

# Maintenance and Removal of Central Venous Catheters



# Presenter

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# Learning Objectives

- Discuss components of the central venous catheter (CVC) maintenance bundle
- Outline issues to address during the transition of care of a patient with a CVC
- Describe strategies to promote the removal of unnecessary CVCs



# Impact of Infection

- CLABSIs result in increased mortality and health care costs
- Of all healthcare-associated infections, CLABSIs cause the highest number of preventable deaths
- 65%–70% of CLABSIs can be prevented by implementing evidence-based practices

*(APIC Implementation Guide: Guide to Preventing Central Line-Associated Bloodstream Infections, APIC, 2015)*

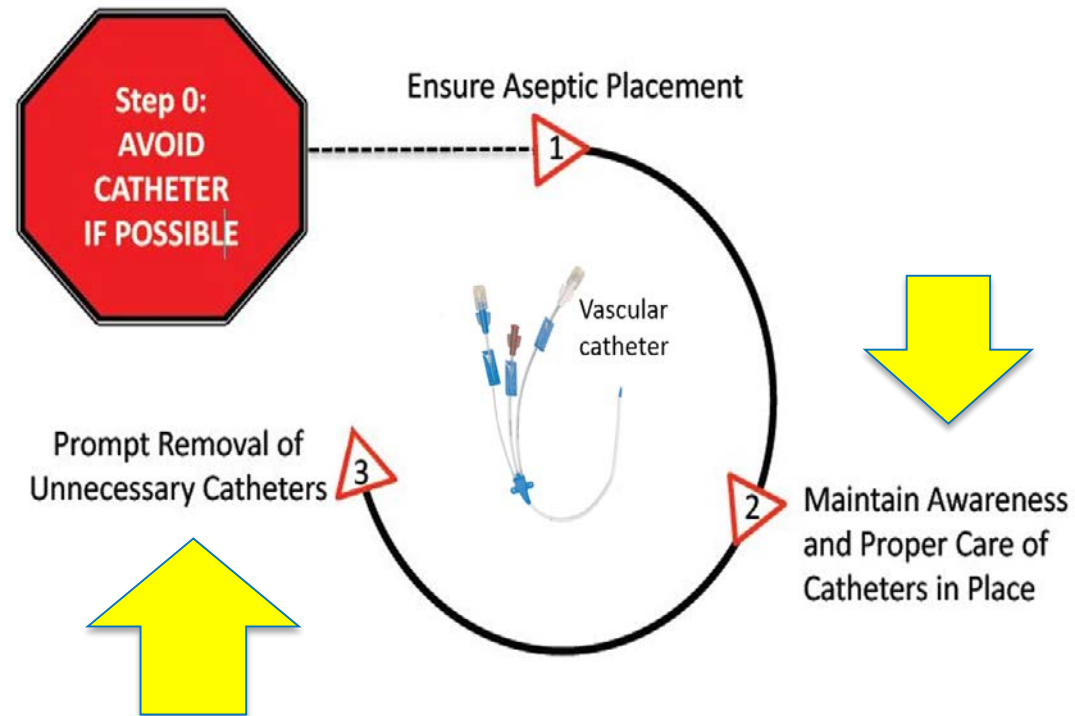


# Targeting Maintenance and Removal

Standardize CVC  
maintenance care  
where possible

Maintain awareness of  
CVCs that are in place

Remove CVC when no  
longer necessary



(Meddings J, Saint S. Disrupting the life cycle of the urinary catheter. *Clin Infect Dis*. 2011;52(11):1291-3. PMID: 21596672)



# Case Study: Maintenance

Mrs. Smith is admitted to the ICU following a motorcycle accident

- Traumatic brain injury
- Compound open fracture of femur, rib fractures
- Requires mechanical ventilation

Has an internal jugular CVC for hemodynamic support and antibiotic administration.

