Central Line-Associated Blood Stream Infections (CLABSI)
Change Package

PREVENTING HARM FROM CLABSI
ACKNOWLEDGEMENTS

We would like to recognize the contributions of the American Hospital Association (AHA)/Health Research & Educational Trust (HRET) Hospital Engagement Network (HEN) team and Cynosure Health for their work in developing the content of this change package.


Accessible at: www.hret-hen.org

Contact: hen@aha.org

© 2016 Health Research & Educational Trust. All rights reserved. All materials contained in this publication are available to anyone for download on www.aha.org, www.hret.org or www.hpoep.org for personal, non-commercial use only. No part of this publication may be reproduced and distributed in any form without permission of the publication or in the case of third party materials, the owner of that content, except in the case of brief quotations followed by the above suggested citation. To request permission to reproduce any of these materials, please email hen@aha.org.
How to Use this Change Package

This change package is intended for hospitals participating in the Hospital Engagement Network (HEN) 2.0 project led by the Centers for Medicare & Medicaid Services (CMS) Partnership for Patients (PFP); it is meant to be a tool to help you make patient care safer and to improve care transitions. This change package is a summary of themes from the successful practices of high performing health organizations across the country. It was developed through clinical practice sharing, organization site visits and subject matter expert contributions. This change package includes a menu of strategies, change concepts and specific actionable items that any hospital can choose to implement based on need, and can begin testing for purposes of improving patient quality of life and care. This change package is intended to be complementary to literature reviews and other evidence-based tools and resources.
PART 1: AVERSE EVENT AREA (AEA) DEFINITION AND SCOPE

Hospital-acquired central line-associated blood stream infections (CLABSI) are serious infections, but are preventable when evidence-based guidelines for central line insertion and maintenance are properly prioritized and implemented.1

Magnitude of the Problem

If not prevented, CLABSI result in increased length of hospital stay, increased cost and increased patient morbidity and mortality. An estimated 30,100 CLABSI occur in U.S. Intensive Care Units (ICU) each year.2 Patient mortality rates associated with CLABSI range from 12-25 percent3 and the cost of CLABSI per episode of care ranges from $3,700 to $36,000 per episode.4

Between 2008 and 2013, the adoption and implementation of evidence-based practices has been associated with a 46 percent reduction in central line-associated blood stream infections.5 Leveraging this improvement, further efforts are needed to prevent patient harm, especially in non-critical care settings including hemodialysis centers and inpatient wards. As the majority of CLABSI occur outside the ICU,1 the maintenance, application and spread of ICU improvement successes are necessary to realize safety goals across patient populations.

Fortunately, CLABSI prevention strategies are applicable to both critical and non-critical care settings. The CLABSI Central Venous Catheter (CVC) Insertion Bundle includes: procedural pause, hand hygiene, aseptic technique, optimal site selection, chlorhexidine for skin preparation and maximal sterile (full-barrier) precautions.6 The CLABSI Maintenance Bundle includes central line site dressing changes, administration tubing changes, IV fluid changes and daily review of line necessity with timely removal.1

HEN 1.0 Progress

Through the work of the AHA/HRET Hospital Engagement Network, from 2011 through 2014, over 1,400 hospitals worked to prevent CLABSI. Under this initiative, 893 CLABSI harms were prevented and an estimated $15,181,000 was saved.7

HE 2.0 Reduction Goals

Decrease the rate of CLABSI by 40% in all tracked units by September 23, 2016.
PART 2: MEASUREMENT

A key component to making patient care safer in your hospital is to track your progress toward improvement. This section outlines the nationally recognized process and outcome measures for which you will be collecting and submitting data for the AHA/HRET HEN 2.0. Collecting these monthly data points at your hospital will guide your quality improvement efforts as part of the Plan-Do-Study-Act (PDSA) process. Tracking your data in this manner will provide valuable information you need to study your data across time to determine the effect of your improvement strategies on reducing patient harm in your hospital. Furthermore, collecting these standardized metrics will allow the AHA/HRET HEN to aggregate, analyze and report its progress toward reaching the project’s 40/20 goals across all AEAs by September 2016.

Nationally Recognized Measures: Process and Outcome

Please download and reference the encyclopedia of measures (EOM) on the HRET HEN website for additional measure specifications and for any updates after publication at: http://www.hret-hen.org/audience/data-informatics-teams/EOM.pdf

HEN 2.0 EVALUATION MEASURE

- CLABSI standardized infection ratio (SIR) (NQF 0139) reported for:
  > ICU units, including NICU
  > ICU + other inpatient units

- Central line utilization ratio reported for:
  > ICU units, including NICU
  > ICU + other inpatient units

- CLABSI rates reported for:
  > ICU units including NICU
  > ICU + other inpatient units

SUGGESTED PROCESS MEASURES

- Central-line-bundle-compliance composite (NQF 0298) - individual bundle element compliance
- Compliance with the daily review of central line necessity
- Central line maintenance bundle compliance - all-or-none bundle element compliance
- Hand hygiene adherence rate (all infection topics)
Suggested Bundles and Toolkits


• For key tools and resources related to preventing and reducing CLABSI, visit www.hret-hen.org.

