NHSN CAUTI Definitions

Slides created by the CDC and modified by
Giovanna Santovito-Carducci
Objectives

- Define resources and methods for CAUTI surveillance
- Review reporting requirements for CAUTI reporting to CMS through NHSN
- Define CAUTI key terms
- Review CAUTI criteria and application
Patient Safety Component Modules

National Healthcare Safety Network (NHSN)

- Device-Associated Module
- Procedure-Associated Module
- Medication-Associated Module
- MDRO and CDAD Module
- High-Risk Inpatient Influenza Vaccination Module
Resources for CAUTI Surveillance

- NHSN Patient Safety Component Module, June 2011
  - Ch 3 Monthly reporting plan
  - Ch 7 CAUTI Protocol (Aug 2011)
  - Ch 14 Tables of instructions, Tables 2a, 5, 6, and 7
  - Chapter 17 Criteria for specific Infections

http://www.cdc.gov/nhsn/TOC_PSCManual.html
Resources for CAUTI Surveillance

- NHSN Forms (June 2011)
  - 57.106 Monthly reporting plan
  - 57.114 Urinary Tract Infection
  - 57.117 Denominator data
  - 57.118 Denominator Data ICU/Other

http://www.cdc.gov/nhsn/forms/Patient-Safety-forms.html
NHSN Surveillance Methodology

• Patient based vs Laboratory based

• **Patient Based** is monitoring patients for events, risk factors, and procedures and practices related to patient care.
  - visit patient care areas, review charts, discuss with caregivers

• **Laboratory Based** is case finding based solely on positive lab findings
NHSN & CMS

- CAUTI must be included in Monthly Reporting Plan for data to be reported on behalf of the hospital/facility to CMS.

- Must follow the NHSN CAUTI Protocol exactly and report complete and accurate data in a timely manner.
  - Report each event or select no events
  - Report total device days and total patient days for selected locations
Key Terms

• **HAI**: A localized or systemic condition resulting from an adverse reaction to the presence of an infectious agent(s) or its toxin(s)
  - Occurs in a patient in a health care setting and
  - Was not present or incubating at the time of admission, unless the infection was related to a previous admission.

* Does not mention a specific time the patient has to be in the hospital.
Indwelling Catheter

- A drainage tube that is inserted into the urinary bladder through the urethra, is left in place, and is connected to a closed collection system
- Does Not Include:
  - Straight Catheters
  - Suprapubic catheters
  - Nephrostomy tubes
CAUTI

A UTI in a patient who had an indwelling urinary catheter in place at the time of or within 48 hours prior to infection onset.

❖ Note there is no minimum period of time that the catheter must be in place in order for the UTI to be considered catheter-associated.
All CAUTIs Must be HAI to go in to NHSN
Location

• In the patient safety component, location is the area where a patient was assigned while receiving care in the healthcare facility.

• Inpatient location - Area where patient is housed overnight.

• Only inpatient locations where denominator data can be collected are eligible for monitoring - NOT ER, OR, radiology, etc.

❖ Location is used to stratify device-associated rates.
CDC Locations

• A list of standard descriptions for patient care and other areas of healthcare facilities

• Each location under surveillance must be “mapped” to one standard CDC location description

• The correct mapping to a CDC location is determined by the type of patients receiving care - 80% rule: 80% of the patients must be of a consistent type to classify the location as that specific type.

Location of Attribution

• CAUTIs are attributed to inpatient location at the time of urine collection or symptom onset, whichever comes first.

Exception: If a CAUTI develops within 48 hours of transfer from one inpatient location to another in the same facility, or a new facility, the infection is attributed to the transferring location (Transfer Rule)
Mr. Smith is transferred to SICU with a Foley and 36 hours later has a fever of 38.2c. The next day a urine cx has >10 to the 5 CFU/ml of *E. coli*. This CAUTI is attributed to the SICU.
Urinary Tract Infection Definitions

• There are two criteria that can be applied for identifying a CAUTI:
  - Symptomatic UTI (SUTI)
  - Asymptomatic Bacteremtic UTI (ABUTI)

Note: The specific site Other Urinary Tract Infection (OUTI) can also be used to identify an infection in the urinary tract, however OUTI are not associated with urinary catheters and therefore cannot be CAUTI events.
Applying NHSN Definitions

2 Key questions

1. Was an indwelling catheter in place at the time of, or within 48 hours prior to, the urine specimen collection or onset of signs or symptoms?

