Do No Harm: Evidence Based Nursing Care Strategies to Improve Patient Outcomes

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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
Session Objectives

• Identify modes of transmission for spread of microorganisms in the critical care environment

• Define key evidence based practices that can reduce bacterial load and/or prevent the development of HAI’s

• Outline key program steps for creating a source control program within your unit
“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 patients host defense through proactive use of evidence based hygiene care strategies

Incontinence Associated Dermatitis Prevention Program
INTERVENTIONAL PATIENT HYGIENE (IPH)

VAP/HAP

Oral Care/Mobility

HAND

Patient

HYGIENE

Catheter Care

Skin Care/Bathing/Mobility

CA-UTI

CA-BSI

SSI

HASI

Vollman KM. Australian Crit Care, 2009;22(4): 152-154
Achieving the Use of the Evidence

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

Vollman KM. Australian Crit Care, 2009;22(4): 152-154

Skills & Knowledge

Resources & System

Value

Attitude & Accountability

NSO
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

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Estimates: 183 Hospitals in 10 States</strong></td>
<td></td>
</tr>
<tr>
<td>HAI:</td>
<td>722,000/year</td>
</tr>
<tr>
<td>HAI-related deaths:</td>
<td>75,000/year</td>
</tr>
<tr>
<td>Hospitalized patients develop infection:</td>
<td>1 out of 25 (4%)</td>
</tr>
<tr>
<td>Death due to sepsis/septic shock:</td>
<td>700/day</td>
</tr>
<tr>
<td>Money spent:</td>
<td>$45 billion/year</td>
</tr>
<tr>
<td>Increase risk of readmission:</td>
<td>27 days vs. 59 days</td>
</tr>
</tbody>
</table>

– 75% of HAI not related to devices (CAUTI, CLABSI, VAP)

• Recommendation:
  – As device-related infections decrease, expand surveillance and prevention activities to include other HAIs

### Health Care Associated Infection Data

<table>
<thead>
<tr>
<th>Measurement</th>
<th>NHSN 2013 3815 Acute Care Hospitals</th>
<th>Estimated # of Infections</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAP/per 1000 patient days</td>
<td></td>
<td>*157,500 (21.8%)</td>
</tr>
<tr>
<td>VAP/per 1000 vent days</td>
<td>Range of pooled means 0.2 (Ped CVICU) -4.4 (Burn ICU)</td>
<td>*49,900</td>
</tr>
<tr>
<td>CLA-BSI/per 1000 cath days</td>
<td>Range of pooled means 0.0 (Prenatal )-2.9 (Burn ICU) Step-down 0.6 (Adult)-1.4 (Peds)</td>
<td>*15,600</td>
</tr>
<tr>
<td>CA-UTI/per 1000 cath days</td>
<td>Range of pooled means 0.0 (Peds Surgical)-4.8 (Burns) Stepdown 0.8 (Peds) – 1.7 (Adults)</td>
<td>*35,600</td>
</tr>
</tbody>
</table>

HAI Progress Report

- 50% decrease in CLABSI between 2008 and 2014
- No change in overall CAUTI between 2009 and 2014
- Progress in non-ICU settings between 2009 and 2014, in all settings between 2013 and 2014, and even more progress in all settings toward the end of 2014
- 13% reduction in MRSA bacteremia’s
- 17% decrease in SSI related to the 10 select procedures tracked in previous reports. Between 2008 and 2014:
  - 17% decrease in abdominal hysterectomy SSI
  - 2% decrease in colon surgery SSI

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
Driving Change

Structure

- Gap analysis
- Build the Will
- Protocol Development

Process

- Make it Prescriptive
- Overcoming barriers
- Daily Integration

Outcomes
Build the Will: NV-HAP?

- HAP 1st most common HAI in U.S.
  - Increased morbidity \(\rightarrow\) 50% are not discharged back home
  - Increased mortality \(\rightarrow\) 18%-29%
  - Extended LOS \(\rightarrow\) 4-9 days
  - Increased Cost \(\rightarrow\) $28K to $109K
  - 2x likely for readmission <30 day


Slide courtesy of Barb Quinn
### Compelling Incidence Data

<table>
<thead>
<tr>
<th>Study</th>
<th>Incidence</th>
<th>Mortality</th>
<th>+LOS</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>J. Davis (2012) Pennsylvania</td>
<td>5,600 /3 yrs</td>
<td>18.9%</td>
<td>Not queried</td>
<td>$28,000</td>
</tr>
<tr>
<td>HCUP National database (P)</td>
<td>2/100 pts</td>
<td>14.5%</td>
<td>4 days</td>
<td>$36,400</td>
</tr>
<tr>
<td>CDC (2014)</td>
<td>13% of all HAIs</td>
<td>19%-50%</td>
<td>4-9 days</td>
<td>$40,000</td>
</tr>
</tbody>
</table>

Davis, Pt Safety Authority 2012 9(3).
Giuliano, K. et al. (2016) APIC Podium 2016
Magill, S.S. et al. (2014) NEJM. 370(13), p 1198-1208