Investigate Your Problem and Implement Best Practices

Driver diagrams: A driver diagram visually demonstrates the causal relationship between change ideas, secondary drivers, primary drivers and your overall aim. A description of each of these components is outlined in the table below. This change package is organized by reviewing the components of the driver diagram to (1) help you and your care team identify potential change ideas to implement at your facility and (2) to show how this quality improvement tool can be used by your team to tackle new process problems.

<table>
<thead>
<tr>
<th>Aim</th>
<th>Primary Driver</th>
<th>Secondary Driver</th>
<th>Change Idea</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

AIM: A clearly articulated goal or objective describing the desired outcome. It should be specific, measurable and time-bound.

PRIMARY DRIVER: System components or factors which contribute directly to achieving the aim.

SECONDARY DRIVER: Action, interventions or lower-level components necessary to achieve the primary driver.

CHANGE IDEAS: Specific change ideas which will support/achieve the secondary driver.
## Drivers in This Change Package

<table>
<thead>
<tr>
<th>Reduce CLABSI</th>
<th>Standardize Insertion Process</th>
<th>Change Idea</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Implement Insertion Checklist</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Implement &quot;Stop the Line&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select Optimal Site</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Guide Line Placement with Ultrasound</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hand Hygiene and Aseptic Technique</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prep with 2% CHG</td>
<td></td>
</tr>
<tr>
<td>Review Line Necessity</td>
<td>Daily Review</td>
<td>Change Idea</td>
</tr>
<tr>
<td>Standardize Maintenance Process</td>
<td>Bundle Elements Together</td>
<td>Change Idea</td>
</tr>
<tr>
<td></td>
<td>Incorporate Into Daily Assessment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scrub the Hub</td>
<td></td>
</tr>
<tr>
<td>Specialize Tactics- &quot;Beyond the Bundles&quot;</td>
<td>Use CHG Dressings</td>
<td>Change Idea</td>
</tr>
<tr>
<td></td>
<td>Bathe with CHG</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use a Non-Suture Securement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use Antiseptic- or Antimicrobial-Impregnated CVCs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Do Not Routinely Replace CVCs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Involve Patients &amp; Families</td>
<td></td>
</tr>
</tbody>
</table>
OVERALL AIMS: REDUCE CLABSI

Primary Driver > Standardize insertion process (Insertion Bundles)
Following established guidelines for CVC insertion will decrease CLABSI rates. All units should adopt and implement this evidence-based Insertion Bundle. The Insertion Bundle includes: indications for CVCs, maximal sterile barrier precautions, aseptic technique, hand hygiene, proper skin prep, and correct insertion technique.

Secondary Driver > Implement an insertion checklist
An insertion checklist can help to ensure that all recommendations for insertion of a CVC are followed each and every time. The checklist includes a list of actions that should occur before (e.g., procedural pause), during (e.g., skin prep with 2% CHG), and after CVC insertion (e.g., appropriate site dressing). Use of a checklist is an effective approach to ensure patients are receiving appropriate care. See Appendix II for an example of CVC insertion checklists.

Change Ideas
Adopt and utilize a CVC insertion checklist using the following guidelines:
+ Engage staff nurses to adopt and adapt a CVC insertion checklist to promote patient safety.
+ Enlist the medical director or other provider champion to support the use of the checklist and to educate and mentor providers.
+ Determine who will complete the insertion checklist at the time of insertion: the nurse assistant assisting, an independent nurse observer, or a technician.
+ Determine what is to be done with the paper or electronic checklist after it has been completed for tracking of compliance to the insertion bundle (e.g., could be sent to infection prevention nurse, manager, or CLABSI prevention champion).

Suggested Process Measure for Your Test of Change
+ Percent compliance of insertion bundle guidelines.

Secondary Driver > Implement “Stop the Line”
A checklist ensures best practices for CLABSI reduction are followed. It is important to create a safe process for staff to speak up if a violation of infection control practices is observed during a central line insertion. Staff and providers should work together to ensure that all aspects of the checklist are instituted with every patient. If a break in practice occurs, the procedure should be halted and corrections made. Corrections could include changing a contaminated glove, replacing the guide wire, or using a full body drape instead of a short drape. Successful implementation of a checklist requires effective interpersonal communication skills and can give staff an opportunity to learn teamwork skills experientially.

Change Ideas
+ Adopt policies that combine individual accountability with a blame free, patient centered approach to errors.
+ Use the medical director or another provider champion to support the “Stop the Line” approach and communicate the value to other providers.
+ Create a process, with staff, to “Stop the Line.” Scripting can be helpful. One hospital’s staff adopted the phrase, “the sterile field has been contaminated” to be uttered by the nurse or technician auditing the process.
+ Determine specific incidents that prompt the staff to “Stop the Line,” e.g., everyone in the room is not wearing maximal barrier precautions, there is a break in the sterile field, a full body drape is not being used, proper skin prep has not been completed.
+ Develop a strategy in your clinical area to support the staff who “Stop the Line.” Executive support for staff “Stopping the Line” is needed before and after breaches in policies occurs.
+ Consider TeamSTEPPS® training to support crucial communication and teamwork.

