



Microbiology Clinical Brief

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The Microbiology Lab and Urinary Tract Infections (UTI)

Infection of the urinary tract (UTI) is one of the most common infections leading to a doctor's office visit. Infections may range from asymptomatic bacteriuria to pyelonephritis and urosepsis. In order for the laboratory to give clinically meaningful and cost effective results, two things must occur. There must be good communication between the clinician and the laboratory and careful collection and transportation of the sample to the laboratory.

Information that is necessary to properly process urine samples includes method of collection, symptomatic status of the patient and the needs of the physician. **This information is essential and determines how the specimen is cultured and worked up. Therefore, the order must state one of these three culture types:**

- 1 Routine Culture.** This is used for patients capable of collecting a midvoid, clean catch urine. Susceptibility testing will be performed on pathogens when colony counts are greater than 10,000 cfu/ml, if in pure culture, and up to two Gram negative rods when colony counts are greater than 100,000 cfu/ml, if in mixed culture.
- 2 Surveillance Culture.** This is used with patients with neurogenic bladders, catheterized patients and geriatric patients (62 years or older). Susceptibility testing will be performed on pathogens when colony counts are greater than 10,000 cfu/ml, if in pure culture. Susceptibility testing will only be performed on one Gram negative isolate of a mixed culture when the colony count is greater than 100,000 cfu/ml and other isolates are less than 10,000 cfu/ml.
- 3 Special Culture.** This is used in pediatric patients (3 years or younger), straight cath samples, suprapubic aspiration, prostatic massage, symptomatic patients post treatment, urology patients and young women with "frequency-dysuria syndrome". Susceptibility testing will be performed on up to two pathogens when colony counts are greater than 100 cfu/ml.

Care with specimen collection and transportation is important in order to avoid potentially misleading results. Proper cleansing prior to obtaining the sample is essential. Samples must be collected in **sterile containers**. For Clean Catch urine specimens, **the patient must be instructed both verbally and in writing on proper collection technique to avoid urethral and vaginal contamination**. Foley catheter specimens must be collected by aspiration from the catheter tubing, NOT from the collection bag. **Pediatric bagged (PUC bag) specimens are often contaminated, making results difficult to interpret. Therefore, positive results must be confirmed by a method such as straight catheterization or suprapubic aspiration before the administration of antibiotics.** Similarly, ileal conduits are often heavily colonized with various bacteria, therefore it may be difficult to determine what, if any, is a pathogen. Collecting urine via an ileal conduit double lumen catheter may provide the most meaningful data.

Specimens must be refrigerated and processed within 24 hours of collection to avoid increased bacterial numbers due to overgrowth. If specimens can not be transported to the laboratory immediately, refrigerate and transport within 24 hours of collection. If this is not possible, specimens may be placed in a preservative, e.g. BD urine preservative tube and transported at room temperature within 48 hours (24 hours or less gives optimal results).

(continue on reverse)

When ordering a urine culture, you must indicate both the **Type of Collection** (e.g. Clean Catch, Straight Cath, Foley Cath, etc.) and **Type of Culture** (i.e. Routine, Surveillance, or Special).

Important things to remember about urinalysis (UA) and urine microscopy:

Leukocyte esterase and nitrite tests should both be performed to increase sensitivity of the screen. If either or both are positive further workup should be done. However, false negative and false positive results occur. Leukocyte esterase detects the presence of intact or degenerated neutrophils. The nitrite test detects the conversion of dietary nitrates to nitrites by nitrate-reducing bacteria.

False negatives for leukocyte esterase with

- Glycosuria
- Some drugs
- Large intake of vitamin C

False negatives for nitrite test

- Infection caused by bacteria that don't reduce nitrate, i.e. *Staph. saprophyticus*
- Decreased incubation time in bladder (<4 hours)
- Large intake of vitamin C

False positives for leukocyte esterase with

- **Contaminated** collection
- Indwelling Foley catheter, foreign body
- Neoplasm
- Appendicitis, pancreatitis, gastroenteritis
- Others

False positives for nitrite test

- **Contaminated** collection

False positive presence of bacteria

- **Contaminated** collection
- Artifacts such as amorphous urates and phosphates

Urinalysis and pediatric bagged urine (PUC bag) results should never be used alone to diagnose a patient with a UTI. If the urinalysis is positive, then a culture should be performed on a properly collected specimen. **If a pediatric bagged urine is positive, it should be confirmed by a straight cath urine before treatment is begun because bagged urines are false positive 85% of the time.**

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POST THIS SHEET WHERE URINE ORDERS ARE ENTERED

**PLEASE INDICATE BOTH TYPE OF CULTURE
AND
TYPE OF COLLECTION**

URINE CULTURE TYPES

ROUTINE CULTURE: FOR PATIENTS CAPABLE OF COLLECTING A MIDSTREAM, CLEAN CATCH URINE.

SURVEILLANCE CULTURE: FOR PATIENTS WITH NEUROGENIC BLADDERS, LONG-TERM CATHETERIZED PATIENTS AND GERIATRIC PATIENTS (62 years plus).

SPECIAL CULTURE: FOR PEDIATRIC PATIENTS (0-3 years), STRAIGHT CATH. SAMPLES, SUPRAPUBIC ASPIRATION, PROSTATIC MASSAGE, SYMPTOMATIC PATIENTS POST TREATMENT, UROLOGY PATIENTS AND YOUNG WOMEN WITH “FREQUENCY-DYSURIA SYNDROME”.

COLLECTION TYPES

CLEAN CATCH
STRAIGHT CATHETER
FOLEY CATHETER
SUPRAPUBIC ASPIRATE
PEDIATRIC URINE COLLECTION BAG
ILEAL CONDUIT CATHETER
ETC.
