Target Zero: Evidence-Based Strategies for Reducing the Risk of CAUTIs

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Disclosures for Kathleen Vollman

- Consultant-Michigan Hospital Association Keystone Center
- Subject matter expert for CAUTI and CLABSI for CMS/HEN 1.0 & 2.0 & HIIN
- Consultant and speaker bureau for Sage Products LLC now a part of Stryker
- 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 CAUTIs.

• Discuss possible barriers to practice changes and realistic solutions to assist the team in the implementation process.
Comparison of HAIs between 2011 and 2015 in Acute care

<table>
<thead>
<tr>
<th>HAI</th>
<th>2011-8,954 patients</th>
<th>2015-8,833 patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia</td>
<td>.97%</td>
<td>.89%</td>
</tr>
<tr>
<td>CDI</td>
<td>.56%</td>
<td>.59%</td>
</tr>
<tr>
<td>SSI</td>
<td>1.0%</td>
<td>.54%</td>
</tr>
<tr>
<td>BSI</td>
<td>.45%</td>
<td>.43%</td>
</tr>
<tr>
<td>UTI</td>
<td>.55%</td>
<td>.34%</td>
</tr>
<tr>
<td>GI other</td>
<td>.25%</td>
<td>.18%</td>
</tr>
</tbody>
</table>

Number of Patients with >1 HAI ↓ from 35 patients in 2011 to 22 patients in 2015

Magill SS et al. NEJM 2014;370:1198-208
Magill et al. 2017 Presented Infectious Disease Week, October 2017, San Diego, CA.
Economic Burden of HAI’s: Build The Business Case


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

Per Case Basis

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

  - EMR Meaningful Use Requirements
    - Reductions up to ¾ of update factor

  - Value Based Purchasing (VBP)
    - 2% reduction
    - CAUTI & CLA-BSI
Addressing CAUTIs Through Evidence-Based Care Practices
The Why

- UTIs represent the 4th most common type of HAIs
- Along with other device associated infections (CLABSI and VAP), UTIs account for 30% of all HAIs
- 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, with an estimated savings of $2,805,000
- HEN 2: 10 of the 34 states ↓ CAUTI harm by 40%. 505 CAUTIs were prevented, with an estimated savings of $505,000.
- HIIN & AHRQ CAUTI reduction projects ongoing

# CUSP & CAUTI Interventions

<table>
<thead>
<tr>
<th>Adaptive /Cultural</th>
<th>Technical</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CUSP</strong></td>
<td><strong>CAUTI</strong></td>
</tr>
</tbody>
</table>
| 1. Educate on the Science of Safety | 1. Insertion  
| 2. Identify Defects (Staff Safety Assessment) | Limiting use  
| 3. Senior Executive Partnership | Using aseptic technique for site prep, equip & supplies  
| 4. Learn from Defects | 2. Maintenance  
| 5. Implement Teamwork & Communication Tools | • 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%

APIC Guide to Preventing CAUTI:2014
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 if 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

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 3L 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.
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: required 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
46% ↓

Average wear time: 48-72hrs

Zero Male CAUTI's During Intervention
Alternative Female External Collection Devices

• **How do they work?**
  • They are placed between the labia and the urethral opening
  • The devices are attached to wall suction
  • When female voids, the urine flows thru the fabric into the collection chamber at the distal end, the suction takes the urine to the collection container
Quality Improvement Project

- 18 bed adult SICU
- 10 month pre/post QI study
- Utilization of an external female collection device
- Daily rounds discussion
  - Inter-professional discussion regarding indications
    - Avoid placement
    - Early removal
- Measurement: CAUTI & SIR rates

Beeson T, Davis C & Vollman K. Presented at the NACNS Meeting in Austin Tx, March 2, 2018
## Outcomes

<table>
<thead>
<tr>
<th>Pre/Post Comparison Using Female External Device</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAUTI Rate</td>
<td>2.55</td>
<td>0.7</td>
</tr>
<tr>
<td>Standardized Infection Ratio (SIR)</td>
<td>1.395</td>
<td>0.381</td>
</tr>
<tr>
<td>Indwelling Catheter Days</td>
<td></td>
<td>↓ 9%</td>
</tr>
</tbody>
</table>

Beeson T, Davis C & Vollman K. Presented at the NACNS Meeting in Austin Tx, March 2, 2018
CDC, SHEA, IDSA, and NHS: Indications for Placement of Indwelling Catheter

- 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 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 impacts 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

4. 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)

<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>TMS/SMX or Nitrofurantoin</td>
<td>Cephalosporin or Cefalaxin</td>
<td>TMS/SMX x 3 days</td>
</tr>
<tr>
<td>UNCOMPLICATED LOWER TRACT UTI</td>
<td>TMP/SMX or Nitrofurantoin</td>
<td>Cephalosporin or Cefalaxin</td>
<td>TMS/SMX x 3 days</td>
</tr>
<tr>
<td>CEPHALOSPORIN RESISTANT</td>
<td>Ceftriaxone or Cefazolin</td>
<td>Cefepime or Piperacillin-tazobactam</td>
<td>Ceftriaxone x 7 days</td>
</tr>
<tr>
<td>COMPLICATED LOWER TRACT UTI</td>
<td>Ceftriaxone or TMS/SMX or Cefepime (if resistant)</td>
<td>Piperacillin-tazobactam (if resistant)</td>
<td>Ceftriaxone</td>
</tr>
<tr>
<td>SEPSIS WITH UTI, PYELONEPHRITIS, PERITONEAL ABSCESS</td>
<td>Ceftriaxone or Cefepime (if critically ill, septic or recently hospitalized) or Piperacillin-tazobactam (if critically ill, septic or recently hospitalized and concern for enterococcus)</td>
<td>Gentamicin or Amikacin</td>
<td>Ceftriaxone</td>
</tr>
</tbody>
</table>