Secondary Driver > Optimal site selection
Research data suggest that certain CVC sites may have a lower risk of infection. The current CDC/NHSN and SHA/IDSA practice recommendation is to avoid using the femoral vein for central venous access in adult patients. The subclavian site may be superior to the jugular site in terms of CLABSI risk, however, other risks associated with the subclavian site must be considered, e.g., pneumothorax. Site selection is based on patient need and risks, and some new evidence suggest the femoral site is not as prone to risk of infection as once reported. If the femoral site is used, site prep and line maintenance done according to guidelines is vitally important.
**Change Ideas**

- Include site selection as an item on insertion checklist.
- Promote documentation of rationale for use of femoral site if it is selected for CVC placement.

**Suggested Process Measure for Your Test of Change**

- Percent compliance with appropriate CVC insertion site selection.

**Secondary Driver > Ultrasound guidance for line placement**

The use of ultrasound (US) to guide insertion may reduce the risk of iatrogenic harm and may increase accuracy of line placement. Studies have demonstrated that, as compared to the technique of using landmarks, US guidance in placement of CVC in adults and children decreases the number of anatomical sites utilized and decreases the number of attempts to achieve successful placement. US guidance may therefore decrease patient discomfort, risk of harm and time to successful CVC placement, and may increase compliance with insertion guidelines. US guidance may encourage the use of the subclavian or internal jugular entry site versus the femoral site because it reduces the risk of iatrogenic pneumothorax and other complications.

**Change Ideas**

- Have the physician champion and other early adopters promote the use of ultrasound guidance.
- Ask the lead physician to host in-services and provide Continuing Medical Education credit (CME) on the use and benefit of using ultrasound for CVC placement. Include hands-on practice for physicians attending. Follow state and hospital credentialing for physician use of ultrasound guidance for line placement. Education and demonstrated competency will be required.
- Partner with your infection control practitioner when introducing US guided CVC placement.

**Suggested Process Measure for Your Test of Change**

- Percentage of central lines placed with ultrasound guidance.

**Secondary Driver > Hand hygiene and aseptic technique**

Establish a process to ensure appropriate practices for hand hygiene, aseptic technique and maximal sterile barrier precautions are followed. Hand hygiene continues to be an integral part of any infection prevention program. Following aseptic technique for insertion and care is crucial to prevent CLABSI. Aseptic technique includes using maximal sterile barrier precautions such as a cap, mask, sterile gown, sterile gloves and a sterile full body drape during insertions of CVCs and peripherally inserted central catheter PICCs or during guide wire exchange.

**Change Ideas**

- Provide easy access to hand hygiene agents such as conventional soap and water or alcohol-based hand sanitizers to facilitate hand hygiene before and after each procedure.
- Include hand hygiene and maximal barrier precautions as part of CVC insertion checklist.
- Have supplies and equipment easily available, e.g., a central line insertion kit with maximal barrier precaution supplies, central line dressing kits and administration sets. Consider enlisting staff to help build an insertion kit or line cart and to keep it stocked.
- Package CVC, skin antiseptic and maximal barrier precautions in insertion kits to make it easier for providers to follow recommended guidelines.

**Suggested Process Measures for Your Test of Change**

- Percent compliance with maximum barrier drape.
- Percent compliance with hand hygiene prior to CVC insertion.

**Secondary Driver > Prep with 2% chlorhexidine (CHG)**

The preferred agent for skin antisepsis before catheter insertion and during dressing changes is 2% chlorhexidine (2% chlorhexidine in 70% isopropyl alcohol) — unless the patient is allergic to chlorhexidine or under two months of age.

**Change Ideas**

- Include 2% CHG swabs in with CVC insertion kits and on the CVC line cart.
- Include skin prep with 2% CHG as an item on insertion checklist.

**Suggested Process Measure for Your Test of Change**

- Percent compliance with use of CHG skin prep.
Hardwiring tactics for the Central Line Insertion Bundle includes many of the change ideas. Ongoing monitoring of compliance to insertion guidelines is vital to sustain recommended practices.

- Engage staff and providers in the design and development of tools and support systems such as an insertion checklist and a CVC line cart.
- Attach the checklist to the central line insertion kit for easy access.
- Implement the use of an insertion checklist and empower the designated observers to enforce use of the checklist and adherence to recommended insertion practices.
- Audit compliance and provide feedback to providers regarding the audit results and recommendations for improvement to providers. Report results regularly in quality or infection control committees. If compliance to insertion guidelines decrease, engage practitioners and nurses to examine contributing factors and identify potential changes.

Primary Driver > Review line necessity

One of the most effective strategies for preventing CLABSIs is to eliminate or reduce exposure to CVCs. The decision regarding the need for a central line is complex, however, and is difficult to standardize or incorporate into a practice guideline. Nevertheless, to reduce exposure to CVCs, the multidisciplinary team should adopt a strategy to systematically evaluate on a daily basis whether all central lines remain necessary or can be removed.\(^{35,36}\)

Secondary Driver > Daily review

Current CDC and SHEA/IDSA practice guidelines recommend daily review of line necessity and prompt removal of the line when no longer necessary.\(^{37,38}\)

Change Ideas

- Combine daily review of line necessity with other best practices reviews such as daily urinary catheter review. Line necessity is determined by a patient’s clinical needs.
- Incorporate daily review into routine workflow, such as charge nurse rounds or daily multi-disciplinary rounds. (See Appendix III for an example of a checklist for charge nurse rapid rounds).
- Include an infection preventionist as part of rounds. They can help support line necessity review.
- If using an electronic practice management system, institute computer-based pop-up reminders to review line necessity.

