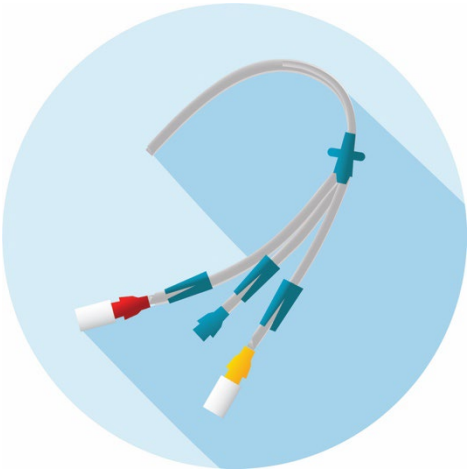
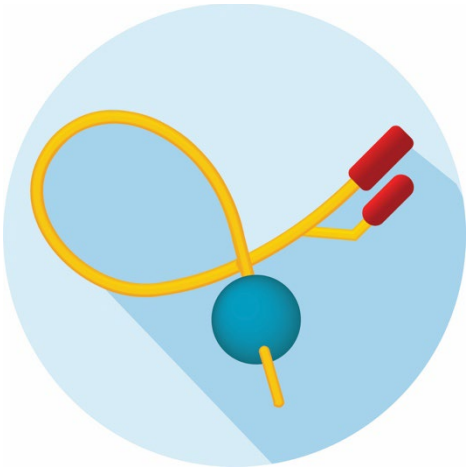
PREVENT HAIs Healthcare-Associated Infections

AHRQ Safety Program for Intensive Care Units: Preventing CLABSI and CAUTI





A Playbook for Preventing CLABSI and CAUTI in the ICU Setting

Agency for Healthcare Research and Quality

CUSP

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Playbook Overview

A Playbook for Preventing CLABSI and CAUTI in the Intensive Care Unit Setting, herein referred to as the Playbook, outlines interventions that intensive care units (ICUs) can use to address central line-associated blood stream infections (CLABSIs) and/or catheter-associated urinary tract infections (CAUTIs) by integrating Comprehensive Unit-based Safety Program (CUSP) and the tiered interventions. The tiered interventions were developed by experts to support teams to prioritize and organize evidence-based guidelines for CLABSI and CAUTI prevention.[1,2] Each of the interventions in the Playbook includes a description of how CUSP can be used to support a tiered approach to preventing CLABSI and CAUTI.

The purpose of this Playbook is to provide information and resources that demonstrate how to use all of the CUSP strategies with a tiered approach to reduce CLABSI and CAUTI. The Playbook identifies interventions associated with each CUSP concept that can be used to support each tiered intervention. This highlights how each CUSP strategy is integral to supporting the tiers to reduce CAUTI and CLABSI.

How To Use This Playbook

This Playbook enhances previous CUSP resources to reduce CLABSI and CAUTI in the hospital setting and introduces a new tiered intervention approach to overcoming challenges with persistently elevated infection rates in the ICU setting. The Intervention Playbook begins with the understanding that teams will use CUSP as the model for how work is done. Using CUSP as a foundation, teams can implement tiers of sustainable interventions that reduce CLABSIs and CAUTIs in ICUs, broken down into Tier 1 and Tier 2 interventions. In order to fully understand how to execute each intervention, specific examples of how CUSP can be demonstrated are described.

The understanding of how teams will use CUSP is described in the next section and provides significant context for use of the tool. It is recommended that users read this once or when they feel it is helpful to reinforce the background around use of the tool. After the context is set, the document does a thorough review of the tiered interventions. This again is helpful to familiarize users with the tiered interventions for first-time users or after a significant amount of time passes. Finally, the remainder of the document takes a deep look into each tiered intervention and links CUSP to these interventions. CLABSI tiers are discussed first followed by CAUTI. Users can choose to read the document as one thorough guidance. The user could also focus on one infection or skip to a specific intervention for focused reading. Like CUSP, the tiered interventions are built to support each other and be executed with cohesion.

Prevention Framework Using CUSP and Tiered Interventions

CLABSI and CAUTI are common, costly, and potentially life-threatening healthcare-associated infections (HAIs) for patients in ICUs. Despite detailed, evidence-based guidelines describing intervention bundles to prevent these complications, some ICUs continue to have elevated rates of these infections.

This Playbook highlights the use of CUSP as a foundation along with Tier 1 and Tier 2 interventions and is intended to help units understand the connections between various CLABSI and CAUTI interventions and CUSP principles to guide the implementation of evidence-based practices in ICUs and help create sustainable change in culture. CUSP is a key foundation prior to the application of the tiered CLABSI/CAUTI interventions. It is a powerful and flexible model of sustainable safety improvement and recognizes that all culture is local and can be adapted to a unit's specific needs and resources. CUSP can also be coupled with other performance improvement tools to support safer care.[3] Once the concepts of CUSP are utilized by a team, they provide a foundation for the tiered CLABSI/CAUTI interventions.

The CLABSI/CAUTI interventions are classified into Tier 1 vs. Tier 2 and were developed based on multiple factors including strength of evidence and judgment about complexity of implementation. In this framework, Tier 1 interventions are technically focused, evidence-based actions that should occur with every patient, every time. The interventions in Tier 1 will aid in driving consistent application of evidence-based practices. Tier 2 interventions are team-based strategies that extend beyond the bedside and can enhance the Tier 1 interventions. These strategies can be applied with varying frequency to accommodate needs specific to individual ICU cultures and concerns.

The ICU Assessment and Action Plan identify gaps in practices, which the use of CUSP and the tiered interventions can fill. The CUSP model is the way the team does work, while the tiered interventions are the work itself. The main tenets of CUSP that guide practice are understanding the science of safety, identifying defects, engaging a senior executive, learning from defects, and implementing teamwork and communication. These tenets of CUSP are complex and have details that are key in supporting the unit to be successful. Let's review these tenets in greater depth:

- **Understanding the Science of Safety:** Staff must understand the science of safety in order to improve system performance. Errors happen, in part, because people are not perfect. Thinking about errors in terms of the surrounding circumstances or system can help us find ways to reduce those errors. Strategies of standardization of care, creation of independent checks, and learning from defects can help to improve systems that support the care provided. It is essential that these strategies are implemented with a mindset of a nonpunitive response to errors. Concepts like Just Culture and High Reliability Organizations are approaches that support an overall learning environment and invite diverse input from teams to support wise decisions and system improvements.[4]
- **Identifying Defects:** Safety is everyone's responsibility and cannot be achieved without consistently looking for how things might fail through identifying potential and actual defects. This process helps prevent future errors, by evaluating errors that have already occurred and potential errors that have not yet occurred, such as near misses. Frontline staff should be encouraged to identify defects, supported by a culture of nonpunitive response to errors. The identification of defects and near misses should be viewed as learning opportunities and fundamental to a culture of safety. The diverse perspective of the frontline staff and insight into the processes are invaluable to identifying defects.[4]
- **Engage the Senior Executive:** Commitment to safety by leadership is imperative. Senior executives must communicate safety principles and an organizational commitment to safety.

They play an essential role in building staff engagement and accountability, and creating the infrastructure for safe care by providing necessary material, operational, and training resources to frontline and other staff. A culture of safety is established when the senior executive sets expectations and reinforces them through actions within the organization; therefore, a partnership with the senior leader can help facilitate learning across the organization.

- **Learn From Defects:** All defects (including near misses or precursors) can be used as learning opportunities. Tools like the Learning From Defects tool can help facilitate analysis of the event to identify root causes and strategies to mitigate the risk of the event's occurring in the future. Lessons learned can be shared with the team and other teams within the organization in ways like huddles or safety rounds, at the unit and organizational level.
    - **CLABSI:** Word and fillable PDF
    - **CAUTI:** Word and fillable PDF
- **Implement Teamwork and Communication:** Tools and processes that improve teamwork and communication are a critical component of the CUSP model, facilitating each of the other tenets of CUSP, and patient care in general. Working together as a team can be a challenge, but there are many tools that help teams improve these skills (e.g., TeamSTEPPS®, interdisciplinary rounds). Time and effort spent improving these skills will bring value and improvement far beyond CUSP implementation.

Once CUSP is implemented and has become the way the team works, then the team can standardize the Tier 1 interventions with regard to products, policies, and bedside processes. The team can then use the enhanced practices, Tier 2 interventions.

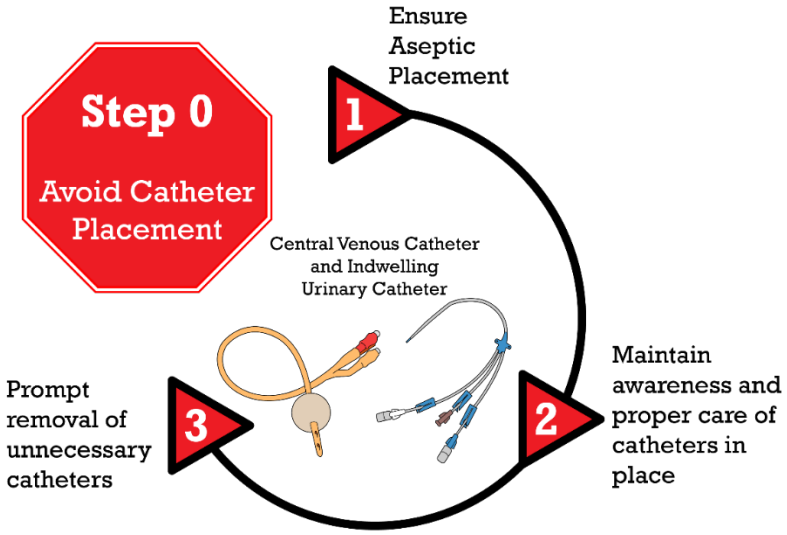
The tiered interventions for CAUTI and CLABSI are illustrated in Figure 2. CLABSI Tiered Interventions and Figure 3. CAUTI Tiered Interventions.

TIER 1 INTERVENTIONS:
Standardize Products, Procedures, and Bedside Processes

Tier 1 interventions to prevent CLABSI and CAUTI follow the stages to disrupt the lifecycle of a catheter device (Figure 1):

- Step 0, avoiding catheter placement – reviews determining appropriateness for indwelling urinary catheter (IUC) and central venous catheter (CVC) devices, using clinical indications and alternatives when applicable.
- Step 1, ensuring aseptic placement – outlines evidence-based practices for ensuring aseptic technique for insertion.
- Step 2, maintaining awareness and proper care of catheters in place – addresses interventions to ensure staff are properly trained and competent to follow care and maintenance protocols.
- Step 3, promptly removing unnecessary catheters – highlights how protocols, reminders, and stop orders can be successful drivers for removing catheter devices.

FIGURE 1: Disrupting the Lifecycle of a Catheter Device



Meddings J, Saint S; Disrupting the Life Cycle of the Urinary Catheter, Clinical Infectious Diseases 2011; 52 (11): 1291–1293, doi:10.1093/cid/cir195. Adapted and reproduced by permission of Oxford University Press on behalf of the Infectious Diseases Society of America. © The Author 2011. All rights reserved. For permissions, please email journals.permissions@oup.com. This figure is not included under the US Government open access license policy of this website.

An additional Tier 1 intervention for CAUTI is culturing stewardship, meaning that procedures and processes are in place so that cultures are only collected when there are clinical signs and symptoms of an infection after an assessment of the patient.

TIER 2 INTERVENTIONS: Enhanced Practices

As your unit moves into the Tier 2 interventions, it is assumed CUSP acts as a foundation for the work your teams do and Tier 1 interventions are applied with every patient. The additional strategies in Tier 2 promote further reduction of CLABSI and CAUTI in your ICU; they offer actions the team can do to ensure reliable implementation of Tier 1 interventions to the maximum extent possible. Note that the Tier 2 interventions are designed to be used in addition to Tier 1 interventions; therefore, do not abandon Tier 1 strategies when you implement Tier 2.

CLABSI Prevention Strategies

This section outlines the two-tiered approach to prevent CLABSI, including interventions, example metrics, case studies, and resources.

FIGURE 2: CLABSI Tiered Interventions[i]

Tier 1: Standardize products, procedures, and bedside processes

Assure Tier 1 interventions are standardized across the team through CUSP implementation

Assess appropriateness and need for CVC	Ensure proper aseptic insertion using maximal sterile barriers and ultrasound guidance	Select appropriate site of insertion: Avoid use of femoral site	Ensure proper care and maintenance of CVC (e.g., proper hand hygiene, adequate staffing, disinfection of connector, secure/intact dressing)	Promptly remove clinically unnecessary CVCs

Tier 2: Enhance progress with team-based improvement practices

Use the strategies below to troubleshoot barriers and to implement additional interventions

To help troubleshoot barriers and identify next steps, use CLABSI GPS tool	Conduct multidisciplinary rounds to audit for necessity of continued CVC use	Feed CLABSI and CVC utilization data back to frontline staff in realtime	Observe competency and compliance with CVC insertion and maintenance document	Use additional approaches (e.g., CHG-impregnated foam disc, impregnated catheters) as indicated by risk assessment	Perform full root cause analysis or focused review of infections

Abbreviations: CHG = chlorhexidine gluconate; CLABSI = central line-associated blood stream infection; CVC = central venous catheter; GPS = Guide to Patient Safety

CLABSI Tier 1 Interventions

Disrupting the lifecycle of the catheter will help prevent CLABSI. Not inserting a CVC, and avoiding the femoral site whenever possible, mitigates the risk of a CLABSI. However, when a

[i] This material was expanded, enhanced and adapted for the AHRQ toolkit from materials developed for CLABSI prevention by faculty and staff at the Department of Veterans Affairs and the University of Michigan.

CVC is necessary, using aseptic insertion techniques, providing proper maintenance, and promptly removing the CVC are all strategies to reduce the risk of infection.

CLABSI Tier 1 Intervention: Avoiding Catheter Placement and Determining Appropriateness

Assess Appropriateness and Need for Central Venous Catheter (CVC)

The most effective way to prevent CLABSI and other catheter-associated complications is to avoid catheter placement. In order to avoid unnecessary catheter placement, it is essential to understand the clinical indications and how to evaluate the use of these in the ICU.