**Question: What are the CVC maintenance priorities for this patient?**

*Disclaimer: All case studies are hypothetical and not based on any actual patient information. Any similarity between a case study and actual patient experience is purely coincidental.*



# Maintenance Bundle of Care

Conduct daily assessments of the necessity of CVCs, with prompt removal if no longer needed

Access ports of entry with aseptic technique

Perform proper care of infusion tubing

Assess and care for central venous catheter dressings

### Checklist for Prevention of Central Line Associated Blood Stream Infections

*Based on 2011 CDC guideline for prevention of intravascular catheter-associated bloodstream infections:  
<http://www.cdc.gov/hicpac/pdf/guidelines/bsi-guidelines-2011.pdf>*

**For Clinicians:**

**Promptly remove unnecessary central lines**

- Perform daily audits to assess whether each central line is still needed

**Follow proper insertion practices**

- Perform hand hygiene before insertion
- Adhere to aseptic technique
- Use maximal sterile barrier precautions (i.e., mask, cap, gown, sterile gloves, and sterile full-body drape)
- Perform skin antiseptics with >0.5% chlorhexidine with alcohol
- Choose the best site to minimize infections and mechanical complications
  - Avoid femoral site in adult patients
- Cover the site with sterile gauze or sterile, transparent, semipermeable dressings

**Handle and maintain central lines appropriately**

- Comply with hand hygiene requirements
- Scrub the access port or hub immediately prior to each use with an appropriate antiseptic (e.g., chlorhexidine, povidone iodine, an iodophor, or 70% alcohol)
- Access catheters only with sterile devices
- Replace dressings that are wet, soiled, or dislodged
- Perform dressing changes under aseptic technique using clean or sterile gloves


**For Facilities:**

- Empower staff to stop non-emergent insertion if proper procedures are not followed
- "Bundle" supplies (e.g., in a kit) to ensure items are readily available for use
- Provide the checklist above to clinicians, to ensure all insertion practices are followed
- Ensure efficient access to hand hygiene
- Monitor and provide prompt feedback for adherence to hand hygiene  
<http://www.cdc.gov/handhygiene/Measurement.html>
- Provide recurring education sessions on central line insertion, handling and maintenance

**Supplemental strategies for consideration:**

- 2% Chlorhexidine bathing
- Antimicrobial/Antiseptic-impregnated catheters
- Chlorhexidine-impregnated dressings

National Center for Emerging and Zoonotic Infectious Diseases  
Division of Healthcare Quality Promotion



(Checklist for Prevention of Central Line Associate Blood Stream Infections, CDC, 2011)



# Basics to Consider



Hand hygiene before and after all CVC care and manipulation

Personal protective equipment use for insertion and maintenance of CVCs

Competency-based training for those that insert and maintain CVCs

Proper staffing of nurses that care for patients with CVCs in critical care

Engage patient and families in CVC care and education





# Daily Assessment of Necessity

Assess necessity of CVC daily with a multidisciplinary team

Indications for ongoing use can include:

- Clinical instability of the patient
- Prescribed continuous or intermittent infusion therapy
- Hemodynamic monitoring
- Documented history of difficult peripheral venous access

Use tools like electronic medical record reminders, daily rounding forms or checklists to prompt discussion among staff and leaders



# Example of CVC Necessity Tracking Tool

**Review Daily with Physician for Central Line Necessity Tracking Tool**

Patient Name: \_\_\_\_\_ Room # \_\_\_\_\_ MR # \_\_\_\_\_  
 Central Line Insertion Date: \_\_\_\_\_ D/C Central Line Date: \_\_\_\_\_

Date	Time <i>(check once per day)</i>	Necessity of Central Line Reviewed	Indication for Central Line Use/ Continued Use <i>(see list below)</i>	If no longer indicated, is there a plan to remove Central Line?	RN Signature
		Yes No		Yes No N/A	
		Yes No		Yes No N/A	
		Yes No		Yes No N/A	
		Yes No		Yes No N/A	
		Yes No		Yes No N/A	
		Yes No		Yes No N/A	
		Yes No		Yes No N/A	
		Yes No		Yes No N/A	
		Yes No		Yes No N/A	

**INDICATIONS FOR CENTRAL LINE USE/CONTINUED USE: (List all that apply)**

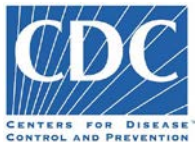
1. Prolonged IV therapy
  - a. Antibiotics
  - b. Total parenteral nutrition
  - c. Chemotherapy
2. Irritating medications
3. Poor peripheral venous access

**Comment:** Blood sampling is not indication for a central line unless there is poor peripheral venous access

4. Critical illness requiring central venous access
  - a. Hemodynamic monitoring
  - b. Vasoactive drips
5. Hemodialysis or plasmapheresis

Modified from IPRO's "Review Daily With Physician for Foley Catheter Necessity" Tracking Tool.