Suggested Process Measure for Your Test of Change

- Percent compliance with daily review of the necessity for a central line.

Hardwire the Process

To hardwire daily review of line necessity, make the process a part of the daily workflow. Do small tests of change with staff to determine the best implementation process. Methods for hardwiring include:

- Adding daily review of line necessity as a standing item in nurse-to-nurse hand-off reports.
- Auditing daily line review compliance and providing feedback to the care team. If compliance is low, engage staff in identifying problems and refining the process of daily review.

Primary Driver > Standardize the maintenance process

The bundle approach provides a means to incorporate evidence-based interventions into patient care. Adopt and embed evidence-based guidelines (bundle) for CVC maintenance after insertion across care settings. Because a significant proportion of central line-days and CLABSI occur in non-ICU settings, it is important to include those settings in the maintenance process implementation. Implementation of a post-insertion care bundle in addition to an insertion bundle has been shown to be effective in reducing CLABSI.
Current recommendations for most CVCs from CDC/NHSN guidelines and SHEA/IDSA 2014 practice recommendations include:

1. Use sterile, transparent, semi-permeable dressing (or sterile gauze) to cover the catheter site.
   a. Replace site dressing every seven days (every two days if made of gauze) or if it becomes loose/soiled/damp.
   b. Use of topical antibiotic ointment or creams is not recommended unless the line is a dialysis catheter.
2. Replace administration tubing at intervals of less than 96 hours.
   a. See CDC Guidelines regarding blood products, fat emulsions, etc.
3. Establish and implement facility guidelines for intra-venous fluid administration bag changes.
   (For further details, please see the actual guidelines referenced above as “Suggested Bundles and Toolkits”)

**Secondary Driver > Bundle elements together**

Bundling care practices and supplies together helps the caregiver to remember the evidence-based practices required and to comply with the guidelines.

**Change Ideas**

+ Have supplies and equipment stored together and easily available, e.g., central line dressing kits, chlorhexidine dressings, IV fluid infusion bags and administration sets.
+ Have supplies for accessing IV tubing and ports together and easily available, e.g., chlorhexidine, povidone iodine, an iodophor, or 70% alcohol, alcohol impregnated caps unused ports.

**Suggested Process Measure for Your Test of Change**

+ Percent compliance with site dressing done according to standard.

**Secondary Driver > Incorporate into daily assessment**

Incorporate a daily review of the maintenance bundle to ensure that dressings, administration tubing and IV fluid are current and not expired. If any missing element is found during the review, establish a process to correct missing element.

**Change Ideas**

+ Perform maintenance bundle review along with daily line necessity review. Items to review can be included in the charge nurse’s checklist. If the bedside nurse has not had time to change the dressing or administration tubing, for example, the charge nurse can delegate the task to another nurse (See Appendix III).
+ Develop a process to ensure CVC maintenance is completed as needed.

**Suggested Process Measure for Your Test of Change**

+ Percent compliance with individual bundle elements in maintenance bundle. See Appendix IV for an example of a CVC Maintenance Audit/Monitoring Tool.
+ Percent compliance of all-or-none bundle element

**Secondary Driver > Scrub the hub**

Before accessing the line, disinfect catheter hubs, needleless connectors and injection ports. SHA/IDSA 2014 practice recommendations state to scrub the hub with a CHG preparation or 70% alcohol combination for a minimum of five seconds. See Appendix V for Scrub the Hub flyer.

**Change Ideas**

+ Have supplies for disinfecting line access sites easily available, e.g., IV carts, medication carts.
+ Incorporate use of alcohol impregnated caps for all central line ports. This eliminates the need to scrub the hub.

**Suggested Process Measure for Your Test of Change**

+ Percent compliance with scrub the hub prior to accessing line.
Hardwire the Process

Strategies to hardwire catheter maintenance and maintenance bundle compliance are similar to those used for insertion bundle and daily line necessity reviews. Hardwiring should be included in the initial planning and testing (PDSA). Making the implementation and review processes as routine as possible will ensure that CLABSI prevention is addressed in every patient with a CVC in any care area.

- Incorporate daily maintenance bundle item review along with line necessity review into the daily workflow.
- Include bundle review as a standing item in nurse-to-nurse hand-off reports. Enlist all shifts (24/7) in reducing risk of harm by implementing the guidelines and performing necessary tasks such as dressing changes.
- Review central line care and maintenance with staff upon hire and at least annually and assess staff competency in this arena.
- Audit maintenance care compliance and provide feedback to the care team. If compliance is low, engage staff in identifying problems and refining the process of implementation and review.