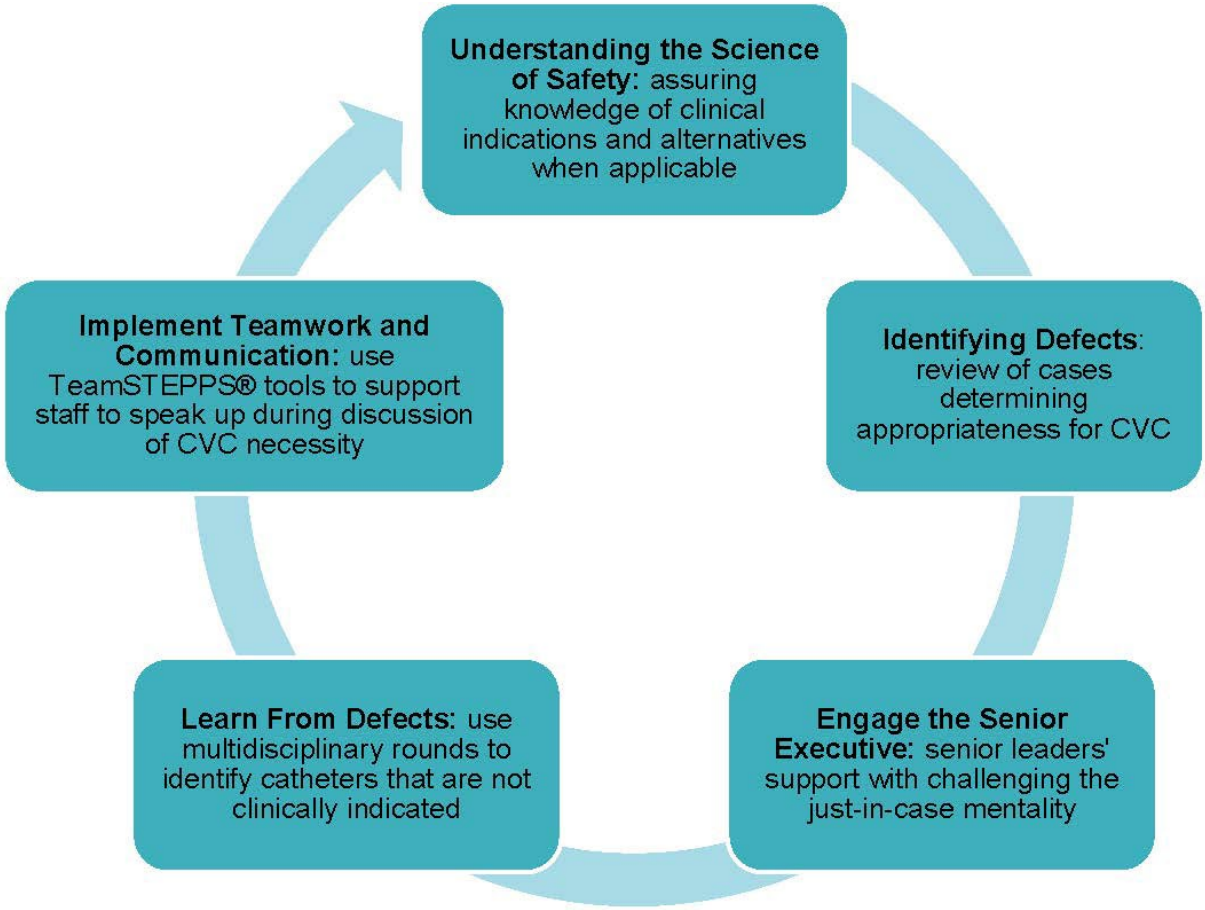
CLINICAL INDICATIONS FOR A CVC IN THE ICU may include:[5-8]

Appropriate Indications	Comments
Management of hemodynamic instability requiring hourly titrations of medications, such as vasopressors, inotropes, diuretics, and intravenous fluid boluses	CVC appropriate for durations of 14 or fewer days
Infusion of non–peripherally compatible infusates • Vesicant solutions includes chemotherapy • Total parenteral nutrition	CVC if hemodynamic monitoring also needed PICC may be appropriate
Acute respiratory failure requiring invasive ventilation with hourly titrations of medical and respiratory therapies	
Documented history of inadequate peripheral venous access	May be appropriate in ICU based upon patient evaluation and diagnostic and treatment modalities
Support high-volume flow for therapy such as hemodialysis	Large lumen CVC (noncuffed, nontunneled) for urgent and temporary dialysis in ICU (capable of delivering blood flow > 300 ml/m) Tunneled CVC with subcutaneous cuff for dialysis of longer durations (i.e., > indication that dialysis will be continued > 2 weeks)

Abbreviations: CVC = central venous catheter; ICU = intensive care unit; PICC = peripherally inserted central catheter

CLABSI Tier 1 Intervention: Avoiding Catheter Placement and Determining Appropriateness (continued)

DEMONSTRATION OF CUSP CONCEPTS applied to this intervention:

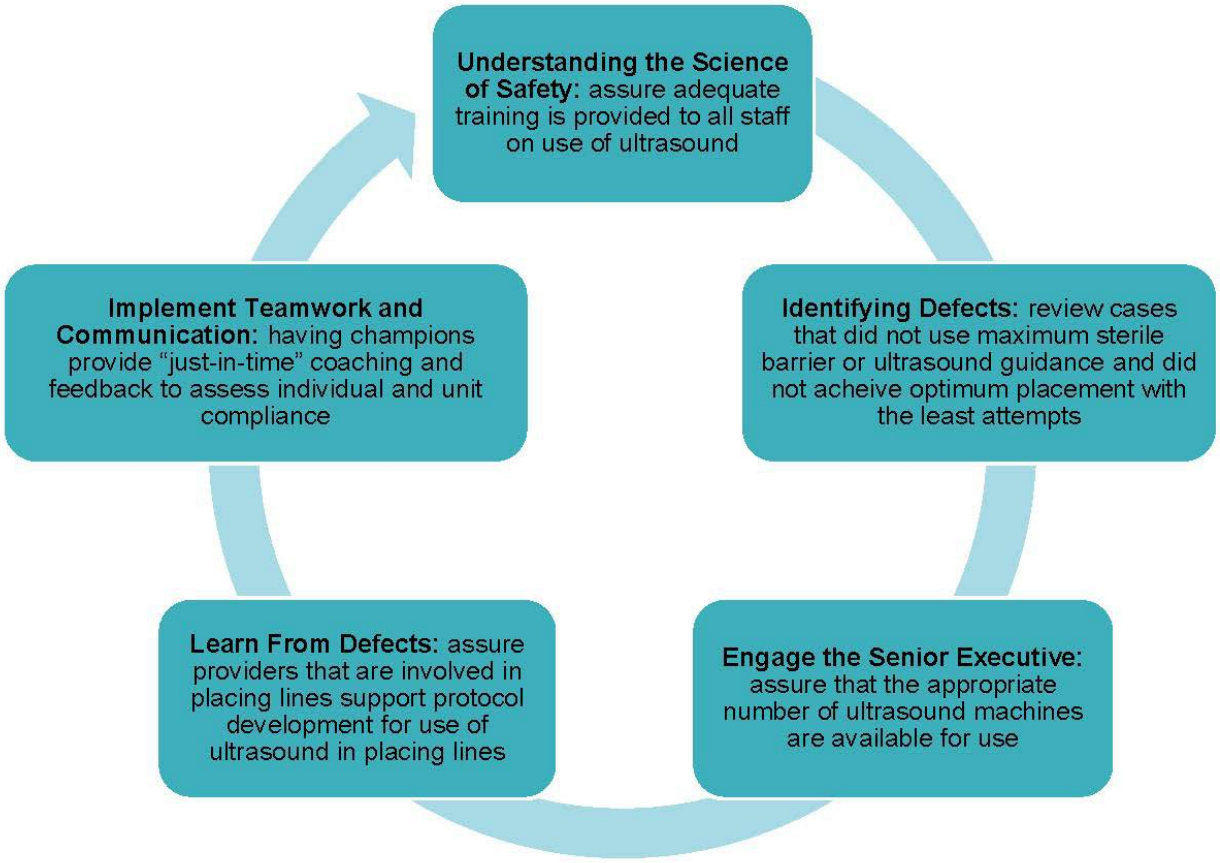


Abbreviation: CVC = central venous catheter

Ensure Proper Aseptic Insertion Using Maximal Sterile Barriers and Ultrasound Guidance

After reviewing the clinical indications and true need for device necessity, and a CVC is still necessary, ensuring an aseptic technique is used is critical to keeping the environment and materials sterile. In fact, compliance with all five CVC bundle elements has been strongly associated with lower CLABSI rates.[7,9,10] To support aseptic technique, the use of maximal sterile barriers and ultrasound guidance can facilitate insertion after appropriate training and competency of all individuals inserting CVCs.

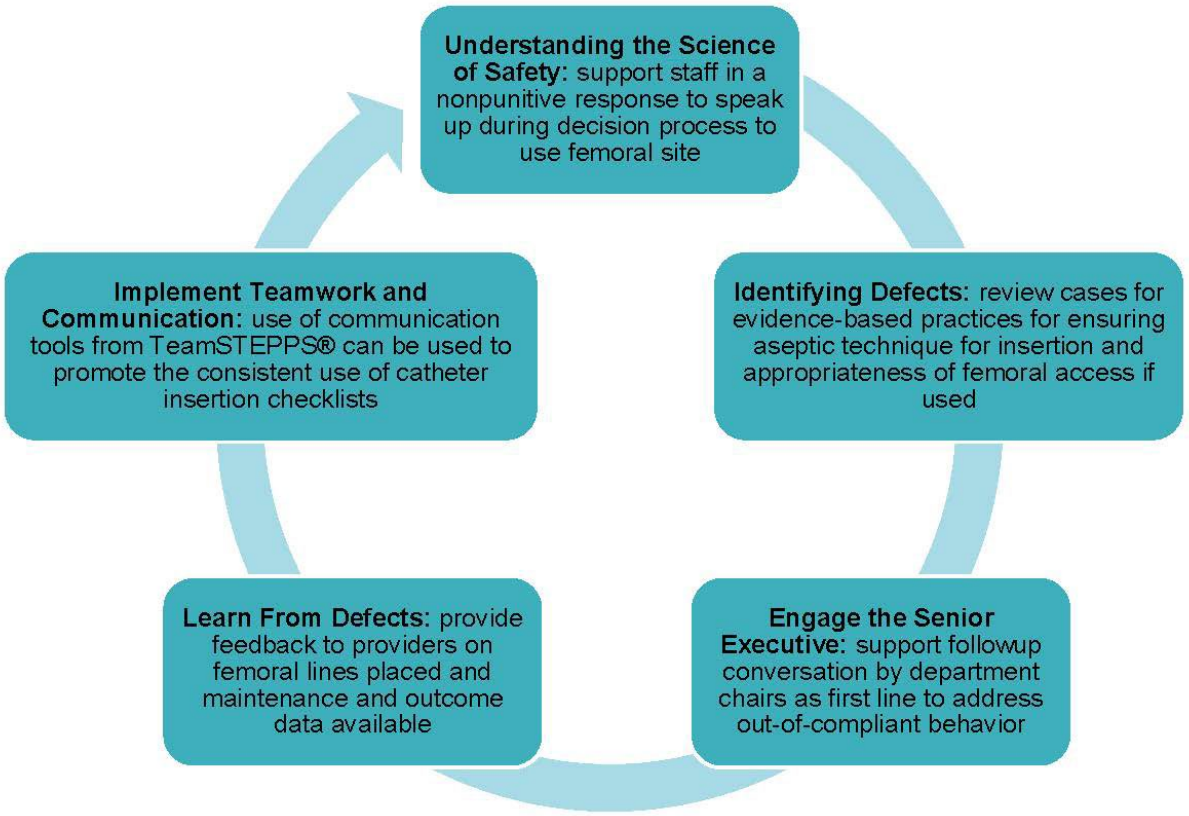
DEMONSTRATION OF CUSP CONCEPTS applied to this intervention:



Select Appropriate Site of Insertion: Avoid Use of Femoral Site

If the CVC is still necessary, ensure selection of the appropriate site and avoid use of the femoral site. When the femoral site is being considered, use effective communication and teamwork between bedside providers in a supportive learning environment while evaluating options outside of the femoral site. Then if the femoral site is used, identifying and learning from the defects can support the team and care of patients moving forward.[7,9-10]

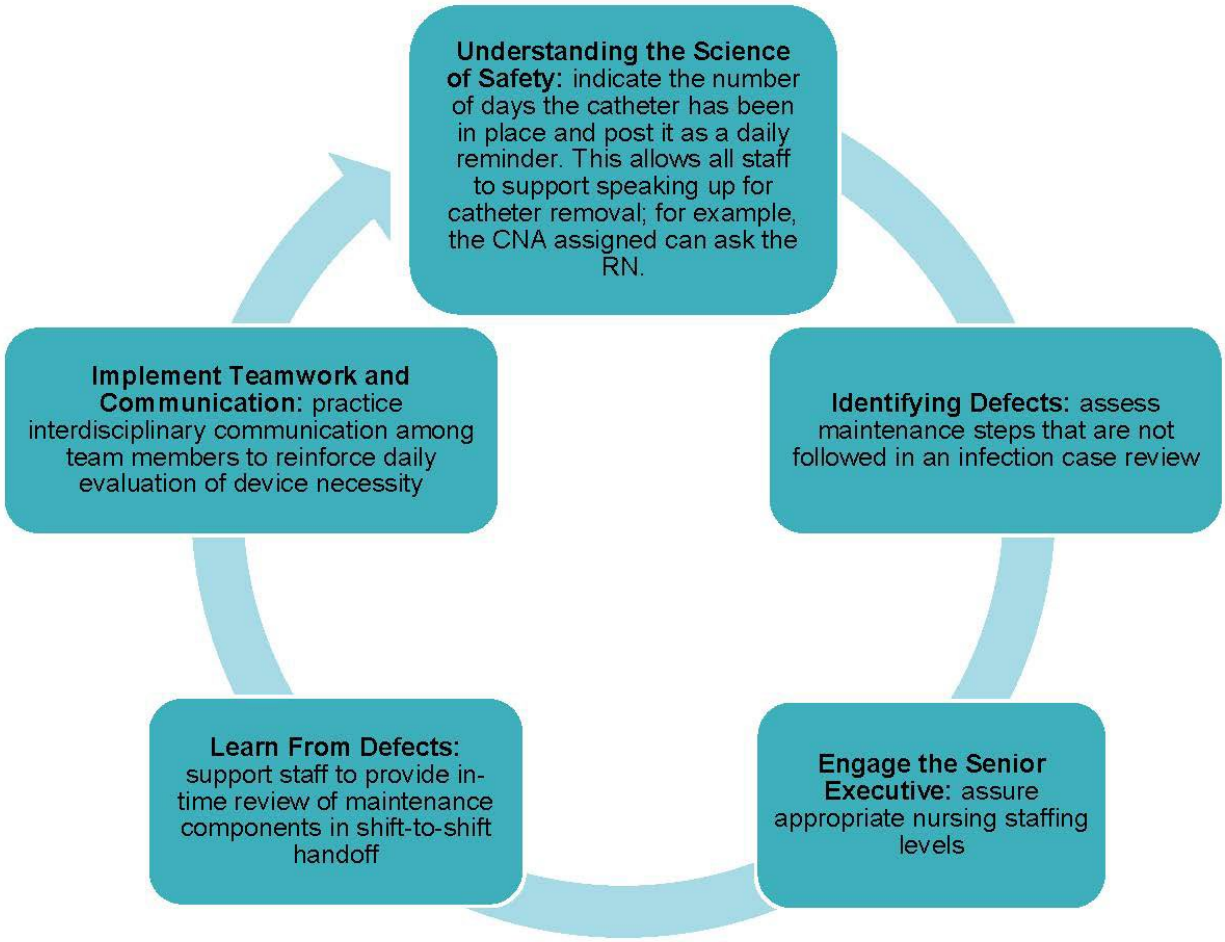
DEMONSTRATION OF CUSP CONCEPTS applied to this intervention:



Ensure Proper Care and Maintenance of CVC

Once a catheter is in place, it is important to maintain the catheter, not only in the ICU but during handoffs and transitions to the transport team and other units. Interventions like staff competency with care and maintenance activities, regular review of CVC necessity, and consistent compliance of maintenance bundle components are key to reducing infection rates.

