

ADVERSE EVENTS ASSOCIATED WITH COMMON INTERVENTIONS (Part 3 of 5)

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| | Clinical Use | Adverse Events | Notes on Mechanism | Historical and Clinical Notes |
|--------------------------------------|--|---|---|---|
| Microbiological | | | | |
| Acyclovir (Zovirax, Sitavig) | Varicella (chickenpox), herpes zoster (shingles), genital herpes (https://medlineplus.gov/druginfo/meds/a681045.html). | Upset stomach, vomiting, diarrhea, dizziness, tiredness, agitation, pain especially in the joints, hair loss, changes in vision, hives, rash or blisters, itching, difficulty breathing or swallowing, swelling, hoarseness, fast heartbeat, weakness, pale skin, difficulty sleeping, signs of infection, unusual bruising or bleeding, blood in urine, stomach pain or cramps, bloody diarrhea, decreased urination, headache, hallucinations, confusion, aggressive behavior, difficulty speaking, numbness or burning or tingling in the arms or legs, temporary inability to move parts of the body, shaking that cannot be controlled, seizures, loss of consciousness (https://medlineplus.gov/druginfo/meds/a681045.html#side-effects). | Purine nucleoside; Synthetic nucleoside analogue (https://www.drugs.com/acyclovir.html , https://medlineplus.gov/druginfo/meds/a681045.html). | First-line treatment for HSV encephalitis (https://www.ncbi.nlm.nih.gov/books/NBK542180/). |
| Amoxicillin (Amoxil) | Bacterial infections of the nose, ears, throat, lung, skin, urinary tract, stomach ulcers caused by H. pylori (https://www.drugwatch.com/drugs/amoxicillin/). | Diarrhea (including caused by C. diff, more than 2 months after taking amoxicillin), vomiting, nausea, rash, mild allergic reaction, other bacterial or fungal superinfection, severe allergic reaction (https://www.healthline.com/health/drugs/amoxicillin#ask-your-doctor). | Aminopenicillin (https://www.drugs.com/amoxicillin.html). | Made from penicillium mold (https://www.drugwatch.com/drugs/amoxicillin/). |
| Amoxicillin/Clavulanate (Augmentin) | Bacterial infections in children and adults, including respiratory and skin infections (https://www.goodrx.com/augmentin/what-is). | Diarrhea, nausea, rash (https://www.goodrx.com/augmentin/what-is). | Beta-lactamase inhibitor (https://www.drugs.com/amoxicillin_clavulanate.html). | This is a combination antibiotic (https://www.goodrx.com/augmentin/what-is). |
| Amphotericin B (Fungizone, Amphocin) | Invasive fungal infections (https://www.ncbi.nlm.nih.gov/books/NBK482327/). | Allergic reaction, pale skin, easy bruising, blood in stools, lightheadedness, seizures, jaundice, fluid build-up, signs of kidney problem, low potassium, signs of infection, nausea, vomiting, stomach pain, diarrhea, upset stomach, loss of appetite, muscle or joint pain, headache, ringing in ears, pain or bruising or swelling at injection site, weight loss, flushing (https://www.drugs.com/mtm/amphotericin-b.html#side-effects). | Polyene (https://www.drugs.com/mtm/amphotericin-b.html). | Lipid formulations are less nephrotoxic (https://www.ncbi.nlm.nih.gov/books/NBK482327/). |
| Ampicillin | Meningitis; Infections of the throat, sinuses, lungs, reproductive organs, urinary tract, GI tract (https://medlineplus.gov/druginfo/meds/a685002.html). | Nausea, vomiting, diarrhea, rash, allergic reaction (https://www.healthline.com/health/drugs/ampicillin-oral-capsule#side-effects). | Aminopenicillin (https://www.drugs.com/mtm/ampicillin.html). | Developed to overcome issue of drug resistance (https://www.ncbi.nlm.nih.gov/books/NBK519569/). |
