Ask an IP: Learning and Communication Series

Foundational Infection Prevention and Control (IPC) Practices related to Central Line-Associated Bloodstream Infections (CLABSI) prevention

Marco Marquez, MPH, CIC + Walteena Brooks, LVN

Infection Preventionists
Healthcare Outreach Unit
Acute Communicable Disease Control (ACDC) Program
Los Angeles County Department of Public Health

LACDPH Infection Preventionist Team

- Jehan Mephors, RN
- Marco Marquez, MPH, CIC
- Walteena Brooks, LVN

Contact Us: LACSNF@ph.lacounty.gov

Website:

http://publichealth.lacounty.gov/acd/AskAnIPProgram/index.htm

Disclosures

- There is no commercial support for today's call
- Neither the speakers nor planners of today's call have disclosed any financial interests related to the contents of this meeting
- This call is meant for healthcare facilities and is off the record, reporters should log off now

Housekeeping

- **Microphones** are disabled. For questions, please use the chat
- **Cameras:** please keep them turned off during the presentation
- **Recording**: the presentation is being recorded and will be posted on the Ask an IP Website within a few weeks following the session
- We will not review COVID-19 guidelines (including CDPH AFLs) during these sessions

Today's Objectives

- Provide a brief overview on CLABSI
- Review foundational IPC practices that are critical for preventing CLABSI
- Highlight resources and tools available for further learning and implementation of best practices related to CLABSI prevention

Overview of CLABSI

What is a Central Line?

- A central line (also known as a central venous catheter) is a long, thin tube that healthcare providers (HCPs) often place in a large vein in the chest or groin area used for:
  - Administering medication to a patient
  - Providing fluids or nutrition
  - Collecting blood for medical tests

1.https://www.cdc.gov/clabsi/about/index.html#:~:text=A%20central%20line%20(also%20known,collect%20blood%20for%20medical%20tests.

Types of Central Lines

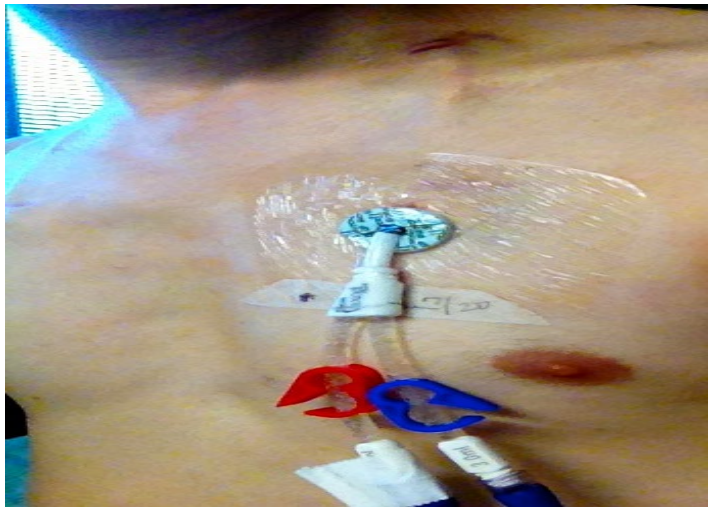
- Peripherally inserted central catheters (PICCs)
- Non-tunneled (subclavian, jugular or femoral)
- Tunneled (Broviac, Hickman, Groshong)
- Dialysis catheter (Quinton)
- Implanted ports (Permacath or Port-a-Cath)

Peripherally inserted central catheters (PICCs)

- Inserted into a vein in the arm (typically the upper arm)
- Threaded toward the heart
- Used for:
  - Extended antibiotic therapy
  - Chemotherapy
  - TPN (Total parenteral nutrition)

Non-tunneled (subclavian, jugular or femoral)

- Directly inserted into a central vein usually the internally jugular, subclavian, or femoral vein
- Used for shorter term access for emergencies, critical care, temporary hemodialysis
- Not meant for long-term triple lumen catheters used in ICU settings



