Indwelling Urinary Catheter Insertion

Ensuring Aseptic Placement

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Why Is Aseptic Insertion So Important?[1-3]

- 2020 National Healthcare Safety Network (NHSN) Urinary Catheter Utilization Report

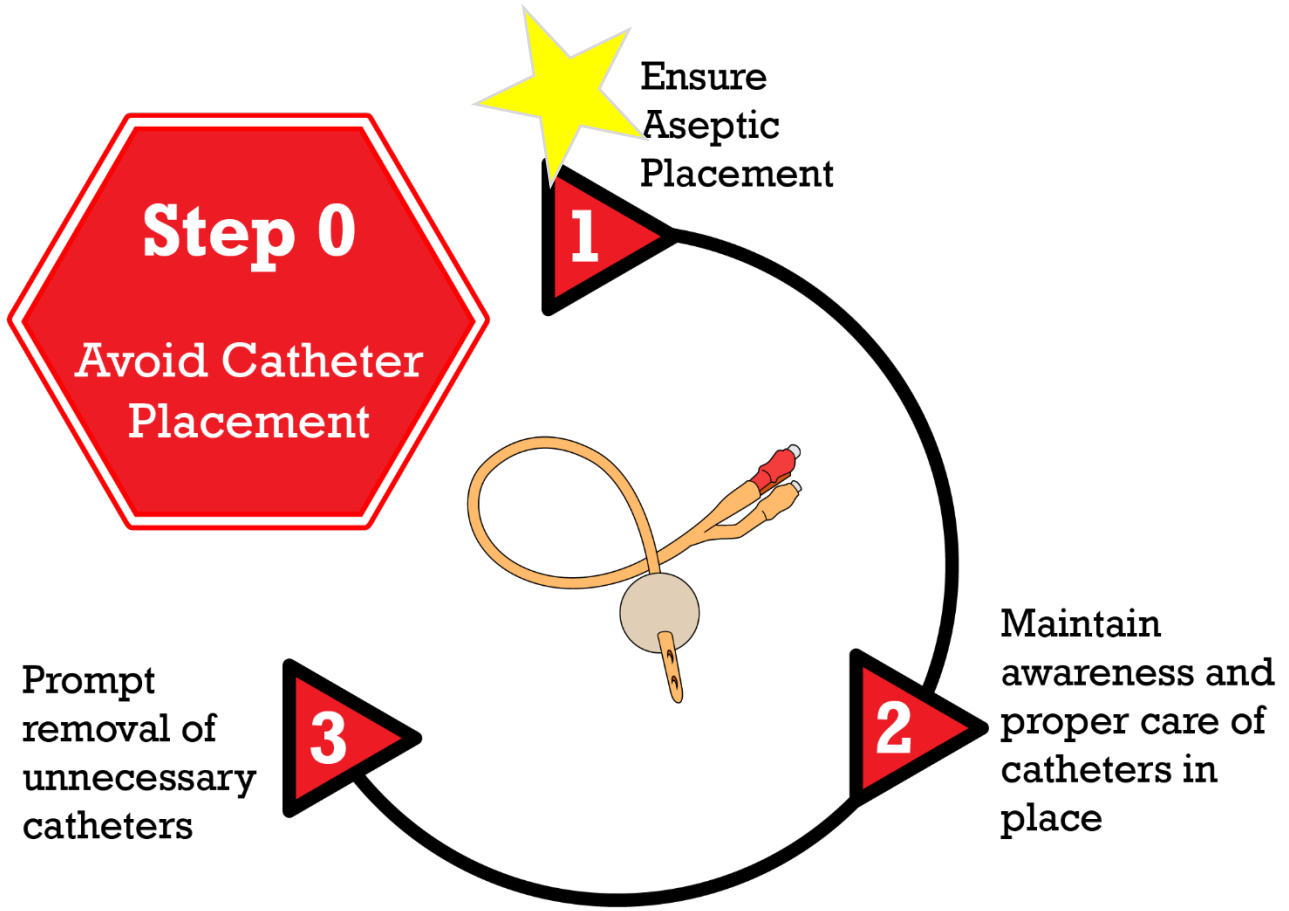
  Variation exists among States and facilities

  - Catheter-associated urinary tract infection (CAUTI) is costly and increases morbidity

- Guidelines have always recommended aseptic insertion of indwelling urinary catheters
  - Bacteria can enter the bladder during insertion

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

Disrupting the Lifecycle of a Urinary Catheter[4]



Patel PK, Gupta A, Vaughn VM, et al. Review of strategies to reduce central line-associated bloodstream infection (CLABSI) and catheter-associated urinary tract infection (CAUTI) in adult ICUs. J Hosp Med. 2018 Feb 1;13(2):105-16. Epub 2017 Nov 8. PMID: 29154382. Used with permission of Journal of Hospital Medicine.

