Urinary Tract Infection (UTI) Event for Long-term Care Facilities

Background: The urinary tract is one of the most common sites of healthcare-associated infections, accounting for up to 20% of infections reported by long-term care facilities (LTCFs)[1]. In the LTC resident, risk factors for developing bacteriuria and UTI include age-related changes to the genitourinary tract, comorbid conditions resulting in neurogenic bladder, and instrumentation required to manage bladder voiding. The point prevalence of asymptomatic bacteriuria in LTC residents can range from 20-50%. Although the incidence of symptomatic UTI is lower, it still comprises a significant proportion of infections manifesting in LTCFs and results in a large amount of antibiotic use.

Though prevalence of indwelling urinary catheter use in LTCFs is lower than in the acute care setting, catheter-associated UTI (CAUTI) can lead to such complications as cystitis, pyelonephritis, bacteremia, and septic shock. These complications associated with CAUTI can result in decline in resident function and mobility, acute care hospitalizations, and increased mortality. Prevention of CAUTIs is discussed in the CDC/HICPAC document, *Guideline for Prevention of Catheter-associated Urinary Tract Infections*[2].

Efforts to examine antibiotic use practices for UTI have demonstrated a discrepancy between the number UTI events identified through the application of evidence-based surveillance criteria with the numbers of clinically identified and treated UTI[3,4]. Consistent tracking and reporting symptomatic UTIs using surveillance criteria identify opportunities to examine, understand and address larger differences between surveillance events and clinically identified events.

References:

1. Genao L, Buhr GT. Urinary tract infections in older adults residing in long-term care facilities. Annals of Long-term Care. 2012;20 (4):33-38.

2. Healthcare Infection Control Practices Advisory Committee (HICPAC) approved guidelines for the Prevention of catheter-associated urinary tract infections, 2009. Available at www.cdc.gov/hicpac/pdf/CAUTI/ CAUTIguideline2009final.pdf

3. Juthani-Mehta M et al. Diagnostic Accuracy of Criteria for Urinary Tract Infection in a Cohort of Nursing Home Residents. Journal of the American Geriatrics Society. 2007; 55: 1072-77.

4. Wang L. et al. Infection rate and colonization with antibiotic-resistant organisms in skilled nursing facility residents with indwelling devices. European Journal of Clinical Microbiology & Infectious Diseases. 2012. 31(8):1797-804).

Settings: UTI Event reporting is currently available for certified skilled nursing facilities/nursing homes (LTC:SKILLNURS), and intermediate/chronic care facilities for the developmentally disabled (LTC:DEVDIS). Surveillance for UTIs should be performed facility-wide.

Only UTI events presenting **> 2 calendar days** after admission (where date of admission= day 1) are considered facility onset events.

Example: NHSN Classification of reportable LTCF UTI Events				
Admission date June 4th	June 5th	June 6th	June 7th	June 8th
day 1	day 2	day 3	day 4	day 5
Not a LTCF reportable UTI event		**LTCF reportable UTI event**		

NOTE: If a resident is transferred from an acute care facility and develops signs/symptoms of a UTI within the first 2 calendar days of admission to the LTCF, it would be considered present at the time of transfer to the LTCF. An event present at the time of transfer should be reported back to the transferring facility and not reported to NHSN as a LTCF UTI event.

Requirements: Facilities must indicate their surveillance for UTI in the *Monthly Reporting Plan for LTCF* (CDC 57.141). UTI surveillance must be reported for at least 6 consecutive months to provide meaningful measures.

Definitions:

Date of Event is defined as the date when the *first clinical evidence (signs/symptoms) of the UTI appeared* or the *date the specimen was collected* that was used to make or confirm the diagnosis, **whichever comes first**.

Urinary tract infections (UTI) are defined using a combination of clinical signs and symptoms and laboratory criteria (See Figure 1 and Table 2).

