

The GOAL: Elimination of Catheter Associated Urinary Tract Infections

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Learning Objectives

Objective #1

After participating in a one hour educational program on CAUTI, the participants will:

Increase their understanding of the basics of CAUTI, as evidenced by their ability to define CAUTI and list three complications of CAUTI

Learning Objectives

Objective #2

After participating in a one hour educational Program on CAUTI, the participants will:

Increase their awareness of CAUTI, as evidenced by their ability to list three evidence-based steps to reduce CAUTI

Pre-Test

- What is the most common Healthcare-Associated Infection?
- Urinary Tract Infection

Healthcare-Associated Infections

- HAIs are infections acquired during the course of receiving treatment for other conditions while being in a healthcare setting
- HAIs are one of the top 10 leading causes of death in the US, according to the CDC, which estimates that there are approximately 1.7 million infections reported annually among patients



Urinary Tract Infections-UTIs

- UTIs are the most common infection in a healthcare setting, accounting for more than 30-35% of HAIs reported by acute care hospitals
- 80% of UTIs are associated with the use of an indwelling urinary drainage device
- Approximately 25% of patients in US hospitals will have an indwelling urinary drainage device at some time during their hospital stay

History of CAUTI

CAUTI

Catheter Associated Urinary Tract Infection

Indwelling Catheter

- An indwelling catheter is a drainage tube that is inserted into the urinary bladder through the urethra, is left in place, and is connected to a closed urine collecting system (Foley Catheter)
- Indwelling catheters do not include in and out catheters or suprapubic catheters

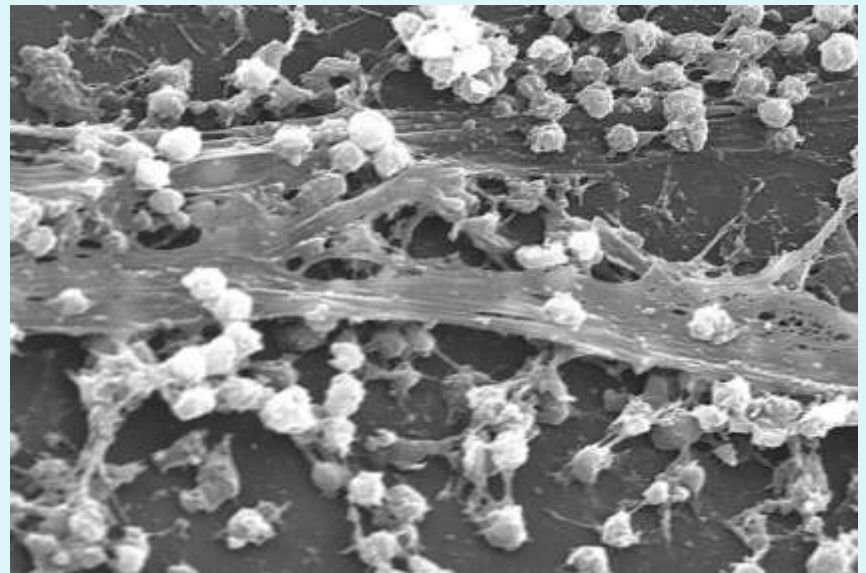
Complications of CAUTI

- Increased morbidity and mortality
- Discomfort
- Prolonged hospital stay
- Increased costs



Pathogenesis of CAUTI

- Formation of biofilms by urinary pathogens is common on the surfaces of catheters and collecting systems
- Antibiotics are not able to penetrate the biofilm, thus the bacteria are resistant to antimicrobials and host defenses



Scanning electron micrograph of *S. aureus* bacteria on the luminal surface of an indwelling catheter with interwoven complex matrix of extracellular polymeric substances known as a biofilm

Photograph from CDC Public Health Image Library: <http://phil.cdc.gov/phil/details.asp>

Common CAUTI Pathogens

- Escherichia coli
- Klebsiella pneumonia
- Enterococcus faecalis
- Pseudomonas aeruginosa
- Enterobacter cloacae
- Serratia marsecens
- Candida albicans
- Proteus mirabilis

NHSN Definition of CAUTI

National Healthcare Safety Network-NHSN through the CDC defines CAUTI as:

UTI that occurs in a patient who had an indwelling urethral urinary catheter in place within the 48-hour period before the onset of the UTI

NSHS Definition of CAUTI

<http://www.cdc.gov/nhsn/PDFs/pscManual/7pscCAUTIcurrent.pdf>

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Using a standardized definition for all surveillance ensures that we are comparing apples to apples and oranges to oranges.