(Used with permission: New York State Partnership for Patients and IPRO. Review Daily with Physician for Central Line Necessity Tracking Tool [NYSPP], adapted from Review Daily With Physician for Foley Catheter Necessity Tracking Tool [IRPO]. Accessed [date] at [http://www.nysppf.org/Materials/Central\\_Line\\_Necessity\\_Tracking\\_Tool.xlsx](http://www.nysppf.org/Materials/Central_Line_Necessity_Tracking_Tool.xlsx).



# Proper Access of CVC

Access CVC only with sterile devices

“Scrub the hub” vigorously for at least 5 seconds with an appropriate antiseptic and allow to dry prior to every access

Assess patency of lines by flushing and aspirating for blood return

Minimize the interruptions of the CVC

- Maintain a closed system as much as possible
- Minimize frequency of tubing disconnects and flushing

*(Gorski L, J Infus Nurs 2016; Marschall J, Infect Control Hosp Epidemiol, 2014; O’Grady NP, Am J Infect Control, 2011)*



# CVC Infusion Tubing

Replace administration sets not used for blood, blood products or lipids at intervals of no more frequently than every 96 hours but at least seven days

- Includes secondary piggyback sets attached to primary continuous set if it remains connected

Replace tubing used to administer Propofol infusions every 6 or 12 hours, per the manufacturers' recommendations or when the container is changed

Change needleless components at least as frequently as the administration set

- There is no benefit to changing these more frequently than every 72 hours

*(Gorski L, J Infus Nurs 2016; O'Grady NP, Am J Infect Control, 2011)*



# CVC Dressing Change

Assess dressing status at least daily

Replace dressing:

- Every 2 days for gauze dressings
- Every 7 days for transparent dressings
- And whenever dressing becomes damp, loosened or soiled

Use aseptic technique and prepare clean skin with greater than 0.5% chlorhexidine with alcohol

CLABSI Surveillance

**Dressing Integrity - Observation Audit**

Reviewer: \_\_\_\_\_ Month Completed: \_\_\_\_\_

Unit	Y/N		Y/N		Y/N		Y/N		Y/N	
	Y	N	Y	N	Y	N	Y	N	Y	N
<b>Central Line Dressing</b>										
1. Central Line Dressing is intact and 100% occlusive.										
2. Date is present on dressing.										
3. Dressing is initialed.										
4. The dressing has been changed within the last 7 days.										
5. The gauze dressing has been changed within the last 48 hours.										
6. RN has assessed the dressing site daily, evidenced by documentation on the flow sheet or electronically.										
<b>Administration Sets</b>										
7. All IV tubing is labeled with time/date/initials.										
8. All IV tubing is changed q96 hours or per policy for particular fluid infusing										
9. All IV tubing has a sterile dead-end cap in place when not in use.										
10. All stopcock ports have sterile dead end caps in place.										
11. All lumens have a needleless device in place.										
<b>TOTAL NUMBER</b>										
<b>PERCENT COMPLIANCE</b>										

Number of correct responses: \_\_\_\_\_ x 100 = % compliance  
 Total number of responses: \_\_\_\_\_

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

(O'Grady NP, Am J Infect Control, 2011)



# CVC Dressing Change (Continued)

Document date and time on dressing

Do not disturb or change a clean, dry, intact dressing until the due date



# Case Study: Transfer of Care

Tracheotomy placed for continuous ventilator support

Neurological status remains poor

Diagnosed with osteomyelitis

Peripherally inserted central catheter (PICC line) placed for long-term course of antibiotics

Mrs. Smith to be transferred to LTACH

**Question: What aspects of care coordination for the central line need to be addressed upon transfer?**

*Disclaimer: All case studies are hypothetical and not based on any actual patient information. Any similarity between a case study and actual patient experience is purely coincidental.*



# Care Coordination of Central Line

Key details to communicate:

- Initial indication for CVC
  - If for antibiotics, the date they were started and reason for treatment
- Date that the line was placed
- Date that the dressing and tubing were last changed
- Issues with patency of lumens

Ongoing assessment of necessity should occur in the new care setting

*Disclaimer: All case studies are hypothetical and not based on any actual patient information. Any similarity between a case study and actual patient experience is purely coincidental.*





