

Recurrent Cystitis – Female ¹

Modifying Circumstances	Probable Organism(s)	Antibiotic Choice(s)	Usual Dosage	Cost per Day			
EARLY RELAPSE < 1 MONTH ¹	<i>E. coli</i> <i>S. saprophyticus</i> Other Gram -ve bacilli	FIRST LINE	TMP/SMX ³	2 tabs BID or 1 DS tab BID	\$0.43 \$0.29		
			Trimethoprim ³	100 mg BID or 200 mg once daily	\$0.52-\$0.54		
			Nitrofurantoin ⁴	50-100 mg QID or Macrobid 100 mg BID	\$0.68-\$0.91 Macrobid: \$1.59		
		SECOND LINE	Norfloxacin ⁵	400 mg BID	\$1.09		
			Ciprofloxacin ^{5, 6}	250 mg BID or 500 mg (extended release) once daily	\$0.89-\$2.31		
			Levofloxacin ⁵	250 mg once daily	\$1.20		
			Fosfomycin	3 g dissolved in 1/2 cup of cold water once	\$18.70		
		THIRD LINE	Cephalexin ⁷	500 mg BID	\$1.80		
		PROPHYLAXIS OF FREQUENT RECURRENCE (TWO OR MORE EPISODES IN 6 MONTHS OR 3 OR MORE EPISODES IN A YEAR) ^{2, 8, 9}		FIRST LINE	TMP/SMX ³	1 tab or 1/2 DS tab qhs 3 times weekly or post-coital	\$0.11 \$0.07
					Trimethoprim ³	100 mg qhs or post-coital	\$0.26
Nitrofurantoin ⁴	50 mg or Macrobid 100 mg qhs or post-coital				\$0.17 \$0.80		
SECOND LINE	Cephalexin ⁷			125-250 mg qhs or post-coital	\$0.11-\$0.23		
	Norfloxacin ⁵			200 mg every other day or 3 times weekly or post-coital	\$0.17		
	Fosfomycin			3 g dissolved in 1/2 cup of cold water once every 10 days	\$18.70		

continued ...

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- Culture and re-assess for upper urinary tract infection. Re-treat for 7 to 14 days usually with a different agent. A recent RCT showed that women drinking an additional 1.5 L of water per day had fewer UTI recurrences (Hooton 2018).
- Consider prophylaxis using continuous low dose or post-coital antibiotics if identified with intercourse. Methenamine mandelate (1 g QID) can also be considered for prophylaxis or suppressive treatment of frequently occurring infections, if available. Patient should be re-assessed following 6 months of therapy. About 50% of women may experience recurrence 3 months after discontinuing the prophylactic antimicrobial. If this occurs, prophylaxis may be reinstated for as long as 1-2 years and remain effective (Nicolle 2008). Women having frequent recurrences, despite prophylaxis, may require genitourinary investigation. The role of topical estrogens for post-menopausal women in preventing urinary infection remains controversial. Probiotics cannot be recommended as a proven therapy for prevention of urinary tract infections (Epp 2010).
- Long term low dose TMP/SMX usually does not result in an increase of resistant flora. Alternatives to TMP/SMX should be considered when local resistance is anticipated to be > 20%.
- Macro-crystals may be better tolerated than micro-crystalline nitrofurantoin. Nitrofurantoin should not be used in infants < 1 month of age and is relatively contraindicated if CrCl is < 30-60 mL/min (AGS 2015; Oplinger 2013).
- Due to the importance of these fluoroquinolones (FQs) for other indications and concern of developing resistance with overuse, these agents need to be held in reserve for severe situations (Adam 2009; Chen 1999). Patients who have previously been treated with these FQs may be at significantly increased risk of contracting community-acquired *E. coli* UTIs that are quinolone (and frequently multi-drug) resistant. However, norfloxacin was not found to select for quinolone-resistant *E. coli*. In addition, previous quinolone use can be a strong risk factor for infection with a TMP/SMX resistant gram-negative uropathogen (Hooton 2003, 2004; Karlowsky 2006; Killgore 2004; Metlay 2003).
- Ciprofloxacin has activity against *Pseudomonas aeruginosa*.
- Cephalexin is not generally recommended, but has a role in treating pregnant women because of safety.
- An alternative strategy for recurrent infections is short course (e.g., 3 days), self-treatment upon the appearance of symptoms (Hooton 2012).
- Cranberry juice cannot currently be recommended for the prevention of UTIs. Other preparations (such as cranberry powders) need to be standardised before being evaluated in clinical studies or recommended for use (Jepson 2012). There is emerging evidence that 36 mg of proanthocyanidins daily (the active ingredient in cranberries) may prevent UTIs (AESGP 2017; Howell 2012; Martini 2014; Thomas 2017; Wang 2012).

References: AESGP 2017; Adam 2009; Arnold 2016; Chen 1999; Dason 2011; Datta 2018; Epp 2010; Falagas 2006; Grabe 2011; Gupta 2013, 2001; Hickling 2013; Hooton 2003, 2004, 2012, 2018; Howell 2012; Huttner 2018; Jepson 2008, 2012; Karlowsky 2006; Killgore 2004; Kontiokari 2001; Lee 2012; Martini 2014; Metlay 2003; Nicolle 2002, 2003, 2008(b); O'Donnell 2002; PHE 2018; Regier 2002; Reid 2006; Rudenko 2005; Sakka 2017; Sanford 2012; Stamm 1993; Stothers 2002; Thomas 2017; Wang 2012.