| Azithromycin (Zithromax) | Sinus infection, community-acquired pneumonia, COPD, skin infection, tonsillitis, urethritis, cervicitis, chancroid genital ulcers, ear infections in children aged 6 months and over (https://www.medicalnewstoday.com/articles/325721#what-does-it-treat). | Nausea, vomiting, diarrhea, pain in abdomen, heart palpitations, chest pain, acid reflux, dizziness, headache, fatigue, vaginitis, rash, dry skin, sun sensitivity, liver damage, heart rhythm changes, serious allergic reactions (https://www.medicalnewstoday.com/articles/325721#side-effects). | Macrolide (https://www.drugs.com/azithromycin.html). | Patients with myasthenia gravis may develop worsening symptoms or breathing problems (https://www.medicalnewstoday.com/articles/325721#side-effects). |

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|---------------------|--|--|---|--|
| Aztreonam (Azactam) | Severe infections of the blood, urinary tract, lungs, skin, stomach, female reproductive organs (https://www.drugs.com/mtm/aztreonam-injection.html). | Nausea, vomiting, diarrhea, stomach pain, redness or swelling or irritation at the injection site, severe diarrhea with or without fever and cramps, hives, itching, rash, difficulty breathing or swallowing, blisters (https://medlineplus.gov/druginfo/meds/a687010.html#side-effects). | Antibiotic; beta-lactam antibiotic (https://www.drugs.com/pro/aztreonam.html , https://pubmed.ncbi.nlm.nih.gov/3512234/). | Originally isolated from <i>Chromobacterium violaceum</i> (https://go.drugbank.com/drugs/DB00355). |
| Cefdinir (Omnicef) | Pneumonia, lung infections related to long-term bronchitis, sinus infection, strep throat, tonsil infections, skin infections, ear infections (https://www.goodrx.com/cefdinir/what-is). | Vomiting, nausea, stomach pain, diarrhea, headache, vaginal itching, reddish colored stools, rash, hives, swelling, difficulty breathing or swallowing, watery or bloody stools, stomach cramps, fever, return of signs of infection (https://medlineplus.gov/druginfo/meds/a698001.html#side-effects). | Third-generation cephalosporin (https://www.drugs.com/mtm/cefdinir.html). | The Omnicef brand has been discontinued in the U.S. (https://www.medicinenet.com/cefdinir/article.htm). |
| Cefuroxime (Ceftin) | Pharyngitis, otitis media, sinusitis, bronchitis (https://www.healthline.com/health/cefuroxime-oral-tablet). | Diarrhea, nausea, vomiting, Jarisch/Herxheimer reaction, allergic reaction (https://www.healthline.com/health/cefuroxime-oral-tablet#side-effects). | Second generation cephalosporin (https://www.drugs.com/mtm/cefuroxime-oral-injection.html). | Sometimes given before and after surgery to prevent infection (https://www.drugs.com/mtm/cefuroxime-oral-injection.html). |
| Cephalexin (Keflex) | Respiratory tract infection, otitis media, skin and skin structure infection, bone infection, UTI (https://www.medicalnewstoday.com/articles/322404#about). | Diarrhea, indigestion, irritation or inflammation of stomach lining, stomach pain, allergic reaction (https://www.medicalnewstoday.com/articles/322404#side-effects). | First-generation cephalosporin (https://www.drugs.com/cephalexin.html). | Taking metformin and cephalexin together may cause kidney problems (https://www.medicalnewstoday.com/articles/322404#interactions). |
| Chloramphenicol | Bacterial conjunctivitis, otitis externa (https://www.ncbi.nlm.nih.gov/books/NBK555966/). | Risk of infection, bleeding, slow healing, aplastic anemia, leukemia (https://www.drugs.com/cdi/chloramphenicol.html); Bone marrow toxicity, grey baby syndrome (https://www.ncbi.nlm.nih.gov/books/NBK555966/). | Synthetically manufactured broad-spectrum antibiotic (https://www.ncbi.nlm.nih.gov/books/NBK555966/). | This drug has also been used for treatment of typhoid and cholera (https://www.ncbi.nlm.nih.gov/books/NBK555966/). |
