

Preventing IV Catheter Associated Infections

Annual Compliance Education



This course contains annual compliance education necessary to meet compliance and regulatory requirements.

Instructions:

To receive credit for completion:

1. Read the content in full.
2. Complete the online exam.



Carolinas HealthCare System

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One

Preventing IV Catheter Associated Infections

Welcome

Purpose:

The purpose of this course is to review information and procedures that help prevent infections linked to IV catheters. After finishing this course, talk with your leader for information about your specific department and work responsibilities.

Learning Objectives:

When finished with this course, you should be able to:

- Describe the risks of using IV catheters
- Identify causes of IV catheter associated infections
- Describe how to prevent IV catheter infections during insertion and catheter maintenance



Preventing IV Catheter Associated Infections

IV Catheter Risks

Intravascular (IV) catheters are used a lot in healthcare. However they are associated with the risk of **bloodstream infections (BSIs)**.

Bloodstream Infections (BSIs) are caused by microorganisms that colonize the:

- External surface of the IV device
- Fluid pathway when the device is inserted
- Fluid pathway when the device is handled after insertion

These serious infections are associated with increased morbidity, mortality and healthcare costs.

Good
News:

BSIs are largely preventable when evidence based practices are followed for insertion and maintenance of intravascular devices.



Preventing IV Catheter Associated Infections

Intravascular Catheters

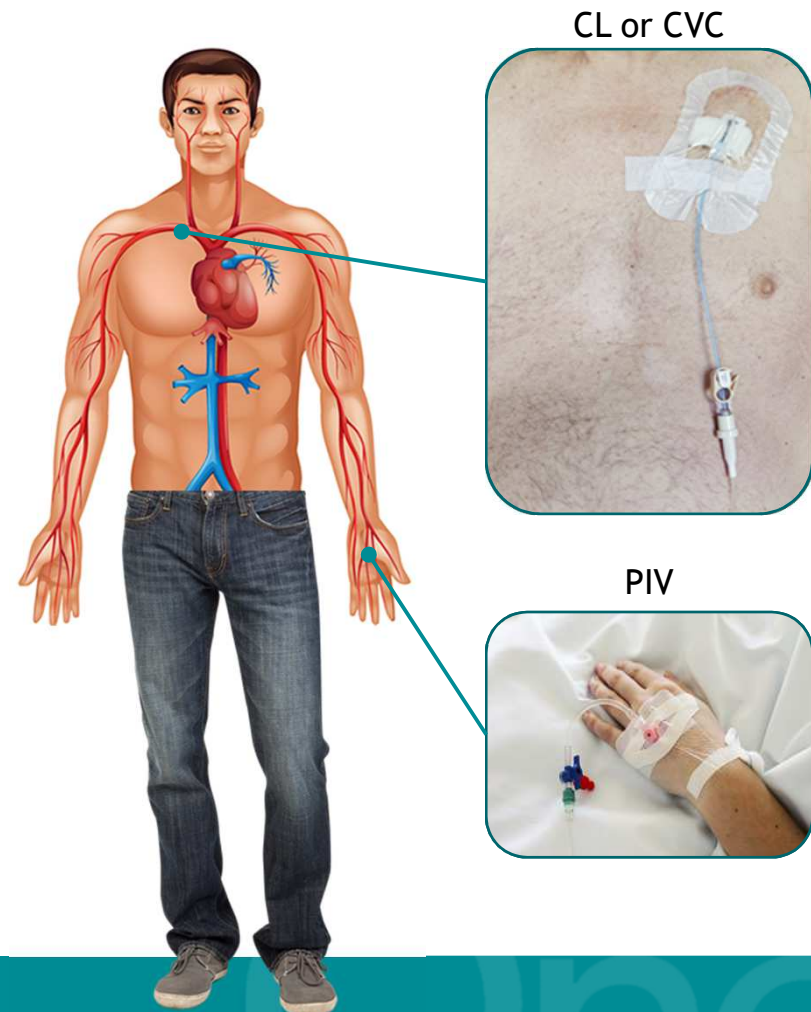
The following are types of IV catheters:

Central Line (CL) or Central Venous Catheter (CVC)

- Is inserted in the neck, chest, groin or arm areas
- Terminates at or close to the heart or in one of the great vessels
- Is used for infusion, withdrawal of blood or hemodynamic monitoring
- Available in various types, including PICCs, implanted ports, tunneled catheters, dialysis catheters, percutaneously placed catheters (internal jugular, femoral), etc.

