

Catheter-Associated Urinary Tract Infection Prevention

Last updated 2019

Basics of Infection Prevention
Healthcare-Associated Infections Program
Center for Health Care Quality
California Department of Public Health



Objectives

- Define the scope of healthcare-associated urinary tract infections (UTI)
- Review evidence-based clinical practices shown to prevent catheter-associated urinary tract infections (CAUTI)
- Discuss strategies to reduce CAUTI within healthcare settings
- Discuss adherence monitoring and feedback

UTI in Hospitals

- Virtually all hospital associated UTI are caused by instrumentation of the urinary tract
- Commonly leads to secondary bloodstream infection
- 10% mortality rate
- Increases length of stay by 2-4 days
- Results in antimicrobial overuse and antimicrobial resistance

[IHI Catheter-Associated Urinary Tract Infection](http://www.ihl.org/topics/CAUTI/Pages/default.aspx)

(<http://www.ihl.org/topics/CAUTI/Pages/default.aspx>)

Urinary Catheter Use

- Use of indwelling urinary catheters high
 - 12-16% of inpatient adults
 - Medical surgical unit: 10-30% patients
 - ICU: 60-90% patients
 - Nursing home: 7-10% residents
- 40-50% patients with a urinary catheter in hospital non-ICU ward do not have a valid indication for placement
- Physicians frequently unaware of use

[NHSN Patient Safety Manual, Chapter 7, UTI CDC: Catheter Associated UTI](https://www.cdc.gov/hai/ca_uti/uti.html)
(https://www.cdc.gov/hai/ca_uti/uti.html)

Indwelling Catheter Duration

- Risk of CAUTI increases each day the urinary catheter remains
- Risk of bacteriuria with catheterization
 - Daily: 3% - 10%
 - By day 30: 100%

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CAUTI Etiology

- Source:
 - Patient's colonic or perineal flora
 - Bacteria on hands of personnel
- Microbes enter bladder via one of two routes:
 - Extraluminal: the external surface
 - Intraluminal: inside the catheter

Maki D & Tambyah P. Engineering out risk of Infection with urinary catheters. *Emerg Infect Dis*, 2001

Common CAUTI Pathogens

- *Escherichia coli* 24%
- *Pseudomonas aeruginosa* 10%
- *Klebsiella pneumoniae/oxytoca* 10%
- *Enterococcus faecalis* 7%

[NHSN Antimicrobial Resistance Report: Distribution of all Pathogens Reported by HAI Type, Appendix to Table 4, 2011-2014](https://www.cdc.gov/nhsn/xls/reportdatatables/2014-appendix-pathogens.xlsx)

(<https://www.cdc.gov/nhsn/xls/reportdatatables/2014-appendix-pathogens.xlsx>)

CAUTI Prevention

- **69%** CAUTI can be prevented with currently recommended infection prevention practices
- National 2020 CAUTI 5-year prevention goal: **25% decrease** from 2015 baseline
 - CDPH HAI Advisory Committee recommended adoption of national goal for California hospitals

CAUTI Prevention – What works?

Best sources for **evidence-based CAUTI prevention practice** recommendations

- **CDC/HICPAC CAUTI Prevention Guideline, 2009**
- **SHEA/IDSA Strategies to Prevent Catheter-Associated Urinary Tract Infections in Acute Care Hospitals, 2014**

CAUTI Prevention Practices

- Insert catheters only for appropriate indications
- Leave in place only as long as needed
- Ensure only properly trained persons insert and maintain
- Perform hand hygiene
- Use aseptic technique and sterile equipment for insertion
- Maintain closed drainage system and unobstructed urine flow
- Implement improvement program to achieve appropriate use of catheters

Appropriate Indications for Indwelling Ureteral Catheters

- Acute urinary retention or obstruction
- Need for accurate measurement of urinary output (ICU)
- Post operative use for selected (not all) surgical procedures
- Assist healing of perineal and sacral wounds in incontinent patients
- Prolonged immobilization due to unstable spine or pelvic fracture
- Hospice (end of life), comfort care, palliative care

Leave Indwelling Catheter in Place Only as Long as Needed

- Implement a process to assess daily the need for the indwelling urinary catheter
 - Physician reminders
 - Electronic medical record prompts
- Consider alternatives to indwelling urinary catheter
 - External catheters
 - Intermittent catheterization

Ensure Only Properly Trained Persons Insert and Maintain Indwelling Urinary Catheters

- Train HCW, family members, or the patient (if appropriate)
 - Correct technique of aseptic catheter insertion
 - Maintenance of the catheter
- Train HCW upon hire and at least annually
- Make return demonstration part of the training to ensure competency

Perform Hand Hygiene

Perform hand hygiene:

- Immediately before and after catheter insertion
- Immediately before and after any catheter manipulation
 - Repositioning the catheter tubing or bag
 - Obtaining a specimen

Use Aseptic Technique and Sterile Equipment for Insertion of Indwelling Urinary Catheter

