

KEY FINDINGS AND PUBLIC HEALTH ACTIONS

Central Line-Associated Bloodstream Infections and Central Line Insertion Practices in California Hospitals, 2012

Introduction

Central lines are intravascular catheters that terminate at or close to the heart or in a major blood vessel. They are used for infusion, withdrawal of blood, or hemodynamic monitoring. More than 100,000 patients in California hospitals have a central line inserted each year. Central line-associated bloodstream infection (CLABSI) rates are important markers for patient safety and the focus of increasing public health, payer, regulatory, and public interest. Contamination of the central line, either during insertion or during the time the line is in use, can cause infection, resulting in serious illness and substantial increased healthcare costs. It is estimated that more than half of CLABSIs may be preventable if hospitals adhere to all of the recommended central line insertion practices (CLIP), which together are called a bundle, for each central line insertion [1]. This is the fourth public report by the California Department of Public Health (CDPH) on CLABSI and CLIP, and the third using information submitted by California hospitals to the Centers for Disease Control and Prevention (CDC) National Healthcare Safety Network (NHSN).

In this report, we present California average (pooled mean) CLABSI rates and hospital-specific CLABSI rates for the period January through December 2012. As in prior reports, CLABSI data are grouped by patient care locations where patients with similar medical conditions receive similar levels of care across hospitals. We provide percentage changes in California average rates in 2012 compared to the period of January through December 2011. Other important details about the definitions, methods and limitations of the data in this report are described in the *Technical Notes* [3].

New in this report we include central line insertion practices (CLIP) adherence percentages grouped by type of intensive care unit where central lines were inserted. The CLIP bundle includes eight care practices that should be used to avoid contamination of the central line while it is being inserted: hand hygiene, recommended skin preparation agent, allowing the skin preparation agent to dry, and five maximal sterile barriers (cap, mask, gown, gloves, and large drape). Hospitals can monitor and enforce adherence to the CLIP bundle by using a checklist. All general acute care hospitals are required to report to CDPH observations of CLIP in intensive care units (ICU), including neonatal intensive care units (NICU). Previous public reports of CLIP data were in a separate report from CLABSI data; however, presenting CLIP and CLABSI data together provides a side-by-side comparison of CLIP adherence and CLABSI rates in specific critical care patient locations.

Annual summary measures, published by CDC, estimate the frequency of CLABSIs over time for the U.S. [4-6] and compare the estimated frequency of CLABSIs in 2011 in California to a U.S. baseline [6]. Although these measures provide important information for comparing California to U.S. baselines, the 2012 CLABSI rates presented in this report provide more specific information for assessing CLABSI rates within and between California hospitals and for targeting and monitoring CLABSI prevention efforts within California hospitals.

Beginning in 2011, the Centers for Medicare and Medicaid Services' (CMS) also required hospitals participating in the Hospital Inpatient Quality Reporting Program to report CLABSI data to NHSN from intensive care units to qualify for annual payment updates, and for public reporting on the Hospital Compare website (<http://www.hospitalcompare.hhs.gov/>). While this

did not affect the reporting mandate for California hospitals, the implementation of this new CMS mandate precipitated important changes in reported data that shape the interpretation of CLABSI rates in 2011 and beyond, including the addition of new and modified patient care location types (i.e. intensive care units and other hospital wards).

CLABSI rate changes in 2012 may be due to a number of factors, including new payer and regulatory pressures by CMS, changes in the how hospitals identify and report CLABSI over time, and/or hospitals' CLABSI prevention efforts. CMS implementation and focus on CLABSI reporting in critical care locations beginning in 2011 may have contributed to improved surveillance and may account in part for the observed CLABSI rate increase in California hospital critical care locations in 2012. Also, CDPH performed an onsite CLABSI data validation project in 100 hospitals in 2011 and used the findings in 2012 to help all California hospitals improve CLABSI case-finding and application of surveillance definitions. Three-hour educational workshops were presented in 17 cities across California (and a distance learning class followed for those unable to attend in person). Over 400 learners attended from 299 hospitals. These outreach efforts may have resulted in increased identification of CLABSI in some hospitals, and may also account for some of the increases observed between 2011 and 2012. Additional efforts by CDPH to ensure quality of reported data continues, with the implementation of onsite data validation audits with hospital-specific recommendations. Continued monitoring and reporting of CLABSI rates by patient care locations will provide important information for targeting CLABSI prevention actions in hospitals across California.

As in 2011, hospitals that did not report CLABSI or other mandated hospital-associated infection (HAI) data, or did not provide data for all 12 months, will be subject to enforcement by CDPH and receive a deficiency.

Key Findings

The California picture

- The number of CLABSIs reported in California was 5% lower in 2012 (2998 cases) than in 2011 (3163 cases) [2].
- The overall California average CLABSI rates in most patient care location types were lower in 2012 than in 2011. Comparisons to 2011 show in general patient care locations (wards) the 2012 CLABSI rate was 6% lower (0.77 vs. 0.82 per 1000 central line days); in special care areas, the 2012 rate was 13% lower (1.96 vs. 1.70), and in neonatal critical care areas, the 2012 rate was 22% lower (0.79 vs. 1.01 per 1000).
- The overall California average CLABSI rate in intensive care units (critical care) was 3% higher in 2012 (1.06 per 1000) than in 2011 (1.03 per 1000) [2].
- Of the 24 patient care location types (in at least 10 California hospitals), 15 (63%) demonstrated lower average CLABSI rates in 2012 than in 2011[2].
- Decreases in statewide CLABSI case counts and rates in 2012 appear to extend the national trajectory downward. These decreases suggest progress towards CLABSI prevention in most patient care locations, although additional efforts are needed to decrease rates uniformly in all hospital patient location types.