| Chloroquine | Amebiasis, treatment of prevention of malaria (https://www.drugs.com/mtm/chloroquine.html , https://medlineplus.gov/druginfo/meds/a682318.html). | Headache, nausea, loss of appetite, diarrhea, upset stomach, stomach pain, rash, itching, hair loss, seeing light flashes and streaks, blurred vision, reading or seeing difficulties, ringing in ears, muscle weakness, drowsiness, vomiting, irregular heartbeats, convulsions, difficulty breathing, mood or mental changes, decreased consciousness or loss of consciousness, thought of self-harm or suicide (https://medlineplus.gov/druginfo/meds/a682318.html#side-effects). | Amebicide, antimalarial quinoline (https://www.drugs.com/mtm/chloroquine.html). | Not effective against all strains of malaria or malaria in areas where infection is resistant to hydroxychloroquine (https://www.drugs.com/mtm/chloroquine.html). |

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|--|--|--|--|--|
| Cidofovir (Vistide) | Cytomegalovirus retinitis in patients with AIDS (https://www.drugs.com/mtm/cidofovir.html). | Vomiting, nausea, diarrhea, loss of appetite, headache, hair loss, sores on lips or mouth or throat, rash, eye pain or redness, vision changes such as light sensitivity or blurred vision, fever, chills, cough, SOB, pale skin (https://medlineplus.gov/druginfo/meds/a696037.html#side-effects). | Purine nucleoside (https://www.drugs.com/mtm/cidofovir.html). | First nucleotide analog approved for clinical use (https://www.uptodate.com/contents/cidofovir-an-overview). |
| Ciprofloxacin (Cipro, Proquin XR) | Anthrax, plague (https://www.drugs.com/ciprofloxacin.html). | Can cause serious or disabling, non-reversible side effects (https://www.drugs.com/ciprofloxacin.html). | Quinolone antibiotic (https://www.webmd.com/drugs/2/drug-7748/ciprofloxacin-oral/details). | Calcium-rich foods may decrease the effect of this medication (https://www.webmd.com/drugs/2/drug-7748/ciprofloxacin-oral/details). |
| Clarithromycin (Biacin) | Stomach ulcers, bacterial infections, disseminated MAC infection in HIV (https://www.webmd.com/drugs/2/drug-5030-7015/clarithromycin-oral/clarithromycin-oral/details , https://medlineplus.gov/druginfo/meds/a692005.html). | Stomach pain, diarrhea, nausea, vomiting, abnormal taste in mouth, liver problems, heart rate problems, allergic or hypersensitivity reactions (https://www.healthline.com/health/drugs/clarithromycin-oral-tablet#side-effects). | Macrolide (https://www.drugs.com/clarithromycin.html). | Extended release tablets should be taken with food (https://www.mayoclinic.org/drugs-supplements/clarithromycin-oral-route/proper-use/drug-20067672). |
| Clindamycin (Cleocin) | Serious infections caused by bacteria (https://www.drugs.com/clindamycin.html). | Overgrowth of dangerous bacteria in the large intestine, diarrhea, life-threatening colitis (https://medlineplus.gov/druginfo/meds/a682399.html). | Lincomycin derivative (https://www.drugs.com/clindamycin.html). | More likely to cause side effects (infection) than other antibiotics, should only be used to treat serious infections that cannot be treated with other antibiotics (https://medlineplus.gov/druginfo/meds/a682399.html). |
| Clotrimazole + Betamethasone (Lotrisone) | Fungal skin infections (https://www.webmd.com/drugs/2/drug-2231/clotrimazole-betamethasone-topical/details). | Skin tingling, burning, adrenal gland problems, high blood sugar, Cushing syndrome, skin changes, allergic reaction, problems with eyesight, Capos sarcoma in patients with HIV, eye problems, growth problems (children and adolescents) (https://www.verywellhealth.com/lotrisone-betamethasone-clotrimazole-topical-6752560#toc-what-are-the-side-effects-of-lotrisone). | Topical steroid with anti-infective (https://www.drugs.com/pro/clotrimazole-betamethasone-cream.html). | Not recommended for children under 17 (https://www.webmd.com/drugs/2/drug-2231/clotrimazole-betamethasone-topical/details). |