The revised definitions for Symptomatic UTI (SUTI) now differentiate between the patient that had an indwelling urinary catheter in place at the time of specimen collection and the patient that had an indwelling urinary catheter removed within the 48 hours prior to the specimen collection and the patient who did not have an indwelling urinary catheter in place at the time of specimen collection nor within 48 hours prior to the specimen collection.

CAUTI-A Look at the Experts

- APIC-Association for Professionals in Infection Control and Epidemiology, Inc.
- CDC-Centers for Disease Control and Prevention
- The Joint Commission
- SHEA-Society for Healthcare Epidemiology of America

APIC

2008 APIC ELIMINATION GUIDE-

Guide to the Elimination of Catheter-Associated Urinary Tract Infections (CAUTIs)

Developing and Applying Facility-Based Prevention Interventions in Acute and Long-Term Care Settings

Centers for Disease Control and Prevention

- Centers for Disease Control and Prevention (CDC) [Healthcare Infection Control Practices Advisory Committee \(HICPAC\)](#) has released the revised [2009 Guideline for Prevention of CAUTIs](#), which provides valuable prevention information for healthcare providers.



The Joint Commission



National Patient Safety Goals

New 2012 National Patient Safety Goal –

**Catheter-Associated Urinary Tract Infection (CAUTI)
(NPSG.07.06.01)**

The Joint Commission has approved one new National Patient Safety Goal for 2012 that focuses on catheter-associated urinary tract infection (CAUTI) for the hospital and critical access hospital accreditation programs

The Joint Commission



The new goal, NPSG.07.06.01, states:

Implement evidence-based practices to prevent indwelling catheter-associated urinary tract infections (CAUTI)

(This goal is not applicable to pediatric populations)

SHEA

- The society is dedicated to advancing the science and practice of healthcare epidemiology and preventing and controlling morbidity, mortality, and the cost-of-care linked to healthcare-associated infections.

SHEA-Society for Healthcare Epidemiology of America

To Report or Not Report? That is the Question!



NHSN Reporting



CDC currently supports more than 3000 hospitals that are using NHSN and 22 states require hospitals to report HAI's using NHSN.

AHRQ—The US Dept of HHS

The Agency for Healthcare Research and Quality's (AHRQ) mission is to improve the quality, safety, efficiency, and effectiveness of health care for all Americans. As 1 of 12 agencies within the Department of Health and Human Services, AHRQ supports research that helps people make more informed decisions and improves the quality of health care services. AHRQ was formerly known as the Agency for Health Care Policy and Research.

- CAUTI CUSP



Centers for Medicare and Medicaid Services

- FY 2011 OPPTS/ASC PPS
- Hospital Value-Based Purchasing
- Medicaid Reimbursement for HCACs
- Accountable Care Organizations
- FY 2012 Hospital IPPS/LTCH PPS
- FY 2012 Inpatient Rehab. Fac. PPS



Healthcare Facility HAI Reporting to CMS via NHSN – Current and Proposed Requirements (8/1/2011)

HAI Event	Facility Type	Start Date
CLABSI	Acute Care Hospitals Adult, Pediatric, and Neonatal ICUs	January 2011
CAUTI	Acute Care Hospitals Adult and Pediatric ICUs	January 2012
SSI	Acute Care Hospitals Colon and abdominal hysterectomy procedures	January 2012
I.V. antimicrobial start (<i>proposed</i>)	Dialysis Facilities	January 2012
Positive blood culture (<i>proposed</i>)	Dialysis Facilities	January 2012
Signs of vascular access infection (<i>proposed</i>)	Dialysis Facilities	January 2012
CAUTI	Inpatient Rehabilitation Facilities	October 2012
CLABSI (<i>proposed</i>)	Long Term Care Hospitals	October 2012
CAUTI (<i>proposed</i>)	Long Term Care Hospitals	October 2012
MRSA Bacteremia	Acute Care Hospitals Facility-wide	January 2013
<i>C. difficile</i> LabID Event	Acute Care Hospitals Facility-wide	January 2013
HCW Influenza Vaccination	Acute Care Hospitals, OP Surgery, ASCs	January 2013
SSI (<i>proposed</i>)	Outpatient Surgery/ASCs	January 2014

CAUTI Reporting

- Some facilities are also required by their state to report healthcare-associated UTIs that are NOT associated with a catheter use
- These are not to be included in the NHSN reporting, because if there was no catheter in in the patient in the preceding 48-hour period, it will not be considered a catheter-associated UTI