The national picture and California

- CDC estimates that the frequency of CLABSI in 2011 was 41% lower nationwide and 44% lower in California as compared to the CDC baseline period of 2006 through 2008 [6]. This period represents the baseline against which to measure progress toward 5-year goals established by the U.S. Department of Health and Human Service Action Plan for the Prevention of HAI. The national goal is to reduce CLABSI rates 50% by 2013.

California hospital-specific findings

- Of 389 California hospitals in continuous operation in 2012, 11 reported no central line-days (i.e., had no patients at risk for developing CLABSI). Of the remaining 378 hospitals, 1 (<1%) submitted no data to NHSN and 377 (100%) reported at least 1 central line-day or 1 CLABSI. Of these latter 377 hospitals, 374 (99%) were included in this report and 3 were excluded because of incomplete data or data that could not be risk stratified. The percentage of hospitals included in this 2012 report (99%) was the same as the percentage (99%) included in the 2011 [2].
- Hospitals reported 2998 CLABSIs in 2012; 2978 (99%) CLABSIs were included in this report and 20 were excluded because of incomplete or insufficient reporting. The percentage of reported CLABSI included in this 2012 report (99%) was the same as the percentage (99%) included in the 2011 report [2].
- In 2012, 49 (13%) of 374 hospitals had at least 1 patient care location CLABSI rate that was statistically higher than the comparable state average; this percentage is similar to the percentage (14%) reported in 2011 [2]. Among these 49 hospitals, 35 (71%) hospitals had only 1 patient care location that was statistically high; the remaining 14 (29%) hospitals had 2 to 5 statistically high-rate patient-care locations. Also, among the 49 hospitals, 7 (14%) had at least 1 patient care location that was statistically higher than the state average in 2012 and 2011. These hospital-specific patient care locations appear to have consistently high rates.
- In 2012, 23 (6%) of 374 hospitals had at least 1 patient care location CLABSI rate that was statistically lower than the comparable state average; this percentage is similar to the percentage (8%) reported in 2011 [2].

Central line insertion practices

- For the reporting period January through December 2012, there were 332 hospitals with an intensive care unit and subject to the reporting mandate for CLIP adherence monitoring. Of these, 312 (94%) submitted CLIP data, 13 (4%) reported 0 central line days, and 7 (2%) did not report CLIP data.
- Adherence to all eight components of the CLIP bundle occurred in 82,287 central line insertions for an overall adherence of 97% in 2012. This is an increase compared to 96% adherence in 2011.
- Most central lines were inserted in adult-only ICUs (82%). Adherence was highest in adult ICUs (97%) compared with NICUs (96%) and pediatric ICUs (95%).

Important context for interpreting key findings

- CLABSI rates are affected by clinical and infection control practices related to the insertion and ongoing care of central lines, risk factors of patients in varying types of care locations, and surveillance methods. While stratifying CLABSI rates by patient care location makes rates more comparable, it cannot control for all individual patient factors that can affect CLABSI rates, nor for differences among hospitals in identifying and reporting infections.

- It is important to consider the overall context of these rates. A low CLABSI rate may reflect greater diligence with infection prevention care practices in line insertion and line maintenance practices, or may reflect less effective surveillance methods that detect fewer infections. Similarly, a high rate may reflect failure to consistently adhere to all recommended infection prevention care practices, or may reflect more complete and accurate infection surveillance.
- Reporting changes may have occurred in 2012 as a result of the CDPH 100-hospital CLABSI data validation project in 2011, which led to education and outreach to all California hospitals in 2012 to improve identification and reporting of CLABSI. New CMS reporting mandates may also have contributed to CLABSI reporting changes. Comparisons between these two time periods should be considered cautiously.

Public Health Actions

In follow up to this report, CDPH will:

- Engage with hospitals that have patient care locations with CLABSI rates statistically higher than statewide averages to explore opportunities to improve CLABSI prevention and control;
- Continue to monitor and engage in efforts to improve the accuracy and completeness of reported CLABSI and CLIP data, including onsite data validation audits and ongoing evaluation of line day reporting;
- Engage with stakeholders to explore opportunities to use these data for evaluating the effectiveness of California CLABSI prevention strategies.

All hospitals should review these data and consider:

- Ensuring the accuracy and completeness of CLABSI data by reviewing all positive blood cultures and strictly following NHSN definitions and protocols for the identification, classification, and reporting of CLABSI, central line-days, and CLIP data;
- Investigating patient care locations with the highest rates of CLABSI to identify opportunities to improve CLABSI prevention;
- Performing active monitoring for adherence to evidence-based CLABSI prevention measures including catheter choice and site, insertion and maintenance care practices, and prompt removal of catheters that are no longer necessary.
- Using CLIP bundle adherence as a quality improvement tool to identify care component(s) with low percentages and targeting interventions to improve adherence;
- Expanding CLIP adherence monitoring to all patient care areas and units where central lines are inserted.
- Analyzing CLIP data to target avoidance of femoral insertion sites;
- Evaluating CLIP adherence for each CLABSI as part of a root cause analysis (or other such case review) to identify specific areas for practice improvement.
- Reviewing CDPH's quarterly quality control reports to confirm that CDPH has correct and complete data and to identify additional data errors.

The public should consider:

- Reviewing the information presented for your hospital, including the context for interpreting CLABSI rates and CLIP adherence data;
- Asking your health care provider about the actions your provider and your hospital are taking to ensure patient safety, including steps to protect patients against CLABSIs; and
- Asking your health care provider about the actions you can take to ensure your safety in the hospital, including protecting against CLABSIs.

REFERENCES

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