Target Zero: Evidence-Based Strategies for Eliminating CA-UTI’s
Disclosures

- Sage Products
  Speaker Bureau
  & Consultant
- Hill-Rom
- Eloquest
  Healthcare

Session Objectives

- Identify risk factors for the development of catheter associated urinary tract infection
- Define key care practices based on the evidence that can reduce and sustain zero CA-UTI's
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

Advocacy Starts with Us
Patient Advocacy/Safety Related to Clinical Practice

- Nurses knowledge of the evidence based care
- Ability to deliver the care to the right patient at the right time, every time it is needed
- The ability to communicate patient concerns in a concise, data driven manner and take appropriate action
- Understanding our role as the voice of the patient

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
CA-UTI

Skin Care/Bathing/Mobility

CA-BSI

SSI

HASI

Vollman KM. Australian Crit Care, 2009;22(4): 152-154
Preventing CA-UTI’s Through Evidence Based Fundamental Nursing Care Strategies

CA-UTIs: Reducing Load

- Use of catheter increases risk
- Daily risk of acquisition of UTI: 3% to 7%
- Second most common HAI & 80% attributable to indwelling catheterization
- CAUTI: associated with ↑ morbidity, mortality (2.3%), hospital cost ($589.00) & LOS
- 30% of HAI’s reported in acute care

Joanna Briggs Institute EBR. 2007
Gould, CV et al. HICPAC Guideline for Preventing Catheter-Associated UTIs. 2009
CA-UTIs: Reducing Load

- 15%-25% of hospital patients may have a urinary catheter during admission
- Pooled mean CAUTI with new definitions rates .8 -4.4 infections per 1000 catheter days (PICU lowest, Burn & Neurosurg ICU highest)
- Inpatient pooled mean for CA-UTI rates .3 to 3.8 infections per 1000 cath days (L & D lowest, Acute rehab highest)
- Add 1 day LOS per patient

Joanna Briggs Institute EBR: 2007
Gould, CV et al. HICPAC Guideline for Preventing Catheter-Associated UTIs. 2009

CA-UTI Bundle
“Bladder Bundle”

- CA-UTI Bundle ( “Bladder Bundle”)
  - Avoid unnecessary urinary catheters
  - Insert urinary catheters using aseptic technique
  - Maintain urinary catheters based on recommended guidelines.
  - Review urinary catheter necessity daily and remove promptly

http://www.bestcare.org.za/docs/Prevent%20Catheter%20CA-UTI.pdf
**Updated HICPAC Categorization Scheme for Recommendations**

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IA</td>
<td>A strong recommendation supported by high to moderate quality evidence suggesting net clinical benefits or harms.</td>
</tr>
<tr>
<td>IB</td>
<td>A strong recommendation supported by low quality evidence suggesting net clinical benefits or harms, or an accepted practice (e.g., aseptic technique) supported by low to very low quality evidence.</td>
</tr>
<tr>
<td>IC</td>
<td>A strong recommendation required by state or federal regulation.</td>
</tr>
<tr>
<td>II</td>
<td>A weak recommendation supported by any quality evidence suggesting a trade off between clinical benefits and harms.</td>
</tr>
<tr>
<td>No</td>
<td>An unresolved issue for which there is low to very low quality evidence with uncertain trade offs between benefits and harms.</td>
</tr>
</tbody>
</table>

**HICPAC CA-UTI Guideline**

- **Appropriate Urinary Catheter Use**
  - Insert catheters only for appropriate indications and leave in place only as long as needed *(1B)*
  - Avoid use of urinary catheters in patients and nursing home residents for management of incontinence. *(1B)*
  - Use urinary catheters in operative patients only as necessary, rather than routinely. *(1B)*
  - Consider using alternatives to indwelling urethral catheterization in selected patients when appropriate. *(II)*

Gould, CV et al. HICPAC Guideline for Preventing Catheter-Associated UTIs. Final 2009
Expert Opinion

Table 2. Appropriate Indications for Indwelling Urethral Catheter Use

<table>
<thead>
<tr>
<th>Patient has acute urinary retention or obstruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need for accurate measurements of urinary output in critically ill patients</td>
</tr>
</tbody>
</table>

