Cohort 4: Stop CAUTI Collaborative

Outcome Data: Application of NHSN CAUTI Criteria

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Slides for today’s presentation can be found at:

http://www.onthecuspstophai.org/on-the-cuspstop-cauti/educational-sessions/on-boarding-calls/
Outline

• Key terms
• Background
• NHSN overview
• Collaborative outcome metrics
• SUTI and ABUTI definitions
• Case studies
Polling Question #1

• Are you responsible for collecting and reporting CAUTI data into NHSN?

A. Yes
B. No
C. Don’t Know
Polling Question #2

• If you are responsible for collecting and reporting CAUTI data into NHSN, have you gone through the NHSN training on CAUTI?

  A. Yes
  B. No
Key Terms

- **CAUTI** – catheter-associated urinary tract infection
- **SUTI** – symptomatic urinary tract infection (CA-SUTI=catheter-associated SUTI)
- **ABUTI** – asymptomatic bacteremic urinary tract infection (CA-ABUTI=catheter-associated ABUTI)
- **NHSN** – National Healthcare Safety Network
Why CAUTI?

• Increased morbidity, mortality (attributable mortality = 2.3%), hospital cost, and length of stay.
• 15% - 25% of hospitalized patients may receive short-term indwelling urinary catheters.
• CAUTI is one of the most common sites of HAI
• 17% to 69% of CAUTI may be preventable with recommended infection prevention measures
  – Up to 380,000 infections and 9,000 deaths related to CAUTI per year could be prevented
Business Case for CAUTI Prevention: Reservoirs of Resistance

Geographical Distribution of *Klebsiella pneumoniae* carbapenemase (KPC) Infections

http://www.cdc.gov/getsmart/healthcare/learn-from-others/factsheets/resistance.html
Last accessed 5/10/12
<table>
<thead>
<tr>
<th>HAI Event</th>
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<td><strong>Acute Care Hospitals</strong></td>
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<tr>
<td>CAUTI</td>
<td>Inpatient Rehabilitation Facilities - all locations</td>
<td>October 2012</td>
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NPSG.07.06.01: Implement evidence-based practices to prevent CAUTI (2012=Planning year; By January 2013=full implementation)

http://www.jointcommission.org/assets/1/6/NPSGs_CAUTI-VAP_HAP_20101119.pdf
HAI Surveillance

http://www.cdc.gov/nhsn/
NHSN Background

- NHSN criteria have been validated and are reproducible.
- Consistency in application of criteria by IPs is vital.
- NHSN CAUTI data collection tool will assist in data collection at point of care.
Comparison of Definition Types

- **Surveillance definitions...**
  (aka “analytical epidemiology”)

Establish uniform criteria to report a disease, ensure usefulness in aggregating and analyzing population-based data affecting policy change and public health actions. *These types of definitions should not be used as the sole criteria for establishing clinical diagnoses or for determining the standard of care necessary for a particular patient.*


- **Clinical definitions...** (aka “clinical epidemiology”)

Are *specific to a patient* and can manifest progressively during an illness. The use of additional clinical, epidemiological, and lab data may enable a provider to diagnose a disease even when the formal surveillance definition may not be met. *Failure to meet the surveillance criteria of the formal case definition should never impede or override clinical judgment during the diagnosis, management or treatment of patients.*
Cohort 4: What do we need to collect?

- **Outcome** and **Process** data will be collected for the collaborative.
- Data are collected according to a cohort-specific schedule – Cohort 4.
- Today’s presentation will focus on **Outcome (CAUTI Rate & Device Utilization Ratio) data**.
- For purposes of this collaborative, only Catheter-associated Symptomatic Urinary Tract Infection (CA-SUTI) will be tracked. (CMS and NHSN reporting requires CA-SUTI and CA-ABUTI).

For a detailed data collection calendar, visit the On the CUSP Website: [https://s3.amazonaws.com/CAUTI_Manuals_and_Toolkits/Cohort+4+Data+Collection+Schedule.doc](https://s3.amazonaws.com/CAUTI_Manuals_and_Toolkits/Cohort+4+Data+Collection+Schedule.doc)
What you enter depends on where you enter...

a. Via MHA Care Counts, enter
   - CA-SUTI only

b. Via NHSN, enter both
   - CA-SUTI and
   - CA-ABUTI
Specific data to collect...

