Urinary Tract Infection Diagnosis in PICU Patients with Indwelling Urinary Catheters

Scope: This guidance document provides best practice recommendations for the diagnosis of catheter associated urinary tract infection (CAUTI) in patients within the pediatric intensive care unit.

Exclusions to this guideline: any renal transplant recipient within 3 months of transplantation – recommend Pediatric Infectious Disease consult for this population if any concern for infection.

Indications for indwelling urinary catheter placement:

- Critically ill patients whose medical management is adjusted based off strict hourly I/Os
- Diabetes insipidus requiring vasopressin infusion titration
- Perioperative use considering surgery type and post-op needs (ex. Epidural in place)
- Urinary catheter placed for urologic procedure/surgery
- Gross hematuria
- Urinary obstruction/relief of urinary retention not manageable by other means such as intermittent catheterization or nursing interventions
- Management of urinary incontinence with stage 3 or greater pressure injuries
- Comfort care for terminally-ill patients

Assess need for continued indwelling catheter use once per shift.

Table 1. CAUTI Prevention Bundle

Insertion	Maintenance	Removal	Appropriate Diagnosis
▪ Avoid unnecessary catheterization ▪ Follow UNC insertion criteria (above) ▪ Follow aseptic technique. Refer to policy for insertion procedure. ▪ Consider other methods for bladder management (external catheters for men and women, intermittent catheterization)	▪ Maintain unobstructed downward flow of urine ▪ Keep bag below level of bladder and free from kinking and dependent loops ▪ Do not put bag in bed during transfers ▪ Secure catheter properly ▪ Maintain closed drainage system ▪ Do not let bag touch the floor ▪ Perform catheter and perineal care daily and prn	▪ Review catheter indication and necessity daily ▪ Remove catheter when it no longer meets insertion criteria ▪ Avoid reinsertion by following trial of void protocol	▪ Order urinalysis for patients with appropriate urinary symptoms (frequency, burning, pain) ▪ Interpret UA and order urine culture ONLY if UA is abnormal ▪ Treat patient based on culture results and following guideline

Types of urinary tract infections (UTI):

- **Cystitis**: infection of the bladder
- **Pyelonephritis**: infection involving the kidneys and upper urinary tract
- **Catheter-associated UTI (CAUTI)**: presence of an indwelling urinary catheter with signs and symptoms of UTI with positive urine culture **AND** no other identified source of infection

Asymptomatic bacteriuria (ASB): isolation of bacteria in the urine at levels often regarded as clinically significant (ie. >100,000 CFU/mL) +/- pyuria, in patients **without symptoms of UTI.**