Tunneled (Broviac, Hickman, Groshong)

- Inserted into a central vein: internal jugular or subclavian
- Tunneling occurs under the skin before the catheter enters the vein
- Designed for long term use (e.g., months to years)
- Often for patient requiring dialysis, chemotherapy, long-term medication administration

Audience Question

- **What are some of the key infection prevention strategies for tunneled central lines**

What are the key infection prevention strategies for tunneled central lines

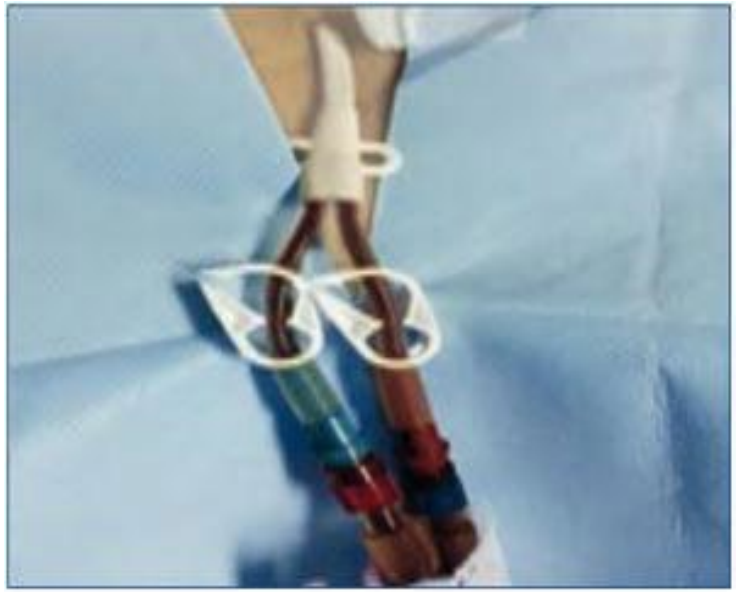
- Aseptic technique
- Hand Hygiene
- Catheter Site Care
- Securement
- Daily Assessment
- Hub and Port Disinfection
- Staff Education
- Monitor and Document

Dialysis catheter (Quinton)

- Usually inserted into the internal jugular vein
- Can also be placed in femoral or subclavian
- Used and designed for patients undergoing dialysis (Short term or long term)
- Tunneled: Used for long-term dialysis
- Non-tunneled: Used for short-term, temporary dialysis
- Emergency dialysis for acute kidney injury
- Chronic dialysis for end-stage renal disease when long-term access isn’t ready

Implanted ports (Permacath or Port-a-Cath)

- A catheter connected to a small reservoir or port implanted under the skin
- Typically placed in the chest
- Used for long-term access for chemotherapy, antibiotics, or frequent blood draws



Central Lines vs Intravenous (IV)

Central Line	Intravenous (IV)
Access a major vein close to the heart	Shorter and typically placed in the hand, arm, or foot
Can remain in place for longer durations, leading to increased risk for infection	Shorter term needs
Central lines are commonly used in ICUs	

What is a CLABSI?

- CLABSI stands for Central Line-Associated Bloodstream Infection
- Serious infection induced by pathogen infiltrating bloodstream through central line
- Can lead to severe complications, including sepsis
- High morbidity and mortality rates

CLABSI Pathogenesis

- Extraluminal contamination: pathogens migrate on external surface of catheter or bacteria is introduced during insertion
- Intraluminal contamination: pathogens migrate along the internal surface or there is a contamination at access port
- Seeding from another infection site source, less common

Symptoms

- Fever, chills
- Redness and pain at central line site
- Low blood pressure, rapid heart rate, altered mental status

Diagnosis

- Typically diagnosed through blood cultures
- Blood cultures identify pathogen in blood
- Clinical signs of infection
- Lab confirmation
- NHSN lab criteria must be met

Modifiable Risk Factors for CLABSI

- Multiple catheters
- Multiple lumen catheters
- Excess line manipulation
- Emergency insertion
- Prolonged duration
- Prolonged hospital stay prior to line insertion
- Neutropenia
- Hemodialysis

Non-Modifiable Risk Factors for CLABSI

- Age
- Underlying diseases or conditions
- Certain types of central lines
- Previous central line insertion damage
- Severity of illness

CLABSI Prevention through Foundational IPC

Keys to CLABSI Prevention

- Proper Central Line Insertion Practices (CLIP)
- Proper line maintenance
- Clinical staff trained and competent as evidenced through return demonstration
- Adherence monitoring and feedback of prevention care practices

Who is involved?

