**IMPORTANT PRACTICE POINTS ON THE DIAGNOSIS OF URINARY TRACT INFECTION (UTI) AND THE ROLE OF LABORATORY TESTS**

**Diagnosis of urinary tract infection (UTI):**
The diagnosis of UTI should be **CLINICAL**, based on symptoms and signs, **NOT** laboratory testing.

- Specific symptoms/signs (e.g. dysuria, frequency, urgency, flank pain): Young, non-catheterized adults
- Non-specific symptoms/signs (e.g. confusion, fever): Elderly and catheterized patients: Diagnosis of UTI made **AFTER** excluding ALL other possible causes (e.g. new medications, infection at other sites)
- UTI should be considered in all pre-verbal children with unexplained fever

**Role of urine culture:**
Urine should be sent for culture only **AFTER** there is a strong **CLINICAL** suspicion of UTI, to find out what organism is present and what antibiotics it is susceptible to. Hence the role of urine culture is to **GUIDE** the selection of antibiotic therapy.

- Urine culture is **recommended** in:
  - **ALL** cases of complicated UTI (upper UTI – pyelonephritis, lower UTI - cystitis in children <14y, men, pregnant women, postmenopausal women and any woman with recurrent or atypical symptoms, known urological abnormalities or co-morbidities or no response to therapy)
- Urine culture is **NOT** recommended in the following circumstances:
  - 1<sup>st</sup> episode, acute, uncomplicated cystitis, that is, in young (premenopausal), non-pregnant, healthy women over the age of 14y with typical symptoms
  - Change in color, or odor of urine in absence of other symptoms/signs of UTI
  - Blocked catheter
  - As a “test of cure”, unless patient has not clinically responded to treatment or is pregnant
  - As a “routine” screen, e.g. on admission/discharge, “standing order”
  - To screen for multi-drug resistant Gram negative bacteria such as ESBL and Amp C

**Asymptomatic bacteriuria (ASB):**
A positive culture result, alone, **CANNOT** differentiate between asymptomatic bacteriuria (colonization of the bladder) and urinary tract infection – this distinction can **ONLY** be made clinically.

- ASB is the presence of bacteria in the bladder in the absence of symptoms/signs of infection. It is very **COMMON** in elderly and catheterized patients. It should **NOT** be looked for or treated except in:
  - Pregnancy
  - Prior to genitourinary instrumentation/surgery (for example, TURP, cystoscopy).

**INAPPROPRIATE** antibiotic treatment of ASB will cause:
- Unnecessary adverse effects to the patient
- Increase in antibiotic resistance
- Increase healthcare costs
- Increase in UTI shown in young women
UTI PRACTICE POINTS

Role of urinalysis (dipstick, urine microscopy and flow cytometry):
Pyuria and/or bacteriuria are common in those with asymptomatic bacteriuria and CANNOT differentiate this from urinary tract infection.
Hence, a positive urinalysis is NOT useful in diagnosing UTI in the elderly or catheterized patient.
Pyuria may be helpful in confirming the diagnosis of UTI in pre-verbal children in whom asymptomatic bacteriuria is rare (<1%).
Bacteriuria in young, healthy women with minimal symptoms/signs of cystitis (≤2) predicts UTI with 80% probability, providing the specimen is not contaminated with perineal flora.
False negatives can occur, especially with dipstick, with low levels of pyuria and with certain types of bacteria. Hence, a negative urinalysis CANNOT exclude UTI in all patients.
A NEGATIVE microscopy for PYURIA can be used to exclude UTI in those patients in whom the clinical diagnosis is uncertain.