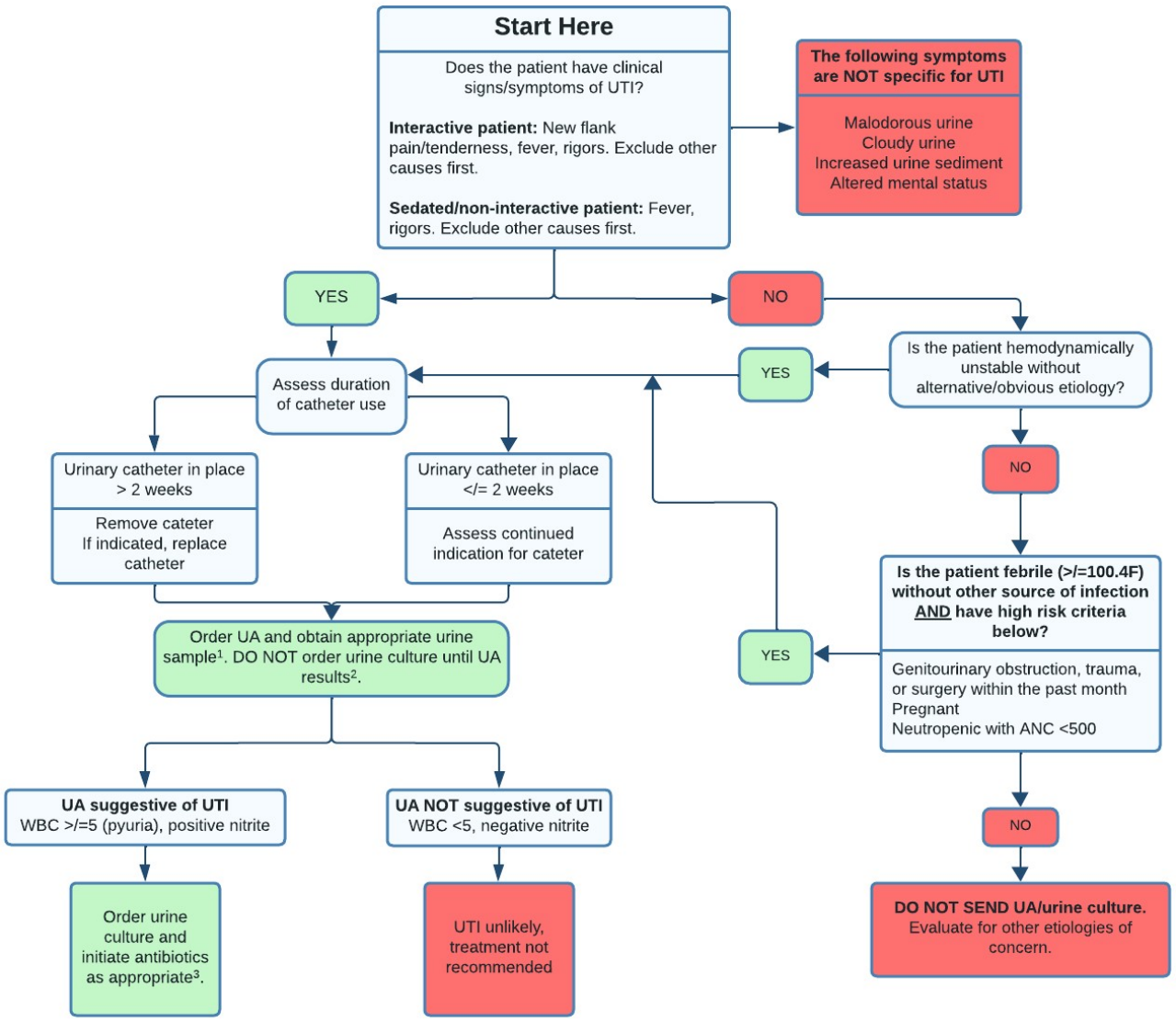
*During clinical trials in the 1970s, the incidence of ASB was approximately 5% per day of indwelling urinary catheterization. After 10-14 days of indwelling catheter retention, it is likely that more than half of patients will have ASB with >100,000 CFU/mL of bacteria detected.

Table 2. Symptoms suggestive of UTI

Classification/Diagnosis	Symptoms
ASB	None!
Cystitis	Dysuria, new or worsening frequency or urgency, suprapubic pain
Pyelonephritis	Cystitis symptoms + chills, flank pain or tenderness, fever
CAUTI	Chills, flank pain or tenderness, fever
The following symptoms are **NOT** specific/suggestive of UTI*: malodorous or cloudy urine, increased urine sediment.	

*Consider alternative, non-UTI diagnosis such as dehydration

Algorithm for Diagnosis of Suspected Catheter-Associated Urinary Tract Infection



1. Refer to Policy Stat for guidelines on appropriate urine sample collection.
2. Consider obtaining UA and urine culture simultaneously in the following scenarios:
    a. Neutropenic with ANC </= 500
    b. Hemodynamic instability (order prior to initiating empiric antibiotics)
3. Refer to UTI treatment algorithm.

Table 3. Urinalysis interpretation

UA Factor	Normal	Abnormal	Interpretation	Caveats
WBC	< 5	>/= 5	**Normal**: UTI unlikely, negative predictive value >90% **Abnormal**: nonspecific to UTI*; may occur in other conditions, including STIs or genital dermatitis.	Less sensitive in neutropenic patients (ie. ANC <500 cells/μL).
Leukocyte Esterase	Absent	Present (any)	**Normal**: UTI unlikely **Abnormal**: nonspecific*. Indicates WBCs in urine.	Less specific than WBC for UTI.
Nitrite	Absent	Positive	**Normal**: does not rule out UTI (low sensitivity). **Abnormal**: indicates presence of certain bacteria, including E coli. Does not differentiate between ASB, contamination, or infection.	Certain bacteria do not produce nitrite, including Enterococcus.
Bacteria	Absent	Present	**Normal**: no bacteria seen. Low sensitivity. **Abnormal**: indicates presence of bacteria. Does not differentiate between ASB, contamination, or infection.	

See next page for urine culture interpretation algorithm.

Urine Culture Interpretation Algorithm

1. UNC CASP Antibiogram
2. Fluconazole requires renal adjustment for CrCl ≤ 50 ml/min
3. Amphotericin B requires pre-medication with IV fluid (NS), acetaminophen, and diphenhydramine. Bladder irrigation is discouraged due to limited data supporting clinical benefit; should only be used in consultation with CASP and/or pharmacy. Consider ID consult for all C. krusei or C. glabrata UTIs if considering treatment.