



# Catheter-Associated Urinary Tract Infection (CAUTI) Prevention



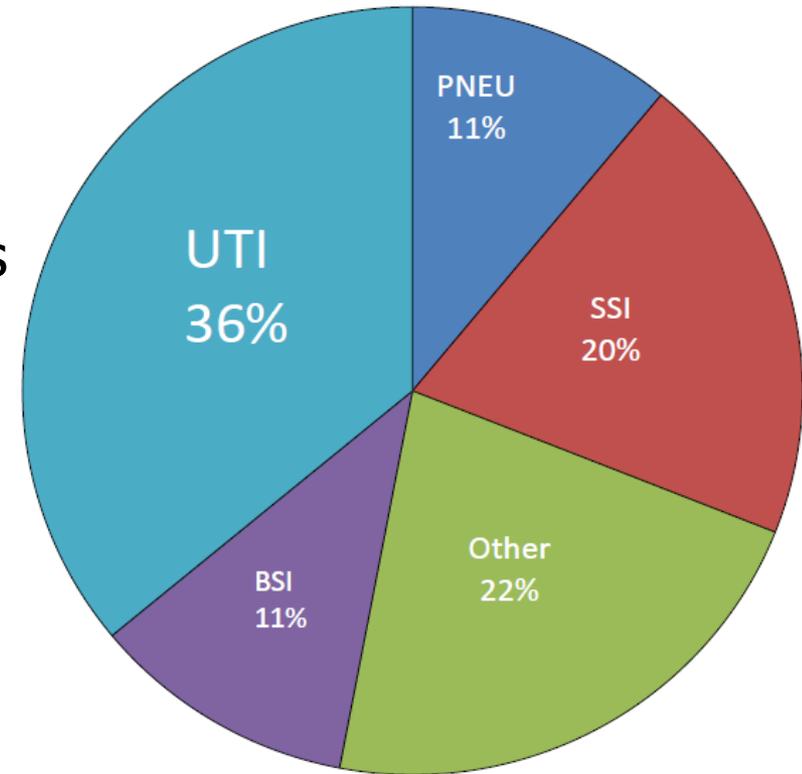
Basics of Infection Prevention  
2-Day Mini-Course  
2016

# 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 the hospital or other healthcare setting
- Review CAUTI surveillance definitions

# Epidemiology of UTI

- Most common type of HAI
- Accounts for >30% of all infections reported to NHSN
- Leading cause of secondary bloodstream infection (BSI)
- 10% mortality rate (13,000 attributable deaths annually)
- Increases length of stay 2-4 days
- Results in antimicrobial overuse and antimicrobial resistance



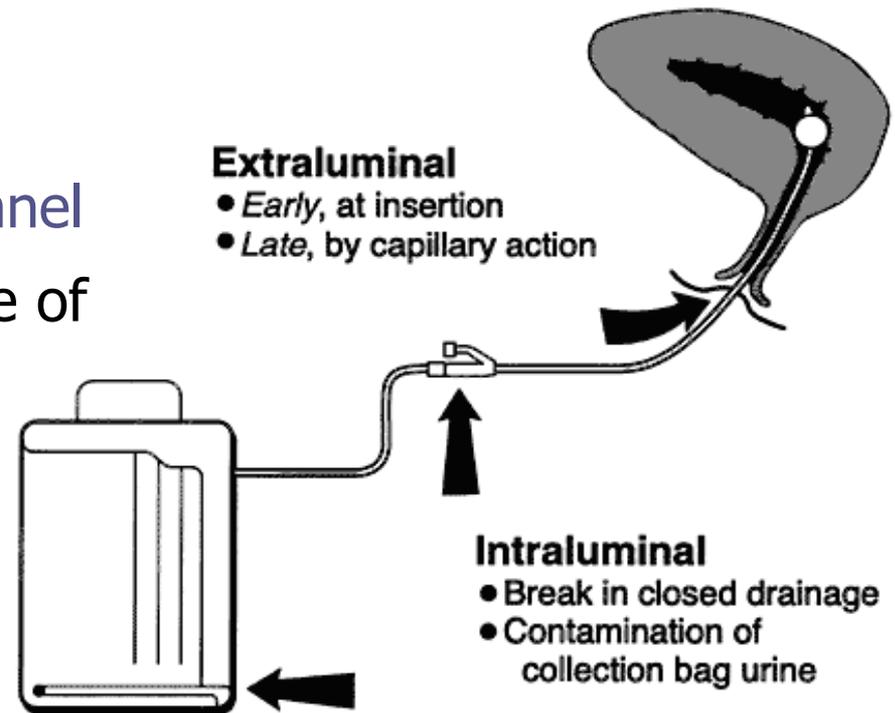
Source: APIC Guide to the Elimination of CAUTI (2008)

