Treatment of Urinary Tract Infection (UTI)

Clinical Guideline

This guideline supports initial treatment of patients with urinary tract infection and includes information for referral to the Children's Wisconsin Urology Clinic.
To support collaborative care, we have developed guidelines for our community providers to use when referring to, and managing patients with, the pediatric specialists at Children's Wisconsin. These guidelines provide information and recommendations for jointly managing patient care between community providers and our pediatric specialists.

Symptoms/Diagnosis/Causes:	Referring provider's initial evaluation and management:	When to initiate or consider referral to Urology Clinic:	How to refer and what to include in the referral to the Urology Clinic:	Specialist's workup will likely include:
Signs and symptoms • Upper tract (i.e. pyelonephritis): fever > 38° C, nausea/vomiting, flank pain, general malaise • Lower tract (i.e. cystitis): dysuria, frequency/urgency, incontinence, suprapubic pain, change in urine odor or color • Neonates/Infants: fever > 38° C, irritability, poor feeding, vomiting, diarrhea, failure to thrive, jaundice, sepsis **Causes** • 75% of urinary tract infections are cause by Escherichia coli. The next most common pathogens are Klebsiella and Proteus, followed by Staphylococcus and Enterococcus.	**Obtain urine** • **Catheterized specimen**: Urinalysis suggestive of infection (pyuria and/or bacteriuria) AND > 50,000 colony-forming units (CFUs) per mL of a uropathogen cultured. Alternatively, > 10,000 CFUs/mL may be considered a possible UTI depending on initial index of suspicion. • **Clean catch specimen**: In a symptomatic child, positive urinalysis AND > 100,000 CFUs/mL of a single uropathogen from a voided clean-catch specimen is also diagnostic. Alternatively, >50,000 CFUs/mL may be considered a possible UTI depending on initial index of suspicion.	• Recurrent UTIs that are refractory to the recommended treatment • Boys after the 1st febrile UTI/pyelonephritis, irrespective of imaging result • Girls after the 1st febrile UTI/pyelonephritis, with abnormal imaging • Boys and Girls after the 2nd febrile UTI/pyelonephritis, irrespective of imaging results • Consider an outpatient referral for boys or girls after the 1st febrile UTI/pyelonephritis, if UTI required inpatient evaluation • Desire by the family or the primary provider to seek specialist evaluation following the 1st febrile UTI/pyelonephritis	**How to refer:** 1. **In Children's Epic: place an ambulatory referral to CHW UROLOGY CLINICS.** 2. **External providers:** • **In your instance of Epic - Place an external referral order to CHW UROLOGY CLINICS or** • **Fax (414-607-5288) or** • **Online ambulatory referral** **For urgent requests: Contact the Physician Consultation Line (414-266-2460).**	1. Your patient will receive testing only if it is warranted. 2. You will receive consultation letter with assessment and plan within a week of the visit. 3. You will receive updates any time the patient returns for follow up. You may receive a phone call if there are additional concerns.

