

## Renal Considerations for Empiric Oral Antibiotics Used for Treatment of UTI

Oral Antibiotic	Place in Therapy	Renal Adjustment	Additional Renal Considerations	Other Considerations
<b>Trimethoprim/ Sulfamethoxazole</b> (Bactrim / Septra)	IDSA recommended empiric therapy for <b>uncomplicated</b> UTI  IDSA recommended alternative for <b>complicated</b> UTI	<u><b>YES</b></u> Dose adjust for CrCl <30 mL/min  Use not recommended with CrCl <15 mL/min	<b>Acute interstitial nephritis:</b> Crystallization of SMX, Reduce risk with adequate hydration  <b>“False” elevation in SCr:</b> TMP inhibition of creatinine secretion in the proximal convoluted tubule  <b>Avoid</b> in chronic renal insufficiency	<b>Hyperkalemia:</b> Dose-related effect of TMP, Inhibition of K+ excretion via Na+/K+ pump in the distal tubule, Particularly when used with ACEI, ARB, or potassium-sparing diuretic  <b>Warfarin:</b> Increased INR
<b>Nitrofurantoin Monohydrate Macrocrystals</b> (Macrobid); <b>Nitrofurantoin Macrocrystals</b> (Macrochantin)	IDSA recommended empiric therapy for <b>uncomplicated</b> UTI  Avoid if <b>complicated</b> UTI or if early pyelonephritis is suspected	<u><b>NO</b></u> Per manufacturer contraindicated with CrCl <60 mL/min, however data exists for use down to CrCl of 40 ml/min	<b>Avoid</b> in chronic and acute renal insufficiency	Little resistance in E coli No activity against proteus sp
<b>Ciprofloxacin</b> (Cipro)  <b>Levofloxacin</b> (Lеваquin)	IDSA recommended empiric therapy for <b>complicated</b> UTI  IDSA recommended alternative for <b>uncomplicated</b> UTI; no longer a first line option for uncomplicated cystitis due to resistance and adverse effects	<u><b>YES</b></u> Dose adjust for CrCl <50 mL/min	<b>Non-nephrotoxic;</b> Can be used in acute and chronic renal insufficiency	Moxifloxacin should not be used for UTI due to low urine concentrations  <b>BBW:</b> Tendon inflammation/rupture (<1%), Increased risk in patients >60 yo on concurrent corticosteroids or with renal disease  Potential to prolong QT  2016 labeling revision secondary to review by FDA which showed potential for disabling and potentially permanent side effects involving tendons, muscles, joints, nerves, and CNS
<b>Amoxicillin/ Clavulanate</b> (Augmentin)	IDSA recommended alternative for <b>uncomplicated</b> UTI	<u><b>YES</b></u> Dose adjust for CrCl <30mL/min	<b>Non-nephrotoxic;</b> Can be used in acute and chronic renal insufficiency	
<b>Cephalexin</b> (Keflex); 1 <sup>st</sup> gen cep <b>Cefuroxime</b> (Ceftin); 2 <sup>nd</sup> gen cep	IDSA recommended alternative for <b>uncomplicated</b> UTI	<u><b>YES</b></u> Dose adjust for CrCl <30 mL/min	<b>Non-nephrotoxic;</b> Can be used in acute and chronic renal insufficiency	No coverage of <i>Enterococcus spp.</i>
<b>Fosfomycin</b> (Monurol)	<b>**Non-Formulary**</b>  IDSA recommended for <b>uncomplicated</b> UTI	<u><b>NO</b></u>	<b>Non-nephrotoxic;</b> Can be used in acute and chronic renal insufficiency	Mainly studied in females / limited data for use in complicated UTI  Limited systemic absorption precludes use beyond cystitis

### Susceptibility of Most Common UTI Pathogens (Miami Valley Hospital 2015)

	<i>Escherichia coli</i>	<i>Klebsiella pneumoniae</i>	<i>Proteus mirabilis</i>	<i>Enterococcus faecalis</i>	<i>Enterococcus faecium</i>
Trimethoprim/Sulfamethoxazole	72%	89%	62%	0%	0%
Nitrofurantoin	96%	58%	0%	99%	53%
Levofloxacin (~Ciprofloxacin)	71%	97%	62%	63%	14%
Ampicillin/Sulbactam (~Amoxicillin/Clavulanate)	53%	78%	89%	99% **Ampicillin / Amoxicillin =Drug of choice**	17%
Cefazolin (~Cephalexin)	86%	90%	91%	0%	0%
Cefuroxime	91%	89%	98%	0%	0%

#### References:

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- 3) Gupta K, Hooton TM, Naber KG, et al. International Clinical Practice Guidelines for the Treatment of Acute Uncomplicated Cystitis and Pyelonephritis in Women: A 2010 Update by the Infectious Diseases Society of America and the European Society for Microbiology and Infectious Diseases. *Clin Infect Dis*. 2011;52:e103 -e120.
- 4) Lexicomp Online [database online]. Hudson, OH: Wolters Kluwer; 2016. Updated April 19, 2016.
- 5) O'Mara NB. Choosing a UTI Antibiotic for Elderly Patients. *Pharmacist's Letter/Prescriber's Letter*. 2011 Dec;27(12):271210.
- 6) Oplinger M, Andrews CO. Nitrofurantoin contraindication in patients with a creatinine clearance below 60 mL/min: looking for the evidence. *Ann Pharmacother*. 2013 Jan;47(1):106-111.