DEMONSTRATION OF CUSP CONCEPTS applied to this intervention:

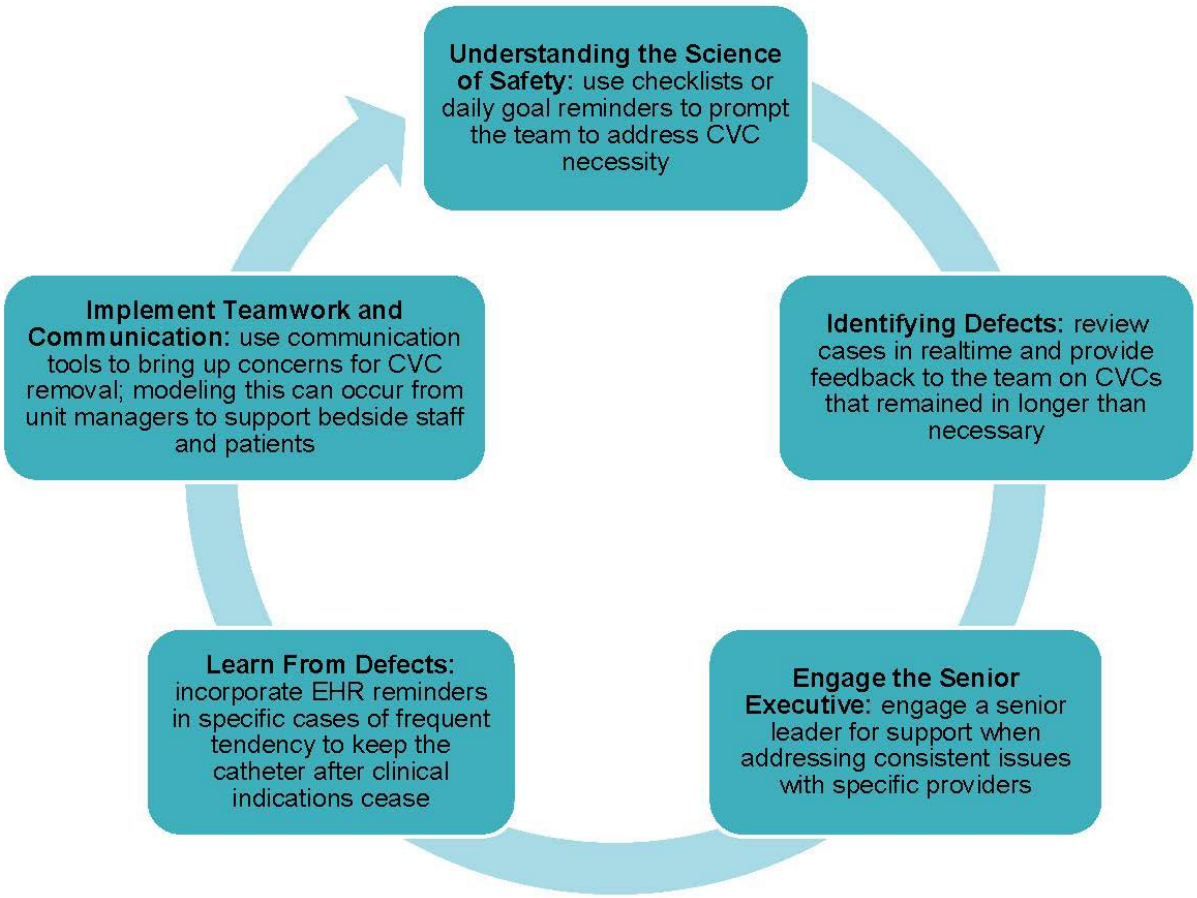


Abbreviations: CNA = certified nursing assistant; RN = registered nurse

Optimize Prompt Removal of Clinically Unnecessary CVCs

CVCs are inserted when clinically necessary. This necessity changes over time and needs to be addressed continually. Each day the CVC remains in increases the risk of infection; so, inserting one when not indicated or not removing it as soon as possible creates unnecessary risk. To reduce the risk of infection, it is important to promptly remove the catheter once it is no longer clinically necessary.

DEMONSTRATION OF CUSP CONCEPTS applied to this intervention:



Abbreviations: CVC = central venous catheter; EHR = electronic health record

CLABSI Tier 2 Interventions: Enhanced Practices

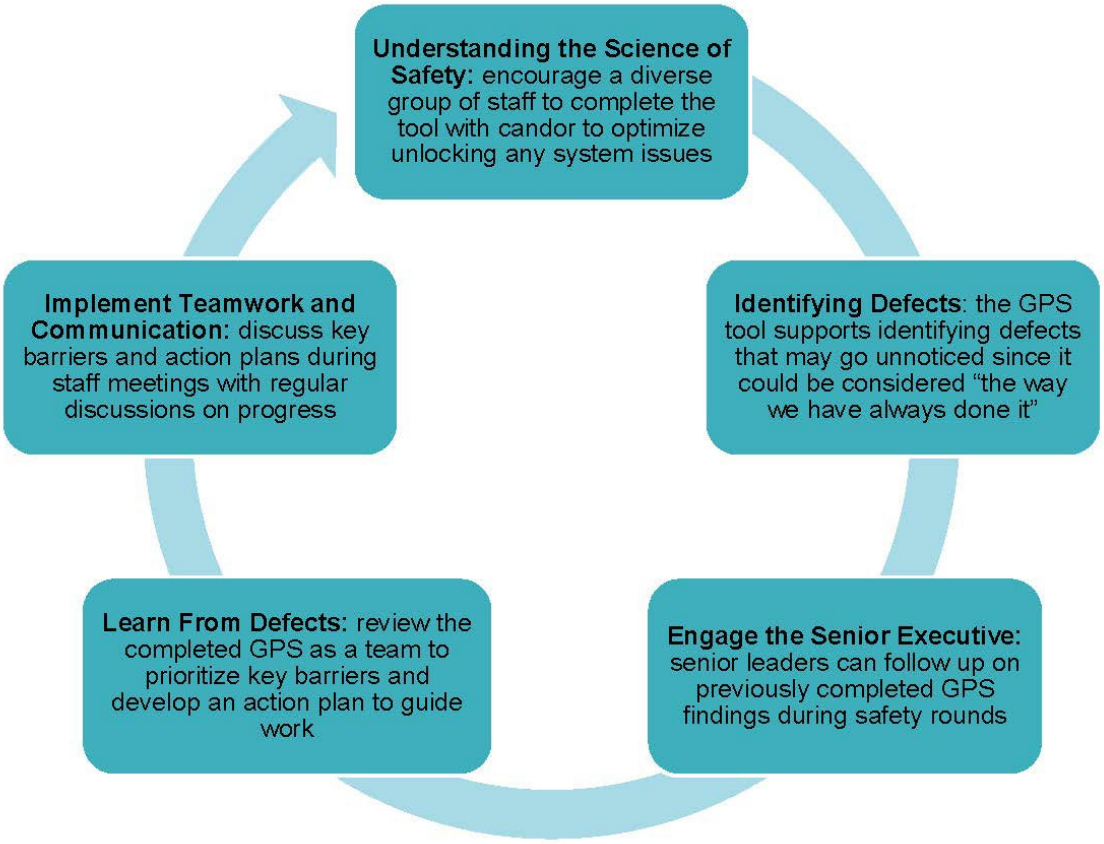
As your ICU implements all of the Tier 1 interventions with every patient, Tier 2 team-based interventions should be used to extend beyond the bedside to enhance the Tier 1 interventions. These strategies can be applied with varying frequency to accommodate needs specific to the culture and concerns individual ICUs. Refer to Figure 2. CLABSI Tiered Interventions for review as needed.

CLABSI Tier 2 Intervention: Gap Analysis

To Help Troubleshoot Barriers and Identify Next Steps, Use CLABSI Guide to Patient Safety Tool[11]

If your CLABSI rate remains elevated after auditing adherence to all the Tier 1 interventions that focus on standardizing products, procedures, and processes, then begin assessing gaps using the CLABSI Guide to Patient Safety (GPS).[ii] The GPS is a brief, validated troubleshooting tool hospitals can use to identify key reasons why hospitals or units may not be successful in preventing CLABSI. Based on the GPS results, work with a multidisciplinary team to develop next steps using the tips provided.

[ii] This tool is modeled on the CAUTI GPS and was adapted for the AHRQ toolkit by the AHRQ Safety Program for ICUs: Preventing CLABSI and CAUTI team that included subject matter experts affiliated with the University of Michigan and Department of Veterans Affairs.



Abbreviations: GPS = Guide to Patient Safety

CLABSI Tier 2 Intervention: Multidisciplinary Catheter Rounds

Conduct Catheter Rounds With Targeted Education To Optimize Appropriate Use

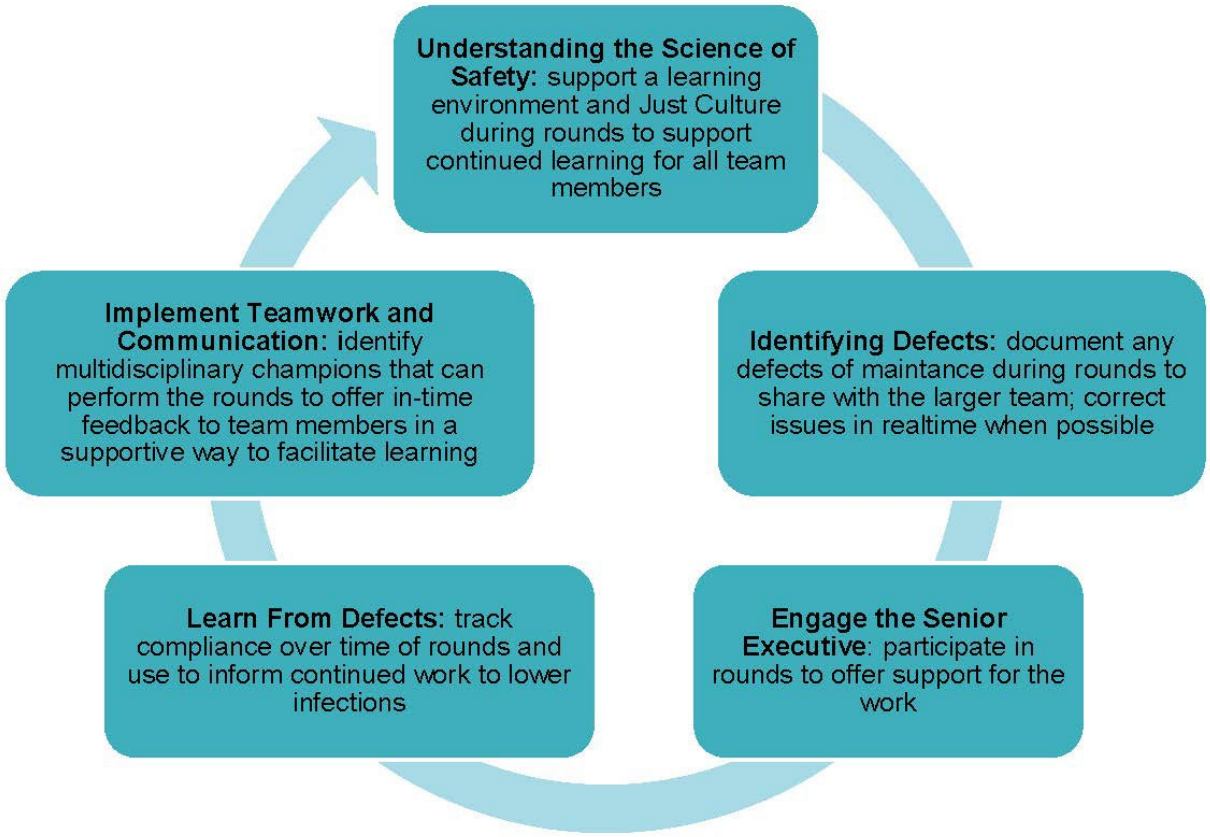
Routine central line rounds with a multidisciplinary team can reduce central line device utilization and the risk for infection. Conduct routine—ideally daily—central line rounds to assess the need for central line use, key aspects of maintenance, and staff understanding of best practice expectations.

A multidisciplinary team for central line rounds often includes a physician, nursing personnel, an infection preventionist, and others you determine might assist and/or benefit in the rounding process. Include Emergency Department (ED) and anesthesia personnel in the feedback from these rounds as appropriate since they frequently insert central lines, access the lines, and care for patients who have a central line in place. Also consider including the transport team, non-nursing units, and radiology to ensure consistent, appropriate maintenance and care practices, including safe injection practices, are being followed.