2. Is the patient 65 years* or older?

* Note: UTI surveillance can be conducted for both catheterized and non-catheterized patients. The patient’s age is only pertinent if UTI surveillance is being performed for non-catheterized patients.
SUTI Overview

Must have symptoms AND 4 different criterion groups

- **Criteria 1 (a & b)**:
  
  Urine culture $\geq 10^5$ CFU/ml, no more than 2 species

- **Criteria 2 (a & b)**:
  
  Urine culture $\geq 10^3$ and $< 10^5$ CFU/ml, no more than 2 species, AND positive UA

“a” criteria: Catheter at/within 48 hours prior to urine collection or onset of signs or symptoms

“b” criteria: No catheter at/within 48 hours prior to urine collection or onset of signs or symptoms
SUTI Overview

Criteria 3 & 4: Patients ≤ 1 year of age: have age-specific signs and symptoms AND

**Criterion 3:** Urine culture $\geq 10^5$ CFU/ml no more than 2 species

**Criterion 4:** Urine culture $\geq 10^3$ and $< 10^5$ CFU/ml, no more than 2 species, AND positive UA
## Symptomatic Urinary Tract Infection (SUTI) 1a

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Urinary Tract Infection (UTI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Symptomatic Urinary Tract Infection (SUTI)</strong></td>
</tr>
<tr>
<td></td>
<td>Must meet at least 1 of the following criteria</td>
</tr>
<tr>
<td>1a</td>
<td>Patient had an indwelling urinary catheter in place at the time of specimen collection and at least 1 of the following signs or symptoms with no other recognized cause: fever ($&gt;$38°C), suprapubic tenderness, or costovertebral angle pain or tenderness and a positive urine culture of $\geq 10^5$ colony-forming units (CFU)/ml with no more than 2 species of microorganisms.</td>
</tr>
</tbody>
</table>

---

**OR**

Patient had indwelling urinary catheter removed within the 48 hours prior to specimen collection and at least 1 of the following signs or symptoms with no other recognized cause: fever ($>$38°C), urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness and a positive urine culture of $\geq 10^5$ colony-forming units (CFU)/ml with no more than 2 species of microorganisms.
### Symptomatic Urinary Tract Infection (SUTI) 2a

| 2a | Patient had an indwelling urinary catheter in place at the time of specimen collection and at least 1 of the following signs or symptoms with no other recognized cause: fever (>38°C), suprapubic tenderness, or costovertebral angle pain or tenderness and a positive urinalysis demonstrated by at least 1 of the following findings:
  a. positive dipstick for leukocyte esterase and/or nitrite
  b. pyuria (urine specimen with ≥10 white blood cells [WBC]/mm³ of unspun urine and a positive urine culture of ≥10³ and <10⁵ CFU/ml with no more than 2 species of microorganisms.

| OR | Patient had indwelling urinary catheter removed within the 48 hours prior to specimen collection and at least 1 of the following signs or symptoms with no other recognized cause: fever (>38°C), urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness and a positive urinalysis demonstrated by at least 1 of the following findings:
  a. positive dipstick for leukocyte esterase and/or nitrite
  b. pyuria (urine specimen with ≥10 white blood cells [WBC]/mm³ of unspun urine or ≥3 WBC/high power field of spun urine)
  c. microorganisms seen on Gram stain of unspun urine and a positive urine culture of ≥10³ and <10⁵ CFU/ml with no more than 2 species of microorganisms. |
Symptomatic Urinary Tract Infection (SUTI) 1b