For the entire month (not just M-F) each enrolled unit must collect:

a. Total # of patient days for unit/month - denominator
b. Total # of indwelling urinary catheter days for unit/month - denominator
c. Total # of NHSN-defined Symptomatic CAUTIs (CA-SUTIs) (and if reporting through NHSN, Asymptomatic Bacteremic CAUTIs [ABUTIs]) for that month – numerator

Outcome Metrics: CAUTI Rate and device utilization ratio (DUR- catheter prevalence in the unit[s] under surveillance)
Cohort 4: When and Where Do We Enter?

**When:**
- Enter monthly for 5 months and quarterly, by month, thereafter (first 3 months are considered baseline)

**Where:**
- Manual data entry into Care Counts, or,
- Manual entry or electronic transfer of data from infection control software into NHSN.  **Then:** Data transferred from NHSN to MHA  (Must convey rights in NHSN to your state collaborative leads for this option)
Submission Date Expectations...

If submitting into NHSN:

• Complete entry of all CAUTIs + denominators (patient and urinary catheter days) by the end of the month following the one under surveillance. E.g. for Apr’12 data – complete entry by 5/31/12.

If submitting directly into MHA Care Counts:

• Submit aggregate data (numerator –CA-SUTIs), denominators (pt. days and urinary cath. days) by the end of the month following the one under surveillance. E.g. for Apr’12 data – complete entry by 5/31/12.
NHSN Training is required prior to collecting and entering data into NHSN. If you are responsible for collecting and submitting data to NHSN and have not yet gone through the formal NHSN training, you may access this training at the above website.
CAUTI Surveillance Methods

- Concurrent, lab-based surveillance
- Use retrospective model only when absolutely necessary
- Non-IPs can screen cultures, but trained IP must make final call
- Non-IPs can collect denominator data, but IP needs to review
  - Pt. and cath days should be collected at the same time of day **each** day, including weekends and holidays.
  - Need to ensure device days do not exceed patient days
- It is not required to monitor for CAUTIs after the patient is discharged from the facility. However, should a CAUTI that occurs within 48 hours of discharge be identified, it should be reported. No additional indwelling catheter days are reported in this situation.
Use January 2012 criteria at
http://www.cdc.gov/nhsn/PDFs/pscManual/7pscCAUTIcurrent.pdf

With 3 important amendments:

1. Include patients receiving irrigation of indwelling urinary catheters, and,

2. The definition of “pyuria” in the UTI definitions is now, “…or >5 WBC/high power field of spun urine.” (Involves UTI criteria 2a, 2b, and 4.) And,

3. New clarification: Include patients whose catheters are switched from leg bags to bed bags and vice versa.

* See April 5, 2012 NHSN E-mail update at http://www.cdc.gov/nhsn/commUp.html
CAUTI Criteria

**CAUTI**-Catheter-associated urinary tract infection which occurs in a patient who had an indwelling urethral catheter in place within 48 hours prior to specimen collection.

*There is no minimum period of time that the catheter must be in place for the UTI to be considered catheter-associated.*

HAI rule: there must be no evidence that the infection was present or incubating at the time of admission to the care setting.
Indwelling Urinary Catheter (aka, “Foley” catheter)

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:

• Intermittent (straight) cath.
• External (condom) cath.
• Suprapubic cath. (surgically placed) However, if pt. has both a suprapubic cath and a Foley, INCLUDE in surveillance for CAUTI.

CA-SUTI with Indwelling Catheter

If fever is present in Signs & Symptoms, continue down flow chart – fever is a nonspecific symptom and do not try to distinguish other possible causes.

NOTE:
DEFINITION OF PYURIA HAS BEEN CHANGED TO >5 WBCs/HIGH POWER FIELD.
CA-SUTI with catheter removed in prior 48 hours...

http://www.cdc.gov/nhsn/PDFs/pscManual/7pscCAUTIcurrent.pdf

If fever is present in Signs & Symptoms, continue down flow chart – fever is a nonspecific symptom and do not try to distinguish other possible causes

NOTE: DEFINITION OF PYURIA HAS BEEN CHANGED TO >5 WBCs/HIGH POWER FIELD.
CA-ABUTI with or without catheter...