Perioperative use for selected surgical procedures:
- Patients undergoing urologic surgery or other surgery on contiguous structures of the genitourinary tract
- Anticipated prolonged duration of surgery (catheters inserted for this reason should be removed in PACU)
- Patients anticipated to receive large-volume infusions or diuretics during surgery
- Operative patients with urinary incontinence
- Need for intraoperative monitoring of urinary output

To assist in healing of open sacral or perineal wounds in incontinent patients

Patient requires prolonged immobilization (e.g., potentially unstable thoracic or lumbar spine)

To improve comfort for end of life care if needed

Indwelling catheters should not be used:
- As a substitute for nursing care of the patient or resident with incontinence
- As a means of obtaining urine for culture or other diagnostic tests when the patient can voluntarily void
- For prolonged postoperative duration without appropriate indications
- Routinely for patients receiving epidural anaesthesia/analgesia

Gould, CV et al. HICPAC Guideline for Preventing Catheter-Associated UTIs. Draft June 2009

HICPAC CA-UTI Guideline

- **Proper Technique for Urinary Catheter Insertion**
  - Perform hand hygiene immediately before and after insertion or any manipulation of the catheter device or site. *(IB)*
  - Ensure that only properly trained persons who know the correct technique of aseptic catheter insertion & maintenance are given this responsibility. *(IB)*
  - Insert catheters using aseptic technique and sterile equipment (except chronic intermittent catheterization). *(IC)*
    - Use sterile gloves, drape, sponges, an appropriate antiseptic or sterile solution for periurethral cleaning, and a single-use packet of lubricant jelly for insertion. *(IC)*
    - Antiseptic lubricants need not be used routinely to prevent CAUTI. *(II)*
  - Further research is needed on the use of antiseptic solutions vs. sterile water or saline for periurethral cleaning prior to catheter insertion. *(No recommendation/unresolved issue)*

Gould, CV et al. HICPAC Guideline for Preventing Catheter-Associated UTIs. 2009, final
Hand Hygiene is the Single Most Important Factor in Preventing the Spread of Infection

Guidelines for Hand Hygiene in Health Care Settings

- If hands are not visibly soiled, use an alcohol-based hand rub for routinely decontaminating hands in all other clinical situations (1A)
- When hands visibly soiled or exposure to potential spore forming organisms, wash with either a non-antimicrobial or antimicrobial soap & water (IB)
- Decontaminate hands after removing gloves
- When washing with soap & water, wet hands first, apply soap, rub vigorously for 15 seconds, rinse and dry. Use towel to turn of faucet. (Duration 40 seconds)
- Provide HCW with hand lotions & creams to minimize occurrence of irritant contact dermatitis (IA)
- Use multidimensional strategies to improve hand hygiene practice (IA)
- Do not wear artificial fingernails or extenders (IA)

CDC. Hand Hygiene Guidelines: MMWR 2002; 51(No. RR-16):[1-45]
WHO Hand Hygiene Guidelines 2009
When to Wash

My 5 moments for HAND HYGIENE

1. Before touching a patient
2. Before touching a procedure
3. After body of exposure risk
4. After touching a patient
5. After decreasing patient environment

Pittet D. Infect Control Hosp Epidemiol, 2009;30(7):611-622

Reasons for Non-Compliance

- Lack of knowledge on importance and how the hands become contaminated
- Lack of understanding of correct technique
- Understaffing and overcrowding
- Poor access
- Irritant contact dermatitis associated with frequent exposure
- Lack of institutional commitment to good hand hygiene

Correct use can reduce colony forming units by 90%, incorrect use only 60%. 1-3mL correct amount per HH episode


HICPAC CA-UTI Guideline

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Gould, CV et al. HICPAC Guideline for Preventing Catheter-Associated UTIs. 2009, final
HICPAC CA-UTI Guideline

• **Proper Technique for Urinary Catheter Insertion**
  - Properly secure indwelling catheters after insertion to prevent movement and urethral traction. *(IB)*
  - Consider using the smallest bore catheter possible, consistent with good drainage, to minimize urethral trauma. *(II)*

• **Proper Techniques for Urinary Catheter Maintenance**
  - Maintain a sterile, continuously closed drainage system *(IB)*
  - If breaks in aseptic technique, disconnection, or leakage occur, replace the catheter and collecting system using aseptic technique and sterile equipment. *(IB)*
  - Key the collecting bag below the level of the bladder at all times *(IB)*
  - Urinary catheter systems with preconnected, sealed catheter-tubing junctions may reduce the risk of CAUTI compared to unsealed catheter systems. *(II)*

