

Central Line–Associated Bloodstream Infection: CLABSI Prevention in Acute Care Hospitals (2022)

About the Guideline

- This guideline offers recommendations for implementing measures to prevent central line–associated bloodstream infection (CLABSI) in the acute-care setting.
- The document updates the 2014 *Strategies to prevent central line–associated bloodstream infections in acute-care hospitals*.
- The recommendations focus on central venous catheters (CVCs) unless otherwise noted.
- The recommendations are not a substitute for individual clinical judgment.

Key Clinical Considerations

Become familiar with the recommendations and best-practice statements provided in this guideline.

Risk Factors

- Any patient with a central venous catheter (CVC) in place
- Presence of short-term peripheral catheters, peripherally inserted central venous catheters (PICCs), midline catheters, and peripheral arterial catheters
- Multi-lumen or concurrent catheters
- Patient environmental risk factors
 - Prolonged hospitalization prior to catheterization
 - Prolonged duration of catheterization
 - Heavy microbial colonization at the catheter hub and insertion site
 - Parenteral nutrition
 - Substandard catheter care or excessive manipulation of the catheter
- Patient history
 - Neutropenia
 - BMI greater than 40
 - Prematurity
- Reduced nurse-to-patient ratio in the ICU
- Transfusion of blood products in pediatric patients

Essential Practices

- The subclavian vein is the preferred site for CVC insertion in an intensive care setting.
- The use of chlorhexidine-containing dressings or daily bathing with chlorhexidine solution is recommended.
- Replacement of administration sets not used for blood, blood products, or lipid formulation can occur in intervals of up to 7 days.
- Do not use PICCs as a strategy to reduce CLABSI.

Before Insertion

- All healthcare providers (HCPs) involved with the insertion of CVC should be trained and credentialed on insertion, access, and maintenance of the CVC.
 - HCP knowledge of and adherence to CLABSI prevention measures should be assessed periodically.
 - Re-educate HCPs when the facility implements changes to the infusion system or implements a product that requires a change in practice.
- ICU patients greater than 2 months of age should be bathed with a chlorhexidine (CHG) preparation daily. Routine daily CHG bathing for non-ICU patients remains inconclusive.
- Verify the indications for the catheter use.
- Gather supplies and checklist to ensure adherence to infection-prevention measures.
 - Use an all-inclusive catheter cart or kit containing all necessary components for aseptic catheter insertion.
 - Gather supplies for maximum sterile barrier precautions for insertion.
 - Masks, caps, sterile gowns, and sterile gloves are to be donned by all HCPs involved with CVC insertion.
 - The patient should be covered with a full-body sterile drape.
- Perform hand hygiene.
 - Use alcohol-based waterless product or soap and water.
- Prep the skin.
 - Apply alcohol CHG solution containing less than 2% chlorhexidine gluconate to the insertion site.
 - For NICU patients: exercise clinical judgment to determine if the benefits of using a CHG solution outweigh the risks.

At Insertion

- Observation of CVC insertion should be done by an HCP who has received appropriate training to ensure the aseptic technique is maintained.
- Utilize a process, such as a checklist, to ensure adherence to aseptic technique throughout the procedure.
- Maintain maximum sterile barrier precautions during CVC insertion and exchange of the catheter over a guidewire.
- CVC site selection
 - ICU setting: The subclavian site is the preferred site for infection reduction.
 - Exclusions: In hemodynamically unstable patients, or those likely to receive dialysis, the subclavian is avoided due to stenosis risk.
 - Non-ICU setting: The risk of infection between different sites remains undetermined.
 - For femoral and internal jugular CVC placement, use ultrasound guidance for catheter insertion, with awareness to maintain the aseptic technique.
 - In pediatric patient, if the upper body is restricted, ideal placement is in the femoral artery with a tunneled catheter and an exit site outside the diaper area in the mid-thigh region.