# Case Study: Removal of Line

Day 28: Mrs. Smith is improving and breathing on her own and she is hemodynamically stable

Antibiotic course is completed and the infection has resolved

She is scheduled for routine lab tests every two days

**Question: Does Mrs. Smith need to continue to have a PICC line in place? Can the line be removed?**

*Disclaimer: All case studies are hypothetical and not based on any actual patient information. Any similarity between a case study and actual patient experience is purely coincidental.*



# Removal: A Bundle Element

## Michigan Keystone Project

Decrease in CLABSIs in 103 ICUs in Michigan (66% reduction)

- Hand hygiene
- Full barrier precautions during central line insertion
- Skin cleansing with chlorhexidine
- Avoiding femoral site
- **Removing unnecessary catheters**
- Use of insertion checklist



# MAGIC Criteria for Ongoing PICC Use

## Appropriate Indications for PICC use

Delivery of peripherally compatible infusates when the proposed duration of such use is  $\geq 6$  days

Delivery of non-peripherally compatible infusates (e.g., irritants or vesicants), regardless of proposed duration of use

Delivery of cyclical or episodic chemotherapy that can be administered through a peripheral vein in patients with active cancer, provided that the proposed duration of such treatment is  $\geq 3$  months

Invasive hemodynamic monitoring or requirement to obtain central venous access in a critically ill patient, provided the proposed duration of such use is  $\geq 15$  days

Frequent phlebotomy (every 8 hours) in a hospitalized patient, provided that the proposed duration of such use is  $\geq 6$  days

Intermittent infusions or infrequent phlebotomy in patients with poor/difficult peripheral venous access, provided that the proposed duration of such use is  $\geq 6$  days

For infusions or palliative treatment during end-of-life care

Delivery of peripherally compatible infusates for patients residing in skilled nursing facilities or transitioning from hospital to home, provided that the proposed duration of such use is  $\geq 15$  days



# Barriers to CVC Maintenance and Removal

- Difficulty engaging physicians and nurses
- Lack of insertion and maintenance supplies
- Lack of knowledge and skill regarding CVC care and maintenance processes
- Poor communication across the continuum of care



# Solutions for Improvement

- Use data to drive action: monitor and share CVC utilization and infection data
- Standardize where you can
  - Pre-packaged dressing change kits
  - Protocols for care processes
- Audit adherence and provide with “just-in-time” education and feedback
- Address CVC need at every hand-off

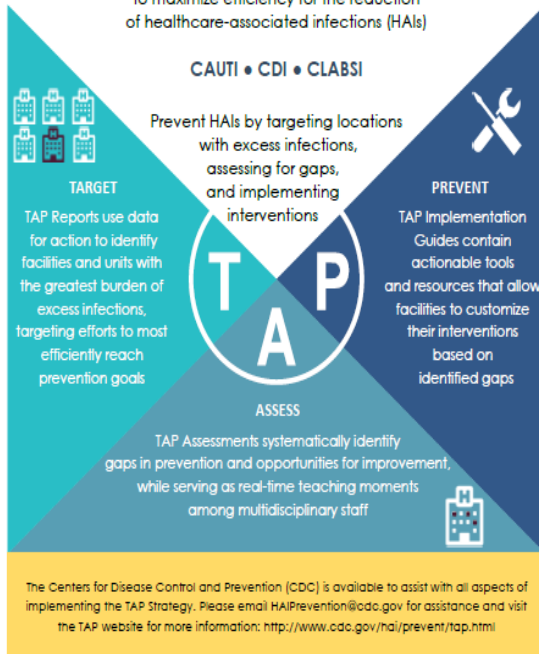


# Tools for Improvement



## The Targeted Assessment for Prevention Strategy

A quality improvement framework that targets resources to maximize efficiency for the reduction of healthcare-associated infections (HAIs)



