Evidence on Prevention of Catheter-Associated Urinary Tract Infections (CA-UTIs)

SYMPOSIUM ON THE PREVENTION OF HEALTHCARE-ASSOCIATED INFECTIONS IN HOSPITALS AND COMMUNITY INSTITUTIONS DEPARTMENT OF HEALTH CENTRE FOR HEALTH PROTECTION HONG KONG JANUARY 17, 2019

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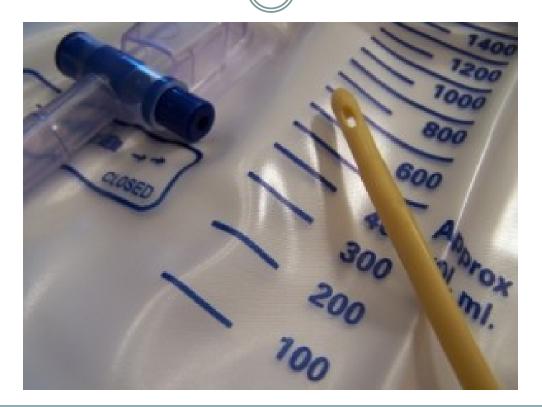
# **Today's Objectives**

- Describe the prevalence and impact of CA-UTI events.
- Review UTI definitions and provide new insights on surveillance.
- Review regulatory and quality initiatives associated with the prevention of CA-UTI.
- Describe the life cycle of the urinary catheter and areas for prevention improvement.
- Provide evidence on CA-UTI prevention.

#### **The Source of Troubles**



# **Background on CA-UTIs**



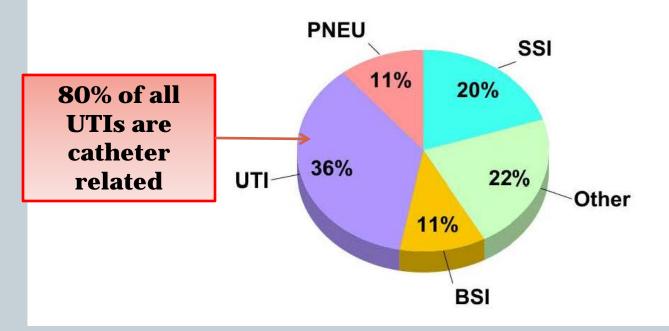
# Epidemiology

- 4 million Americans per year undergo urinary catheterization.<sup>1</sup>
- >500,000 remain indwelling for some time.<sup>1</sup>
- About 25% of patients in hospitals<sup>2</sup> and 4.5 % of long-term care patients<sup>3</sup> will have an indwelling catheter.
- CA-UTI occurs at a rate of 3% to 10% per day.<sup>4</sup>
- CA-UTI incidence approaches 100% within 30 days.<sup>5</sup>
- CA-UTI is the leading cause of secondary hospital-acquired bloodstream infection <sup>6</sup>
- Annually, an estimated 561,677 CA-UTIs with 8,250 associated deaths occur per year in the United States.<sup>7</sup>
- 1. Doyle B. Decreasing nosocomial urinary tract infection in a large academic community hospital. Lippincotts Case Manag 2001;6:127-136.
- 2. Saint S. The potential clinical and economic benefits of silver allow urinary catheters in preventing urinary tract infection. Arch Intern med 2000;160:2670-75.
- Junkin J. Prevalence of incontinence and associated skin injury in the acute care inpatient. J Wound Ostomy Continence Nurs 2007;34:260-69.
- 4. Trautner BW. Prevention of catheter-associated urinary tract infection. Curr Opin Infect Dis 2005;18:37-41.
- Warren JW. A prospective microbiologic study of bacteruria in patients with chronic indwelling urinary catheters. J Infect Dis 1982;146:719-23.
- 6. Gould C. Guideline for prevention of CAUTI 2009.
- 7. Department of Health and Human Services, Action Plan To Prevent Healthcare-Associated Infection, 2009, US Department of Health and Human Services.

#### **Healthcare-Associated Infections**

It has long been acknowledged that CAUTI is the most frequent type of infection in acute care settings. In a study that provided a national estimate of healthcare-associated infections, urinary tract infections comprised 36% of the total HAI estimate. (See figure 2.1 below.)<sup>1</sup>

Figure 2.1. Infection types in acute care settings.



\*An APIC Guide 2008: Guide to the Elimination of Catheter-Associated Urinary Tract Infections (CAUTIs)

<sup>1</sup> Klevens RM, Edwards JR, Richards CL, et al. Estimating healthcare-associated infections and deaths in U.S. hospitals, 2002. *Public Health Rep. 2007;* 122:160-167. http://www.cdc.gov/ncidod/dhqp/pdf/hicpac/infections\_deaths.pdf

## CA-UTI Rates, CDC NHSN, 2012

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| Type of location                     | No. of locations | No. of CAUTI | Catheter days | Pooled Mean |
|--------------------------------------|------------------|--------------|---------------|-------------|
| CRITICAL CARE                        |                  |              |               |             |
| Medical-Major teaching               | 230              | 2181         | 741,268       | 2.9         |
| Medical-All others                   | 460              | 1438         | 852,627       | 1.7         |
| Medical cardiac                      | 405              | 1517         | 703,734       | 2.2         |
| Medical/surgical – major<br>teaching | 328              | 2280         | 935,001       | 2.4         |
| Neurosurgical                        | 173              | 2464         | 489,391       | 5.0         |
| Pediatric medical/surgical           | 297              | 452          | 166,710       | 2.7         |
| Surgical – major teaching            | 176              | 1800         | 558,102       | 3.2         |
| Surgical – cardiothoracic            | 456              | 1657         | 939,044       | 1.8         |
| INPATIENT WARDS                      |                  |              |               |             |
| Medical                              | 813              | 1334         | 882,392       | 1.5         |
| Medical/surgical                     | 1825             | 2752         | 2,038,073     | 1.4         |
| Neurosurgical                        | 48               | 175          | 61,879        | 2.8         |
| Surgical                             | 458              | 1099         | 647,041       | 1.7         |

Dudeck MA. National Healthcare Safety Network (NHSN) Report, data summary for 2012, device-associated module. AJIC 2013;41:1148-66.

# **Cost of CA-UTIs**

- The CDC has estimated that up to 139,000 hospital onset, symptomatic CA-UTIs occurred in 2007,<sup>1</sup> resulting in as much as \$131 million in excess direct medical costs.<sup>2</sup>
- Each episode of UTI costs between US\$600-\$3803.<sup>3-4</sup>
- UT-related bacteremia cost an average of US\$2800.<sup>5</sup>
  - 1. Wise M. Burden of major hospital-onset device-associated infection types among adults and children in the United States, 2007. 21<sup>st</sup> Annual Scientific Meeting of the Society of Healthcare Epidemiology of America, April 2, 2011; dallas, Tx. Abstract 3703.
  - 2. Scott R. Economic burden of major device-associated, acute-care hospital-onset infections among adults and children in the United States, 2007. 21<sup>st</sup> Annual Scientific Meeting of the Society of Healthcare Epidemiology of America, April 2, 2011; dallas, Tx. Abstract 4552.
  - 3. Saint S. Clinical and economic consequences of nosocomial catheter-related bacteriuria. Am J Infect Cont 2000;28:68-75.
  - 4. McConnel E. New catheters decrease nosocomial infections. Nurs Manag 2000;31:52,55.
  - 5. Tambyah PA. The direct costs of nosocomial catheter-related urinary tract infection in the era of managed care. Infect Cont Hosp Epidemiol 2002;23:27-31.

# National & Regulatory CA-UTI Prevention Initiatives



## Financial: Center for Medicare and Medicaid Services (CMS) - *Show Me the Money!*

- Starting in October 1, 2008, the CMS under a revised Acute Care Hospital Inpatient Prospective Payment System (IPPS), no longer reimburses hospitals for costs attributable to CA-UTIs.
- Starting in 2014, CMS began publically reporting rates of CA-UTI for hospitals participating in the Hospital Inpatient Quality Reporting Program.
- Starting in 2015, required reporting of CA-UTIs in all settings, including adult and pediatric medical, and surgical wards.
- CMS will base penalties on Center for Disease Control and Prevention (CDC) National Healthcare Safety Network (HSHN) CA-UTI data.

CMS. Medicare Program: hospital inpatient prospective payment systems for acute care hospitals and long-term care hospital prospective payment system and proposed fiscal year 2014 rates. Fed Regist 2013;78:27622-35.