Slide courtesy of Barb Quinn
Hospital-Acquired Pneumonia: Non-Ventilated versus Ventilated Patients in Pennsylvania

- **Purpose:**
  - Compare VAP and NV-HAP incidence, outcomes

- **Methods:**
  - Pennsylvania Database queried
  - All nosocomial pneumonia data sets (2009-2011)

### Results:

<table>
<thead>
<tr>
<th>Year</th>
<th>NO. OF NV-HAP CASES</th>
<th>NO. OF NV-HAP DEATHS</th>
<th>% OF NV-HAP CASES CONTRIBUTING TO DEATH</th>
<th>NO. OF VAP CASES</th>
<th>NO. OF VAP DEATHS</th>
<th>% OF VAP CASES CONTRIBUTING TO DEATH</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>1,976</td>
<td>363</td>
<td>18.4 (95% CI: 16.5 to 20.3)</td>
<td>922</td>
<td>163</td>
<td>17.7 (95% CI: 15.0 to 20.5)</td>
</tr>
<tr>
<td>2010</td>
<td>1,848</td>
<td>366</td>
<td>19.8 (95% CI: 17.8 to 21.8)</td>
<td>737</td>
<td>144</td>
<td>19.5 (95% CI: 16.3 to 22.7)</td>
</tr>
<tr>
<td>2011</td>
<td>1,773</td>
<td>315</td>
<td>17.8 (95% CI: 15.8 to 19.7)</td>
<td>640</td>
<td>127</td>
<td>19.8 (95% CI: 16.4 to 23.3)</td>
</tr>
<tr>
<td>Total</td>
<td>5,597</td>
<td>1,044</td>
<td>18.7 (95% CI: 17.5 to 19.8)</td>
<td>2,299</td>
<td>434</td>
<td>18.9 (95% CI: 17.1 to 20.7)</td>
</tr>
</tbody>
</table>

Note: NV-HAP refers to nonventilator-hospital-acquired pneumonia and VAP refers to ventilator-associated pneumonia.

- Mortality
- Incidence
- Total deaths
- Total cost
- Wide-spread

• **Purpose:**
  – Determine incidence and clinical factors of NV-HAP

• **Method:**
  – Descriptive, quasi-experimental study using retrospective data
  – Inclusion criteria:
    • All adult discharges
    • ICD-9 codes of pneumonia not POA
    • AND met CDC definition of HAP

<table>
<thead>
<tr>
<th>Hap ICD-9 Codes</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>480.8</td>
<td></td>
</tr>
<tr>
<td>481</td>
<td></td>
</tr>
<tr>
<td>482</td>
<td></td>
</tr>
<tr>
<td>482.1</td>
<td></td>
</tr>
<tr>
<td>482.2</td>
<td></td>
</tr>
<tr>
<td>482.39</td>
<td></td>
</tr>
<tr>
<td>482.41</td>
<td></td>
</tr>
<tr>
<td>482.42</td>
<td></td>
</tr>
<tr>
<td>482.82</td>
<td></td>
</tr>
<tr>
<td>482.83</td>
<td></td>
</tr>
<tr>
<td>482.89</td>
<td></td>
</tr>
<tr>
<td>483.8</td>
<td></td>
</tr>
<tr>
<td>484.1</td>
<td></td>
</tr>
<tr>
<td>484.6</td>
<td></td>
</tr>
<tr>
<td>484.7</td>
<td></td>
</tr>
<tr>
<td>485</td>
<td></td>
</tr>
<tr>
<td>486</td>
<td></td>
</tr>
</tbody>
</table>
NV-HAP SMCS Research Findings: 2010

24,482 patients and 94,247 patient days

Incidence:
- 115 adults
- 62% non-ICU
- 50% surgical
- Average age 66
- Common comorbidities:
  - CAD, COPD, DM, GERD
- Common Risk Factors:
  - Dependent for ADLs (80%)
  - CNS depressant meds (79%)

Cost:
- $4.6 million
- 23 deaths
- Mean Extended LOS 9 days
- 1035 extra days

Impact of NV-HAP in the ICU

HAPPI-2 Preliminary Data

- 23 hospitals in U.S.; 2014 data; 1306 total cases
  - 28% occurred in ICU
  - 26% occurred on Med/Surg units and were transferred to ICU
  - 54% of all NV-HAP cases spend some time in the ICU
  - 33% transferred to ICU died
  - 42% transferred to ICU survived but were discharged to a higher level of care; 25% home

Impact of NV-HAP on one year mortality:

- Any length of time spent in an ICU increases mortality of elderly patients who survive to discharge

ICU-Acquired pneumonia: VAP vs. NV-HAP

• **Methods:**
  – Prospective study of 135 consecutive episodes over 3 years of adults with ICU-acquired pneumonia
  – Compared clinical and microbiological characteristics of VAP and NV-HAP

• **Results** for VAP & NV-HAP were not statistically different:
  – Pathogens
  – Comorbid conditions,
  – Severity parameters,
  – Mortality, and
  – Hospital length of stay

• Among NV-HAP patients, 79 (52%) needed subsequent intubation

Where is the Highest Risk for NV-HAP?

