

National Healthcare Safety Network

General Principles

Definitions

Key Terms

*Catheter-associated Urinary Tract Infection
(CAUTI)*



Definitions

- ▶ Indwelling Catheter: A drainage tube inserted into urinary bladder via the urethra, is left in place and connected to a drainage system. This includes a collection system that is used for irrigation of any type or duration (intermittent, continuous)
 - ▶ Also called a Foley catheter



- ▶ Condom or straight in-and-out catheters are not included, nor are nephrostomy tubes, ileoconduits or suprapubic catheters.

Definitions

- Urinary Tract Infections (UTI) are defined using Symptomatic Urinary Tract Infection (SUTI) criteria, Asymptomatic Bacteremic UTI (ABUTI)
 - Both types, if catheter-associated, must be reported as part of any CMS CAUTI reporting requirements!!
- Date of Event (DOE): For a UTI when the first element used to meet the UTI infection criteria occurred for the first time within the 7-day Infection Window Period

Definitions



- ▶ Catheter-associated UTI (CAUTI): A UTI where indwelling urinary catheter was in place for > 2 calendar days on the date of event with day of device placement being day 1

AND

An indwelling urinary catheter was in place on the date of event or the day before

Also Worth Considering in Your Facility



- Culturing practices:
 - Reflex urine cultures?- send U/A along with culture and only perform culture if U/A is positive
 - Change long-dwelling catheters before collecting urine?- exclude colonization
 - Indications for urine cultures?
 - In addition to prevention efforts, strengthening diagnostic practices can improve CAUTI rates, increase patient safety, and increase staff moral

Categories of Urinary Tract Infections

- Symptomatic Urinary Tract Infection (SUTI)
 - SUTI 1a, any age, (CAUTI)
 - SUTI 1b, any age, (Non-CAUTI)
 - SUTI 2 (CAUTI or Non-CAUTI in patients 1 year of age or less)
- Asymptomatic Bacteremic Urinary Tract Infection (ABUTI) (any age)

Urine Culture clarification(s)

- Candida species or yeast not otherwise specified, mold, dimorphic fungi or parasites are excluded as organisms in the UTI definition therefore blood with these organisms cannot be secondary to UTI
- Urine culture with yeast can be used as long as there is at least one bacterium with $\geq 10^5$ CFU/ml and no more than 2 organisms (for example, $> 10^5$ CFU/ml of E. coli and $> 10^5$ CFU/ml of C. albicans)
- Urine cultures with > 2 organisms are regarded as contaminated cultures and not used for NHSN UTI surveillance (for example, $> 10^5$ CFU/ml E. coli, S. aureus and C. albicans = 3 organisms)
- Urine culture including “mixed flora” or equivalent such as “perineal flora”, “vaginal flora”, “normal flora” cannot be used (for example, $> 10^5$ CFU/ml of E. coli and perineal flora)

**With no other recognized cause: An indwelling urinary catheter in place would constitute “other recognized cause” for patient complaints of “frequency” “urgency” or “dysuria” and therefore these cannot be used as symptoms when catheter is in place.*

Symptomatic Urinary Tract Infection (SUTI) Criteria 1b (Non-CAUTI)

Must Meet 1, 2, and 3

1. One of the following is true:

- Patient has/had an indwelling urinary catheter but it has/had not been in place > 2 calendar days

OR

- Patient did not have a urinary catheter in place on the date of event nor the day before the date of event.

2. Patient has at least one of the following signs or symptoms:

- fever (>38°C) in a patient that is ≤65 years of age, urgency*, frequency*, dysuria*, suprapubic tenderness*, or costovertebral angle pain or tenderness*

3. Patient has a urine culture with no more than two species of organisms, at least one of which is a bacteria of >10⁵ CFU/ml.