Symptomatic UTI (SUTI) events occur when the resident manifests signs and symptoms such as acute dysuria, new and/or marked increase in urinary frequency, suprapubic tenderness, etc., which localize the infection to the urinary tract. These events can occur in residents without urinary devices or those managed with urinary devices other than indwelling urinary catheters, such as suprapubic catheters, straight in-and-out catheters and condom catheters. Events occurring in residents with indwelling urinary catheters (defined below) are a sub-set of SUTIs referred to as catheter-associated SUTI (CA-SUTI) events.

Catheter-associated SUTIs (CA-SUTI) events occur when a resident develops signs and symptoms localizing to the urinary tract while having an indwelling urinary catheter in place or removed within the 2 calendar days prior to the date of event (where day of catheter removal = day 1).

> NOTE: An indwelling urinary catheter should be in place for a minimum of 2 calendar days before infection onset (where day of catheter insertion = day 1) in order for the SUTI to be catheter-associated
>
> NOTE: If a resident is transferred to your facility with an indwelling urinary catheter and you replace that catheter with a new one while the resident is in your care, then the date of insertion of the device corresponds to the date the new catheter was placed in your facility.

Indwelling urinary 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; also called a Foley catheter. Indwelling urinary catheters do not include straight in-and-out catheters or suprapubic catheters.

> NOTE: UTIs in residents managed with suprapubic, in and out, or condom (males only) catheters will be captured as SUTIs, not CA-SUTIs.

Asymptomatic Bacteremic UTI (ABUTI) events occur when the resident has NO signs or symptoms localizing to the urinary tract but has matching *urine and blood cultures positive* for at least one organism (See Table 1) regardless of whether a catheter is in place or not.

Table 1. Examples of ‘‘sameness’’ by organism speciation

Culture	Companion Culture	Report as…
S. epidermidis	Coagulase-negative *staphylococcus*	*S. epidermidis*
Klebsiella oxytoca	*Klebsiella* spp.	*K. oxytoca*
S. salivarius	*Streptococcus* viridans	*S. salivarius*

Numerator and Denominator Data:

Numerator Data: The *Urinary Tract Infection (UTI) for LTCF* form (CDC 57.140) is used to collect and report each SUTI, CA-SUTI, or ABUTI that is identified during the month selected for surveillance. The *Table of Instructions* includes information on how to complete this form.

The UTI form includes resident demographic information and information on whether or not a catheter (or other urinary device) was present. Additional data include the specific clinical criteria evidence (signs and symptoms) and laboratory and diagnostic testing that were used for identifying the UTI; whether the resident developed a secondary bloodstream infection; whether the resident was transferred to an acute care facility for any reason or died from any cause within 7 days of the UTI event; and the organisms isolated from cultures and their antimicrobial susceptibilities.

NOTE: When a urine specimen is being collected from a resident with a chronic indwelling urinary catheter (in place >14 days), it is recommended that the original catheter be changed prior to specimen collection. Failure to change the catheter prior to specimen collection does not exclude a specimen from being used to meet the UTI criteria.

Denominator data: Catheter-days, resident-days, and new antibiotic starts for UTI indication are used for denominators. *Catheter-days*, defined as the number of residents with an indwelling urinary (Foley) catheter, are collected daily for all residents in the facility using the *Denominators for LTCF* form *(CDC 57.142).* The *Table of Instructions* includes information on how to complete this form.

NOTE: None of the following urinary management devices should be included when counting indwelling catheter-days: suprapubic catheters, straight in-and-out catheters or condom catheters.

NOTE: If a resident is transferred to an acute care facility for a suspected UTI, no additional indwelling catheter-days are reported after the day of transfer.

Resident-days are calculated using the daily census of residents in the facility each day of the month. These daily counts are summed and only the total for the month is entered into NHSN, under Summary Data.