Patient did **not** have an indwelling urinary catheter in place at the time of specimen collection nor within 48 hours prior to specimen collection and has at least 1 of the following signs or symptoms with no other recognized cause: fever (>38°C) in a patient that is ≤65 years of age, urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness and a positive urine culture of ≥10^5 CFU/ml with no more than 2 species of microorganisms.
|   | Patient did **not** have an indwelling urinary catheter in place at the time of specimen collection nor within 48 hours prior to specimen collection and has at least 1 of the following signs or symptoms with no other recognized cause: fever (>38°C) in a patient that is ≤65 years of age, urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness and a positive urinalysis demonstrated by at least 1 of the following findings: a. positive dipstick for leukocyte esterase and/or nitrite b. pyuria (urine specimen with ≥10 WBC/mm³ of unspun urine or ≥3 WBC/high power field of spun urine) c. microorganisms seen on Gram stain of unspun urine and a positive urine culture of ≥10³ and <10⁵ CFU/ml with no more than 2 species of microorganisms. | UA + Culture |
### Symptomatic Urinary Tract Infection (SUTI) 3 & 4 ≤ 1 year old

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td><strong>Patient ≤1 year of age with or without an indwelling urinary catheter has at least 1 of the following signs or symptoms with no other recognized cause: fever (&gt;38°C core), hypothermia (&lt;36°C core), apnea, bradycardia, dysuria, lethargy, or vomiting</strong> and a positive urine culture of ≥10^5 CFU/ml with no more than 2 species of microorganisms.</td>
</tr>
<tr>
<td>4</td>
<td><strong>Patient ≤1 year of age with or without an indwelling urinary catheter has at least 1 of the following signs or symptoms with no other recognized cause: fever (&gt;38°C core), hypothermia (&lt;36°C core), apnea, bradycardia, dysuria, lethargy, or vomiting</strong> and a positive urinalysis demonstrated by at least one of the following findings: a. positive dipstick for leukocyte esterase and/or nitrite b. pyuria (urine specimen with ≥10 WBC/mm³ of unspun urine or ≥3 WBC/high power field of spun urine) c. microorganisms seen on Gram’s stain of unspun urine and a positive urine culture of between ≥10^3 and &lt;10^5 CFU/ml with no more than two species of microorganisms.</td>
</tr>
</tbody>
</table>

The Foley was in place 48 hrs prior to specimen collection or onset of s/s (Jan 2012 release).
# Asymptomatic Bacteremic UTI (ABUTI)

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Asymptomatic Bacteremic Urinary Tract Infection (ABUTI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient with or without an indwelling urinary catheter has <strong>no</strong> signs or symptoms (i.e., for any age patient, <strong>no</strong> fever (&gt;38°C), urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness, <strong>OR</strong> for a patient ≤1 year of age, <strong>no</strong> fever (&gt;38°C core), hypothermia (&lt;36°C core), apnea, bradycardia, dysuria, lethargy, or vomiting) <strong>and</strong> a positive urine culture of &gt;10⁵ CFU/ml with no more than 2 species of uropathogen microorganisms* <strong>and</strong> a positive blood culture with at least 1 matching uropathogen microorganism to the urine culture, or at least 2 matching blood cultures drawn on separate occasions if the matching pathogen is a common skin contaminant.</td>
<td></td>
</tr>
</tbody>
</table>

*Uropathogen microorganisms are: Gram-negative bacilli, *Staphylococcus* spp., yeasts, beta-hemolytic *Streptococcus* spp., *Enterococcus* spp., *G. vaginalis*, *Aerococcus urinae*, and *Corinobacterium* (urease positive).
Figure 1: Identification and Categorization of SUTI Indwelling Catheter at the Time of Specimen Collection

Patient had an indwelling urinary catheter at the time of specimen collection

- At least 1 of the following with no other recognized cause:
  - fever (>38°C)
  - suprapubic tenderness
  - costovertebral angle pain or tenderness

- A positive urinalysis demonstrated by at least 1 of the following findings:
  - positive dipstick for leukocyte esterase and/or nitrite
  - pyuria (urine specimen with ≥10 WBC/mm³ of unspun urine or ≥3 WBC/high power field of spun urine)
  - microorganisms seen on Gram stain of unspun urine

- A positive urine culture of ≥10⁶ CFU/ml with no more than 2 species of microorganisms
  - SUTI – Criterion 1a
  - CAUTI

- A positive urine culture of ≥10³ and <10⁶ CFU/ml with no more than 2 species of microorganisms
  - SUTI – Criterion 2a
  - CAUTI
Figure 2: Identification and Categorization of SUTI Indwelling Catheter Discontinued in Prior 48 Hours

Patient had an indwelling urinary catheter discontinued within 48 hours prior to specimen collection.