Rate of Nonventilator Hospital-Acquired Pneumonia

NV-HAP per 1000 patient days

Slide courtesy of Barb Quinn
Preventing NV-HAP Through Evidence Based Fundamental Nursing Care Strategies
Pathogenesis → Prevention

Germs in Mouth
- Dental plaque provides microhabitat
- Bacteria replicate 5X/24 hrs

Aspirated into Lungs
- Most common route
- 50% of healthy adults micro-aspirate in sleep

Weak Defenses
- Poor cough
- Immunosuppressed
- Multiple co-morbidities

Micro Aspiration During Sleep in Healthy Subjects

• Prospective duplicate full-night studies
• 10 normal male’s 22-55 yrs of age
• Methods:
  – Radioactive $^{99}$mTc tracer inserted into the nasopharynx
  – Lung scans conducted immediately following final awakening
  – No difference in sleep efficacy btwn 2 study nights
• Results:
  – 50% of subjects had tracer in the pulmonary parenchyma upon final awakening
  – No difference in age, time spent in bed, efficacy of sleep, apnea-hyponea index, arousal plus awakening index or % sleep in the supine position between subjects that aspirated and those that did not.

Risk Factors for Oral Bacteria in the Hospital

• Poor oral health in the U.S. (CDC, 2011)
• Increased bacteria counts
  • Plaque, gingivitis, tooth decay
  • Reduced salivary flow
• 24-48 hours for HAP pathogens in mouth
• If aspirated =100,000,000 bacteria/ml saliva into lungs

Oral Cavity & VAP

- 89 critically ill patients
- Examined microbial colonization of the oropharynx throughout ICU stay
- Used pulse field gel electrophoresis to compare chromosomal DNA
- Results:
  - Diagnosed 31 VAPs
  - 28 of 31 VAP’s the causative organism was identical via DNA analysis

- 49 elderly nursing home residents admitted to the hospital
- Examined baseline dental plaque scores & microorganism within dental plaque
- Used pulse field gel electrophoresis to compare chromosomal DNA
- Results:
  - 14/49 adults developed pneumonia
  - 10 of 14 pneumonias, the causative organism was identical via DNA analysis

El-Solh AA. Chest. 2004;126:1575-1582
Impact of Oral Care on HAP

**Figure 2.** Effects of oral care on preventing non-ventilator-associated pneumonia (non-VAP).

**Figure 3.** The effect of mechanical oral care on non-ventilator-associated pneumonia (non-VAP).

Current Evidence for Oral Care Procedure

- **Method:**
  - Review of 7 RCTs and 1 meta-analysis

- **Results:**
  - Toothbrushing removes dental plaque; swabs do not.
  - Chlorhexidine reduces oropharyngeal colonization
  - Chlorhexidine interventions reduce rate of VAP

  - Optimal frequency of basic oral care – unknown

Halm, A. Amer J Crit Care. 2009. 18, 275-278.
SMCS HAP Prevention Plan

Phase 1: Oral Care

• Formation of new quality team: Hospital-Acquired Pneumonia Prevention Initiative (HAPPI)

• New oral care protocol to include non-ventilated patients

• New oral care products and equipment for all patients

• Staff education and in-services on products

• Ongoing monitoring and measurement
  – Monthly audits

# Gap Analysis

<table>
<thead>
<tr>
<th>Best Practice</th>
<th>Our Gaps</th>
<th>Action To Take</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehensive oral care for all (CDC, SHEA)</td>
<td>ICU vent patients only</td>
<td>Develop inclusive oral care protocol</td>
</tr>
<tr>
<td>Oral CHG (0.12%) periop adult CV surgery and vent pts. (CDC, ATS, IHI).</td>
<td>Not using CHG on these patients.</td>
<td>Added to preprinted orders, and to protocol</td>
</tr>
<tr>
<td>Therapeutic oral care tools (ADA)</td>
<td>Poor quality oral care tools. Absence of denture care supplies.</td>
<td>New tools and supplies.</td>
</tr>
</tbody>
</table>

## Protocol – Plain & Simple

<table>
<thead>
<tr>
<th>Patient Type</th>
<th>Tools</th>
<th>Procedure</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Care / Assist</td>
<td>Brush, paste, rinse, moisturizer</td>
<td>Provide tools Brush 1-2 minutes Rinse</td>
<td>4 X / day</td>
</tr>
<tr>
<td>Dependent / Aspiration Risk</td>
<td>Suction toothbrush kit (4)</td>
<td>Package instructions</td>
<td>4 X / day</td>
</tr>
<tr>
<td>Dependent / Vent</td>
<td>ICU Suction toothbrush kit (6)</td>
<td>Package instructions</td>
<td>6 X / day</td>
</tr>
<tr>
<td>Dentures</td>
<td>Tools + Cleanser Adhesive</td>
<td>Remove dentures &amp; soak Brush gums, mouth Rinse</td>
<td>4X / day</td>
</tr>
</tbody>
</table>

Provide Meaningful Data

- Ortho Unit had ZERO HAP cases in the last 4 months of 2013!!
- Great WORK!!
- Remember, the goal is to provide and document oral care after each meal and before bedtime.