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| Daptomycin (Cubicin) | MRSA, VRE (https://www.ncbi.nlm.nih.gov/books/NBK470407/). | Allergic reaction, severe stomach pain, diarrhea that is water or bloody (even months after last dose), fever, flu symptoms, mouth and throat ulcers, rapid heart rate, shallow breathing, pain or burning with urination, numbness, tingling, burning pain in hands or feet, easy bruising, unusual bleeding, new or worsening cough or fever or trouble breathing, unexplained muscle pain or tenderness or weakness, chest pain, trouble breathing, headache, dizziness, stomach pain, vomiting, swelling, abnormal liver function tests, rash, itching, sweating, trouble sleeping, sore throat, increased blood pressure (https://www.drugs.com/mtm/daptomycin.html#side-effects). | Antibiotic (https://www.drugs.com/mtm/daptomycin.html). | Derived from <i>Streptomyces roseosporus</i> (https://www.ncbi.nlm.nih.gov/books/NBK470407/). |
| Dapsone | Dermatitis herpetiformis, Hansen's disease (https://www.webmd.com/drugs/2/drug-6744/dapsone-oral/details). | Upset stomach, vomiting, sore throat, fever, rash, yellowing of skin or eyes, unusual bruising (https://medlineplus.gov/druginfo/meds/a682128.html#side-effects). | Leprostatic, sulfone (https://www.drugs.com/mtm/dapsone.html , https://www.webmd.com/drugs/2/drug-6744/dapsone-oral/details). | If taken for Hansen's disease or to prevent infections due to HIV, usually taken for years or for life (https://www.webmd.com/drugs/2/drug-6744/dapsone-oral/details). |
| Demeclocycline (Declomycin) | Bacterial infections such as UTI, lung infections, intestinal infections, acne, hemorrhage, chlamydia, Rocky Mountain spotted fever (https://www.drugs.com/mtm/demeclocycline.html). | Diarrhea, nausea, vomiting, changes in skin or mouth color, throat irritation, excessive thirst, frequent urination, weakness, inflammation of end of penis, headache, blurred vision, seeing double, loss of vision, dizziness, ringing in ears, rash, hives, peeling or blistering skin, swelling, difficulty breathing or swallowing, unusual bleeding or bruising, confusion, swelling, decreased urination, joint pain, chest pain, watery or bloody stools, stomach cramps fever, return of signs of infection (https://medlineplus.gov/druginfo/meds/a682103.html#side-effects). | Tetracycline (https://www.drugs.com/mtm/demeclocycline.html). | Sometimes used to treat SIADH (https://medlineplus.gov/druginfo/meds/a682103.html). |
| Doxycycline (Vibramycin) | Bacterial infections, adult acne, acne rosacea, anthrax, plague, tularemia (https://www.mayoclinic.org/drugs-supplements/doxycycline-oral-route/description/drg-20068229 , https://medlineplus.gov/druginfo/meds/a682063.html). | Allergic reaction, severe skin reaction, skin rash, fever, swollen glands, flu-like symptoms, muscle aches, severe weakness, unusual bruising, yellowing of the skin or eyes, severe stomach pain, diarrhea that is watery or bloody, throat irritation, trouble swallowing, chest pain, irregular heart rhythm, feeling short of breath, little or no urination, low white blood cell counts, severe headaches, ringing in ears, dizziness, nausea, vision problems, pain behind eyes, loss of appetite, upper stomach pain (that may spread to the back), tiredness, nausea or vomiting, fast heart rate, dark urine, jaundice, upset stomach, loss of appetite, mild diarrhea, skin rash or itching, darkened skin color, vaginal itching or discharge (https://www.drugs.com/doxycycline.html#side-effects). | Antimalarial, tetracycline (https://www.drugs.com/doxycycline.html). | Derived from oxytetracycline, which was manufactured first in the 1950s (https://www.drugs.com/tips/doxycycline-patient-tips). |