# CDC NHSN Definitions of CA-UTI: Preventing the Preventable



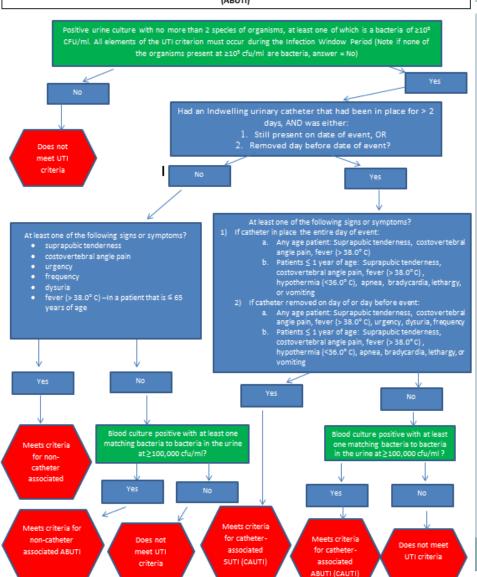


#### **CDC NHSN CA-UTI Definition Revisions 2015**

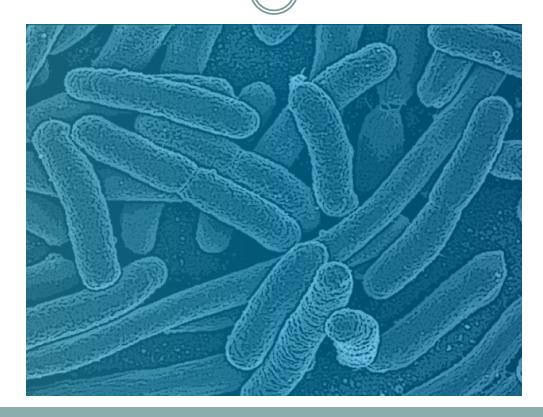
- Effective January 2015
  - The Urinary Tract Infections (UTI) definitions will no longer include:
    - × Symptomatic UTI (SUTI) criteria 2 and 4 due to removal of the following elements:
      - o Colony counts of less than 100,000 CFU/ml
      - o Urinalysis results
    - × Urine cultures that are positive only for yeast, mold, dimorphic fungi, or parasites.
    - Uropathogen list for Asymptomatic Bacteremic UTI (ABUTI) ABUTI criteria will use the same pathogen list as Symptomatic UTI (SUTI)

#### CDC NHSN, SUTI and ABUTI Definitions, 2015

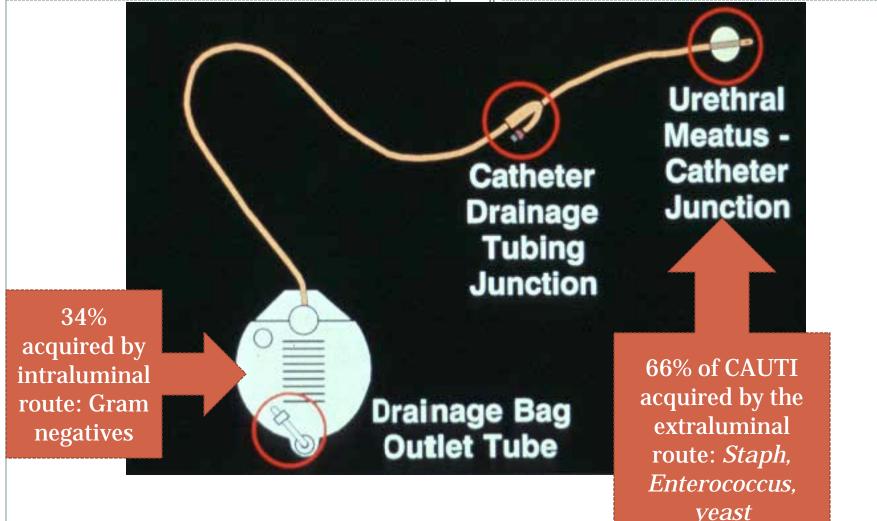
Identifying Symptomatic Urinary Tract Infections (SUTI) and Asymptomatic Bacteremic Urinary Tract Infections (ABUTI)



# Pathogenesis of CA-UTI



#### Pathogenesis



Tambyah PA. A prospective study of pathogenesis of catheter-associated urinary tract infections. Mayo Clin Proc 1999;74:131-6.

• Extraluminal acquisition of organisms is usually associated with endogenous organisms, i.e., bacteria that colonize the patient's own perineum.

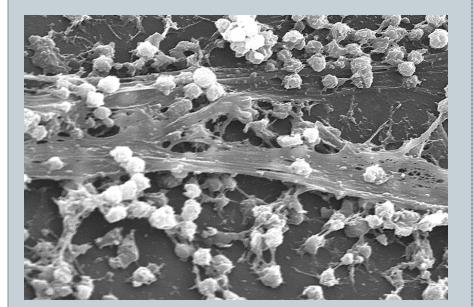
- Intraluminal acquisition is most often associated with exogenous organisms and result from cross-contamination from the hands of healthcare workers.
- Approx. 15% of episodes of healthcare-associated bacteruria occur in clusters from intrahospital transmission.

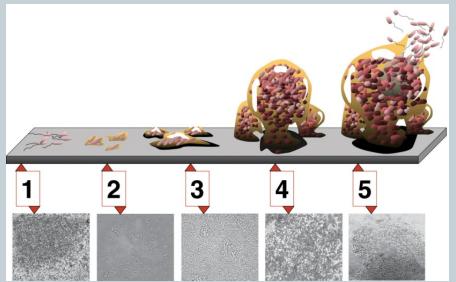
Maki DG. Engineering out the risk of infection with urinary catheters. Emerg Infect Dis 2001;7:1-6.

#### **Catheter Biofilms**

Biofilms are composed of clusters of mircoorganisms in a polysaccharide matrix. They form on intraluminal and extraluminal surfaces. Organisms in biofilms may ascend the catheter in 1-3 days.

Biofilms form a protective environment for organisms with poor penetration by antimicrobials.





Saint S. Biofilms and catheter-associated urinary tract infections. Infectious Dis Clin North America 2003;17:411-32.

# **Pathogens Associated with CAUTIs**

TABLE 5. Distribution of Rank Order of Selected Pathogens Associated with Healthcare-Associated Infections (HAIs) Reported to the National Healthcare Safety Network, by Type of HAI, 2009–2010

|                                  | Overall                 |      | CLABSI               |                   | CAUTI                   |                   | VAP                     |                   | SSI                     |                   |  |
|----------------------------------|-------------------------|------|----------------------|-------------------|-------------------------|-------------------|-------------------------|-------------------|-------------------------|-------------------|--|
| Pathogen                         | No. (%) of<br>pathogens | Rank | No. (%) of pathogens | Rank <sup>a</sup> | No. (%) of<br>pathogens | Rank <sup>a</sup> | No. (%) of<br>pathogens | Rank <sup>a</sup> | No. (%) of<br>pathogens | Rank <sup>a</sup> |  |
| Staphylococcus aureus            | 12,635 (15.6)           | 1    | 3,735 (12.3)         | 2                 | 442 (2.1)               |                   | 2,043 (24.1)            | 1                 | 6,415 (30.4)            | 1                 |  |
| Escherichia coli                 | 9,351 (11.5)            | 2    | 1,206 (4.0)          | 9                 | 5,660 (26.8)            | 1                 | 504 (5.9)               | 6                 | 1,981 (9.4)             | 3                 |  |
| Coagulase-negative staphylococci | 9,261 (11.4)            | 3    | 6,245 (20.5)         | 1                 | 467 (2.2)               |                   | 72 (0.9)                |                   | 2,477 (11.7)            | 2                 |  |
| Klebsiella (pneumoniae/oxytoca)  | 6,470 (8.0)             | 4    | 2,407 (7.9)          | 5                 | 2,365 (11.2)            | 3                 | 854 (10.1)              | 3                 | 844 (4.0)               | 7                 |  |
| Pseudomonas aeruginosa           | 6,111 (7.5)             | 5    | 1,166 (3.8)          | 10                | 2,381 (11.3)            | 2                 | 1,408 (16.6)            | 2                 | 1,156 (5.5)             | 5                 |  |
| Enterococcus faecalis            | 5,484 (6.8)             | 6    | 2,680 (8.8)          | 3                 | 1,519 (7.2)             | 5                 | 45 (0.5)                |                   | 1,240 (5.9)             | 4                 |  |
| Candida albicans                 | 4,275 (5.3)             | 7    | 1,974 (6.5)          | 7                 | 1,887 (8.9)             | 4                 | 147 (1.7)               |                   | 267 (1.3)               |                   |  |
| Enterobacter spp.                | 3,821 (4.7)             | 8    | 1,365 (4.5)          | 8                 | 880 (4.2)               | 8                 | 727 (8.6)               | 4                 | 849 (4.0)               | 6                 |  |
| Other Candida spp. or NOS        | 3,408 (4.2)             | 9    | 2,465 (8.1)          | 4                 | 811 (3.8)               | 9                 | 36 (0.4)                |                   | 96 (0.5)                |                   |  |
| Enterococcus faecium             | 3,314 (4.1)             | 10   | 2,118 (7.0)          | 6                 | 654 (3.1)               | 10                | 25 (0.3)                |                   | 517 (2.5)               |                   |  |
| Enterococcus spp.                | 2,409 (3.0)             | 11   | 703 (2.3)            | 12                | 1,010 (4.8)             | 7                 | 11 (0.1)                |                   | 685 (3.2)               | 8                 |  |
| Proteus spp.                     | 2,031 (2.5)             | 12   | 232 (0.8)            |                   | 1,013 (4.8)             | 6                 | 119 (1.4)               |                   | 667 (3.2)               | 9                 |  |
| Serratia spp.                    | 1,737 (2.1)             | 13   | 762 (2.5)            | 11                | 204 (1.0)               |                   | 386 (4.6)               | 7                 | 385 (1.8)               |                   |  |
| Acinetobacter baumannii          | 1,490 (1.8)             | 14   | 629 (2.1)            | 13                | 185 (0.9)               |                   | 557 (6.6)               | 5                 | 119 (0.6)               |                   |  |
| Other <sup>a</sup>               | 9,304 (11.5)            |      | 2,762 (9.1)          |                   | 1,633 (7.7)             |                   | 1,510 (17.8)            |                   | 3,399 (16.1)            |                   |  |
| Total                            | 81,139 (100)            |      | 30,454 (100)         |                   | 21,111 (100)            |                   | 8,474 (100)             |                   | 21,100 (100)            |                   |  |