New antibiotic starts for UTI indication may be collected daily or summarized at the end of each month. A “new antibiotic start” refers to a new prescription for an antibiotic ordered for a resident who is suspected or diagnosed with having a urinary tract infection (both catheter-associated and not catheter associated) regardless of whether that UTI meets the NHSN event definition. There is no minimum number of doses or days of therapy which define a new antibiotic start—count all new orders. Include only antibiotics which are started while the resident is receiving care in your facility, either by clinical providers working in the facility or by outside physicians who see the resident in an outpatient clinic or Emergency department. Do not

include antibiotic courses started by another healthcare facility prior to the resident's admission or readmission back to your facility even if the resident continues to take that antibiotic while in the facility.

Data Analyses:

Line lists of UTI events and UTI events by catheter status are available as part of the UTI event within the NHSN LTCF component. Below are measures and calculations that are incorporated into the analytics output.

Calculated UTI Rates and Metrics
Data will be stratified by time (e.g., month, quarter) and aggregated across the entire facility.

Total UTI incidence rate/1,000 resident-days = Number of UTI Events (i.e., SUTI+CA-SUTI+ABUTI) / Total resident-days x 1,000.

> *Percent* that are SUTI = Number of SUTI Events / Total number of UTI Events x 100.
>
> *Percent* that are CA-SUTI = Number of CA-SUTI Events / Total number of UTI Events x 100.
>
> *Percent* that are ABUTI = Number of ABUTI Events / Total number of UTI Events x 100.

SUTI incidence rate/1,000 resident-days = Number of SUTI Events / (Total resident-days – catheter-days) x 1,000.

> NOTE: Only SUTIs which are NOT catheter-associated will be included in the SUTI incidence rate.

CA-SUTI incidence rate/1,000 catheter-days = Number of CA-SUTI events/ Catheter-days x 1,000

> NOTE: Only symptomatic events which develop at the time an indwelling catheter is in place or recently removed (within last 2 calendar days) will contribute to the CA-SUTI rate.

Urinary Catheter Utilization Ratio = Total urinary catheters-days / Total resident-days.

UTI treatment ratio = New antibiotic starts for UTI / Total UTI Count (SUTI + ABUTI + CA-SUTI)

NOTE: When the UTI treatment ratio is <1, there are fewer reported antibiotic starts for UTI than symptomatic UTI events submitted; when the UTI treatment ratio equals 1, there are the same number of new antibiotic starts for UTI and symptomatic UTI events submitted; when the UTI treatment ratio is >1, there are more reported antibiotic starts for UTI than symptomatic UTI events submitted.

Figure 1: Criteria for Defining UTI Events in NHSN LTCF Component.

Resident *without* an indwelling catheter (Meets criteria 1a **OR** 2a **OR** 3a):

SUTI - Criteria 1a

Either of the following:
1. Acute dysuria
2. Acute pain, swelling or tenderness of the testes, epididymis or prostate

OR

SUTI - Criteria 2a

Either of the following:
1. Fever[+ a]
2. Leukocytosis[b]

AND

ONE or more of the following:
- ❑ Costovertebral angle pain or tenderness
- ❑ New or marked increase in suprapubic tenderness
- ❑ Gross hematuria
- ❑ New or marked increase in incontinence
- ❑ New or marked increase in urgency
- ❑ New or marked increase in frequency

OR

SUTI - Criteria 3a

TWO or more of the following:
- ❑ Costovertebral angle pain or tenderness
- ❑ New or marked increase in suprapubic tenderness
- ❑ Gross hematuria
- ❑ New or marked increase in incontinence
- ❑ New or marked increase in urgency
- ❑ New or marked increase in frequency

↓

AND

↓

Either of the following:
1. Specimen collected from clean catch voided urine and positive culture with no more than 2 species of microorganisms, at least one of which is bacteria of $\geq 10^5$ CFU/ml
2. Specimen collected from in/out straight catheter and positive culture with any microorganism, at least one of which is bacteria of $\geq 10^2$ CFU/ml

NOTE: Yeast and other microorganisms, which are not bacteria, are not acceptable UTI pathogens

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SUTI

[+] Fever can be used to meet SUTI criteria even if the resident has another possible cause for the fever (e.g., pneumonia)
[a] Fever: Single temperature ≥ 37.8ºC (>100ºF), or > 37.2ºC (>99ºF) on repeated occasions, or an increase of >1.1ºC (>2ºF) over baseline
[b] Leukocytosis: >14,000 cells/mm^3, or Left shift (> 6% or 1,500 bands/mm^3)

Figure 1: Criteria for Defining UTI Events in NHSN LTCF Component.

