Background of CAUTI

- Most common type of HAI
  - >30% of HAI’s reported to NHSN
  - Estimated >560,000 nosocomial UTIs annually
- Increased morbidity and mortality
  - Estimated 13,000 attributable deaths annually
  - Leading cause of secondary BSI with ~10% mortality
- Excess length of stay 2-4 days
- Unnecessary antimicrobial use
Catheter-Associated UTIs (CAUTIs)


- Hospital-acquired bacteriuria and candiduria in 25% of those with urinary catheters placed for a week
- Risk of bacteriuria: about 5% per day
- Symptomatic UTI: 16-32% of those bacteriuric

Urinary Catheter-Related Infection: Pathophysiology

Organisms enter the bladder by 3 ways:

1) At time of catheter insertion
2) Through the catheter lumen (from a colonized drainage bag)
3) Along external surface of the catheter (migrate along the catheter-mucosal interface)

**Background: Pathogenesis of CAUTI**

* Source of microorganisms may be endogenous (meatal, rectal, or vaginal colonization) or exogenous, usually via contaminated hands of healthcare personnel during catheter insertion or manipulation of the collecting system.

---

**Formation of biofilms by urinary pathogens common on the surfaces of catheters and collecting systems**

**Bacteria within biofilms resistant to antimicrobials and host defenses**

**Some novel strategies in CAUTI prevention have targeted biofilms**

Urinary Catheters

- 15-25% of hospitalized patients
- 5-10% (75,000-150,000) NH residents
- Often placed for inappropriate indications
- Physicians frequently unaware
- In a recent survey of U.S. hospitals:
  - > 50% did not monitor which patients catheterized
  - 75% did not monitor duration and/or discontinuation

“Experience is necessary for the right using of all new tools or instruments and that will perhaps ... direct the manner of using it.”

- Benjamin Franklin - in 1752 after inventing the first flexible urinary catheter for his brother John Franklin
What Is Our Goal?

- Reduce the number of CAUTIs.
- Provide tools for hospitals to reduce the risk for CAUTI.
- To educate health care workers about the appropriate management of urinary catheters.
- To prevent the placement of unnecessary urinary catheters.
- To promptly remove urinary catheters that are no longer needed.

Ten Non-Reimbursable Selected Conditions by CMS (October 2008)

1. Foreign Object Retained After Surgery
2. Air Embolism
3. Blood Incompatibility
4. Stage III and IV Pressure Ulcers
5. Falls and Trauma
6. Manifestations of poor glycemic control
7. Catheter-Associated Urinary Tract Infection
8. Vascular Catheter-Associated Infection
9. Surgical Site Infection-Mediastinitis, bariatric, some ortho
10. DVT/PE post orthopedic cases

More pressure ulcers with immobility?
More falls with UCs?

http://www.cms.hhs.gov/HospitalAcqCond/
Avoid Having a Pseudoepidemic of CAUTI

- Do not over-diagnose: obtaining urine cultures without an indication may result in inappropriate antibiotic use and mislabeling a patient for having CAUTI.
- Only culture the urine if the patient has symptoms of a UTI such as fever, chills, and abdominal pain.
- Cloudy urine ≠ infection
- Sediment in urine ≠ infection
- Smelly urine ≠ infection

*Saint S, Ann Intern Med 2002; 137: 125-7*
Prevention strategies

Core Strategies

- High levels of scientific evidence
- Demonstrated feasibility

Supplemental Strategies

- Some scientific evidence
- Variable levels of feasibility

Core Prevention Strategies

- Insert catheters only for appropriate indications
- Leave catheters in place only as long as needed
- Ensure that only properly trained person insert and maintain catheters
- Insert catheters using aseptic technique and sterile equipment
- Maintain a closed system
- Maintain unobstructed urine flow
- Hand hygiene and standard precautions
What are appropriate indications for catheter insertion?