NOTE. CAUTI, catheter-associated urinary tract infection; CLABSI, central line-associated bloodstream infection; NOS, not otherwise specified; SSI, surgical site infection; VAP, ventilator-associated pneumonia.

<sup>a</sup> A rank is not given if pathogen is not in the top 14 reported for the specific HAI type listed in Table 3 of the supplemental report on the CDC website (http://www.cdc.gov/nhsn/dataStat.html).

Sivert DM. Antimicrobial-resistant associated with HAIs: Summary of data reported to the NHSN a the CDC, 2009-2010. ICHE 2013;34;1-14.

# **Antibiotic Resistant Organisms & CAUTIs**

TABLE 7. Percentage of Pathogenic Isolates Resistant to Selected Antimicrobial Agents, National Healthcare Safety Network, 2009–2010

| , , ,                           |                                |                                  |                  |                                |                                  |                  |                                |                                  |                  |                                |                                  |                  |
|---------------------------------|--------------------------------|----------------------------------|------------------|--------------------------------|----------------------------------|------------------|--------------------------------|----------------------------------|------------------|--------------------------------|----------------------------------|------------------|
|                                 | CLABSI                         |                                  |                  | CAUTI                          |                                  |                  | VAP                            |                                  |                  | SSI                            |                                  |                  |
| Pathogen, antimicrobialª        | No. of<br>isolates<br>reported | No. (%) of<br>isolates<br>tested | Resistance,<br>% | No. of<br>isolates<br>reported | No. (%) of<br>isolates<br>tested | Resistance,<br>% | No. of<br>isolates<br>reported | No. (%) of<br>isolates<br>tested | Resistance,<br>% | No. of<br>isolates<br>reported | No. (%) of<br>isolates<br>tested | Resistance,<br>% |
| Staphylococcus aureus           | 3,735                          |                                  |                  | 442                            |                                  |                  | 2,043                          |                                  |                  | 6,415                          |                                  |                  |
| OX/METH                         |                                | 3,611 (96.7)                     | 54.6             |                                | 438 (99.1)                       | 58.7             |                                | 1,974 (96.6)                     | 48.4             |                                | 6,304 (98.3)                     | 43.7             |
| Enterococcus spp.               |                                |                                  |                  |                                |                                  |                  |                                |                                  |                  |                                |                                  |                  |
| E. faecium                      | 2,118                          |                                  |                  | 654                            |                                  |                  | 25                             |                                  |                  | 517                            |                                  |                  |
| VAN                             |                                | 2,069 (97.7)                     | 82.6             |                                | 639 (97.7)                       | 82.5             |                                | 23 (92)                          | 82.6             |                                | 509 (98.5)                       | 62.3             |
| E. faecalis                     | 2,680                          |                                  |                  | 1,519                          |                                  |                  | 45                             |                                  |                  | 1,240                          |                                  |                  |
| VAN                             |                                | 2,578 (96.2)                     | 9.5              |                                | 1,446 (95.2)                     | 8.4              |                                | 41 (91.1)                        | 9.8              |                                | 1,187 (95.7)                     | 6.2              |
| Klebsiella (pneumoniae/oxytoca) | 2,407                          |                                  |                  | 2,365                          |                                  |                  | 854                            |                                  |                  | 844                            |                                  |                  |
| ESC4                            |                                | 2,109 (87.6)                     | 28.8             |                                | 1,998 (84.5)                     | 26.9             |                                | 747 (87.5)                       | 23.8             |                                | 710 (84.1)                       | 13.2             |
| Carbapenems                     |                                | 1,858 (77.2)                     | 12.8             |                                | 1,520 (64.3)                     | 12.5             |                                | 617 (72.2)                       | 11.2             |                                | 582 (69.0)                       | 7.9              |
| MDR1                            |                                | 1,932 (80.3)                     | 16.8             |                                | 1,650 (69.8)                     | 16.1             |                                | 658 (77.0)                       | 13.4             |                                | 621 (73.6)                       | 6.8              |
| Escherichia coli                | 1,206                          |                                  |                  | 5,660                          |                                  |                  | 504                            |                                  |                  | 1,981                          |                                  |                  |
| ESC4                            |                                | 1,067 (88.5)                     | 19.0             |                                | 4,656 (82.3)                     | 12.3             |                                | 429 (85.1)                       | 16.3             |                                | 1,627 (82.1)                     | 10.9             |
| FQ3                             |                                | 1,137 (94.3)                     | 41.8             |                                | 5,513 (97.4)                     | 31.2             |                                | 466 (92.5)                       | 35.2             |                                | 1,876 (94.7)                     | 25.3             |
| Carbapenems                     |                                | 931 (77.2)                       | 1.9              |                                | 3,579 (63.2)                     | 2.3              |                                | 344 (68.3)                       | 3.5              |                                | 1,330 (67.1)                     | 2.0              |
| MDR1                            |                                | 992 (82.3)                       | 3.7              |                                | 3,929 (69.4)                     | 2.0              |                                | 365 (72.4)                       | 3.3              |                                | 1,390 (70.2)                     | 1.6              |
| Enterobacter spp.               | 1,365                          |                                  |                  | 880                            |                                  |                  | 727                            |                                  |                  | 849                            |                                  |                  |
| ESC4                            |                                | 1,309 (95.9)                     | 37.4             |                                | 818 (93.0)                       | 38.5             |                                | 690 (94.9)                       | 30.1             |                                | 816 (96.1)                       | 27.7             |
| Carbapenems                     |                                | 1,041 (76.3)                     | 4.0              |                                | 614 (69.8)                       | 4.6              |                                | 530 (72.9)                       | 3.6              |                                | 594 (70.0)                       | 2.4              |
| MDR1                            |                                | 1,123 (82.3)                     | 3.7              |                                | 667 (75.8)                       | 4.8              |                                | 579 (79.6)                       | 1.4              |                                | 648 (76.3)                       | 1.7              |
| Pseudomonas aeruginosa          | 1,166                          |                                  |                  | 2,381                          |                                  |                  | 1,408                          |                                  |                  | 1,156                          |                                  |                  |
| AMINOS                          |                                | 819 (70.2)                       | 10.0             |                                | 1,495 (62.8)                     | 10.9             |                                | 920 (65.3)                       | 11.3             |                                | 664 (57.4)                       | 6.0              |
| ESC2                            |                                | 1,120 (96.1)                     | 26.1             |                                | 2,294 (96.3)                     | 25.2             |                                | 1,355 (96.2)                     | 28.4             |                                | 1,097 (94.9)                     | 10.2             |
| FQ2                             |                                | 1,114 (95.5)                     | 30.5             |                                | 2,337 (98.2)                     | 33.5             |                                | 1,378 (97.9)                     | 32.7             |                                | 1,111 (96.1)                     | 16.9             |
| Carbapenems                     |                                | 982 (84.2)                       | 26.1             |                                | 1,883 (79.1)                     | 21.3             |                                | 1,162 (82.5)                     | 30.2             |                                | 872 (75.4)                       | 11.0             |
| PIP/PIPTAZ                      |                                | 809 (69.4)                       | 17.4             |                                | 1,792 (75.3)                     | 16.6             |                                | 1,059 (75.2)                     | 19.1             |                                | 818 (70.8)                       | 6.8              |
| MDR2                            |                                | 1,096 (94)                       | 15.4             |                                | 2,250 (94.5)                     | 14.0             |                                | 1,342 (95.3)                     | 17.7             |                                | 1,053 (91.1)                     | 5.3              |
| Acinetobacter baumannii         | 629                            |                                  |                  | 185                            |                                  |                  | 557                            |                                  |                  | 119                            |                                  |                  |
| Carbapenems                     |                                | 522 (83)                         | 62.6             |                                | 128 (69.2)                       | 74.2             |                                | 449 (80.6)                       | 61.2             |                                | 102 (85.7)                       | 37.3             |
| MDR3                            |                                | 617 (98.1)                       | 67.6             |                                | 183 (98.9)                       | 77.6             |                                | 552 (99.1)                       | 63.4             |                                | 114 (95.8)                       | 43.9             |

