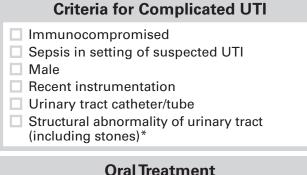
Toronto Central LHIN: Guidelines for Empiric Treatment of Urinary Tract Infection in Adults

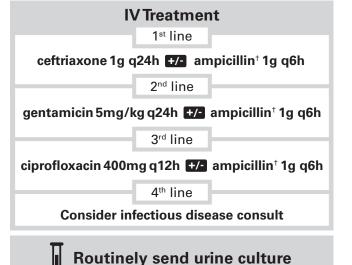
Uncomplicated UTI / Cystitis

Oral Treatment 1st line nitrofurantoin macrocrystals 100mg bid x 5 days 2nd line trimethoprim-sulfamethoxazole (TMP-SMX) 1 DS bid x 3 days 3rd line ciprofloxacin 500mg bid x 3 days 4th line amoxicillin-clavulanate 875/125mg bid x 5-7 days 5th line cephalexin[◊] 500mg qid x 5-7 days Urine culture recommended if: Other than 1st, 2nd, or 3rd line antibiotic is used Persistent symptoms despite treatment Recurrent UTI within 3 months of treatment **Indications for Hospitalization with Complicated UTI / Pyelonephritis** Inability to tolerate oral intake ☐ Suspected sepsis (e.g. hypotension, confusion)

Complicated UTI / Pyelonephritis







Asymptomatic Bacteriuria

No treatment, except if pregnant

UTI in Pregnancy

Oral Treatment for
Cystitis/Asymptomatic Bacteriuria

1st line

nitrofurantoin macrocrystals structure
100mg bid x 5 days

2nd line

amoxicillin-clavulanate
875/125mg bid x 5-7 days

IV Treatment for
Pyelonephritis

1st line

ceftriaxone 1g q24h +/- ampicillin† 1g q6h

2nd line

gentamicin 1.5mg/kg q8h
+/ampicillin† 1g q6h



Urinary tract obstruction

Acute renal insufficiency



[♦] Use if *E. coli* susceptibility >70% at local hospital.

^{*} Patients with urogenital abnormalities will need 10-14 days of treatment.

[†] Add ampicillin if prior urine colonization with enterococcus or septic patients with suspected UTI.

[§] Use nitrofurantoin macrocrystals if less than 36 weeks gestation.

Treat pyelonephritis in pregnancy initially with IV antibiotics.

Guidelines for Empiric Treatment of Urinary Tract Infection in Adults: Appendix

- 1 The microbial spectrum of uncomplicated UTI and pyelonephritis consist mainly of *E. coli* (75-95%), with occasional other species of *Enterobacteriaceae*, such as *Proteus mirabilis* and *Klebsiella pneumoniae*, and *Staphylococcus saprophyticus*. Other gramnegative and gram-positive species are rarely isolated in uncomplicated UTIs.
- 2 Local antimicrobial susceptibility patterns of *E. coli* in particular should be considered in empirical antimicrobial selection for uncomplicated UTIs. Since resistance patterns of urinary *E. coli* varies considerably between regions and countries, a specific treatment recommendation may not be universally suitable for all regions or countries.
- **3** Do **not** use nitrofurantoin to treat pyelonephritis because of negligible drug levels in serum and renal parenchyma. Avoid nitrofurantoin with decreased creatinine clearance (<60 mL/min) and in the elderly (>age 75).
- 4 In patients with pyelonephritis who will be managed as outpatients, a select proportion based on severity of illness will benefit from an initial one-time dose of a long-acting parenteral antibiotic (beta lactam or aminoglycoside) and continued treatment with oral antibiotics. This practice allows administration of an antibiotic with better coverage of *E. coli* while awaiting culture and sensitivity results.