## CDC TAP



## ELIMINATE HARM ACROSS THE BOARD

### Days Since Last CLABSI

**CENTRAL-LINE ASSOCIATED BLOODSTREAM INFECTION (CLABSI) PREVENTION:**

- Implement insertion bundle: procedural pause, hand hygiene, aseptic technique for insertion and care, site selection of subclavian (preferred), internal jugular (acceptable) and avoidance of femoral vein in adults, maximal sterile precautions, skin prep with 2% chlorhexidine
- Implement "stop the line" approach to insertion bundle; if there is an observed violation of infection control practices (maximal sterile barrier precautions, break in sterile technique), line placement should stop and the violation corrected
- Implement insertion checklist to help with compliance and monitoring
- Incorporate daily review of line necessity into workflow, such as charge nurse rounds, electronic health care record prompt
- Adopt maintenance bundle of dressing changes (every seven days for transparent) line changes and IV fluid changes; incorporate into daily assessment and review — can be part of charge nurse checklist along with the daily review of line necessity
- Use a chlorhexidine-impregnated sponge dressing
- Use 2% chlorhexidine-impregnated cloths for daily skin cleansing
- Do not routinely replace CVCs, PICCs, hemodialysis catheters or pulmonary artery catheters
- Use a sutureless securement device
- Use ultrasound guidance to place lines if this technology is available

American Hospital Association logo, Partnership for Patients logo, HRET logo.

## Days Since Last CLABSI. Eliminate Harm Across the Board.

CLABSI Surveillance

**Dressing Integrity - Observation Audit**

Reviewer: \_\_\_\_\_ Month Completed: \_\_\_\_\_

Unit	Y/N	Y/N	Y/N	Y/N	Y	N
<b>Central Line Dressing</b>						
1. Central Line Dressing is intact and 100% occlusive.						
2. Date is present on dressing.						
3. Dressing is initialed.						
4. The dressing has been changed within the last 7 days.						
5. The gauze dressing has been changed within the last 48 hours.						
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<b>Administration Sets</b>						
7. All IV tubing is labeled with time/date/initials.						
8. All IV tubing is changed q96 hours or per policy for particular fluid infusing						
9. All IV tubing has a sterile dead-end cap in place when not in use.						
10. All stopcock ports have sterile dead end caps in place.						
11. All lumens have a needless device in place.						
<b>TOTAL NUMBER</b>						
<b>PERCENT COMPLIANCE</b>						

Number of correct responses \_\_\_\_\_ x 100 = % compliance  
Total number of responses \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_

## CLABSI Surveillance. Dressing Integrity Observation Audit. University of Rochester.



# Summary

Use a bundled approach to improve CVC maintenance and removal practices

Address of CVC care for patients that move from one care setting to another

To overcome barriers, use strategies that involve data, audits, feedback and standardize care and supplies where possible



# Reference

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[http://www.nyspfp.org/Materials/Central\\_Line\\_Necessity\\_Tracking\\_Tool.xlsx](http://www.nyspfp.org/Materials/Central_Line_Necessity_Tracking_Tool.xlsx).



# Speaker Notes



# Speaker Notes: Slide 1

This module, titled “Maintenance and Removal of Central Venous Catheters,” will review key steps and strategies to ensure proper maintenance and removal of central venous catheters.



# Speaker Notes: Slide 2

This module was developed by national infection prevention experts devoted to improving patient safety and infection prevention efforts.



# Speaker Notes: Slide 3

After completing this module you will be able to:

- Discuss components of the central venous catheter maintenance bundle;
- Outline issues to address during the transition of care of a patient with a central venous catheter; and
- Describe strategies to promote the removal of unnecessary central venous catheters.



# Speaker Notes: Slide 4

To begin our discussion of maintenance and removal of central venous catheters, let's review the impact of central line-associated bloodstream infections, or CLABSIs. Data show that CLABSIs result in a higher rate of mortality for patients and increased health care costs. Of all the healthcare-associated infections, CLABSIs cause the highest number of preventable deaths. But the good news is that by implementing evidence-based practices, 65 to 70 percent of CLABSIs can be prevented.



# Speaker Notes: Slide 5

Other modules for this course describe appropriateness of central venous catheters and best practices for insertion. This module will focus on best practices for maintenance and removal that hospital teams should implement as part of their CLABSI prevention program. This includes standardizing CVC maintenance care where possible, maintaining awareness of CVCs that are in place, and promptly removing CVCs when no longer necessary.



# Speaker Notes: Slide 6

Let's consider a case study to help illustrate common maintenance and removal issues for central venous catheters.