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Diagnosis • Catheterized specimen: Urinalysis suggestive of infection (pyuria and/or bacteriuria) AND > 50,000 colony-forming units (CFUs) per mL of a uropathogen cultured. Alternatively, > 10,000 CFUs/mL may be considered a possible UTI depending on initial index of suspicion. • Clean catch specimen: In a symptomatic child, positive urinalysis AND > 100,000 CFUs/mL of a single uropathogen from a voided clean-catch specimen is also diagnostic. Alternatively, >50,000 CFUs/mL may be considered a possible UTI depending on initial index of suspicion.	**Urinalysis** • Leukocyte esterase test: 71-86% sensitive in the context of clinically suspected UTI • Nitrite test: highly specific; not sensitive in children who empty their bladders frequently • Combination LE and nitrite positive: 94% sensitive for clinically suspected UTI • Culture results of urine collected in a bag applied to the perineum are only valid when negative and are not routinely encouraged for this reason. **Treatment & Medications** 1. Behavior modification: robust hydration and frequent voiding 2. Treatment of constipation 3. Antibiotics 4. Renal Ultrasound and/or VCUG dependent upon number of febrile infections and/or under 6 months of age **Outpatient empiric therapy with oral antibiotic recommendation* pending culture and sensitivity results:** **Age >60 days to <2 years** • **Any UTI:** cephalexin for 10 days • 25 mg/kg/dose (max 1000mg/dose) TID • (Intravenous antibiotic treatment is highly recommended in infants who may not tolerate oral treatment) ***If allergy to cephalosporins** or severe IgE-mediated reaction (i.e. anaphylaxis or anaphylactoid reaction) to penicillin (incl. amoxicillin, consider trimethoprim/sulfamethoxazole 5-6mg/kg/dose (max 160mg/dose trimethoprim for cystitis or pyelonephritis) BID for the duration recommended for cephalexin based on age and diagnosis.	• See above	**What to include in the referral:** • Urgency of the referral • Chief complaint in detail • Pertinent past medical history • Abnormal lab or imaging findings • Key question you want addressed • Does patient have psychosocial stressors or mental health concerns? • Indicate if you want consult only or consult and management of the problems. • Lab work, and any office notes regarding this patient's problems. • Send any X-ray films/reports with patient, if film was not done at Children's	• See above

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• See above	**Imaging:**
	The purpose of imaging after a febrile urinary tract infection (UTI) or pyelonephritis is to identify children who may have vesicoureteral reflux (VUR) and to rule out the small percentage (about 1%) who may have a structural abnormality of the urinary tract.
	
	Imaging is not typically recommended for recurrent, non-febrile UTIs, unless there are other concerning symptoms—such as visible blood in the urine (gross hematuria) or recurrent flank pain—or if a child has frequent UTIs (≥3 per year) caused by the same organism, which raises concern for a possible nidus, such as a kidney stone.
	
	Renal US:
	• **60 days to 2 years**: After 1st febrile UTI/pyelonephritis, wait at least 30 days to obtain RUS as
	• **> 2 years**: After 2nd febrile UTI/pyelonephritis or 1st febrile UTI with a non-*E. Coli* organism or 1st degree relative with history of VUR.
	
	VCUG:
	• Obtain a VCUG after: Second febrile UTI / pyelonephritis Abnormal RBUS*
	• Obtain a VCUG after: The first febrile UTI / pyelonephritis if any of the following are present:
	  ○ Non–E. coli UTI Parent or sibling with known VUR
	  ○ High provider suspicion for clinically significant VUR, including:
	  ▪ Severe presentation of febrile UTI (e.g., prolonged or complicated hospitalization)
	  ▪ Infection with a multi-drug–resistant organism
	  ▪ Parental concern or strong desire to evaluate for VUR
	  ○ Abnormal renal US
	  ○ Moderate to severe hydronephrosis / pelviectasis
	  ○ Hydroureter
	  ○ Ureteral duplication
	  ○ Evidence of renal scarring
		• See above	• See above	• See above

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Please contact clinicalguidelines@childrenswi.org for questions or comments.

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Medical Disclaimer

This Clinical Guideline (CG) is designed to provide a framework for evaluation and treatment. It is not intended to establish a protocol for all patients with this condition, nor is it intended to replace a clinician's judgement. Adherence to this CG is voluntary. Decisions to adopt recommendations from this CG must be made by the clinician in light of available resources and the individual circumstances of the patient. Medicine is a dynamic science; as research and clinical experience enhance and inform the practice of medicine, changes in treatment protocols and drug therapies are required. The authors have checked with sources believed to be reliable in their effort to provide information that is complete and generally in accord with standards accepted at the time of publication. However, because of the possibility of human error and changes in medical science, neither the authors nor Children's Hospital and Health System, Inc., nor any other party involved in the preparation of this work warrant that the information contained in this work is in every respect accurate or complete, and they are not responsible for any errors in, omissions from, or results obtained from the use of this information.