Target Zero: Evidence Based Strategies for Eliminating CAUTI’s

Kathleen M. Vollman MSN, RN, CCNS, FCCM, FAAN
Clinical Nurse Specialist / Educator / Consultant
ADVANCING NURSING
kvollman@comcast.net
Northville Michigan
www.Vollman.com

©ADVANCING NURSING LLC 2017
Disclosures for Kathleen Vollman

- Consultant-Michigan Hospital Association Keystone Center
- Consultant/Faculty for CUSP for MVP—AHRQ funded national study
- Subject matter expert for CAUTI and CLABSI for CMS/HEN 1.0 & 2.0
- Consultant and speaker bureau for Sage Products LLC
- Consultant and speaker bureau for Hill-Rom Inc
- Consultant and speaker bureau for Eloquest Healthcare
Objectives

• Describe the forces within the current healthcare environment that are targeting zero for device related infections.

• Identify and detail the evidence-based practices that go beyond the guidelines in preventing CAUTI’s.

• Discuss possible barriers to practice changes and realistic solutions to assist the team in the implementation process.
Notes on Hospitals: 1859

“It may seem a strange principle to enunciate as the very first requirement in a Hospital that it should do the sick no harm.”

Florence Nightingale

Advocacy = Safety
Protect The Patient From Bad Things Happening on Your Watch

Implement Interventional Patient Hygiene
Interventional Patient Hygiene

- Hygiene...the science and practice of the establishment and maintenance of health
- Interventional Patient Hygiene....nursing action plan directly focused on fortifying the patient's host defense through proactive use of evidence based hygiene care strategies

Central line catheter insertion and maintenance program
INTERVENTIONAL PATIENT HYGIENE (IPH)

VAP/HAP

Oral Care/Mobility

VAP/HAP

Catheter Care

CA-UTI

CLA-BSI

SSI

Falls

HASI

HAND

Patient

HYGIENE

Skin Care/Bathing/Mobility

Factors Impacting the ability to Achieve Quality Nursing Outcomes at the Point of Care

Building Resiliency Into Interventions

- Forcing functions and constraints
- Automation and computerization
- Standardization and protocols
- Checklists and independent check systems
- Rules and policies
- Education and information
- Vague warnings – Be more careful!
Why HAI's?
Protecting Patients From Harm

<table>
<thead>
<tr>
<th>Estimates: 183 Hospitals in 10 States</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAI:</td>
</tr>
<tr>
<td>HAI-related deaths:</td>
</tr>
<tr>
<td>Hospitalized patients develop infection:</td>
</tr>
<tr>
<td>Death due to sepsis/septic shock:</td>
</tr>
<tr>
<td>Money spent:</td>
</tr>
<tr>
<td>Increase risk of readmission:</td>
</tr>
</tbody>
</table>

### Table 2. Distribution of 504 Health Care–Associated Infections.*

<table>
<thead>
<tr>
<th>Type of Infection</th>
<th>Rank</th>
<th>No. of Infections</th>
<th>Percentage of All Health Care–Associated Infections (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia†</td>
<td>1 (tie)</td>
<td>110</td>
<td>21.8 (18.4–25.6)</td>
</tr>
<tr>
<td>Surgical-site infection</td>
<td>1 (tie)</td>
<td>110</td>
<td>21.8 (18.4–25.6)</td>
</tr>
<tr>
<td>Gastrointestinal infection</td>
<td>3</td>
<td>86</td>
<td>17.1 (14.0–20.5)</td>
</tr>
<tr>
<td>Urinary tract infection‡</td>
<td>4</td>
<td>65</td>
<td>12.9 (10.2–16.0)</td>
</tr>
<tr>
<td>Primary bloodstream infection‡</td>
<td>5</td>
<td>50</td>
<td>9.9 (7.5–12.8)</td>
</tr>
<tr>
<td>Eye, ear, nose, throat, or mouth infection</td>
<td>6</td>
<td>28</td>
<td>5.6 (3.8–7.8)</td>
</tr>
<tr>
<td>Lower respiratory tract infection‡</td>
<td>7</td>
<td>20</td>
<td>4.0 (2.5–6.0)</td>
</tr>
<tr>
<td>Skin and soft-tissue infection‡</td>
<td>8</td>
<td>16</td>
<td>3.2 (1.9–5.0)</td>
</tr>
<tr>
<td>Cardiovascular system infection‡</td>
<td>9</td>
<td>6</td>
<td>1.2 (0.5–2.5)</td>
</tr>
<tr>
<td>Bone and joint infection</td>
<td>10</td>
<td>5</td>
<td>1.0 (0.4–2.2)</td>
</tr>
<tr>
<td>Central nervous system infection‡</td>
<td>11</td>
<td>4</td>
<td>0.8 (0.3–1.9)</td>
</tr>
<tr>
<td>Reproductive tract infection‡</td>
<td>12</td>
<td>3</td>
<td>0.6 (0.2–1.6)</td>
</tr>
<tr>
<td>Systemic infection†</td>
<td>13</td>
<td>1</td>
<td>0.2 (0.01–1.0)</td>
</tr>
</tbody>
</table>