After Insertion

- Use chlorhexidine-containing dressings for CVCs in patients over 2 months of age. It is unclear if these dressings offer an additional benefit to infection prevention if the patient is already receiving daily CHG baths.
- Disinfect catheter hubs, needless connectors, and injection ports before accessing the catheter.
 - Apply friction for a minimum of 5 seconds with alcoholic chlorhexidine preparation or 70% alcohol.
- Remove nonessential catheters to reduce the risk of CLABSI infection.
- Routine replacement of administration sets not used for blood, blood products, or lipid formulations can be performed in intervals of 7 days.
- Non-tunneled CVCs: change transparent dressings and perform site care with chlorhexidine-based antiseptic at least every 7 days or immediately if dressing is soiled, loose, or damp.
- Change gauze dressings every 2 days or earlier if the dressing is loose, soiled, or damp.
 - In the presence of bleeding or drainage from the catheter exit site, use gauze dressings rather than transparent film until drainage resolves.
- NICU patients or patients at high risk for dislodgement: less frequent dressing changes are recommended unless dressings are soiled, loose, or damp.
- Ensure appropriate nurse-to-patient ratio and limit the use of float nurses in ICU.

Additional Approaches

- Hemodialysis patient considerations:
 - Antimicrobial ointment should be used on the catheter site.
 - Use antimicrobial lock therapy for patients with long-term CVCs and history of recurrent CLABSIs.
 - Use recombinant tissue plasminogen activating factor (rt-PA) weekly after hemodialysis treatment, if hemodialysis therapy is delivered through a CVC.
- Consider using an antiseptic containing hub/connector, cap/port protector.
- Consider using antimicrobial lock therapy for long-term CVCs, especially in patients with a history of CLABSIs.
- Consider utilizing an infusion or vascular team to reduce CLABSI rates.
 - Evidence supports infusion and vascular teams for peripheral-infection reduction; more studies are required to assess the impact of intravenous teams on CLABSI rates.

Not Recommended as Part of Routine CLABSI Prevention

- Do not use antimicrobial prophylaxis for short-term, tunneled catheter insertions or while catheters are in situ; systemic antimicrobial prophylaxis is also not recommended.
- Do not routinely replace CVCs or arterial catheters.

Recommended CLABSI Prevention Methods and Measures

Implementation

- Formal training of HCP on indications for the placement and maintenance of devices in addition to regular competencies.
- Implementation of “insertion site prevention bundle.” Such a measure is proven effective, sustainable, and cost-effective for both adult and pediatric populations.

Infrastructure Requirements

- Adequately staffed infection prevention and control program, including staff to identify patients who meet surveillance criteria for CLABSI, laboratory support for timely specimen processing, and information technology (IT) support for data collection and computation.
- Adequate staff education and training resources.
- Utilize tools to promote high-reliability processes and enhance teamwork.

Four Es

- The Four Es are used widely in the United States to assess, educate, measure, and consider attitudes and beliefs of health care team members involved in insertion and care of CVCs.
 - *Engage* frontline clinicians and senior leadership as champions in process and outcome improvement.
 - *Educate* HCP caregivers and patients on the following:
 - Indications prior to insertions
 - Use of full barrier precautions
 - Daily evaluation of the necessity of the device
 - *Execute*
 - Competency checklist
 - Education of patient and family as appropriate is required for all CVC procedures in preparation for transfer to other facilities or care settings.
 - *Evaluate*
 - Set clear goals.
 - Ensure process and outcome measures.
 - Provide periodic feedback: consider monthly and quarterly reports.
 - Collect data to capture trends, both population- and unit-specific.
 - The standard utilization ratio (SUR) provides units with data to compare to others with similar characteristics.

Reference

Buetti, N., Marschall, J., Drees, M., Fakh, M., Hadaway, L., Maragakis, L., ... Mermel, L. (2022). Strategies to prevent central line-associated bloodstream infections in acute-care hospitals: 2022 Update. *Infection Control & Hospital Epidemiology*, 43(5), 553-569. <https://doi.org/10.1017/ice.2022.87>