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| Elvitegravir (Vitekta) | Used in combination with ritonavir and another HIV drug to treat infection caused by HIV (https://www.mayoclinic.org/drugs-supplements/elvitegravir-oral-route/description/drug-20122617). | Headache, difficulty falling asleep or staying asleep, unusual dreams, diarrhea, gas, rash, swelling, hoarseness, difficulty swallowing or breathing, decreased urination, pain, loss of appetite, flu-like symptoms, nausea, vomiting, extreme tiredness, unusual bleeding or bruising, weakness, dizziness, lightheadedness, fast or irregular heartbeat, trouble breathing, dark yellow or brown urine, light-colored bowel movements, yellowing of the skin or eyes, feeling cold (especially in the arms or legs), muscle pain (https://medlineplus.gov/druginfo/meds/a612035.html#side-effects). | Integrase strand transfer inhibitor (https://www.drugs.com/cdi/elvitegravir.html). | Does not cure or prevent HIV or AIDS, may help delay problems associated with AIDS/HIV (https://www.mayoclinic.org/drugs-supplements/elvitegravir-oral-route/description/drug-20122617). |
| Ethambutol (Myambutol) | Tuberculosis (https://www.webmd.com/drugs/2/drug-8082/ethambutol-oral/details). | Allergic reaction, serious vision problems including vision loss that may be permanent, new or worsening cough with fever, trouble breathing, numbness or tingling in hands or feet, confusion, hallucinations, fever, swollen glands, painful mouth sores, skin sores, cold or flu symptoms, general ill feeling, easy bruising or bleeding, chest pain or SOB with mild exertion, little or no urination, liver problems, severe skin reaction, itching or rash, joint pain, headache, dizziness, nausea, vomiting, stomach pain, indigestion, loss of appetite (https://www.drugs.com/mtm/ethambutol.html#side-effects). | Antituberculosis agent (https://www.drugs.com/mtm/ethambutol.html). | Should be taken at least 4 hours before taking antacids containing aluminum (https://www.webmd.com/drugs/2/drug-8082/ethambutol-oral/details). |
| Fluconazole (Diflucan) | Candidiasis (fungal infection), meningitis (https://www.medicalnewstoday.com/articles/fluconazole-oral-tablet). | Liver failure, usually reversible; Severe potentially life-threatening rash, torsades de pointes (https://www.medicalnewstoday.com/articles/fluconazole-oral-tablet#important-warnings). | Azole antifungal (https://www.drugs.com/mtm/fluconazole.html). | Risk of torsades de pointes higher with low potassium, antipsychotic use, antidepressant use, congenital heart rhythm condition (https://www.medicalnewstoday.com/articles/fluconazole-oral-tablet#important-warnings). |
| Flucytosine (Ancobon) | Candida infection, cryptococcus infection (https://www.ncbi.nlm.nih.gov/books/NBK557607/). | Nausea, emesis, abdominal pain, diarrhea, rash, pruritus, acute hepatitis, nephrotoxicity, hematologic problems, IBD, ulcerative colitis, perforation of the bowel (https://www.ncbi.nlm.nih.gov/books/NBK557607/#article-21829.s5). | Antifungal, antimetabolite (https://www.drugs.com/mtm/flucytosine.html , https://www.ncbi.nlm.nih.gov/books/NBK557607/). | FDA approval in 1971 for treatment of severe candida and cryptococcus infections (https://www.ncbi.nlm.nih.gov/books/NBK557607/). |

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| Foscarnet (Foscavir) | CMV, HSV, and VZV in AIDS patients and immunocompromised patients (https://www.ncbi.nlm.nih.gov/books/NBK556108/). | Nausea associated with infusion of the drug, electrolyte derangements, reduced renal function, GI symptoms, seizures, genital ulcers, anemia, QT prolongation, torsades de pointes (https://www.ncbi.nlm.nih.gov/books/NBK556108/#article-21935.s5). | Antiviral; Selective inhibition at the pyrophosphate binding site on virus-specific DNA polymerases at concentrations that do not affect cellular DNA polymerases (https://www.drugs.com/mtm/foscarnet.html , https://go.drugbank.com/drugs/DB00529). | Organic analogue of inorganic pyrophosphate (https://go.drugbank.com/drugs/DB00529). |