How to ensure an accurate urine culture result:
- Urine MUST be collected BEFORE starting antibiotics
- If collecting MSU or in/out catheter specimen, should collect 2-4 hours after last void, if possible
- Contamination should be avoided during collection. Follow the guidelines on urine specimen collection:
  - MSU collection instructions for female
  - MSU collection instructions for male
- If patient is able to give MSU, clear VERBAL and WRITTEN instructions should be given.
- If collecting a specimen from an indwelling catheter in situ for >14 days, the catheter should be REMOVED and either an MSU collected or a new catheter replaced before aseptically aspirating urine from its side port. Do NOT collect urine from the collection bag.
- Urine should be collected in a sterile container and transferred IMMEDIATELY into a preservative containing tube which can be kept at room temperature. The preservative will stop the bacteria from multiplying and giving an inaccurate result.
- If preservative tubes are not available, a sterile, orange-top container should be used for collection and transport. This must be REFRIGERATED after collection, and transported WITH AN ICE PACK.
- The tube/container should be labeled with 2 patient identifiers, date/time of collection and type of specimen (MSU, in/out etc...).
- The requisition should be labeled with patient demographics, details of submitting physician, type of specimen (MSU, indwelling catheter etc...), date and time of collection, symptoms/signs, proposed/recent antibiotic and drug allergies. This is VERY important to achieve a TIMELY and MEANINGFUL result.
- Delivery to the laboratory should be AS SOON AS POSSIBLE after collection to expedite the result and the initiation of therapy.
What is a significant bacterial count?

- Traditionally, only high counts of $10^7/10^8$ CFU/L were considered “significant”.
- Now we know that in the presence of symptoms/signs of UTI, lower colony counts of uropathogens ($10^6$ CFU/L) may be significant in certain clinical scenarios such as catheterized patients and younger patients with cystitis.
  - Low colony counts may also indicate contamination from perineal/distal urethral flora. Hence, full identification and susceptibility testing will ONLY be done if there is pure/predominant growth of an uropathogen AND symptoms/signs suggestive of UTI are stated on the requisition.
- A mixed growth (3 or more organisms) in MIDSTREAM URINE usually indicates contamination from perineal/distal urethral flora and the need for a NEW specimen.
- In those with long-term, indwelling catheters, mixed growth usually indicates colonization of the catheter. However, it may indicate a polymicrobial infection in catheterized and spinal cord injury patients who are SYMPTOMATIC of UTI.
  - If collecting a specimen from an indwelling catheter in situ for >14 days, the catheter should be REMOVED and either an MSU collected or a new catheter replaced before aseptically aspirating urine from its side port.
  - Only if symptoms and signs suggestive of UTI are stated on the REQUISITION, will the uropathogens in a mixed culture be identified and susceptibilities reported

References:


Please see next page for a summary of important practice points
• The diagnosis of urinary tract infection (UTI) should be CLINICAL, based on symptoms and signs, NOT laboratory testing.

• Urine should be sent for culture only AFTER there is a strong clinical suspicion of UTI, to find out what organism is present and what antibiotics it is susceptible to.

• The role of urine culture is to guide selection of ANTIBIOTIC therapy.

• A “positive culture result”, alone, CANNOT differentiate between asymptomatic bacteriuria and urinary tract infection – this distinction can ONLY be made CLINICALLY.

• Asymptomatic bacteriuria is common in the elderly and catheterized patient, and should NOT be treated, except during pregnancy and prior to genitourinary instrumentation/surgery.

• Urinalysis is NOT a useful test in the diagnosis/confirmation or exclusion of UTI in MOST patients.

• Lower bacterial counts (10^6 CFU/L) may be significant in catheterized patients and in younger patients in the presence of SYMPTOMS/SIGNS of UTI.

• It is very important to state the SYMPTOMS/SIGNS suggestive of UTI ON THE REQUISITION so that appropriate work up is performed.

• To ensure an accurate culture result:
  o Urine MUST be collected BEFORE starting antibiotics.
  o If collecting MSU or in/out catheter specimen, collect 2-4 hours after last void, if possible.
  o Avoid contamination during collection. Follow the guidelines on urine specimen collection:
    ▪ MSU collection instructions for female
    ▪ MSU collection instructions for male
  o If patient is able to give MSU, provide clear VERBAL and WRITTEN instructions.
  o If collecting a specimen from an indwelling catheter in situ for >14 days, the catheter should be REMOVED and either an MSU collected or a new catheter replaced before aseptically aspirating urine from its side port.
  o Both the tube and requisition need to be labeled/completed properly.
  o Urine should be transferred into a preservative-containing tube IMMEDIATELY after collection. This can be stored and transported at room temperature.
  o Delivery to the laboratory should be AS SOON AS POSSIBLE after collection to expedite the result and the initiation of therapy.