Gould, CV et al. HICPAC Guideline for Preventing Catheter-Associated UTIs. 2009

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HICPAC CA-UTI Guideline

• **Proper Techniques for Urinary Catheter Maintenance**
  - Maintain unobstructed urine flow. *(IB)*
    - Keep the catheter and collecting tube free from kinking. *(IC)*
    - Empty the collecting bag regularly using a separate collecting container for each patient, and avoid contact of the drainage spigot with the nonsterile collecting container. *(IC)*
  - Use Standard Precautions, including the use of gloves and gown as appropriate, during any manipulation of the catheter or collecting system. *(IC)*
  - Complex urinary drainage systems (utilizing mechanisms for reducing bacterial entry such as antiseptic-release cartridges in the drain port) need not be used routinely to prevent CAUTI. *(II)*
  - Do not change indwelling catheters or drainage bags at arbitrary fixed intervals. *(IB)*

Gould, CV et al. HICPAC Guideline for Preventing Catheter-Associated UTIs. 2009
HICPAC CA-UTI Guideline

- **Proper Techniques for Urinary Catheter Maintenance**
  - Do not clean the periurethral area with antiseptics to prevent CAUTI while the catheter is in place. Routine hygiene (e.g., cleansing of the meatal surface during daily bathing) is appropriate. *(1B)*
  - Avoid bladder irrigation unless obstruction is anticipated *(II)*
    - If obstruction is anticipated, closed continuous irrigation may be used to prevent obstruction. *(II)*
  - The bladder or collection bag need not be irrigated with antimicrobials routinely to prevent CAUTI. *(II)*
  - Clamping indwelling catheters prior to removal is unnecessary. *(II)*

Gould, CV et al. HICPAC Guideline for Preventing Catheter-Associated UTIs. 2009

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**The Bath: The First Line Of Defense**

- Nurse!!!
- Early Detection of Skin Injury
- Reducing Microorganism spread
- Efficiency & Effectiveness
Optimal Hygiene

- ph balanced (4-6.8)
  - Stable pH discourages colonization of bacteria & ↓ risk of infection
  - Bar soaps may harbor pathogenic bacteria
  - Skin pH requires 45 minutes to return to normal following a ordinary washing

- 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

Impact of Wash Cloth/Soap Cleansing and Towel Drying on Skin

- Methodology
  - 15 healthy volunteers, 6 different W/D techniques
  - 3 W/D techniques on each arm repeated twice with a 2hr rest period
  - Measured: Transepidermal water loss (TEWL), skin hydration, skin pH and erythema

- Results:
  - TEWL increased with each type of W/D episode, further loss with repeated procedures
  - Increase skin pH with all W/D, esp with soap

Washing with soap & water and towel drying significantly disruptive effective on skin barrier function

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

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

COMFORT BATH…THE RIGHT WAY TO BATHE

- Non-irritating, no rinse
- pH balanced to maintain healthy protective properties of the skin
- Cloth for each area to reduce cross contamination
- Cleanses & moisturizes
- Warm & comforting
Spreading Microorganism

Why are there so many bugs in here?

Environmental Contamination as a Source of Health Care Acquired Pathogens

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Survival</th>
<th>Data</th>
<th>Transmission Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>C. difficile</em></td>
<td>Months</td>
<td>3+</td>
<td>Healthcare facilities</td>
</tr>
<tr>
<td>MRSA</td>
<td>d-weeks</td>
<td>3+</td>
<td>Burn units</td>
</tr>
<tr>
<td>VRE</td>
<td>d-weeks</td>
<td>3+</td>
<td>Healthcare facilities</td>
</tr>
<tr>
<td>Acinetobacter</td>
<td>33 d</td>
<td>2/3+</td>
<td>ICUs</td>
</tr>
<tr>
<td><em>P. aeruginosa</em></td>
<td>7 h</td>
<td>1+</td>
<td>Wet environments</td>
</tr>
</tbody>
</table>