- IP
- Nursing staff
- Leadership
- PICC Team/Vascular access team
- Infection Control Committee/QAPI Committee
- Multidisciplinary

Audience Question

What is a prevention bundle and why do we use them for CLIPs?

What is a prevention bundle and why do we use them for CLIPs?

- A collection of practices supported by strong clinical evidence for effectiveness
- When implemented together, these practices yield synergistic improvement
- Benefits include:
  - Reducing practice variation among HCPs
  - Enhancing adherence to recommended practices

Preparing for CLIP

- All-inclusive catheter cart/kit
- Ultrasound guidance used
- Optimal catheter site selected
  - Lower risk insertion site if possible
  - Avoid femoral site
  - Subclavian preferred for non-tunneled in adults

Best Practices for Central Line Insertion

- List of evidence-based indications is used to determine line necessity (patient meets indications)
- Hand hygiene is performed before and after insertion
- Ultrasound guidance used
- Maximum sterile barrier precautions are used for insertion
- Optimal site is selected
  - Typically: femoral is avoided in adults, and subclavian is preferred for ICU patients

Best Practices for Central Line Insertion

- Greater than 2% CHG with alcohol is used for skin antisepsis prior to insertion
- Scrubbing motion used when applying CHG
- Prep must dry completely
- Sterile gauze, sterile transparent, or sterile semi-permeable dressing used to cover site
- Insertion date and indication are document at time of insertion

CDPH Central Line Insertion Practices Tool

Healthcare-Associated Infections Program Adherence Monitoring
Central Line Insertion Practices

Facility name:
Facility ID:
Assessment completed by:
Date:
Unit:

Regular monitoring with feedback of results to staff can maintain or improve adherence to central line insertion practices. Use this tool to identify gaps and opportunities for improvement. Monitoring may be performed in any type of patient care location where central lines are inserted.

Instructions: Use this tool to **directly observe** *central line insertions*. Observe each practice and check "Yes" if adherent and "No" if not. In the last columns, record the total number of "Yes" for adherent practices observed and the total number of observations ("Yes" + "No"). Calculate adherenc percentage in the last row. "Essential" practices are considered core strategies and should be correctly practiced for each line insertion.

Central Line Insertion Practice	CVC Patient Patient 1	CVC Patient Patient 2	Adherence by Task # Yes	Adherence by Task # Observed
IP1. Essential: **A list of evidence-based indications is used to determine line necessity. (This patient meets indications.)**	☐ Yes ☐ No	☐ Yes ☐ No		
IP2. Essential: **Hand hygiene is performed before and after insertion.**	☐ Yes ☐ No	☐ Yes ☐ No		
IP3. Essential: **Ultrasound guidance used.**	☐ Yes ☐ No	☐ Yes ☐ No		
IP4. Essential: **Maximum sterile barrier precautions are used for insertion.**	☐ Yes ☐ No	☐ Yes ☐ No		
IP5. Essential: **Optimal site is selected (avoiding the femoral site in all adult patients and the subclavian vein preferred in ICU patients).**	☐ Yes ☐ No	☐ Yes ☐ No		
IP6. Essential: **Greater than 2% CHG with alcohol is used for skin antisepsis prior to insertion, a scrubbing motion is used to apply CHG, and the prep is allowed to dry completely. If CHG is contraindicated appropriate substitute is used (same method as CHG unless otherwise specified).**	☐ Yes ☐ No	☐ Yes ☐ No		
IP7. Essential: **Sterile gauze, sterile transparent, or sterile semi-permeable dressing is used to cover catheter site.**	☐ Yes ☐ No	☐ Yes ☐ No		
IP9. CVC insertion date and indication are documented at the time of insertion.	☐ Yes ☐ No	☐ Yes ☐ No		
All essential components met:	☐ Yes ☐ No	☐ Yes ☐ No		
# of Correct Practices Observed ("# Yes"): ___	Total # Contact Precautions Observations ("# Observed"): ____ (Up to 16 total) *If practice could not be observed (i.e., cell is blank), do not count in total # Observed.* **All essential components are in place for all patients ☐ Yes ☐ No**		Adherence ____% (Total "# Yes" ÷ Total "# Observed" x 100)	

