

Table 1 - Local Outpatient Antibigram Data for Microorganisms Associated with UTI, 2020

ORGANISM % UTI Pathogen*	Number of Isolates	Gentamicin	Ampicillin or Amoxicillin	Cefazolin or Cephalexin	Ceftriaxone, Cefdinir or Cefixime	Ciprofloxacin	Levofloxacin	Nitrofurantoin	Tetracycline	Trimethoprim-Sulfamethoxazole
<i>Escherichia coli</i> (approx. 70%)	606	93	54	92	95	84	90	99	80	75
<i>Klebsiella sp.</i> (approx. 5%)	38	100	R	95	97	90	92	37	79	82
<i>Proteus sp.</i> (approx. 4%)	39	100	80	92	97	97	100	R	R	90
<i>Staphylococcus aureus</i> (approx. 1%)	24	96	--	**	65	--	100	100	96	100

*Percentages based on local outpatient urine culture data, 2013-2018
**Not tested, but if MSSA appropriate to use

***Inclusion Criteria**

Patients >60 days of age with most or all of the following:

- Fever ≥ 38 degrees Celsius
- Dysuria
- Urinary frequency
- Flank pain
- Vomiting

Note: if <60 days, refer to febrile young infant pathway

Exclusion Criteria

- Major comorbidity (immunocompromise, malignancy etc.)
- Known urinary tract abnormalities
- Neurogenic bladder
- Chronic/complex conditions (i.e. spina bifida, indwelling or intermittent urinary catheter, hardware. Etc.)
- Recent GU surgery or instrumentation
- Critical illness

Definition of a UTI:

Compatible clinical syndrome plus the following laboratory abnormalities:

- *Catheterized specimen or suprapubic aspiration*
 - Definite: > 50,000 cfu/mL
 - Possible: > 10,000 cfu/mL
- *Clean-catch specimen*
 - Definite: > 100,000 cfu/mL
 - Possible: >50,000 cfu/mL

Considerations:

- Poly-microbial cultures in an otherwise healthy child should be considered contaminated and do not warrant treatment with antibiotics.

Rare Pathogenic Organisms	Other Organisms Considered Contaminants
Group B <i>Streptococci</i>	"Other Gram positives" <i>Lactobacillus</i>
<i>Staphylococcus saprophyticus</i>	<i>Corynebacteria</i> , diphtheroids
<i>Candida</i> (in premature) infants)	<i>Micrococcus sp.</i>
<i>Pseudomonas sp.</i>	<i>Bacillus sp.</i>
<i>Enterobacter sp.</i>	Coagulase-negative <i>Staphylococci</i>
<i>Enterococcus faecalis</i>	

Urinary Tract Infection

Clinical Practice Guideline

Antibiotic Therapy

Table 2- Antibiotic Dosing

Inpatient treatment

- <28 days of age: refer to Fever in Young Infants guideline
- ≥28 days of age: Ceftriaxone 50 mg/kg/day, max 1000 mg/day, once daily
- For step-down therapy, see outpatient treatment recommendations below

Outpatient treatment- refer to Table 2 for dosing

- Uncomplicated UTI:
 - 1st choice - cephalexin (based on local outpatient antibiogram data)
 - 2nd choice - nitrofurantoin
 - 3rd choice - cefixime
 - 4th choice - ciprofloxacin
- Complicated UTI (i.e. pyelonephritis)
 - Use culture results to guide therapy.
 - Bactrim, ciprofloxacin or levofloxacin are preferred over beta-lactams due to better kidney penetration.
 - If isolate is susceptible (MIC <8), consider cephalexin (has good kidney penetration)

Considerations:

- If previous UTI, review previous organism & susceptibilities
- If patient is on UTI prophylaxis, do not use the same antibiotic for treatment
- For all patients treated empirically, check urine culture results to assure appropriate antibiotic therapy.
- Do not obtain a follow up urinalysis if clinically improved with appropriate antibiotic treatment.
- Stop empiric treatment if culture results as contaminant or negative
- Check response to treatment within 48 hours.
- Targeted antibiotic therapy should be based on organism ID and susceptibility.
- For bacteremia, renal abscess or resistant organisms, including ESBL producers, consult infectious diseases for treatment recommendations.
- Consider upper tract infection (pyelonephritis) if signs/symptoms of fever, flank pain, or ill appearance