### All Health Care–Associated Infections (N = 504)†

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>No. (%)</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Clostridium difficile</em></td>
<td>61 (12.1)</td>
<td>1</td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>54 (10.7)</td>
<td>2</td>
</tr>
<tr>
<td><em>Klebsiella pneumoniae or K. oxytoca</em></td>
<td>50 (9.9)</td>
<td>3</td>
</tr>
<tr>
<td><em>Escherichia coli</em></td>
<td>47 (9.3)</td>
<td>4</td>
</tr>
<tr>
<td><em>Enterococcus species</em>‡</td>
<td>44 (8.7)</td>
<td>5</td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em>§</td>
<td>36 (7.1)</td>
<td>6</td>
</tr>
<tr>
<td><em>Candida species</em>§</td>
<td>32 (6.3)</td>
<td>7</td>
</tr>
<tr>
<td><em>Streptococcus species¶</em></td>
<td>25 (5.0)</td>
<td>8</td>
</tr>
<tr>
<td><em>Coagulase-negative staphylococcus species</em></td>
<td>24 (4.8)</td>
<td>9</td>
</tr>
<tr>
<td><em>Enterobacter species</em></td>
<td>16 (3.2)</td>
<td>10</td>
</tr>
</tbody>
</table>

*Magill SS et al. NEJM 2014;370:1198-208*
Economic Burden of HAI’s: Build The Business Case


- Generated point estimates for attributable cost & LOS
- 5 Major Infections=9.8 billion
  - SSI’s, CLABSI’s, VAP/VAE, CAUTI’s, C-Diff
    - SSI’s (33.7%)
    - VAP (31.6%)
    - CLA-BSI (18.9%)
    - C-Diff (15.4%)
    - CA-UTI <1%

Per Case Basis

<table>
<thead>
<tr>
<th>SSI</th>
<th>CLABSI</th>
<th>VAP</th>
<th>CAUTI</th>
<th>C-Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>$20,785</td>
<td>$45,814</td>
<td>$40,144</td>
<td>$896</td>
<td>$11,285</td>
</tr>
</tbody>
</table>

50% HAI’s Preventable
Hospital Performance Based Payments

8% of Based DRG Payments at Risk by 2017

Hospital Acquired Conditions
- 1% reduction to total DRG payments
  - CLA-BSI, CAUTI & C-diff
  - 2018 expanded to wards

Readmissions
- 3% reduction
  - CLA-BSI, CAUTI & C-diff

Value Based Purchasing (VBP)
- 2% reduction
  - CAUTI & CLA-BSI

EMR Meaningful Use Requirements
- Reductions up to ¾ of update factor
Preventing CAUTI’s Through Evidence Based Care Practices
The Why

- UTIs represent the 4th most common type of HAI’s
- Along with other device associated infections (CLABSI and VAP) account for 30% of all HAI’s
- 93,300 UTIs in acute care hospitals in 2011
- 70-80% of CAUTI are due to urinary catheters
- 15 to 25% of inpatients are catheterized

The Why

• Leads to ↑ increased morbidity and costs ($896)
• LOS ↑ 2-4 days
• CAUTIs are associated with an ↑ cost of $400 million to $500 million annually
• HEN 1: 9 of the 31 states participating ↓ CAUTI harm by 40%. 2,805 CAUTIs were prevented, and an estimated savings of $2,805,000
• HEN 2: 10 of the 34 states ↓ CAUTI harm by 40%. 505 CAUTIs were prevented, and an estimated savings of $505,000.

CUSP & CAUTI Interventions

Adaptive /Cultural

1. Educate on the Science of Safety
2. Identify Defects (Staff Safety Assessment)
3. Senior Executive Partnership
4. Learn from Defects
5. Implement Teamwork & Communication Tools

Technical

CUSP

CLAUTI

1. Insertion
   Limiting use
   Using aseptic technique for site prep, equip & supplies
2. Maintenance
   • Securing the catheter for unobstructed flow
   • Maintaining the sterility of the urine collection system
   • Replacing the urine collection system when required
   • Collecting urine samples
Isn’t this a patient safety issue, not just CAUTI?
Pathogenesis of CAUTI

• Source: colonic or perineal flora on hands of personnel

• Microbes enter the bladder via extraluminal {around the external surface} (proportion = 2/3) or intraluminal {inside the catheter} (1/3)

• Daily risk of bacteriuria with catheterization is 3% to 10%; by day 30 = 100%
Disrupting the Lifecycle of the Urinary Catheter

1. Aseptic Insertion
2. Maintaining Awareness & Proper Care of Catheters
3. Prompting Catheter Removal

Step 0: Avoid Catheter is Possible

www.catheterout.org
(Adapted Meddings. Clin Infect Dis 2011)
Before Placing an Indwelling Catheter, Please Consider if These Alternatives Would be Appropriate:

- *Bedside commode, urinal, or continence garments:* to manage incontinence.

- **Bladder scanner:** to assess and confirm urinary retention, prior to placing catheter to release urine.

- **Straight catheter:** for one-time, intermittent, or chronic voiding needs.

- **External catheter:** appropriate for cooperative men without urinary retention or obstruction.
Nurse Driven Protocol-ER/ICU/OR & Floor

- Assessment of criteria for insertion
- Use of the bedside bladder ultrasound to assess urinary retention (reduce rates by 30-50%)
  - If minimal or no urine found in the bladder alternative strategies should be considered prior to catheterization
- Examine alternatives to indwelling catheters
  - Intermittent catheterization several times per day (post-op)
  - External catheters for male patients or female patients without urinary retention or bladder outlet obstruction*
- Prevalence evaluation to determine number of catheters versus the number of catheters that met criteria

*Saint S, et al. J am Geriatr Sco. 2006;54(7)1055-1061
Nurse Driven Intermittent Catheterization Program

If retention is suspected post removal:

• If no voiding within 4-6 hours of assessment pre insertion or post removal, a bladder scan ultrasound used.

