# Antibiotic Side Effects

## Risk of antibiotic side effects and adverse reactions

- Antibiotic use is the most important risk factor for developing multidrug-resistant infections, which contribute to over 35,000 deaths in the United States each year
- Antibiotic-associated adverse events are one of the most common reasons for emergency department (ED) visits for drug-related adverse events
- 1 in 1,000 antibiotic prescriptions leads to an ED visit for an adverse event.

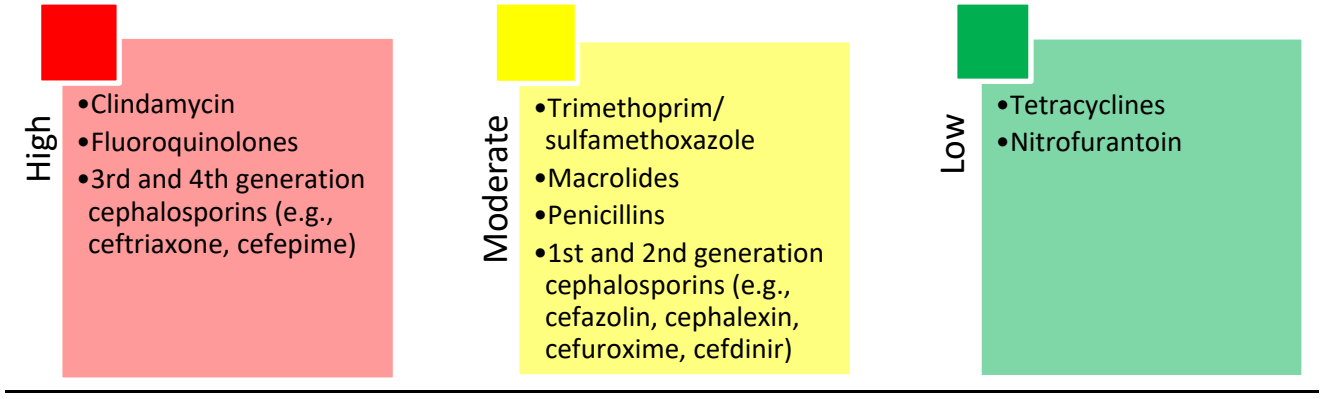
## Common side effects and adverse reactions

- Gastrointestinal disturbances (such as diarrhea) occur with most antibiotics (5–25%)
- Antibiotics can lead to nephrotoxicity (damage to kidneys), neurotoxicity (damage to central and/or peripheral nervous system), skin reactions such as rashes, or yeast infections
- Antibiotics can cause *Clostridioides difficile* infections

## Potential adverse reactions and drug-drug interactions of commonly used antibiotics

| Antibiotic | Potential Adverse Reactions | Drug-Drug Interactions |
|---|---|---|
| Fluoroquinolones (e.g., ciprofloxacin, levofloxacin, moxifloxacin) | • Damage to tendons, joints, muscles, and nerves<br>• Delirium<br>• QTc prolongation | Significant interaction with warfarin |
| Trimethoprim-sulfamethoxazole | • Rash<br>• Increase in potassium and/or creatinine | Significant interaction with warfarin |
| Nitrofurantoin | With prolonged exposure (weeks to months), increased risk for pulmonary toxicity in patients with CrCl ≤ 30 ml/min | Rare interactions |
| Penicillins (e.g., amoxicillin, ampicillin-sulbactam, piperacillin-tazobactam) and cephalosporins | Rash, hypersensitivity reactions | Allopurinol may increase risk of amoxicillin rash |

## Antibiotic classes and risk for *Clostridioides difficile* infections



## References


Bartlett JG. Antibiotic-associated diarrhea. N Engl J Med. 2002 Jan;346(5):334-9. PMID: 11821511.

Brown KA, Khanafer N, Daneman N, et al. Meta-analysis of antibiotics and the risk of community-associated Clostridium difficile infection. Antimicrob Agents Chemother. 2013 May;57(5):2326-32. PMID: 23478961.

CDC. Antibiotic Resistance Threats in the United States, 2019. Atlanta, GA: U.S. Department of Health and Human Services, CDC. 2019. https://www.cdc.gov/drugresistance/pdf/threats-report/2019-ar-threats-report-508.pdf. Accessed April 1, 2020.

Deshpande A, Pasupuleti V, Thota P, et al. Community-associated Clostridium difficile infection and antibiotics: a meta-analysis. J Antimicrob Chemother. 2013 Apr;68(9):1951-61. PMID: 23620467.

Stevens V, Dumyati G, Fine LS, et al. Cumulative antibiotic exposures over time and the risk of *Clostridium difficile* infection. Clin Infect Dis. 2011 Jul;53(1):42-8. PMID: 21653301.



AHRQ Pub. No. 17(21)-0029
June 2021