Primary Driver > Specialize tactics “beyond the bundles”

Additional strategies are recommended to further reduce CLABSI rates if the rates remain unacceptably high after implementation of basic CLABSI prevention strategies. More research has emerged on the use of CHG dressings and CHG-containing sponge dressings, CHG bathing, the use of non-suture securement devices, the use of antimicrobial-impregnated CVCs for adult patients and ultrasound guidance to place lines. Both SHEA/IDSA and CDC/NHSN guidelines also recommend against routine replacement of CVCs.47,48

Secondary Driver > Use of chlorhexidine (CHG)-containing dressings

Apply CHG-containing sponge dressings directly to the insertion site (it encircles the catheter itself) for temporary short-term catheters under a transparent dressing.49,50,51 Also emerging as a recommendation for catheter sites, is the use of a transparent dressing with infused CHG that covers the site.52

Change Ideas

- Include CHG dressing use in staff trainings on CVC site care and maintenance and assess staff understanding and competency.
- Include CHG-infused sponge dressings or CHG dressings in the dressing kit or supplies.
- Review the use of CHG dressing sponges daily as part of the maintenance bundle review.

Suggested Process Measure for Your Test of Change

- Percent compliance with CVC dressing changes.

Secondary Driver > Bathe with CHG

Daily bathing with CHG has been shown to reduce the incidence of health care associated bloodstream infections and is now a recommended practice as an additional intervention.53,54,55,56 CHG bathing reduces the bio-burden on the patient’s skin and thereby reduces the risk of CVC site infection and CLABSI. Bathe patients older than two months of age daily with 2% CHG.57,58

Change Ideas

- Include CHG bathing as part of staff central line care and maintenance training and assess staff competency.
- Have 2% CHG saturated cloths easily available to staff.
- Incorporate use of 2% CHG cloths for daily skin cleansing into the daily workflow such as nurses’ aides’ delivery of daily hygiene care.
- Incorporate CHG skin cleansing daily as part of the maintenance bundle review.

Suggested Process Measure for Your Test of Change

- Percent compliance with daily CHG bathing and bathing technique.

Secondary Driver > Use a non-suture securement

The use of a non-suture securement device reduces the risk of infection at the CVC site and is included in the CDC/NHSN guidelines.59
Change Idea
+ Include a non-suture device in the CVC insertion kits. Do not include sutures in the kit. Work with the supplier/assembler of the insertion kits to include all needed supplies.

Suggested Process Measure for Your Test of Change
+ Percent compliance with non-suture securement device.

Secondary Driver > Use antiseptic- or antimicrobial-impregnated CVCs
Use a CVC impregnated with CHG/silver sulfadiazine or minocycline/rifampin in patients whose catheter is expected to remain in place for more than five days (contraindicated if the patient is allergic to impregnated substance). Use of antimicrobial-integrated CVCs can also be an additional strategy to reduce CLABSI rate in facilities with continued high CLABSI rates after the implementation of insertion and maintenance bundles. Consider the use of these CVCs in other situations, such as for inpatients with limited venous access and a history of recurrent CLABSI, and for patients who have increased risk for severe sequelae from a CLABSI (e.g., patients with recently implanted intravascular devices).

Change Ideas
+ Trial the use of an antiseptic- or antimicrobial-impregnated CVC in patients whose CVC is expected to remain in place for more than five days.
+ Include an antiseptic- or antimicrobial-impregnated CVC as an option for placement in the CVC line cart.

Suggested Process Measure for Your Test of Change
+ Percent compliance with antiseptic- or antimicrobial-impregnated CVC in appropriate patients.

Secondary Driver > Do not routinely replace CVCs
Routine replacement of CVCs is NOT recommended by either CDC/NHSN guidelines or SHAE/IDSA. CVCs including PICCs should not be removed on the basis of fever alone. CDC/NHSN recommends that physicians use clinical judgment regarding the appropriateness of removing the CVC if infection is evidenced elsewhere or if a non-infectious cause of fever is suspected. CDC/NHSN guidelines also caution against the use of routine guide wire exchanges to prevent infection and to replace a catheter suspected of infection.

Change Idea
+ Incorporate into policy the recommendation that CVCs are not to be replaced routinely.

Suggested Process Measure for Your Test of Change
+ Percent of CVCs not replaced.

Secondary Driver > Involve patient and families
Educate patients and families on all the steps being taken to prevent central line infection using “teach back” method. Patients and family education should include the purpose of a central line, expected duration of use and why it is important to remove it as soon as it is no longer needed.

Change Ideas
+ Educate the patient and their family or caregivers about what they can do to help prevent a central line infection, i.e., invite the patient and the family to remind health care providers to wash their hands and to ask each day if the central line continues to be necessary.
+ Make available to patients and families educational material on central lines.

Suggested Process Measure for Your Test of Change
+ Percent of CVCs not replaced.

Hardwire the Process
Hardwiring is key to sustain change. Making it easy for caregivers to do the right thing is a cornerstone hardwiring strategy. Be sure to include staff on the decision making of the design process.
+ Bundle CHG dressings with other needed items into a CVC dressing kit.
+ Store CHG bathing cloths in a place easily accessible to staff.
+ Elicit feedback from patients and families on not only the care received but also the support they received from communication and education.
Choice of Tests and Interventions for CLABSI Reduction:
Implement the CVC Maintenance Bundle and Line Necessity Review one unit at a time.