• Volume < 500mL, encourage the patient to void by using techniques to stimulate bladder reflex (cold water to abdomen, stroke inner thigh, run water, flush toilet).

• Continue to assess the patient and repeat the bladder scan in 2 hours if no voiding.

• If the bladder volume > 500mL, and intake is less than 3/l a day- catheterize for residual urine volume rather than place an indwelling catheter.

• If volumes are greater/catheter goes back in 24hrs

STOP CAUTI Sample Policy and Procedure
University of Virginia Health System nurse driven intermittent cath program
Before Placing an Indwelling Catheter, Please Consider if These Alternatives Would be Appropriate:

- **Bedside commode, urinal, or continence garments**: to manage incontinence.
- **Bladder scanner**: to assess and confirm urinary retention, prior to placing catheter to release urine.
- **Straight catheter**: for one-time, intermittent, or chronic voiding needs.
- **External catheter**: appropriate for cooperative men without urinary retention or obstruction.
Challenges with Current Appropriate Alternatives: External Male Catheters

1 out of every 200 men is born with what’s medically known as ‘micro-penis’
Buried Penis
Condom Catheter
Common Problems

- Most common problems are:
  - Skin irritation and maceration
  - Difficult to keep the condom from falling off/retraction of the penis or decrease size
  - Ischemia and penile obstruction/tightness
  - Adherence: requires to secure on the shaft & adhesive mechanisms are challenging

Innovated Male External Catheter Study

- This project was conducted in a 107-bed long-term acute care hospital.
- **Timeline:** The QI initiative started on 02/21/16.
- **Appropriate ECD Application:** The nursing team was educated on appropriate assessment of male anatomy for ECD placement.
- **Measurement:**
  - Before and after catheter utilization and CAUTI infection rates
  - Increased adherence to best practices was reported on staff surveys (N=30; [15 RNs, 15 CNAs].

**Foley Catheter Appropriateness Criteria:** Benign prostatic hypertrophy; neurogenic bladder; stage 3 and 4 sacral pressure injury; and strict I&O

**ECD Appropriateness Criteria:** No restraints; no neurogenic bladder; no benign prostatic hypertrophy; and cooperative with no urinary issues.

**ECDs were contraindicated:**
- Patient was unable to void or had known urinary retention
- Unhealed wound on glans penis
- Active inflammation or infection of the glans, foreskin or urethra
- Severe phimosis or severe hypospadias
Zero Male CAUTI’s During Intervention

Average wear time: 48-72hrs
Female External Device

- Tri-City Medical Center/CA-388 beds
- Pre-post design comparing 2015 female CAUTI rates to 2016 post implementation CAUTI rates
- Education & training performed
- Results
  - 2015 6 female CAUTI’s
  - 2016 0 female CAUTI’s
  - Reduced indwelling catheters in 2016 and ↑ use of external female device
  - 15 RN’s surveyed 93% to 100% satisfied

Mattia L, et al. Tri-City Medical Center, Oceanside, CA, 2016
CDC, SHEA, IDSA and NHS: Indications for Placement

• Perioperative use for selected surgical procedures
• **Urine output in critically ill patients**
• Management of acute urinary retention and urinary obstruction
• Assistance in pressure ulcer healing for incontinent patients
• At a patient request to improve comfort (SHEA) or for comfort during end of life care (CDC)

Mindful When Making the Decision for Placement
Types Of Treatments Requiring Close UO Monitoring

• Bolus fluid resuscitation
• Vasopressors
• Inotropes
• High dose diuretics
• Hourly urine studies to measure life threatening laboratory abnormalities

Are you responding hourly to the patient’s urine output??
I & O in Critical Care

“Even if you are on the right track, you will get run over if you just sit there.”

Will Rogers
The Culture of Culturing
"Asymptomatic bacteriuria" (ASB) is the condition of having a specified count of bacteria in an appropriately collected urine sample obtained from a person without clinical signs and symptoms of urinary tract infection.

1. Overuse of antibiotics that can potentially cause complications in the individual patient, including *C. difficile*
2. ↑increase in resistant pathogens impact the individual, organization & community patterns of resistance.
3. Falsely inflates an organization’s CAUTI rate as bacteremia is unnecessarily treated
4. 23% to 50% antibiotic days for UTI are from ASB

Garcia, R & Spitzer ED. American J of Infect. Control. 2017;article in press
Resident Physicians (N=106) and Nurses (N=159): Triggers For Cultures In Catheterized Patients
(Sibai et al, ID Week 2013, presentation 205)

<table>
<thead>
<tr>
<th>Trigger for Urine Culture</th>
<th>Resident Physicians (Answered Yes)</th>
<th>Nurses (Answered Yes)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foul smelling urine</td>
<td>75 (70.8%)</td>
<td>378/391 (96.7%)</td>
</tr>
<tr>
<td>Cloudy urine</td>
<td>84 (79.2%)</td>
<td>376/391 (96.2%)</td>
</tr>
<tr>
<td>Sediments in urine</td>
<td>57 (53.8%)</td>
<td>330/389 (84.8%)</td>
</tr>
<tr>
<td>Darker urine</td>
<td>39 (36.8%)</td>
<td>207/382 (54.2%)</td>
</tr>
<tr>
<td>Chronic UC on admission</td>
<td>46 (43.4%)</td>
<td>305/389 (78.4%)</td>
</tr>
</tbody>
</table>

All of the above should NOT trigger a urine culture in catheterized patients!

