Catheter-Associated Urinary Tract Infection Prevention

Last updated 2015

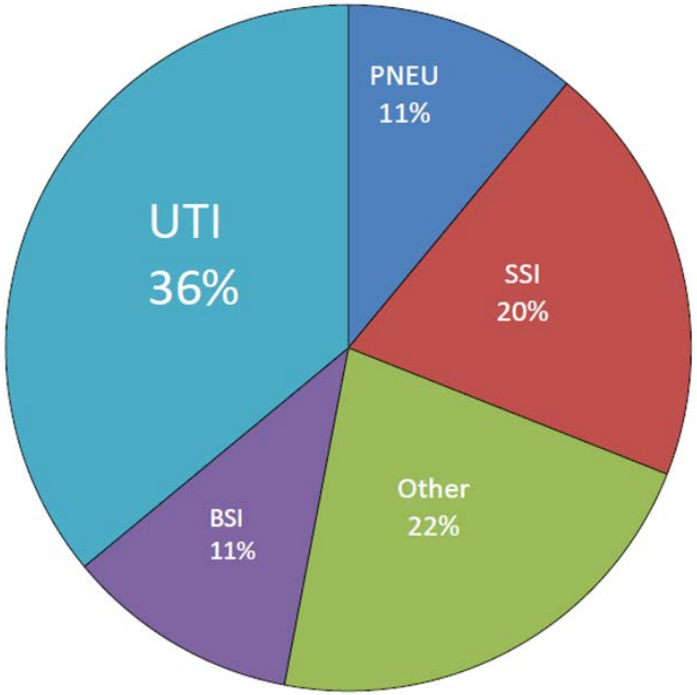
Basics of Infection Prevention
Healthcare-Associated Infections Program
Center for Health Care Quality
California Department of Public Health

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
- Review CAUTI surveillance definitions

UTI Epidemiology

- Accounts for >30% of all HAI reported to NHSN by hospitals
- 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



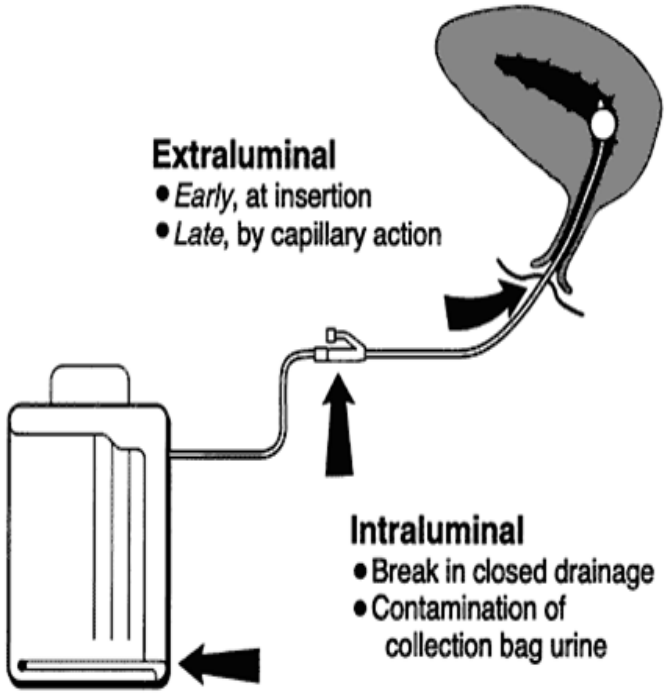
Gould C., Catheter-Associated Urinary Tract Infection (CAUTI) Toolkit, CDC
Source: APIC Guide to the Elimination of CAUTI (2008)

Urinary Catheter Use

- Medical surgical unit: 10-30%
- ICU: 60-90%
- Nursing home: 5-10%
- 40-50% of catheters on non-ICU hospital wards do not have a valid indication for use
- Physicians frequently unaware of use
  - In recent study, >50% did not know which patients were catheterized
  - 75% did not know duration of use or discontinuation