- Perform hand hygiene before and after procedure
- Ensure the following are used during insertion
 - Sterile gloves, drape, and sponges
 - Appropriate antiseptic or sterile solution for peri-urethral cleaning
 - A single use packet of lubricant jelly for insertion

Maintain Closed Drainage System and Unobstructed Urine Flow

A closed system prevents contamination and possible pathogens from entering the bladder

- Replace the catheter and collection system if breaks in aseptic technique during insertion, or disconnection, or leakage occurs
- Use urinary catheter systems with pre-connected, sealed catheter-tubing junctions
- Keep the catheter tubing below the bladder and free from kinking

CAUTI Prevention Bundle Examples

Insertion Bundle

- Verify need prior to insertion
- Insert urinary catheter using aseptic technique.
- Maintain urinary catheter based on recommended guidelines

Maintenance Bundle

- Daily assessment of catheter need documented
- Tamper evident seal is intact
- Catheter secured to patient
- Hand hygiene performed before patient contact
- Daily meatal hygiene with soap and water
- Drainage bag emptied using a clean container
- Unobstructed flow maintained

[APIC Preventing CAUTI, Patient-centered Approach, 2012](#)

(https://apic.org/Resource_/TinyMceFileManager/epublications/CAUTI_feature_PS_fall_12.pdf)

Not Recommended

No evidence to support UTI prevention

- X Complex urinary drainage systems
- X Routinely changing catheters or drainage bags
- X Routine antimicrobial prophylaxis
- X Cleaning the periurethral area with antiseptics
- X Antimicrobial irrigation of the bladder
- X Antiseptic / antimicrobial solution instillation into drainage bags
- X Routine screening for asymptomatic bacteriuria

Additional CAUTI Prevention Practices

Use when adherence to practices is high, but CAUTI still occur

- Consider alternatives to indwelling urinary catheters
- Use portable ultrasound devices to assess urinary retention, reduce unnecessary catheterizations
- Consider antimicrobial/antiseptic impregnated catheters

Hospital Role in CAUTI Prevention

- Ensure policies and practice reflect current evidence based recommendations
 - CDC guidelines
 - Ensure staff competency upon hire and at least annually
 - New hire orientation
 - Annual skills fair
 - Return demonstration to ensure competency
 - Establish an adherence monitoring program for core care practices
 - Use tools to measure adherence
 - Perform UTI surveillance
 - Provide feedback to frontline staff and leaders
 - Present adherence results with CAUTI incidence to each unit
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Infection (Outcome) Measure

Measure infections:

- Perform UTI surveillance using standardized definitions and protocols
- Bacteria in urine alone is not an infection
 - Must evaluate for other UTI symptoms or have supporting laboratory data

NHSN Patient Safety Module: Chapter 7 Device-Associated Module, CAUTI

Adherence (Process) Measures

Measure catheter use:

- The number of urinary catheter days/the number of predicted urinary catheter days = Standardize Utilization Ratio (SUR)*

Measure health care provider adherence:

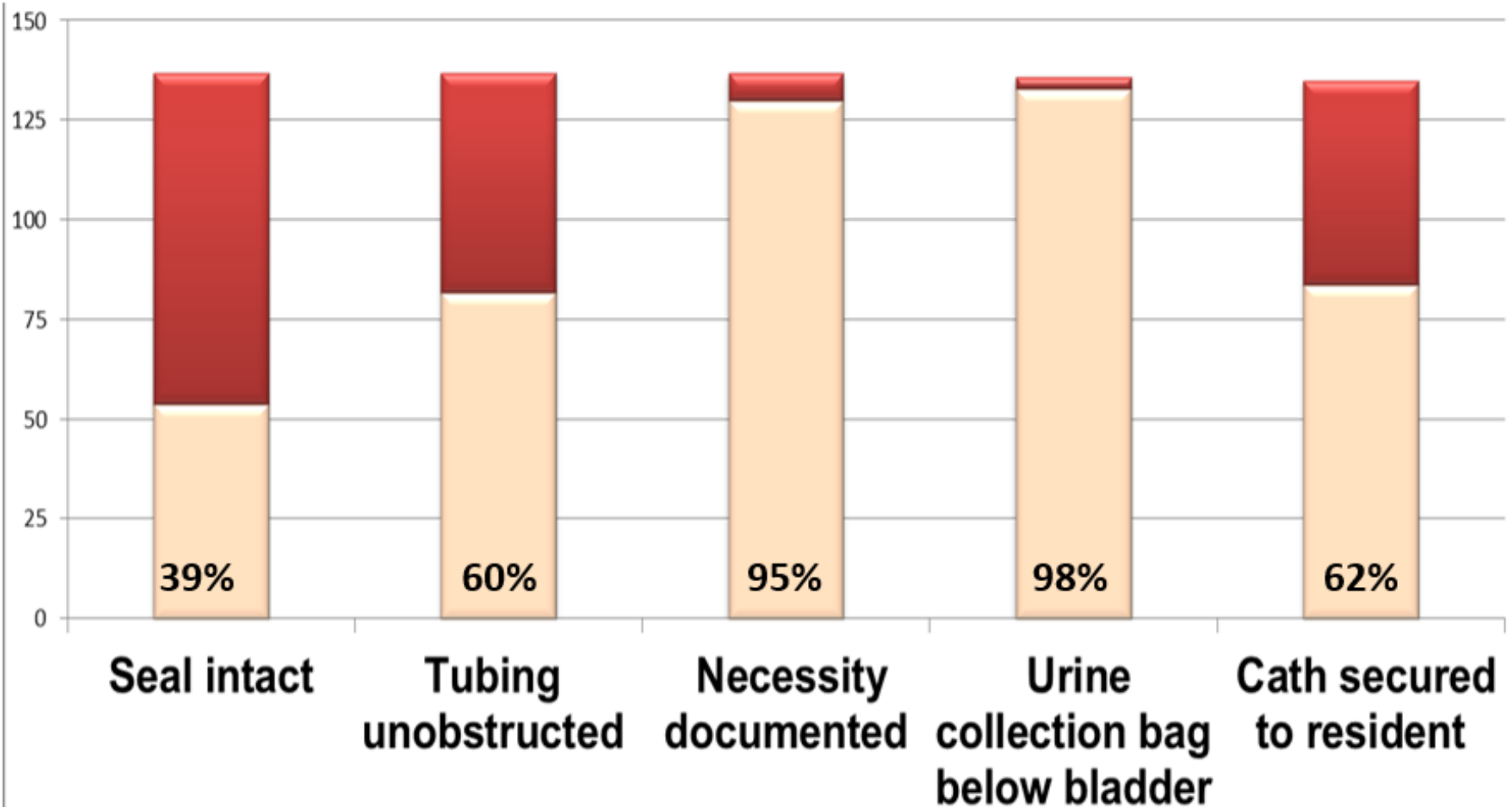
- Hand hygiene
- Documentation of catheter insertion and removal
- Daily assessment of indwelling urinary catheter
- Documentation of indications for use