- Engage front-line staff from the beginning on process design and on the adoption and adaptation of procedures.
- Consider testing Maintenance Bundle and Line Necessity Review in non ICU settings.

Implement Small Tests of Change
PDSA - Implement the CVC Maintenance Bundle and Line Necessity Review

PLAN
Do not reinvent the wheel. Pick a daily review tool that has been successful at another hospital and adapt it for your facility. (See Appendix III and IV for examples).

Engage front-line staff in designing the implementation process, e.g., the day shift change nurse on morning rounds will review Maintenance Bundle items and Line Necessity with the bedside nurse.

Ask a receptive, early-adopter bedside nurse and charge nurse to trial these changes on their next patient with a CVC.

DO
Test “small”: one charge nurse, one bedside nurse, one patient with a CVC, one shift.
Coordinate with the trial nurses to begin the daily review of the Maintenance Bundle and Line Necessity with one patient.

STUDY
Debrief as soon as possible after the test with those involved, asking:
- What happened?
- What went well?
- What didn’t go well?
- What do we need to do differently next time?

ACT
Do not wait for the next committee meeting to make changes. Revise the procedures and re-test as soon as possible with the same bedside nurse and charge nurse.
Grow the second test to include all patients on one unit, on one shift and include additional bedside nurses.
Potential Barriers

Assess for practice drift periodically even if your rates are low. Engage with staff to discuss any barriers to full implementation of the insertion and maintenance bundles.

- Do a spot check to determine bundle compliance for each element by checking five patients with CVCs (including PICCs). Spot check questions include:
  > Were all of the insertion bundle elements completed?
  > Is the site dressed according to the guidelines, is the dressing current and is the CHG sponge applied correctly?
  > Is the administration tubing current?
  > Was the CVC assessed daily for necessity?

- Recognize that there may be some resistance from physicians regarding changing practice.
  > Engage a physician champion to support your change efforts.
  > Listen to physician feedback and engage them in process design and equipment and supply selection.
  > Begin implementation with early-adopter physicians who can lead and recruit other early-adopter champions from among specialty groups and intensivists.
  > Despite the research evidence showing benefits from these guidelines, some physicians may be reluctant to wear a cap or other items required for maximal barrier precautions. One hospital approached this challenge by discussing the research evidence and the pros and cons of the recommendations with the medical director of the ICU. The value of complying with the recommendations was emphasized. After the medical director and other early-adopter champions modeled the new practices, the rest of the medical staff agreed to adopt the evidence-based recommendations as well.

- Nurses may feel uncomfortable with “Stopping the Line” for an observed violation of infection control practices and physicians may feel their credibility and authority is being challenged when a break in technique is called out. To address these concerns:
  > Both physician and nursing leadership need to be visible and to communicate the expectations of adherence to the Insertion Bundle. They can coach staff on the importance of consistency in procedure implementation and on how to “Call a Halt” or “Stop the Line.”
  > Invite senior or unit level leadership to meet with nursing and physician staff to emphasize that the focus is on teamwork to promote patient safety and improve patient outcomes.
  > Develop an algorithm for the observer to follow if a “Stop the Line” intervention is resisted. For example, the observer could page the unit director 24/7 to intervene.
  > Audit the percentage of CVC insertions that had the checklist properly completed. Calculate the rates of compliance with evidence-based practice and the number of corrections required. Make the results known to providers and enlist the providers in developing methods for improvement.

Enlist Administrative Leadership as Sponsors to Help Remove or Mitigate Barriers

- Enlist an executive sponsor who recognizes the value of preventing CLABSI to the organization and your patients. The sponsor can help engage key stakeholders, the board and staff in seeing the big picture of the importance of eliminating harm caused by CLABSI.
- The sponsor must have the authority and ability to provide solutions in overcoming barriers and resources needed to facilitate implementation.
- Utilize respected senior physicians as “opinion leaders” who can trial these changes in their local units and then advocate for organization-wide adoption of successful best practices.
Change not only “The Practice,” but also “The Culture”

- Instituting the CLABSI insertion and maintenance bundles will require a change in culture, particularly among physicians, who will be asked to evolve their practice of individualizing management for each patient towards a more standardized, multi-disciplinary approach. Physicians may be concerned about the perceived risks of loss of control and shared responsibility. Encourage physicians to actively monitor the effectiveness of these multi-disciplinary interventions to reduce CLABSI rates.

- Many physicians prefer to learn from peers rather than by following theoretical “expert advice.” Use lead physicians as peer educators to advocate for the adoption of improvements such as a CVC insertion bundle and to model the new practices.

- Begin the trial with a small test-of-change in one unit or area and then disseminate successful results more widely across the organization. The ideal outcome is the development of team-based care wherein each member of the team (physician, nurse, technicians) contributes to improved quality of patient care.