Hospital Value-Based Purchasing – *Final Rule*

- Medicare reimbursement based on quality of care, not volume of care
- Incentive payments to hospitals based on 2 domains:
 - hospital performance or improvement on certain clinical process measures
 - HCAHPS patient experiences with care survey
- First year (FY 2013) infection-related quality measures = SCIP process measures
 - SCIP-Inf-1: Prophylactic antibiotic received within 1 hr prior to incision
 - SCIP-Inf-2: Prophylactic antibiotic selection for surgical patients
 - SCIP-Inf-3: Prophylactic antibiotics discontinued w/in 24 hrs after surgery end time
 - SCIP-Inf-4: Cardiac surgery patients with controlled 6am postop serum glucose
- Beginning FY 2014 quality measures = HACs, including
 - CAUTI
 - Vascular Catheter-Associated Infection
- Implementation -- October 1, 2012



Medicaid Reimbursement for Provider-Preventable Conditions (PPCs) – *Final Rule*

- Prohibits Medicaid payments by States for services related to **provider-preventable conditions (PPCs)**. PPCs defined as:
 - **Health Care Acquired Conditions (HCACs)** = Medicare HACs (except DVT/PE following total knee or hip replacement) in inpatient hospital settings
 - **Other Provider-Preventable Conditions (OPPCs)** = 3 Medicare National Coverage Determination (NCD) procedures (surgery on wrong patient, wrong surgery on patient, wrong site surgery) in any healthcare setting
- States may add additional OPPCs, with CMS approval, if the conditions:
 - Are reasonably preventable through application of procedures supported by evidence-based guidelines;
 - Have a negative consequence for the beneficiary; and
 - Are auditable.
- No federal matching funds for Medicaid claim denied by Medicare because of the presence of a HAC
- Payment reduction only if condition not POA
- **CMS intends to delay compliance actions until July 1, 2012**

Evidence-Based Strategies

Core Prevention Strategies

- Appropriate Use of Catheters
- Alternatives to Using Indwelling Catheters
- Proper Techniques for Insertion of Urinary Catheters
- Urinary Catheter Maintenance
- Specimen Collection
- Catheter Materials
- Documentation
- Education and Training
- Surveillance
- Data Analysis
- Quality Improvement Strategies

Risk Factors for Developing a CAUTI

Primary Risks

Female

Age > 50

Diabetes

Urethral Colonization

Debilitated Health

Incomplete bladder emptying

Fecal Incontinence

Secondary Risks

Dehydration

Sickle-cell anemia

Immobility

Concurrent infections

History of UTI

Colonization with MDROs

Poor personal hygiene

Care Provider Related Risk Factors

Lack of hand hygiene prior to catheter manipulation

Inappropriate use of catheters

Drainage bag spigot contamination

No catheter securement

Catheters in place too long

Poor insertion technique/unsterile insertions

Breaks in a closed system or non use of a closed system

Drainage bag raised above the level of the bladder

Lack of use of methods to control incontinence

No sample port on closed system

Appropriate Use of Catheters

- Insert catheters only for appropriate indications, and leave in place only as long as needed
- Minimize urinary catheter use and duration of use in all patients, particularly those at higher risk for CAUTI or mortality from catheterization such as women, the elderly, and patients with impaired immunity
- Avoid use of urinary catheters in patients and nursing home residents for management of incontinence.
 - Further research is needed on periodic (e.g., nighttime) use of external catheters (e.g., condom catheters) in incontinent patients or residents and the use of catheters to prevent skin breakdown
- Use urinary catheters in operative patients only as necessary, rather than routinely
- For operative patients who have an indication for an indwelling catheter, remove the catheter as soon as possible postoperatively, preferably within 24 hours, unless there are appropriate indications for continued use.