**No other recognized cause*

Symptomatic Urinary Tract Infection SUTI 2

Must Meet 1, 2, and 3

- Patient ≤ 1 year of age with** or without an indwelling urinary catheter has at least 1 of the following signs or symptoms: fever ($>38^{\circ}\text{C}$ core), hypothermia ($<36^{\circ}\text{C}$ core), apnea*, bradycardia*, lethargy*, vomiting* or suprapubic tenderness*

and

- Patient has a urine culture with no more than two species of organisms, at least one of which is a bacteria of $\geq 10^5$ CFU/ml

**No other recognized cause*

***Patient had an indwelling urinary catheter in place for > 2 calendar days, with day of device placement being Day 1 and catheter was in place on the data of event or the previous day*

Asymptomatic Bacteremic Urinary Tract Infection (ABUTI)

- Patient with* or without an indwelling urinary catheter:
 - Has NO signs or symptoms of SUTI 1 or 2 according to age (**NOTE: Patients > 65 years of age with a non-catheter-associated ABUTI may have a fever and still meet the ABUTI criterion**)
- Patient has a urine culture with no more than two species of organisms, at least one of which is a bacteria of $\geq 10^5$ CFU/ml
- Patient has a positive blood culture with at least one matching bacteria to the urine culture, or meets LCBI criterion 2 (without fever) and matching common commensal(s) in the urine

**Patient had an indwelling urinary catheter in place for >2 calendar days, with day of device placement being Day 1, and catheter was in place on the date of event*

Urinary System Infection (USI)

(formerly OUTI) (kidney, ureter, bladder, urethra or tissue surrounding the retroperitoneal or perinephric space)

- Must meet one of the following:
 - Patient has microorganisms isolated from culture of fluid (excluding urine) or tissue from affected site
 - Patient has an abscess or other evidence of infection on gross anatomical exam, during invasive procedure, or on histopathologic exam
 - Patient has at least one of the following signs or symptoms: fever (>38.0 C); localized pain or tenderness
- AND at least one of the following:
- purulent drainage from affected site
 - organisms cultured from blood and imaging test evidence of infection (CT scan, ultrasound, MRI)

Urinary System Infection (USI)

(formerly OUTI) (kidney, ureter, bladder, urethra or tissue surrounding the retroperitoneal or perinephric space)

- Must meet one of the following:
 - Patient < 1 year of age has at least one of the following signs or symptoms:
 - Fever (>38.0 C);
 - Hypothermia (<36.0 C)
 - Apnea*
 - Bradycardia*
 - Lethargy*
 - Vomiting*
- AND at least one of the following:
- purulent drainage from affected site
 - organisms cultured from blood and imaging test evidence of infection (CT scan, ultrasound, MRI)

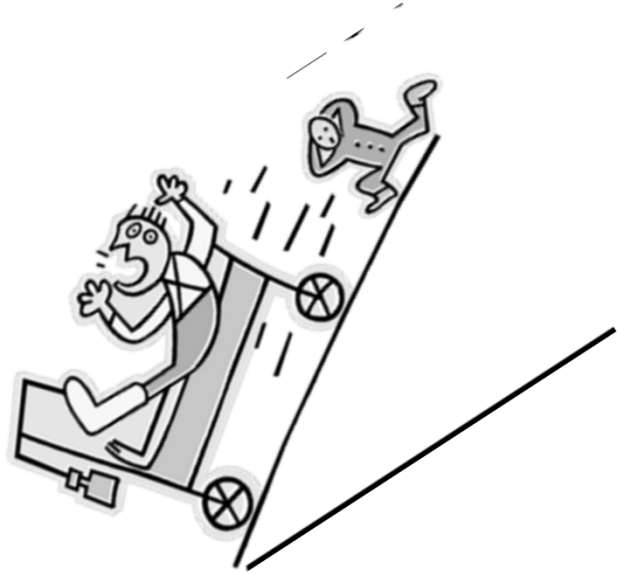
Notes

- SUTI 1b and USI cannot be catheter-associated.
- Indwelling urinary catheters that are removed and reinserted:
 - If, after indwelling urinary catheter removal, the patient is without an indwelling urinary catheter for at least 1 full calendar day (NOT to be read as 24 hours), then the urinary catheter day count will start anew.
 - If instead, a new indwelling urinary catheter is inserted before a full calendar day has passed without an indwelling urinary catheter being present, the urinary catheter day count will continue.