Bath Water: A Source of Health-Care Associated Microbiological Contamination

- Compared normal bath water with chlorhexidine bath water on 3 wards
- Without Chlorhexidine: All samples + for bacterial growth (14/23 > 10^5 cfu/ml)
- With Chlorhexidine: 5/32 grew bacteria with growth 240 to 1900 cfu/ml
- Gloved hands/bathing: objects touch grew significant numbers of bacteria


Bath Basins: Potential Source of Infection

- Multicenter sampling study (3 ICU's) of 92 bath basins
- Identify & quantify bacteria in patients basins
- Sampling done on basins used > 2x in patients hospitalized > 48 hours & preformed 2 hours post bath
- Cultures sent to outside laboratory
- Qualitative vs. quantitative measures used to exclude growth that may have occurred in transport
- Bathing practices not controlled & no antiseptic soaps used to bathe

Bath Basins: Potential Source of Infection

Results
- 98% of all cultures grew some form of bacteria after plating or enrichment

• Enrichment Results
  - 54% enterococci. 32% for gram -, 23% for S aureus and 13% VRE (statistically significant)
  - <10% growth rates for: MRSA 8%, P aeruginosa 5%, C albicans 3% & E coli 2%


Large Multi-Center Basin Evaluation For Presence of MDRO’s

Methodology
- 88 hospitals from US & Canada
- From July 2007 to February 2011
- Randomly selected basins for damp swab culture
- External lab tested for MRSA & VRE & gram – bacilli
- All basins were clean & were not visibly soiled

Results:
- 1103 basins: 63.2% contaminated
- 385 basins (34.9%) from 80 hospitals were colonized with VRE
- 495 basins (44.9%) from 86 hospitals had gram-negative bacilli
- 36 basins (3.3%) from 28 hospitals had MRSA

Waterborne Infections Study

- Hospital tap water is the most overlooked source for Health Care Acquired pathogens
- 29 evidenced-based studies present solid evidence of waterborne Health Care Acquired infections
- Transmission occurs via drinking, bathing, items rinsed with tap water and contaminated environmental surfaces
- Conservative estimates suggest significant morbidity and mortality from waterborne pathogens
- Immunocompromised patients are at the greatest risk
- Recommendation I: Minimize patient exposure to hospital tap water via bottled water and pre-packaged, disposable bathing sponges


Bacteria Biofilm

- Organized communities of viable & non-viable microorganisms protected within a matrix of extracellular polysaccharides, nutrients & entrained particles
- Adhere to inert material (plumbing)
- Bacteria contain within Biofilm may be transmitted to at risk patients by direct contact with water used for ingestion, ice, washing

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

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

<table>
<thead>
<tr>
<th>Unit Census: 14</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phases</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>I- Pre-Packaged Bathing Washcloths (9 months)</td>
</tr>
<tr>
<td>II- Basin/Water (9 months)</td>
</tr>
<tr>
<td>III- Additional Product Cost, UTI, LOS, COSTS</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  

**BATHING WITH A BASIN & TAP WATER**

↑ transmission of organisms  
↑ time & effort  
↑ # of supplies  
Harmful soaps  
Rough washcloths  
Cold/tepid water  
Scrubbing technique  
Tap-Water
HICPAC CA-UTI Guideline

**Catheter Materials**
- If the CAUTI rate is not decreasing with a comprehensive strategy, consider using antimicrobial/antiseptic impregnated catheters. *(1B)*
  - Further research is needed on the effect of using antimicrobial/antiseptic catheters in reducing the risk of symptomatic UTI. *(No recommendation/unresolved issue)*
- Silicone may be preferable to other catheter materials to reduce the risk of encrustation in long-term catheterized patients who have frequent obstruction. *(II)*

Gould, CV et al. HICPAC Guideline for Preventing Catheter-Associated UTIs, 2009

HICPAC CA-UTI Guideline

**Specimen Collection**
- Obtain urine samples aseptically. *(1B)*
- If a small volume of fresh urine is needed for examination (i.e., urinalysis or culture), aspirate the urine from the needleless sampling port with a sterile syringe/cannula adapter after cleansing the port with a disinfectant. *(1B)*
- Obtain large volumes of urine for special analyses (not culture) aseptically from the drainage bag. *(1B)*

Gould, CV et al. HICPAC Guideline for Preventing Catheter-Associated UTIs, 2009
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)
- 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