Examples of Appropriate Use of Indwelling Urethral Catheter

- Patient has acute urinary retention or bladder outlet obstruction
- Need for accurate measurements of urinary output in critically ill patients
- Perioperative use for selected surgical procedures:
 - Patients undergoing urologic surgery or other surgery on contiguous structures of the genitourinary tract
 - Anticipated prolonged duration of surgery (catheters inserted for this reason should be removed in PACU)
 - Patients anticipated to receive large-volume infusions or diuretics during surgery
 - Need for intraoperative monitoring of urinary output
- To assist in healing of open sacral or perineal wounds in incontinent patients
- Patient requires prolonged immobilization (e.g., potentially unstable thoracic or lumbar spine, multiple traumatic injuries such as pelvic fractures)
- To improve comfort for end of life care if needed

Alternatives to Indwelling Catheterization

- Intermittent catheterization – consider for:
 - Patients requiring chronic urinary drainage for neurogenic bladder
 - Spinal cord injury
 - Children with myelomeningocele
 - Postoperative patients with urinary retention
 - May be used in combination with bladder ultrasound scanners
- External (i.e., condom) catheters – consider for:
 - Cooperative male patients without obstruction or urinary retention

Alternatives to Indwelling Catheterization

- If intermittent catheterization is used, perform it at regular intervals to prevent bladder over distension
- Consider using a portable ultrasound device to assess urine volume in patients undergoing intermittent catheterization to assess urine volume and reduce unnecessary catheter insertions.
 - If ultrasound bladder scanners are used, ensure that indications for use are clearly stated, nursing staff are trained in their use, and equipment is adequately cleaned and disinfected in between patients.

Proper Techniques for Catheter Insertion

- Perform hand hygiene immediately before and after insertion or any manipulation of the catheter device or site
- Follow Standard Precautions
- Ensure that only properly trained persons (e.g., hospital personnel, family members, or patients themselves) who know the correct technique of aseptic catheter insertion and maintenance are given this responsibility
- In the acute care hospital setting, insert urinary catheters using aseptic technique and sterile equipment
- Use sterile gloves, drape, sponges, an appropriate antiseptic or sterile solution for periurethral cleaning, and a single-use packet of lubricant jelly for insertion
- Routine use of antiseptic lubricants is not necessary

Proper Techniques for Catheter Insertion

- Properly secure indwelling catheters after insertion to prevent movement and urethral traction
- Unless otherwise clinically indicated, consider using the smallest bore catheter possible, consistent with good drainage, to minimize bladder neck and urethral trauma

Urinary Catheter Insertion Bundle

- Assessment of catheter necessity
- Hand hygiene
- Clean the urethral meatus prior to catheter insertion
- Use a single-use packet of lubricant
- Aseptic insertion technique
- Catheter secured
- Sterile closed drainage system

Urinary Catheter Maintenance

- Following aseptic insertion of the urinary catheter, maintain a closed drainage system. If breaks in aseptic technique, disconnection, or leakage occur, replace the catheter and collecting system using aseptic technique and sterile equipment
- Consider using urinary catheter systems with preconnected, sealed catheter-tubing junctions
- Maintain unobstructed urine flow. Keep the catheter and collecting tube free from kinking
- Keep the collecting bag below the level of the bladder at all times. Do not rest the bag on the floor
- Empty the collecting bag regularly using a separate, clean collecting container for each patient; avoid splashing, and prevent contact of the drainage spigot with the nonsterile collecting container.

Urinary Catheter Maintenance

- Use Standard Precautions, including the use of gloves and gown as appropriate, during any manipulation of the catheter or collecting system
- Complex urinary drainage systems (utilizing mechanisms for reducing bacterial entry such as antiseptic-release cartridges in the drain port) are not necessary for routine use
- Changing indwelling catheters or drainage bags at routine, fixed intervals is not recommended. Rather, it is suggested to change catheters and drainage bags based on clinical indications such as infection, obstruction, or when the closed system is compromised
- Unless clinical indications exist (e.g., in patients with bacteriuria upon catheter removal post urologic surgery), do not use systemic antimicrobials routinely to prevent CAUTI in patients requiring either short or long-term catheterization.
 - Further research is needed on the use of urinary antiseptics (e.g., methenamine) to prevent UTI in patients requiring short-term catheterization.

Urinary Catheter Maintenance

- Do not clean the periurethral area with antiseptics to prevent CAUTI while the catheter is in place. Routine hygiene (e.g., cleansing of the meatal surface during daily bathing or showering) is appropriate
- Unless obstruction is anticipated (e.g., as might occur with bleeding after prostatic or bladder surgery) bladder irrigation is not recommended. If obstruction is anticipated, closed continuous irrigation is suggested to prevent obstruction
- Routine irrigation of the bladder with antimicrobials is not recommended
- Routine instillation of antiseptic or antimicrobial solutions into urinary drainage bags is not recommended
- Clamping indwelling catheters prior to removal is not necessary
- Further research is needed on the use of bacterial interference (i.e., bladder inoculation with a nonpathogenic bacterial strain) to prevent UTI in patients requiring chronic urinary catheterization.