Resident *with* an indwelling catheter:

CA-SUTI – Criteria

ONE or more of the following:

- ❑ Fever[+ a]
- ❑ Rigors
- ❑ New onset hypotension, with no alternate noninfectious cause
- ❑ New onset confusion/functional decline **AND** Leukocytosis[b]
- ❑ New costovertebral angle pain or tenderness
- ❑ New or marked increase in suprapubic tenderness
- ❑ Acute pain, swelling or tenderness of the testes, epididymis or prostate
- ❑ Purulent discharge from around the catheter

↓

AND

↓

Any of the following:

If urinary catheter removed within last 2 calendar days:

1. Specimen collected from clean catch voided urine and positive culture with no more than 2 species of microorganisms, at least one of which is bacteria of $\geq 10^5$ CFU/ml
2. Specimen collected from in/out straight catheter and positive culture with any microorganism, at least one of which is bacteria of $\geq 10^2$ CFU/ml

If urinary catheter in place:

3. Specimen collected from indwelling catheter[c] and positive culture with any microorganism, at least one of which is bacteria of $\geq 10^5$ CFU/ml

NOTE: Yeast and other microorganisms, which are not bacteria, are not acceptable UTI pathogens

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CA-SUTI

[+] Fever can be used to meet SUTI criteria even if the resident has another possible cause for the fever (e.g., pneumonia)

[a] Fever: Single temperature ≥ 37.8ºC (>100ºF), or > 37.2ºC (>99ºF) on repeated occasions, or an increase of >1.1ºC (>2ºF) over baseline

[b] Leukocytosis: >14,000 cells/mm^3, or Left shift (> 6% or 1,500 bands/mm^3)

[c] Indwelling urinary catheters which have been in place for >14 days should be changed prior to specimen collection, but failure to change catheter does not exclude a UTI for surveillance purposes

Figure 1: Criteria for Defining UTI Events in NHSN LTCF Component.

