



Healthcare-associated Infection Surveillance Protocol for Urinary Tract Infection (UTI) Events 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 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 LTCF residents can range from 20-50%. Although the incidence of symptomatic UTI is lower, it still comprises a significant proportion of infections manifesting in LTCF residents and results in a large amount of antibiotic use.⁵

Though the prevalence of indwelling urinary catheter use in LTCFs is lower than the acute care setting, catheter-associated UTI (CAUTI) can lead to complications such as cystitis, pyelonephritis, bacteremia, and septic shock. These complications can then lead to declined 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 for UTI have demonstrated a discrepancy between the number UTI events identified through the application of evidence-based surveillance criteria and the numbers of clinically identified and treated UTI.^{3,4} Consistent tracking and reporting of symptomatic UTIs using surveillance criteria will help identify opportunities to examine, understand, and address differences between surveillance events and clinically identified events.

References:

1. Genao L, Buhr G. T. Urinary Tract Infections in Older Adults Residing in Long-Term Care Facilities. *Annals of Long-term Care*, vol. 20, no. 4, 2012, pp. 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*, vol. 55, 2007, pp. 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*, vol. 31, no. 8, 2012, pp. 1797-804.
5. Nace D. A., et al. Clinical Uncertainties in the Approach to Long Term Care Residents with Possible Urinary Tract Infection. *Journal of American Medical Directors Association*. vol. 15, no. 2014, 2014, pp. 133-39.



Methods: Facilities may choose to monitor urinary tract infections (UTIs) using healthcare-associated infection (HAI) surveillance. This surveillance method incorporates the use of laboratory data and clinical evaluation of the resident for signs and/or symptoms to monitor for catheter and non-catheter-associated urinary tract infection events. NHSN forms should be used to collect all required data, using the definitions of each data field as indicated in the Table of Instructions.

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

Only UTI events presenting > **2 calendar days** after admission (where date of admission is equal to day 1) are considered facility onset events and should be submitted to NHSN. 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.

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

Requirements: A *NHSN Monthly Reporting Plan* for the LTCF ([CDC 57.141](#)) must be completed for each calendar month in which a facility plans to enter data into the NHSN. For each participating calendar month, facilities must report numerator (catheter-associated and non-catheter-associated UTI events) and denominator data for the entire facility, referred to as facility-wide inpatient (FacWideIN), for the entire calendar month. See [Numerator and Denominator Section](#)

Facilities are encouraged to perform UTI surveillance and reporting for at least 6 consecutive months to provide meaningful measures for analysis.

Definitions:

Date of Event: The date when the first clinical evidence (signs/symptoms) of the UTI appeared or the date the specimen used to meet the infection criteria was collected, **whichever comes first.**



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 drainage bag/collection system (including leg bags); also called a Foley catheter. Indwelling urinary catheters do not include straight in-and-out catheters or suprapubic catheters.

Urinary tract infections (UTI) are defined using [Symptomatic UTI \(SUTI\)](#) criteria for residents *without* an indwelling urinary device, [Catheter-Associated Symptomatic UTI \(CA-SUTI\)](#) criteria for residents *with* an indwelling urinary device, or [Asymptomatic Bacteremic UTI \(ABUTI\)](#) criteria for residents *with or without* an indwelling urinary device.

Symptomatic UTI (SUTI): Events that 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. (See [Figure 1](#) and [Table 2](#)).

Catheter-associated SUTIs (CA-SUTI): Events that occur when a resident develops signs and symptoms of a UTI 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 is equal to day 1 (*urinary catheter is in place on the day of event or the day before the event*). (See [Figure 2](#) and [Table 3](#)). **Note:** to be considered a CA-UTI, the indwelling catheter must be in place for >2 calendar days on the date of event, with day of device placement being Day 1.

EXAMPLE: Mr. T, is a resident in your facility. On March 1st, he developed an increase in incontinence and new suprapubic pain. Later that day a Foley catheter was inserted. The following day, on March 2nd, a specimen collected from the Foley catheter was sent to the lab and subsequently tested positive for greater than 100,000 ($\geq 10^5$) CFU/ml of *E. coli*. Mr. T does meet criteria for a SUTI, but it is not considered as a CA-SUTI because the Foley catheter had not been in place >2 calendar days on the date of event (March 1st).

Asymptomatic Bacteremic UTI (ABUTI): Events that 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. (See [Figure 3](#) and [Table 4](#)).