* Further explanation in the Introduction to NHSN presentation

Adherence Monitoring Tool - UTI Prevention

CAUTI Prevention Opportunity	Patient/ Resident 1		Patient/ Resident 2		Adherence by Task	
	# Yes	# Obs	# Yes	# Obs	# Yes	# Obs
Seal between catheter and collecting tubing is intact.	Yes	No	Yes	No		
Catheter tubing unobstructed- not twisted, kinked, or looped.	Yes	No	Yes	No		
Documentation of indwelling catheter necessity – and it is appropriate.	Yes	No	Yes	No		
The urine collection bag is below the level of the bladder.	Yes	No	Yes	No		
The catheter is secured to the patient/resident.	Yes	No	Yes	No		
#Yes _____ #Observed _____ #Yes/ # Observed = % Adherence _____%						

CDPH CAUTI Observations, 131 Facilities, 2016



Preventing CAUTI: The MOST Important Things

Prevent Catheter Associated UTI - Avoid Antibiotics

- Insert catheters only for appropriate indications
- Leave in place only as long as needed
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- Maintain closed drainage system and unobstructed urine flow
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Summary

- CAUTI can lead to bloodstream infections
- Adherence monitoring to evidence based care practices will reduce CAUTI incidence
- Feedback CAUTI incidence and adherence monitoring results to staff will improve outcomes

Additional CAUTI Prevention References and Resources

- [APIC Preventing CAUTI: A patient-centered approach, 2012](http://apic.org/Resource_/TinyMceFileManager/epublications/CAUTI_feature_PS_fall_12.pdf) (PDF)
(http://apic.org/Resource_/TinyMceFileManager/epublications/CAUTI_feature_PS_fall_12.pdf)
- [APIC Guide to the Elimination of CAUTI, 2008](https://www.apic.org/Resource_/EliminationGuideForm/c0790db8-2aca-4179-a7ae-676c27592de2/File/APIC-CAUTI-Guide.pdf) (PDF)
(https://www.apic.org/Resource_/EliminationGuideForm/c0790db8-2aca-4179-a7ae-676c27592de2/File/APIC-CAUTI-Guide.pdf)
- [Gould CV, Umscheid CA, Agarwal RK, Kuntz G, Pegues DA, and HICPAC. Guideline for Prevention of Catheter-associated Urinary Tract Infections, 2009](http://www.cdc.gov/hicpac/pdf/CAUTI/CAUTIguideline2009final.pdf) (PDF)
(<http://www.cdc.gov/hicpac/pdf/CAUTI/CAUTIguideline2009final.pdf>)
- [IHI Program to Prevent CAUTI](http://www.ihl.org/topics/CAUTI/Pages/default.aspx)
(<http://www.ihl.org/topics/CAUTI/Pages/default.aspx>)
- [SHEA/IDSA Compendium, ICHE, 35:464-479, 2014](https://www.shea-online.org/index.php/practice-resources/priority-topics/compendium-of-strategies-to-prevent-hais)
(<https://www.shea-online.org/index.php/practice-resources/priority-topics/compendium-of-strategies-to-prevent-hais>)

Questions?

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