STEPS TO PREPARE FOR AND CONDUCT ROUTINE CATHETER ROUNDS with a multidisciplinary team include:

- Identify key practices to observe or check during planned rounds and specific goal(s) of rounds. This will vary over time as barriers or needs are identified and may vary by ICU.
- Identify a physician champion and nurse experts to round, as well as a nurse champion to lead the rounds.
- Observe insertions, if the opportunity to observe an insertion occurs.
- Develop or adapt a rounding checklist to record findings.
- Provide direct, constructive feedback to staff during rounds to educate, compliment, seek information, etc. per goals of rounds, and as opportunities arise.
- Aggregate findings from rounds and provide feedback to the ICU and individuals as appropriate.

DEMONSTRATION OF CUSP CONCEPTS applied to this intervention:



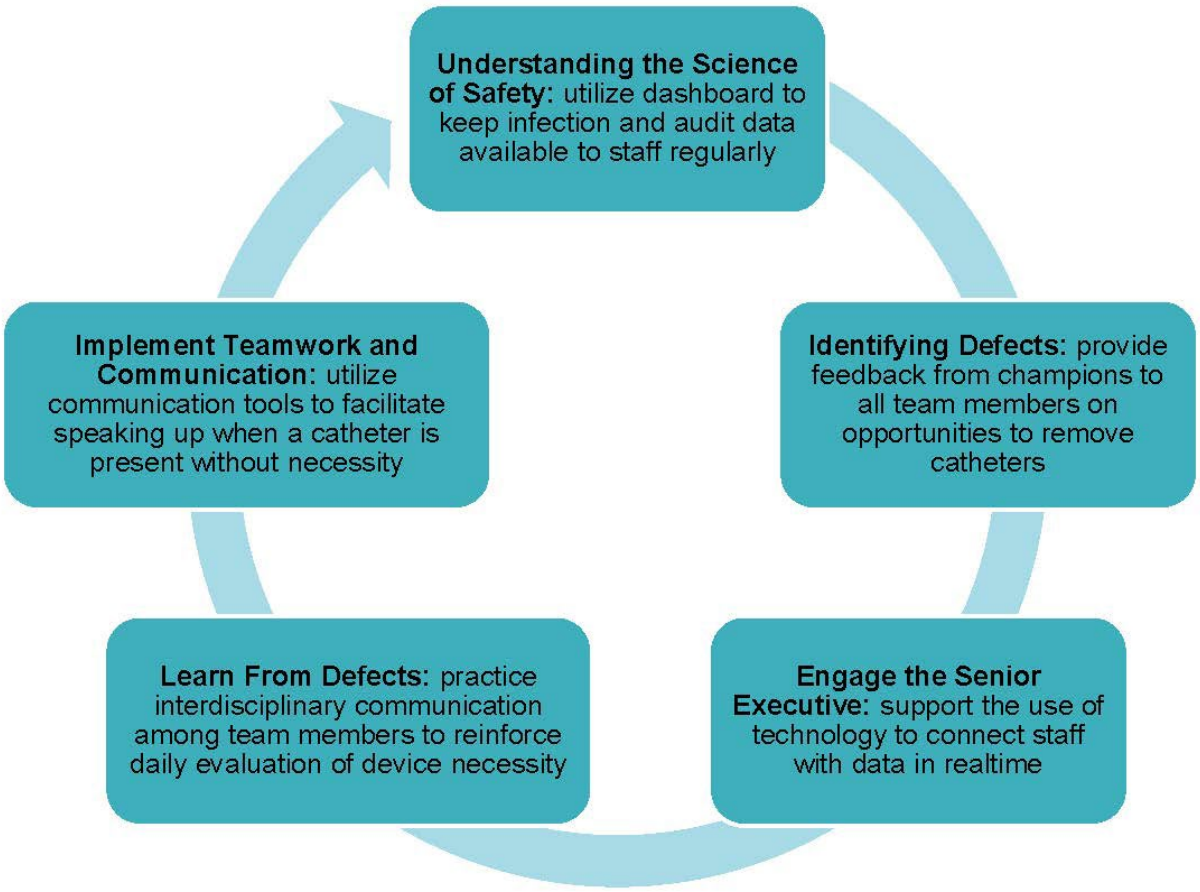
CLABSI Tier 2 Intervention: Data Sharing

Feed CLABSI and Central Venous Catheter Utilization Data Back to Frontline Staff in Realtime

Using audits and feedback to optimize appropriate use and care of central lines and alternatives, such as avoiding the femoral site, can greatly reduce the risk for infection and mitigate the risk of future CLABSIs. Moreover, evidence suggests that if consistent use of any of the five elements of the central line bundle is less than 75 percent, the impact on CLABSI rates

will be limited.[9] Strategies to audit and feed data back to staff include daily multidisciplinary catheter rounds with real-time feedback and an in-depth review of CLABSIs to identify contributing factors to the infection.

DEMONSTRATION OF CUSP CONCEPTS applied to this intervention:



Observe and Document Competency of Catheter Insertion: Education and Observed Behavior

Using targeted education to optimize appropriate use of central lines, and alternatives to using the catheters, can greatly reduce the risk for infection. Strategies to assess competencies include observing catheter insertion, incorporating education into new staff orientation and annual competency assessments, and using alternative approaches to reduce CLABSI. Another opportunity for targeted education can be when conducting multidisciplinary catheter rounds. Consider the following steps to prepare for and onboard staff, and to execute periodic skills testing.

New Staff Onboarding

Educate new staff about what their role will be with central lines and provide education and training on how they are expected to meet requirements.

STEPS TO PREPARE FOR AND ONBOARD STAFF include:

- Identify what an employee's role will be related to central lines (e.g., insertion, personnel supporting insertion, maintenance, central line access for medication or fluid administration, patient transport).
- Identify knowledge and skills required for each staff role related to central lines.
- Educate employees on hospital policy/procedure and expectations for performance.
- Ensure personnel inserting central lines are aware of central line insertion bundle practices and monitoring.
- Assess knowledge through testing.
- For medical staff and mid-level providers, determine appropriateness of request for privileges to insert central lines, and assess credentials for this procedure. Determine what credentialing requirements are in place for this privilege and establish competency.

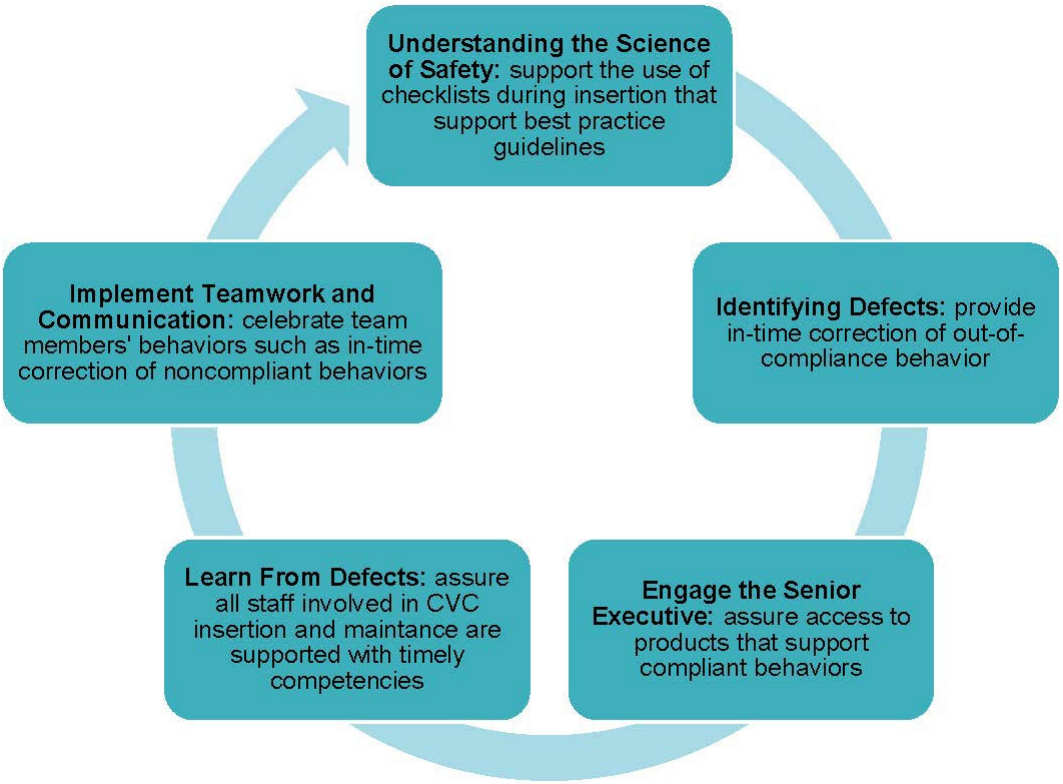
Return Demonstration of Skills

Develop a process to observe a return demonstration of expected skills of employee's role (e.g., central line dressing change). This should be done upon hire and then periodically thereafter to ensure no drift in practice has occurred. Typically, this should be performed at least annually. Specific skills for type of employee role should be included (e.g., correct line access technique for personnel who have that function within their scope of practice, such as nurses. But also include personnel functions in non-nursing units, such as appropriate transport of patients with central lines to maintain securement of the device during transport and/or therapy/testing and what to do if dressing becomes dislodged or they see blood in tubing or on dressing. Competencies for insertion by physicians and mid-level practitioners should be determined by the medical staff and handled through those credentialing channels.) Competencies for accessing these lines to administer drugs and fluids should be determined by auditing, based on evidence-based hospital policies.

STEPS TO PREPARE FOR AND EXECUTE SKILLS TESTING with staff include:

- Determine insertion observation requirements considering medical staff credentialing policies and procedures for physicians and mid-level practitioners.
- For nurses inserting peripherally inserted central catheter (PICC) lines, insertion observation requirements should be determined by hospital policy and monitored accordingly, considering State law training requirements.
- For staff assisting insertion, it should be clear that this is a vital role, fundamental to maintaining sterile technique. This person should be knowledgeable of the principles of aseptic insertion and able to speak up if technique is not appropriate. Leadership support and acknowledgment of this important role is key.
- Regularly monitor staff who insert central lines for competency in aseptic technique via insertion bundle audits.
- Feed adherence data for these practices back to medical staff for physician and mid-level practitioners as part of their requirements for recredentialing and quality assurance.
- Audit adherence for nurses who insert PICC lines and provide feedback to the nurse and share results with supervising nurse manager.
- Conduct maintenance practice observations during orientation and then through auditing, catheter rounds, and annual competency assessments thereafter. Observe other units or departments that regularly work with patients in the ICU who have central lines, such as radiology, transport, and physical therapy.
- Observe non-nursing units that also access central lines during procedures for administration of fluids or medications to ensure adherence to safe injection practices.[12]

DEMONSTRATION OF CUSP CONCEPTS applied to this intervention:



Abbreviation: CVC = central venous catheter

Use Additional Approaches as Indicated by Risk Assessment

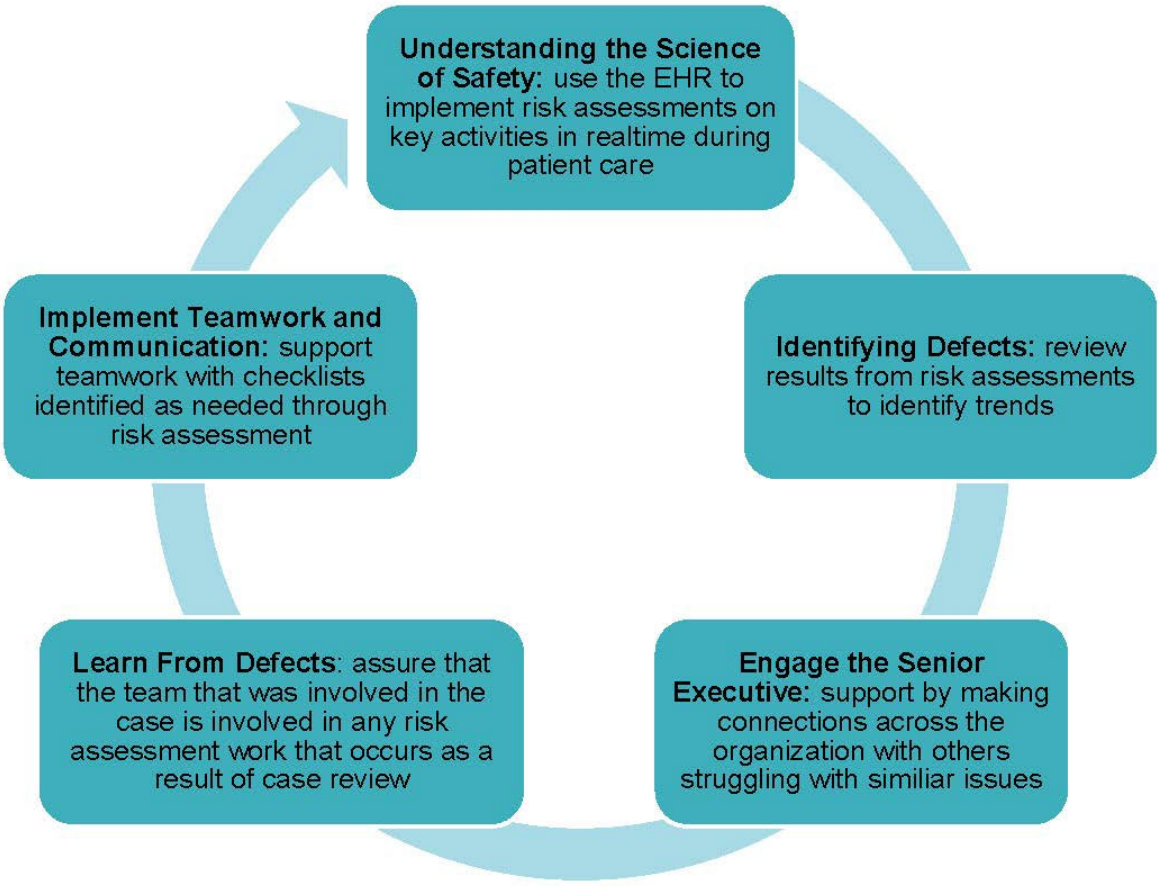
Additional, advanced approaches to CLABSI prevention may be indicated if CLABSI rates are not coming down and you are able to identify particular populations that are most often involved in having CLABSI through defect analysis and/or CLABSI epidemiological trends and your audits reveal reliable, high adherence to Tier 1 and 2 interventions. For example, are you seeing more CLABSIs in certain patient populations, such as patients with cancer, those in burn units or in the neonatal ICU, and audits of practice show a high adherence to appropriate care in these populations? If this is the case, then the team can look for more advanced interventions specific to these populations. It is important to reflect that many facilities throughout the United States have achieved their goals for prevention of CLABSI without use of these advanced interventions in these populations; so, it is important to explore and understand the scientific basis and cost for any advanced intervention being considered and its application to the specific at-risk population you have identified. Unless the team possesses the expertise, a literature review or consultation with a subject matter expert should occur to establish which advanced practices will be used for which populations if advanced interventions are being considered.