ABUTI not counted for Collaborative but is reported for NHSN and CMS purposes.
Steps for Identifying Cases of CA-SUTI

1) Start with review of + urine cultures (UCs) – e.g. daily report from your facility’s micro lab

- Pull out + UCs from the unit(s) under surveillance
  
  **Important:** the unit on the lab result is location at the time of specimen collection – may not reflect recent transfers to or from the unit(s) under surveillance (In some facilities, once pt. is discharged, lab may assign location of specimen to all one location for the patient. Know your lab’s practices and review accordingly to capture needed specimens.)

- Cultures taken on day of admission should be assessed for evidence of infection on admission. Cultures must be assessed with the Transfer Rule in mind.
a. Transfer rule: If an HAI develops w/in 48 hours of transfer from one inpatient location to another in the same facility, the infection is attributed to the transferring location. Likewise, if an HAI develops within 48 hours transfer from one inpatient facility to another, the infection is attributed to the transferring facility. Facilities should share information about such HAIs with the transferring facility to enable reporting.

**Example:** Ms. Jones is transferred from CCU to 8A Cardiac Stepdown on 5/12/12 w/Foley. On 5/13, she develops suprapubic pain and urine culture grows E. coli. Her CAUTI should be assigned to CCU.
b. Verify with your facility’s information technology personnel that reporting rules applied to the LIS do not preclude your receipt of certain positive cultures. I.E: some custom facility-specific reporting rules or data mining systems remove results where colony counts are $< 10^5$. (Impact – removes possible cases of CAUTI from detection during review, e.g. criterion 2a)
2. Now that you have identified the + UCs, review the individual medical records to see:

Did pt. have Foley at time of specimen collection or during the 48 hours prior to specimen collection?

- YES – Continue review.
- NO – Stop. No need to continue.
3. Apply NHSN CA-SUTI criteria:

1A Criterion

• Does this patient have at least one of the following signs/symptoms with no other recognized cause?
  - fever >38°C (100°F), or
  - suprapubic tenderness, or
  - costovertebral angle pain or tenderness, or
  - urgency, or
  - frequency, or
  - dysuria

AND

• UC of ≥10⁵ CFU/ml [< 2 different species]?
• If YES, this is a CA-SUTI- NHSN criterion 1a – enter into NHSN UTI form and your HAI data collection system
• If NO, go to next criteria
Step 3, continued...Applying criteria

2a Criterion

Does this patient have at least one of the following signs/symptoms with no other recognized cause?:

- fever >38°C (100°F), or
- suprapubic tenderness, or
- costovertebral angle pain or tenderness, or
- urgency, or
- frequency, or
- dysuria

AND

UC of ≥ 10³ < 10⁵ CFU/ml [≤ 2 different species]

AND

Positive Urinalysis (see criteria)

If YES, this is a CA-SUTI- NHSN criterion 2a – enter into NHSN UTI form or your HAI data collection system.
Identifying ABUTI*

Pt. with or w/o an indwelling urinary catheter has no signs or symptoms of UTI:

- i.e., for any age patient, NO fever (with fever defined as >38°C), urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness,

\textbf{and}

- a + UC of $\geq 10^5$ CFU/ml with no more than 2 species of uropathogen microorganisms*

\textbf{and}

- a positive blood culture with at least 1 matching uropathogen microorganism to the urine culture
  
  - Uropathogens: Gram-negative bacilli, \textit{Staphylococcus spp.}, yeasts, beta-hemolytic \textit{Streptococcus spp.}, \textit{Enterococcus spp.}, \textit{G. vaginalis}, \textit{Aerococcus urinae}, and \textit{Corynebacterium} (urease positive).

*Not reported to MHA Care Counts but is reported into NHSN.
Determining Date of Event

Date of Event = the date when the first clinical evidence of the HAI infection appeared, or the date the specimen used to make or confirm the diagnosis was collected, whichever comes first.
Assigning to a Unit

Assign the CAUTI to the location where the patient was located on the date of onset of the SUTI event.

**Exception: The Transfer Rule**

If a CAUTI develops within 48 hours of transfer from one inpatient location to another in the same facility, the infection is attributed to the transferring location. Likewise, an HAI that develops within 48 hours of transfer from one inpatient facility to another, is attributed to the transferring facility.

*Example:* A patient with a Foley is transferred from SICU to the step-down unit on Friday 1/04/12. Saturday [01/05/12] afternoon, fever of 38.5 C is observed, UC is obtained which finds >10^5 K. *pneumoniae* CFU/ml. CAUTI identified and assigned to the SICU.
• Infections associated with complications or extensions of infections already present on admission (POA) are NOT considered healthcare-associated unless associated with a previous admission.