Table 1. Examples of “sameness” by organism speciation

Culture	Companion Culture	Report as...
<i>S. epidermidis</i>	Coagulase-negative <i>staphylococcus</i>	<i>S. epidermidis</i>
<i>Klebsiella oxytoca</i>	<i>Klebsiella</i> spp.	<i>K. oxytoca</i>
<i>S. salivarius</i>	<i>Streptococcus viridans</i>	<i>S. salivarius</i>

Key Points:

1. An indwelling urinary catheter should be in place for > 2 calendar days on the date of event (where day of catheter insertion = Day 1) in order for the SUTI to be catheter-associated.
2. If a resident is transferred to the facility with an indwelling urinary catheter in place, and the facility replaces the catheter with a new one while the resident is in the care of the facility, then the date of insertion of the device corresponds to the date the new catheter was placed in the LTCF.
3. UTIs in residents managed with suprapubic, in and out straight catheters, or condom (males only) catheters will be captured as SUTIs, not CA-SUTIs.



Table 2. Criteria for Symptomatic Urinary Tract Infection (SUTI)

Criterion	<i>For residents without an indwelling catheter in place or removed >2 calendar days prior to the date of event, where day of catheter removal is equal to day 1:</i>
1	<p>Either of the following (Signs & Symptoms):</p> <ol style="list-style-type: none"> 1. Acute dysuria 2. Acute pain, swelling, or tenderness of the testes, epididymis, or prostate <p>AND</p> <p>A positive urine culture with no more than 2 species of microorganisms, at least one of which is a bacterium of $\geq 10^5$ CFU/ml</p>
2	<p>Either of the following:</p> <ol style="list-style-type: none"> 1. Fever⁺ [Single temperature $\geq 37.8^\circ\text{C}$ ($>100^\circ\text{F}$), or $>37.2^\circ\text{C}$ ($> 99^\circ\text{F}$) on repeated occasions, or an increase of $>1.1^\circ\text{C}$ ($>2^\circ\text{F}$) over baseline] 2. Leukocytosis ($>14,000$ cells/mm^3 or Left shift [$>6\%$ or 1,500 bands/mm^3]) <p>AND</p> <p>One or more of the following (New and/or marked increase):</p> <ol style="list-style-type: none"> 1. Costovertebral angle pain or tenderness 2. Suprapubic tenderness 3. Visible (Gross) hematuria 4. Incontinence 5. Urinary urgency 6. Urinary frequency <p>AND</p> <p>A positive urine culture with no more than 2 species of microorganisms, at least one of which is a bacterium of $\geq 10^5$ CFU/ml</p>
3	<p>Two or more of the following (New and/or marked increase):</p> <ol style="list-style-type: none"> 1. Costovertebral angle pain or tenderness 2. Incontinence 3. Urinary urgency 4. Urinary frequency 5. Suprapubic tenderness 6. Visible (gross) hematuria <p>AND</p> <p>A positive urine culture with no more than 2 species of microorganisms, at least one of which is a bacterium of $\geq 10^5$ CFU/ml</p> <p>Footnote: ⁺ Fever can be used to meet SUTI criteria even if the resident has another possible cause for the fever (for example, pneumonia).</p>



Table 3. Criteria for Catheter-associated Symptomatic Urinary Tract Infection (CA-SUTI)

Criterion	<i>For residents with an indwelling catheter in place or removed within 2 calendar days prior to event onset, where day of catheter removal is equal to day 1:</i>
	<p>One or more of the following (Signs and Symptoms and Laboratory and Diagnostic Testing):</p> <ol style="list-style-type: none"> 1. Fever⁺[Single temperature $\geq 37.8^{\circ}\text{C}$ ($>100^{\circ}\text{F}$), or $>37.2^{\circ}\text{C}$ ($> 99^{\circ}\text{F}$) on repeated occasions, or an increase of $>1.1^{\circ}\text{C}$ ($>2^{\circ}\text{F}$) over baseline] 2. Rigors 3. New onset hypotension, with no alternate non-infectious cause 4. New onset confusion/functional decline with no alternate diagnosis AND leukocytosis ($>14,000$ cells/mm^3 or Left shift [$>6\%$ or $1,500$ bands/mm^3]) 5. New or marked increase in suprapubic tenderness 6. New or marked increase in costovertebral angle pain or tenderness 7. Acute pain, swelling, or tenderness of the testes, epididymis, or prostate 8. Purulent discharge from around the catheter insertion site <p>AND</p> <p>A positive urine culture with no more than 2 species of microorganisms, at least one of which is a bacterium of $\geq 10^5$ CFU/ml</p> <p>Footnote: ⁺ Fever can be used to meet CA-SUTI criteria even if the resident has another possible cause for the fever (for example, pneumonia).</p>