Peripheral Intravenous Line (PIV)

- Is inserted into a patient's peripheral vein
- Is short and terminates only an inch or so from the insertion point
- Is used for administering medication, fluids and/or blood products



Preventing IV Catheter Associated Infections

How Peripheral/Central Line Associated Infections Occur

IV catheters can become contaminated with microorganisms in different ways:

- Contaminated teammate hands
- Contamination of the catheter during insertion or handling
- Inadequate disinfection of catheter hubs, ports or needleless connectors before accessing the line
- Skin organisms from the patient that travel through the insertion site
- Contaminated IV fluids (rare)

A **CLABSI** is a Central Line Associated Bloodstream Infection. It is a CDC/NHSN surveillance term for a primary bloodstream infection (BSI) that is not secondary to an infection at another site and develops in a patient with a central line in place for more than 2 calendar days.



Preventing IV Catheter Associated Infections

Prevention Bundles: Central Lines

A **bundle** is a group of evidence-based prevention interventions that, when implemented together, result in better outcomes for patients.

For central line insertion and maintenance, follow these bundle practices:

Central Line Insertion Checklist

- Perform proper hand hygiene
- Prep the site with an alcohol/chlorhexidine solution
- Use maximal sterile barriers (cap, mask, sterile gown, sterile gloves, full body sterile drape)
- Select the optimal catheter site

Central Line Care/Maintenance Bundle

- Perform proper hand hygiene before handling or manipulating a catheter line (from the bag down to the insertion site)
- Assess the necessity of the central line daily
- Maintain a clean, dry and intact dressing with Chlorhexidine-impregnated sponge or dressing
- Disinfect hub before every access
- Bathe patient daily with Chlorhexidine Gluconate (CHG)



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Central Line: Insertion Checklist

These practices should be completed for each central line inserted *except* in emergent situations (The Joint Commission National Patient Safety Goal).

When inserting a central line catheter:

- ❑ **Perform hand hygiene** with an alcohol based hand rub before inserting an IV device or having contact with the IV dressing, site, device or attachments
- ❑ **Prep skin** at insertion site. Do this with an alcohol/chlorhexidine solution (70% alcohol, >0.5% chlorhexidine), such as ChloroPrep. The Center for Disease Control (CDC) says this type of solution is best for site preparation and care. Follow these steps:
 - Perform a 30 second back and forth scrub and then air dry
 - Perform a two-minute back and forth scrub and then air dry for moist sites, such as the groin
 - Use tincture of iodine, an iodophor, and/or 70% alcohol as alternatives if there is a contraindication to chlorhexidine (i.e., patient sensitivity, device manufacturer recommendations)
- ❑ **Use maximal sterile barriers** during all central line insertions, including PICC lines and guidewire exchange:
 - Make sure all teammates directly assisting with the catheter insertion procedure use maximal sterile barriers (cap, mask, sterile gown and sterile gloves)
 - Use a large (head-to-toe) sterile drape over the patient during the procedure
- ❑ **Select an optimal catheter site**
 - For adult central venous catheters, the subclavian is the preferred site over the internal jugular or femoral (exception: hemodialysis or advanced kidney disease)
 - See policy *Central Venous Access Devices and Midline Catheter Care and Maintenance* for more details



Preventing IV Catheter Associated Infections

Central Line: Care/Maintenance Bundle

When caring for a central line catheter:

- ❑ **Perform hand hygiene** with an alcohol based hand rub before inserting an IV device or having contact with the IV dressing, site, device or attachments
- ❑ **Assess the necessity** of the catheter with a physician on a daily basis (or per facility policy). Contact the physician to request a removal order if the line is no longer needed. Each day the central line stays in increases the risk of infection.
- ❑ **Maintain a clean, dry and intact dressing with Chlorhexidine-impregnated sponge or dressing**
 - Change dressings every seven days and/or when the dressing becomes damp, loosened or soiled
 - Clean and disinfect the skin and catheter hub at every dressing change. Do this with alcohol/chlorhexidine solution using aseptic technique.
 - Use a gauze dressing if the patient is diaphoretic or if the site is bleeding or oozing. Change gauze every two days during use. Gauze dressings placed under a transparent dressing is considered a gauze dressing and should be changed every two days.
 - Place a chlorhexidine impregnated sponge or dressing on all central line insertion sites, unless contradicted. Cover with a transparent dressing and change with dressing changes.

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Preventing IV Catheter Associated Infections

Central Line: Care/Maintenance Bundle (continued)

- ❑ **Disinfect ports, hubs, needleless connectors and stopcocks before you connect or inject.** Scrub vigorously with alcohol/chlorhexidine solution or alcohol (recommended scrub time is 15 seconds or more) and let dry. Clean visible blood from all ports, tubing, stopcocks and connections.

All luer-activated un-accessed ports/hubs on any patient with a central line will be protected by an alcohol port protector (Curos). This includes PIV site ports and Y-sites on all tubing.

- Alcohol port protectors (Curos) must be in place at least three minutes prior to access to ensure hub disinfection
- Curos are single use devices and must be changed once it has been removed from the port/hub and at least every seven days
- For more details on Curos use, refer to the *Alcohol Port Protectors* policy in the Infection Prevention manual

- ❑ **Bathe patient daily** with Chlorhexidine Gluconate (CHG), using either 2% CHG cloths or 4% CHG liquid/foam. Document daily CHG baths under "ADL Hygiene" in the medical record.

Alcohol Port Protectors (Curos)



Use alcohol port protectors (Curos, shown above) on all adult patients with central lines.



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More Central Line Care/Maintenance Steps

When caring for a central line catheter:

- ❑ **Do not routinely rotate** central venous catheters or PICC sites to prevent infection.
- ❑ **Closely follow hang times.** Use these guidelines:
 - Do not hang IV fluids mixed by Pharmacy or Nursing longer than 24 hours, unless otherwise indicated. This includes parenteral nutrition.
 - Do not hang premixed fluids for adults longer than 96 hours
 - See specific hospital policies on hang times for blood, blood products and lipids
- ❑ **Change tubing** for adults every 96 hours for continuous infusions or every 24 hours for intermittent infusions, unless otherwise indicated (e.g., Propofol). Follow these steps:
 - Change TPN tubing every 24 hours (refer to the Nursing TPN policy). For blood and blood components refer to the Nursing Blood/Blood Component Administration policy.
 - Change tubing that is contaminated or otherwise compromised immediately
 - Change the needleless connector before drawing a blood culture through a catheter, with IV tubing changes or if blood or debris is visible within the needleless connector (not with each standard blood draw). As a reminder – blood cultures should not be routinely drawn from a central line.
Exception: Change needleless connector attached to parenteral nutrition with each new bag or every 24 hours.

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More Central Line Care/Maintenance Steps (continued)

- ❑ **Maintain a closed sterile system.** To do this:
 - Use sterile end caps
 - Do not “loop” IV tubing back into the hub when disconnected for intermittent infusions
 - Avoid breaks in the closed tubing system when possible
 - Back prime compatible infusates for intermittent infusions

- ❑ **Palpate, visually assess and document** the site at least every four hours (or per policy) and as needed. To do this:
 - Look for signs of infection or malfunction
 - Assess patient for complaints of pain at the site, redness, warmth, swelling, tenderness, oozing of fluid or blood, skin discoloration, red streaks, palpable cord or pus or infiltration
 - Report central lines with these signs to the physician immediately

- ❑ **Educate patients and their families** as needed, about care of the central line and how to prevent infections. To do this:
 - Educate before the central line is inserted, when possible
 - Use patient education sheet Patient Education for Catheter-Associated *Bloodstream Infections*
 - Document education provided on the Education Teaching Record



