

The CDC estimates an annual total of 250,000 cases of central venous catheter-related bloodstream infections (CRBSIs) occur annually in hospitals, with a 12%–25% mortality rate and a cost of \$25,000 per episode.



# CDC GUIDELINES

## MULTIDISCIPLINARY CARE PREVENTS CRBSIs

Intravascular catheters are indispensable in modern-day medicine, particularly in intensive care units (ICUs). Although catheters provide necessary vascular access, their use places patients at risk for local and systemic infectious complications, including local site infection, bloodstream infections (BSIs), septic thrombophlebitis, and endocarditis. Healthcare institutions purchase millions of intravascular catheters each year, but the majority of serious catheter-related infections are associated with central venous catheters (CVCs), especially CVCs placed in patients in the ICUs.

Multiple factors can influence the rate of catheter-related BSIs, including the site of catheter insertion, the type of catheter material, hand hygiene and aseptic technique, skin antisepsis, and catheter site dressing techniques.

### Site of Catheter Insertion

The catheter site influences the risk for infection. CVCs placed in the neck have a higher risk of BSIs than catheters placed in the upper chest (subclavian). Other factors that need to be considered when choosing a catheter site are patient comfort, catheter security, ability to maintain aseptic technique, and patient diagnosis. The use of bedside ultrasound has also been found to reduce the risk of mechanical complications and the overall risk for infection.

antibacterial soap and water. Because CVCs carry a greater risk for infection, the CDC recommends the donning of cap, mask, sterile gown, sterile gloves, and a large sterile drape during the insertion of CVCs to reduce the incidence of BSIs.

### Skin Antisepsis

In the U.S., povidone iodine is the most widely used antiseptic for cleansing arterial catheter and CVC-insertion sites. However, preparation of central venous and arterial sites with a two percent aqueous chlorhexidine gluconate has been shown to lower BSI rates.

### Type of Catheter Material

Teflon® catheters have lower infection rates than polyvinyl chloride or polyethylene catheters. Steel needles used as an alternative to catheters have the same infection rate as Teflon®, but the use of steel needles can be complicated by infiltration of IV fluids into the subcutaneous tissues.

### Catheter Site Dressing Regimens

Transparent, semipermeable polyurethane dressings and gauze dressings have similar infection rates. Transparent dressings permit continuous visual inspection of the catheter site, permit patients to bathe and shower without saturating the dressing, and require less frequent changes than do standard gauze and tape dressings. However, if blood is oozing from the catheter insertion site, gauze or island dressing is preferred.

CVCs coated or impregnated with antimicrobial or antiseptic agents have been found to decrease the risk for CRBSI. These catheters should be used if strategies for reducing BSIs do not meet an institution's infection rate goal.

### Hand Hygiene and Aseptic Technique

Good hand hygiene before catheter insertion or maintenance, combined with proper aseptic technique during catheter manipulation, protects against infection. Good hand hygiene can be achieved through the use of an alcohol-based product or an

The CDC recommends replacing CVC dressings every seven days if using a transparent dressing and every two days if using gauze. For short term peripheral IVs, dressings are to be changed when the catheter is removed or replaced.

*Sponsored by a grant from*

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## COMPLIANCE CHECKLIST

According to the CDC, the risk for BSI declines following standardization of aseptic care. This effort should be multidisciplinary, involving healthcare professionals who insert and maintain catheters, healthcare managers who allocate resources, and patients.

### GENERAL

- Observe hand hygiene before and after catheter insertion, replacement, access, repair, or dressing.
- Assess adherence to guidelines for all who insert and manage catheters.
- Conduct surveillance to determine infection rates and monitor trends.

### INSERTION

- Designate trained staff to insert and maintain catheters.
- Use maximal barrier precautions for guidewire exchange or insertion of CVCs.
- Record operator, date, and time of insertion and dressing changes on a standard form.
- Wear clean gloves for insertion of short PIV catheters if access site is not touched after application of skin antiseptics and sterile gloves for the insertion of arterial and CVCs.
- Do not routinely use cutdown insertion procedure.

### DRESSINGS

- Use sterile gauze or a sterile transparent, semi-permeable dressings.
- Wear clean or sterile gloves when changing dressings.
- Change CVC dressings weekly for adults and adolescents.
- Replace dressing when it becomes damp, soiled, or loose.
- Replace dressings on short PIV catheters when the catheter is removed or replaced.
- Remove peripheral dressings daily to evaluate site if dressing prevents ability to palpate or visualize site.
- Replace dressings on short-term CVC sites every two days for gauze and every seven days for transparent dressings, except in pediatrics.
- Replace dressing on tunneled or implanted CVC sites no more than once a week until insertion site has healed.
- Use gauze or island dressing when site is bleeding, oozing, or when patient is diaphoretic.

### SITE/LINE CARE

- Palpate insertion site through dressing daily.
- Inspect through transparent dressing daily.
- Remove opaque/gauze dressing and inspect visually if patient develops signs of infection.
- Remove any non-essential intravascular device.
- Replace catheter within 48 hours when aseptic technique during insertion can't be ensured.
- Replace tubing every 72 hours unless an infection is suspected.
- Replace tubing used for blood products or lipid emulsions within 24 hours.
- Clean access port with antiseptic. Access port only with sterile device.
- Clean injection ports with 70% IPA or an iodophor before accessing.
- Cap all stopcocks when not in use.
- Disinfect clean skin with antiseptic before insertion and at time of dressing change.
- Allow antiseptics to remain on insertion site and air dry.
- Do not apply organic solvents (ether or acetone) to skin before the insertion or dressing change.

### PERIPHERAL VEIN/MIDLINE CATHETERS

- Avoid steel needles.
- Use upper extremity insertion sites for adults and hand, scalp, or foot for pediatrics.
- Replace adult short peripheral catheters at least every 72–96 hours. For pediatrics, leave catheter in place until the treatment is complete, provided there are no complications.
- Use midline or PICC catheter when duration of therapy is expected to exceed six days.

### PERIPHERAL ARTERIAL CATHETERS/PRESSURE MONITORING DEVICES

- Use disposable transducers.
- Replace transducers, tubing, flush devices, and flush solutions at 96-hour intervals.

### CENTRAL VEIN AND PULMONARY ARTERY CATHETERS

- Use CVC with minimum number of ports.
- Designate one port exclusively for hyperalimentation.
- Use subclavian site vs. jugular or femoral site for non-tunneled CVCs.
- Use totally implantable devices for long-term, intermittent access, and PICCs or tunneled CVCs for frequent or continuous access.
- Use antimicrobial or antiseptic-impregnated CVCs in adults whose catheter will remain in place more less than five days if the BSI rate remains above goal after implementation of antisepsis techniques.
- Replace short-term CVCs if there is purulence at the insertion site.
- Use sterile sleeve for all PA catheters.

### NOT RECOMMENDED

- Do not use chlorhexidine sponge dressings in neonates less than seven days or gestational age less than 26 weeks.
- Do not routinely use in-line filters or antibiotic lock solutions.
- Do not routinely replace CVC catheters.
- Do not change catheters over guidewire when catheter-related infection is suspected.
- Do not routinely culture catheter tips.
- Do not routinely administer intranasal or systemic prophylactic antimicrobials.
- Do not routinely use topical antimicrobial ointments or creams on insertion sites, except when using a hemodialysis catheter.
- Do not submerge catheter under water.

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