Table 4. Criteria for Asymptomatic Bacteremic Urinary Tract Infection (ABUTI)

Criterion	<i>Resident with or without an indwelling urinary catheter</i>
	<p>No qualifying fever or signs or symptoms (specifically, no urinary urgency, urinary frequency, acute dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness). <i>If no catheter is in place, fever alone would not exclude ABUTI if other criteria are met.</i></p> <p>AND</p> <p>A positive urine culture with no more than 2 species of microorganisms, at least one of which is a bacterium of $\geq 10^5$ CFU/ml</p> <p>AND</p> <p>A positive blood culture with at least 1 matching bacteria to the urine culture</p>



Key Reminders:

1. “Mixed flora” is not available in the pathogen list within NHSN and 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 (specifically, at least two organisms).
2. Yeast and other microorganisms, which are not bacteria, are not acceptable UTI pathogens, and therefore, cannot be used to meet NHSN UTI criteria without the presence of a qualifying bacterium.
3. To remove the subjectivity about whether a fever is attributable to a UTI event, the presence of a fever, even if due to another cause (for example, pneumonia), should still be counted as part of meeting a UTI definition.

Numerator and Denominator Data

NHSN provides users with forms and accompanying instructions that can be used to collect the required UTI event data (numerator data), as well as the required monthly summary data (denominator data). The forms include all required data elements that must be submitted in the NHSN application. Facilities may also choose to customize these forms to better accommodate individual surveillance programs, keeping in mind that only UTIs meeting NHSN UTI criteria should be submitted to NHSN.

The UTI form includes resident demographic information and information on whether a catheter (or another 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 NHSN defined 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

Numerator: The *Urinary Tract Infection (UTI) for LTCF* form ([CDC 57.140](#)) is used to collect and report each NHSN defined UTI identified during the surveillance month. The [Table of Instructions for Completion of a Urinary Tract Infection for LTCF form](#) include brief instructions for collection and entry of each data element on the form.

Denominator: Includes **monthly totals** for resident-days, urinary catheter-days, new antibiotic starts for UTI indication, and number of urine cultures ordered. The *Denominator for LTCF* form ([CDC 57.142](#)) may be used to collect denominator data. The daily counts are summed and only the totals for the month are entered into the NHSN. The [Table of Instructions for Completion of the Long-term Care Facility Component-Denominators for LTCF](#) include brief instructions for collection and entry of each data element on the form.



Definitions and Key Points for UTI Denominator Data

Catheter-days, are calculated using the daily count of residents in the facility with an indwelling urinary device each day of the month.

Key Points about *Catheter-Days*:

1. 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.
2. If a resident is transferred to an acute care facility, 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. The monthly total is submitted to NHSN.

New antibiotic starts for UTI indication refers to a new prescription for an antibiotic ordered for a resident who is suspected of having or diagnosed with a UTI, either catheter-associated or non-catheter associated, regardless of whether that UTI meets the NHSN event definition.

Key Points about *New Antibiotic Starts for UTI Indication*:

1. There is no minimum number of doses or days of therapy that define a new antibiotic start—count all new orders.
2. Include only antibiotics that 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.
3. 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 antibiotic is continually administered while the resident is in your facility.
4. Data may be collected daily or summarized at the end of each month.



Number of urine cultures ordered refers to new urine cultures ordered for a resident regardless of whether the resident has a UTI meeting the NHSN event definition.

Key Points about *Number of Urine Cultures Ordered*:

1. Include only urine culture orders that are ordered 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.
2. Do not include urine cultures ordered by another healthcare facility prior to the resident’s admission or readmission back to your facility.
3. Data may be collected daily or summarized at the end of each month.

Data Analyses

All event and summary data submitted to NHSN can be analyzed. After a user generates analysis datasets in the application, all data entered for the facility up until that time are made available within the analysis reports. These data can be visualized and analyzed in various ways. For example, line listing reports provide detailed line by line listing of events reported by catheter status and rate table reports provide summarized monthly data with calculated rates and denominator data. Users can also generate frequency tables, bar charts, and pie charts. Additionally, the LTCF Dashboard, located on the NHSN Home Page, allows users to quickly visualize data found in the rate tables and line listings in the form of interactive bar charts and line graphs. For additional information about the LTCF Dashboard, please review the [CDC Guidance Document – Dashboard](#). Below are measures and calculations that are incorporated into the analytics output.

Calculated UTI Rates and Metrics:

The following section describes the various metrics calculated for UTI Event surveillance that are generated as part of the reports within the analysis section of NHSN.

