

## Diagnostic Testing Recommendations for Investigation of Urinary Tract Infections (UTI)

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### Background

- **No laboratory testing is required for healthy adult women presenting** with symptoms and signs consistent with **acute uncomplicated cystitis** (pre-menopausal, non-pregnant women without a history suggestive of an anatomical or functional abnormality of the urinary tract), without a history of UTI or other infection requiring antibiotics in the last month or a history of recurrent complicated urinary tract infections.
- **A urinalysis** (defined here as a urine dipstick test) **AND urine culture** should be obtained from **adult women presenting with symptoms and signs consistent with pyelonephritis, and from all patients with a history of UTI or other infection requiring antibiotics in the last month or a history of recurrent or active investigation for complicated upper urinary tract infections (UTI).**
- The presence of pyuria (defined here as a positive urine dipstick for leukocyte esterase) should not be used to support a need for antimicrobial therapy in the absence of UTI symptoms.
- Based on current evidence, the following testing guidelines are recommended in the diagnostic workup of UTI.

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### Testing guidelines

1. **Adult women presenting with symptoms and signs consistent with uncomplicated cystitis (pre-menopausal, non-pregnant women without history suggestive of an anatomical or functional abnormality of the urinary tract' and no antibiotic use in the last 1 month)<sup>1</sup>:**
  - This is predominantly a clinical diagnosis (based on history and physical examination). Urinalysis and urine culture is not routinely indicated as these tests do not improve diagnostic efficacy.
  - Urine culture **is indicated** for patients failing to respond to initial therapy (raising the possibility of an antimicrobial-resistant organism) and in the setting of recurrent symptoms less than one month after treatment of a previous UTI
  - Urinalysis and urine culture may be considered in the setting of atypical symptoms.
2. **Adult women presenting with symptoms and signs consistent with uncomplicated pyelonephritis (pre-menopausal, non-pregnant women without history suggestive of an anatomical or functional abnormality of the urinary tract)<sup>1</sup>:**
  - Urinalysis and urine culture should be obtained prior to the initiation of antimicrobial therapy.
3. **Adults being investigated for complicated UTI (any patient that does not fall in the category of uncomplicated UTI – exception: non-catheterized geriatric residents of long-term care facilities – see next section below)<sup>2</sup>:**
  - Diagnostic testing should only be performed if the patient has a compatible clinical presentation. Laboratory test results (urinalysis and urine culture) are not sufficient to rule in UTI requiring treatment in the absence of clinical symptoms.
  - Testing for pyuria has a high negative predictive value, and a negative test result may suggest an alternative diagnosis, especially in patients with non-specific symptoms.
  - The presence of pyuria is consistent with but not diagnostic of UTI.
  - Due to the wide variety of potential infectious organisms and increased likelihood of more antibiotic resistant organisms, urine culture should be ordered prior to management with antimicrobials. A positive urine culture result does NOT indicate a need for antimicrobial therapy in the absence of clinical symptoms consistent with a UTI.

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### 4. Non-catheterized geriatric residents of long-term care facilities being investigated for UTI<sup>3</sup>:

- This population has a high incidence of asymptomatic bacteriuria. Diagnostic testing should only be performed if the patient has a compatible clinical presentation. Note that foul smelling/dark/cloudy urine alone typically indicates dehydration rather than urinary infection.
- A urinalysis should be obtained for patients with a compatible clinical presentation. The absence of pyuria makes UTI unlikely and an alternate diagnosis should be considered. If pyuria is present, a urine culture should be obtained prior to the initiation of antimicrobial therapy.