Mrs. Smith is a 52-year-old woman who was just in a severe motorcycle accident. Mrs. Smith suffered a traumatic brain injury, multiple rib fractures and a compound open fracture of her right femur. In the emergency department, an internal jugular, or IJ central line was placed for infusion of fluids and vasopressors for her hypotension and antibiotics for her open fracture. The patient is admitted to the ICU.

Question: What are the CVC maintenance priorities for Mrs. Smith?





# Speaker Notes: Slide 7

To answer that question, we can look at maintenance practices using a bundled approach. There are four practices to consider as priorities for CVC maintenance.

First, conduct a daily assessment of the necessity of CVCs, with prompt removal if no longer needed. In some cases—like our case study, for example—in some cases, lines placed emergently can require closer monitoring since adherence to aseptic technique in emergencies can be variable. Second, always access ports of entry using aseptic technique. You also want to ensure proper care of infusion tubing, assessment, and care for CVC dressings. By ensuring that these basic practices occur in a consistent way, we can reduce harm to patients.



# Speaker Notes: Slide 8

There are some basic practices that we need to consider when preventing central line infections. Anyone accessing or manipulating a CVC must perform hand hygiene prior to performing line care. Clinicians that are involved in the line insertion, removal or dressing change, should don proper personal protective equipment (PPE) including sterile gloves, masks and gowns. To ensure that staff are properly trained in these and other CVC practices, they should receive competency-based training for aspects of both line insertion and maintenance.



# Speaker Notes: Slide 8 Continued

This includes aseptic technique for insertion and proper assessment of insertion site and dressing integrity. For critically ill patients that are at higher risk of developing central line infections, staffing should ensure appropriate nurse-to-patient ratio. And finally but just as important, hospitals need to engage patients and families by providing them education about central lines and encouraging them to speak up when they have concerns about CVCs.



# Speaker Notes: Slide 9

Now that we have discussed the basics, let's look at some of the key components of the maintenance bundle. An important step to preventing CLABSIs is to conduct a daily assessment of CVC necessity. On each day of CVC use, a multidisciplinary team of physicians and nurses should review and discuss to meet the indications for ongoing need of the device. Indications of ongoing need can include clinical instability of the patient, receiving continuous or intermittent infusion therapy, hemodynamic monitoring or the patient may have a documented history of difficult peripheral venous access. For more information about CVC appropriateness, please review module CLABSI102.



# Speaker Notes: Slide 9 Continued

There are many different tools to help promote the daily assessment of CVC necessity. These can include daily prompts built into the electronic medical record (EMR) and rounding forms or checklists that help generate discussion among the team caring for the patient. Electronic medical record prompts can help highlight assessment criteria, ensure accurate documentation of necessity and support monitoring of adherence to best practices. Use of a rounding tracking tool or checklist ensures that all important items are covered in the daily discussion.



# Speaker Notes: Slide 10

Here is an example of a rounding tool that can be used during multidisciplinary rounds to help address the ongoing need for the CVC and prompt removal if it is no longer needed. Ask for the input of your relevant clinical team members (including unit manager and critical care staff) that the tool you decide to use is appropriate and useful for your hospital.



# Speaker Notes: Slide 11

Another important aspect of CVC maintenance is accessing the line using aseptic technique. Disinfecting the connection site prior to accessing the CVC reduces the risk of pathogen contamination to the internal lumen of the catheter, which can lead to infection. Before accessing catheter hubs, needleless connectors or injection ports, vigorously apply mechanical friction or “scrub the hub” for no less than five seconds with an antiseptic such as alcoholic chlorhexidine preparation, 70 percent alcohol, or povidone-iodine and allow it to dry.



# Speaker Notes: Slide 11 Continued

Some hospitals now use connector access devices like alcohol-impregnated port protector caps. If using these devices, make sure staff are properly trained to follow the manufacturer's recommendations for use. To help maintain patency of the CVC, it should be flushed per hospital protocol and all ports assessed on a regular basis. Finally, try to access the CVC and access only when absolutely necessary. Consider consolidating lab draws and switching IV meds to oral when appropriate.





# Speaker Notes: Slide 12

CVC infusion tubing or administration sets should be changed per established guidelines. The timeframes are dependent on the type of fluid being infused and potential rate of bacterial growth associated with that fluid. For administration sets not used for blood, blood products or lipids, tubing should be changed at intervals no more frequently than every 96 hours but at least seven days. For infusions of propofol, the tubing should be changed every six to 12 hours, per the manufacturers' recommendations or when the propofol container is replaced. Hub, connector or ports should be changed at least as frequently as the administration set, but no more frequently than every 72 hours, unless specified by the manufacturer.