The following are possible advanced approaches to consider, depending on the above-described assessments:

- Use antiseptic-containing hub/connectors or cap/port protectors to cover CVC line connectors.[13,14]
- In patients whose catheter is expected to remain in place greater than 5 days, use a chlorhexidine/silver sulfadiazine or minocycline/rifampin-impregnated CVC to reduce rates of CLABSI, if the CLABSI rate did not decrease after successful implementation of a comprehensive strategy.[15-17]
- In patients with long-term catheters who have a history of multiple bouts of CLABSI despite optimal maximal adherence to appropriate insertion and maintenance interventions, use prophylactic antimicrobial lock solution. These may include patients who are critically ill, receiving total parenteral nutrition, chemotherapy, or dialysis, for example.[16,17]
- Daily bathing with chlorhexidine gluconate (CHG) has been shown to reduce the incidence of healthcare-associated bloodstream infections and is now a recommended practice as an additional intervention.[18-20] CHG bathing reduces the bioburden on the patient's skin and thereby reduces the risk of CVC site infection and CLABSI. Bathe patients older than 2 months of age daily with 2 percent CHG when a CVC line is present.[21, 22]

CLABSI Tier 2 Intervention: Additional Approaches (continued)

DEMONSTRATION OF CUSP CONCEPTS applied to this intervention:

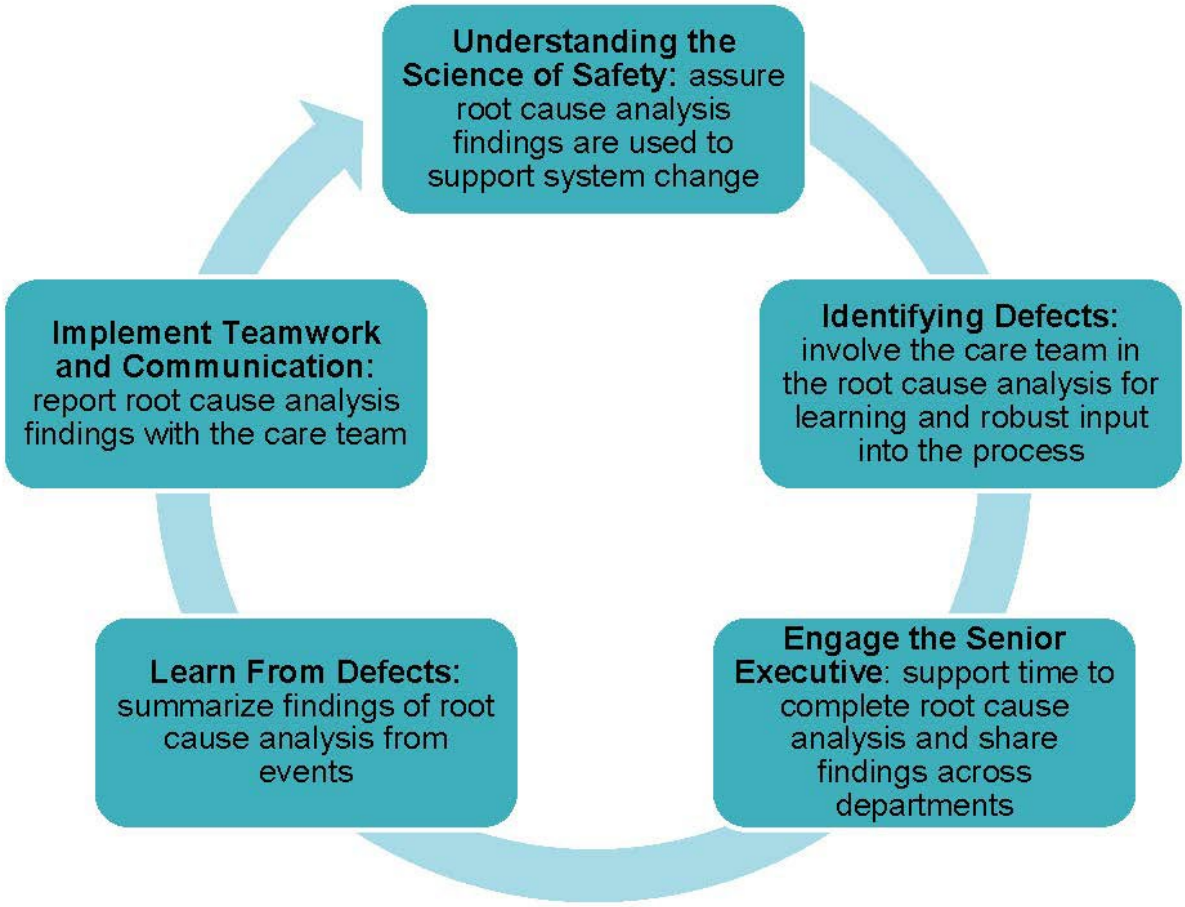


Abbreviation: EHR = electronic health record

Perform Full Root Cause Analysis or Focused Review of Infections

When an infection occurs, performing a full root cause analysis of the infection can provide learnings to the team. Assuring that a multidisciplinary team that provided care to the patient during the time of the onset of the infection is key to assure success of the review. Additionally, sharing the summary and learning of the review with all staff is key.

DEMONSTRATION OF CUSP CONCEPTS applied to this intervention:



CLABSI Resources

CLABSI Prevention Modules

These modules provide simple steps ICU teams can take to ensure the clinical and cultural changes that prevent CLABSI are sustained after the initial work is completed. The CLABSI Prevention Modules provide information on how to disrupt the lifecycle of a catheter device using Tier 1 and Tier 2 interventions. There are four modules that follow the lifecycle of the catheter across the four stages of potential intervention: indication, insertion, maintenance, and removal. The modules are as follows and can be accessed for additional supports beyond this Playbook.

CLABSI Modules

- Central Venous Catheter Indications and Alternatives
  - Avoiding placement and determining appropriateness
- Central Venous Catheter Insertion Bundle
  - Avoiding improper placement techniques
- Central Venous Catheter Maintenance
  - Maintaining awareness and proper care of catheters in place
- Central Venous Catheter Removal
  - Prompting removal of unnecessary catheters

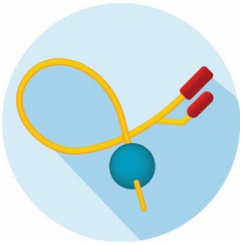
Complementary Tools

Tools for Reducing Central Line-Associated Blood Stream Infections (AHRQ) assist in implementing evidence-based practices to eliminate CLABSIs.[23]

The Checklist for Prevention of Central Line Associated Blood Stream Infections (CDC) is a tool that highlights evidence-based, Tier 1 interventions.[24]

The Central Line Bundle (AHRQ) provides five evidence-based practices shown to reduce the risk of CLABSI infection by 66 percent.[25] These steps should be implemented to disrupt the lifecycle of the CVC device:

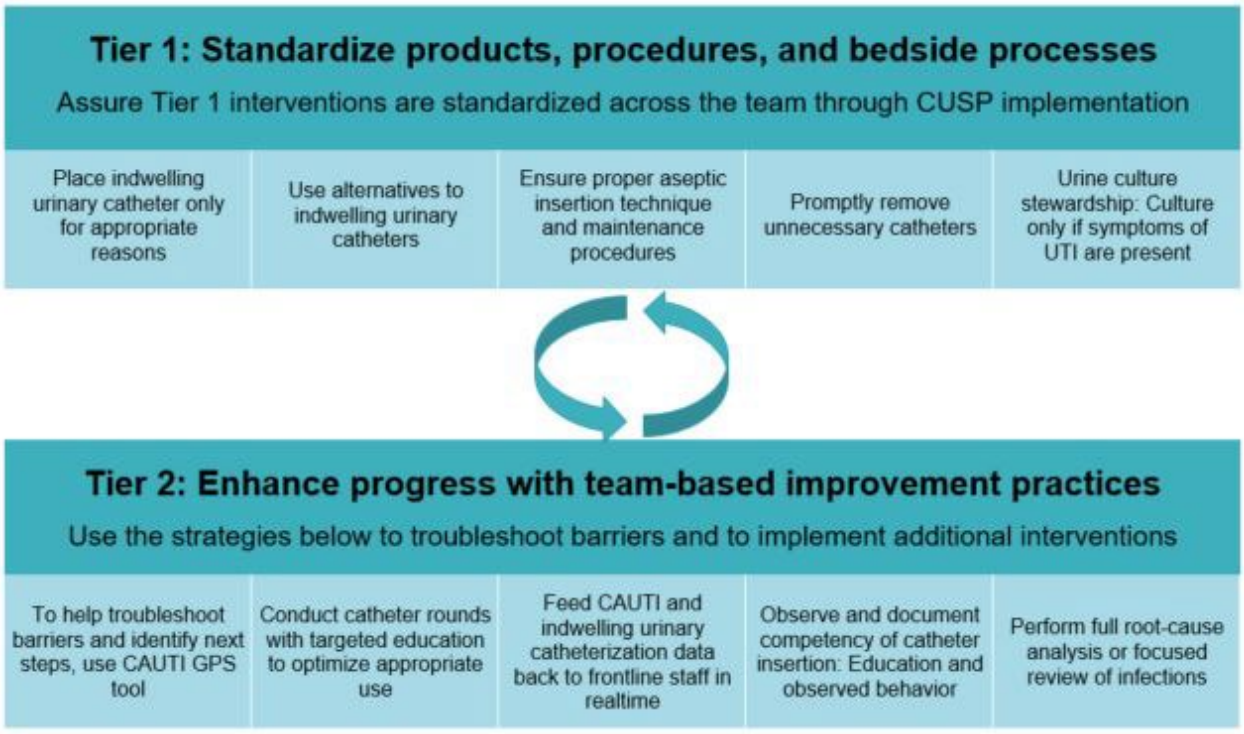
- Use appropriate hand hygiene.
- Use maximal (full) barrier precautions during insertion.
- Use CHG skin antisepsis.
- Optimal catheter site selection to avoid infection and other complications; avoid using the femoral vein for CVCs in adult patients.
- Review line necessity every day, with prompt removal of unnecessary lines.[26]



CAUTI Prevention Strategies

This section outlines the CUSP strategies that can be applied within the two-tiered approach to prevent CAUTI, including interventions, example metrics, case studies, and resources.

FIGURE 3: CAUTI Tiered Interventions[iii]



Abbreviations: CAUTI = catheter-associated urinary tract infection; CUSP = Comprehensive Unit-based Safety Program; GPS = Guide to Patient Safety; UTI = urinary tract infection

CAUTI Tier 1 Interventions

Disrupting the lifecycle of the catheter will help prevent CAUTI and being good stewards of urine culturing will mitigate unnecessary urine cultures, misdiagnosis, and inappropriate antibiotic use. Not inserting a urinary catheter eliminates the possibility of a CAUTI, but when one is necessary, aseptic insertion techniques, proper maintenance, and prompt removal are all strategies to mitigate the risk of infection as well.

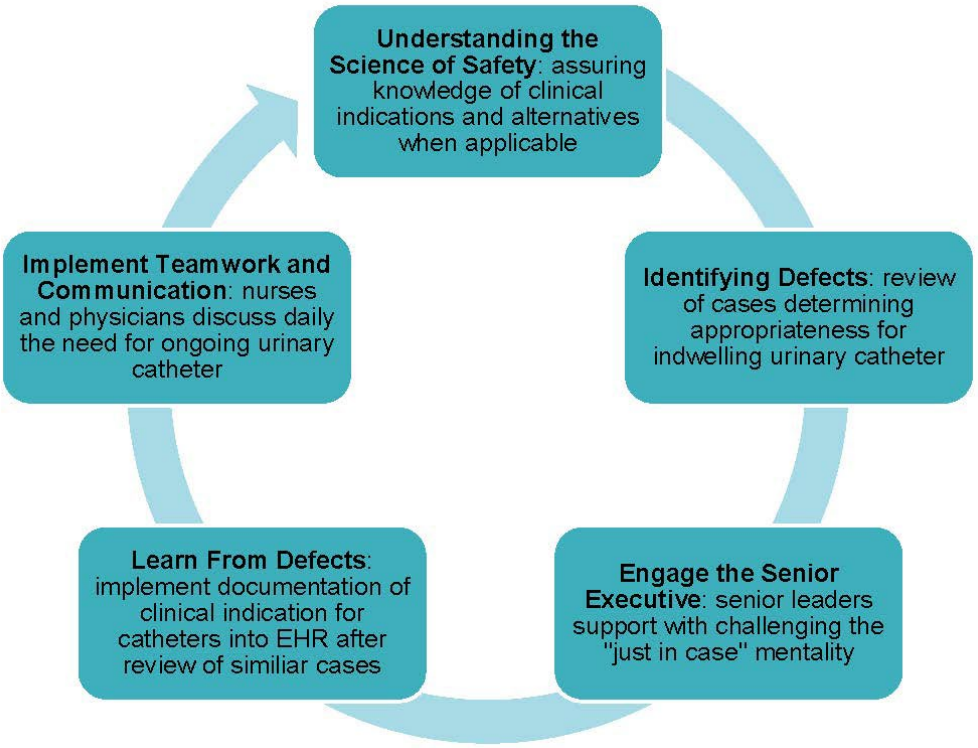
[iii] This material was expanded, enhanced and adapted for the AHRQ toolkit from materials developed for CAUTI prevention by faculty and staff at the Department of Veterans Affairs and the University of Michigan.

