

Introduction to Urinary Tract Infections

Urinary tract infections (UTIs) are common healthcare-associated infections, with the vast majority being caused by the use of instruments and equipment in the urinary tract system. Healthcare-associated urinary tract infections are categorized into catheter-associated urinary tract infections (CAUTI) and non-catheter-associated urinary tract infections. Statistics show that approximately 12-16% of hospitalized adult patients will have an indwelling catheter during their hospital stay. Research indicates that for each day a catheter is in place, the risk of developing a CAUTI increases by 3-7%.

Complications from CAUTI are diverse and include prostatitis, epididymitis, orchitis, cystitis, pyelonephritis, bacteremia, endocarditis, spinal osteomyelitis, septic arthritis, endophthalmitis, and meningitis. The occurrence of CAUTI and its subsequent complications can lead to patient suffering, prolonged hospital stays, increased medical costs, and higher mortality rates. According to data from Taiwan's Nosocomial Infection Surveillance System, in 2016, urinary tract infection cases accounted for 36% of all healthcare-associated infections in hospitals at the regional level and above in Taiwan, ranking second among all infection sites, with 91% related to catheter use.

Terminology of Urinary Tract Infections

1. Criteria for determining healthcare-associated infections, applicable to the following:
 - Present on Admission (POA)
 - Healthcare-Associated Infection (HAI)
 - Date of Event (DOE): For urinary tract infections, the DOE is the date on which the first symptom meeting the surveillance definition criteria for a UTI appears within the 7-day infection window period (IWP).
 - Infection Window Period (IWP)
 - Repeat Infection Timeframe (RIT)
 - Secondary Bloodstream Infection Attribution Period
2. Indwelling Catheter: A drainage tube inserted into the bladder through the urethra and left in place, with the end of the tube connected to a drainage bag (including leg bags). This device is also known as a Foley catheter. It does not include condom catheters, straight in-and-out catheters, nephrostomy tubes, ileal conduits, or suprapubic catheters unless an indwelling catheter is also present. Indwelling urethral catheters used for intermittent or continuous irrigation are included in CAUTI surveillance.
3. Catheter-Associated Urinary Tract Infection (CAUTI):
 1. The first day of catheter placement is considered day 1 of catheter use. On the DOE, the patient must have had an indwelling catheter

for more than 2 calendar days, and the catheter must still be in place on the DOE or the day before.

2. For catheters that are removed and reinserted: Surveillance is not focused on whether a specific catheter caused an infection but on the risk of UTI due to the use of an indwelling catheter.
 - If the catheter is removed and the patient remains without a catheter for at least one full calendar day (not calculated as 24 hours), the catheter use days will reset to 1 upon reinsertion.
 - If a new catheter is reinserted without a full calendar day passing after removal, the catheter use days will continue to be counted.
 - If the DOE is on the second day of catheter insertion, it cannot be considered a CAUTI as the catheter has not been in place for more than 2 calendar days on the DOE. However, it can still be assessed as a healthcare-associated UTI based on the admission date.

Surveillance Definitions for Urinary Tract Infections

1. CAUTI Criteria: The patient must meet the following three conditions, all occurring within the IWP:
 1. The first day of catheter placement is considered day 1 of catheter use. On the DOE, the catheter must have been in place for more than 2 calendar days and still be in place on the DOE or the day before.
 2. The patient must have at least one of the following signs or symptoms:
 - Fever ($>38.0^{\circ}\text{C}$)
 - Suprapubic tenderness
 - Costovertebral angle pain or tenderness
 - Urinary urgency (not applicable during catheter use)
 - Urinary frequency (not applicable during catheter use)
 - Dysuria (not applicable during catheter use)
 3. Urine culture must show no more than 2 species of microorganisms, with at least one species having a colony count of $\geq 100,000$ cfu/ml.
2. Non-CAUTI Criteria: The patient must meet the following three conditions, all occurring within the IWP:
 1. On the DOE, the catheter must not have been in place for more than 2 calendar days, or the patient must not have had a catheter in place on the DOE or the day before.
 2. The patient must have at least one of the following signs or symptoms:
 - Fever ($>38.0^{\circ}\text{C}$) (only applicable to patients ≥ 65 years old)
 - Suprapubic tenderness
 - Costovertebral angle pain or tenderness
 - Urinary urgency
 - Urinary frequency
 - Dysuria
 3. Urine culture must show no more than 2 species of microorganisms,

- with at least one species having a colony count of 100,000 cfu/ml.
3. CAUTI or Non-CAUTI in Patients 1 Year of Age or Less: The patient must meet the following three conditions, all occurring within the IWP:
 1. The patient is 1 year old (regardless of catheter use).
 2. The patient must have at least one of the following signs or symptoms:
 - Fever (rectal temperature $>38.0^{\circ}\text{C}$)
 - Hypothermia (rectal temperature $<36.0^{\circ}\text{C}$)
 - Apnea
 - Bradycardia
 - Lethargy
 - Vomiting
 - Suprapubic tenderness
 - Costovertebral angle pain or tenderness
 3. Urine culture must show no more than 2 species of microorganisms, with at least one species having a colony count of 100,000 cfu/ml.
 4. Based on the patient's catheter use, determine whether the case meets the criteria for CAUTI or a general UTI case.
 4. Asymptomatic Bacteremic UTI (ABUTI) Criteria: The patient must meet the following three conditions, all occurring within the IWP:
 1. Regardless of catheter use, the patient has no symptoms or signs that meet the criteria for symptomatic UTI.
 - Based on the patient's catheter use, determine whether the case meets the criteria for CAUTI or a general UTI case.
 2. Urine culture must show no more than 2 species of microorganisms, with at least one species having a colony count of 100,000 cfu/ml.
 3. Blood culture or other non-culture microbiological tests must show microorganisms, with at least one species matching the urine culture microorganism with a colony count of 100,000 cfu/ml.
 - If a patient >65 years old has a fever ($>38.0^{\circ}\text{C}$) without catheter use, they may still meet the criteria for asymptomatic bacteriuria.

Reporting Considerations for Urinary Tract Infections

1. Suprapubic Tenderness:
 - Information can come from palpation (tenderness-sign) or patient-reported symptoms (pain-symptom). As long as the relevant information is documented in the medical records and the symptom record date is within the IWP, it can be included in the symptomatic UTI case criteria.
 - Lower abdominal pain, bladder or pelvic discomfort can be considered signs of suprapubic tenderness. However, general abdominal pain documented in the medical records cannot be used as evidence of suprapubic tenderness due to the many causes of abdominal pain.
2. Pain in the lower left or right side of the back or flank can be considered

signs of costovertebral angle pain or tenderness. However, general lower back pain documented in the medical records cannot be used as evidence of costovertebral angle pain or tenderness.

3. “Mixed flora” cannot be reported as a pathogen for healthcare-associated infections. If the urine culture report shows “mixed flora,” it indicates that the test result cannot be used to meet the criteria for a UTI.

Determining the Ward of UTI Occurrence

1. The infection ward is the ward where the patient was located on the DOE.
2. Transfer Rule: If the DOE is on the day of transfer or discharge or the next day, the infection ward is attributed to the transfer-out ward/discharge location. If the patient had multiple transfers on the DOE or the day before, the infection ward is determined based on the first ward on the day before the DOE.