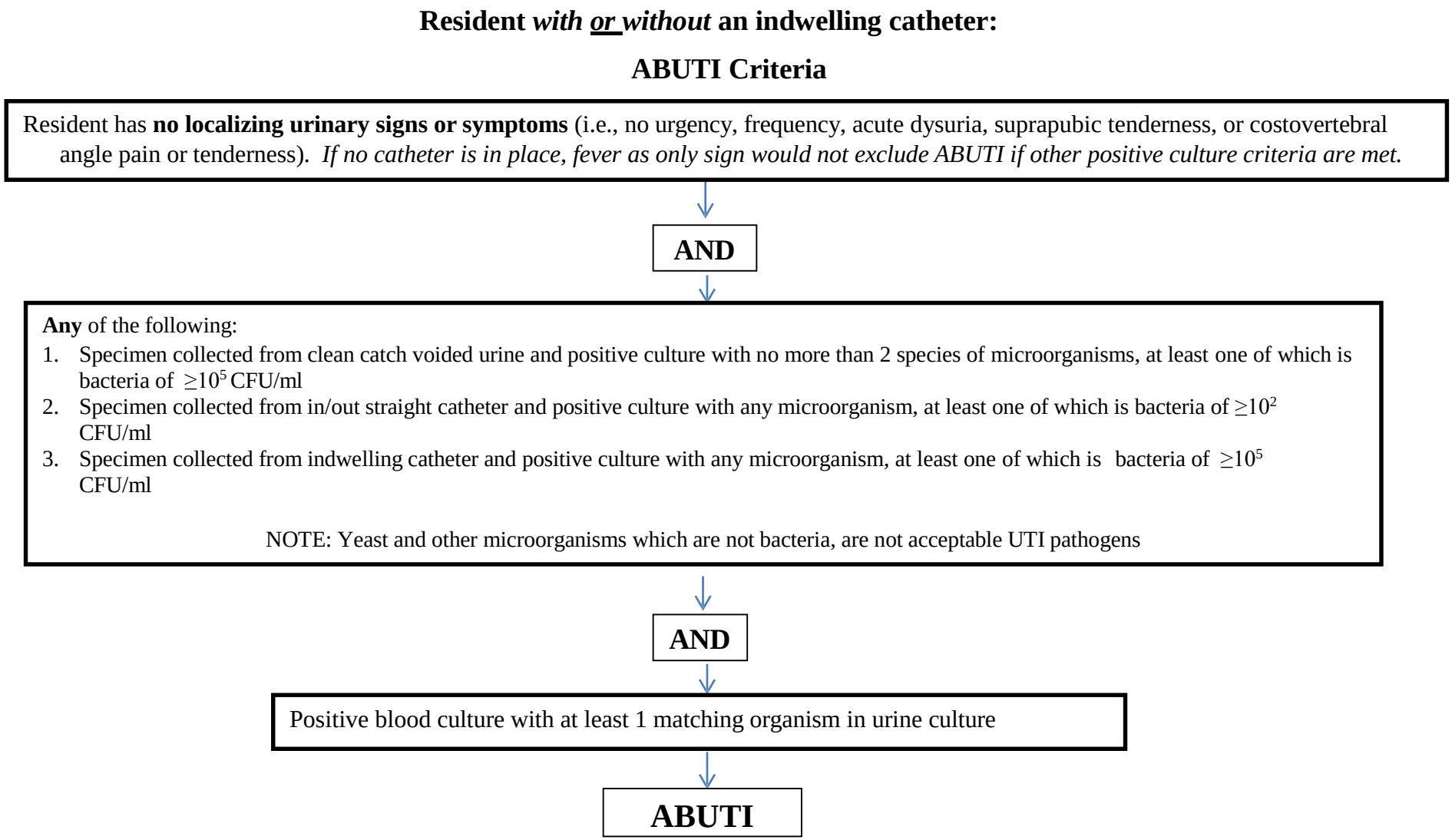

Table 2. Criteria for Defining UTI Events in NHSN LTCF Component.

Criterion	**Symptomatic Urinary Tract Infection (SUTI)** *For residents **without** an indwelling catheter:*
1a	**Either** of the following (Signs & Symptoms): 1. Acute dysuria 2. Acute pain, swelling, or tenderness of the testes, epididymis, or prostate **AND** **Either** of the following (Laboratory and Diagnostic Testing): 1. Specimen collected from clean catch voided urine and positive culture with no more than 2 species of microorganisms, at least one of which is bacteria of $\geq 10^5$ CFU/ml 2. Specimen collected from in/out straight catheter and positive culture with any microorganism, at least one of which is bacteria of $\geq 10^2$ CFU/ml
2a	**Either** of the following: 1. Fever[+] (Signs and Symptoms) [Single temperature ≥ 37.8°C (>100°F), or >37.2°C (> 99°F) on repeated occasions, or an increase of >1.1ºC (>2ºF) over baseline] 2. Leukocytosis (Laboratory and Diagnostic Testing) [>14,000 cells/mm^3] or Left shift (>6% or 1,500 bands/mm^3) **AND** **One or more** of the following (New and/or marked increase): 1. Costovertebral angle pain or tenderness 2. Suprapubic tenderness 3. Visible (Gross) hematuria 4. New or marked increase incontinence 5. New or marked increase urgency 6. New or marked increase frequency **AND** **Either** of the following (Laboratory and Diagnostic Testing): 1. Specimen collected from clean catch voided urine and positive culture with no more than 2 species of microorganisms, at least one of which is bacteria of $\geq 10^5$ CFU/ml 2. Specimen collected from in/out straight catheter and positive culture with any microorganism, at least one of which is bacteria of $\geq 10^2$ CFU/ml