NOTE. CAUTI, catheter-associated urinary tract infection; CLABSI, central line-associated bloodstream infection; SSI, surgical site infection; VAP, ventilator-associated pneumonia. <sup>a</sup> AMINOS, aminoglycosides (amikacin, gentamicin, tobramycin). Carbapenems are imipenem and meropenem. ESC2, extended-spectrum (ES) cephalosporins (cefepime, ceftazidime); ESC4, ES cephalosporins (cefepime, ceftazidime, ceftraixone). FQ2, fluoroquinolones (ciprofloxacin, levofloxacin); FQ3, fluoroquinolones (ciprofloxacin, moxifloxacin). MDR1, pathogens tests as "I" (intermediate) or "R" (resistant) to at least 1 drug in 3 of the 5 following classes: ESC4, FQ3, aminoglycosides, carbapenems, and piperacillin/tazobactam; MDR2, pathogen must test as I or R to at least 1 drug in 3 of the 5 following classes: ESC2, FQ2, aminoglycosides, carbapenems, and piperacillin/tazobactam; MDR3, pathogen must test as I or R to at least 1 drug in 3 of the 6 following classes: ESC2, FQ2, aminoglycosides, carbapenems, piperacillin or piperacillin/sulbactam. OX/METH, oxacillin/methicillin; PIP, piperacillin; PIPTAZ, piperacillin/tazobactam; VAN, vancomycin.

Sivert DM. Antimicrobial-resistant associated with HAIs: Summary of data reported to the NHSN a the CDC, 2009-2010. ICHE 2013;34;1-14.

# **Urine Specimen Collection**



#### Area of Improvement:

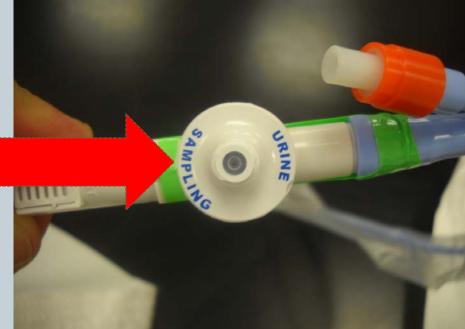
#### **Collection of Urine for Microbiology Culture**

- Protocol is nearly universally overlooked in improvement plans
- Major points to address when obtaining urine cultures from urinary catheters:
  - In a patient who is symptomatic, replace the catheter and obtain specimen from the new catheter.
  - Collect sample in an aseptic manner (wash hands, wear gloves).
  - Use a disinfectant to wipe the collection port (*scrub the hub*?).
  - Use a 20ml syringe to collect urine from the sampling port.
  - If facility method is to place the sample in a sterile container, then transport to lab: analysis should take place within 2 hours of collection; if not, place in refrigerator (2-8°C), max 24 hrs.
  - *There is a preferred method of collection!*
- Educate all staff who collect samples for urine culture.

#### How should we collect urine specimens?

 "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 adaptor after cleansing the port with a disinfectant." (Category IB)





Gould CV, et al. HICPAC. Centers for Disease Control & Prevention . Guideline for Prevention of CAUTI, 2009.

#### **Education on Proper Urine Collection**

Processing Urine Samples with BD Vacutainer® Collection Products UA Preservative or Plain UA Tube with Culture and Sensitivity (C&S) Tube 8-10 X 50 and a 1. Submerge tip of transfer 2. • Push C&S Preservative 3. • Pigh UA preservative Tube (cherry red/yellow top) or 4. Label both filled tubes 5. Dispose of transfer straw in Tube (gray top) into the transfer straw. • Hold in position until flow stops. straw in spe with patient's name, the plain UA Tube (yellow top) date/time of specimer into transfer straw completely.
Hold in position until flow stops. collection and any other data required by your 8-10x Remove tube, leaving transfer X straw in specimen container. Remove tube, leaving transfer institution. straw in specimen contained Invert UA Preservative Tube 8-10 times to mix the sample • Shake tube vigorously. **3**X 3X **UA Preservative or Plain UA Tube Only** 33 80 2. • Push UA Preservative Tube 3. Label filled tube with 1. Submerge tip of transfer 4. Dispose of transfer straw in (cherry red/yellow top) or plain UA Tube (yellow top) into transfer straw completely. patient's name, the sharps collector. date/time of specimen collection and any other deta required by your oinstitution. · Hold in position until flow stops. 85-10X · Remove tube, leaving transfer straw in specimen container. • Invert UA Preservative Tube 8-10 times to mix the samp 8-10x 3×3x **C&S Tube Only** AP 1. Submerge tip of transfer 2. • Push C&S Preservative Tube 3. Label filled tube with 4. Dispose of transfer straw in (gray top) into the transfer straw all the way. any other data equired by your institution. straw in specime sharps collecto · Hold in position until 8-10× Remove tube, leaving 8-10× transfer straw in spec Shake tube vigorously. 3× 8-10x 3× BD Globa Hechnical Services: 1.800.631.0174 vacutainer\_techservices@bd.com 8-10x BD Customer Service: 1.888.237.2762 www.bd.com/vacutainer

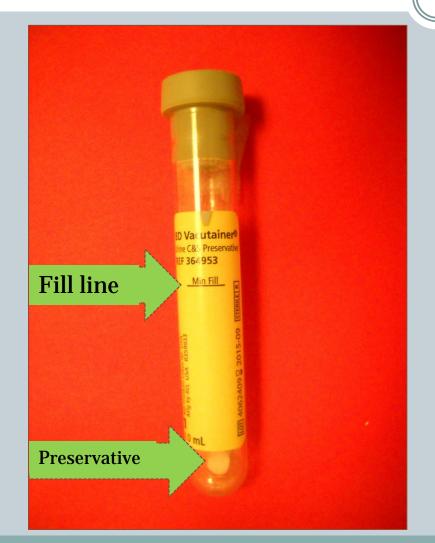
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Handle all biologic samples and medical "shaps" (lancets, needles, and transfer straws) according to the policies, and procedures of your facility. Othain appropriate medical attention in the event of any exposure to biologic samples for example, through a puncture injury since they may transmit vial hepatite, HV (ADS), or other infectious deases. B Ode son trecommend resheding used needles, but the policies and procedures of your facility may differ and must aways be followed locard any medical "shaps" in biobarad containers approved for their disposal.

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## **Preferred Method of Urine Collection**



• Use a kit containing a vacutainer tube with preservative (buffered boric acid).

 viable at room temp up to 48 hrs.

 In order to optimize the yield of bacteria, collect approx. 15ml of urine (to "Min Fill").

Urinalysis: Approved Guideline, 3<sup>rd</sup> Ed. Clinical and Laboratory Standards Institute, 2009.