Resident Physicians and Pyuria: Obtain A Urine Culture In Catheterized Patients
(Sibai et al, ID Week 2013, presentation 205)

<table>
<thead>
<tr>
<th>Trigger for Urine Culture</th>
<th>Answered Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urine WBC 25 cells</td>
<td>71 (67%)</td>
</tr>
<tr>
<td>Urine WBC 100 cells</td>
<td>94 (88.7%)</td>
</tr>
<tr>
<td>Urine WBC 500 cells</td>
<td>101 (95.3%)</td>
</tr>
</tbody>
</table>

Pyuria in an asymptomatic patient with an indwelling urinary catheter should not be a trigger for culture or antimicrobials

Garcia, R & Spitzer ED. American J of Infect. Control. 2017;article in press
Color or Odor
(Hooton, Clin Infect Dis 2010; 50:625–663)

**IDSA guidelines:**
“In the catheterized patient, the presence or absence of odorous or cloudy urine alone should not be used to differentiate CA-ASB from CA-UTI or as an indication for urine culture or antimicrobial therapy.”

- Implement triggers for lab and/or infectious disease review of urine cultures ordered without documented signs of infection
- Educate front-line staff about asymptomatic bacteriuria (ASB) and the harm of over-treating ASB.

How to Reduce Unnecessary Urine Cultures

1. Evaluate current processes for obtaining urine cultures (avoid automatic triggers or screening cultures with no appropriate indications)

2. Evaluate practice patterns (avoid PAN culturing)

3. UC order that requires selection of appropriate indications

4. Provide education on when it is appropriate to obtain urine cultures

5. Measure % of patients treated with antibiotics for urinary tract infection with catheter and no documented signs or symptoms of clinical infection (ASB)

5. Reflux urine cultures should only be considered if used in conjunction with careful clinical evaluation of S & S.

Garcia, R & Spitzer ED. American J of Infect. Control. 2017;article in press
Practice Urine Culture Stewardship

**Appropriate Urine Culture Use**

- Part of an evaluation of sepsis without a clear source (CAUTI is often a diagnosis by exclusion)
- Based on local findings suggestive of CAUTI (example, pelvic discomfort or flank pain)
- Prior to urologic surgeries where mucosal bleeding anticipated or transurethral resection of prostate
- Early pregnancy (avoid urinary catheters if possible)

S & S: fever, acute hematuria, delirium, rigors, flank pain, burning, pelvic discomfort, urgency, frequency, dysuria, suprapubic pain
Example: St Joseph Mercy Hospital Urine Culturing Tool

*SHOULD THIS PATIENT BE EVALUATED FOR A URINARY TRACT INFECTION?*

Does the patient have any of the following without alternate explanation?

1. Urgency, frequency, dysuria
2. Suprapubic pain/tenderness
3. Flank pain or tenderness
4. New onset delirium
5. Fever >38 C/Rigors
6. Acute hematuria
7. Increased spasticity or autonomic dysreflexia in a spinal cord injury patient
8. ≥2 SIRS criteria (T > 38 C or < 35 C, HR > 90, RR > 20 or PaCO2 < 32 mmHg, WBC > 12 K/mm³ or < 4 K/mm³ or > 10% bands) OR shock with concerns for sepsis

**YES**

Send U/A & urine culture
Document indication for sending urine culture
Start empiric therapy (see reverse side)

**NO**

Do NOT send urine culture

**EMPIRIC THERAPY BASED ON CLASSIFICATION OF URINARY TRACT INFECTION (UTI)**

Empiric choices should take into account recent antibiotic use.

<table>
<thead>
<tr>
<th>PATIENT CATEGORY</th>
<th>PREFERRED</th>
<th>2ND LINE</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASYMPTOMATIC BACTERIURIA</td>
<td>Do not treat except in pregnancy, prior to urologic procedures, or neutropenia</td>
<td>Candidiasis: Change catheter. Do not treat except prior to urologic procedures or in neutropenia</td>
<td></td>
</tr>
</tbody>
</table>
| UNCOMPLICATED LOWER TRACT UI | TMP/SMX or Nitrofurantoin | Ciprofloxacin or Cephalexin | TMP/SMX: 3 days
Nalidixic acid: 3 days (contraindicated if GFR < 60 mL/min) Ciprofloxacin: 3 days
Cephalexin: 2 days |
| COMPLICATED LOWER TRACT UI | Ceftriaxone or TMP/SMX or Ciprofloxacin (if high risk for resistant gram negatives) or Piperacillin-tazobactam (if high risk for resistant gram negatives and enterococcus) | Ciprofloxacin | 7 days if prompt resolution
5 days if quinolone used
14 days if delayed response to therapy or bacteremia |
| SEPSIS WITH UTI, PYELOPYEONEPHRITIS, PERINEPHRIC ABSCESSES | Ceftriaxone or Ciprofloxacin (if high risk for resistant gram negatives and enterococcus) | Ceftaridine Vancomycin PLUS Aztreonam | Ceftaridine: 10-14 days
Vancomycin: 7 days
Aztreonam: 10-14 days |

Follow culture results and de-escalate therapy based on final results and sensitivities.