Used with permission from Barbara Quinn
**NV-HAP Incidence**

50 % Decrease from Baseline

Control chart for NV-HAP
January 2010 to December 2013

Open Heart Surgery Patients:
NV-HAP Reduced 75%

Oral chlorhexidine periop started
Return on Investment

- 60 NV-HAP avoided Jan 1 – Dec. 31 2013
- $2,400,000 cost avoided
- $117,600 cost increase for supplies
- $2,282,400 return on investment

• 8 lives saved

PRICELESS

Preventing Harm:

Reducing the Bacterial Load on the Patient:
Evidence Based Bathing Practices
Optimal Hygiene

• pH balanced (4-6.8)
  – Stable pH discourages colonization of bacteria & ↓ risk of infection
  – Bar soaps may harbor pathogenic bacteria
• Excessive washing/use of soap compromises the water holding capacity of the skin
• Non-drying, lotion applied
• Multiple steps can lead to large process variation

Voegel D. J WOCN, 2008;35(1):84-90
Traditional Bathing

Why are there so many bugs in here?

Soap and water basin bath was an independent predictor for the development of a CLABSI

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%

Method of Basin Contamination

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

Waterborne Infection

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

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

89% Reduction
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

<table>
<thead>
<tr>
<th>Phases</th>
<th>Product Cost/</th>
<th>No. of UTI</th>
<th>Median(^4) LOS 17 Days</th>
<th>Median(^4) 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>175</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>336</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>151</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\(^4\)

Bathing with CHG Basinless Cloths

- Prospective sequential group single arm clinical trial
- 1787 patients bathed
  - Period 1: soap & water
  - Period 2: CHG basinless cloth bath*
  - Period 3: non-medicated basinless cloth bath

*2% CHG cloth for bathing is consider an off label use of the product.

Veron MO et al. Archives Internal Med 2006;166:306-312
26 colonization's with VRE per 1000 patients days vs. 9 colonization's per 1000 patient days with CHG bath

*2% CHG cloth for bathing is consider an off label use of the product.

Veron MO et al. Archives Internal Med 2006;166:306-312
Impact on VRE with 2% CHG Cloth Bathing*

- Decreased hand contamination: 56% vs 37% in VRE rooms; 16% vs 8% in common areas.
- Decreased VRE acquisition: 20% vs 8%.
- Decreased skin contamination: 47% vs 94%; 2.5 log reduction on inguinal skin.
- Decreased environmental contamination: 34% vs 11%.

*2% CHG cloth for bathing is considered an off-label use of the product.

Veron MO et al. Archives Internal Med 2006;166:306-312
The Efficacy of Daily Bathing with Chlorhexidine for Reducing Healthcare-Associated Bloodstream Infections: A Meta-analysis

John C. O’Hor, MD; Germana L. M. Silva, MD; L. Silvia Munoz-Price, MD; Nasia Safdar, MD, PhD

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental Events</th>
<th>Total Events</th>
<th>Control Events</th>
<th>Total Events</th>
<th>Weight</th>
<th>Odds Ratio M-H, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2.1 CHG Bathing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borer et al., 2007</td>
<td>2</td>
<td>1600</td>
<td>15</td>
<td>1923</td>
<td>3.3%</td>
<td>0.16 [0.04, 0.70]</td>
</tr>
<tr>
<td>Camus et al., 2005</td>
<td>6</td>
<td>1991</td>
<td>7</td>
<td>1961</td>
<td>5.3%</td>
<td>0.84 [0.28, 2.52]</td>
</tr>
<tr>
<td>Climo et al., 2009</td>
<td>14</td>
<td>15472</td>
<td>41</td>
<td>15225</td>
<td>10.5%</td>
<td>0.34 [0.18, 0.62]</td>
</tr>
<tr>
<td>Gould et al., 2007</td>
<td>171</td>
<td>6664</td>
<td>264</td>
<td>6989</td>
<td>17.1%</td>
<td>0.66 [0.54, 0.80]</td>
</tr>
<tr>
<td>Munoz-Price et al., 2009</td>
<td>29</td>
<td>7532</td>
<td>59</td>
<td>8210</td>
<td>13.1%</td>
<td>0.40 [0.25, 0.62]</td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td><strong>33359</strong></td>
<td><strong>32218</strong></td>
<td></td>
<td></td>
<td><strong>49.3%</strong></td>
<td><strong>0.47 [0.31, 0.71]</strong></td>
</tr>
<tr>
<td><strong>Total events</strong></td>
<td>222</td>
<td>386</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 0.12; Chi² = 11.07, df = 4 (P = 0.03); I² = 64%
Test for overall effect: Z = 3.53 (P = 0.0004)

