

Urinary Tract Infection Evaluation Guidance

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Approved DUH ASET: 3/3/2021; September 2025 DUHS AS FET Update: Match DUHS Standard for Urine Culture among Adults with Indwelling Catheter

I. Evaluating UTI Symptoms by Clinical Context

Based on discussions with the Neurology & Neurocritical Care group, a quality initiative to improve ordering of urine cultures has been identified. Goals include reducing CAUTI rates, reducing treatment of asymptomatic bacteriuria, and reducing *C. difficile* risk. Members of the Antimicrobial Stewardship and Evaluation Team (ASET) have volunteered to draft Duke-specific guidance for a few of the key patient populations cared for on the Neurology and Neurocritical Care services. In constructing these algorithms, the authors drew upon evidence and existing recommendations from IDSA guidelines, critical care society guidelines, statements from the Spinal Cord Institute, among others.¹⁻⁵

The following three algorithms have been constructed for the patient with confusion, the patient with spinal cord injury or neurogenic bladder, and the patient with an indwelling urinary catheter. Neurology and Neurological Critical Care teams adopted use of these algorithms from 2021-2024.

In 2025, the algorithm for evaluation of adult patients with indwelling catheters was updated for adoption as a DUHS Standard.

Patient with Confusion

Clinical Suspicion for UTI

Assess symptoms

Urine culture should NOT be sent for:

- Foul smelling or cloudy urine
- Dysuria within 24 hours of catheter removal
- Pre-op screening (except Urologic procedures)
- Test of cure

Non-specific symptoms in clinically stable patient

- Confusion or altered mental status
- Chronic urinary incontinence, frequency, urgency
- Fever without focal GU symptoms

UTI-specific symptoms or clinically unstable patient:

- Acute dysuria, new or worsening urgency/frequency, suprapubic pain/tenderness, CVA pain/tenderness
- Fever *plus* at least one of the above

Assess and treat more likely causes first. Consider:

- Hydration (oral or IV)
- Evaluate medication list for drug interactions, adverse effects, recent changes, Beer's criteria
- Review other causes of fever or mental status changes
- Medical causes for delirium, other infections

Send urine sample for urinalysis

*Preferable to begin with urinalysis whenever feasible. If unstable or unable to collect culture later, may collect culture simultaneously.

Urinalysis with:

<10 WBCs
Trace or negative LE

Urinalysis with:

≥10 WBCs or
≥ 1+ LE
(or UA not available)

UTI ruled out

-No culture or treatment indicated

If clinically stable:

-Send urine culture and await results to assess need for therapy / optimal therapy

If unstable or meeting sepsis criteria:

-Assure blood & urine cultures sent
-Assess for other infectious sources
-Consider empiric treatment

Assess response to treatment

If symptoms improve or other etiology found:

-UTI ruled out

If symptoms persist/worsen despite other interventions:

-Could consider UTI per pathway

Interpret urine culture

Urine culture with mixed organisms, yeast, coagulase-negative Staph, or <100,000 CFU (irrespective of UA findings)

Contamination or colonization likely

-Retesting or treatment generally *not* indicated

Urine culture positive with >100,000 CFU

UTI likely

-See [CustomID](#) for treatment

Spinal Cord Injury/Neurogenic Bladder (including indwelling or clean intermittent or suprapubic catheter)

Clinical Suspicion for UTI

Assess symptoms

Urine culture should NOT be sent for:

- Foul smelling or cloudy urine
- Dysuria within 24 hours of catheter removal
- Pre-op screening (except Urologic procedures)
- Test of cure

Non-specific symptoms in clinically stable patient:

- Confusion or altered mental status
- Chronic urinary incontinence, frequency, urgency
- Fever without focal GU symptoms

Assess and treat other more likely causes first. Consider:

- Evaluate medication list for drug interactions, adverse effects, recent changes, Beer's criteria
- Evaluate patency/functioning of catheter
- Evaluate other medical causes for symptoms

Assess response to treatment

If symptoms improve:

- UTI ruled out

If symptoms persist/worsen despite other interventions:

- Could consider UTI per pathway

UTI-specific symptoms or clinically unstable:

- Acute dysuria, new or worsening urgency/frequency, new urinary incontinence, gross hematuria, suprapubic or CVA pain/tenderness
- Also: **worsening spasticity, autonomic dysreflexia**
- Fever *plus* at least one of the above* (see box, lower left for special considerations)

Send urine sample for urinalysis

*Preferable to begin with urinalysis whenever feasible. If unstable or unable to collect culture later, may collect culture simultaneously.

Urinalysis with:

<10 WBCs
Trace or negative LE

UTI ruled out

-No culture or treatment indicated

Urinalysis with:

≥10 WBCs or
≥ 1+ LE
(or UA not available)

If clinically stable:

- Send urine culture and await results to assess need for therapy / optimal therapy

If unstable or meeting sepsis criteria:

- Assure blood & urine cultures sent
- Assess for other infectious sources
- Consider empiric treatment

Interpret urine culture

Urine culture with mixed organisms, yeast, coagulase-negative Staph, or <100,000 CFU (irrespective of UA findings)

Contamination likely

- Retesting or treatment generally *not* indicated

Urine culture positive with >100,000 CFU

UTI likely

- See [CustomID](#) for treatment

***Special considerations:**

- Patients with spinal cord injury may not experience typical focal symptoms from infection – either for UTI or other infections
- Urinary colonization is also common: 23-69% of spinal cord injured patients have positive urine cultures even when infection is not present
- To minimize the risk of mis-attributing fever to UTI (given unreliable testing and symptoms), careful assessment for other sources is critical

