

KEY FINDINGS, PUBLIC HEALTH MESSAGES AND ACTIONS

Central Line Insertion Practices, 2011

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. Contamination of the line during insertion can cause infection, often 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. The CLIP bundle includes eight components: hand hygiene, recommended skin preparation agent, allowing the skin preparation agent to dry, and five maximal sterile barriers (cap, mask, gown, gloves, and drape). Hospitals can monitor and enforce adherence to the CLIP bundle by using a checklist.

All general acute care hospitals were required to report to the California Department of Public Health (CDPH) on observations of central line insertion practices (CLIP) in intensive care units, including neonatal intensive care units. This is the third report to the public on this information and presents data from January through December, 2011.

Key Findings

- For the reporting period January 1, 2011 through December 31, 2011, there were 313 licensed general acute care hospitals with an ICU that were subject to the reporting mandate for CLIP adherence monitoring.
- During calendar year 2011, 309 hospitals reported 83,799 complete CLIP observations.
- The median number of central lines placed by hospitals was 169 and ranged from 1 to 2,773. The median adherence percentage among the 309 hospitals reporting complete bundle data was 97.8% and ranged from 0% to 100%. The top 10% of hospitals had CLIP bundle adherence of 100%; 64 hospitals composed this group. The bottom 10% of hospitals had CLIP bundle adherence of 82.9% or lower; 31 hospitals composed this group.
- Most central lines were inserted in adult-only ICUs (82.6%). The most common reason for central line insertion was a new indication for a central line, such as for hemodynamic monitoring or administering fluids or medication; this accounted for 87.8% of central line insertions. Most central lines (60.1%) were placed in an upper extremity. The inserter recorded the majority of the observations (61.4%), meaning that the inserter also completed the CLIP Adherence Monitoring form. The peripherally inserted central catheter (PICC) team performed most central line insertions (34.4%) followed by attending physicians (16.4%).

- Adherence to all eight components of the CLIP bundle occurred in 80,223 central line insertions for an overall adherence of 95.7%. This is an increase compared to 94.9% adherence for the reporting period April 1, 2010 through March 31, 2011.
- Adherence was highest in adult ICUs (96.0%) compared with NICUs and pediatric ICUs (94.5%). Adherence was highest for both new central line insertions and lines that were replaced due to infection (96.0%). Lines placed in the upper extremity had highest CLIP bundle adherence (97.7%), followed by lower extremity lines (96.0%), and jugular lines (94.1%). Adherences were lowest in femoral (90.1%) and scalp (89.0%) lines. CLIP bundle adherence was 97.8% when the inserter was also the observer compared with 92.5% when the observer was a third party. Advanced practice nurses had the highest CLIP bundle adherence as a group (100%), but inserted only 48 lines. The PICC team followed, with adherence at 97.8%. All occupational groups were above 90% for CLIP bundle adherence; however, attending physicians had the lowest adherence among inserters at 91.4%.
- Although CLIP bundle adherence has improved for attending physicians, they also had the lowest adherence for the January 1, 2009 through March 31, 2010 and April 1, 2010 through March 31, 2011 reporting periods.
- The inserter did not follow all eight components of the CLIP bundle in 3,576 insertions (4.3%); inserters did not use at least one of the five maximal sterile barriers in 42.4% of these insertions. The least followed barrier was wearing a cap (28.8%). Among the individual non-adherent components, not using a recommended skin preparation agent (40.0%) and not allowing the skin preparation agent to dry prior to first skin puncture (29.3%) were most frequent.
- Not using at least one of the five maximal sterile barriers was also the most frequent reason for non-adherence for the January 1, 2009 through March 31, 2010 and April 1, 2010 through March 31, 2011 reporting periods. For all three reporting periods, not using a cap was most frequent.
- Adherence was well over 95% for each bundle component. Among all complete insertions, adherence was highest for wearing gloves (99.4%). Chlorhexidine gluconate (CHG) was used as the skin preparation agent most often (93.4%). For individual maximal sterile barriers, use of gloves was followed by gown (99.2%) and drape and mask (99.1%). Collectively, maximal sterile barriers were used in 98.2% of insertions.

Public Health Messages

- When a patient in a California ICU receives a central line, personnel adhere to the recommended measures to prevent infections 95.7% of the time. This is an improvement compared to the CLIP adherence 94.9% from April 1, 2010 through March 31, 2011.

- The data for calendar year 2011 represent an evaluation of CLIP adherence surveillance and demonstrate that California hospitals continue to achieve high adherence. This achievement may be attributable in part to improved reporting of CLIP data by hospitals, and efforts by the CDPH HAI Program to improve hospital reporting, but also to numerous CLABSI prevention collaborative initiatives in California.
- Attending physicians continue to have the lowest CLIP bundle adherence among inserters. Physicians may need reminders about following the eight components in the CLIP bundle. Hospitals should consider targeted education that focuses specifically on the bundle components to improve adherence percentages among physicians.
- Not using at least one of the five maximal sterile barriers was the most frequent reason for non-adherence in 2011. Not using a cap was the most common barrier not used. Hospitals with low adherence to cap use may not have central line insertion kits that would include all required sterile barriers; caps may not be readily available for insertions in these hospitals. Ensuring universal availability of insertion kits may improve adherence in these settings.
- CDPH will continue to promote hospital reporting of complete CLIP data to NHSN through regular quality assurance and quality control reports. These reports will include numerator, denominator, adherence, and missing data for review and correction by the hospital.
- Hospitals should consider using CLIP bundle adherence as a quality improvement tool to identify individual component(s) with low percentages and use targeted, evidence-based interventions to improve adherence. For example, use of central line insertion kits that contain equipment needed for the insertion may ensure use of all maximal sterile barriers.
- Hospitals should develop and implement targeted educational programs for personnel groups with low adherence.
- Hospitals should consider expanding CLIP adherence monitoring to all patient care units where central lines are used. Additionally, analyzing CLIP adherence monitoring data with CLABSI surveillance data could link prevention practices with outcomes and identify areas for improvement in practice.
- Consumers should ask healthcare providers about CLABSI prevention activities, including monitoring CLIP adherence, and ask about CLIP adherence results. Additionally, ask providers about the actions you can take to ensure your safety in the hospital, including protecting against CLABSIs.

- Consumers should speak up if they don't understand or have a question. Clear communication between patients and their healthcare providers is one of the first steps toward ensuring their safety.