# **CA-UTI Prevention Recommendations**



# National Survey on Prevention of UTIs

- Random sample of hospitals with ICUs and >50 beds to determine the extent of prevention practices.
- 119 VA hospitals, 2671 Non-VA hospitals.
- Results:
  - ~56% of hospitals did not have system for monitoring which patients had urinary catheters.
  - ~74% did not monitor catheter duration.
  - ~70% did not have established system for monitoring UTI rates.
  - Only ~10% used either catheter reminders or stop orders.
- Conclusion: <u>no single strategy was widely used for the prevention</u> <u>of nosocomial UTI</u>

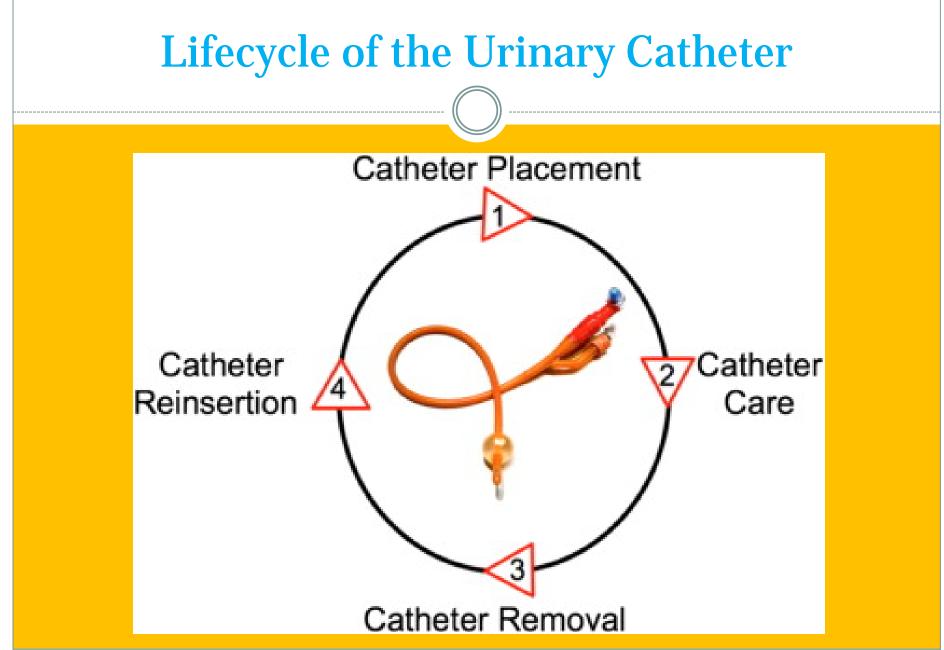
Saint S. Preventing hospital-acquired urinary tract infection in the United States: A National Survey. Clin Infect Dis 2008;46:243-50.

## What Can We Prevent?

- An estimated 17% to 69% of CA-UTI may be preventable with recommended infection control measures, which means that up to 380,000 infections and 9000 deaths related to CA-UTI per year could be prevented.<sup>1</sup>
- The best quality studies suggest that as many as **70% of all CA-UTIs are preventable** with current evidence-based strategies. CA-UTI may be the most preventable HAI; the number of avoidable infections ranges from 95,483 to 387,550 per year.<sup>2</sup>
- 1. CDC Guideline for the Prevention of CAUTI 2009.
- 2. Umscheid CA, et al. Estimating the proportion of HAIs that are reasonably preventable and the related mortality and cost. ICHE 2011;32:101-114.

#### **Evidence-based Strategies to Prevent CA-UTI**

- 1. Educate all relevant staff on proper urinary catheter insertion/ maintenance.
- 2. Insert urinary catheters only when necessary.
- **3**. Ensure CA-UTI surveillance is accurate-use standardized definitions and methods.
- 4. Educate staff on proper urine collection, including the best urine collection products and methods.
- **5.** Consider alternate type urinary catheters.
- 6. Practice clean procedures for meatal care.
- 7. Conduct competency to ensure staff are implementing policy components correctly.
- 8. Implement daily reminders/alerts/stop orders/nurse protocols to initiate catheter removal.
- 9. Provide feedback to staff on all units.



Meddings J, et al. Disrupting the life cycle of the urinary catheter. Clin Inf Dis 2011;52:1291-3.

#### **Lifecycle 1: Catheter Placement**

- 1. Use the smallest bore catheter possible.
- 2. Assure that all staff understand the indications for appropriate insertion.
- 3. Only trained personnel to insert catheters.
- 4. Use alternate devices if possible (condom catheters, intermittent catheterization).

## When is Urinary Catheterization Appropriate?

- Patient has acute urinary retention or bladder outlet obstruction.
- Need for accurate measurements of urinary output in critically ill patients.
- Peri-operative 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 the PACU).
  - Patients anticipated to receive large-volume infusions or diuretics during surgery.
  - 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, multiple traumatic injuries such as pelvic fractures).
- To improve comfort for end of life care, if needed.

#### When is Urinary Catheterization Inappropriate?

- 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 (e.g., structural repair of urethra or contiguous structures, prolonged effect of epidural anesthesia, etc.).

# Area of Improvement: Catheter Use in Emergency Departments

- Analysis of National Hospital Ambulatory Medical Care Survey (NHAMCS) data, ED visits, 1995-2010.
- Examined use of urinary catheters and appropriateness of use based on CDC criteria.
- Results:
  - Urinary catheter use: 2.2 to 3.3 per 100 ED visits.
  - o Among admitted patients, 8.5% received urinary catheters.
  - 64.9% of catheters were potentially avoidable.
    - × Reasons:
      - Catheters sometimes placed to collect specimens
      - To monitor output
      - Determine residual bladder volume
      - Patient or staff convenience

Schuur JD, et al. Urinary catheter use and appropriateness in U.S. Emergency Departments, 1995-2010. Acad Emer Med 2014;21:292-300.

#### **Recommendations on Urinary Catheter Insertion**

- "Perform hand hygiene immediately before and after insertion or any manipulation of the catheter device or site" (Category IB)
- "Ensure that properly trained persons (e.g., hospital personnel, family members, or patients themselves) who know the correct technique of aseptic catheter insertion and maintenance are given this responsibility" (Category IB)
- "In the acute care hospital setting, insert urinary catheters using aseptic technique and sterile equipment" (Category IB)
  - "Use sterile gloves, drape, sponges, an appropriate antiseptic or sterile solution for periurethral cleaning, and a single-use packet of lubricant jelly for insertion" (Category IB)
  - "Routine use of antiseptic lubricants is not necessary" (Category II)
  - "Further research is needed on the use of antiseptic solutions vs. sterile water or saline for periurethral cleaning brforecatheter insertion" (No recomm.)

# **Sample Manufacturer Procedure Statements**

- "Tips to reduce catheter-associated urinary tract infection"
  - "Cleanse hands before and after any manipulation of the catheter or site.
  - **Do Not** touch anything which is non-sterile once you put on sterile gloves.
  - Make sure the tip of the catheter is well lubricated for easy insertion and to help prevent damage to the urethra.
  - **Do not** reinsert catheter if first insertion was unsuccessful.
    - × If the catheter is inserted into the female patient's vagina by mistake, leave it there as a marker until a new catheter is properly placed in the urethra.
  - Whenever possible, maintain a closed sterile drainage system after insertion.
  - Make sure the catheter drains. Verify that tubing is not kinked or twisted."



# "Instruction should never be the endpoint,

Competency in practice is what matters"

## Antimicrobial/Antiseptic Catheters

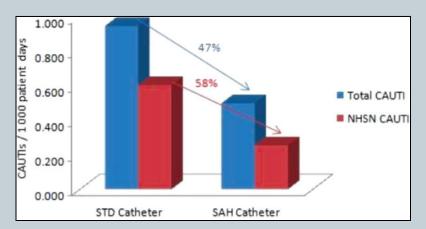
- "If the CA-UTI rate is not decreasing after implementing a comprehensive strategy to reduce rates of CA-UTI, consider using antimicrobial/antiseptic-impregnated catheters. The comprehensive strategy should include, at a minimum, the high priority recommendations for urinary catheter use, aseptic insertion, and maintenance." (Category IB)
  - "Further research is needed on the effect of antimicrobial/antisepticimpregnated catheters in reducing rates the risk of symptomatic UTI, their inclusion among the primary interventions, and the patient population most likely to benefit from these catheters." (No recommendation/unresolved issue)

#### **Results of 2 Meta-Analysis of Antimicrobial Urinary Catheters**

- Review of 12 trials; 13,392 patients.
- No trials addressed symptomatic UTIs.
- Studies limited by number, size, quality of studies.
- These catheters may delay or prevent UTIs in select populations with short-term catheterization.
  - Johnson JR. Systematic review: antimicrobial urinary catheters to prevent catheter-associated urinary tract infection in hospitalized patients. Ann Intern Med 2006;144:116-27.
- Review of 23 trials; 5,236 patients in 22 parallel group trials and 27,878 patients in one large cluster-randomized cross-over trial.
- Silver oxide catheters were of no benefit.
- Silver alloy catheters were found to significantly reduce asymptomatic bacteriuria in short-term catheterized patients (<7d).</li>
- Data was insufficient to determine effect on patients catheterized for longer periods.
  - Schumm K. Types of urethral catheters for management of short-term voiding problems in hospitalized adults: a short version cochrane review. Neuro Urodynamics 2008;27:738-46.