Patient with Indwelling Urinary Catheter

Urine culture should NOT be sent for:

- Foul smelling or cloudy urine
- Dysuria within 24 hours of catheter removal
- Pre-op screening (except Urologic procedures)
- Test of cure

Clinical Suspicion for CAUTI

Assess signs and symptoms

Non-specific findings in clinically stable patient:

- Confusion or altered mental status
- Fever or leukocytosis without obstructive symptoms (flank pain/CVA tenderness, nausea, vomiting)

Assess and treat other more likely causes first. Consider:

- Assess functioning/patency of catheter or dependent loops
- Consider catheter removal if no longer indicated
- Evaluate for other causes of bladder spasm/discomfort and non-specific fever
- Review hydration, polypharmacy, metabolic disturbances

Assess response to treatment

If symptoms improve:
-UTI ruled out

If symptoms persist/worsen despite other interventions:
-Could consider UTI per pathway

CAUTI-specific symptoms OR hemodynamically unstable with suspected sepsis:

- Fever, rigors, or acute hematuria PLUS at least one of the following:
 - New or worsening CVA pain/tenderness or renal graft tenderness (concern for pyelonephritis)
 - Recent renal transplant (within 2 months)
 - Neutropenia (ANC <500; pyuria may be absent in neutropenia)
 - Recent genitourinary surgery, trauma, or obstruction (eg obstructive stones, catheter trauma etc)
 - Among patients unable to give subjective history: Radiographic evidence of pyelonephritis

Send urine sample for urinalysis

*Preferable to begin with urinalysis whenever feasible.

Urinalysis with:
<10 WBCs
Trace or negative LE

UTI ruled out
-No culture or treatment indicated

Urinalysis with:
≥10 WBCs or
≥ 1+ LE

If catheter has been in place ≥2 calendar days, exchange catheter and send urine culture from newly placed catheter

If clinically stable:
-Send urine culture and await results to assess need for therapy / optimal therapy

If unstable or meeting sepsis criteria:
-Assure blood & urine cultures sent
-Assess for other infectious sources
-Consider empiric treatment

Interpret urine culture

Urine culture with mixed organisms, yeast, coagulase-negative Staph, or <100,000 CFU (irrespective of UA findings)

Contamination likely
-Retesting or treatment generally *not* indicated

Urine culture positive with >100,000 CFU

CAUTI likely
-See [CustomID](#) for treatment

References

1. Mody L, Juthani-Mehta M. Urinary tract infections in older women: a clinical review. *Jama* 2014; **311**(8): 844-54.
2. Gupta K, Hooton TM, Naber KG, et al. International Clinical Practice Guidelines for the Treatment of Acute Uncomplicated Cystitis and Pyelonephritis in Women: A 2010 Update by the Infectious Diseases Society of America and the European Society for Microbiology and Infectious Diseases. *Clinical Infectious Diseases* 2011; **52**(5): e103-e20.
3. Nicolle LE, Gupta K, Bradley SF, et al. Clinical Practice Guideline for the Management of Asymptomatic Bacteriuria: 2019 Update by the Infectious Diseases Society of America. *Clinical Infectious Diseases* 2019; **68**(10): e83-e110.
4. Massa LM, Hoffman JM, Cardenas DD. Validity, accuracy, and predictive value of urinary tract infection signs and symptoms in individuals with spinal cord injury on intermittent catheterization. *J Spinal Cord Med* 2009; **32**(5): 568-73.
5. Mullin KM, Kovacs CS, Fatica C, et al. A Multifaceted Approach to Reduction of Catheter-Associated Urinary Tract Infections in the Intensive Care Unit With an Emphasis on "Stewardship of Culturing". *Infect Control Hosp Epidemiol* 2017; **38**(2): 186-8.
6. Fakas N, Souli M, Koratzanis G, Karageorgiou C, Giamarellou H, Kanellakopoulou K. Effects of antimicrobial prophylaxis on asymptomatic bacteriuria and predictors of failure in patients with multiple sclerosis. *Journal of Chemotherapy* 2010; **22**(1): 36-43.
7. Andrews KL, Husmann DA. Bladder dysfunction and management in multiple sclerosis. *Mayo Clinic Proceedings*; 1997: Elsevier; 1997. p. 1176-83.
8. Fitzgerald KC, Cassard LA, Fox SR, Probasco JC, Cassard SD, Mowry EM. The prevalence and utility of screening for urinary tract infection at the time of presumed multiple sclerosis relapse. *Multiple Sclerosis and Related Disorders* 2019; **35**: 61-6.
9. Sebastian S, Stein LK, Dhamoon MS. Infection as a Stroke Trigger. *Stroke* 2019; **50**(8): 2216-8.
10. Aizen E, Shifrin B, Shugaev I, Potasman I. Clinical and Microbiological Outcomes of Asymptomatic Bacteriuria in Elderly Stroke Patients. *Isr Med Assoc J* 2017; **19**(3): 147-51.
11. Yan T, Liu C, Li Y, Xiao W, Li Y, Wang S. Prevalence and predictive factors of urinary tract infection among patients with stroke: A meta-analysis. *Am J Infect Control* 2018; **46**(4): 402-9.
12. Bogason E, Morrison K, Zalatimo O, et al. Urinary Tract Infections in Hospitalized Ischemic Stroke Patients: Source and Impact on Outcome. *Cureus* 2017; **9**(2): e1014.
13. Naveed O, Dorotan MK, Flynn B, Satz W, Jacobson M. Seizures in the ED: Significance of Asymptomatic Bacteriuria in Patients Presenting with Breakthrough Seizures (2722). *Neurology* 2020; **94**(15 Supplement): 2722.