Calculated Metrics	Calculations	Comments
Total UTI incidence rate per 1,000 resident-days	$\frac{\text{Total Number of UTI Events}}{\text{Total resident days}} \times 1,000$	Includes: SUTI, CA-SUTI, and ABUTI
<ul style="list-style-type: none"> • <i>Percent that are SUTI</i> 	$\frac{\text{Number of SUTI Events}}{\text{Total number of UTI Events}} \times 100$	
<ul style="list-style-type: none"> • <i>Percent that are CA-SUTI</i> 	$\frac{\text{Number of CA – SUTI Events}}{\text{Total number of UTI Events}} \times 100$	



Calculated Metrics	Calculations	Comments
SUTI incidence rate per 1,000 non-catheter days	$\frac{\text{Number of SUTI Events}}{\text{Total non - catheter days}} \times 1,000$	<p>Only SUTIs that are NOT catheter-associated will be included in the SUTI incidence rate.</p> <p>Non-catheter days is equal to Resident Days <i>minus</i> Catheter Days</p>
CA-SUTI incidence rate per 1,000 catheter-days	$\frac{\text{Number of CA - SUTI Events}}{\text{Total catheter - days}} \times 1,000$	
Urinary Catheter Utilization Ratio	$\frac{\text{Total urinary catheter - days}}{\text{Total resident - days}}$	
Urine Culture Rate per 1,000 total resident days	$\frac{\text{Number of urine cultures order}}{\text{Total resident - days}} \times 1,000$	
UTI treatment ratio	$\frac{\text{New antibiotic starts for UTI}}{\text{Total number of UTI events}}$	<p>When the UTI treatment ratio is <1, there are fewer reported antibiotic starts for UTI than symptomatic UTI events submitted;</p> <p>when the UTI treatment ratio equals 1, there are the same number of new antibiotics starts for UTI events submitted;</p> <p>when the UTI treatment ratio is >1, there are more reported antibiotic starts for UTI than UTI events submitted.</p>



Figure 1: Criteria for Defining Non-Catheter Associated Symptomatic Urinary Tract Infection (SUTI):

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

SUTI – Criteria 1

Either of the following:

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

OR

SUTI - Criteria 2

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 3

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

A positive culture with no more than 2 species of microorganisms, at least one of which is a bacterium of $\geq 10^5$ CFU/ml

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

SUTI

⁺ Fever can be used to meet SUTI criteria even if the resident has another possible cause for the fever (for example, pneumonia)

^a Fever: Single temperature $\geq 37.8^{\circ}\text{C}$ ($>100^{\circ}\text{F}$), or $> 37.2^{\circ}\text{C}$ ($>99^{\circ}\text{F}$) on repeated occasions, or an increase of $>1.1^{\circ}\text{C}$ ($>2^{\circ}\text{F}$) over baseline

^b Leukocytosis: $>14,000$ cells/mm³, or Left shift ($> 6\%$ or $1,500$ bands/mm³)



Figure 2: Criteria for Defining Catheter Associated Symptomatic Urinary Tract Infection (CA-SUTI)

Resident with an indwelling urinary catheter:

ONE or more of the following:

- Fever⁺ ^a
- Rigors
- New onset hypotension, with no alternate noninfectious cause
- New onset confusion/functional decline with no alternate diagnosis **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

A positive culture with no more than 2 species of microorganisms, at least one of which is a bacterium of $\geq 10^5$ CFU/ml

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

CA-SUTI

⁺ Fever can be used to meet SUTI criteria even if the resident has another possible cause for the fever (for example, pneumonia)

^a Fever: Single temperature $\geq 37.8^\circ\text{C}$ ($>100^\circ\text{F}$), or $> 37.2^\circ\text{C}$ ($>99^\circ\text{F}$) on repeated occasions, or an increase of $>1.1^\circ\text{C}$ ($>2^\circ\text{F}$) over baseline

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



Figure 3: Criteria for Defining A symptomatic Bacteremic Urinary Tract Infection (ABUTI)

Resident with or without an indwelling catheter:

Resident has **no qualifying fever or localizing urinary signs or symptoms** (specifically, no urgency, frequency, acute dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness). *If no catheter is in place, fever as only sign would not exclude ABUTI if other positive culture criteria are met.*

AND

A positive urine culture with no more than 2 species of microorganisms, at least one of which is a bacterium of $\geq 10^5$ CFU/ml
NOTE: Yeast and other microorganisms which are not bacteria, are not acceptable UTI pathogens

AND

Positive blood culture with at least 1 matching organism in urine culture

ABUTI