- 5 The addition of ampicillin to empiric treatment should be based on both prior urine colonization with enterococcus and clinical stability of patient (enterococcal coverage should be included in septic patients with suspected complicated UTI until C&S results are available).
- **6** Avoid gentamicin with impaired renal function. Caution is advised regarding the risk of ototoxicity, especially with prolonged use of gentamicin. If >24 hours of treatment with gentamicin is required, then pharmacy involvement is recommended.
- **7** Avoid using the same antibiotic if recurrent UTI within 3 months.
- 8 Beta-lactam agents are appropriate choices for therapy when other recommended agents cannot be used. However, they have higher failure rates even when cultured organisms are deemed susceptible and require longer duration of treatment (5-7 days for uncomplicated UTI and 10-14 days for pyelonephritis).
- **9** Collateral damage (e.g. *Clostridium difficile* colitis and selection of drug-resistant organisms) is more likely to occur with use of fluoroquinolones and broad-spectrum cephalosporins over TMP-SMX and nitrofurantoin.
- **10** Shortening the duration of antibiotic therapy is one of the strategies to reduce increasing antibiotic resistance in patients with mild symptoms or early clinical response.



Guidelines for Empiric Treatment of Urinary Tract Infection in Adults: Additional Tools

Toronto Central LHIN Emergency Department Urine <i>E. coli</i> Susceptibility (%) 2012 - 2013									
Emergency Department	nitrofurantoin	TMP-SMX	ciprofloxacin	amoxicillin- clavulanate	cephalexin	cefazolin	ceftriaxone	gentamicin	
MSH	96	75	79	81	52		90	92	
SB	91	71	72			84	88	90	
SMH	90	63	69	84		79	82	89	
TEGH	94	74	80		87	86	88	92	
TGH	90	66	68	75	46		87	87	
TWH	93	76	75	80	54		90	90	
St. Joseph's (in & out pts.)	95	84	84	88		73	97	92	

Guide to S	electing Antimicrobials Used to	Approximate Antimicrobial Costs		
Antimicrobial	Pro's	Con's	Antibiotic	Cost/Course [‡]
nitrofurantoin	Lower rates of resistance Generally well tolerated	Cannot use in pyelonephritisUnsafe with impaired creatinine clearance	nitrofurantoin macrocrystals 100mg po bid x 5d	\$7.40
	 Limited effects on resistance to other antimicrobials 	Use with caution in elderlyMore expensive than alternatives	TMP-SMX 1 DS po bid x 3d	\$0.30
TMP-SMX	Reasonable resistance rates with <i>E. coli</i> Lower rates of <i>C. difficile</i> than fluoro-	Many potential adverse effects, primarily with prolonged use	ciprofloxacin 500mg po bid x 3d	\$1.00
	quinolones or amoxicillin-clavulanate • Inexpensive	Potential for drug-drug interactions Not recommended in pregnancy	amoxicillin-clavulanate 875/125 po bid x 7d	\$5.00
ciprofloxacin		Induces resistance to fluoroquinolones	cephalexin 500mg po qid x 7d	\$4.20
	 Reasonable resistance rates with <i>E. coli</i> Generally well-tolerated Allows for shorter course of therapy 	 and other antimicrobials Increased risk of <i>C. difficile</i> Potential for drug-drug interactions 	Antibiotic	Cost/Day
	(especially pyelonephritis)	 Risk of QT-prolongation Relatively contraindicated in pregnancy 	ceftriaxone 1g iv q24h	\$8.10
amoxicillin-	Lower rates of resistance	Longer courses needed Politically broad anastrum activity	gentamicin 5mg/kg iv q24h	\$21.00 (70kg)
clavulanate	Fewer side effects	Relatively broad-spectrum activityCan cause diarrhea	ciprofloxacin 400mg iv q12h	\$4.20
cephalexin	Generally well tolerated	Local susceptibility rates varyQID dosing	ampicillin 1g iv q6h	\$18.00

[‡] Does not include dispensing fee.