CAUTI Etiology

- Source:
  - Patient's colonic or perineal flora
  - Bacteria on hands of personnel
- Microbes enter bladder via one of two routes:
  - Extraluminal: around the external surface
  - Intraluminal: inside the catheter
- Risk of bacteriuria with catheterization
  - Daily: 3% - 10%
  - By day 30: 100%



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

Pathogens Associated with CAUTI

• *E. coli*	26%
• Enterococci	16%
• *P. aeruginosa*	12%
• Candida species	9%
• *K. pneumoniae*	6%
• Enterobacter species	6%

Gould C., Catheter-Associated Urinary Tract infection (CAUTI) Toolkit, CDC

Historical Perspective

What we did

- IP typically
  - Reviewed CDC guidelines on prevention of UTI
  - Educated staff, mainly nursing, on the guidelines
  - Performed surveillance of UTI
  - Reported findings to Infection Control and Executive Committees
  - Reported our “success” to The Joint Commission

Historical Perspective - 2

And What Happened

- Many thousands of patients developed hospital-acquired UTIs per year
- 80% were urinary catheter-associated
- Approximately half of the patients with a urinary catheter did not have a valid indication for placement
- Each day the urinary catheter remained, the risk of CAUTI increased 5%

Gould C., Catheter-Associated Urinary Tract infection (CAUTI) Toolkit, CDC

Current Perspective on HAI Prevention

- Consumer awareness of the impact of HAI
- Costs of healthcare
- Population with decreased access to medical care
- Demand for accountability by regulatory agencies, advocacy groups, and legislative mandates
- Infection PREVENTION has become **a clear mandate**

It takes a village
(or at least a health care team)
to prevent HAI

New Tenets of Infection Prevention

IP **expected** to

- Review the evidence-based (CDC) guidelines
- Evaluate **your** facility's adoption of recommended practices
  - What is actually going on versus what is recommended?
  - Collect data to understand current practice
- Implement recommended practices
  - Educate staff --- ALL healthcare stakeholders
  - Change patient care practices where necessary
- Educate patients regarding infection risks and their role in prevention

New Tenets of Infection Prevention - 2

- Perform standardized surveillance for infections
  - Understand the current state
  - Set prevention target (% reduction goal or elimination)
  - **Monitor progress** in reducing infections
- Monitor compliance until the prevention target has been reached
  - Feedback observational data to all stakeholders
- Monitor process measures periodically to ensure sustainability of prevention target outcome measures