* 1.2.2 CHG Impregnated Cloths

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental Events</th>
<th>Total Events</th>
<th>Control Events</th>
<th>Total Events</th>
<th>Weight</th>
<th>Odds Ratio M-H, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleasedale et al., 2007</td>
<td>9</td>
<td>2210</td>
<td>22</td>
<td>2119</td>
<td>8.2%</td>
<td>0.39 [0.18, 0.85]</td>
</tr>
<tr>
<td>Dixon and Carver, 2010</td>
<td>8</td>
<td>3148</td>
<td>27</td>
<td>3346</td>
<td>8.0%</td>
<td>0.31 [0.14, 0.69]</td>
</tr>
<tr>
<td>Evans et al., 2010</td>
<td>4</td>
<td>1785</td>
<td>15</td>
<td>1904</td>
<td>5.2%</td>
<td>0.28 [0.09, 0.85]</td>
</tr>
<tr>
<td>Holder and Zellinger, 2009</td>
<td>2</td>
<td>2000</td>
<td>12</td>
<td>2112</td>
<td>3.3%</td>
<td>0.28 [0.06, 1.24]</td>
</tr>
<tr>
<td>Montecalvo et al., 2010</td>
<td>27</td>
<td>13864</td>
<td>57</td>
<td>12603</td>
<td>12.8%</td>
<td>0.43 [0.27, 0.68]</td>
</tr>
<tr>
<td>Popovich et al., 2009</td>
<td>2</td>
<td>5510</td>
<td>19</td>
<td>6728</td>
<td>3.4%</td>
<td>0.13 [0.03, 0.54]</td>
</tr>
<tr>
<td>Popovich et al., 2010</td>
<td>17</td>
<td>5799</td>
<td>19</td>
<td>7366</td>
<td>9.8%</td>
<td>1.14 [0.59, 2.19]</td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td><strong>34416</strong></td>
<td><strong>37399</strong></td>
<td></td>
<td></td>
<td><strong>50.7%</strong></td>
<td><strong>0.41 [0.25, 0.65]</strong></td>
</tr>
<tr>
<td><strong>Total events</strong></td>
<td>69</td>
<td>171</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 0.19; Chi² = 12.80, df = 6 (P = 0.05); I² = 53%
Test for overall effect: Z = 3.78 (P = 0.0002)

**Total (95% CI)**

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental Events</th>
<th>Total Events</th>
<th>Control Events</th>
<th>Total Events</th>
<th>Weight</th>
<th>Odds Ratio M-H, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total events</strong></td>
<td>201</td>
<td>557</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 0.13; Chi² = 26.12, df = 11 (P = 0.006); I² = 58%
Test for overall effect: Z = 5.39 (P < 0.00001)
Test for subgroup differences: Chi² = 0.19, df = 1 (P = 0.66), I² = 0%

*2% CHG cloth for bathing is consider an off label use of the product.

Infect Control Hosp Epidemiol 2012;33(3):257-267
The Evidence: Impact of 2% CHG Cloth Baths*
Evaluate effect of daily bathing with CHG on acquisition of MDRO’s and incidence of CLABSI


9 ICU’s & Bone Marrow Transplant unit
Randomly assigned 7727 patients:

a. No-rinse, 2% CHG impregnated washcloths*
b. Non-antimicrobial, no-rinse bath cloths

Results of 2% CHG bathing

<table>
<thead>
<tr>
<th>Category</th>
<th>Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDROs</td>
<td>23%</td>
</tr>
<tr>
<td>HAI (primary blood stream)</td>
<td>28%</td>
</tr>
<tr>
<td>Gram positive CLABSI</td>
<td>50%</td>
</tr>
<tr>
<td>Fungal CLABSI</td>
<td>90%</td>
</tr>
</tbody>
</table>

*2% CHG cloth for bathing is consider an off label use of the product
Impact of 2% CHG Cloth Baths*
Study to determine the best method for reducing spread of MRSA & MDROs

3 protocols tested:

a) Swab for MRSA on admission to ICU
   – Isolate if positive

b) Swab for MRSA on admission to ICU
   – Isolate if positive
   – Nasal mucopiricin x 5 days
   – 2% CHG cloth* bathing for entire ICU stay

c) No swab
   – Nasal mucopiricin x 5 days
   – 2% CHG bath* for entire ICU stay

* 2% CHG cloth for bathing is consider an off label use of the product

Results: No Swab Group
Universal Decolonization Demonstrated

CHG Bathing: Meta-Analysis

- Meta-analysis performed using Cochrane Collaboration methodology
- 18 studies included
- Examine risk of acquiring HAI: CLA-BSI, MRSA, VRE
- Longer duration & nasal antibiotic showed even lower risk MRSA

*2% CHG cloth for bathing is considered an off-label use of the product.*

**CHG Bathing: Meta-Analysis**

- Meta- analysis performed using Cochrane Collaboration methodology
- 18 studies included
- Examine risk of acquiring HAI: CLABSI, MRSA, VRE
- Longer duration & nasal antibiotic showed even lower risk MRSA