## Multicenter Study on Impact of Silver-alloy Hydrogel Impregnated Urinary Catheters

- Before/After study on effect of standard non-silver urinary catheters (STD) vs. Silver-alloy hydrogel catheters (SAH) on clinical and CDC NHSN CA-UTI.
- 7 acute care hospitals.
- 453 pre- vs. 450 post-intervention patients.
- No significant changes in indwelling catheter practices or overall catheter usage in the two study time periods.
- 1<sup>st</sup> study to compare outcomes of Clinical CA-UTI and NHSN-defined CA-UTI.
- Study conducted after NHSN definition revisions.
- Results:



Lederer JW, Jarvis WR, et al. Multicenter cohort study to assess the impact of a silver-alloy and hydrogel-coated urinary tract catheter on symptomatic CAUTIS. J WOCN 2014;41:473-80.

## Lifecycle 2: Catheter Care

- 1. Practice routine hygiene of the meatal surface during daily bathing or showering; use of antiseptics is not necessary.
- 2. Properly secure indwelling catheters after insertion to prevent movement and urethral traction.
- 3. If breaks in aseptic technique, disconnection, or leakage occur, replace the catheter and collecting system.
- 4. Maintain unobstructed urine flow: Keep the bag below the level of the bladder, avoid kinking, empty bag regularly.

## **Meatal Cleansing**

• Emphasis should be to ensure separation of bathing or incontinence cleanup from meatal hygiene, i.e., change gloves and perform hand hygiene

#### • Joint Commission:

- *"The HCW should take care to wash his or her hands and don a fresh pair of gloves before moving to cleanse the urinary catheter and periurethral area."*
- CDC:
  - "Do not clean the periurethral area with antiseptics to prevent CA-UTI while the catheter is in place. Routine hygiene (e.g., cleansing of the meatal surface during daily bathing or showering) is appropriate."

#### • APIC:

- "Provide routine hygiene for meatal care."
- SHEA:
  - "Employ routine hygiene; cleaning the meatal area with antiseptic solutions is unnecessary."
- AHRQ:
  - "Routine urethral meatus cleansing with soap and water during bath and after bowel movement."
- WOCN:
  - "Routine perineal care is recommended."

## **Secure the Catheter**



- *Properly secure* indwelling catheters after insertion to prevent movement and urethral traction" - CDC
- Consider using an alcohol impregnated cap on sampling port

## **Maintain Unobstructed Urine Flow**

- *"Keep the collecting bag below the level of the bladder at all times; do not place the bag on the floor" CDC*
- What do transporters do in you facility when transporting patients with urinary catheters?



## **Emptying the Collection Bag**

- Some institutions are using mostly kits with urimeters to avoid breaking the seal.
- When do you empty a urine collection bag?
- What is used to empty the urine collection bag?



## **Emptying the Collection Bag**





## **Lifecycle 3: Catheter Removal**

- Implement quality improvement programs or strategies to enhance appropriate use of indwelling catheters and to reduce risk of CA-UTI; examples of programs:
  - Daily reviews of patients with indwelling catheters.
  - Alerts or reminders to identify patients with catheters and assess need for continued catheterization.
  - Stop orders.
  - Guidelines and protocols for nurse-directed removal of unnecessary catheters.
- Replacement of urinary catheters.

### Example of Intervention Using Daily Reviews (1)

- Study Unit: Med-Surg-Trauma ICU
- **Objective**: reduce CA-UTIs by decreasing use of urinary catheters.
- Intervention period: 12 months
- **Team**: Multidisciplinary including staff nurses
- **Methods**: Use of criteria-based urinary catheter guidelines, a decision-making algorithm, and a daily checklist.

## • Results:

- Usage decreased from a mean cath device days of 4.72 vs. 2.98
- Decrease of 408 catheter-days
- CA-UTI rates decreased 33%

### **Example of Intervention Using Daily Reviews (2)**

- Study Unit: MICU
- **Objective**: reduce CA-UTI by decreasing use of urinary catheters.
- Intervention period: 11 months vs. 6 months
- **Methods**: daily evaluation using criteria for appropriate use.
- Results:
  - Usage decreased from 311.7 d/mo to 238.6 d/mo
  - CA-UTI rates decreased from 4.7/1000 CD to zero
  - *32% of device-days were considered inappropriate*

### Example of Intervention Using *Weekly* Reviews (3)

- Study Unit: 228-bed hospital
- **Objective**: reduce CA-UTI by decreasing use of urinary catheters.
- Intervention period: 6 months
- **Team:** infection control, education, nursing, performance, improvement, risk management, and pharmacy.
- **Methods**: weekly catheter patrols to identify patients with catheters and appropriateness of use.
- Results:
  - CA-UTI rates decreased from 4 CAUTI/mo to zero.

#### Examples of Interventions Using Reminders and/or Stop Orders (1)

|   |        |     |                         |        |        |   |   |  |      |              | %      |
|---|--------|-----|-------------------------|--------|--------|---|---|--|------|--------------|--------|
| Study (Year)                                  |        |     |                         |        |        |   |   |  | RR ( | 95% CI)      | Weight |
| Reminder                                      |        |     |                         |        |        |   |   |  |      |              |        |
| Huang (2004)                                  |        |     | -+                      | -      |        |   |   |  | 0.64 | (0.49, 0.86) | 22.54  |
| Crouzet (2007)                                | •      |     |                         |        |        |   |   |  | 0.10 | (0.01, 0.75) | 2.41   |
| Subtotal (I-squared = 69.7%, p = 0.069)       |        |     |                         |        | $\geq$ |   |   |  | 0.33 | (0.06, 1.95) | 24.95  |
| Stop Order                                    |        |     | 1                       |        |        |   |   |  |      |              |        |
| Cornia (2003)                                 |        |     | -                       |        | •      |   | - |  | 1.57 | (0.41, 6.09) | 4.79   |
| Topal (2005)                                  |        | -   | •                       | -      |        |   |   |  | 0.63 | (0.33, 1.22) | 12.89  |
| Robinson (2007)                               | _      | •   |                         |        |        |   |   |  | 0.35 | (0.14, 0.86) | 8.78   |
| Loeb (2008)                                   |        | -   |                         | +      | -      |   |   |  | 0.99 | (0.35, 2.80) | 7.25   |
| Seguin (2010)                                 |        |     | -                       | +      |        |   |   |  | 0.71 | (0.40, 1.26) | 14.66  |
| Subtotal (I-squared = 4.2%, p = 0.383)        |        |     | $\langle \cdot \rangle$ | $\geq$ |        |   |   |  | 0.68 | (0.47, 0.97) | 48.38  |
| Both  |        |     |                         |        |        |   |   |  |      |              |        |
| Van den Broek (2011)                          |        |     |                         | +      |        |   |   |  | 1.01 | (0.93, 1.09) | 26.67  |
| Subtotal (I-squared = .%, p = .)              |        |     |                         | ¢      |        |   |   |  | 1.01 | (0.93, 1.09) | 26.67  |
| <b>Overall</b> (I-squared = 68.0%, p = 0.003) |        |     |                         | >      |        |   |   |  | 0.72 | (0.52, 0.99) | 100.00 |
| NOTE: Weights are from random effects and     | alysis |     |                         |        |        |   |   |  |      |              |        |
| .01   | .1     | .25 | .5                      | 1      | 2      | 4 | 6 |  |      |              |        |

11 published studies (with online supp. figure), indicate that the rate of CA-UTI was reduced by 53% with the use of a reminder or a stop order.

Meddings J, et al. Reducing unnecessary urinary catheter use and other strategies to prevent CAUTI: an integrative review. BMJ Qual Saf 2014;23:277-89.

#### Example of Interventions Using a Reminder (2)

- **Study Unit**: 4 hospital wards (2 control, 2 intervention)
- **Objective**: decrease use of urinary catheters.
- **Methods**: A simple <u>written reminder</u> provided to the patient's clinical team that the patient has a urinary catheter.
- Results:
  - o 5,678 patients evaluated
  - *Control group avg. proportion of time pts. catheterized increased by 15.1%*
  - Intervention group avg. proportion of time pts. catheterized decreased by 7.6%

### Examples of Intervention Using a Reminder (3)

- Study Unit: Adult ICUs, Large hospital, Taiwan
- **Objective**: reduce CA-UTIs and decrease use of urinary catheters.
- Study period: Nov 2000-Dec 2002
- **Methods**: Nurse-generated daily <u>reminders</u> provided to the physicians to remove unnecessary urinary catheters 5 days after insertion.

#### • Results:

- o 6,297 patients evaluated
- Avg. duration of catheterization decreased from 7.0d to 4.6d
- CA-UTI rate decreased from 11.5/1000 CD to 8.3/1000 CD
- *Monthly cost of antibiotics was reduced by 69%*

Huang W-C. Catheter-associated urinary tract infections in intensive care units can be reduced by prompting physicians to remove unnecessary catheters. ICHE 2004;25:974-78.

