

Antibiotic Class Reference Chart for Outpatient Providers of Adult Patient Populations

The following charts summarize common antibiotics, grouped by antibiotic class with both generic and brand names. It serves as a reference to which antibiotics are within each class and a reminder of the mechanism of action.

PENICILLINS^{1,2}

Also known as beta-lactams, this class of antibiotics prevents growth of the bacterial cell wall and are classified as bactericidal. This class includes 5 different groups: aminopenicillins, antipseudomonal penicillins, beta-lactamase inhibitors, natural penicillins, and penicillinase resistant penicillins.

Generic	Brand Name Examples
Amoxicillin	Amoxil
Amoxicillin-Clavulanate	Augmentin, Augmentin ES-600
Carbenicillin	Geocillin
Dicloxacillin	Diclocil, Dycill
Penicillin V potassium	Penicillin VK
Penicillin G	Bicillin, Permapen

CEPHALOSPORINS^{1,3}

Like penicillins, cephalosporins contain a beta-lactam ring and prevent bacterial cell wall synthesis. More specifically, cephalosporins block the action of peptidoglycan transpeptidase (a peptidoglycan binding protein) and are bactericidal. Cephalosporins have activity against Gram-positive and Gram-negative organisms, however specific action depends upon the generation of cephalosporin.

Generic	Brand Name Examples	Generation
Cefadroxil	Duricef	1 st generation
Cephalexin	Keflex	1 st generation
Cefaclor	Ceclor, Raniclor	2 nd generation
Cefprozil	Cefzil	2 nd generation
Cefuroxime	Ceftin, Zinacef	2 nd generation
Cefdinir	Omnicef	3 rd generation
Ceftriaxone	Rocephin	3 rd generation
Cefixime	Suprax	3 rd generation
Cefpodoxime	Vantin	3 rd generation

TETRACYCLINES^{1,4}

Tetracyclines are broad-spectrum antibiotics that work by inhibiting bacterial protein synthesis and are classified as bacteriostatic. They are used to treat many types of infections and have activity against methicillin-resistant *S. aureus* (MRSA) and vancomycin-resistant *Enterococcus* (VRE).

NOTE: Tetracycline use should be reduced or avoided in patients with low renal function. Tetracycline use should also be avoided in pregnant women unless absolutely necessary and children under 8 years old, with limited exceptions in pediatrics.

Generic	Brand Name Examples
Demeclocycline	Declomycin
Doxycycline	Doryx, Doxy 100, Monodox, Oracea, Vibramycin
Minocycline	Amzeeq, Dynacin, Minocin, Minolira, Solodyn, Ximino, Zilxi
Omadacycline	Nuzyra
Sarecycline	Seysara
Tetracycline	Achromycin V

FLUOROQUINOLONES^{1,5}

Fluoroquinolones are broad-spectrum antibiotics that work by inhibiting two bacterial enzymes necessary for DNA replication: DNA gyrase and topoisomerase. As a result, they have concentration-dependent bactericidal activity.

NOTE: Fluoroquinolones are more likely to cause severe side effects and adverse events such as tendon damage and *C. diff* infections. The FDA has issued multiple strong warnings about this class of antibiotics. Their use is contraindicated for children in most cases (with limited exceptions) and limited for pregnant women.

Generic	Brand Name Examples
Ciprofloxacin	Cipro, Cipro XR
Delafloxacin	Baxdela
Levofloxacin	Levaquin
Moxifloxacin	Avelox
Gemifloxacin	Factive

LINCOMYCINS^{1,6}

Lincomycins work by inhibiting protein synthesis reactions at the 50s ribosomal subunit, thus inducing a bacteriostatic effect. They generally have good activity against Gram-positive cocci (except enterococci) and anaerobes. Gram-negative aerobic bacteria are usually intrinsically resistant to lincomycins due to active efflux pumping.

Generic	Brand Name Examples
Clindamycin	Cleocin, Cleocin T, Clindets, Clindesse, Evoclin

MACROLIDES^{1,7}

Macrolides are a class of broad-spectrum bacteriostatic antibiotics that bind to the 50s ribosomal subunit, inhibiting bacterial protein synthesis. In part due to their immunomodulatory effects, broad spectrum and ease of administration, macrolides are often overprescribed. As a result, resistance to macrolides is extensively documented. Consider organism and community resistance patterns when prescribing macrolides.

Generic	Brand Name Examples
Azithromycin	Zithromax
Clarithromycin	Biaxin
Erythromycin	E.E.S., Ery-Tab, Eryc
Fidaxomicin (ketolide)	Difcid

SULFONAMIDES^{1,8}

Sulfonamides work by inhibiting bacterial synthesis of folic acid, which is essential for bacterial growth. The addition of trimethoprim has a synergistic effect, further reducing folic acid synthesis. Sulfonamides are bacteriostatic.

Generic	Brand Name Examples
Sulfamethoxazole-trimethoprim	Bactrim, Bactrim DS, Septra
Sulfasalazine	Azulfidine

REFERENCES:

1. Anderson LAA. Antibiotics guide. Drugs.com. September 17, 2021. <https://www.drugs.com/article/antibiotics.html>
2. Preston SL & Dusano GL. Penicillins. *Antimicrobe*. 2017. <http://www.antimicrobe.org/d24.asp>
3. Bui T. Cephalosporins. *StatPearls*. August 31, 2021. <https://www.statpearls.com/ArticleLibrary/viewarticle/19158>
4. Shutter MC & Akhondi H. Tetracycline. *StatPearls*. July 8, 2021. <https://www.ncbi.nlm.nih.gov/books/NBK549905/>
5. Werth BJ. Fluoroquinolones. Merck Manual. May 2020. <https://www.merckmanuals.com/professional/infectious-diseases/bacteria-and-antibacterial-drugs/fluoroquinolones>
6. Spižek J & Řezanka T. Lincomycin, clindamycin and their applications. *Appl Microbiol Biotechnol*, Volume 64, May 2004, Pages 455-464. doi: <https://doi.org/10.1007/s00253-003-1545-7>
7. Patel PH & Hashmi MF. Macrolides. *StatPearls*. August 14, 2021. <https://www.ncbi.nlm.nih.gov/books/NBK551495/>
8. Smith CL & Powell KR. Review of sulfonamides and trimethoprim. *Peds*, Volume 21, Issue 11, November 2000, Pages 368-371. doi: <https://doi.org/10.1542/pir.21-11-368>