# Speaker Notes: Slide 13

Another important aspect of the maintenance bundle is CVC dressing care. Nurses should assess the status of the dressing at least daily, and some hospitals promote assessment every shift. Dressings should be changed every two days for gauze dressings and every seven days for transparent dressings. If a dressing is damp, loosened or soiled it should be changed immediately.



# Speaker Notes: Slide 13 Continued

Clinicians should use aseptic technique when performing dressing changes. This includes wearing sterile gloves and a mask. An alcohol chlorhexidine solution should be used for skin antisepsis during dressing changes. Standardizing these products within a pre-made kit can help promote adherence with these practices.

Auditing adherence with dressing change practices can provide opportunities for quality improvement and staff education. On the right side of the slide is an example of a dressing integrity audit tool that can be used.



# Speaker Notes: Slide 14

Here are a couple of other important aspects of CVC dressing care to keep in mind. First, be sure to have clear documentation of the date the dressing was changed or change due date (as facility policy dictates). And remember, unless loose, damp or soiled, do not disturb or change a dressing until the necessary due date. Changing CVC dressings too frequently can increase the risk of introducing bacteria to the entry site.

You can see in the images on the slide how a dressing should be dated and timed.



# Speaker Notes: Slide 15

Now we'll return to our case study. After five days in the ICU, Mrs. Smith is unable to be weaned from the ventilator and receives a tracheotomy for continued ventilator support. She is hemodynamically stable, but her neurological status remains poor and after developing a fever, blood cultures and CT scan show that she has developed MRSA osteomyelitis in her injured right femur.



# Speaker Notes: Slide 15 Continued

The team inserts a peripherally inserted central catheter, or PICC line, and removes the internal jugular central line. On day eight, the patient's neuro and respiratory status remain unchanged and the decision is made to move the patient to the long-term acute care hospital or LTACH, for continued support.

Question: What aspects of care coordination regarding the central line need to be addressed upon transfer?



# Speaker Notes: Slide 16

In preparation for receiving Mrs. Smith, the LTACH admission nurse calls the ICU to receive her report. When coordinating the care of a patient with a CVC from one care setting to another, there are important details that must be communicated.

These include describing what the initial indication for the CVC was. Why did the patient need the central line? And why is it still in place? If the CVC is being used for antibiotic infusions, be sure to share the date the antibiotic was started, the duration of treatment, the antibiotic dose, and the reason for the antibiotic treatment.



# Speaker Notes: Slide 16 Continued

Other key information to share across care settings is the date that the CVC was placed and the date the dressing and administration tubing were last changed. Also report any issues with patency of the lumens. If the CVC will remain in place after the transfer of care, the accepting care location should continue to assess the necessity of the line on a daily.





# Speaker Notes: Slide 17

By day 28, Mrs. Smith's neurological status is beginning to improve and she is now able to breathe on her own without the assistance of the ventilator. She is hemodynamically stable and has completed her course of antibiotics. Her most recent blood cultures were negative and CT scan shows her osteomyelitis is resolved. She is scheduled for routine blood testing every two days.

Does Mrs. Smith need to have a PICC line in place? Or can the line be removed?



# Speaker Notes: Slide 18

As was shown by the Michigan Keystone Project, central line bundles including removal of unnecessary CVC's reduce CLABSIs.













# Speaker Notes: Slide 22

Here are a couple of examples of tools that you might find helpful. On the left is a poster that displays the number of days since a unit's last CLABSI. This is a great visual way to engage staff in their CLABSI improvement efforts. On the right is a CVC dressing integrity audit tool from the University of Rochester. These tools and more can be found online at CDC's TAP CLABSI Implementation Guide.





# Speaker Notes: Slide 23

In summary, this module described how to use a bundled approach to improve CVC maintenance practices; shared how to address CVC care for patients that move from one care setting to another; and finally, outlined several strategies that can be used to improve maintenance and ensure prompt removal of CVCs.



# Speaker Notes: Slide 24

No notes.



# Speaker Notes: Slide 25

No notes.