*2% CHG cloth for bathing is consider an off label use of the product.*
**Impact of 2% CHG Cloth Bath*: Follow Up Analysis On Universal Decolonization on Bacteriuria & Candiduria**

3 protocols tested:

a) Swab for MRSA on admission to ICU
   – Isolate if positive
b) Swab for MRSA on admission to ICU
   – Isolate if positive
   – Nasal mucopiricin x 5 days
   – 2% CHG cloth* bathing for entire ICU stay
c) No swab
   – Nasal mucopiricin x 5 days
   – 2% CHG cloth bath* for entire ICU stay

---

<table>
<thead>
<tr>
<th>Hazard ratios (95% CI)</th>
<th>Overall trial (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group 1</td>
</tr>
<tr>
<td><strong>High-level bacteriuria (≥50,000 CFU/mL)</strong></td>
<td></td>
</tr>
<tr>
<td>All patients</td>
<td>1.02 (0.88-1.18)</td>
</tr>
<tr>
<td>Women</td>
<td>0.97 (0.80-1.17)</td>
</tr>
<tr>
<td>Men</td>
<td>1.09 (0.85-1.40)</td>
</tr>
<tr>
<td><strong>High-level candiduria (≥50,000 CFU/mL)</strong></td>
<td></td>
</tr>
<tr>
<td>All patients*</td>
<td>1.14 (0.95-1.37)</td>
</tr>
<tr>
<td>Women</td>
<td>1.09 (0.88-1.36)</td>
</tr>
<tr>
<td>Men*</td>
<td>1.21 (0.88-1.68)</td>
</tr>
<tr>
<td><strong>Any bacteriuria</strong></td>
<td></td>
</tr>
<tr>
<td>All patients</td>
<td>0.95 (0.84-1.09)</td>
</tr>
<tr>
<td>Women</td>
<td>0.91 (0.77-1.08)</td>
</tr>
<tr>
<td>Men†</td>
<td>1.01 (0.81-1.25)</td>
</tr>
</tbody>
</table>

*2% CHG cloth for bathing is consider an off label use of the product

Additional Benefits

- Demonstrates lower rates of blood culture contamination with universal decolonization with CHG cloth bathing* (Septimus EJ, et al. Infect Control Hosp Epidemiol, 2014;35:S17-22)


Some challenges with the data

*2% CHG cloth for bathing is consider an off label use of the product.
CHG Bathing Process

Monitor for compliance by assessing amount of CHG on the skin (Assay). Prevent sub-optimal concentrations


*2% CHG cloth for bathing is consider an off label use of the product.

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.
- Use separate cloths to clean front to back in the perineal area and 6 inches of the catheter**
- Apply barrier cloth to area of skin requiring protection.

Preventing CAUTI’s Through Evidence Based Care Practices
### CUSP & CAUTI Interventions

#### CUSP
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

#### 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%

Extraluminal
- Early, at insertion
- Late, by capillary action

Intraluminal
- Break in closed drainage
- Contamination of collection bag urine
Disrupting the Lifecycle of the Urinary Catheter

1. Preventing Unnecessary and Improper Placement

2. Maintaining Awareness & Proper Care of Catheters

3. Prompting Catheter Removal

4. Preventing Catheter Replacement

(Meddings. Clin Infect Dis 2011)

www.catheterout.org
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
- Examine alternatives to indwelling catheters
  - External condom catheters for male patients without urinary retention or bladder outlet obstruction*
  - Intermittent catheterization several times per day (post-op)
- 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
- 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 removing the catheter, a bedside bladder scan ultrasound should be obtained.
- If the bladder volume is less than 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 the patient has not voided.
- If the bladder volume is greater than 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

Before & After QI Project

- 60-day comparison
- Use of novel EMC device vs. indwelling catheter
- Inclusion criteria:
  - No restraints
  - No BPH
  - No neurogenic bladder
  - Cooperative
  - Hospitalized ≥ 2 weeks
- Monitored wear time, evaluated skin

Foley utilization rate, before, during & after

Average Wear Time = 24hrs

Fitzwater M, IP Kindred Albuquerque, 2015
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??
The Culture of Culturing
Bacteriuria with Catheter Use
(Garibaldi et al, Infect Control 1982; 3: 466-70)

Daily bacteriologic monitoring of 1140 cases:

- Bacteriuria at insertion: 99/1,140 (8.7%) catheterizations
- 1,041 had no colonization at insertion, 433 removed within 24 hours
- Of 608 catheterizations >24 hours, 76 (12.5%) developed bacteriuria
- Risk of bacteriuria was 3% per catheter-day
Common Inappropriate Triggers For Urine Culture In Patients With Urinary Catheters