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Peripheral IV Catheter (PIV): Insertion Checklist

When inserting a PIV catheter:

- Perform hand hygiene** with an alcohol based hand rub before inserting an IV device or having contact with the IV dressing, site, device or attachments
- Wear Personal Protective Equipment (PPE).** PIV insertions require gloves and mask with face shield.
- Select an optimal Insertion site.** In an adult, the preferred PIV site is the dorsum of the hand. See the policy Peripheral Intravenous Venipuncture Technique.
- Prep skin at insertion site** with an alcohol/chlorhexidine solution (70% alcohol, >0.5% chlorhexidine), such as Chloraprep. The Center for Disease Control (CDC) says this type of solution is best for site preparation and care. Follow these steps:
 - Perform a 30 second back and forth scrub and then air dry
 - Use tincture of iodine, an iodophor, and/or 70% alcohol as alternatives if there is a contraindication to chlorhexidine (i.e., patient sensitivity, device manufacturer recommendations, neonates)



Preventing IV Catheter Associated Infections

Peripheral IV Catheter (PIV): Care/Maintenance Checklist

When caring for a PIV catheter:

- Perform hand hygiene** with an alcohol based hand rub before contact with the IV dressing, site, device or attachments
- Disinfect ports, hubs, needleless connectors and stopcocks before you connect or inject.** Scrub vigorously with alcohol/chlorhexidine solution or alcohol (recommended scrub time is 15 seconds or more) and let dry. Clean visible blood from all ports, tubing, stopcocks and connections.
- Assess the necessity** of PIV lines on a daily basis (or per facility policy). If you determine that the IV is no longer necessary, contact the physician for a removal order.
- Do not routinely rotate PIV sites** unless clinically indicated. Replace the PIV immediately if the site is no longer functional or there are signs of infiltration, phlebitis, purulence or other signs of infection.
- Apply transparent dressings** using aseptic technique. Leave dressings until catheter is removed unless they become damp, wet, loose or soiled.
- Maintain a closed sterile system.** To do this:
 - Use sterile end caps
 - Do not “loop” IV tubing back into the hub when disconnected for intermittent infusions
 - Avoid breaks in the closed tubing system whenever possible
 - Back prime compatible infusates for intermittent infusions

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Preventing IV Catheter Associated Infections

Peripheral IV Catheter (PIV): Care/Maintenance Checklist (continued)

- ❑ **Palpate, visually assess and document** the site at least every two hours with continuous infusions, or at least twice in a 24 hour period when IV site is “locked” for intermittent infusions, and as needed. To do this:
 - Look for signs of infection or malfunction
 - Assess patient for complaints of pain at the site, redness, warmth, swelling, tenderness, oozing of fluid or blood, skin discoloration, red streaks, palpable cord or pus or infiltration
 - Discontinue the IV immediately if these signs appear. Replace IV if the need for one remains.

- ❑ **Closely follow hang times.** Use these guidelines:
 - Do not hang IV fluids mixed by Pharmacy or Nursing longer than 24 hours, unless otherwise indicated. This includes parenteral nutrition.
 - Do not hang premixed fluids for adults longer than 96 hours
 - See specific hospital policies on hang times for blood, blood products and lipids

- ❑ **Change tubing** for adults every 96 hours for continuous infusions or every 24 hours for intermittent infusions, unless otherwise indicated. Follow these steps:
 - Change PPN tubing every 24 hours (refer to the Nursing PPN policy). For blood and blood components refer to the Nursing Blood/Blood Component Administration policy.
 - Change tubing that is contaminated or otherwise compromised immediately
 - Change the needleless connectors or caps along with the tubing and as needed

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Preventing IV Catheter Associated Infections

Arterial Line: Insertion Checklist

When inserting an arterial catheter:

- ❑ **Perform hand hygiene** with an alcohol based hand rub before inserting an IV device or having contact with the IV dressing, site, device or attachments
- ❑ **Prep skin** at insertion site with an alcohol/chlorhexidine solution (70% alcohol, >0.5% chlorhexidine), such as Chloraprep. The Center for Disease Control (CDC) says this type of solution is best for site preparation and care. Follow these steps:
 - Perform a 30 second back and forth scrub and then air dry
 - Perform a two-minute back and forth scrub and then air dry for moist sites, such as the groin
 - Use tincture of iodine, an iodophor, and/or 70% alcohol as alternatives if there is a contraindication to chlorhexidine (i.e., patient sensitivity, device manufacturer recommendations, neonates)
- ❑ **Use maximal sterile barriers** for all arterial line insertions
 - Maximal sterile barriers include cap, mask, sterile gown, sterile gloves and a full body sterile drape. For radial artery line insertions, a smaller drape may be used.
 - All teammates directly assisting in the catheter insertion procedure are to use maximal sterile barriers (cap, mask, sterile gown and sterile gloves)



Preventing IV Catheter Associated Infections

Help to Stop Infections - Speak Up for Patient Safety!

Stop teammates who fail to follow any bundle element on the checklist or other infection prevention guidelines while:

- Inserting an IV device
- Touching/manipulating any line component or attachments, except in an emergency

Remind teammates to use bundle and checklist prevention interventions!



Preventing IV Catheter Associated Infections

Resources

Policies are located within Policy Tech for your reference.



Preventing IV Catheter Associated Infections

Course References

References used for this course include:

- *The CDC Guidelines for Prevention of Intravascular Catheter-Related Infections, 2011* (CDC website www.cdc.gov)
- *Infusion Nursing Standards of Practice, 2011*
- *CHS Electronic Policy Manual*
- *APIC Guide to the Elimination of Catheter-Related Bloodstream Infections, 2009*
- CDC/NHSN Device-associated Course: CLABSI Event 2015



Preventing IV Catheter Associated Infections

Summary

Bloodstream Infections (BSIs) are largely avoided when evidence-based prevention steps are taken during IV insertion and care. Teammates in all areas should be aware of the proper maintenance and care of IV catheters.

The following was covered in this course:

- Follow the bundle and checklist elements every time you insert or handle an IV catheter line element or component
- Use hand hygiene with an alcohol based hand rub before inserting an IV device or having contact with the IV dressing, site, device or attachments
- Wear appropriate PPE
- Change bags, dressings and tubing according to policies
- Disinfect sites before you connect or inject
- Regularly assess sites for any sign of infection
- Stop teammates who fail to follow bundle or checklist elements. Remind teammates about the increased risk of infection.



Preventing IV Catheter Associated Infections

Exam Instructions

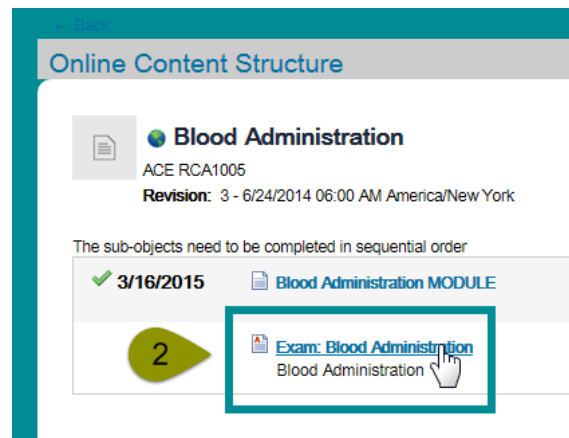
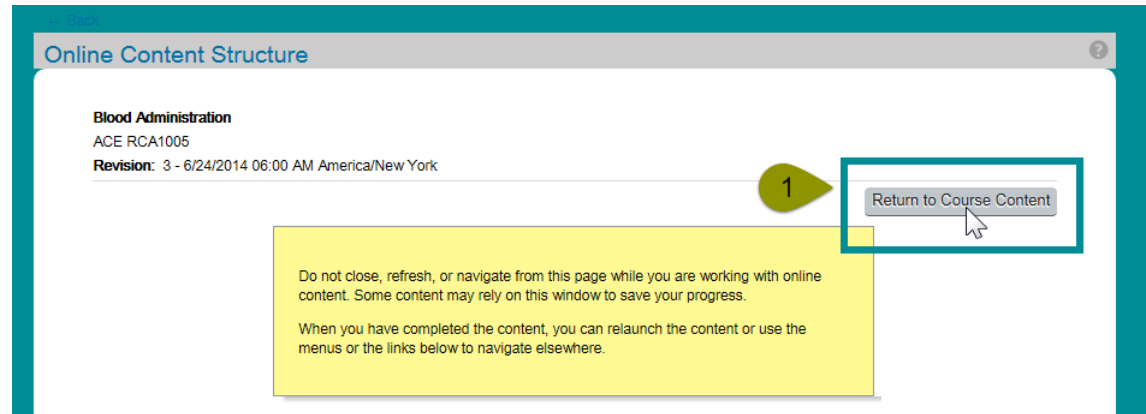
You have come to the end of the course.