Care & Maintenance Bundle

- Daily Assessment of Catheter Necessity
- Catheter Secured
- Tamper-Evident Seal Intact
- Drain Bag Properly Positioned (below bladder and not touching floor)
- Drain Bag is Not Overfilled

Specimen Collection

- Obtain urine samples aseptically. If a small volume of fresh urine is needed for examination (i.e., urinalysis or culture), aspirate the urine from the needleless sampling port with a sterile syringe/cannula adapter after cleansing the port with a disinfectant.

Catheter Materials

- If the CAUTI rate is not decreasing after implementing a comprehensive strategy to reduce rates of CAUTI, consider using antimicrobial/antiseptic-impregnated catheters. Silver alloy catheters may be considered also.
- Hydrophilic catheters might be preferable to standard catheters for patients requiring intermittent catheterization. Silicone might be preferable to other catheter materials to reduce the risk of encrustation in long-term catheterized patients who have frequent obstruction. Further research is needed to clarify the benefit of catheter valves in reducing the risk of CAUTI and other urinary complications.

Documentation

- Consider implementing a system for documenting the following in the patient record: indications for catheter insertion, date and time of catheter insertion, individual who inserted catheter, and date and time of catheter removal.
- Ensure that documentation is accessible in the patient record and recorded in a standard format for data collection and quality improvement purposes is suggested. Electronic documentation that is searchable is preferable.

Education and Training

- Ensure that healthcare personnel and others who take care of catheters are given periodic in-service training regarding techniques and procedures for urinary catheter insertion, maintenance, and removal. Provide education about CAUTI, other complications of urinary catheterization, and alternatives to indwelling catheters.

Surveillance

- Laboratory reports
- Pharmacy reports
- Radiology reports
- History and Physicals
- Physician progress reports
- Nursing notes
- Vital signs
- Patient Care conferences
- Daily rounds

Surveillance

- Use CDC/NHSN criteria for identifying patients who have symptomatic UTI (SUTI)
- Routine screening of catheterized patients for asymptomatic bacteriuria (ASB) is not recommended. When performing surveillance for CAUTI, consider providing regular (e.g., quarterly) feedback of unit-specific CAUTI rates to nursing staff and other appropriate clinical care staff

Surveillance

- Consider surveillance for CAUTI when indicated by facility-based risk assessment. Identify the patient groups or units on which to conduct surveillance based on frequency of catheter use and potential risk of CAUTI.

Data Analysis

Numerators

The number of new cases of infection for the period of review

Data Analysis

Denominators for CAUTI are collected like they are for other monitored devices:

- Record the number of patients on the unit, collecting this number at the same time each day
- Record the number of patients on the unit with an indwelling urinary catheter, collecting this number at the same time each day

Sample Denominator Collection Tool

Location: ICU	Month: July	Year: 2011
Date	Number of Patients	Number of Patients with an indwelling urinary catheter
1	9	2
2	7	0
3	5	1
4	6	1
5	7	1
⇓	⇓	⇓
Totals	Patient Days 299	Indwelling Urinary Catheter Days 12

CAUTI Rate Formula Using Device Days

$$\text{CAUTI Rate} = \frac{\text{\#CAUTIs identified}}{\text{\# Total urinary catheter device days}} \times 1000$$

$$1/12 = .083 \times 1000 = 83$$

83 UTIs per urinary Catheter device days

Device Utilization (DU) Ratio

$$\begin{array}{l} \text{Urinary} \\ \text{Catheter} \\ \text{DU Ratio} \end{array} = \frac{\# \text{ Indwelling catheter days}}{\# \text{ Patient Days}} \times 100$$

$$12/299 = .04 \times 100 = 4$$

Quality Improvement Strategies

- Implement quality improvement programs to enhance appropriate use of indwelling catheters and reduce risk of CAUTI

Examples:

- Alerts or reminders
- Stop orders
- Protocols for nurse-directed removal of unnecessary catheters
- Guidelines/algorithms for appropriate perioperative catheter management

Quality Improvement Strategies

- CAUTI Posters
- CAUTI Rounds
- CAUTI Reference Signs
- CAUTI Teams/Meetings

Antimicrobial Stewardship

- Promote proper use of antibiotics
- Target infections rather than colonization

Summary

In a perfect world, the best practice to avoid CAUTI is to avoid inserting a catheter. Since we are not in a perfect world, for patient's with indwelling urinary catheters **PREVENTION** is always the best practice!



Q & A's

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