CAUTI Tiers[5]

Tier 1: Standardize products, procedures, and bedside processes

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

Place indwelling urinary catheter only for appropriate reasons	Use alternatives to indwelling urinary catheters	Ensure proper aseptic insertion technique and maintenance procedures	Promptly remove unnecessary catheters	Urine culture stewardship: Culture only if symptoms of UTI are present

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 CAUTI GPS tool	Conduct catheter rounds with targeted education to optimize appropriate use	Feed CAUTI and indwelling urinary catheterization data back to frontline staff in real time	Observe and document competency of catheter insertion: Education and observed behavior	Perform full root-cause analysis or focused review of infections

Abbreviations: CAUTI = catheter-associated urinary tract infection; GPS = Guide to Patient Safety; UTI = urinary tract infection

These materials were expanded, enhanced, and adapted from tiered interventions implemented in cohorts 1 and 2 of AHRQ Safety Program for ICUs: Preventing CLABSI and CAUTI from materials developed for CAUTI prevention by faculty and staff at the Department of Veterans Affairs and the University of Michigan.

Components of the Indwelling Urinary Catheter Insertion Bundle[6,7]

1. Assess for the necessity of an indwelling urinary catheter
2. Encourage the use of alternatives
3. Use a standard indwelling urinary catheter kit
4. Ensure proper insertion technique

Use a Standard Indwelling Urinary Catheter Kit[8]

- Tier 1 interventions start with a standardized kit or cart
- Several different types of kits available
- Closed-system catheter insertion kits are recommended
- Supplies in each kit are organized by order of use
- Remove individual catheters from patient care units – except some specialty catheters that may be rarely used

Ensure Proper Insertion Technique[9]

- Aseptic insertion technique is recommended
- Many nurses and other clinicians have to relearn "proper" technique
  - Working environment does not resemble learning environment
- Checklists can often help assure that insertion is done aseptically
- Consider use of two-person insertion to maintain the sterile field

ANA Tool: Algorithm and Checklist[10]

Indwelling Urinary Catheter (IUC) Insertion Checklist to Prevent CAUTI in the Adult Hospitalized Patient: Important Evidence-Based Steps.	Yes	Yes with Reminder	Comments
Before IUC insertion:			
1) **Determine if IUC is appropriate per the CDC Guidelines** (CDC, 2009) (See page 1, Box 1).			
2) **Select smallest appropriate IUC** (14 Fr., 5ml or 10 ml balloon is usually appropriate unless ordered otherwise).			
3) **Obtain assistance PRN** (e.g., 2-person insertion, mechanical aids) **to facilitate appropriate visualization/insertion technique.**			
4) **Perform hand hygiene.**			
Patient Preparation/Insertion of IUC:			
1) **Perform peri-care**, then, **re-perform hand hygiene.**			
2) **Maintain strict aseptic technique throughout the actual IUC insertion procedure, re-perform hand hygiene upon completion.** • Use sterile gloves and equipment and establish/maintain sterile field. • Do not pre-inflate the balloon to test it, as this is not recommended.			
3) **Insert IUC to appropriate length and check urine flow before balloon inflation to prevent urethral trauma.** • In males, insert fully to the IUC "y" connection, or in females, advance ~1 inch or 2.5 cm beyond point of urine flow.			
4) **Inflate IUC balloon correctly**: Inflate to 10 ml for catheters labeled 5 ml or 10 ml per manufacturer's instructions.			

