



Clear, not cloudy: Antibiotic options for uncomplicated urinary tract infections

CLINICAL QUESTION

What is the preferred treatment regimen for uncomplicated Urinary Tract Infections (UTI)?

BOTTOM LINE

For symptom resolution, all antibiotics are similar. Based on limited evidence, best guidance for treatment durations for symptom resolution are nitrofurantoin 5-day; trimethoprim-sulfamethoxazole, beta-lactams, ciprofloxacin and norfloxacin 3-day, and fosfomycin 1-day. Treatment choice should be driven by patient preference, local resistance, side effects, and allergies.

EVIDENCE

- Results statistically significant unless indicated.
- Antibiotic choice:
 - Six systematic reviews¹⁻⁶ (4-27 RCTs, 1497-6016 mostly adult women) compared different antibiotics (beta-lactams, fluoroquinolones, fosfomycin, nitrofurantoin, and trimethoprim-sulfamethoxazole) for UTI symptoms and/or positive urine culture.
 - Symptom resolution: No difference between antibiotics.¹⁻⁶

- Bacterial eradication at ≤ 2 weeks: Fluoroquinolones^{4,6} (88-89%) superior to nitrofurantoin⁴ (79%) and beta-lactams⁶ (70%); no difference at 4-8 weeks.⁶
 - Adverse effects: Less rash with nitrofurantoin (0.2%) and fluoroquinolones (0.1%) versus trimethoprim-sulfamethoxazole (2.6%) and beta-lactams (6%).⁶
- Duration:
 - Systematic review⁷ (32 RCTs, 9605 women, 16-65 years old) comparing 3-days versus 5-10 days of the same antibiotic. Antibiotics included beta-lactams, fluoroquinolones, cephalosporins, sulfonamides and trimethoprim-sulfamethoxazole at typical doses.
 - Symptom resolution: No difference.
 - Bacterial eradication with 3-day versus ≥ 5 -day at < 2 weeks (91% versus 93%) and 4-8 weeks (82% versus 87%), respectively.
 - Network meta-analysis⁸ (61 RCTs, 20,780 women) compared treatment durations. Direct comparisons for clinical response reported below.
 - Symptom resolution: Fluoroquinolones: 1 or 3-days similar except second-generation (example ciprofloxacin, norfloxacin) may be slightly (~5% relatively) more effective at 3-days. Third and fourth generation fluoroquinolones studied are not available in Canada.
 - Other data agrees with first systematic review.⁷
 - Data lacking for nitrofurantoin.
- Fosfomycin is single dose in all studies.^{1-3,5}
- Limitations: Older studies with low quality evidence. Few direct comparisons between different durations of antibiotics.

CONTEXT

- $\geq 60\%$ of women in primary care presenting with suspected UTI have one.⁹
- Small differences in bacterial eradication rates don't appear to impact clinical symptoms and may be irrelevant.
- Guidelines^{10,11} recommend nitrofurantoin 5-day (~\$21), trimethoprim-sulfamethoxazole 3-day (~\$14) and fosfomycin 1-day as first-line treatment (~\$33).¹²
- Updated resistance patterns found at provincial antibiograms.¹³⁻¹⁴

REFERENCES

1. Alfaresi M, Hassan K and Alnjadat R, *et al.* Open Microbiology Journal. 2019; 13:193-199.
2. Cai T, Tamanini I, Tascini, C *et al.* J Urology. 2020; 203(3):570-578.
3. Falagas M, Vouloumanou E, Trogias A *et al.* J Antimicrob Chemother. 2010; 65:1862-1877.
4. Huttner A, Verhaigh E, Harbarth S *et al.* J Antimicrob Chemother 2015; 70:2456-2464.
5. Konwar M, Gogtay N, Ravi R *et al.* J Chemother. 34:3,139-148
6. Trestioreanu Z, Green H, Paul M *et al.* Cochrane Database Syst Rev. 2010 (10): CD007182.

AUTHORS

Jennifer Young MD, CCFP-EM, **Betsy Thomas**, BSc. Pharm, **G Michael Allan**, MD, CCFP

Authors do not have any conflicts of interest to declare.

7. Milo G, Katchman EA, Paul M, *et al.* Cochrane Database Syst Rev. 2005 Apr 18; (2):CD004682.
8. Kim D, Kim J, Lee J *et al.* Lancet Infect Dis 2020; 20:1080–88.
9. Young J, Thomas B, Allan M. Tools for Practice #324. Available at <https://cfpclearn.ca/tfp324/>. Accessed on Feb 17, 2023.
10. Ontario Anti-infective Review Panel. 2019. Anti-infective Guidelines for Community-acquired Infections. Toronto, Ontario, Canada: MUMS Health Clearinghouse.
11. Bugs and Drugs. Available at: <https://www.bugsanddrugs.org/7399B374-C9F6-4044-9E03-86B1D11F2874>. Accessed on February 17, 2023.
12. Personal communication with Summerside Pharmacy, Edmonton, Alberta, Dec 7, 2022.
13. British Columbia, Saskatchewan, and Ontario antibiograms. Available at: <https://www.lifelabs.com/healthcare-providers/reports/antibiograms/>. Accessed on February 17, 2023.
14. Alberta Antibiograms. Available at: <https://www.albertaprecisionlabs.ca/hp/Page13779.aspx>. Accessed on February 17, 2023.

**TOOLS FOR PRACTICE
PROVIDED BY**



IN PARTNERSHIP WITH



Tools for Practice are peer reviewed and summarize practice-changing medical evidence for primary care. Coordinated by **Dr. G. Michael Allan** and **Dr Adrienne Lindblad**, they are developed by the Patients, Experience, Evidence, Research (PEER) team, and supported by the College of Family Physicians of Canada, and the Alberta, Ontario, and Saskatchewan Colleges of Family Physicians. Feedback is welcome and can be sent to toolsforpractice@cfpc.ca. Archived articles can be found at www.toolsforpractice.ca

This communication reflects the opinion of the authors and does not necessarily mirror the perspective and policy of the College of Family Physicians of Canada.