UTI Repeat Infection Timeframe

- 14- day timeframe
- No new UTIs are reported.
- Date of event = Day 1
- Additional pathogens from urine cultures are added to the event.
- Device placement does not change the original category of infection





- **Multiple Transfers:**

- In instances where a patient has been transferred to more than one location on the date of a UTI, or the day before, attribute the UTI to the **first** location in which the patient was housed the **day before** the UTI's date of event.

Multiple Transfers

Locations
that patient
was
transferred
to

3/1

Unit A

3/2

Unit A
Unit B
Unit C

3/3









Unit C

Unit D

This is also the date of
event for a CAUTI.

CAUTI is attributed to
Unit A since Unit A was
the first location in
which the patient was
housed the day before
the date of event.

Common misconceptions

- UTI as secondary infectio  
- Positive culture on admission automatically = Present on Admiss  (POA) 
- UTI signs or symptoms such as fever on admission automatically = POA  
- RIT continues during readmission  

CAUTI Case Study 1

Timeline	Physical findings	Diagnostic Studies/Results
Day 1	48 year old female admitted for elective hip replacement. Foley inserted in the OR	Pre-op workup negative
Day 2	Foley removed post-op day 1 and patient without complaints.	
Day 3 (post/op day 2)	Patient complains of dysuria. Febrile with temp of 38.6 C. Blood cultures and UC obtained and sent to lab	Urine + > 10 ⁵ col of Enterococcus Blood cultures negative
Day 4	Patient on antibiotic therapy, afebrile and feels much better	
Day 5	Afebrile, voiding well and being prepared for discharge	

CAUTI Case Study 1

Question ?



► Select the correct response

- A. Patient has a CAUTI
- B. Patient has a UTI not catheter related
- C. Patient has early signs and symptoms of an SSI
- D. Patient does not meet any criteria for HAI

CAUTI Case Study 2

Timeline	Physical findings	Diagnostic Studies/Results
Day 1	75 year old female admitted from the nursing home secondary to hypotension. Patient has history of decreased po intake, progressive weakness x 2 days. At time of admission to the M/S unit the patient is afebrile, incontinent and urine is dark and foul smelling. Patient voices no complaints of pain or discomfort	Straight cath specimen obtained and sent for routine UA and culture UA positive for 1+ nitrite; 30-40 WBCs; Negative protein Culture negative
Day 3	Patient continues to be incontinent with skin breakdown. Foley catheter inserted. Has difficulty taking diet and chokes easily	
Day 5	Patient becomes unresponsive with fever of 101.4. Pulse Ox 80% on 2L via nasal cannula. Tachycardic and RR team called. CVL inserted and patient intubated. Transfers to ICU	CXR done and + for early infiltrate Blood cultures 1/2 positive <i>Serratia</i> Urine culture + for >10 ⁵ <i>Serratia</i>

CAUTI Case Study 2

Question 1



- ▶ How should this infection be classified?
 - A. POA (Present on Admission)
 - B. HAI (Healthcare Associated Infection)

CAUTI Case Study 2

Question 2?



- ▶ Select which NHSN infection site specific criteria is met.
 - A. Laboratory confirmed blood stream infection
 - B. Catheter associated UTI with secondary BSI
 - C. Symptomatic UTI with a secondary BSI
 - D. Asymptomatic urinary tract bacteremia

CAUTI Case Study 3

Timeline	Physical findings	Diagnostic Studies/Results
Day 1	59 year old female transferred from another healthcare facility to your hospital. Foley catheter in place at time of transfer. Patient has no complaints	Routine urine and culture obtained. Culture + for 10,000 CFU yeast
Day 2	Patient has a low grade fever of 100 with no complaints	
Day 3	Patient spikes a temp of 102. Blood cultures and urine culture obtained.	Blood cultures negative Urine culture positive for >100,000 yeast

CAUTI Case Study 3

Question 1



▶ Does this meet site specific criteria for healthcare associated infection?