PART 4: CONCLUSION & YOUR NEXT STEPS

CLABSI prevention is complex and challenging. However, there are many evidence-based strategies and tools to use to reduce CLABSI. This effort requires a multidisciplinary approach that includes physicians, leaders and front-line staff. Ongoing monitoring of compliance to bundles for data-driven decision making, using data to drive practice and process changes, and communication of bundle performance and CLABSI rates to physician and nursing staff are also key for success.

- Multidisciplinary approach — assemble a team with physician champions, front-line staff leaders and key leadership persons. Determine and define roles and ensure the leader has the energy to lead a dynamic process improvement project. Assess the composition of the team and the support from key strategic partners such as the quality leader, chief medical officer, nursing director, infection prevention, etc. Create strategies and/or allocate resources to engage front-line staff in designing new care processes.

- Ongoing monitoring — use the data to drive decision making for determining practice and process changes. Use the Top Ten Checklist (Appendix I) to assess current efforts in CLABSI prevention. Ask “Do we have this element in place? If so, how well are we doing it? Have we had practice drift?” Enlist physician and nursing champions on the team to assist in data analysis, determine potential interventions, and conduct small tests of change.

- Communication — establish clear lines of communication with physicians, staff, other stakeholders and supporting leadership. Communication should include bundle compliance performance, CLABSI rates and annotated with interventions to show effect of improvement efforts.
APPENDIX I: CLABSI Top Ten Checklist

Associated Hospital/Organization: AHA/HRET HEN 2.0

Purpose of Tool: A checklist to review current interventions or initiate new interventions for CLABSI prevention in your facility.

Reference: www.hret-hen.org

<table>
<thead>
<tr>
<th>Process Change</th>
<th>In Place</th>
<th>Not Done</th>
<th>Will Adopt</th>
<th>Notes (Responsible and By When?)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implement the Insertion Bundle: Procedural pause, hand hygiene, aseptic technique for insertion and care, site selection of subclavian (preferred) or internal jugular (acceptable), avoidance of femoral vein in adults, maximal sterile precautions and skin prep with 2% chlorhexidine.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implement an insertion checklist to promote compliance and monitoring.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implement a “Stop the Line” approach to the insertion bundle. If there is an observed violation of infection control practices (e.g., maximal sterile barrier precaution, break in sterile technique), line placement should stop and the violation corrected.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adopt the maintenance bundle with dressing changes (every seven days for transparent dressings), line changes, and IV fluid changes. Incorporate dressing changes into daily assessment and review. Can be part of charge nurse’s checklist along with the daily review of line necessity.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incorporate a daily review of line necessity and maintenance bundle into workflow, e.g., charge nurse rounds. Use an electronic health care record prompt.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use a chlorhexidine impregnated sponge dressing.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use 2% chlorhexidine impregnated cloths for daily skin cleansing.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not routinely replace CVCs, PICCs, hemodialysis catheters or pulmonary artery catheters.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use a suture-less securement device.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use ultrasound guidance to place lines if this technology is available.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX II: CENTRAL LINE PROCEDURAL CHECKLIST

Associated Hospital/Organization: Institute for Healthcare Improvement

Purpose of Tool: To document procedural practices in the CCU related to insertion technique for CVP lines, dialysis access ports and central lines (including PICC).


<table>
<thead>
<tr>
<th>Type of catheter:</th>
<th>Central Line</th>
<th>Location:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CVP</td>
<td>Location:</td>
</tr>
<tr>
<td></td>
<td>Dialysis Catheter</td>
<td>Location:</td>
</tr>
<tr>
<td></td>
<td>PICC Line</td>
<td>Location:</td>
</tr>
</tbody>
</table>

Is this a NEW line: [ ] Yes ☐ No

Is the procedure: [ ] Elective ☐ Emergent ☐ Rewire ☐ Re-position

---

### Procedural Checklist

**SAFETY PRACTICE**

**YES**

**YES**

**AFTER REMINDER**

---

**Before procedure, did the provider:**

1. **PERFORM PROCEDURAL PAUSE**
   - Perform patient ID x2
   - Announce the procedure to be performed
   - Mark/assess site
   - Position patient correctly for the procedure
   - Assemble equipment/verify supplies
   - Utilize relevant documents (chart/forms)
   - Order follow-up Radiology images (PRN)

2. **Cleanse hands?** (ASK if unsure)

3. **Prep procedure site with Chloraprep?**
   - *30 seconds for dry site
   - **2 minutes for moist site (esp. femoral)

4. **Use large drape to cover patient in sterile fashion?**

---

**During procedure, did the provider:**

1. **Wear sterile gloves during catheter insertion?**
2. **Wear hat, mask, and sterile gown?**
3. **Maintain sterile field?**
4. **Use ultrasound/Sonosite if appropriate?**
5. **Did assisting physician follow the same precautions?**
   (hand washing, mask, gloves, gown)
6. **Did all staff and patient in the room wear a mask?**

---

**After the procedure:**

1. **Was sterile technique maintained when applying dressing?**
2. **Was dressing dated?**

---

**NAME OF INTENSIVIST**

**NAME OF PROCEDURE MD**

**NAME OF ASSISTING MD**

**NAME OF RN (AUDITOR):**

**TODAY'S DATE**

**ROOM**

**CCU BED**

---

Please return completed form to: “BSI FORMS” Labeled Envelope in CCU-7 Conference Room