Another Type of Checklist

Procedural Steps	Yes	No	NA
Place patient in supine position			
Inspect the sterile catheterization kit and remove it from its outer packaging			
Open the inner paper wrapping to form a sterile field			
Form sterile field on bedside table or other flat surface but not patient bed			
With washed hands carefully retrieve the absorbent pad from the top of the kit			
Place absorbent pad beneath patient's buttocks, with plastic side down			
Don sterile gloves			
Cover patient's abdomen and superior pubic region with fenestrated drape			
Organize contents of the tray on the sterile field			
Pour antiseptic solution over the preparation swabs in the tray compartment			
Squeeze some sterile catheter lubricant onto the tray to lubricate the catheter tip			
Using gloved nondominant hand, identify the urethra by spreading labia majora and minora			
Use the thumb and index finger to spread the inner labia with gentle traction, pulling upward towards patient's head			
Nondominant hand is not removed from this position			
Use an expanding circular motion to clean the opening with remaining swabs			
Lubricate distal end of the catheter with the sterile jelly			
Holding the catheter in the dominant hand, gently introduce the catheter tip into meatus			
Slowly advance catheter through the urethra into the bladder			
If catheter is accidentally contaminated, it is discarded, and a new sterile catheter is obtained			
*If catheter is accidentally inserted into the vagina, it is left in place until a new sterile catheter is obtained and inserted correctly			
Once urine is observed in tubing, the catheter is advanced another 3-5 cm			
Balloon is inflated with entire contents of 10cc. syringe of sterile water only after urine is observed in tubing			

Strategies To Use With Checklists

Require oversight for catheter insertion by a licensed provider

If possible, when catheter insertion is necessary, use two people to maintain the sterile field.

Aseptic Insertion Essentials

- Set up a sterile field
- Perform hand hygiene immediately before and after insertion
- Use sterile gloves, drapes, sponges
- Use appropriate antiseptic or sterile solution for peri-urethral cleaning, and a single-use packet of lubricant jelly for catheter tip
- If catheter is accidentally contaminated, discard it and obtain a new sterile catheter

Major Breaks in Aseptic Insertion Technique[11]

Case study in an emergency department

Prospectively observed urinary catheter insertion attempts

- 81 observed insertion attempts
- Number of patients = 65
- Location: Emergency department (ED) of a level 1 trauma center
- Timeframe: 1/29 – 6/30

59% of the attempts had at least 1 major break in aseptic insertion technique

Categories and Frequencies of Major Breaks in Sterility[12,13]

Category	Frequency (%)	Examples
Contamination of sterile field	22 (27%)	• Nurse touched items on sterile field with bare nonsterile hands. • Stethoscope/garment/torso touched sterile field.
Contamination of the catheter	25 (31%)	• Patient's labia closed over the catheter during insertion and contaminated the catheter; nurse did not get a new one. • Catheter tip touched genitalia before being introduced into urethra.
Breach of sterile barrier	31 (38%)	• Sterile gloved hand used to swab genitalia (without tongs); same hand used to insert catheter. • Nurse inserting catheter ripped sterile gloves, did not get new ones.

Competency[14]

- Competency involves the "knowledge, skills, abilities, and behaviors to perform a task correctly and skillfully"
- Develop a process to observe a return demonstration of expected skills of employee's role (e.g., urinary catheter insertions)
- When to observe:
  - Upon hire
  - Periodically – this should be a minimum of annually, whenever new products or processes are introduced or when adverse outcomes may identify a performance gap
- Define specific skills for type of employee and their role in CAUTI prevention

Tier 2 Interventions

- 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.
- Targeted education can occur during multidisciplinary catheter rounds as opportunities are identified (sometimes referred to as “just-in-time education”)
- Consider combining CAUTI and CLABSI rounds

Barriers to Aseptic Insertion

- Supplies are not readily available
- Supplies are not designed to facilitate aseptic insertion
  - Wisps from cotton balls tend to cling to tongs in some kits
- Work space is not aligned with workflow
  - Inconsistent or inconvenient locations for hand gel
  - Inconvenient location of sinks
  - Little room to set up sterile field

Strategies To Overcome Barriers

Ensure availability of standard catheter insertion kits as well as special kits designed specifically for the population (e.g., pediatric kits in emergency department or surgical services)

- Other necessary supplies
  - Over-the-bed tables
  - Hand sanitizers
  - Sterile gloves
- Adequate facilities for hand hygiene
- Accessibility/location of kits
  - Where are kits located in relation to where the procedure is to take place?