A. Yes

B. No

CAUTI Case Study 4

Timeline	Physical findings	Diagnostic Studies/Results
POD 2	66 y.o. patient in the ICU s/p exploratory lap. Foley inserted on day of surgery is removed.	
POD 4	Patient complained of diffuse abdominal pain and spikes a temp of 101. WBC increased to 15,000 Urine slightly cloudy	Routine urine and culture obtained secondary to signs and symptoms Urine culture + for $>10^5$ <i>pseudomonas aeruginosa</i>

CAUTI Case Study 4

Question ?



- ▶ Select the correct response
- A. Patient has a CAUTI
 - B. Patient has a UTI not catheter related
 - C. Patient has early signs and symptoms of an SSI
 - D. Patient does not meet any criteria for HAI

CAUTI Case Study 5

Timeline	Physical findings	Diagnostic Studies/Results
Day 1	53 year old male suffering trauma after falling from roof at a construction site. Admitted to SICU after being taken to OR for ORIF of radius/ulna and femur. Patient intubated and has central line and foley catheter placed.	ICU standing orders for testing, medications and vent wean.
Day 5	Patient is doing much better, has been weaned from the ventilator. Central line and Foley are removed and PIV placed.	
Day 6	Patient is stable and is transferred from the SICU to the orthopedic unit	
Day 7	Patient's surgical site is healing well, he is voiding well and has no complaints of discomfort. Daily labs are notable for elevated WBC. Urine cultures, CXR and BC are obtained.	Findings are positive for: UC >100,000 of VRE CXR normal Blood 1/2 cultures positive for VRE

Case Study 5



Question ?

▶ Select the correct response

- A. Urine and blood cultures are probably a contaminate
- B. Patient has a UTI with secondary BSI
- C. Patient has a primary BSI since the VRE in urine is probably colonization
- D. Patient has an asymptomatic bacteremic UTI

CAUTI Case Study 6

Timeline	Physical findings	Diagnostic Studies/Results
3/16/15	<p>73 year old male admitted with complaints of chest pain and shortness of breath for 2 days. At time of admission patient complains of problems with urination, and states he feels difficulty and pain in suprapubic area and also feels frequency with urination</p> <p>Physician's assessment includes: Dysuria, R/O UTI</p>	<p>Routine UA and UC sent Culture negative and UC + for > 10⁵ of multiple bacterial morphotypes</p>
3/17/15	No complaints	
3/18/15	Complains of frequency	UA sent and negative
3/19/15	Complains of dysuria and frequency	
3/20/15	Complains of frequency; Foley catheter inserted	
3/21/15	Routine UA and UC sent	<p>UA negative; UC + >10⁵ <i>enterococcus</i></p>

CAUTI Case Study 6

Question ?



- ▶ Select the correct response
- A. Patient does not meet any HAI definition
- B. Patient has a CAUTI
- C. Patient has a UTI POA
- D. Patient has a HAI UTI

CAUTI Case Study 7

Timeline	Physical findings	Diagnostic Studies/Results
Day 1	<p>52 year old female admitted from home. Daughter states her mom has had increase in confusion over the past several days with poor po intake and retention of urine. No history of diarrhea, fever, vomiting. Foley catheter inserted in the ED</p>	
Day 2	<p>Patient spikes a temp of 101. Chest x-rays and blood and urine cultures ordered.</p>	<p>Lab findings are as follows: Blood cultures no growth; Chest x-ray has chronic abnormalities but no acute process. Urine culture did not get sent</p>
Day 3	<p>No change in patient status</p>	
Day 4	<p>Physician recognizes that the UC did not get sent and orders another one</p>	<p>Urine culture + for >10⁵ Proteus</p>

CAUTI Case Study 7

Question ?