### 5. Patients with in-dwelling catheter<sup>4</sup>:

- This population has a high incidence of catheter-associated bacteriuria (catheter-associated asymptomatic bacteriuria, CA-ASB, and catheter-associated UTI, CA-UTI). Diagnostic testing should only be performed if the patient has a compatible clinical presentation.
- Screening for CA-ASB is not recommended to reduce subsequent CA-bacteriuria or CA-UTI in patients with short-term or long-term indwelling urethral catheters, neurogenic bladders managed with intermittent catheterization, and other catheterized patients. Exceptions to this are:
  - i. Pregnant women
  - ii. patients who undergo urologic procedures for which visible bleeding is a risk
- Urinalysis for pyuria or nitrates is not recommended to diagnose UTI but can be used to rule it out in symptomatic patients. The absence of pyuria makes UTI unlikely and an alternate diagnosis should be considered.
  - i. The presence, absence, or degree of pyuria should not be used to differentiate CA-ASB from CA-UTI.
- A urine culture should be obtained, prior to the initiation of antimicrobial therapy, for patients with a compatible clinical presentation.
  - i. In the catheterized patient, the presence or absence of odorous or cloudy urine alone should not be used to differentiate CA-ASB from CA-UTI or as an indication for urine culture.

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### 6. Asymptomatic bacteriuria<sup>5</sup>:

- Guidelines indicate that pyuria accompanying asymptomatic bacteriuria is not an indication for antimicrobial therapy, regardless of age, gender, or comorbidities present.
- Urinalysis does not influence management of patients with asymptomatic bacteriuria.
- **Urine culture should be used to screen for asymptomatic bacteriuria** in pregnant women and in patients who will undergo urological procedures in which mucosal bleeding is anticipated.

### 7. For pediatric patients 2 months to 35 months of age with a fever of $>39^{\circ}$ Celsius<sup>6-7</sup>:

- If the febrile infant is deemed to have low likelihood of UTI, no testing of the urine is warranted. Clinical follow-up is recommended. Exceptions include children who:
  - i. are less than 2 months
  - ii. have recurrent UTIs
  - iii. have renal abnormalities
  - iv. have indwelling catheter
  - v. immune compromised.
- If the febrile infant has a high likelihood of UTI, one of two options can be followed:
  - vi. Obtain urine specimen by catheterization or suprapubic aspiration (SPA) collection for both urinalysis and urine culture.
  - vii. Obtain urine via convenient means for urinalysis only. A positive leukocyte esterase or nitrite should provoke a urine collection via catheterization or SPA for culture.
- A diagnosis of UTI requires both a urine test suggestive of inflammation (pyuria) and growth of a significant amount of a uropathogen ( $\geq 5 \times 10^7$  cfu/L for a specimen obtained by transurethral catheterization or any growth for a specimen obtained by suprapubic aspiration)<sup>6</sup>. When UTI is suspected in toilet-trained children, a midstream urine sample (where  $\geq 1 \times 10^8$  cfu/L is indicative of UTI) rather than a transurethral catheter or suprapubic aspirate specimen should be submitted for urinalysis and culture.<sup>2</sup>

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8. **For pediatric patients  $\geq 36$  months age with a fever of  $>39^{\circ}\text{Celsius}$ <sup>7</sup>:**
  - If the febrile child has a high likelihood of UTI and/or has the presence of urinary symptoms (dysuria, urinary frequency, hematuria, abdominal pain, back pain or new daytime incontinence):
    - i. Obtain a urine specimen for both urine dipstick and urine culture. The method used to obtain a urine sample depends on whether or not the child is toilet trained (see the Canadian Pediatric Society Position Statement, reference #7 for details).

#### References

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- 4) Hooton, T. M., et al. "Diagnosis, prevention, and treatment of catheter-associated urinary tract infection in Adults: 2009 International clinical practice guidelines from infectious diseases society of America." *Clinical Infectious Diseases* (2010) 50:625-663.
- 5) Nicolle, L. E., et al. "Clinical Practice Guideline for the Management of Asymptomatic Bacteriuria: 2019 Update by the Infectious Diseases Society of America." *Clinical Infectious Diseases* (2019) XX: 1-28.
- 6) Roberts, K. B., et al. "Reaffirmation of AAP clinical practice guideline: the diagnosis and management of the initial urinary tract infection in febrile infants and young children 2-24 months of age." *Pediatrics* (2016) 138.6.
- 7) Robinson, J. L. R., et al; Canadian Paediatric Society, Community Paediatrics Committee, Infectious Diseases and Immunization Committee, *Paediatr Child Health* (2014) 19.6:315-19