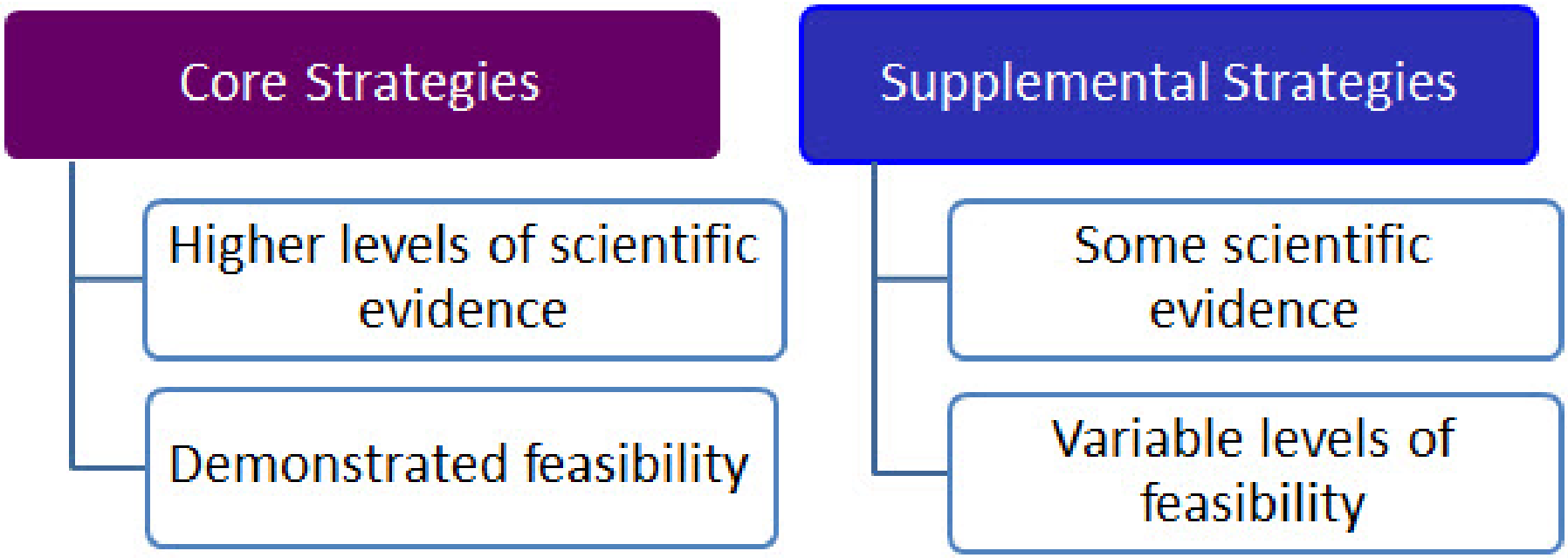
CAUTI Prevention

- With currently recommended infection prevention practices, estimated up to **69%** CAUTI can be prevented
  - 380,000 infections prevented annually
  - 9,000 lives saved
- National CAUTI 5-year prevention goal:
  - 25% decrease from 2009 baseline

CDC 2009 CAUTI Guideline: (www.cdc.gov/hicpac/pdf/CAUTI/CAUTIguideline2009final.pdf)

HHS Agency HAI: Priority Goal: (www.health.gov/hai/pdfs/2012-hai-progress-meeting-hhs-agency-priority-goals.pdf)

CAUTI Prevention Strategies



- Standard practice
- Implement in addition to Core when infections persist or rates are high

CAUTI Core Prevention Strategies

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

CDC 2009 CAUTI Guideline:
(www.cdc.gov/hicpac/pdf/CAUTI/CAUTIguideline2009final.pdf)

CAUTI Supplemental Prevention Strategies

- Alternatives to indwelling urinary catheters
- Portable ultrasound devices to assess urinary retention, reduce unnecessary catheterizations
- Antimicrobial/antiseptic impregnated catheters

CDC 2009 CAUTI Guideline:
(www.cdc.gov/hicpac/pdf/CAUTI/CAUTIguideline2009final.pdf)

Use Indwelling Urinary Catheters for Appropriate Indications

- Acute urinary retention or obstruction
- Peri-operative use in selected surgeries
- Assist healing of perineal and sacral wounds in incontinent patients
- Hospice, comfort care, palliative care
- Required immobilization for trauma or surgery
- Chronic indwelling urinary catheter on admission
- Accurate measurement of urinary output in critically ill patients (intensive care)

CDC 2009 CAUTI Guideline:
(www.cdc.gov/hicpac/pdf/CAUTI/CAUTIguideline2009final.pdf