- Do not clean the periurethral area with antiseptics to prevent CAUTI while the catheter is in place. Routine hygiene (e.g., cleansing of the meatal surface during daily bathing) is appropriate. (1B)
- Further research is needed on the use of antiseptic solutions vs. sterile water or saline for periurethral cleaning prior to catheter insertion. (No recommendation/unresolved issue)
- If the CAUTI rate is not decreasing with a comprehensive strategy, consider using antimicrobial/antiseptic impregnated catheters. (1B)
- Practice hand hygiene in standard precautions according to CDC & HICPAC guidelines
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
- Physical signs on the perineum & buttocks
  - Erythema, swelling, oozing, vesiculation, crusting and scaling

Brown DS & Sears M, OWM 1993;39:2-26
The things included in the measurement becomes relevant, the things omitted are out of sight out of mind

Peter F. Drucker
EBP Recommendations to Reduce Injury From Incontinence & Other Forms of Moisture

- Clean the skin as soon as it becomes soiled.
- Use a protective cream or ointment on the skin to protect it from wetness.
  - Disposable barrier cloth prevents unprotected episodes (www.ihi.org 5 Million Lives Campaign)
- Use an incontinence pad and/or briefs to absorb/wick away wetness from the skin.
- Consideration of pouching device or a bowel management system
- Ensure an appropriate microclimate & breathability
- < 4 layers of linen

www.ihi.org

Current Practice: Moisture Management

Reusable Incontinence pads
Disposable Incontinence Pads
Airflow pads for Specialty Beds
Adult diaper
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[www.ihi.org](www.ihi.org)

Evaluating the Efficacy of a Uniquely Delivered Skin Protectant and Its Effect on the Formation of Sacral/Buttock Pressure Ulcers

**Methodology:**
- Retrospective/prospective quasi-experimental study
- 57 bed LTC
- Data collected 3 months before use & 3 months following conversion
- Demographics comparable between groups
  - Age, LOS, mobility in bed, transfer between surfaces, incontinence of bowel/bladder, BMI, albumin and concurrent disease scale
- Pre-data revealed 12 residents with incontinence developed 15 sacral stage 1 & 2 ulcers.
- Monthly incidence rates over 9 months 4.7%

Clever K. OWM. 2002;48(12): 60-67
Clever et al. “Pressure Ulcer” Study

Evaluating the Efficacy of a Uniquely Delivered Skin Protectant and Its Effect on the Formation of Sacral/Buttock Pressure Ulcers

Average Monthly Incidence of Sacral/Buttock Pressure Ulcers

Old Standard of Care compared to use of Comfort Shield® as preventative*

<table>
<thead>
<tr>
<th>Old Standard of Care</th>
<th>New Standard of Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 2000 to March 2001</td>
<td>May to July 2001 Feb to April 2002</td>
</tr>
</tbody>
</table>

89% Reduction in Incidence

*No significant differences in impact variables between groups

Clever K. OWM. 2002;48(12): 60-67

Advocacy Starts with Us
Key Element of a CA-UTI Reduction Program

- Reformulation or clarification of policies and procedures related to indwelling catheters
- Remove tap water from any form of cleansing
- Remove basins from the environment
- Monitor usage to determine compliance
- Active involvement of a multidisciplinary team
- Standardized mechanism to review appropriateness of insertion
- Mechanism for reviewing the potential to remove beginning as soon as day 1 and no later than day 3
- Mechanism for regular and constructive staff feedback about the results of the program

Gray M. AACN Advance Practice. 2010;21(3):247-257

Reducing Use…Does it Reduce CA-UTIs

- Pre and post intervention study
- Unit clinicians developed indications for continued use of catheter (evidence-based)
- 6 month intervention period evaluated appropriateness of catheter daily
- 337 patients/1432 catheterization days were evaluated
  - Duration of use significantly reduced (236.6 d/mo vs. 311.7 d/mo)
  - CA-UTIs went from 4.7 per 1000 days to 0 per 1000 catheter days for the intervention period
  - Only 11% inappropriate days

Reminder Systems May Reduce Inpatient Catheter Use and Associated UTIs


Reminder
56% reduction

Stop Order
41% reduction

Be Yourself and Be Faithful to Your Own Muse... Risk the Herd Instinct.
Be Courageous

We all are responsible for the safety of our patients & ourselves…Own the Issues

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