CLIP Bundle IPC Essentials

- Hand hygiene performed
  - Each step of the way
- Skin Prep
  - Chlorhexidine (CHG) for most patients
  - Povidone iodine, alcohol as alternatives and for infants
- Skin prep, completely dry before insertion
- All 5 maximal sterile barriers used
  - Sterile gloves, sterile gown, cap, mask worn, and large sterile drape (covers patients entire body)

Best Practices for Central Line Maintenance

- Dressings that are wet, soiled or dislodged are changed promptly
- Dressing must be clean, intact, and dated
- CHG saturated dressing is used for patients > than two months old
- Sterile gauze, sterile transparent or sterile semi-permeable dressing is used to cover catheter site and in place for no more than 7 days without being changed

Best Practices for Central Line Maintenance

- Need for central line is assessed DAILY by practitioner
  - Central line promptly removed if not indicated
- Daily 2% CHG bathing
- Tubing and administration set have been in place <7 days
- If receiving TPN/ lipids, tubing is dated to ensure change every 24 hours or less
- Insertion date documented
- Antiseptic protector caps are utilized for all line connectors if policy

CDPH Central Line Maintenance Practices Tool

Healthcare-Associated Infections Program Adherence Monitoring
Central Line Maintenance Practices

Facility name:
Facility ID:
Assessment completed by:
Date:
Unit:

Regular monitoring with feedback of results to staff can improve adherence to central line maintenance practices. Use this tool to identify gaps and opportunities for improvement. Monitoring may be performed in any type of patient care location where central lines are used.

Instructions: Use this tool to evaluate patients/residents with a central line. Review documentation and observe tubing and condition of dressings. Observe each practice and check "Yes" if adherent and "No" if not. In the last columns, record the total number of "Yes" for adherent practices observed and the total number of observations ("Yes" + "No"). Calculate adherence percentage in the last row. "Essential" practices are considered core strategies and should be correctly practiced for each line insertion.

Central Line Maintenance Practices	CVC Patient Patient 1	CVC Patient Patient 2	CVC Patient Patient 3	CVC Patient Patient 4	Adherence by Task # Yes	Adherence by Task # Observed
DO1. Essential: **Optimal site is selected, avoiding the femoral site in all adult patients and the subclavian vein preferred in ICU patients.**	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No		
DO2. Essential: **Dressings that are wet, soiled, or dislodged are changed promptly; they are clean, intact, and dated.**	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No		
DO3. Essential: **Chlorhexidine-containing dressing used for patients >2 months old.**	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No		
DO4. Essential: **Sterile gauze, sterile transparent or sterile semi-permeable dressing is used to cover catheter site and in place <7 days.** Mark *No* if no date on dressing.	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No		
DO5. Essential: **The need for CVC is assessed daily by practitioner, with prompt removal of unnecessary lines.** Review chart	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No		
DO6. Essential: **Daily bathing with at least a 2% CHG solution is performed.** ☐ All CVC patients ☐ **ICU only** (At minimum) Review chart	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No		
DO7. Tubing and administration set have been in place <7 days. Mark *No* if no date on tubing.	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No		
DO8. If receiving TPN/lipids, tubing is dated to ensure change every 24 hours. Mark *No* if not dated.	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No ☐ N/A		
DO9. Antiseptic containing protector caps are utilized for all line connectors if policy.	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No		
DO10. CVC insertion date documented. Review chart	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No		
All essential components met:	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No		