CAUTI Insertion Bundle

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

CAUTI Maintenance Bundle

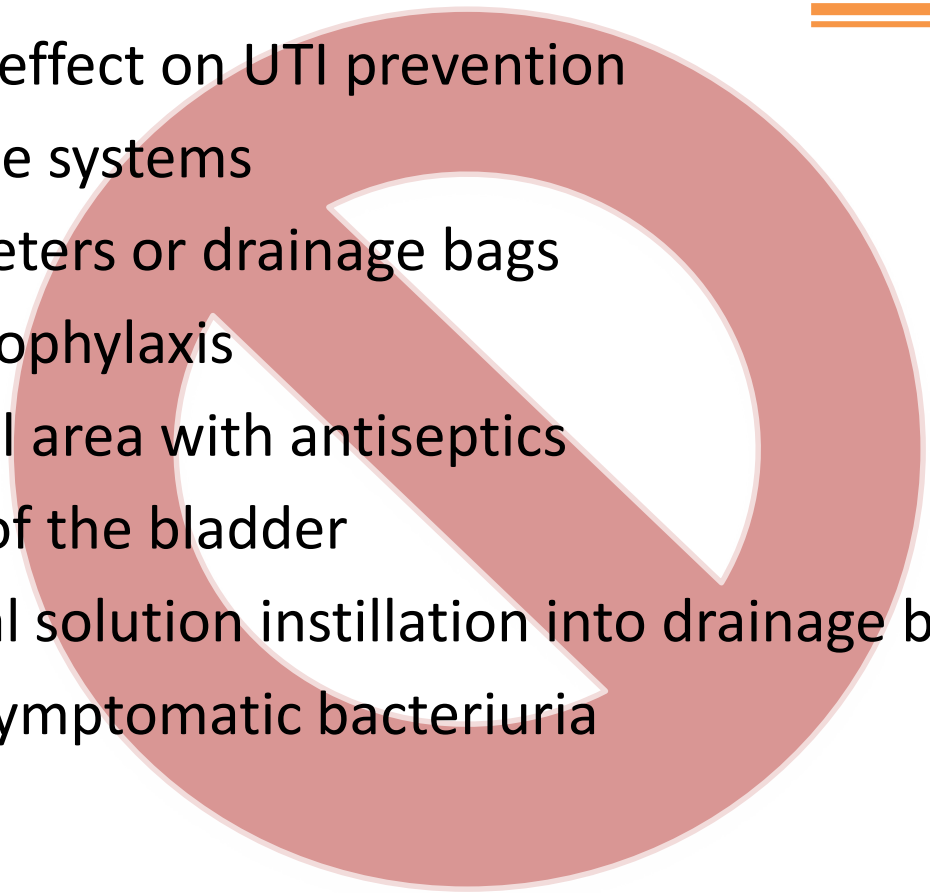
- Daily assessment and documented need for catheter
- Tamper evident seal is intact
- Catheter secured with securement device
- Hand hygiene performed before patient contact
- Daily meatal hygiene with soap and water
- Drainage bag emptied using a clean container
- Unobstructed flow maintained

Preventing CAUTI: A patient-centered approach; (Autumn 2012) APIC Prevention *strategist*: (apic.org/Resource_/TinyMceFileManager/epublications/CAUTI_feature_PS_fall_12.pdf)

Not Recommended

No evidence to support an effect on UTI prevention

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



Gould C., Catheter-Associated Urinary Tract infection (CAUTI) Toolkit, CDC

UTI Prevention Process Measures

Measure HCW compliance using one or more of the following:

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

Gould C., Catheter-Associated Urinary Tract infection (CAUTI) Toolkit, CDC

UTI Prevention Outcome Measure

- Perform UTI surveillance using standardized definitions and protocols
- Note: Bacteria isolated from urine alone does **NOT** meet surveillance definitions for UTI
  - **Example:** If a culture grows $\geq$ 100,000 (10^5) CFU/ml, the patient must have symptoms described in the NHSN protocol.

CAUTI Surveillance

UTI may or may not be associated with use of a urinary catheter (CAUTI vs. UTI)

- For CAUTI:

Catheter must be in place >2 days (Day 1= day of insertion)

And

Catheter still present

Or

Catheter removed day of or day prior to when UTI criteria met

CAUTI Surveillance - continued

- NHSN infection window period: seven days during which all site-specific infection criteria must be met
- Criteria for CAUTI include specific clinical symptoms and positive urine culture, and sometimes positive blood culture
- Includes the day the **first** positive diagnostic test (urine culture or blood culture for CAUTI) was obtained, 3 calendar days before and 3 calendar days after

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

CAUTI Infection Window Period - Acute Care Facilities

Infection Window Period:	3 days before first positive diagnostic test			FIRST POSITIVE DIAGNOSTIC TEST	3 days after first positive diagnostic test		
Example:	Mar 7	Mar 8	Mar 9	Mar 10	Mar 11	Mar 12	Mar 13