Place Indwelling Catheter Only for Appropriate Reasons

The most important way to prevent CAUTI and other catheter-associated complications is to avoid catheter placement. In order to avoid unnecessary catheter placement, it is essential to understand the clinical indications for urinary catheters. To support what can often be a complex decision-making process in the ICU setting, review the tools and resources outlined in this section.

CLINICAL INDICATIONS for an IUC in the ICU include:[27,28]

- Acute urinary retention/obstruction that cannot be monitored or addressed by a bladder scanner or intermittent straight catheterization
- Perioperative use for selected surgeries
- Anticipated urinary retention due to paralytic medications
- Recent urologic or gynecologic diagnosis or procedure for which catheter removal is not yet recommended
- Assistance with healing of open wounds in incontinent patients when alternative methods cannot be used
- End-of-life care when other non-catheter options, intermittent straight catheterizations, or external catheters cannot be used
- Critically ill and need for accurate hourly measurement of urinary output



Abbreviation: EHR = electronic health record

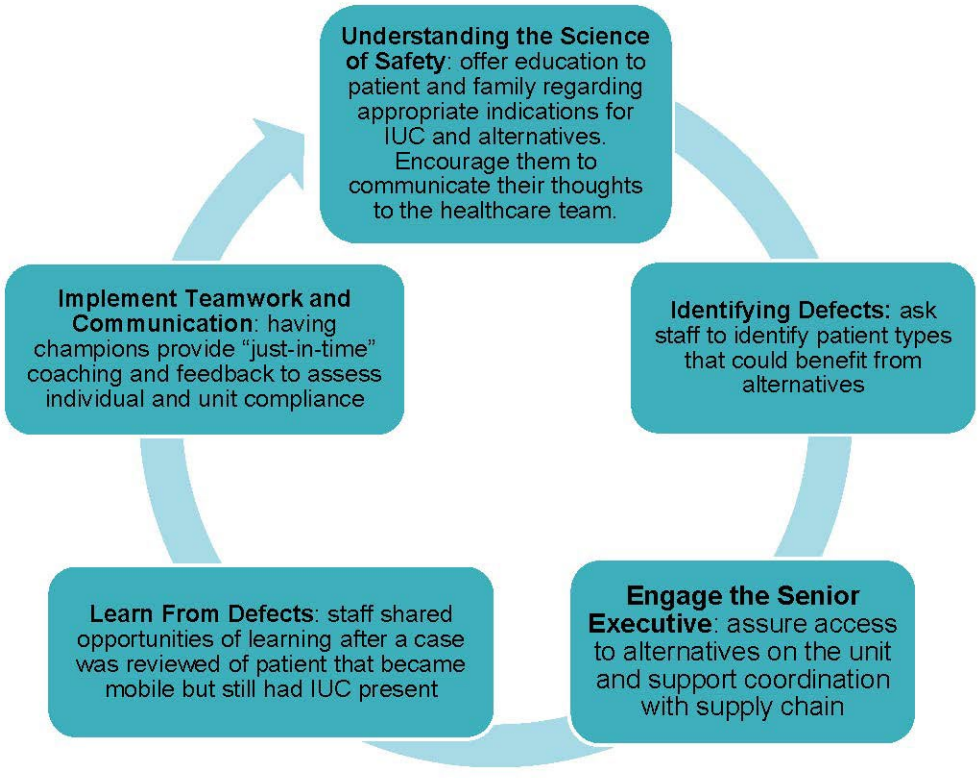
Encourage Use of Alternative to Indwelling Urinary Catheters

In order to avoid unnecessary catheter placement, it is essential to understand the available alternatives and how to evaluate the use of these in your ICU. Consider alternatives that are based on a patient's individual care needs and determine the best alternative option instead of an IUC. Alternatives provide a much lower risk of infectious complications and can reduce or eliminate noninfectious complications, such as discomfort and immobility.[30,31] If possible, involve the patient and family in the discussion for why an indwelling catheter is appropriate in this situation.

CLINICAL INDICATIONS for use of external catheters:[32]

- Stage III or Stage IV or unstageable pressure ulcers
- Moderate to severe incontinence-associated dermatitis
- Daily (not hourly) measurement of urine volume
- Single 24-hour or random urine sample for diagnostic testing
- Reduction in acute, severe pain with movement
- Patient request for external catheter to manage urinary incontinence while hospitalized; and/or
- Improvement in comfort in a dying patient

DEMONSTRATION OF CUSP CONCEPTS applied to this intervention:



Abbreviation: IUC = indwelling urinary catheter

Ensure Proper Aseptic Insertion Techniques and Maintenance Procedures

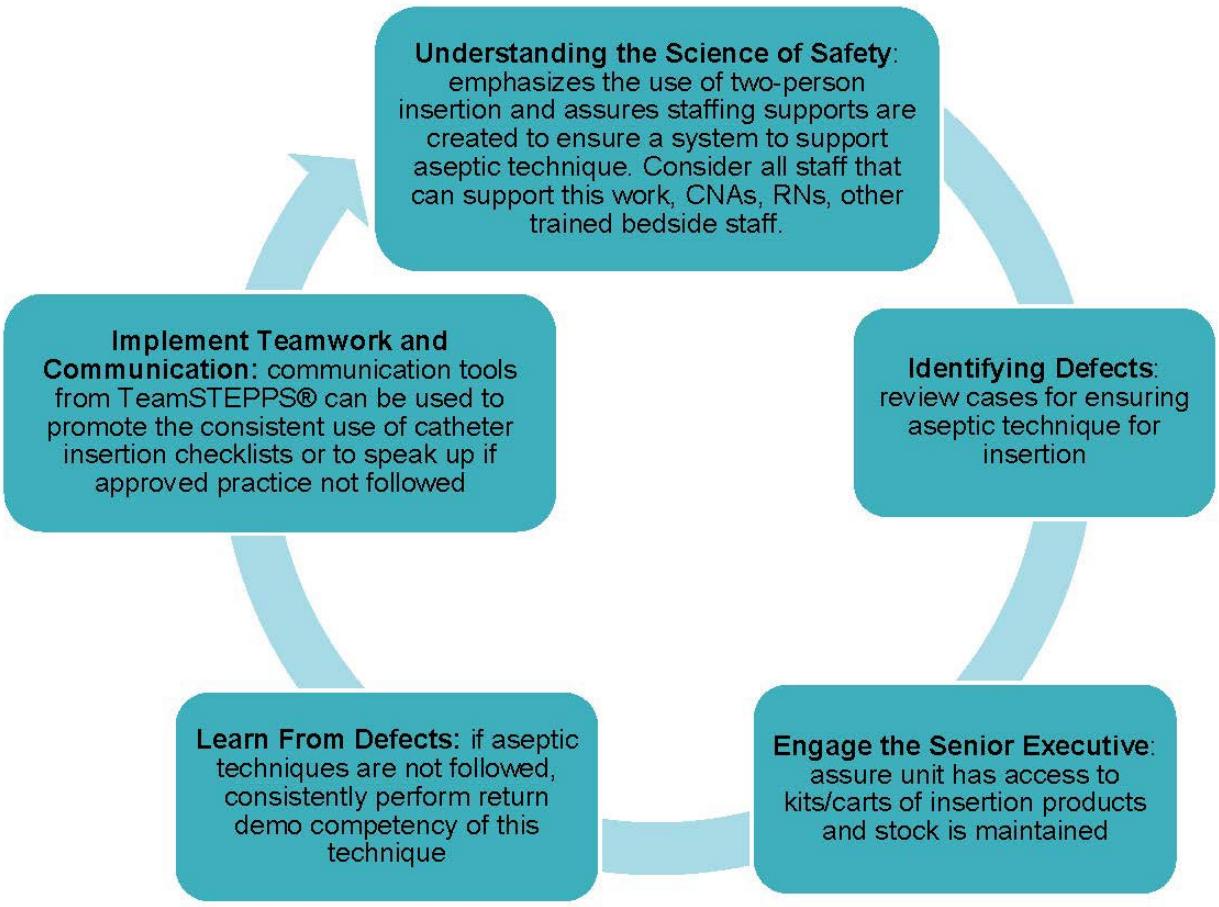
After reviewing the clinical indications and true need for device necessity, and determining that an IUC is still necessary, ensuring that an aseptic technique is used is critical to keeping the environment and materials sterile. If the catheter is accidently contaminated, discard it, and obtain a new sterile catheter. Once a catheter is in place, it is important to focus on catheter safety and cleanliness not only in your ICU, but also during handoffs and transitions to the transport team and other units.

CATHETER CARE ESSENTIALS: The following catheter care essentials are from AHRQ Catheter Care Pocket Cards, available on the AHRQ website, and listed in our references:[33]

- Use appropriate hand hygiene and gloves.
- Properly secure catheters to prevent movement and urethral traction.
- Maintain a sterile closed drainage system.
- Maintain good hygiene at the catheter-urethral interface.
- Maintain unobstructed urine flow.
- Maintain drainage bag below level of bladder at all times.
- Do not change IUCs or drainage bags at arbitrary fixed intervals.
- Document indication for IUC on each day of use.

CAUTI Tier 1 INTERVENTION: Catheter Insertion & Maintenance (continued)

DEMONSTRATION OF CUSP CONCEPTS applied to this intervention:



Abbreviations: CNA = certified nursing assistant; RN = registered nurse

CAUTI Tier 1 INTERVENTION: Removal of Unnecessary Catheters

Optimize Prompt Removal of Unnecessary Catheters

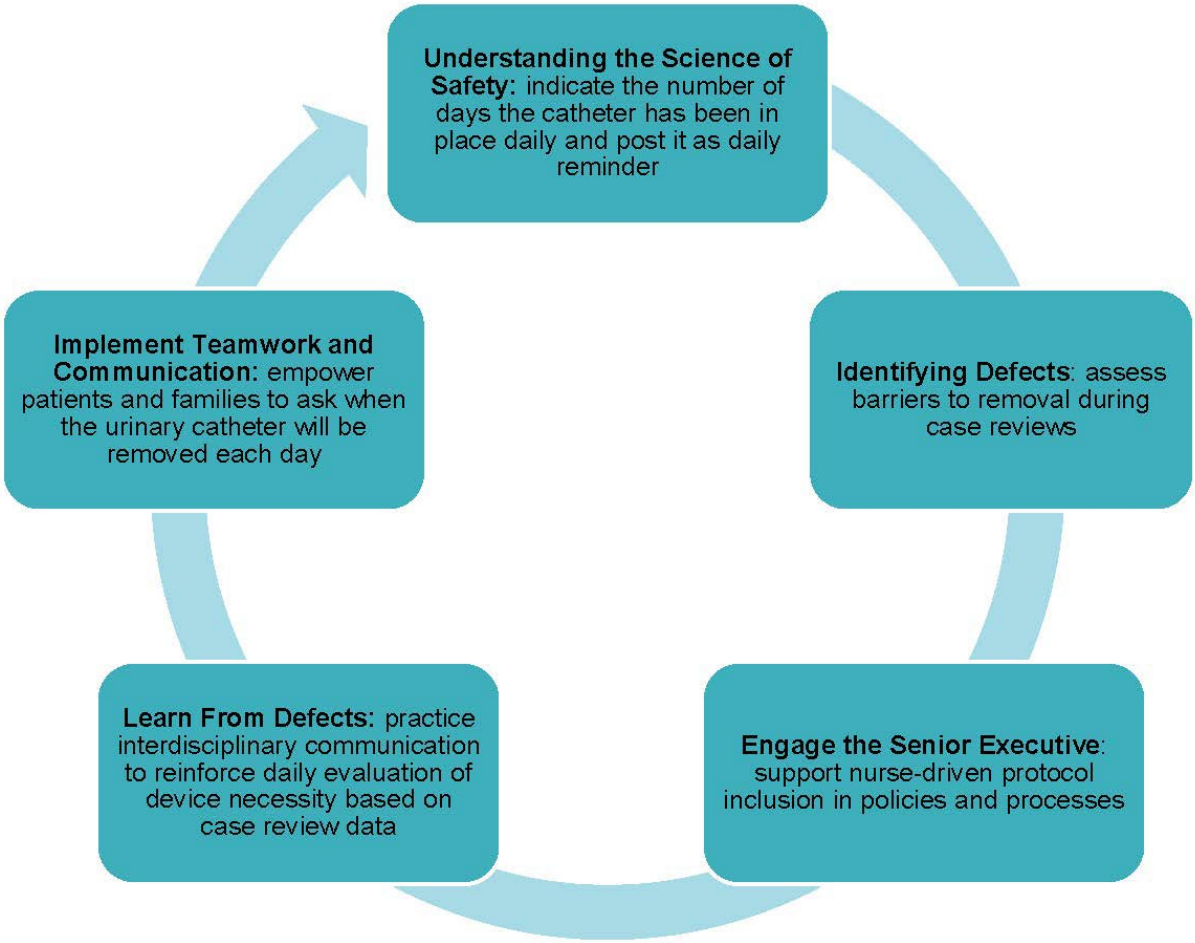
Indwelling urinary catheters are often inserted by teams on other units before a patient is transferred into your ICU, such as emergent catheters placed in the ED. At times, catheters are inserted when not clinically indicated or not removed as early as possible. To reduce the risk of infection, it is important to promptly remove the catheter once it is clinically unnecessary.