# of Correct Practices Observed ("# Yes"): ___	Total # Contact Precautions Observations ("# Observed"): ____ *If practice could not be observed (i.e., cell is blank), do not count in total # Observed.* **All essential components are in place for all patients ☐ Yes ☐ No**	Adherence ____% (Total "# Yes" ÷ Total "# Observed" x 100)

Central Line Maintenance IPC Essentials

- Excellent and pristine **hand hygiene**
  - Prior to replacing, accessing, repairing, or dressing a catheter
- **Disinfect** hub and access port prior to access
- Sterile gloves and appropriate PPE identified and worn correctly

Daily Chlorhexidine (CHG) Bathing

- Perform daily CHG (2% solution) bathing for specific populations:
  - ICU patients
  - Units with ongoing CLABSI issues
  - SNF residents with a central line
- CHG bathing reduces the microbial burden on the patient's skin and the hands of HCPs
- CHG alternatives: povidone-iodine, triclosan, isopropyl alcohol
  - Please consult medical provider if considering alternatives for a patient

Daily Review of Line Necessity

- **Perform daily review** of central line necessity, and document findings in the patient record
- **Remove any unnecessary line** promptly, as the risk of infection increases with the duration of the line

Daily inspection of insertion site

- Carefully observe the area around the insertion site for signs of redness, swelling, pain, warmth, drainage, or discoloration
- Ensure appropriate personal protective equipment (PPE) and hand hygiene practices are consistently followed
- Encourage patients to speak up regarding condition of their insertion site/central line

Staff Training and Competency

- Clinical staff must be trained at hire and undergo annual competency training
- Competency should be proven through return demonstration (teach-back)
- Facilities must have **policies and practices** in place, and staff should be updated on new evidence-based practices whenever guidance changes
- A good policy has everything covered in this presentation and MORE! (Step by step with QAPI and compliance built into it)

Adherence Monitoring

- Conduct CLABSI surveillance using standardized methods
- Monitor adherence to CLABSI prevention practices through tools and practices such as:
  - CLIP adherence monitoring tool (NHSN form)
  - CDPH Central Line Maintenance and Insertion tools
  - Daily review of line necessity
  - Prompt removal of central lines
  - “Scrub-the-Hub” practices when accessing the line
  - Proper catheter site care and dressing practices

Feedback and Staff Education

- Provide constructive feedback to frontline staff and leadership
- Implement a QAPI project to reduce CLABSI rates, prioritizing if CLABSI rates are high
- Perform frequent audits and rounds
- Regularly share CLABSI rates and related information with all staff

Patient and Visitor Education

- Encourage patients to advocate for HCPs practicing good infection prevention and control (IPC)
- Speak up if there are concerns about the insertion site or pain
- Notify HCPs immediately if the bandage or dressing comes off, becomes wet, or is dirty

Patient and Visitor Education continued…

- Advise visitors not to touch tubing or catheters
- Remind patients not to touch or pull central lines
- Ensure visitors are performing proper hand hygiene
- Ask providers if the central line is still necessary and have the rationale explained in plain language

Scenarios/Case Studies/Interactive

Case Scenario 1: Redness Around the Central Line

Mr. Jackson, a 72-year-old resident with a history of congestive heart failure, has a central line placed in his right subclavian vein. During your assessment, you notice redness and swelling around the insertion site, and Mr. Jackson complains of tenderness, his temperature is 101.2 F.

Question:

What should the nurse do first?

A. Clean the site with antiseptic and reapply a sterile dressing.
B. Notify the physician and prepare to draw blood cultures.
C. Flush the central line with normal saline to check for patency.
D. Continue to monitor for additional symptoms and recheck in the next shift.