## A Systems (and Technical) Solution: Timely Removal of Endwelling Catheters

- 14 studies have evaluated urinary catheter reminders and stop-orders (written, computerized, nurseinitiated)
  - Significant reduction in catheter use (~2.5 days).
  - Significant reduction in infection (~50%).
  - No evidence of harm (i.e., re-insertion).

#### Meddings J et al. Clin Infect Dis 2010

## Example of a Physician and Nurse-Directed Protocol (1)

- Study Unit: 4 general medical units
- **Objective**: reduce CA-UTIs and decrease use of urinary catheters.
- Intervention period: 2 periods, one year each
- **Methods**: Computer Physician Online Entry (CPOE) system updating physician of urinary catheter insertion and prompting options for minimizing duration; nurse-directed protocol for removal; use of bladder scanners.

#### • Results:

- 81% of catheters inserted in ED; only 22% had physician orders.
- **Catheter days decrease from 892 to 521 to 184.**
- *CA-UTI rate (per 1000 CD) decreased from 36 to 19 to 11.*
- CA-UTI reduced by 81%.

Topal J. Prevention of nosocomial catheter-associated urinary tract infections through computerized feedback to physicians and a nurse-directed protocol. Am J Med Qual 2005;20:121-26.

## Example of Intervention Using a Bladder Bundle (1)

- Study Unit: 28-bed medical-surgical ICU
- **Objective**: reduce CA-UTIs
- Intervention Period: one year
- **Methods:** physician-led multidisciplinary rounds, use of prevention bundles, culture changes with focus on team decision making process.
- **UTI bundle**: regular assessment of continued need, sterile insertion technique, daily perineal care, drainage bag lower than patient's bladder, secure all catheters, use silver-coated catheters in selected cases.

#### • Results:

• Urinary catheter days: Baseline – 7,691 vs. Study – 5,780

CA-UTI rate (per 1000 CD) Baseline – 3.8, Study – 2.4

Jain M. Decline in ICU adverse events, nosocomial infections and cost through a quality improvement initiative focusing on teamwork and culture change. Qual Saf Health Care 2006;15:235-39.

## Example of Intervention Using a Bladder Bundle (2)

- **Study Hospital**: 123-bed Veterans Affairs hospital
- **Objective**: decrease unnecessary urinary catheter use.
- Intervention Period: one year
- **Methods:** Soliciting leadership, physicians, and key players to address known intervention processes.
- **UTI bundle**: staff education, system redesign, feedback, dedicated urinary catheter nurse.

#### • Results:

- Urinary catheter (UC) usage: Baseline 15% vs. Study 12%
- Non-ordered UCs: Baseline 17.0%, Study 5.1%
- Non-indicated UCs: Baseline 15.0%, Study 1.2%

Knoll BM, et al. Reduction of inappropriate urinary tract catheter use at a Veterans Affairs hospital through a multifaceted quality improvement program. Clin Infec Dis 2011;52:1283-90.

## Example of Intervention Using a Bladder Bundle (3)

- Study Hospital: 30-bed Neurosurgery ICU
- **Objective**: decrease CA-UTI
- Intervention Period: 32 months
- **UTI bundle**: avoidance of insertion, product standardization, maintenance of catheter sterility, timely removal of catheters, education.

## • Results:

Urinary catheter usage: Baseline – 100% vs. Study – 73%
CA-UTI rate: Baseline – 13.3%, Study – 4.0%

Titsworth WL, et al. Reduction of CAUTI among patients in a neurological intensive care unit: a single institution's success. J Neurosurg 2012;116:911-20.

## **Lifecycle 4: Catheter Reinsertion**

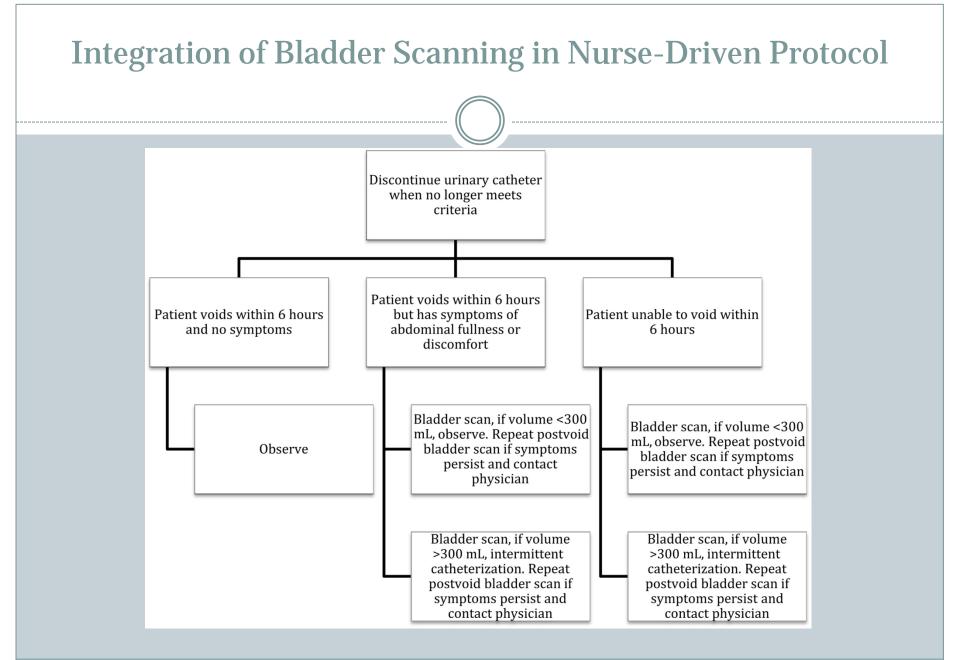
 Consider using a portable ultrasound device in patients undergoing intermittent catheterization to assess urine volume and reduce unnecessary catheter insertions

 If ultrasound bladder scanners are used, ensure that indications for use are clearly stated, nursing staff are trained in their use, and equipment is adequately cleaned and disinfected in between patients

## **Bladder Scanner for Avoiding Reinsertion**



- "Consider using a portable ultrasound device to assess urine volume in patients undergoing intermittent catheterization to assess urine volume and reduce unnecessary catheter insertions" (Category II)
- When do you use the device as an integral part of a CAUTI reduction program?



Fakih MG, et al. Engaging healthcare workers to prevent CAUTI and avert patient harm. Am J Infect Control 2014;42:S223-S229.

#### A CA-UTI Reduction Program with Integral Bladder Scanning Protocols

• Study conducted in an SICU

#### • Pre-study CAUTI rates:

- Trauma: 10 CA-UTIs per 1000 device days
- Neurosurgery: 32 CA-UTIs per 1000 device days
- SICU device utilization rate: 89<sup>th</sup> percentile
- Intervention: Algorithm incorporating a scoring tool for insertion, daily assessment guide, and...
  - o bladder scanner use to assess volume 4 hours after removal
  - use of intermittent catheterization if volume >300 cc
  - if <300cc, scan again in 2 hrs
  - Re-insert if needed to be intermittently cath 2 times

#### • Results:

- Urinary catheter utilization rate: decreased from 0.89 to 0.81
- CA-UTI rate: 10 to 5.4 per 1000 device days

## **Consensus Across all Guidelines**

- 1. Catheterize only when necessary and only for as long as necessary
- 2. Insert catheters using aseptic techniques and sterile equipment
- 3. Maintain closed, sterile drainage system

Conway LJ. Guidelines to prevent catheter-associated urinary tract infection: 1980-2010. Heart and Lung, 2011; in press.

## **Implementation Strategies**



## The "ABCDE Bladder Bundle"

- Adherence to general infection control principles (e.g., hand hygiene, surveillance and feedback, aseptic insertion, proper maintenance, education) is important.
- **B**ladder ultrasound may avoid indwelling catheterization.
- Condom catheters or alternatives to indwelling catheter such as intermittent catheterization should be considered.
- **D**o not use the indwelling catheter unless absolutely necessary.
- Early removal of the catheter using a reminder or nurse-initiated removal protocol appears to warranted.

Saint S. Translating health care-associated urinary tract infection prevention research into practice via the bladder bundle. Jt Comm J Qual Patient saf 2009;35:449-55.

## **Effectiveness of Bundles (1)**

- 28-bed Med/Surg ICU
- 2 year study
- Implemented UTI Bundle:
  - Regular assessment of continued need for catheter.
  - Sterile technique at insertion.
  - Perineal care daily and after bowel movement.
  - Drainage bag lower than patient's bladder at all times, including transport.
  - Secure all catheters.
  - Use silver coated catheter in selected cases.
- Result:
  - Decrease CA-UTI rate from 3.8 to 2.4 per 1000 catheter-days.

Jain M, et al. Decline in ICU adverse events, nosocomial infections and cost through a quality improvement initiative focusing on teamwork and culture change. Qual Saf Health Care 2006;15:235-39.