- Patient has acute urinary retention or bladder outlet obstruction
- Need for accurate measurement of urinary output in critically ill patients
- Perioperative use for selected surgical procedures
- To assist in healing of open or perineal wounds in the incontinent patient
- Patient requires prolonged immobilization
- To improve comfort for end of life if needed

Regularly Using to Prevent CAUTI: 2005 vs. 2009


<table>
<thead>
<tr>
<th>Method</th>
<th>2005</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bladder ultrasound</td>
<td>28%</td>
<td>41%</td>
</tr>
<tr>
<td>Reminder/stop order</td>
<td>9%</td>
<td>21%</td>
</tr>
<tr>
<td>Silver alloy catheters</td>
<td>30%</td>
<td>40%</td>
</tr>
<tr>
<td>Condom catheters</td>
<td>13%</td>
<td>10%</td>
</tr>
</tbody>
</table>

National
2009 Prevention of CAUTI HICPAC Guidelines
(Gould et al, Infect Control Hosp Epidemiol 2010; 31: 319-326)

Table 2.
A. Examples of Appropriate Indications for Indwelling Urethral Catheter Use

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

B. Examples of Inappropriate Uses of Indwelling Catheters

<table>
<thead>
<tr>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>As a substitute for nursing care of the patient or resident with incontinence</td>
</tr>
<tr>
<td>As a means of obtaining urine for culture or other diagnostic tests when the patient can voluntarily void</td>
</tr>
<tr>
<td>For prolonged postoperative duration without appropriate indications (e.g., structural repair of urethra or contiguous structures, prolonged effect of epidural anaesthesia, etc.)</td>
</tr>
</tbody>
</table>

Note: These indications are based primarily on expert consensus.

UTI Prevention Rule #1: Make Sure the Patient Really Needs the Catheter

**Appropriate indications**

- Bladder outlet obstruction
- Incontinence and sacral wound
- Urine output monitored
- Patient’s request (end-of-life)
- During or just after surgery

(Wong and Hooton - CDC 1983)

![Percent unjustified graph](graph.png)

(Jain, Arch Int Med 95)
Proper Insertion Technique

- Perform hand hygiene before and after placement.
- Maintain aseptic technique and use of sterile equipment.
- Use sterile gloves, drape, an antiseptic solution for periurethral cleaning, and a single packet of lubricant for insertion.
- Use the appropriate catheter size.

Maintenance of Urinary Catheters

- Keep a closed system for the urinary drainage system.
- Make sure urinary flow is not obstructed:
  1. No kinks in the catheter.
  2. Urinary bag should always be lower than the bladder.
  3. Regular emptying of urinary bag.
Removal of No-Longer Indicated Catheters

- Nurse-driven removal of no longer needed catheters
  - Pilot study: 45% reduction in unnecessary catheter utilization (Fakih et al, Infect Control Hosp Epidemiol 2008; 29: 815-9)
  - Identify appropriate indications based on HICPAC guidelines (Gould et al, Infect Control Hosp Epidemiol 2010; 31: 319-326)

Summary of Prevention Measures*

Core Measures
- Insert catheters only for appropriate indications
- Leave catheters in place only as long as needed
- Only properly trained persons insert and maintain catheters
- Insert catheters using aseptic technique and sterile equipment
- Maintain a closed drainage system
- Maintain unobstructed urine flow
- Hand hygiene and standard (or appropriate isolation) precautions

Supplemental Measures
- Alternatives to indwelling urinary catheterization
- Portable ultrasound devices to reduce unnecessary catheterizations
- Antimicrobial/antiseptic-impregnated catheters

*All recommendations in HICPAC guidelines at: http://www.cdc.gov/hicpac/cauti/001_cauti.html
More about the supplemental measures

- Intermittent catheterizations
  - May be helpful in patients with spinal cord injury
- Condom caths
- Ultrasound of the bladder
- Antimicrobial impregnated catheters

CAUTI NOT RECOMMENDED:

- Complex urinary drainage systems (e.g., antiseptic-releasing cartridges in drain port)
- Changing catheters or drainage bags at routine, fixed intervals (clinical indications include infection, obstruction, or compromise of closed system)
- Routine antimicrobial prophylaxis
- Cleaning of periurethral area with antiseptics while catheter is in place (use routine hygiene)
- Irrigation of bladder with antimicrobials
- Instillation of antiseptic or antimicrobial solutions into drainage bags
- Routine screening for asymptomatic bacteriuria (ASB)
Measurement: Examples of Process Measures
- Compliance with hand hygiene
- Compliance with educational program
- Compliance with documentation of catheter insertion and removal
- Compliance with documentation of indications for catheter placement

http://www.cdc.gov/hicpac/cauti/001_cauti.html

What is next for CAUTI in Iowa?
- Ongoing work with Telligen and HEN for CAUTI prevention
- Reducing inappropriate Catheter use
- Expanding CAUTI/UTI prevention to long term care
- Increasing use of NHSN for reporting
The Good News
  • Everyone wants HAI data