# Urinary Catheter Use

- Urinary catheter prevalence:
  - Medical surgical unit 10-30%
  - ICU 60-90%
  - Nursing home 5-10%
- 40-50% catheters on hospital wards (non-ICU) do not have 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

# Etiology of CAUTI

- Source
  - Patient's colonic or perineal flora
  - Bacteria on hands of personnel
- Microbes enter bladder via one of 2 routes
  - Extraluminal - around the external surface
  - Intraluminal - inside the catheter
- Daily risk of bacteriuria with catheterization 3% to 10%
  - By day 30, 100%



# 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

[www.cdc.gov/hicpac/pdf/CAUTI/CAUTIguideline2009final.pdf](http://www.cdc.gov/hicpac/pdf/CAUTI/CAUTIguideline2009final.pdf)

[www.health.gov/hai/pdfs/2012-hai-progress-meeting-hhs-agency-priority-goals.pdf](http://www.health.gov/hai/pdfs/2012-hai-progress-meeting-hhs-agency-priority-goals.pdf)

# CDC Prevention Strategies

## Core Strategies

High levels of scientific evidence

Demonstrated feasibility

- Should become standard practice

## Supplemental Strategies

Some scientific evidence

Variable levels of feasibility

- Consider implementing 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



<http://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



<http://www.cdc.gov/hicpac/pdf/CAUTI/CAUTIguideline2009final.pdf>

# Use Indwelling Urinary Catheters ***ONLY*** for Appropriate Indications

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



# CAUTI Prevention Bundle Example

- CAUTI Insertion Bundle
  - Verification of need prior to insertion
  - Insert urinary catheter using aseptic technique.
  - Maintain urinary catheter based on recommended guidelines
- CAUTI Maintenance Bundle
  - Daily documented assessment of need
  - 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
  - Daily assessment of catheter necessity



# 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

# UTI Prevention **Process** Measures

## **Measure HCW compliance** (select one or more)

- Hand hygiene
- Documentation of catheter insertion & 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 culture grows  $\geq 100,000$  ( $10^5$ ) CFU/ml, must have symptoms described in 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 of insertion=day 1) **AND**
    - Catheter still present **or**
    - Catheter removed day of or day prior to when UTI criteria met



# Acute Care Hospital UTI Surveillance Definitions

- CAUTI definition uses the NHSN Infection Window Period
- Defined as the 7-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



# CAUTI Infection Window Period

## (Acute Care Facilities)

*Example:*

<b>Infection Window Period</b>		<b>3 days before</b>	3/7/15
			3/8/15
			3/9/15
	<b>First positive diagnostic test</b>		<b>3/10/15</b>
	<i><b>For CAUTI, the first diagnostic test will be either a positive urine culture or blood culture</b></i>		
		<b>3 days after</b>	3/11/15
			3/12/15
	3/13/15		

# CAUTI Infection Criteria

## (Acute Care Hospitals)

Diagnostic Test for Possible CAUTI	Localized Sign or Symptom Examples for Possible CAUTI
<ul style="list-style-type: none"> <li>Positive urine culture or positive blood culture</li> </ul>	<ul style="list-style-type: none"> <li>Suprapubic tenderness</li> <li>Costovertebral angle pain</li> <li>Urgency</li> <li>Frequency</li> <li>Dysuria</li> <li>Fever</li> </ul>



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

No new CAUTI can be reported can be 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

- CAUTI should be attributed 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



# Surveillance Definition: **Symptomatic CAUTI**

- **Symptomatic CAUTI** requires the patient to have BOTH clinical and microbiologic findings\*
  - **Refer to written definitions frequently when performing UTI surveillance!**
  - Clinical symptom criteria differ for patient with current indwelling catheter vs. catheter removed day prior vs 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

\*Within a 7-day window period



# Surveillance Definition: **Asymptomatic CAUTI with Bacteremia**

**Asymptomatic UTI with Bacteremia (ABUTI)** requires the following **three** criteria\*:

- Urine culture with no more than two species of organisms, at least one of which is a bacteria of  $\geq 10^5$  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

\* Within the 7-day window period



# UTI and CAUTI Surveillance Definitions for Long-Term Care Facilities (LTCF)

- LTCF UTI Surveillance available for 2 facility types:
  - Certified skilled nursing facilities/nursing homes
  - Intermediate/chronic care facilities for the developmentally disabled
- Based on modified McGeer CAUTI criteria for LTCFs
- Criteria differs from acute care definitions to include UTI symptoms seen with chronic catheter use/advanced age.
  - Example:
    - Acute change in mental status from baseline
    - Acute functional decline/confusion



# UTI and CAUTI Surveillance Definitions for Long-Term Care Facilities (LTCF) - continued

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 2 days
- **Asymptomatic UTI with bacteremia**
  - Occurs with or without a device
  - Microorganisms in blood and urine cultures match



# CAUTI Prevention: Summary

- 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 ICUs 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.ihl.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](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