Correct Answer:

B. Notify the physician and prepare to draw blood cultures.

Rationale:

Signs of infection such as redness, swelling, tenderness, and fever may indicate a CLABSI. The nurse must report the findings promptly and follow protocols such as obtaining blood cultures, to confirm the diagnosis. Flushing the line or delaying action may worsen the infection.

Case Scenario 2: Inappropriate Dressing Change Technique

Scenario:

During a routine dressing change on Ms. Lee's central line, you observe a new staff member performing the procedure without wearing a mask. The staff member also places the sterile dressing kit directly on Ms. Lee's bedside table, which is visibly cluttered.

Question:

What is the most appropriate response?

A. Remind the staff member to wear gloves for the procedure.
B. Allow the staff member to complete the dressing change and discuss the issue afterward.
C. Stop the procedure immediately and reinforce proper aseptic technique.
D. Continue observing but report the incident to the charge nurse later.

Correct Answer:

C. Stop the procedure immediately and reinforce aseptic technique .

Rationale:

Proper aseptic technique is critical to prevent CLABSI during dressing changes. Stopping the procedure ensures that the resident is not exposed to infection risk, and immediate education reinforces correct practices. Waiting or only reporting afterwards allows potential harm

References and Tools

References

- CDC CLABSI Webpage
  - https://www.cdc.gov/clabsi/about/index.html#:~:text=A%20central%20line%20(also%20known,collect%20blood%20for%20medical%20tests.
- CDPH ACH IP CLABSI, CAUTI, PNU Prevention Slides
  - https://www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/ACH_IP_OnlineCourseG_CLABSI-CAUTI-PNU_Prevention.pdf
- CDPH IP Training for ACH Slides
  - https://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/IP_TrainingForACHs_OnlineCourse.aspx

1.

References continued..

- Joint Commission “Scrub-the-Hub” document
  - https://www.jointcommission.org/-/media/tjc/documents/resources/health-services-research/clabsi-toolkit/clabsi_toolkit_tool_3-21_scrub_the_hubpdf.pdf
- CDPH CLABSI Prevention Slides
  - https://www.cdph.ca.gov/Programs/CHCQ/HAI/CDPH%20Document%20Library/7_CLABSI.Prevention_Approved2.22.19.pdf
- Indiana Public Health CLABSI Slides
  - https://www.in.gov/health/idepd/files/5.26.23-CLABSI-Presentation.pdf

Tools

- Joint Commission CLABSI Toolkit
  - https://www.jointcommission.org/resources/patient-safety-topics/infection-prevention-and-control/central-line-associated-bloodstream-infections-toolkit-and-monograph/
- NHSN CLIP form
  - https://www.cdc.gov/nhsn/forms/57.125_CLIP_BLANK.pdf
- CDPH Central Line Adherence Monitoring Tools
  - https://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/MonitoringAdherenceToHCPracticesThatPreventInfection.aspx

LACDPH Project Firstline

Register for PSIE

- Voluntary participation
- Currently limiting to 5 or fewer users per facility, targeting users who are responsible for infection prevention and control or implementation of transmission-based precautions.
- Three steps to access MDRO information from PSIE:
  1. Complete a registration form.
  2. Sign and submit Data User Agreement.
  3. Set up Microsoft Authentication to use County of Los Angeles apps upon approval.

Email PSIE@ph.lacounty.gov for these steps and links to be sent by email or for more information!

Regional Healthcare Network (RHN)

- The RHN is a new program to connect healthcare facility leaders across Los Angeles County and facilitate the sharing of helpful information between facilities
- Opportunity to meet with other leaders in your regional network to identify and address ways to improve specific health concerns specific to your regions
- Meetings take place quarterly, next virtual meetings in February
- Email RHN@ph.lacounty.gov to learn more and sign up for the next session

Thank you!

Questions?

Email LACDPH anytime at hai@ph.lacounty.gov

Or visit our website at http://publichealth.lacounty.gov/acd/HOU.htm