

UCSF CENTRAL LINE-ASSOCIATED BLOODSTREAM INFECTION PREVENTION GUIDELINES: ADULT SERVICES

- I. **Avoid unnecessary use of central lines.** Appropriate clinical indications for central line use include:
 - 1) Inability to obtain peripheral access
 - 2) Infusions incompatible with peripheral administration
 - i. References:
 1. [Extravasation of Non-Toxic Medications](#)
 2. [Hazardous Medication Safe Handling Part 2: Chemotherapy and Biotherapy Extravasation of Vesicants](#)
 3. [IV Push Administration Guideline \(Adult\)](#)
 4. [Medication Administration](#)
 5. [CVC Care and Maintenance](#)
 - 3) Invasive hemodynamic monitoring needed
 - 4) Complex infusions (multiple, incompatibility issues)
 - i. References:
 1. [IV Drug Reference for Adult Patient in Critical Care Areas](#)
 2. [Lexicomp](#)
 3. [Guidelines for Safe Administration of Therapies and Medications on Adult Acute Care & Transitional Care Units](#)
 4. [Micromedex](#)
 - 5) Administration of TPN
 - 6) High-volume flow required for renal replacement therapy, plasmapheresis, and ECMO
- II. **Site selection** should be based on the balance of risks (infectious and non-infectious), patient anatomy, access needs, and clinical situation. Consult with supervising attending/primary attending if questions about appropriate site.
- III. **General guide to selection of central line type:** This will depend on a number of patient and clinical factors. As a starting point, we recommend using the Michigan Appropriateness Guide for Intravenous Catheters (MAGIC) algorithm, an evidence-based approach to selecting central venous access devices (available as app “Michigan MAGIC”).
 - 1) [Apple-MAGIC App](#)
 - 2) [Android-MAGIC App](#)
- IV. **Infection prevention for all inpatients**
 - 1) Treat patients >2 months of age with chlorhexidine (CHG) **on a daily basis**.
 - i. [CHG Chlorhexidine Gluconate Therapy](#)
 - ii. [Patient and Family Education: CHG Therapy](#)
 - 2) Perform hand hygiene before manipulating, accessing, or removing any vascular catheter, including central lines. If gloves are used, perform hand hygiene prior to donning and after removal of gloves.
- V. **At Insertion**
 - 1) Use a CVC insertion checklist (**Appendix A**) to ensure adherence to infection prevention practices at the time of central line insertion.
 - 2) Perform hand hygiene prior to catheter insertion or manipulation,
 - 3) Use an all-inclusive catheter cart or kit.
 - 4) Use ultrasound guidance for catheter insertion.

- 5) Use maximum sterile barrier precautions:
 - i. A mask, cap, sterile gown, and sterile gloves are to be worn by all HCP involved in the catheter insertion procedure.
 - ii. Cover the patient with a large (full-body) sterile drape.
 - iii. Use the same measures when exchanging a catheter over a guidewire.
- 6) Use an alcoholic chlorhexidine antiseptic (e.g., Chloraprep) for skin preparation before insertion.
 - i. Allow the antiseptic solution to dry before skin puncture.

VI. After Insertion

- 1) **Remove nonessential catheters**
 - i. Assess the need for continued central venous access daily during multidisciplinary rounds.
- 2) Use chlorhexidine-containing dressings (e.g., Biopatch or CHG tegaderm).
- 3) For nontunneled central lines, change transparent dressings and perform site care with a CHG-based antiseptic at least every 7 days or immediately if the dressing is soiled, loose, or damp.
 - i. Change gauze dressings every 2 days or earlier if the dressing is soiled, loose, or damp.
 - ii. If there is excessive bleeding or drainage from the catheter exit site, use gauze dressings instead of transparent dressings until drainage resolves.
- 4) Disinfect catheter hubs, needleless connectors, and injection ports before accessing the catheter.
 - i. Apply mechanical friction for a minimum of 10 seconds.
- 5) Routine replacement of administration sets not used for blood, blood products, or lipid formulations can be performed at intervals up to 96 hours.
 - i. References:
 1. [CVC Care and Maintenance](#)

VII. Blood culturing practices (Note: specific patient care services [e.g., Malignant Hematology] may have additional protocol-driven guidance)

- 1) Indications for blood cultures include:
 - i. Suspected sepsis
 - ii. New fever in an ICU patient
 - iii. Suspected endocarditis
 - iv. New fever in a neutropenic patient
 - v. Suspected bacteremia/fungemia
 - vi. Follow-up blood cultures to assess clearance of bacteremia/fungemia for some pathogens (e.g., *Staphylococcus aureus*, *Staphylococcus lugdunensis*, *Candida* species, multidrug-resistant Gram negatives, Enterococcus species) or clinical situations associated with risk for persistent bacteremia or fungemia (e.g., endocarditis or other endovascular infection. Consider ID consultation for specific guidance).
- 2) Additional considerations:
 - i. In general, avoid sending blood cultures for situations where there is a low probability of bacteremia (such as post-op fever within 48 hours in clinically stable patients, isolated fever, patients with non-severe cellulitis or non-severe community acquired pneumonia) as blood cultures in these cases are generally negative.
 - ii. In general, avoid obtaining repeat blood cultures in patients with ongoing fever sooner than 48-72 hours following previous negative blood cultures unless there is clinical deterioration.
- 3) Blood culture collection:

- i. Use strict aseptic technique including skin disinfection with alcoholic chlorhexidine (e.g., Chloraprep) and disinfection of the tops of the blood culture bottles with 70% isopropyl alcohol. Allow the disinfectant to dry.
- ii. Always obtain at least 2 sets of blood cultures for adults.
- iii. If possible, obtain blood cultures prior to initiating antibiotics.
- iv. The preferred method for obtaining blood cultures is by peripheral venipuncture (lowest contamination rates).
 1. Avoid obtaining blood cultures through central lines if possible.
 2. If not feasible to obtain two sets of blood cultures through separate peripheral venipunctures or if assessing the need for line removal due to central line-associated infection, one set from a peripheral venipuncture and one set from a central line can be obtained.
 3. Do not obtain cultures from multiple ports of a multilumen central line.
 4. When a central line-associated infection is suspected, differential time to positivity (DTTP) can be used to assess whether the central line is infected and to assist in clinical assessments regarding likely sources of bacteremia/fungemia and decisions around the need for central line removal.
 - a. When using DTTP, blood cultures with equal volumes of blood should be drawn from the central line and a peripheral vein at the same time (i.e., within 15 minutes of each other) and accurately labeled.
 - b. If the culture obtained from the central line becomes positive >2 hours earlier than the culture obtained from the peripheral vein, this is evidence that the central line may be the source of infection.
 - c. Reported DTTP test performance has been variable and may have varying performance characteristics for different organisms.
 - d. DTTP results do not impact whether a positive blood culture is classified as a CLABSI using surveillance definitions.

Appendix A:

UCSF Central Line Insertion Checklist

UCSF CENTRAL LINE INSERTION CHECKLIST

Patient Name/MRN#: _____ Unit: _____ Room/Bed: _____

Date: _____ Start time: _____ End time: _____

Procedure Location: (Operating Room / Radiology / Intensive Care Unit / Other: _____

Person Inserting Line: _____

Person Completing Form: _____

Catheter Type: (Dialysis / Tunneled / Non-tunneled / Implanted / Non-implanted / Peripherally Inserted Central Catheter)

Number of Lumens: (1, 2, 3, 4) _____

Insertion Site: (Jugular / Subclavian / Femoral / Peripheral vein/ other) _____

Side of Body: (Left / Right) _____

Reason for Insertion: (New indication / Malfunction / Routine Replacement / Emergent) _____ -

Guide Wire Used: (Yes/No) _____

Ultrasound Used: (Yes/No) _____

Before the Procedure		
	YES	NO
Assess Patient and indication for line: Patient history, allergies, infection risk, anticoagulation therapy, abnormal labs (i.e., INR, platelets, etc)		
Consent Obtained (for elective procedures)? If no, give reason:		
Select site, position patient appropriately for procedure: Trendelenburg for IJ, SC, supine for femoral		
Perform Time out		
Gather all necessary equipment: (US, desired central line kit, dressings, sterile flushes, etc.)		
During the Procedure		

Operator and assistant perform appropriate hand hygiene		
Operator and assistant use full barrier precautions: wear mask, cap, sterile gown and gloves, place full body drape over patient. ***Any additional people in room/area must at minimum wear mask and cap during line insertion		
Apply CHG (chloraprep) skin prep using 30 sec friction rub and allow to dry prior to placing drape (use alternative prep if noted allergy to CHG)		
Preflush and clamp all catheter lumens		
Confirm venous placement PRIOR TO dilation of vein (US of wire in vessel, column, pressure transduced, TEE)		
Confirm removal of intact guide wire		
Flush all ports and apply sterile caps after confirmation of blood aspiration		
Clean site (repeat CHG 30 second friction rub), apply biopatch with sterile occlusive dressing		
Maintain sterile field throughout procedure		
After the Procedure		
Confirm appropriate position by CXR (exception: femoral line)		
Document procedure in patient chart		
Complications If yes: <input type="checkbox"/> Arterial Cannulation <input type="checkbox"/> Air Embolus <input type="checkbox"/> Dysrhythmia <input type="checkbox"/> Malposition <input type="checkbox"/> Hematoma <input type="checkbox"/> Pneumothorax <input type="checkbox"/> Break in sterile field <input type="checkbox"/> Uncontrolled bleeding <input type="checkbox"/> Other:		
Attending notified of Complications?		