To complete the exam, follow these steps:

1. Exit this course.
2. Click **Return to Course Content**.
3. Click the exam link.

To receive credit for this course, you must score 80% or higher on the exam.

If you are not able to access PeopleLink Learning, print the exam. Submit the completed paper version of the exam to your leader.



Preventing IV Catheter Associated Infections: Exam

Name: _____

Date: _____

Circle the correct answer(s).

1. When should hand hygiene with an alcohol based hand rub be performed?
 - A. Before inserting a PIV
 - B. Before touching an IV site
 - C. Before donning gloves to insert a central line
 - D. Before changing a central line dressing
 - E. All of the above

2. Which Personal Protective Equipment (PPE) is required by a teammate inserting or directly assisting with inserting a central line or arterial line?
 - A. Cap
 - B. Mask
 - C. Sterile gown
 - D. Sterile gloves
 - E. All of the above



Preventing IV Catheter Associated Infections: Exam

3. The correct skin preparation for insertion of PIVs and central lines is an alcohol/Chlorhexidine solution (i.e., ChloroPrep) applied using a back and forth scrub for 30 seconds and then air dried.
 - A. True
 - B. False

4. Which findings during assessment of a patient's IV require tubing to be changed?
 - A. End cap missing, tubing open to air
 - B. Tubing is looped back and connected to a hub
 - C. End of open tubing touches a nonsterile surface
 - D. All of the above

5. IV tubing used for continuous IVs, with the exception of TPN and blood administration, should be changed with what frequency?
 - A. Every 96 hours
 - B. Every 7 days
 - C. Every 24 hours
 - D. Every 12 hours



Preventing IV Catheter Associated Infections: Exam

6. Which evidence-based practices are to be used to prevent bloodstream infections associated with a central line?
- A. Practicing hand hygiene before insertion
 - B. Reviewing the necessity of the central line daily and requesting its removal when no longer needed
 - C. Choosing an optimal site (avoid femoral, subclavian preferred unless hemodialysis patient)
 - D. Prep skin with a chlorhexidine/alcohol solution
 - E. Using Maximal sterile barriers (sterile gown, gloves, full body drape, cap and mask)
 - F. All of the above
7. A Peripheral IV catheter (PIV) is to be removed immediately (to lower the risk of a bloodstream infection) when you see what signs or symptoms?
- A. Redness
 - B. Warmth
 - C. Infiltration
 - D. Palpable cord
 - E. All of the above
8. Disinfect ports, hubs and stopcocks before you connect or inject by vigorously scrubbing for 15 seconds or more with which of the following disinfectants?
- A. 70% Alcohol
 - B. Alcohol/chlorhexidine solution
 - C. Tincture of iodine
 - D. All of the above
 - E. A or B only



Preventing IV Catheter Associated Infections: Exam

9. Alcohol port protectors (Curos) are required for use on all adult patients with a central line.
- A. True
 - B. False
10. Which of the following causes catheter associated BSIs or CLABSIs? (Select the best three answers)
- A. Contamination of the catheter during insertion or handling
 - B. Not disinfecting catheter hubs, ports or needleless connectors enough
 - C. Skin organisms from the patient that travel through the insertion site
 - D. Teammates who routinely follow all infection prevention bundle and checklist processes