Antibiotic Name	Dose	Frequency & Duration for Uncomplicated UTI	Frequency & Duration for Complicated UTI (i.e. Pyelonephritis)	Relative Cost*	Notes
Cephalexin (Keflex®)	50mg/kg/DAY, max 4000mg/day	3 times a day <u>Children:</u> 7-14 days <u>Adolescents:</u> 3-7 days	4 times a day <u>Children:</u> 10-14 days <u>Adolescents:</u> 10-14 days	\$	Good kidney penetration.
Nitrofurantoin (Macrochantin®)	< 30 kg OR cannot swallow capsules: 6 mg/kg/DAY, max 400mg/day	4 times a day <u>Children:</u> 7-14 days <u>Adolescents:</u> 5 days	<i>Do not use</i>	Cap: \$\$ Susp: \$\$\$	Capsules can be sprinkled. Suspension may be difficult to obtain. Poor kidney penetration.
Nitrofurantoin (Macrobid®)	≥ 30 kg AND able to swallow capsules: 200 mg/DAY	Twice a day <u>Children:</u> 7-14 days <u>Adolescents:</u> 5 days	<i>Do not use</i>	\$\$	Poor kidney penetration.
Cefdinir (Omnicef®)	14mg/kg/DAY, max 600mg/day	Twice a day <u>Children:</u> 7-14 days <u>Adolescents:</u> 3-7 days	<i>Do not use</i>	\$\$	Poor kidney penetration.
Cefixime (Suprax®)	8mg/kg/DAY, max 400mg/day	Daily <u>Children:</u> 7-14 days <u>Adolescents:</u> 3-7 days	Daily <u>Children:</u> 10-14 days <u>Adolescents:</u> 10-14 days	\$\$\$	On Medicaid formulary as of August 2020
Ciprofloxacin (Cipro®)	30mg/kg/DAY, max 1500mg/day	Twice a day <u>Children:</u> 7-14 days <u>Adolescents:</u> 3 days	Twice a day <u>Children:</u> 10-14 days <u>Adolescents:</u> 7 days	\$\$	Suspension not always available in pharmacies other than VCH outpatient pharmacy.
Levofloxacin (Levaquin®)	10mg/kg/DOSE max 750 mg/day	6 mo to < 5 years: Twice a day ≥ 5 years: Daily <u>Children:</u> 7-14 days <u>Adolescents:</u> 3 days	6 mo to < 5 years: Twice a day ≥ 5 years: Daily <u>Children:</u> 10-14 days <u>Adolescents:</u> 5 days	\$\$	Suspension not always available in pharmacies other than VCH outpatient pharmacy.
Cefprozil (Cefzil®)	30mg/kg/DAY, max 1000mg/day	Twice a day <u>Children:</u> 7-14 days <u>Adolescents:</u> 3-7 days	<i>Do not use</i>	\$\$\$	Not always available in pharmacies. Poor kidney penetration.
Cefpodoxime (Vantin®)	10mg/kg/DAY, max 200mg/day	Twice a day <u>Children:</u> 7-14 days <u>Adolescents:</u> 3-7 days	<i>Do not use</i>	\$	Not always available in pharmacies. Poor kidney penetration.
Trimethoprim-sulfamethoxazole (Bactrim®, Septra®)	10mg/kg/DAY, max 320mg/day	Twice a day <u>Children:</u> 7-14 days <u>Adolescents:</u> 3 days	Twice a day <u>Children:</u> 10-14 days <u>Adolescents:</u> 10-14 days	\$\$	Use with caution for empiric therapy based on antibiogram data.

*Estimated average wholesale price per 10-day course

This guideline does not take into account individual patient situations, and does not substitute for clinical judgment

Urinary Tract Infection Clinical Practice Guideline



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