Criterion	**Symptomatic Urinary Tract Infection (SUTI)** *For residents **without** an indwelling catheter:*
3a	**Two or more** of the following (New and/or marked increase): 1. Costovertebral angle pain or tenderness 2. New or marked increase incontinence 3. New or marked increase urgency 4. New or marked increase frequency 5. Suprapubic tenderness 6. Visible (gross) hematuria **AND** **Either** of the following (Laboratory and Diagnostic Testing): 1. Specimen collected from clean catch voided urine and positive culture with no more than 2 species of microorganisms, at least one of which is bacteria of $\geq 10^5$ CFU/ml 2. Specimen collected from in/out straight catheter and positive culture with any microorganism, at least one of which is bacteria of $\geq 10^2$ CFU/ml [+] Fever can be used to meet SUTI criteria even if the resident has another possible cause for the fever (e.g., pneumonia)

Criterion	**Catheter-associated Symptomatic Urinary Tract Infection (SUTI): CA-SUTI** *For residents **with** an indwelling catheter in place or removed within 2 calendar days prior to event onset*
	One or more of the following (Signs and Symptoms and Laboratory and Diagnostic Testing): 1. Fever[+] 2. Rigors 3. New onset hypotension, with no alternate non-infectious cause 4. New onset confusion/functional decline with no alternate diagnosis ***AND*** leukocytosis 5. New onset suprapubic pain or costovertebral angle pain or tenderness 6. Acute pain, swelling, or tenderness of the testes, epididymis, or prostate 7. Purulent discharge from around the catheter **AND** **Any** of the following: *If urinary catheter removed within last 2 calendar days:* 1. Specimen collected from clean catch voided urine and positive culture with no more than 2 species of microorganisms, at least one of which is bacteria of $\geq 10^5$ CFU/ml 2. Specimen collected from in/out straight catheter and positive culture with any microorganism, at least one of which is bacteria of $\geq 10^2$ CFU/ml *If urinary catheter in place:* 3. Specimen collected from indwelling catheter and positive with any microorganism, at least one of which is bacteria of $\geq 10^5$ CFU/ml [+] Fever can be used to meet SUTI criteria even if the resident has another possible cause for the fever (e.g., pneumonia)

Criterion	**Asymptomatic Bacteremic Urinary Tract Infection (ABUTI)** *Resident **with or without** an indwelling urinary catheter*
1	**No** signs or symptoms (i.e., no urgency, frequency, acute dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness). *If no catheter is in place, fever alone would not exclude ABUTI if other criteria are met.* **AND** **One** of the following: 1. Specimen collected from clean catch voided urine and positive culture with no more than 2 species of microorganisms, at least one of which is bacteria of $\geq 10^5$ CFU/ml 2. Specimen collected from in/out straight catheter and positive culture with any microorganism, at least one of which is bacteria of $\geq 10^2$ CFU/ml 3. Specimen collected from indwelling catheter and positive culture with any microorganism, at least one of which is bacteria of $\geq 10^5$ CFU/ml **AND** A positive blood culture with at least 1 matching bacteria to the urine culture

COMMENTS

1. "Mixed flora" is not available in the pathogen list within NSHN. Therefore, it cannot be reported as a pathogen to meet the NHSN UTI criteria. Additionally, "mixed flora" often represents contamination and likely represents presence of multiple organisms in culture.
2. Yeast and other microorganisms, which are not bacteria, are not acceptable UTI pathogens.
3. Presence of a fever, even if due to another cause (e.g., pneumonia), should still be counted as part of meeting a UTI definition. This change to the protocol is being made to remove subjectivity about whether a fever is attributable to a UTI event.