Outcome and Process Performance Measures

Outcome Measures

- Outcome measure data are collected to measure the rate of CLABSI in a patient population.

Measure	Calculation	Description/Notes
CLABSI rate per 1,000 central line-days*	number of CLABSI cases in each unit assessed _____ x 1,000 total number of central line–days in each unit assessed	• Note that central line–days, not patient-days, are used as the denominator, as only patients with a central line are at risk of developing a CLABSI.[1] The NHSN methodology also stipulates that no matter how many central lines or lumens each patient has, each patient is counted as one catheter-day.[2]

Process Measures

- Process measures assess adherence to recommended practices to prevent CLABSIs.
- Process measures are all multiplied by 100 so that they are expressed as percentages. The target adherence rate is 100%.[3]
- Process measures to consider, ranked in order of priority from highest to lowest, include the following[4]:

Measure	Calculation	Description/Notes
Adherence to all elements of the CVC Insertion Checklist (appropriate hand hygiene performed, maximal sterile barrier precautions used, chlorhexidine skin antisepsis used)	number of CVC insertions in which all 3 interventions are performed at CVC insertion _____ x 100 number of CVC insertions	• Assessed by reviewing the documentation on the insertion checklist (Note that, in parts of the world where chlorhexidine may not be available for use, the same methodology would apply to measuring the use of other skin antiseptics.)
Adherence to documentation of daily assessment of the need for continuing CVC access	number of patients with a CVC for whom there is documentation of a daily assessment _____ x 100 number of patients with a CVC	• Assessed by reviewing the documentation in the patient's medical record.
Adherence to cleaning of catheter hubs and injection ports before they are accessed	number of times that a catheter hub or port is observed to be cleaned before it is accessed _____ x 100 number of times a catheter hub or port is accessed	• Assessed through actual observation of practice
Adherence to avoiding the femoral vein site for CVC insertion in adult patients that are not used for temporary hemodialysis	number of patients with a CVC in the femoral vein _____ x 100 number of patients with a CVC	• Assessed through observation on point prevalence surveys or by review of documentation on insertion checklists

Continued on next page

* It should be noted that other researchers have found that the NHSN method of collecting central line–days can result in undercounting of line–days in patients with multiple CVCs, which can inflate the CLABSI rate in settings that have high CVC use.[5] This may be especially important in countries such as the United States, where all hospitals are now required to report their ICU CLABSI rates to the US Centers for Medicare & Medicaid Services (CMS) via the US CDC's NHSN.[6] CLABSI rates, which were required to be submitted beginning in 2011, were to be used to determine the level of reimbursement from CMS to US hospitals, starting in 2013.[6]

Collecting central line–days can be burdensome, particularly when electronic health records are not in use and the data are collected manually each day.[7,8] To address this burden, Klevens et al. devised a method of sampling to simplify the counting of central line–days. The approach involves collecting the number of central line–days one day a week, an approach that was tested in more than 250 US hospitals.[9] The researchers found that the estimate of the number of central line–days, based on the sample, produced an infection rate that was not meaningfully different from the traditional method of collecting central line–days. Building on the research of Klevens et al., the US CDC began collaborating with 10 state health departments to evaluate the validity and feasibility of estimating central line–days for use in CLABSI surveillance in the NHSN.[10] Phase 1 of the US CDC project included retrospective evaluation of denominator data collected during 2009 and 2010; in Phase 2, which started in January 2011, volunteer hospitals began collecting denominator data using the simplified method. The US CDC will determine how well the once-weekly sampling approximates the monthly reporting of daily denominator reporting. If this methodology is determined to be valid and is adopted by the NHSN, it is estimated it could save 85% of staff time spent collecting the daily CLABSI denominator data.[10]

Another group of researchers studied the usefulness of prospectively estimating central line–days using device utilization ratios.[11] Six New York hospitals with a total of 38 hospital units outside the ICU counted and recorded the number of patients with central lines on at least one day each week. Hospital registration systems provided the total number of patient-days per unit each month. The device utilization ratio was calculated by dividing the number of central line–days by the number of patient days; the researchers concluded that this ratio provided a reasonable estimate to use in calculating CLABSI rates.

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