*FOR EACH ANTIBIOTIC: DOCUMENT INDICATION AND PLANNED DURATION FOR ALL PATIENTS*
Impact of Culturing Practice Change

- 700 bed Academic Medical Center
- Quasi-Experimental/pre & post design
- Aggregate data from all adult ICU patients; population level antimicrobial use, urine cultures, bacteriuria per 1000 pt days per & post

Results:
- Aggregate monthly rates of urine cultures performed & bacteriuria significantly ↓ but not days of antibiotic use did not
- Patient level: fewer patients started on antimicrobials based on urine culture results (23% vs 41% p=.002), no diff in total days.

Collection & Transport to Reduce Contamination

- If it is a catheter placed > 2 weeks, change the catheter before collecting a specimen
- Clamp tubing 12 inch below sample port allowing urine

Contaminated urine cultures lead to additional diagnostic evaluation and inappropriate antibiotic administration > 40%


- If specimen can’t be transported and plated on culture medium within 2 hrs. of collection, then specimen should be refrigerated.
- To overcome logistic barriers: most use urine collection tubes with preservatives.

www.apic.org/implementationguides April 2014
Garcia, R & Spitzer ED. American J of Infect. Control. 2017;article in press
On Transfer

• What devices can be removed before the patient is transferred to a different level of care
Core Recommendations

• Insert catheters only for appropriate indications (1B)
• Leave catheters in only as long as needed (1B)
• Ensure that only properly trained persons insert and maintain catheters (1B)
• Insert catheters using aseptic technique and sterile equipment (acute care settings) (1C)
• Consider use of alternatives (II)
• Maintain a close drainage system (1B)
• Secure the system (1B)
• Maintain unobstructed urine flow (1B)
• Key the collecting bag below the level of the bladder at all times (1B)
• Unresolved-
  • Antiseptic or sterile saline for meatal cleaning before insertion

# Simplified Insertion Checklist for Urinary Catheter

<table>
<thead>
<tr>
<th>Components of Checklist</th>
<th>Compliant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand hygiene before and after procedure</td>
<td>Yes</td>
</tr>
<tr>
<td>Sterile gloves, drapes, sponges, aseptic sterile solution for cleaning, and single use packet lubricant used</td>
<td>Yes, after correction</td>
</tr>
<tr>
<td>Aseptic insertion technique (no contamination during placement)</td>
<td></td>
</tr>
<tr>
<td>Proper securement of urinary catheter post-procedure</td>
<td></td>
</tr>
<tr>
<td>Closed drainage system and bag below patient post-procedure</td>
<td></td>
</tr>
</tbody>
</table>
Core Recommendations

• Insert catheters only for appropriate indications (1B)
• Leave catheters in only as long as needed (1B)
• Ensure that only properly trained persons insert and maintain catheters (1B)
• Insert catheters using aseptic technique and sterile equipment (acute care settings) (1C)
• Consider use of alternatives (II)
• Maintain a close drainage system (1B)
• Secure the system (1B)
• Maintain unobstructed urine flow (1B)
• Key the collecting bag below the level of the bladder at all times (1B)
• Unresolved-
  • Antiseptic or sterile saline for meatal cleaning before insertion

Securement Devices
Core Recommendations

- Insert catheters only for appropriate indications (1B)
- Leave catheters in only as long as needed (1B)
- Ensure that only properly trained persons insert and maintain catheters (1B)
- Insert catheters using aseptic technique and sterile equipment (acute care settings) (1C)
- Consider use of alternatives (II)
- Maintain a close drainage system (1B)
- Secure the system (1B)
- Maintain unobstructed urine flow (1B)
- Key the collecting bag below the level of the bladder at all times (1B)
- Unresolved-
  - Antiseptic or sterile saline for meatal cleaning before insertion

Additional Recommendations: SHEA Compendium Update 2014

• Develop a protocol for management of post-op urinary retention
  • Bladder scanner
  • Intermittent catheterization
• Bladder training if appropriate

• Replace the catheter and the collecting system using aseptic technique when breaks in aseptic technique, disconnection, or leakage occur (quality of evidence: III).

• Do not routinely use antimicrobial/antiseptic impregnated catheters (small study in PICU showed no statistical difference between betadine, .05% CHG and sterile water*)

• Do not screen for asymptomatic bacteriuria in catheterized patients

How We Bathe May Impact CA-UTI’s

Why are there so many bugs in here?
Bath Basins
Potential Source of Infection

Large multi-center study evaluates presence of multi-drug resistant organisms

Total hospitals: 88
Total basins: 1103

- Contaminated: 686 basins/88 Hospital (62%)
- Gram negative bacilli: 495 basins/86 hospitals (45%)
- Colonized w/ VRE: 385 basins/80 hospitals (35%)
- MRSA: 36 basins/28 hospitals (3%)

Mechanisms of Contamination

• Skin flora
• Multiple-use basins
  • Incontinence cleansing
  • Emesis
• Product storage
• Bacterial biofilm from tap water

Biofilms are ubiquitous
Water Source

**Hospital Tap Water**

- Bacterial biofilm
- Most overlooked source for pathogens
- 29 studies demonstrate an association with HAIs and outbreaks

**Transmission:**
- Drinking
- Bathing
- Rinsing items
- Contaminated environmental surfaces
- Immunocompromised patients at greatest risk

Understanding Water

• All water with the exception of sterile water and filtered water is contaminated with microbes (eg, potable water, tap water, showers, and ice).