• If the patient has a UTI POA, then has a change in the uropathogen or symptoms which strongly suggest the acquisition of a new infection, this should be considered as an HAI.

• Colonization of the urine (asymptomatic bacteriuria) is NOT considered an infection, even if an MD diagnoses a UTI.
Denominator Data

• Make sure CAUTI is included in your monthly NHSN reporting plan for the unit(s) included in this collaborative.

• Engage personnel in unit(s) identified in your surveillance plan to collect catheter days and patient days at the same time each day of the month.
STOP!

Have you validated accuracy of urinary catheter days collated automatically if this is available via your facility’s electronic medical record (EMR)?

Rule of thumb: urinary catheter days from EMR need to be within 5% of those identified from manual collation method, e.g. monthly device log. Minimum 3 month validation required by NHSN.

There are successful examples of use of EMR for device days:

- Wright MO, et al. The electronic medical record as a tool for infection surveillance: successful automation of device-days. AJIC 2009; 37(5):364-70
Calculating CA-SUTI Rates

Data elements required to calculate **Collaborative outcomes**:

a. Numerator: # of CA-SUTIs/ month
b. Denominator: # of indwelling catheter days/month

Equation to calculate:

\[
\text{CAUTI Rate} = \frac{\text{# of CA-SUTIs/month}}{\text{# Catheter Days/month}} \times 1,000
\]
Catheter Prevalence

AKA: DUR (Device Utilization Ratio)

Data elements required to calculate:

1. Catheter days
2. Patient days

Equation: \( \text{DUR} = \frac{\# \text{Catheter Days/month}}{\# \text{Patient Days/month}} \)
What does it mean?

• Provides ratio of time in which patients are at risk of developing complications such as infection from an indwelling urinary catheter.

• For example, MICU’s Catheter Utilization Ratio is 0.50

  \[(50 \text{ Catheter days} \div 100 \text{ Patient days} = 0.50)\]

• That means that 50% of MICU’s patient days are days in which patients are at risk of device-related complications.
Frequently Asked Questions

Q: What is the time period for associating symptoms or U/A to a positive urine culture?
   
   A: Presently there is no identified time period. Clinical course will vary between patients. Clinical judgment must be used.

Q: If a patient has a positive U/A on admission are subsequent UTIs considered present on admission?

   A: U/As may be positive from non-infectious causes. Therefore U/As alone cannot determine present on admission.
Frequently Asked Questions

Q: What if a patient is not able to sense or verbalize symptoms?

A:

- Some sedated patients may be able to communicate pain non-verbally.

- Ensure that adequate assessment is being performed. This may necessitate education of staff.

- Always apply the definitions as written. If patient does not meet the surveillance definition do not report a UTI.
Mrs. J, a 62-yo female was transferred to unit 4 East from CCU four days ago, after admission for a MI. Her Foley was removed at midnight on the day of her transfer to unit 4 East. Today, on 4 East, she spiked a temp to 100.6 F (38.1° C). A UA and UC were sent. UA showed 3 WBCs from an unspun sample. The UC came back growing $10^2$ CFU/ml of *E. coli*. 
Does this case meet the criteria for a catheter-associated SUTI?

A. Yes
B. No
C. Does not meet CA-SUTI criteria but is a HAI UTI.

No, the patient does not meet the minimum microbial growth for culture requirements for UTI.
Case Study # 2

Frank, 86, is a stroke patient in your MICU. He has had a Foley in place since admission. On hospital day 11, he c/o of pain just above his pubic area upon examination. A UA showed >10 WBCs/mm³ of unspun urine and UC grew 10,000 CFU/ml *Pseudomonas aeruginosa.*
Is this a catheter-related SUTI?

A. Yes
B. No

Yes, this patient meets SUTI criterion 2a: suprapubic pain, U/A positive for sufficient WBCs and positive UC with sufficient organisms.
Case Study # 3

• 9/1: 68-year-old female admitted to 6E from OR, status post left KPRO. Foley draining pink urine, PACU nurse reports difficulty with Foley placement. Bulb suction to left knee via stab wound draining small amount bloody drainage. IV in left forearm, site without redness and dressing dry. Patient controlled analgesia via pump.

Case Study # 3, continued...