- For CAUTI, the first diagnostic test will be either a positive urine or blood culture

CAUTI Infection Criteria - Acute Care Hospitals

CAUTI Diagnostic Test

- Positive urine or blood culture

Examples of Localized Signs and Symptoms

- Suprapubic tenderness
- Costovertebral angle pain
- Urgency
- Frequency
- Dysuria
- Fever

CAUTI Cannot Re-Occur in the Same Patient Within a 14-Day Period

No new CAUTI can be reported within a 14-day "repeat infection timeframe"

- The date of the CAUTI event is considered day 1
- A new CAUTI is not reported until 14 days have elapsed
- If a new pathogen is identified in the urine within the 14-day period it should be added to the CAUTI already reported
- Refer to the CAUTI protocol for more details

CAUTI Location Attribution

- Attribute CAUTI to the inpatient location where the patient was assigned on the date of infection event
- If all elements of CAUTI are present on the date of transfer or discharge, or the next day, the CAUTI is attributed to the transferring/discharging location

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

Symptomatic CAUTI Surveillance Definition

Symptomatic CAUTI requires the patient to have both clinical and microbiologic findings within a 7-day window period

- **Refer to written definitions frequently when performing UTI surveillance**
- Clinical symptom criteria differ for patients with current indwelling catheters versus catheters removed day prior versus no exposure to catheter.
- Urine culture must grow no more than two species of organisms, at least one of which is bacteria of $\geq 10^5$ CFU/ml

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

Asymptomatic CAUTI with Bacteremia Surveillance Definition

Asymptomatic UTI with Bacteremia (ABUTI) requires the following **three** criteria within a 7-day window period:

- Urine culture with no more than two species of organisms, at least one of which is a bacteria of $>10^5$ CFU/ml
- Positive blood culture with at least one matching bacteria to the urine **or** 2 positive blood cultures with common commensal bacteria and a matching common commensal in the urine
- **No** clinical signs or symptoms of CAUTI

Surveillance Definitions for Long-Term Care Facilities

- LTCF UTI Surveillance available for:
  - Certified skilled nursing facilities/homes
  - Intermediate/chronic care facilities for the developmentally disabled
- Based on modified McGeer CAUTI criteria for LTCF
- Includes UTI symptoms seen with chronic catheter use and advanced age
  - Example: Acute change in mental status from baseline; acute functional decline or confusion

CDC National Healthcare Safety Network (NHSN) training, updated January 2015 (http://www.cdc.gov/nhsn/PDFs/LTC/slides/LTCF-UTI-Event-training.pdf

Surveillance Definitions for Long-Term Care Facilities - 2

Type of UTI is based on LTCF criteria and presence of device

- Three types of symptomatic UTI in patient without catheter
- Symptomatic CAUTI in patient with a urinary catheter
  - Catheter in place or removed in last two days
- Asymptomatic UTI with bacteremia
  - Occurs with or without a device
  - Microorganisms in blood and urine cultures match

CDC National Healthcare Safety Network (NHSN) training,
(http://www.cdc.gov/nhsn/PDFs/LTC/slides/LTCF-UTI-Event-training.pdf)

CAUTI Prevention

- Prevention requires commitment to evaluate urinary catheter usage
  - Begin in the emergency department
  - Avoid unnecessary catheterization!
- Reducing CAUTI incidence has been shown to result in overall reductions of MDRO infections
- Perform surveillance and feedback CAUTI rates to ICU and wards

References and Resources

- 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.ihi.org/topics/CAUTI/Pages/default.aspx)
- APIC Preventing CAUTI: A patient-centered approach (2012) (http://apic.org/Resource_/TinyMceFileManager/epublications/CAUTI_feature_PS_fall_12.pdf)
- IDSA Guidelines (Clin Infect Dis 2010;50:625-63)
- SHEA/IDSA Compendium (ICHE 2014;35:464-479)
- National Quality Forum (NQF) Safe Practices for Better Healthcare – 2010 Update

Questions?

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

Thank you.