Patient Label: Virginia Mason Medical Center

Central Line Procedural Checklist
APPENDIX III: EXAMPLE OF A CHARGE NURSE RAPID ROUNDS CHECKLIST

Associated Hospital/Organization: AHA/HRET HEN 2.0
Purpose of Tool: For use during bedside rounding tool to assess CLABSI bundle compliance.
Reference: www.hret-hen.org

Patient Label

ARRIVED ON UNIT ON ___________________________ AT __________________________ FROM ___________________________

Purposeful rounding done within 24 hours of admission by ___________________________ on __________________________ at __________________________

Patient Safety/Prevention
Bundles Checklist

Sepsis Screen completed (first 2 hours of shift)
Central line care
  > Next dressing change due
  > IV fluid & tubing current
  > Line necessity reviewed?
DVT prophylaxis
  > Mechanical
  > Medication
  > Ambulation? If not, do we need PT?
Urinary Catheter: Does it meet criteria?
  > Obtain order for early removal

Patient/ Family Centered Care:

Special needs/preferences:

Emergency Contact:

  + Name:

  + Number:

Notes from Rapid Rounds:

<table>
<thead>
<tr>
<th>Date</th>
<th>Plan</th>
<th>RN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Central Venous Catheter Audit Tool

**Unit Name:**

*Please do not edit the audit tool*

Instructions: Please audit the status of all central lines on your unit Monday - Friday. Record audit results in the appropriate box below.

<table>
<thead>
<tr>
<th>Legend:</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>UTD: Unable to Determine</td>
<td>Yes</td>
<td>No</td>
<td>Not Dated or UTD</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>is all IV tubing current (not expired)?</th>
<th>Yes</th>
<th>No</th>
<th>Not Dated or UTD</th>
<th>Compliant</th>
<th>Non-Compliant</th>
<th>Not Dated or UTD</th>
</tr>
</thead>
<tbody>
<tr>
<td>is the IV site absent of drainage?</td>
<td>Yes</td>
<td>No</td>
<td>Not Dated or UTD</td>
<td>Compliant</td>
<td>Non-Compliant</td>
<td>Not Dated or UTD</td>
</tr>
<tr>
<td>is the dressing intact and occlusive?</td>
<td>Yes</td>
<td>No</td>
<td>Not Dated or UTD</td>
<td>Compliant</td>
<td>Non-Compliant</td>
<td>Not Dated or UTD</td>
</tr>
<tr>
<td>is the dressing clean and dry?</td>
<td>Yes</td>
<td>No</td>
<td>Not Dated or UTD</td>
<td>Compliant</td>
<td>Non-Compliant</td>
<td>Not Dated or UTD</td>
</tr>
<tr>
<td>is the inspoch in place with the blue side up?</td>
<td>Yes</td>
<td>No</td>
<td>Not Dated or UTD</td>
<td>Compliant</td>
<td>Non-Compliant</td>
<td>Not Dated or UTD</td>
</tr>
<tr>
<td>is the dressing current (not expired)?</td>
<td>Yes</td>
<td>No</td>
<td>Not Dated or UTD</td>
<td>Compliant</td>
<td>Non-Compliant</td>
<td>Not Dated or UTD</td>
</tr>
<tr>
<td>is the dressing int constant?</td>
<td>Yes</td>
<td>No</td>
<td>Not Dated or UTD</td>
<td>Compliant</td>
<td>Non-Compliant</td>
<td>Not Dated or UTD</td>
</tr>
<tr>
<td>are all extension ports and lumens not in use?</td>
<td>Yes</td>
<td>No</td>
<td>Not Dated or UTD</td>
<td>Compliant</td>
<td>Non-Compliant</td>
<td>Not Dated or UTD</td>
</tr>
<tr>
<td>is the line saturated?</td>
<td>Yes</td>
<td>No</td>
<td>Not Dated or UTD</td>
<td>Compliant</td>
<td>Non-Compliant</td>
<td>Not Dated or UTD</td>
</tr>
<tr>
<td>is there a securement device being used?</td>
<td>Yes</td>
<td>No</td>
<td>Not Dated or UTD</td>
<td>Compliant</td>
<td>Non-Compliant</td>
<td>Not Dated or UTD</td>
</tr>
</tbody>
</table>

Goal performance: >95% (Green): 86.5-94.9%, (Yellow): 84.5-86.4%, (Red): <84.5%
APPENDIX V: EXAMPLE OF A SCRUB THE HUB FLYER

Associated Hospital/Organization: University of Kansas Hospital in Kansas City, Kansas
Purpose of Tool: To promote line access disinfecting.
Reference: Not Applicable


44. Soothill JS, Bravery K, Ho A, Macqueen S, Collins J, Lock P. A fall in bloodstream infections followed a change to 2% chlor-hexidine in 70% isopropanol for catheter connection antisepsis: a pediatric single center before/after study on a hemopoietic stem cell transplant ward. Am J Infect Control 2009;37(8):626–630. 120.