COMMON SUCCESS FACTORS: Here are common factors that affect success of reminders and stop orders to remove unnecessary IUCs:[34]

- Communication patterns and unit culture relative to urinary catheter use
- Nurse comfort with urinary catheter removal protocols
- Staff knowledge and skills
- Respect among nurses and physicians
- Dedicated personnel to review, remind, and reinforce

- Information technology support for data collection
- Feedback using data on catheter use
- ICU team's recognition of the hazard of urinary catheters

DEMONSTRATION OF CUSP CONCEPTS applied to this intervention:



CAUTI Tier 1 INTERVENTION: Urine Culturing Stewardship

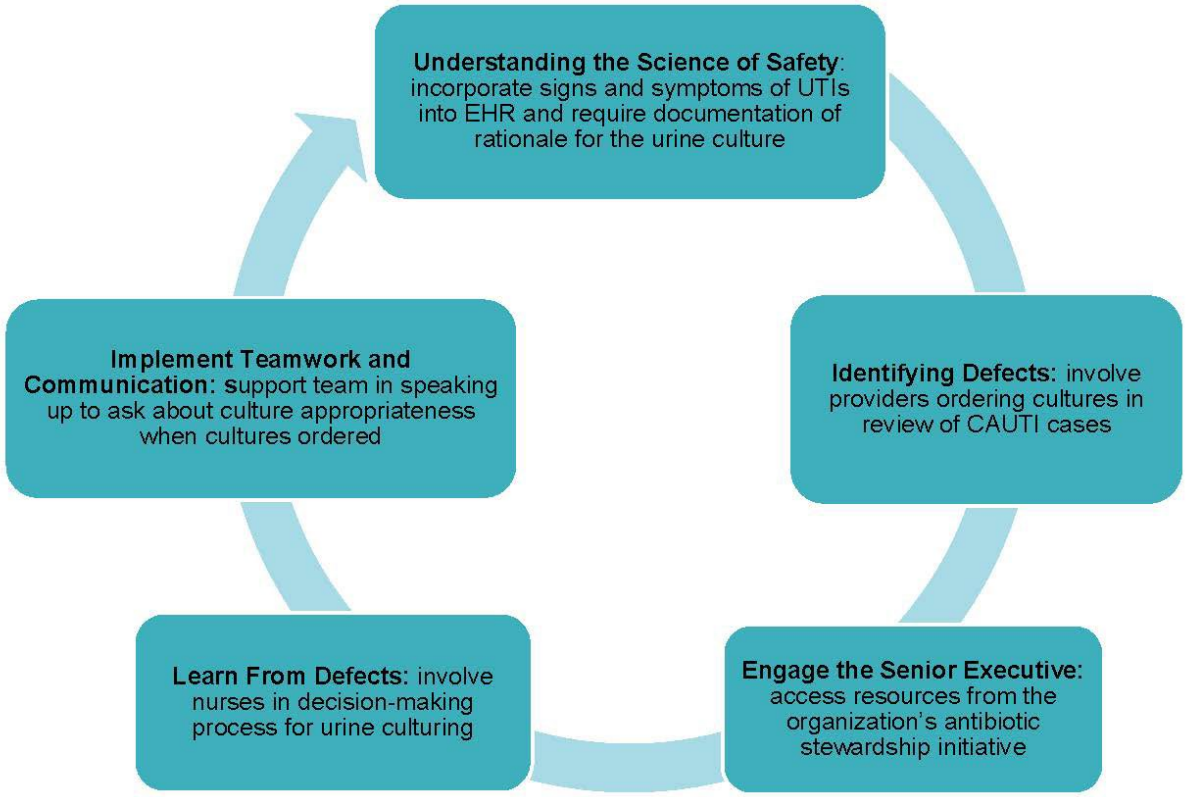
Culture Urine Only if Symptoms of a Urinary Tract Infection (UTI) Are Present

The risk of bacteriuria increases 3 to 8 percent each day a urinary catheter is in place. Bacteriuria does not require treatment if signs and symptoms of a UTI are not present. Patients in the ICU often have limited ability to communicate and may present with or develop a fever, but determining the source of fever in a catheterized patient can be difficult. To prevent collecting unnecessary urine cultures, which can contribute to overinflated CAUTI rates, missed diagnoses, and misuse of antibiotics, it is critical to know when urine cultures are appropriate and inappropriate, and be familiar with strategies to improve clinical stewardship for culturing urine.[35]

CAUTI SIGNS AND SYMPTOMS include the following when other alternative explanations cannot be determined for these symptoms:[36]

- Fever >38°C
- Urgency, frequency, dysuria
- Flank pain or pelvic discomfort
- Costovertebral angle pain and tenderness
- If the catheter was removed, then patients can also have dysuria or urgent or frequent urination

DEMONSTRATION OF CUSP CONCEPTS applied to this intervention:



Abbreviations: CAUTI = catheter-associated urinary tract infection; EHR = electronic health record; UTI = urinary tract infection

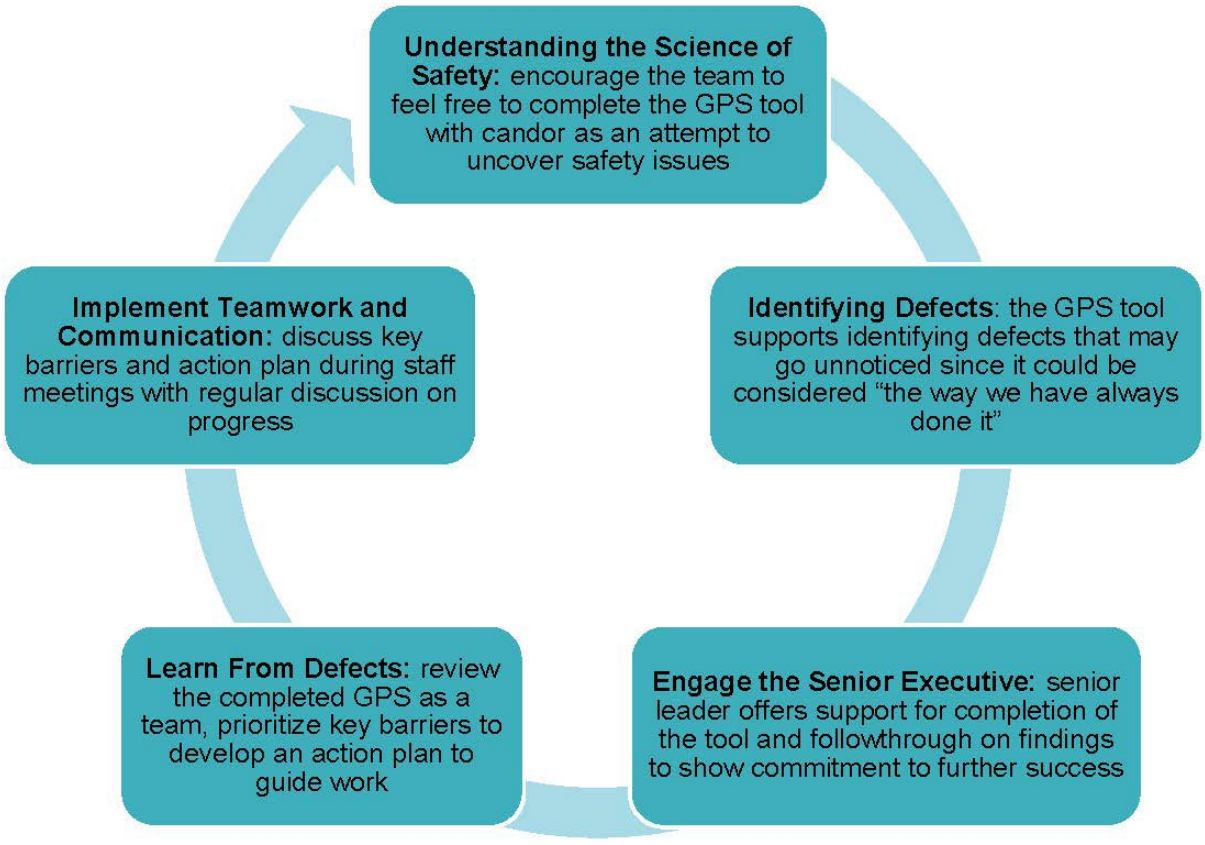
CAUTI Tier 2 Interventions

As your ICU implements all of the Tier 1 interventions with every patient, Tier 2 team-based interventions can be used to extend beyond the bedside to enhance the Tier 1 interventions. These strategies can be applied with varying frequency to accommodate needs specific to individual ICU cultures and concerns. Refer to Figure 3. CAUTI Tiered Interventions for review as needed.

To Help Troubleshoot Barriers and Identify Next Steps, Use CAUTI Guide to Patient Safety Tool[39]

If your CAUTI rate remains elevated after auditing adherence to all the Tier 1 interventions that focus on standardizing products, procedures, and processes, then begin assessing gaps using the CAUTI Guide to Patient Safety (GPS).[iv] The GPS is a validated, brief troubleshooting tool hospitals can use to identify some key reasons why hospitals or units may not be successful in preventing CAUTIs. Based on the GPS results, work with a multidisciplinary team to develop next steps using the tips provided.

DEMONSTRATION OF CUSP CONCEPTS applied to this intervention:



Abbreviations: GPS = Guide to Patient Safety

[iv] This tool was developed by faculty and staff from the Department of Veterans Affairs and the University of Michigan using funding support from the Department of Veterans Affairs, the University of Michigan, and the National Institutes of Health (NIH). This tool was validated, and disseminated using funding support from the Agency for Healthcare Research and Quality (AHRQ), the Department of Veterans Affairs, and the University of Michigan.

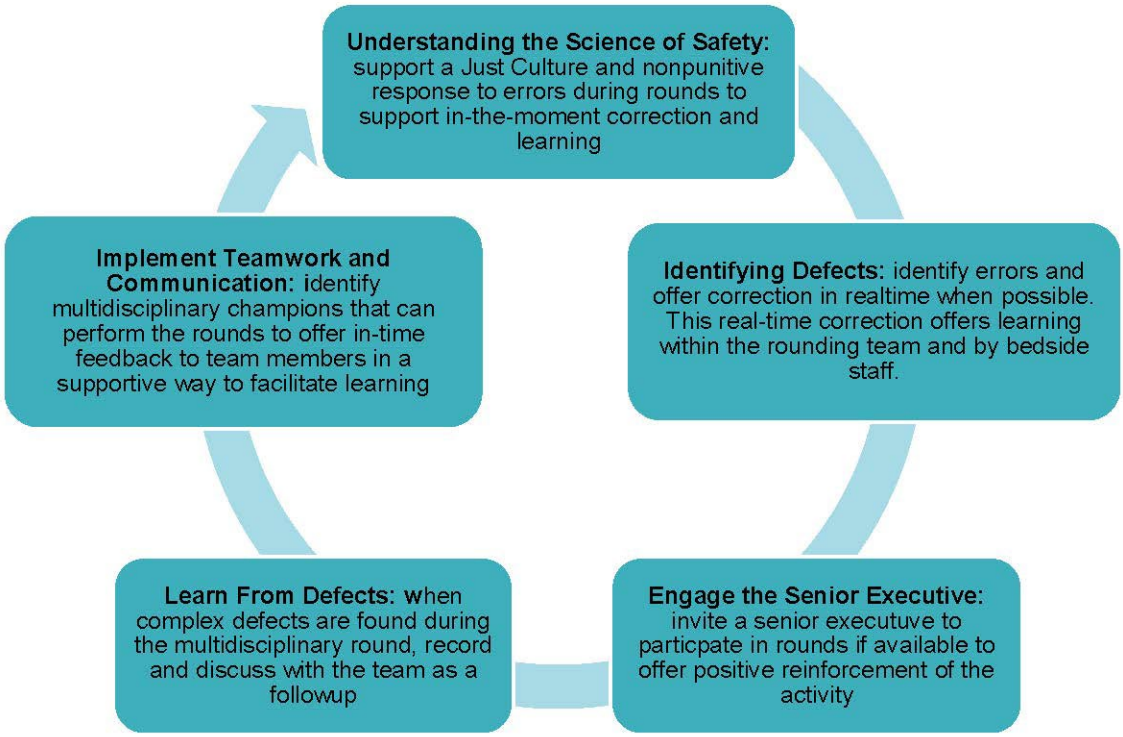
Conduct Catheter Rounds With Targeted Education To Optimize Appropriate Use

Routine catheter rounds can reduce urinary catheter device utilization and the risk for infection. Conduct routine—ideally daily—catheter rounds with a multidisciplinary team to assess the need for urinary catheter use, key aspects of maintenance, and staff understanding of best practice expectations. Since patients in the ICU often come from the ED or OR where the urinary catheter was inserted and cared for, include staff from these departments in catheter rounds. Also consider including the transport team, non-nursing units, and radiology to ensure consistent, appropriate maintenance and care practices are being followed.

STEPS TO PREPARE FOR AND CONDUCT ROUTINE CATHETER ROUNDS with a multidisciplinary team include:

- Identify key practices to observe or check during planned rounds and specific goal(s) of rounds. This will vary over time as barriers or needs are identified and may vary by ICU.
- Identify nurse experts to round and a nurse champion to lead the rounds. (Refer to Multidisciplinary Catheter Rounds section for suggested personnel.)
- Observe insertions, if the opportunity to observe an insertion occurs.
- Develop or adapt rounding checklist to record findings.
- Provide direct, constructive feedback to staff during rounds to educate, compliment, seek information, etc. per goals of rounds, and as opportunities arise.
- Aggregate findings from rounds and provide feedback to the ICU and individuals as appropriate.