One More Strategy: Mindfulness[15]

Mindfulness in catheter insertion:

- Mindfulness is the process of carefully assessing the task at hand. There can be potential harm involved when an invasive device is inserted, and a mindful approach can be used to help prevent that harm.
- Urinary catheterization is often seen as a task. However, the inserter needs to be mindful that any invasive device can cause harm.
- Consider multiple steps in the insertion process, as something can go wrong at any point in the process

Take-Home Points

- Use judgement and critical thinking
- Consider a change in practice
- Delay catheter insertion
- Use checklists and mindfulness

References

1. Saint S, Greene MT, Krein SL, et al. A program to prevent catheter-associated urinary tract infection in acute care. New Engl J Med. 2016;374(22):2111-9. PMID: 27248619.
2. Centers for Disease Control and Prevention. 2019 National and State Healthcare-Associated Infections Progress Report. https://www.cdc.gov/hai/data/portal/progress-report.html. Accessed on October 11, 2021.
3. Fakih MG, Bufalino A, Sturm L, et al. Coronavirus disease 2019 (COVID-19) pandemic, central-line-associated bloodstream infection (CLABSI), and catheter-associated urinary tract infection (CAUTI): The urgent need to refocus on hardwiring prevention efforts Infect Control Hosp Epidemiol. 2021;1-6. doi:10.1017/ice.2021.70. PMID: 33602361.
4. Meddings J, Saint S. Disrupting the life cycle of the urinary catheter. Clin Infect Dis. 2011 Jun;52(11):1291-3. PMID: 21596672.
5. Meddings J, Manojlovich M, Fowler KE, et al. A tiered approach for preventing cather-associated urinary tract infections. Ann Intern Med. 2019 Oct 1;171(7_Supple):S30-S37. PMID: 31569226.
6. Patel PK, Gupta A, Vaughn VM, et al. Review of strategies to reduce central line-associated bloodstream infection (CLABSI) and catheter-associated urinary tract infection (CAUTI) in adult ICUs. J Hosp Med. 2018 Feb 1;13(2):105-16. Epub 2017 Nov 8. PMID: 29154382.
7. Centers for Disease Control and Prevention. Catheter-Associated Urinary Tract Infections (CAUTI). https://www.cdc.gov/HAI/ca_uti/uti.html. Accessed October 11, 2021.
8. Agency for Healthcare Research and Quality. Appendix G. Indwelling Urinary Catheter Insertion Checklist. https://www.ahrq.gov/hai/quality/tools/cauti-ltc/modules/resources/tools/prevent/insertion-checklist.html. Accessed on October 11, 2021.
9. Fletcher-Gutowski S, Cecil J. Is 2-person urinary catheter insertion effective in reducing CAUTI? Am J Infect Control. 2019;47(12):1508-9. PMID: 31324489.
10. American Nurses Association. Streamlined Evidence-Based RN Tool: Catheter Associated Urinary Tract Infection (CAUTI) Prevention. https://www.nursingworld.org/~4aede8/globalassets/practiceandpolicy/innovation--evidence/clinical-practice-material/cauti-prevention-tool/anacautipreventiontool-final-19dec2014.pdf. Accessed October 1, 2021.
11. Manojlovich M, Saint S, Meddings J, et al. Indwelling urinary catheter insertion practices in the emergency department: an observational study. Infect Control Hosp Epidemiol. 2016;37(1):117-9. PMID: 26434781.
12. Lo E, Nicolle L, Coffin S, et al. Strategies to prevent catheter-associated urinary tract infections in acute care hospitals: 2014 update. Infect Control Hosp Epidemiol. 2014 May;35(5):464-79. doi: 10.1086/675718. PMID: 24709715.
13. Carter EJ, Pallin DJ, Mandel L, et al. Emergency department catheter-associated urinary tract infection prevention: multisite qualitative study of perceived risks and implemented strategies. Infect Control Hosp Epidemiol. 2016 Feb;37(2):56-62. PMID: 26526870.
14. Davila S, Cook M, Manojlovich M. Competency-Based Training for Infection Prevention. Health Research & Educational Trust and U.S. Centers for Disease Control and Prevention. https://www.cdc.gov/infectioncontrol/pdf/strive/CBT101-508.pdf. Accessed February 7, 2022.
15. Kiyoshi-Teo H, Krein S, Saint S. Applying mindful evidence-based practice at the bedside: using catheter-associated urinary tract infection as a model. Infect Control Hosp Epidemiol. 2013 Oct;34(10):1099-1101. doi: 10.1086/673147. PMID: 24018928.