• In healthy persons, contact or ingestion of such water rarely leads to infection.

• However, contact or ingestion of such water may cause infection in immunocompromised persons or when applied to non-intact skin.

• Transmission of these pathogens from a water reservoir may occur by direct and indirect contact, ingestion and aspiration of contaminated water, or inhalation of aerosols.*

Presented at MSIPC October 6th, 2016, Lansing MI by Dorine Berriel-Cass
Reducing UTI’s Through Basinless Bathing

CA-UTI 7.5 per 1000 catheter days to 4.42 per 1000 catheter days, then to .46 per 1000 catheter days

Stone S, APIC 2010
Impact on UTI with Basin Bathing

UTI Rate - Removal of Prepackaged Bath Product QTR 3 FY05

# The Effect of Bathing with Basin and Water and UTI Rate, LOS and Costs

## Unit Census: 14

<table>
<thead>
<tr>
<th>Phases</th>
<th>Product Cost/ No. of UTI</th>
<th>Median LOS 17 Days</th>
<th>Median Cost (4857.00)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I- Pre-Packaged Bathing Washcloths (9 months)</td>
<td>$10,530(^1) ($3.00)</td>
<td>25</td>
<td>$117,175</td>
</tr>
<tr>
<td>II- Basin/Water (9 months)</td>
<td>$3,510(^2) ($1.00)</td>
<td>48</td>
<td>$224,916</td>
</tr>
<tr>
<td>III- Additional Product Cost, UTI, LOS, COSTS</td>
<td>$7,020</td>
<td>23(^3)</td>
<td>$107,741</td>
</tr>
</tbody>
</table>

\(^1\)Based on 3 packages of 8 towels each  \(^2\)Based on product cost of towels, soap, and basin  \(^3\)Difference between phase I pre-package/phase II basin water  \(^4\)

Cleansing of Patients with Indwelling Catheter

- Indwelling catheter care should occur with the daily bath (basinless bathing)*, as a separate procedure using clean technique.
- There is no evidence to support 2x a day indwelling catheter care.
- If a large liquid stool occurs, bathe the patient with basin less bathing.
- Apply barrier cloth to area of skin requiring protection.
Nurstoons

by Carl Elbing

How did your first Foley catheter insertion go?
Terrible!! I got so nervous that I put it in the wrong "opening."

Don't be so hard on yourself. It's difficult to find the meatus on an old lady.

I know... but it wasn't an old lady, it was a man!!

OH...

www.nurstoons.com
THINGS TO CONSIDER
Cost-Benefit Ratio

CA-UTI vs. IAD & Pressure Ulcer
Moisture Injury: Incontinence Associated Dermatitis

- Inflammatory response to the injury of the water-protein-lipid matrix of the skin
  - Caused from prolonged exposure to urinary and fecal incontinence
- Top down injury
- Physical signs on the perineum & buttocks
  - Erythema, swelling, oozing, vesiculation, crusting and scaling

Brown DS & Sears M, OWM 1993;39:2-26
IAD: Multisite Epidemiological Study

• 5342 patients in 424 facilities in Acute & Long Term Care in US
• Prevalence study
  • To measure the prevalence of IAD in the acute care setting,
  • To describe clinical characteristics of IAD, and
  • To analyze the relationship between IAD and prevalence of sacral/coccygeal pressure ulcers
• Results: 1716 patients incontinent (44%)
  • 57% both FI and UI, 27% FI, 15% UI
  • 24% IAD rate
    • 60% mild
    • 27% moderate
    • 5% severe
  • 73% was facility acquired
• ICU a 36% rate
• IAD 5x more likely to develop a HAPU

Giuliana K. Presented at the CAACN September 25-27th Winnipeg, Manitoba, CA
Gray M. Presenting a Wound Care Conference, 2016, New York City, NY
Partners

**WOC**
- Incontinence associated dermatitis (IAD)
- Bathing strategies to maximize the barrier function of the skin
- Do no harm: process variation reduction

**Infection Preventionist**
- Nurse catheter removal program
- Basin less bathing to address the risk factors with basins and tap water
- Do no harm: process variation reduction

---

Parry MF, et al. AM J Of Infect Control, 2013;41:1178-81
Reminder Systems May Reduce Inpatient Catheter Use and Associated UTIs


