average for all NHSN hospitals. If the p-value is greater than .05, then there is not enough evidence to conclude the hospital's infection rate is different from the average for all NHSN hospitals.