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

FOR EACH ANTIBIOTIC: DOCUMENT INDICATION AND PLANNED DURATION FOR ALL PATIENTS

Version date: 9/30/2012
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 1,000 pt days pre & post

**Results:**
- Aggregate monthly rates of urine cultures performed & bacteriuria significantly ↓ but 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 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, 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
CAUTI Reduction: Improving Culture Process

- Level 1 Trauma center, from Jan 2013 to Jan 2015
- 6,236 patients: pre: 5,003 & post 1,233

**Process Improvement**

<table>
<thead>
<tr>
<th>Urinary catheter process optimization</th>
<th>Standard process for obtaining a urine culture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caregiver engagement on appropriate patient selection</td>
<td>Removing or placing a new catheter prior to urinalysis and culture for existing catheters greater than 72 hours</td>
</tr>
<tr>
<td>Optimization of insertion and maintenance technique</td>
<td>Defining a negative UA as white cells less than 10 WBC/HPF, where a culture is not indicated</td>
</tr>
<tr>
<td>Prospective audits with evaluation for ongoing indication</td>
<td>Prospective urine culture surveillance and discontinuation of inappropriate cultures based on the UA definition</td>
</tr>
<tr>
<td>Emphasis on early discontinuation</td>
<td></td>
</tr>
</tbody>
</table>

**Results**

- 29 urine cultures cancelled

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 closed drainage system (1B)
- Secure the system (1B)
- Maintain unobstructed urine flow (1B)
- Keep the collection 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, after correction</td>
</tr>
<tr>
<td>Sterile gloves, drapes, sponges, aseptic sterile solution for cleaning, and single use packet lubricant used</td>
<td></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)
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- Maintain closed drainage system (1B)
- Secure the system (1B)
- Maintain unobstructed urine flow (1B)
- Keep the collection 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 closed drainage system (1B)
• Secure the system (1B)
• Maintain unobstructed urine flow (1B)
• Keep 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 CAUTIs

Why are there so many bugs in here?
Reducing UTI’s Through Basinless Bathing

CA-UTI 7.5 per 1,000 catheter days to 4.42 per 1,000 catheter days, then to .46 per 1,000 catheter days

89% Reduction

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&lt;sup&gt;1&lt;/sup&gt; ($3.00)</td>
<td>25</td>
<td>$117,175</td>
</tr>
<tr>
<td>II- Basin/Water (9 months)</td>
<td>$3,510&lt;sup&gt;2&lt;/sup&gt; ($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&lt;sup&gt;3&lt;/sup&gt;</td>
<td>$107,741</td>
</tr>
</tbody>
</table>

<sup>1</sup>Based on 3 packages of 8 towels each  
<sup>2</sup>Based on product cost of towels, soap, and basin  
<sup>3</sup>Difference between phase I pre-package/phase II basin water  
Cleansing of Patients with Indwelling Catheter

- Antiseptic cleaning of the meatal area before and during catheter use may reduce the risk of CAUTIs.

- 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 basinless bathing.

- Apply barrier cloth to area of skin requiring protection.

Comparison of antibacterial agent for routine care vs soap and water trended towards significance.

HHE /CAUTI Reduction Project/ 610 Bed Academic Center

Catheter-Associated Urinary Tract Infection Cause-and-Effect and Driver Diagrams

Define
Measure
Analyze
Improve
Control

HHE /CAUTI Reduction Project

CAUTI Rates

Utilization Rates


81.5% Reduction
THINGS TO CONSIDER
Cost-Benefit Ratio

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

- Inflammatory response to 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

- 5,342 patients in 189 acute care facilities in 36 states
- Prevalence study
  - To measure the prevalence of IAD, describe clinical characteristics of IAD, and analyze the relationship between IAD and prevalence of sacral/coccygeal pressure ulcers
- Results: 2,492 patients incontinent (46.6%)
  - 57% both FI and UI, 27% FI, 15% UI
  - 21.3% IAD rate overall/14% also had fungal rash
  - 45.7% in incontinent patients
    - 52.3% mild
    - 27.9% moderate
    - 9.2% severe
  - 73% was facility-acquired
- ICU a 36% rate
- IAD alone and in combination with immobility statistically associated with FAPI

Gray M. Giuliana K. JWOCN. 2018;45(1):63-67
WOC

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

FRONTLINE NURSE

Infection Preventionist

- Nurse catheter removal program
- Basinless 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


Reminder
56% reduction

Stop Order
41% reduction
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%

APIC Guide to Preventing CAUTI
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
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>
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<tbody>
<tr>
<td><strong>Primary</strong></td>
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<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>
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<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>
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<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>
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<tr>
<td><strong>Additional</strong></td>
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<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>
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*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/1,000 catheter days to 2.19 per 1,000 catheter days (22.3% change) (unadjusted)

• (Adjusted) CAUTI rates decreased from 2.4 infections/1,000 catheter days to 2.05 infections/1,000 catheter days (P=0.009)

• Reductions occurred mainly in the non-ICU: 2.28 to 1.54 infections/1,000 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.

Be Courageous

We all are responsible for the safety of our patients ......Own the Issues

• “If not this, then what??”
• “If not now, then when?”
• “If not me, then who??”