Catheter-Associated Urinary Tract Infection (CAUTI) Prevention

Basics of Infection Prevention
2-Day Mini-Course
May 2017
Objectives

• Define the scope of healthcare-associated Urinary Tract Infections (UTI)

• Review evidence-based clinical practices to prevent Catheter-Associated Urinary Tract Infections (CAUTI)

• 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


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

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 “success” to The Joint Commission
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
- Demand for accountability by regulatory agencies, advocacy groups, and legislative mandates
- Health & Financial Burden
- 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
  • Engage multidisciplinary teams and frontlines

• 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

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

CAUTI Supplemental Prevention Strategies

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

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

Gould C., Catheter-Associated Urinary Tract infection (CAUTI) Toolkit, CDC
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 \( \geq 100,000 \times 10^5 \) CFU/ml, must have symptoms described in NHSN Protocol

2015 NHSN Updated Definition
NHSN Patient Safety Module: Chapter 7 Device-Associated Module: CAUTI
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)

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

<table>
<thead>
<tr>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
<th>CAUTI?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foley placed</td>
<td>Foley in place</td>
<td>Foley in place for part of day only then removed</td>
<td>Date of event</td>
<td>Yes</td>
</tr>
<tr>
<td>Foley placed</td>
<td>Foley in place for part of day only then removed</td>
<td>No Foley</td>
<td>Date of event</td>
<td>No</td>
</tr>
</tbody>
</table>

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

- 3/7/15
- 3/8/15
- 3/9/15
- 3/10/15
- 3/11/15
- 3/12/15
- 3/13/15

<table>
<thead>
<tr>
<th>Infection Window Period</th>
<th>3 days before</th>
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<tbody>
<tr>
<td>First positive diagnostic test</td>
<td>3/10/15</td>
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</table>

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

2015 NHSN Updated Definition

NHSN Patient Safety Module: Chapter 7 Device-Associated Module: CAUTI
# CAUTI Infection Criteria
(Acute Care Hospitals)

## Diagnostic Test for Possible CAUTI
- Positive urine culture or positive blood culture

## Localized Sign or Symptom Examples for Possible CAUTI
- Suprapubic tenderness
- Costovertebral angle pain
- Urgency
- Frequency
- Dysuria
- Fever

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2015 NHSN Updated Definition

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

• 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
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 $> 10^5$ 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

2015 NHSN Updated Definition
NHSN Patient Safety Module: Chapter 7 Device-Associated Module: CAUTI
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

CDC National Healthcare Safety Network (NHSN) training, updated January 2015
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

CDC National Healthcare Safety Network (NHSN) training, updated January 2015
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


- IHI Program to Prevent CAUTI
  [http://www.ihi.org/topics/CAUTI/Pages/default.aspx](http://www.ihi.org/topics/CAUTI/Pages/default.aspx)


- SHEA/IDSA Compendium (ICHE 2014;35:464-479)


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Questions?

Thank you