<table>
<thead>
<tr>
<th>Study</th>
<th>RR (95% CI)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reminder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apisarnthanarak (2007)</td>
<td>0.24 (0.15, 0.37)</td>
<td>19.34</td>
</tr>
<tr>
<td>Crouzet (2007)</td>
<td>0.15 (0.01, 0.82)</td>
<td>11.09</td>
</tr>
<tr>
<td>Ploum (2004)</td>
<td>0.72 (0.54, 0.96)</td>
<td>16.72</td>
</tr>
<tr>
<td>Jain (2006)</td>
<td>0.64 (0.33, 1.20)</td>
<td>10.35</td>
</tr>
<tr>
<td>Overall (P = 0.09; P &lt; .001)</td>
<td>0.44 (0.13, 0.74)</td>
<td>57.49</td>
</tr>
<tr>
<td>Stop Order</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Topal (2005)</td>
<td>0.53 (0.25, 1.06)</td>
<td>11.09</td>
</tr>
<tr>
<td>Stephen (2006)</td>
<td>0.41 (0.19, 0.82)</td>
<td>13.55</td>
</tr>
<tr>
<td>Durance (1998)</td>
<td>0.65 (0.50, 0.84)</td>
<td>17.87</td>
</tr>
<tr>
<td>Overall (P = 0.09; P = .403)</td>
<td>0.59 (0.45, 0.73)</td>
<td>42.51</td>
</tr>
<tr>
<td>Overall (P = 78.7%; P &lt; .001)</td>
<td>0.48 (0.28, 0.68)</td>
<td>100.00</td>
</tr>
</tbody>
</table>

NOTE: Weights are from random effects analysis
Nurse Directed Catheter Removal

- 300 bed community teaching hospital
- Implementation of a nurse directed urinary catheter removal protocol
  - Protocol linked to physician catheter order
  - Physician documentation of catheter insertion criteria & device specific charting in progress notes
  - Bi-weekly unit specific feedback
- Results: 50% ↓ in catheter use & 70% ↓ in CAUTI

Parry MF, et al. AM J Of Infect Control, 2013;41:1178-81
Engage the Patient & Family

- Educate patients and families about the steps that are being taken to minimize the risk of CAUTI.
- Education: purpose, current indications for use, expected duration of the catheter, why it is important to remove as soon as possible & catheter alternatives
- Catheter removal goal on whiteboard & include in rounds

Pathogenesis of CAUTI

- Source: colonic or perineal flora on hands of personnel
- Microbes enter the bladder via extraluminal {around the external surface} (proportion = 2/3) or intraluminal {inside the catheter} (1/3)
- Daily risk of bacteriuria with catheterization is 3% to 10%; by day 30 = 100%
Novel Dual Balloon Catheter

- Tampa General Neuro ICU
- No protocol/CAUTI bundle changes occurred during the study period.
- 161 patients had dual balloon catheters placed and 223 patients had single balloon catheters placed in the NSICU
- Dual balloon rate lower than NHSN benchmark for Academic center NICUs

Tools Used with Intervention

- Lecture for nurses
- Pocket cards, posters

**Tools Used with Intervention**

- Lecture for nurses
- Pocket cards, posters

---

**Urinary Catheter Project**

*Goals*

- To decrease catheter-associated urinary tract infections (CAUTIs)
- To improve patient safety
- To teach nurses the indications for urinary catheter use
- To increase the unnecessary use of urinary catheters in the hospital setting

*Background*

- 560,000 patients develop hospital-acquired UTIs per year
- 5% of these are catheter-associated
- At least 100,000 patients with a urinary catheter do not have a valid indication for placement
- Each day the urinary catheter remains, the risk of the CAUTI increases 5%

*Prevention of CAUTI*

- Follow criteria for urinary catheter use:
  1. Acute urinary retention or obstruction
  2. Perioperative 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 catheters on admission

**Remove Unnecessary Urinary Catheters!**

**Remove That Urinary Catheter!**

**Urinary Catheters Increase:**

- Likelihood of infection
- Patient discomfort
- Antibiotic use
- Length of stay
- Cost

*Urinary Catheters ARE Indicated for:*

- Acute urinary retention or obstruction
- Perioperative 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

*Urinary Catheters ARE NOT Indicated for:*

- Urine output monitoring OUTSIDE intensive care
- Incontinence (place on toileting routine, change frequently)
- Prolonged postoperative use
- Patients referred from intensive care to general units
- Mobidity
- Immobility (turn patient q 2 hours, up in chair)
- Confusion or dementia

**DOES YOUR PATIENT REALLY NEED A URINARY CATHETER?**

**INDICATIONS FOR URINARY CATHETER USE INCLUDE:**

- Acute urinary retention or obstruction
- Perioperative 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

**ANY QUESTIONS, PLEASE CALL [INSERT CONTACT INFO]**

---

**Urinary Catheter Use Information**

**Foley Catheter Indication:***

- Acute urinary retention or obstruction
- Perioperative 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

**Foley Catheter are not indicated for:***

- Urine output monitoring OUTSIDE intensive care
- Incontinence (place on toileting routine, change frequently)
- Prolonged postoperative use
- Patients referred from intensive care to general units
- Mobidity
- Immobility (turn patient q 2 hours, up in chair)
- Confusion or dementia
- Frail patient

---

**Urinary Catheter Use Information**

**Foley Catheter Indication:***

- Acute urinary retention or obstruction
- Perioperative 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

**Foley Catheter are not indicated for:***

- Urine output monitoring OUTSIDE intensive care
- Incontinence (place on toileting routine, change frequently)
- Prolonged postoperative use
- Patients referred from intensive care to general units
- Mobidity
- Immobility (turn patient q 2 hours, up in chair)
- Confusion or dementia
- Frail patient
A Program to Prevent Catheter-Associated Urinary Tract Infection in Acute Care

