

Catheter-Associated Urinary Tract Infection Prevention

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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

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**

UTI in Hospitals

- 80% UTI are catheter-associated (CAUTI)
- Leading cause of secondary bloodstream infection (BSI)
- 10% mortality rate (13,000 attributable deaths annually)
- Increases length of stay by 2-4 days
- Results in antimicrobial overuse and antimicrobial resistance

Urinary Catheter Use

- Use of indwelling urinary catheters high
 - 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

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%

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

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>

CAUTI Prevention

- **69%** CAUTI can be prevented with currently recommended infection prevention practices
 - 380,000 infections prevented annually (~40,000
 - 9,000 lives saved
- National 2020 CAUTI 5-year prevention goal:
25% decrease from 2015 baseline
 - CDPH HAI Advisory Committee recommended adoption of national goal for California hospitals

HAI Prevention Practice Terms

Core / Basic Care Practices

- **Standard of practice**
- Based on higher levels of scientific evidence
- Demonstrated feasibility
- **Effectiveness depends on consistency**

Special Approaches

- Used **in addition to** **Core/Basic** care practices when HAI rates remain high or during outbreaks
- Based on some scientific evidence
- May not be feasible in all settings

Core/Basic CAUTI Prevention Strategies

- 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 HCP, family members, or the patient (if appropriate)
 - Correct technique of aseptic catheter insertion
 - Maintenance of the catheter
- Train HCP 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 periurethral 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

CAUTI Prevention Special Approaches

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

**Special Approaches will not be effective
unless core/basic care practices are used routinely**

UTI Prevention Process Measures

Measure catheter use:

- Days with Foley catheter ÷ Patient days (x 100) = __%

Measure health care provider adherence:

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

UTI Prevention 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

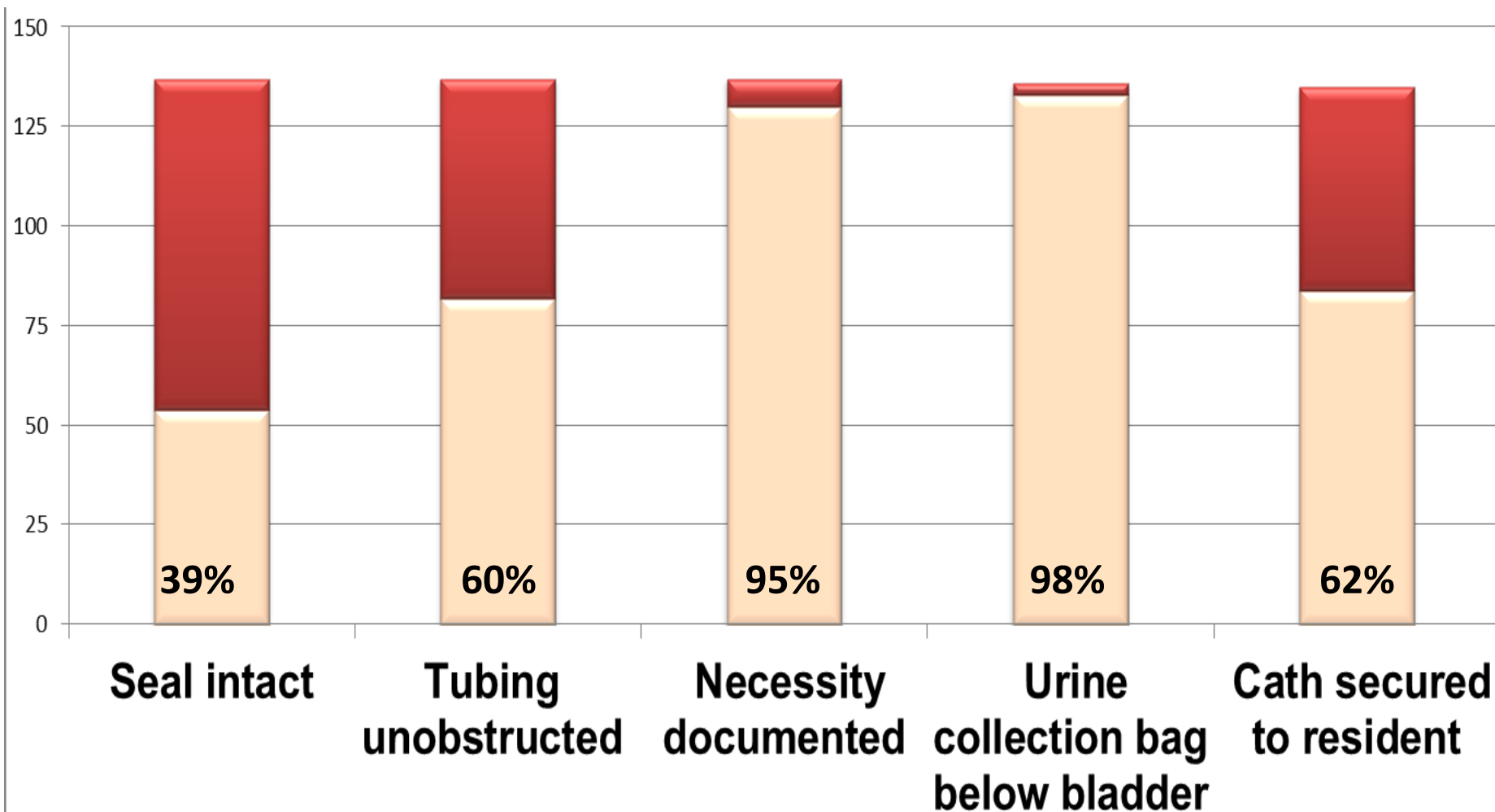
Adherence Monitoring Tool - UTI Prevention

CAUTI Prevention Opportunity	Patient/ Resident 1		Patient/ Resident 2		Adherence by Task	
					# 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 _____%						

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

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
- ☐ 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

Additional CAUTI Prevention References and Resources

- APIC Preventing CAUTI: A patient-centered approach ,2012,
[http://apic.org/Resource_/TinyMceFileManager/epublications/CAUTI feature P S fall 12.pdf](http://apic.org/Resource_/TinyMceFileManager/epublications/CAUTI_feature_P_S_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
- 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>
- IHI Program to Prevent CAUTI
<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>

Questions?

For more information,
please contact any
HAI Liaison IP Team member

Or email

HAIProgram@cdph.ca.gov