- Urine color, consistency and smell
- Pyuria
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>146 (94.8%)</td>
</tr>
<tr>
<td>Cloudy urine</td>
<td>84 (79.2%)</td>
<td>146 (94.8%)</td>
</tr>
<tr>
<td>Sediments in urine</td>
<td>57 (53.8%)</td>
<td>129 (84.3%)</td>
</tr>
<tr>
<td>Darker urine</td>
<td>39 (36.8%)</td>
<td>72 (47.7%)</td>
</tr>
<tr>
<td>Chronic UC on admission</td>
<td>46 (43.4%)</td>
<td>115 (74.2%)</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
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. Provide education on when it is appropriate to obtain urine cultures
4. Have periodic audits on urine culture use in the intensive care units to look for trends
5. Promote appropriate urinary catheter use to reduce risk of bacteriuria/ funguria
## Appropriate Urine Culture Use

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part of an evaluation of sepsis without a clear source (CAUTI is often a diagnosis by exclusion)</td>
</tr>
<tr>
<td>Based on local findings suggestive of CAUTI (example, pelvic discomfort or flank pain)</td>
</tr>
<tr>
<td>Prior to urologic surgeries where mucosal bleeding anticipated or transurethral resection of prostate</td>
</tr>
<tr>
<td>Early pregnancy (avoid urinary catheters if possible)</td>
</tr>
</tbody>
</table>
**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

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send U/A &amp; urine culture Document indication for sending urine culture Start empiric therapy (see reverse side)</td>
<td>Do NOT send urine culture</td>
</tr>
</tbody>
</table>

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

Empiric choices should take into account recent antimicrobial use. If urine culture is negative & patient was on antibiotics at the time of the culture & patient has symptoms (e.g. on the reverse side) it may be appropriate to treat.

<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 salpingectomy, or neutropenia</td>
<td>Ceftriaxone or Cephalexin</td>
<td>TMP/SMX x 3 days</td>
</tr>
<tr>
<td>UNCOMPICLISHED LOWER TRACT UTI</td>
<td>TMP/SMX or Ceftriaxone</td>
<td>Cephalixin</td>
<td>TMP/SMX ± 3 days</td>
</tr>
<tr>
<td>COMPLICATED LOWER TRACT UTI</td>
<td>Ceftriaxone or TMP/SMX or Ceftazidime or Piperacillin-tazobactam (if risk for resistant gram negatives)</td>
<td>Cephalixin</td>
<td>7 days if prompt resolution</td>
</tr>
<tr>
<td>SEPSIS WITH UTI, PYELONEPHRITIS, PERIPNEPHRIC ABSCESS</td>
<td>Ceftriaxone or Cephalexin (if critically ill, septic or recently hospitalized) or Piperacillin-tazobactam (if critically ill, septic or recently hospitalized and concern for enterococcal)</td>
<td>Piperacillin-tazobactam</td>
<td>7 days if prompt resolution</td>
</tr>
<tr>
<td>E. coli/ESBL</td>
<td>Vancomycin PLUS Aztreonam</td>
<td>Piperacillin-tazobactam</td>
<td>E. coli: 10-14 days</td>
</tr>
</tbody>
</table>
| **Symptom based screening is not reliable in the following cases: pregnancy, prior to salpingectomy, patients with complex urinary anatomy (i.e. nephrostomy tubes, urinary tract stones, k/o urinary diversion surgery in the past, or renal transplant), patients admitted to the ICU, or neutropenia. Use your clinical judgment for this population.**

**For each antibiotic: document indication and planned duration for all patients.**

**Version date:** 8/9/2012
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)

# 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)

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)

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

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

Will Rogers
Additional Recommendations: SHEA Compendium Update 2014

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

• For examination of fresh urine, collect a small sample by aspirating urine from the needleless sampling port with a sterile syringe/cannula adaptor after cleansing the port with disinfectant (quality of evidence: III).

Nurstoons

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!!

www.nurstoons.com
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
### IAD Assessment Tool

**Hospital Survey on Incontinence & Related Skin Injury**

**Instructions:**
This survey is limited to inpatient care areas and excludes the following: Labor & Delivery, Obstetrics, Nursery, Emergency Department & Operating Room.

**Date of Survey:** __/__/____  
**Unit:** ______

Please check the unit specialty that best describes the care provided.

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burn</td>
<td>LTAC</td>
</tr>
<tr>
<td>Cardio Surgery</td>
<td>LTO</td>
</tr>
<tr>
<td>ICU - General</td>
<td>Medical</td>
</tr>
<tr>
<td>ICU - Interventions</td>
<td>Med Surg</td>
</tr>
<tr>
<td>ICU - Cardiovascular</td>
<td>Neurology</td>
</tr>
<tr>
<td>ICU - General</td>
<td>Oncology</td>
</tr>
<tr>
<td>ICU - Medical</td>
<td>Orthopedic</td>
</tr>
<tr>
<td>ICU - Neuro</td>
<td>Surgical</td>
</tr>
<tr>
<td>ICU - Neonatal</td>
<td>PACU</td>
</tr>
<tr>
<td>ICU - Pediatric</td>
<td>Pediatrics</td>
</tr>
<tr>
<td>ICU - Surgical</td>
<td>Psychiatric - Geriatric</td>
</tr>
</tbody>
</table>

**Patient Census of Unit at Time of Survey:** ______

**Incontinence Collection Products:**
Check all that apply to a specific unit/work area.

<table>
<thead>
<tr>
<th>Products</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diaper/Brief</td>
<td>Collection Device</td>
</tr>
<tr>
<td>Reusable cloth</td>
<td>Collection Device</td>
</tr>
<tr>
<td>Disposable plastic-backed</td>
<td>Collection Device</td>
</tr>
<tr>
<td>Disposable air-flow backed</td>
<td>Collection Device</td>
</tr>
</tbody>
</table>

**Incontinence Cleanup & Skin Protection:**
Check all product categories that are available in a specific unit/work area.