## **Effectiveness of Bundles (2)**

- Minneapolis Veterans Admin. Medical Center
- 123-bed acute care bed facility
- 8 year study
- Implemented UTI Bundle:
  - Staff education including list of appropriate use of catheters
  - Regular assessment of continued need for catheter
  - o System redesign including documentation and notices on EMR
  - o 72-hr. stop date
  - Maintenance practices
  - Feedback
- Result:
  - Decrease in non-ordered urinary catheters (UC) from 17.0% to 5.1%
  - Decrease in non-indicated UCs from 15% to 1.2%.

Knoll BM, et al. Reduction of inappropriate urinary catheter use at a Veterans Affairs Hospital through a multifaceted quality improvement project. Clin Infect Dis 2011;52:1283-90.

## **Effectiveness of Bundles (3)**

- Rochester VA Medical Center
- 8 month study

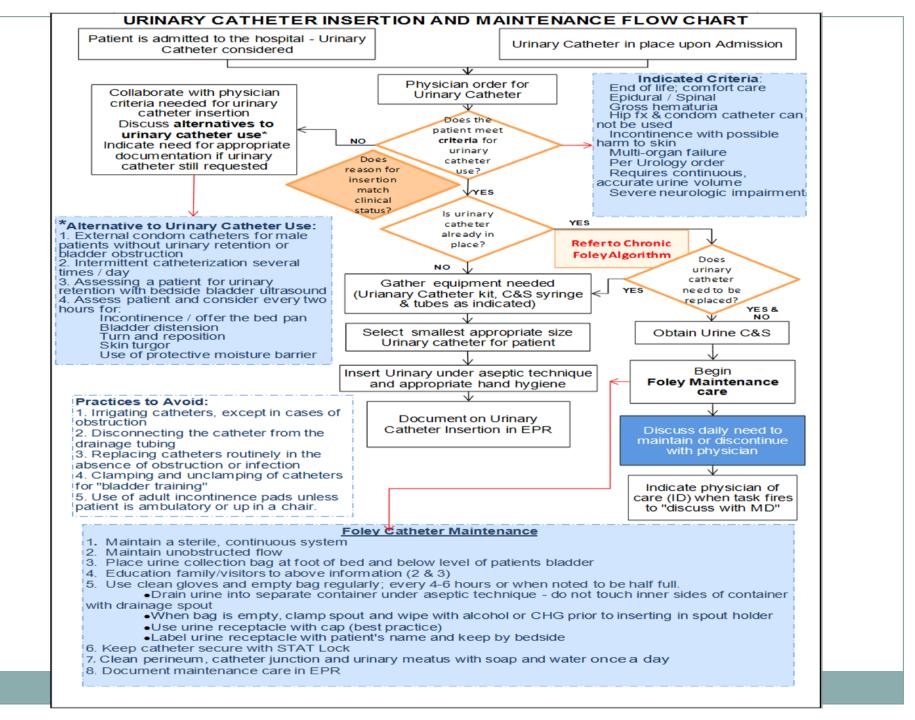
#### Implemented UTI Bundle:

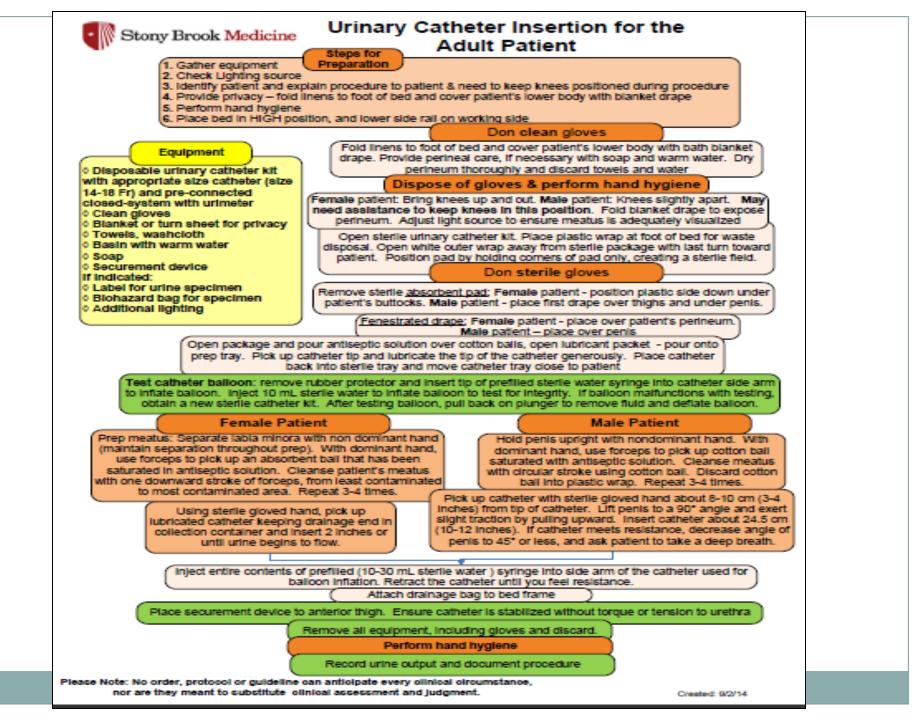
- Obtain provider order for insertion
- Use appropriate size catheter
- Strict hand hygiene
- Secure catheter
- Assess daily need for continued catheterization; consider alternatives
- Perform pericare daily and after bowel movements
- Keep drainage bag and tubing below level of bladder
- When sending C&S sample, cleanse the port vigorously with alcohol and allow to air dry
- Result:
  - Decrease of 71% in catheter days
  - Decrease of 56% in catheter use

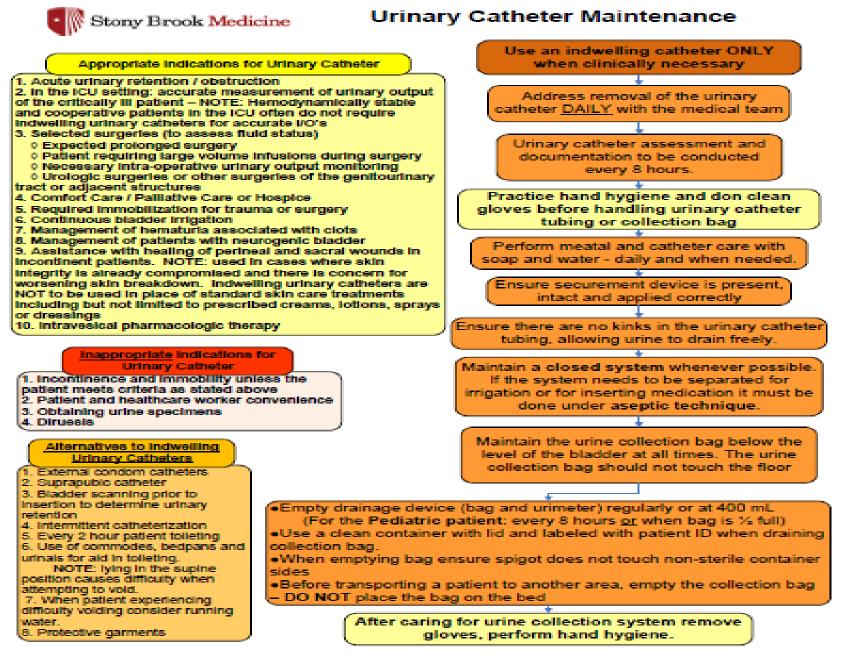
## **Effectiveness of Bundles (4)**

- Shands Hospital, Univ of Florida
- Neuro ICU, 32 month study
- Implemented UTI Bundle:
  - Avoidance of catheter insertion
  - Maintenance of sterility
  - o Product standardization
  - Early catheter removal
- Result:
  - *Decrease in catheter utilization from 100% to 73.3%*
  - Decrease in CA-UTI rate from 13.3 to 4.0 per 1000 CD

Titsworth WL, et al. reduction of CAUTI among patients in a neurological ICU: a single institution's success. J Neurosurg 2012;116:911-20.







Please Note: No order, protocol or guideline can anticipate every clinical circumstance, nor are they meant to substitute clinical assessment and judgment.

## **Is Your Hospital Safe?**



• Would you want a loved one to be a patient at your hospital? Your unit?

• Would you want to be a patient in the unit where you work?

•Can you say with 100 percent certainty that you believe that your hospital does everything it can to protect its patients?





# *"The bulk of the evidence is consistent with the view that multimodal strategies could prevent between 25% and 75% of CA-UTIs."*

Saint S. Catheter-associated urinary tract infection and the Medicare Rule changes. Ann Intern Med 2009;150:877-84.

## Thank you!