- **Signs and Symptoms**
  - At least 1 of the following with no other recognized cause:
    - fever (≥38°C)
    - urgency
    - frequency
    - dysuria
    - suprapubic tenderness
    - costovertebral angle pain or tenderness

- **Urinalysis**
  - A positive urinalysis demonstrated by at least 1 of the following findings:
    - positive dipstick for leukocyte esterase and/or nitrite
    - pyuria (urine specimen with ≥10 WBC/mm³ of unspun urine or ≥3 WBC/high power field of spun urine)
    - microorganisms seen on Gram stain of spun urine

- **Culture Evidence**
  - A positive urine culture of ≥10⁶ CFU/ml with no more than 2 species of microorganisms
  - A positive urine culture of ≥10³ and <10⁵ CFU/ml with no more than 2 species of microorganisms

- **SUTI – Criterion 1a**
- **CAUTI**

- **SUTI – Criterion 2a**
- **CAUTI**
Figure 5: Identification of Asymptomatic Bacteremic Urinary Tract Infection (ABUTI)

Patient with or without an indwelling urinary catheter

**Patient of any age**
- NONE of the following:
  - fever (>38°C)
  - urgency
  - frequency
  - dysuria
  - suprapubic pain
  - costovertebral angle pain or tenderness

**Patient ≤1 year of age**
- NONE of the following:
  - fever (>38°C core)
  - hypothermia (<36°C core)
  - apnea
  - bradycardia
  - lethargy
  - vomiting

---

**Culture Evidence**

A positive urine culture of ≥10⁵ CFU/ml with no more than 2 species of microorganisms*

A positive blood culture with at least 1 matching uropathogen microorganism* to the urine culture

---

Asymptomatic Bacteremic Urinary Tract Infection (ABUTI)

---

*Uropathogen microorganisms are: Gram-negative bacilli, *Staphylococcus* spp., yeasts, beta-hemolytic *Streptococcus* spp., *Enterococcus* spp., *G. vaginalis*, *Aerococcus urinae*, *Corynebacterium* (urease positive)*.

*Report *Corynebacterium* (urease positive) as either *Corynebacterium* species unspecified (COS) or, as *C. urealyticum* (CORUR) if so speciated.
Figure 4: Identification and Categorization of SUTI in Patient ≤1 Year of Age

Patient ≤1 year of age (with or without an indwelling urinary catheter)

- At least 1 of the following with no other recognized cause:
  - fever (>38°C core)
  - dysuria
  - hypothermia (<36°C core)
  - lethargy
  - apnea
  - vomiting
  - bradycardia

Urinalysis

- A positive urinalysis demonstrated by at least 1 of the following findings:
  - positive dipstick for leukocyte esterase and/or nitrite
  - pyuria (urine specimen with ≥10 WBC/mm³ of unspun urine or ≥3 WBC/high power field of spun urine)
  - microorganisms seen on Gram stain of unspun urine

Culture Evidence

- A positive urine culture of ≥10⁹ CFU/ml with no more than 2 species of microorganisms
- A positive urine culture of ≥10³ and <10⁵ CFU/ml with no more than 2 species of microorganisms

SUTI — Criterion 3

- Was an indwelling urinary catheter in place within the last 48 hours?
  - Yes → CAUTI
  - No → SUTI

SUTI — Criterion 4

- Was an indwelling urinary catheter in place within the last 48 hours?
  - Yes → CAUTI
  - No → SUTI
• Urinary catheter tips should not be cultured and are not acceptable for the diagnosis of a urinary tract infection.

• Urine cultures must be obtained using appropriate technique, such as clean catch collection or catheterization. Specimens from indwelling catheters should be aspirated through the disinfected sampling ports.

• In infants, urine cultures should be obtained by bladder catheterization or suprapubic aspiration; positive urine cultures from bag specimens are unreliable and should be confirmed by specimens aseptically obtained by catheterization or suprapubic aspiration.
Surveillance Consistency is a Must!