<table>
<thead>
<tr>
<th>Cleansing</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soap/Water/Basin</td>
<td>Petroleum</td>
</tr>
<tr>
<td>Peri-Wash (spray)</td>
<td>Zinc Oxide</td>
</tr>
<tr>
<td>Cleansing Foam</td>
<td>Dimethicone</td>
</tr>
<tr>
<td>Washcloth (white type)</td>
<td>Liquid Film Barrier</td>
</tr>
<tr>
<td>reusable / disposable</td>
<td>Other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Moisturizers</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>All-in-one products</td>
<td>Barrier cloth with skin protection</td>
</tr>
<tr>
<td>Lotion</td>
<td>Other</td>
</tr>
<tr>
<td>Cream</td>
<td>Other</td>
</tr>
<tr>
<td>Ointment</td>
<td>Other</td>
</tr>
</tbody>
</table>

**Section 1:** Complete for all patients surveyed

**Patient Information**

<table>
<thead>
<tr>
<th>Patient Gender</th>
<th>Patient Age Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>______</td>
<td>______</td>
</tr>
</tbody>
</table>

**Continence Status:**

- Stool: ______
- Urinary: ______

**Section 2:** Complete only for incontinent patients

**Contributing Factors & Co-Morbidities:**

- Low albumin: ______
- Anticholinergics: ______
- Constipation: ______
- Skin Fold: ______
- Impaired mobility: ______
- Impaired cognition: ______

**Incontinence Cleanup & Skin Protection:**

- Barrier Protection: (Tubes, Bottles or Sprays)
- Must contain one of the “Active Ingredients” listed below:
  - Petroleum
  - Zinc Oxide
  - Dimethicone
  - Liquid Film Barrier
  - Other

- Moisturizers:
  - Lotion
  - Cream
  - Ointment

**Section 3:** Complete only for incontinent patients with rash/redness of buttock or perineal skin

**Perineal Skin Injury:**

**Check all that apply:**

<table>
<thead>
<tr>
<th>Area Affected</th>
<th>Contamination Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watershed</td>
<td>Bullets</td>
</tr>
</tbody>
</table>
| Groin         | Contaminated/
| Buttocks      | Other                    |
| Other Areas   | Other                    |

**Section 4:**

- Pressure Ulcer prevention or treatment: ______
- Lower Extremity: ______

**Section 5:**

- Incontinence Associated Dermatitis
  - Rash and erythema
  - Bacterial Skin Infection
  - Skin Ulcer

- Should I advise the patient:
  - To change position appropriately:
  - To maintain good hygiene:
  - To consult a wound care specialist:

---

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
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

<table>
<thead>
<tr>
<th></th>
<th>Single-Balloon</th>
<th>Dual-Balloon</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total # of patients</td>
<td>223</td>
<td>161</td>
<td>-</td>
</tr>
<tr>
<td>Total catheter days</td>
<td>1090.0</td>
<td>870.3</td>
<td>-</td>
</tr>
<tr>
<td># of males (%)</td>
<td>112 (50.2)</td>
<td>91 (56.5)</td>
<td>0.25</td>
</tr>
<tr>
<td>Avg age (median)</td>
<td>60.8 (42)</td>
<td>60.2 (63)</td>
<td>0.73</td>
</tr>
<tr>
<td>Diagnosis of DM (%)</td>
<td>95 (42.6)</td>
<td>68 (42.2)</td>
<td>0.92</td>
</tr>
<tr>
<td>Avg days spent in ICU (median)</td>
<td>7.4 (14.0)</td>
<td>9.7 (7.0)</td>
<td>0.003</td>
</tr>
<tr>
<td># of CAUTIs</td>
<td>6</td>
<td>1</td>
<td>0.25</td>
</tr>
<tr>
<td>Infections per 1000 catheter-days</td>
<td>5.5</td>
<td>1.1</td>
<td>0.11</td>
</tr>
</tbody>
</table>

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 (and based on the successful Michigan Health and Hospital Association (MHA) Keystone Center’s Bladder Bundle)
- National collaboration of professional societies, academic researchers, government agencies (IE: CDC), and state hospital associations
- Combination of application of technical practices to prevent CAUTI and addressing socio-adaptive factors (through the application of 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>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>
</tbody>
</table>

**Additional**

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Example of Intervention</th>
</tr>
</thead>
<tbody>
<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%
It is not enough to do your best; you must know what to do, and THEN do your best.

~ W. Edwards Deming
Targeting to Zero!!!!
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??”