Study Population and Methods

- 926 units (59.7% non-ICU, 40.3% ICU) (more than 10% of U.S. acute care hospitals)
- 603 hospitals in 32 states, the District of Columbia and Puerto Rico
- Sponsored by the AHRQ & (MHA) Keystone Center’s Bladder Bundle
- National collaboration of professional societies, academic researchers, government agencies (IE:CDC), and state hospital associations
- Technical practices and socio-adaptive factors (CUSP)
- 9 Cohorts of hospital units participated—reporting the results of the first 4 Cohorts
- Began March of 2011 to November of 2013 (18 months)
Goals of Program

- Reduce Catheter associated UTIs
- Improve attitudes and behavior with respect to safety (IE: safety culture)

Timeline

- 3 month baseline
- 2 months implementation phase
- 12 months—sustainability phase

Program Components

- 3 in-person meetings—“Learning Sessions” over course of 18 months
- Monthly National Content Calls—experts provided education on both technical and socio-adaptive aspects of CAUTI prevention
- Monthly coaching calls by state organizations/leaders
# Key Interventions

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Example of Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary</strong></td>
<td></td>
</tr>
<tr>
<td>Conducting daily assessment of the presence of and need for an indwelling urinary catheter</td>
<td>Conducting daily nursing rounds to review urine-collection strategies, including indications for continued urinary-catheter use</td>
</tr>
<tr>
<td>Avoiding use of an indwelling urinary catheter by considering alternative urine-collection methods</td>
<td>Promoting the use of condom catheters, bladder scanners, intermittent straight catheterization, and accurate measurement of daily weight (all in lieu of indwelling urinary catheters)</td>
</tr>
<tr>
<td>Emphasizing the importance of aseptic technique during catheter insertion and proper maintenance after insertion</td>
<td>Developing or updating the catheter-insertion policy to include all the proper steps, developing competencies for health care workers who insert catheters, and considering periodic audits of catheter placement</td>
</tr>
<tr>
<td><strong>Additional</strong></td>
<td></td>
</tr>
<tr>
<td>Providing feedback to the units regarding urinary-catheter use and catheter-associated UTI rates</td>
<td>Providing nurses and physicians with data on urinary-catheter use, with monthly feedback on use and catheter-associated UTIs</td>
</tr>
<tr>
<td>Addressing any identified gaps in knowledge of urinary management processes†</td>
<td>Conducting an evaluation for gaps in knowledge of infectious and noninfectious consequences of urinary-catheter use; developing tailored educational materials to fill identified gaps; using multiple venues for education, including bedside and electronic; incorporating education into annual competency testing for nurses; and using multiple venues for physicians (formal presentations and meetings, with one-to-one discussions for physicians with high use)</td>
</tr>
</tbody>
</table>

*UTI denotes urinary tract infection.
† Urinary management processes include proper insertion and maintenance of indwelling urinary catheters, use of alternative urine-collection methods, and prevention of infectious and noninfectious consequences of urinary-catheter use.
Results

• CAUTI rates decreased from 2.82 infections/1000 catheter days to 2.19 per 1000 catheter days (22.3% change) (unadjusted)

• (Adjusted) CAUTI rates decreased from 2.4 infections/1000 catheter days to 2.05 infections/1000 catheter days (P=0.009)

• Reductions occurred mainly in the non-ICU: 2.28 to 1.54 infections/1000 catheter days (P<0.001)

• Catheter use in non-ICU decreased from 20.1% to 18.8% (adjusted for hospital size)

• Catheter use in the ICUs decreased from 61.1% to 57.6%
### Catheter-Associated Urinary Tract Infections (CAUTI)
#### Top Ten Checklist

1. Insert indwelling urinary catheters only for clinically appropriate reasons. Involve clinicians in all units where catheters are commonly inserted, including ED, ICU and surgical procedure units.
2. Promote use of alternatives to indwelling catheters such as external catheters, bladder scanners, intermittent catheterization, optimal incontinence products, prompted toileting and use of urinals, bedside commodes and daily weights as alternative methods to collect and measure.
3. Ensure proper aseptic insertion and maintenance technique involving hand hygiene, soap and water perineal care, strict adherence to aseptic catheter insertion steps, catheter securing, no kinks, bag lower than bladder and avoid breaks in closed system. Do not routinely change catheters. Educate all staff and family that care for or transport catheterized patients.
4. Optimize prompt removal of urinary catheters that are not clinically indicated. Conduct daily review of catheter necessity, with consideration of nurse empowerment to remove by default if no longer clinically indicated.
5. Culture only when symptomatic. Do not culture because of odor, color, cloudiness or simply prolonged catheter use.
6. Perform root cause analysis on all CAUTIs to identify root causes and contributing factors. Evaluate and discuss with interprofessional team to identify systems issues and practice gaps related to unnecessary or improper catheter use.
7. Provide transparent feedback to providers and staff regarding hospital-wide and unit-specific infection and catheter utilization data.
8. Observe, document competency and provide real-time feedback of catheter insertion and maintenance on a routine basis.
9. Conduct regular catheter rounds with targeted education to reduce inappropriate use and clarify interpretations of appropriateness criteria.
10. Encourage and expect staff, patients and families to speak up and consider hand hygiene as an "always event," as well as to inquire about the daily necessity of indwelling urinary catheters.

It is not enough to do your best; you must know what to do, and THEN do your best.

~ W. Edwards Deming
Advocacy Starts with Us
Forbid yourself to be deterred by poor odds just because your mind has calculated that the opposition is too great. If it were easy, everyone would do it.