- ▶ Select the correct response
- A. Patient does not meet HAI definition
- B. Patient has a CAUTI
- C. Patient has a UTI with secondary BSI
- D. Patient has a UTI present on admission
- E. Both A and D

CAUTI Case Study 8



CAUTI Case Study 8

- ▶ Day 1: She has a broken femur. Foley and peripheral IV are inserted.
- ▶ Day 3: Foley is removed; She is awake and making good recovery progress.
- ▶ Day 4: Up with assistance; complains of pain on voiding; U/A collected and has slight leukocyte esterase, negative nitrites, 15 WBC on spun urine.
- ▶ Day 5: Urine culture collected. = 10^4 CFU/ml *E coli*.

CAUTI Case Study 8

Question ? 1



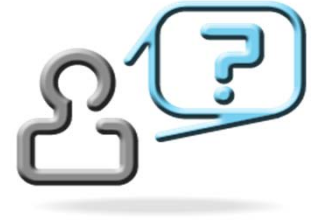
- ▶ Does this patient have a CAUTI? If, so what type?
1. Yes. SUTI; Criterion 1a.
 2. Yes, SUTI; Criterion 2a.
 3. Yes, ABUTI.
 4. No UTI

CAUTI Case Study 9

- ▶ Day 1: 58-year-old patient is admitted to the ED with GI bleed. Foley inserted.
- ▶ Day 2: Patient spikes temp of 38.6°C. Indwelling catheter remains in place. Urine specimen is sent.
- ▶ Day 3: Culture results 100,000 CFU/ml *Pseudomonas aeruginosa*. Afebrile and asymptomatic. Antibiotics started.
- ▶ Day 4 and 5: Patient asymptomatic and afebrile.

CAUTI Case Study 9

Question ?



- ▶ Is this an HAI? If so, what type?
 1. Yes, HCA UTI but not a CAUTI because catheter not in place > 2days
 2. No it is a UTI that is POA
- 1. Yes CAUTI, SUTI, criterion 1a

Number 9 continued

- ▶ Day 13. Foley remains in place. Patient completed treatment for UTI on hospital day 2.
- ▶ Hospitalization has been complicated by development of DVT. Has been afebrile till today, though temp has been edging up the last 2 days, and is now, 38.1°C. Cough productive of yellow phlegm. Rhonchi present.
- ▶ Day 15: Urine cloudy. Fever 37.9°C cough continues. Urine and sputum cultures collected.
- ▶ Day 16: Urine and sputum both positive for *S. aureus* with > 100,000 CFU/ml in urine.

CAUTI Number 9 cont'd



- ▶ Does this patient have a CAUTI?
 1. Yes. First UTI resolved and treatment finished.
 2. No, this is an infection at the same site .
 3. No. The UTI is secondary to a respiratory infection

CAUTI Case Study 10

- ▶ 11/26/15: 90-year-old female, admitted with hip fracture. Foley inserted on admit
- ▶ 11/30/15: Discharged from acute care and admitted to inpatient rehab unit
- ▶ 12/1/15: Urine culture sent at 12:20. Foley catheter removed at 16:19. Urine culture is positive for >100,000 *E. coli*
- ▶ 12/2-12/3/15: Patient is incontinent of urine
- ▶ 12/4/15: Nurse documents frequency

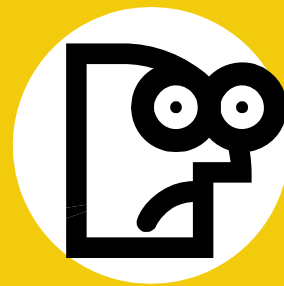
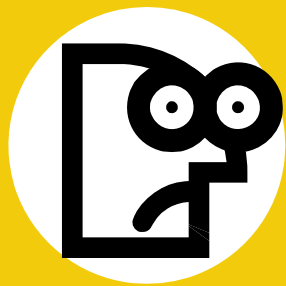
CAUTI Case Study 10

Question ?



▶ Does this patient have a UTI? If so, what type?

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



It's QUESTION TIME!!