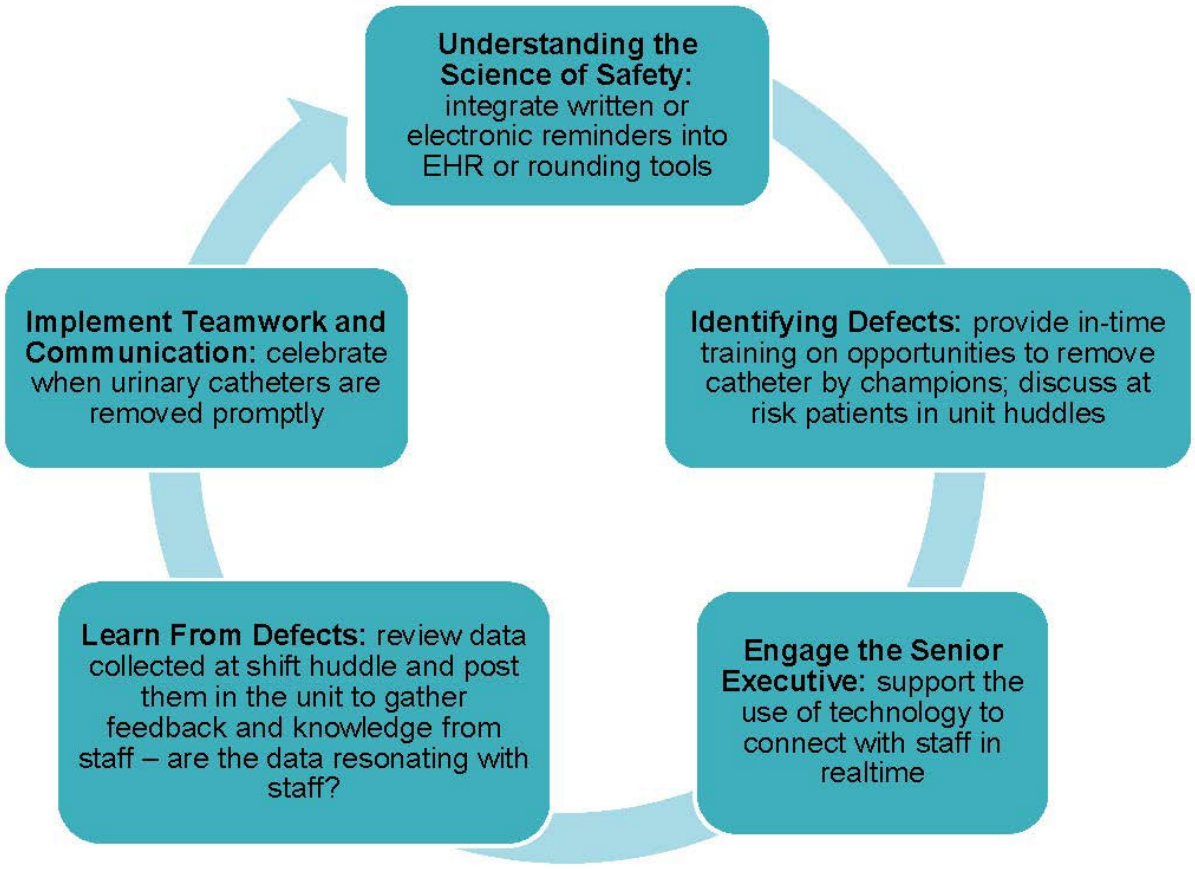
DEMONSTRATION OF CUSP CONCEPTS applied to this intervention:



Feed CAUTI and Indwelling Urinary Catheter Utilization Data Back to Frontline Staff in Realtime

Sharing data about CAUTI and IUC utilization back to frontline staff in real time can optimize appropriate use and care of IUCs. Additionally, this feedback encourages use of alternatives to catheters, which can greatly reduce the risk for infection and mitigate the risk of future CAUTIs. Strategies to feed data back to staff include but are not limited to multidisciplinary catheter rounds with real-time feedback, and an in-depth review of CAUTIs to identify contributing factors to the infection.

DEMONSTRATION OF CUSP CONCEPTS applied to this intervention:



Abbreviations: EHR = electronic health record

Observe and Document Competency of Catheter Insertion: Education and Observed Behavior

In order to support the Tier 1 intervention of ensuring proper aseptic insertion techniques, observing competency is a key to accomplish this intervention. Strategies to assess competencies include observing catheter insertion and incorporating education into new staff orientation and annual competency assessments. Another opportunity for just-in-time targeted education can be when conducting multidisciplinary catheter rounds.

Staff Onboarding

Educate new staff about their role and responsibilities regarding urinary catheters, and provide education and training on how they are expected to meet requirements.

Steps to prepare for and onboard staff include:

- Identify what an employee's role will be related to urinary catheters (insertion, maintenance, transport of patients with urinary catheters, etc.).
- Assure education and competency are offered to those with the responsibility of insertion.
- Educate employees on hospital policies, procedures, and expectations for performance.
- Assess knowledge through testing.[38]

Return Demonstration of Skills

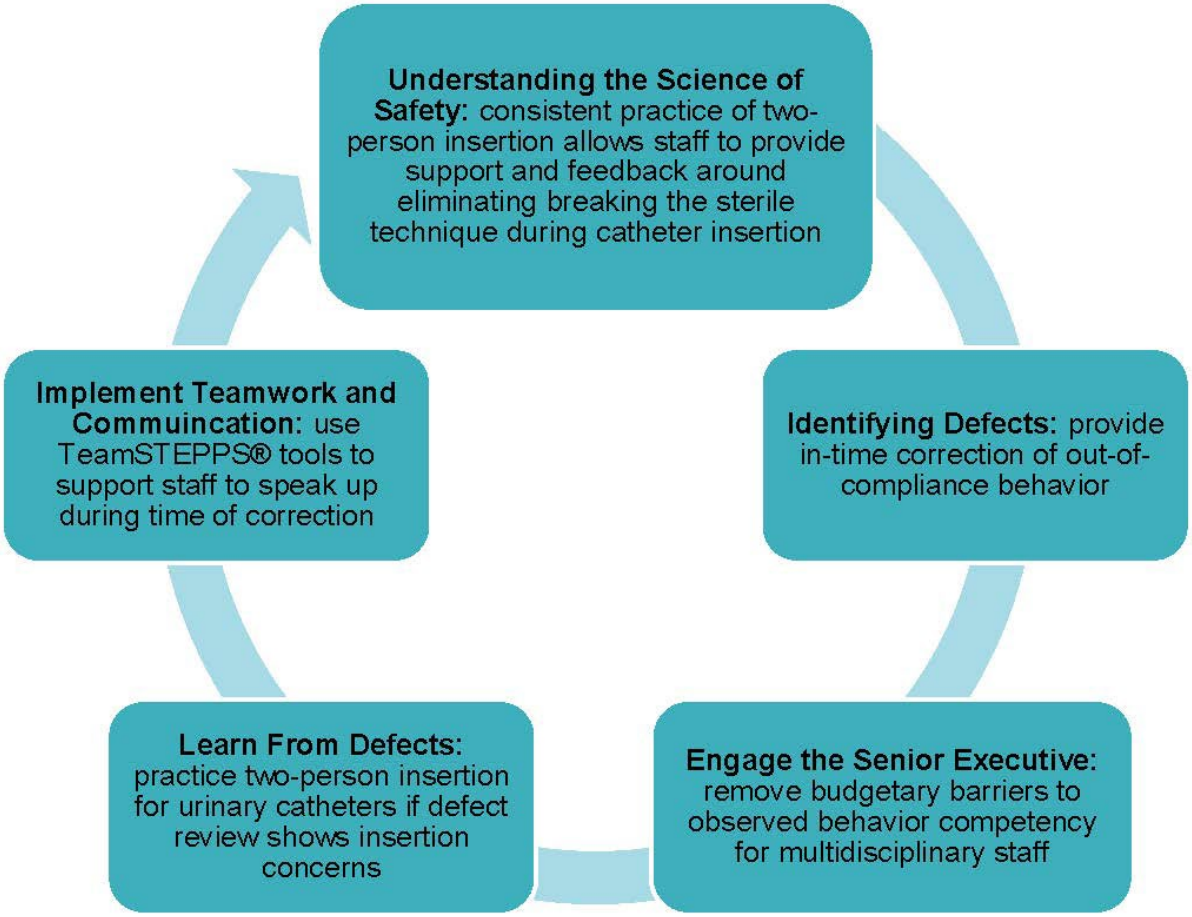
Develop a process to observe a return demonstration of expected skills of employee's role (e.g., urinary catheter insertions). This should be done upon hire, and then periodically thereafter to ensure no drift in practice has occurred. Specific skills for type of employee role should be included. For example, correct insertion technique for personnel who have that function within their scope of practice, such as nurses.

Steps to prepare for and execute skills testing with staff include:

- Identify how observations for each skill will be done. For catheter insertion, consider simulation lab experience, if available, or preceptorship on the nursing unit with a senior nurse for new hires, regardless of new hire experience (i.e., new grad nurse vs. nurse with previous work experience).
- Conduct periodic checks for ongoing competency thereafter through simulation, if available, and direct peer observation of technique. If two-person insertions are a required practice in your ICU, this can be accomplished through that process.

CAUTI Tier 2 Intervention: Catheter Insertion Competency (continued)

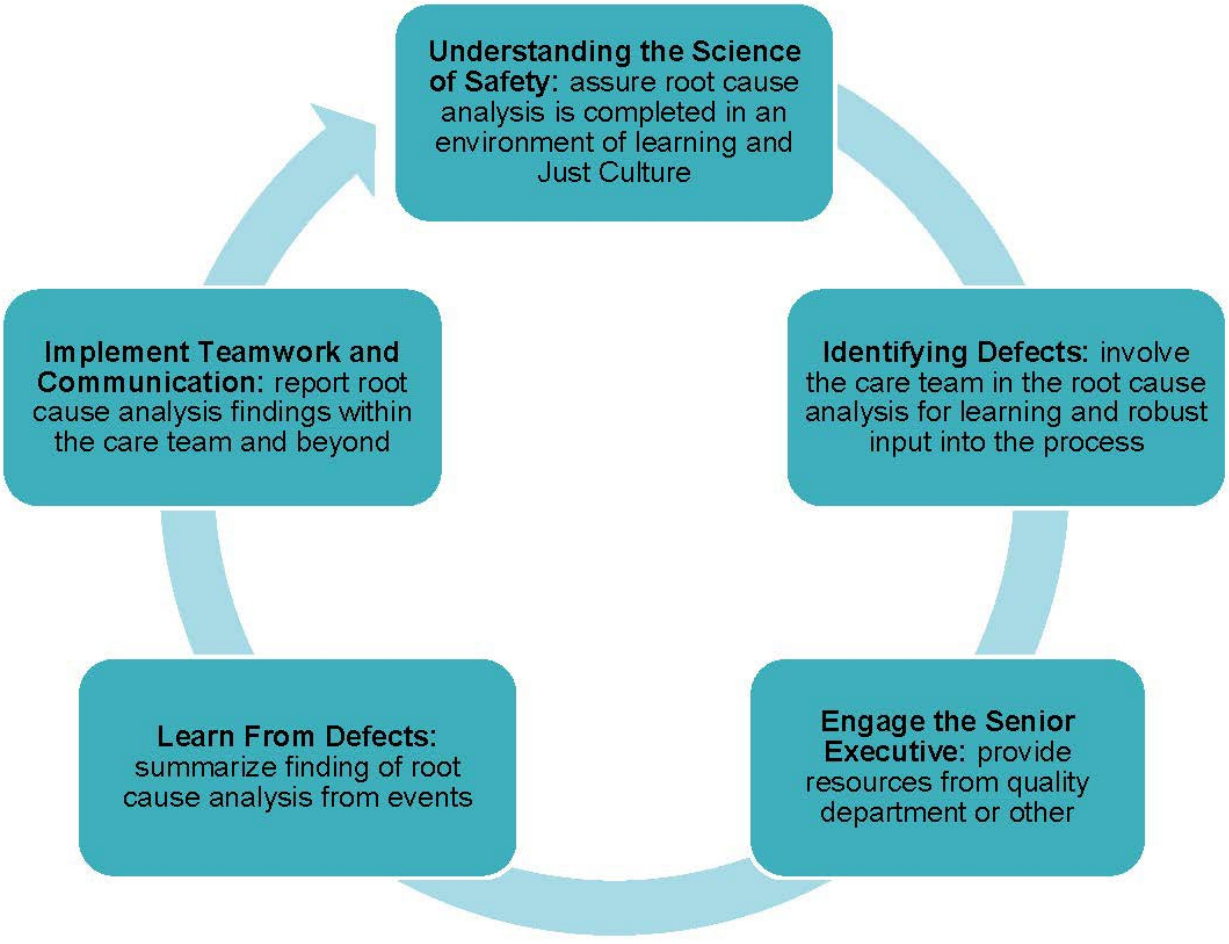
DEMONSTRATION OF CUSP CONCEPTS applied to this intervention:



Perform Full Root Cause Analysis or Focused Review of Infections

When an infection occurs, performing a full root cause analysis of the infection can provide learnings to the team. Assuring that a multidisciplinary team that provided care to the patient during the time of the onset of the infection is key to assure success of the review. Additionally, sharing the summary and learning from the review with all staff is key.

DEMONSTRATION OF CUSP CONCEPTS applied to this intervention:



CAUTI Resources

CAUTI Prevention Modules

These modules provide simple steps ICU teams can take to ensure the clinical and cultural changes that prevent CAUTI are sustained after the initial work is completed. The CAUTI Prevention modules provide information on how to disrupt the lifecycle of a catheter device using Tier 1 and Tier 2 interventions. There are six modules that follow the lifecycle of the catheter across the four stages of potential intervention: indication, insertion, maintenance, and removal. The CAUTI modules have two additional stages that are discussed in depth, alternatives to urinary catheters and urine culture stewardship. The modules are as follows and can be accessed for additional supports beyond this Playbook.

CAUTI Modules:

- Indwelling Urinary Catheters Indications
  - Avoiding placement and determining appropriateness
- Alternative to Indwelling Urinary Catheters
  - Review when alternatives to indwelling urinary catheters are appropriate in the ICU setting
- Indwelling Urinary Catheter Insertion Bundle
  - Ensuring aseptic placement
- Indwelling Urinary Catheter Maintenance
  - Maintaining awareness and proper care of catheters in place
- Prompting Removal of Unnecessary Indwelling Urinary Catheters
  - Review of clinical indications for use and strategies to improve prompt removal
- Urine Culturing Stewardship in the ICU Setting
  - Review situations in which urine cultures are appropriate or inappropriate

Complementary Tools

Guideline for Prevention of Catheter-Associated Urinary Tract Infections 2009 (Centers for Disease Control and Prevention [CDC]) summarizes CAUTI prevention practices to disrupt the lifecycle of the IUC.[27]

The Ann Arbor Criteria for Appropriate Urinary Catheter Use in Hospitalized Medical Patients: Results Obtained by Using the RAND/UCLA Appropriateness Method (American College of Physicians [ACP]) refines the CDC guidelines for appropriate catheter use.[28]

The ANA CAUTI Prevention Tool (American Nurses Association [ANA]) is an algorithm to make decisions on use of an IUC.[39]

Toolkit for Reducing CAUTI in Hospitals (AHRQ) can be used to teach team members how to apply CUSP to prevent CAUTI.[40]

Urinary Catheterization – Sample Policy gives guidance for urinary catheter use, insertion, maintenance, and removal to prevent CAUTIs.[41]

Intensive Care Unit Infographic Poster is a visual to post and use as a reminder on alternatives for measuring fluid intake and output and when to culture urine.[42]

The CAUTI module (Emergency Nurses Association) helps emergency nurses assess appropriateness of IUCs and provides strategies and tools to effect change.[43]

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This Playbook is located in the AHRQ Toolkit To Prevent CLABSI and CAUTI in Intensive Care Units at www.ahrq.gov/icuhai.

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