- **9/3:** Patient to physical therapy. Complains of burning with urination and urgency. Suprapubic pain upon palpation. Temp 37.8°C. Urine collected and sent for culture and U/A; + for 10+ WBCs by HPF of unspun urine, + leukocyte esterase. Empiric antibiotics begun.

- **9/4:** Urine culture with >100,000 CFU/ml *S. epidermidis*. 

Downloaded from www.catheterout.org
Does this patient have a UTI attributable to 6E?

A. Yes, patient has a SUTI 1a attributable to 6E.
B. No, patient’s SUTI 1a is attributable to the OR.
C. No, patient does not have a UTI.

A. Yes, patient has a SUTI 1a attributable to 6E. Foley removed in last 48 hours: Urgency, (frequency, suprapubic pain); sufficient number organisms in UC.
84 year old patient is hospitalized with GI bleed.

Day 3: Patient has indwelling catheter in place and no signs or symptoms of infection.

Day 9: Patient becomes unresponsive, is intubated and CBC shows WBC of 15,000. Temp 38.0°C. Patient is pan-cultured. Blood culture and urine both grow Streptococcus pyogenes – urine $>10^5$ CFU/ml.
Is this a UTI? If so, what type?

A. No, because the blood seeded the urine and therefore there is no UTI.

B. Yes, ABUTI.

C. Yes, SUTI Criterion 1a with secondary BSI.

B. Yes, ABUTI. No symptoms (Tmax not > 38°C); matching uropathogen in blood and urine culture (≥ 10^5 CFU/ml).
What if the organism in both cultures had been Micrococcus?

A. There would be an ABUTI.
B. There would not be an ABUTI.
C. There would be no UTI.

C. There would be no UTI. Micrococcus is not on the list of uropathogens.
Case Study # 5

• 9/1: 73 y.o. patient in neurosurgical ICU. Admitted 7 days ago following cerebrovascular accident. Ventilated, subclavian catheter and Foley catheter in place since admission. Patient reacts only to painful stimuli.

• 9/2: WBCs slightly elevated, at 12,000/mm³, temp 37.4°C, urine cloudy. Lungs clear to auscultation.
Case Study # 5, continued...

- **9/3:** WBC 15,800/mm³. Temperature: 37.6°C. Breath sounds slightly coarse, minimal clear sputum. Urine unchanged. Blood, endotracheal and urine cultures collected. No suprapubic or CVA pain noted.

- **9/4:** Blood and endotracheal cultures no growth. Urine with 100,000 CFU/ml *E. faecium.*
Does this patient have a UTI? If so, what type?

A. Yes, ABUTI.
B. Yes, SUTI Criterion 1a.
C. Yes, SUTI Criterion 1b.
D. No UTI.

D. No UTI. No symptoms, and no matching blood culture to urine culture.
Case Study # 6

• What if the patient from Case #5 had a temp. of 38.1°C and the patient also met the criteria for a PNU including a bronchoalveolar lavage for *E. faecium*?
Does this patient have a UTI? If so, what type?

A. Yes, ABUTI.
B. Yes, SUTI Criterion 1a.
C. Yes, SUTI Criterion 1b.
D. No UTI.

B. Yes, SUTI Criterion 1a. Fever > 38.0°C, positive urine culture of sufficient quantity. Not possible to exclude source of fever as urine.
Polling Question 3

I am comfortable applying NHSN CAUTI criteria to determine CAUTI rates.

A. YES
B. NO
C. YES, but have some questions
Questions?

• NHSN Training Resources:
  http://www.cdc.gov/nhsn/training/
## Hospital Onboarding Calls

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<th>Time</th>
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<tr>
<td>5/14/2012</td>
<td>11:30 am – 12:45 pm CT</td>
<td>Onboarding Call #1 - Building a Team and a Process to Reduce CAUTI Risk</td>
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<td>5/29/2012</td>
<td>1:00 pm – 2:15 pm CT</td>
<td>Onboarding Call #2 - The Essentials of Data: Definitions for Process and Outcome Measures, and the Review of Guidelines</td>
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<td>6/12/2012</td>
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<td>Onboarding Call #3 - Assess and Adapt: Understanding the Science of Safety and Reliability</td>
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<td>On-Boarding Call #4 - Care Counts Data Entry and Report Training</td>
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<td>7/10/2012</td>
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<td>Onboarding Call #5: HSOPS Training</td>
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Your Feedback is Important!

https://www.surveymonkey.com/s/CAUTICallEvaluation