• Criteria is designed to look at population at risk NOT all cases
• Identify patients meeting criteria
• Consistently apply criteria
  - Ensures the comparability of the data and protects your facility and others
  - Strengthens the validity of data
Event information

• The top section of UTI data collection form is used to collect patient demographics. Required fields have an asterisk(*)
  - Facility ID
  - Patient ID (make sure will follow patient through multiple admissions)
  - Gender
  - Date of birth
Event Information

• Date of event is the date the signs or symptoms appeared or date the diagnosing urine specimen was collected, whichever comes first

• Post procedure UTI- mark yes if this event occurred after a NHSN defined procedure but before discharge from the facility
Event Information

• MDRO Infection- Enter “YES” *only* if the pathogen is being followed for surveillance in the MDRO/CDI Module in that location as part of your monthly reporting plan

• If a CAUTI develops in a patient within 48 hours of transfer from a location, indicate the transferring location, not the current location of the patient
Secondary BSI

• All ABUTIs will have a secondary bloodstream infection.

• For UTI, at least one organism from the positive urine culture must match an organism in the blood culture (antibiograms of the isolates do not have to match)

Example: Patient grows *E. coli* in her urine and in her blood. The CAUTI is reported with Secondary BSI= Yes and the pathogen is *E. Coli*

Event Details

• Died- If patient died during this hospitalization= Yes or No

• UTI contributed to death- If the UTI caused the death or exacerbated an existing condition which led to death, mark YES*

  *Discuss with QI, Medical Team
Collecting Summary Denominator Data

For all locations, count **at the same time every day**
- Number of patients on the unit
- Number of patients with an indwelling urinary catheter

NICU is different, it is weight based and will be available in NHSN 1/2012 for off plan use only.
SIR

• A summary measure that can be used to compare the HAI experience between a group of patients and a standard population (NHSN Baseline)
• An indirect standardization method
• Able to account for differences in HAI incidence within groups
• What CMS will be displaying on Hospital Compare!
Calculating SIR

SIR = Observed # of HAI/ Expected (predicted) # of HAI

- Observed # of HAI is the number of events you enter into NHSN
- Expected or Predicted # of HAI comes from national baseline data (2009 NHSN)

- NHSN WILL DO THIS FOR YOU!
Internal Validation

Check for:

- Mis-mapped facility locations
- Incomplete Denominators
- Support staff that does not follow protocol
- Misconceptions of definitions
- Missed, incomplete, and overcalled cases
Suggestions for Internal Validation

• Annual
  – Update training on protocols
  – Review facility descriptors, annual survey data, methods

• Monthly
  - In plan locations and conditions
  - Denominators, SSI procedure imports
  - Analysis checks for missing, unusual, inconsistent, or duplicate data

• Daily
  - Active case identification- walk the walk: micro, ICU, floors.
Case Studies

Ground Rules

1. Training on definitions AS THEY EXIST (Aug 2011)
2. Surveillance ≠ clinical

These case studies are not to debate the correctness of the definitions, but to learn how to correctly apply them.
Case1

50 yo patient with end stage pancreatic cancer with liver and bone mets admitted to the hospital with advance directive for comfort care and abx only. Foley catheter, peripheral IV and nasal cannula inserted.

- Day 4: pt afebrile to 38.0 C and has suprapubic tenderness; urine obtained for cx, abx started
- Day 5: difficulty breathing; CXR= lung infiltrate L lung base
- Day 6: urine cx results= $10^5$ E. coli
- Day 7: WBC/mm$^3$ = 3400; patchy infiltrates in both lung bases; continued episodes of dyspnia; rales noted in LLL
- Day 11: Pt expired
Does this patient have a UTI? If So, What Type

1. Yes, SUTI 1 a
2. Yes, SUTI 1 b
3. Yes, ABUTI
4. No UTI
Case 2

- POD 3: 66 yo patient in ICU with a foley catheter s/p exploratory lap; pt noted to be febrile (38.9 C) and complained of diffuse abdominal pain
- WBC increased to 19,000. He had cloudy, foul-smelling urine and urinalysis showed 2+ protein, + nitrate, 2+ leukocyte esterase, WBC -, and 3+ bacteria. Culture was 10,000 CFU/ml *E.coli*. The abdominal pain seemed localized to the surgical area
Does this patient have a UTI? If So, What Type

1. No UTI
2. Yes, SUTI 1b
3. Yes, SUTI 2a
4. Yes ABUTI
Questions?

gcarducci@health.nv.gov