The Bad News
  • Everyone wants HAI data

Who is asking?
  • CMS for PPS
    • CLABSI, CAUTI, SSI Colon and abd hyster
  • IHC/HEN
    • CLABSI, CAUTI, SSI, VAP
  • IDPH
    • CAUTI, CDI
  • Telligen QIO
    • CAUTI, CDI, SSI
Reporting data so many locations so little time

- NHSN
- IHA
- Hospital boards
- Health systems
- Hospital Leadership, C suite
- Care providers unit staff

How do we minimize duplication of reporting

- State HAI steering committee endorses NHSN reporting
  - One location for data entry for multiple groups
  - IDPH, IHC/HEN, Telligen
- Data collected can be used for internal reporting
The good news about data

- NHSN
  - Can be used for IDPH, IHC/HEN, IHA, Telligen/QIO
- Engages board of directors
- Brings infection prevention out of the weeds
- Empowers unit staff to improve care delivery
- Validates evidence based practice

SIR reports

<table>
<thead>
<tr>
<th>SummaryYH</th>
<th>infCount</th>
<th>numExp</th>
<th>numucathdays</th>
<th>SIR</th>
<th>SIR_pval</th>
<th>SIR95CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010H1</td>
<td>9</td>
<td>6.769</td>
<td>4448</td>
<td>1.330</td>
<td>0.2413</td>
<td>0.608, 2.524</td>
</tr>
<tr>
<td>2010H2</td>
<td>34</td>
<td>30.818</td>
<td>18259</td>
<td>1.103</td>
<td>0.3062</td>
<td>0.764, 1.542</td>
</tr>
<tr>
<td>2011H1</td>
<td>59</td>
<td>57.364</td>
<td>34307</td>
<td>1.029</td>
<td>0.4319</td>
<td>0.783, 1.327</td>
</tr>
<tr>
<td>2011H2</td>
<td>29</td>
<td>54.872</td>
<td>32176</td>
<td>0.529</td>
<td>0.0001</td>
<td>0.354, 0.759</td>
</tr>
</tbody>
</table>

If infCount in this table is less than you reported, aggregate data are not available to calculate numExp.
Lower bound of 95% Confidence Interval only calculated if infCount > 0. SIR values only calculated if numExp >= 1.
SIR excludes those months and locations where device days are missing.

Data contained in this report were last generated on June 8, 2012 at 3:40 PM.
Describe the impact, definition and surveillance methodologies of catheter-associated urinary tract infection (CAUTI):

**DEFINITION**

Patient had an indwelling urinary catheter in place at the time of specimen collection and at least 1 of the following signs or symptoms with no other recognized cause:

- fever (>38°C),
- suprapubic tenderness, or costovertebral angle pain or tenderness
- *and* a positive urine culture of ≥10⁵ colony-forming units (CFU)/ml with no more than 2 species of microorganisms.

**OR**

Patient had indwelling urinary catheter removed within the 48 hours prior to specimen collection and at least 1 of the following signs or symptoms with no other recognized cause:

- fever (>38°C),
- urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness
- *and* a positive urine culture of ≥10⁶ colony-forming units (CFU)/ml with no more than 2 species of microorganisms

**References**

  http://www.cdc.gov/hicpac/cauti/003_cauti2009_execSum.html
- SHEA-IDSA compendium of strategies to prevent HAI
  http://www.shea-online.org/GuidelinesResources/CompendiumofStrategiestoPreventHAIs.aspx
  http://www.apic.org/Professional-Practice/Implementation-guides
- IDPH HAI prevention participant guide
  http://www.idph.state.ia.us/hai_prevention/participant_guide.asp
• Iowa Healthcare collaborative  

• Institute for Healthcare Improvement  
  http://www.ihi.org/Pages/default.aspx

• National Health Safety Network (NHSN)  
  http://www.cdc.gov/nhsn/psc.html

Questions
• Nancy Wilde  
  • Nancy.wilde@idph.iowa.gov  
  • 515-242-3892