| Ganciclovir | CMV retinitis (https://medlineplus.gov/druginfo/meds/a605011.html). | Lowered number of cells in blood (https://medlineplus.gov/druginfo/meds/a605011.html). | Antiviral (https://medlineplus.gov/druginfo/meds/a605011.html). | Causes birth defects in animals, not known if causes birth defects in people (https://medlineplus.gov/druginfo/meds/a605011.html). |
| Griseofulvin (Gris-PEG) | Fungal infections of the hair, nails, and skin (https://www.healthline.com/health/drugs/griseofulvin-oral-tablet). | Rash, numbness, tingling, yeast infection in mouth, stomach pain, diarrhea, heartburn, nausea, vomiting, dizziness, headache, trouble sleeping, confusion, severe skin allergic reaction, liver damage (https://www.healthline.com/health/drugs/griseofulvin-oral-tablet#side-effects). | Antifungal (https://www.drugs.com/mtm/griseofulvin.html). | For best absorption, taken with or after a meal containing a moderate amount of fat (https://www.webmd.com/drugs/2/drug-52769/griseofulvin-oral/details). |
| Hydroxychloroquine (Plaquenil) | Malaria, RA, lupus, juvenile idiopathic arthritis, antiphospholipid syndrome, primary Sjogren's syndrome (https://www.webmd.com/covid/hydroxychloroquine). | Nausea, vomiting, diarrhea, stomach pain, itching, rash, darkening skin or dark spots, hair changes, muscle weakness, mood problems, tinnitus, prolonged QT interval, ventricular tachycardia, permanent vision changes, blindness, blood and lymph system disorders, kidney problems, liver injury or failure, anemia (https://www.webmd.com/covid/hydroxychloroquine). | Antimalarial quinoline, antirheumatic; Mechanism not clear (https://www.drugs.com/hydroxychloroquine.html , https://www.webmd.com/covid/hydroxychloroquine). | Regular eye exams recommended for long-term use of this drug (https://www.webmd.com/covid/hydroxychloroquine). |
| Imipenem/cilastatin (Primaxin) | Severe infections of the heart, lungs, bladder, kidneys, skin, blood, bones, joints, stomach, female reproductive organs (https://www.drugs.com/mtm/imipenem-and-cilastatin.html). | Possible rare cause of clinically apparent liver injury (https://www.ncbi.nlm.nih.gov/books/NBK548708/). | Carbapenem (https://www.drugs.com/mtm/imipenem-and-cilastatin.html). | Approved for use in the U.S. in 1985 (https://www.ncbi.nlm.nih.gov/books/NBK548708/). |
| Isoniazid (Nydrazid) | Active TB, prevention of TB (https://www.webmd.com/drugs/2/drug-8665/isoniazid-oral/details). | GI effects, rash, pruritus, peripheral neuropathy (may be due to reduced biologically available active B6), elevated serum concentrations of other drugs, drug-induced lupus, liver toxicity (https://www.ncbi.nlm.nih.gov/books/NBK557617/#article-23786.s5). | Hydrazine derivative (https://www.drugs.com/mtm/isoniazid.html). | An important drug used in TB treatment since 1952 (https://www.ncbi.nlm.nih.gov/books/NBK557617/#article-23786.s5). |

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| | Clinical Use | Adverse Events | Notes on Mechanism | Historical and Clinical Notes |
|-------------------------------------|---|--|--|---|
| Ketoconazole (Nizoral) | Skin infections, dandruff, pityriasis (fungal infection) (https://www.webmd.com/drugs/2/drug-75147-1052/ketoconazole-topical/ketoconazole-cream-topical/details). | GI effects, nausea, vomiting, constipation, abdominal pain, dry mouth, flatulence, tongue discoloration, adrenal insufficiency, orthostatic hypotension, gynecomastia in males, severe liver injury, jaundice, anaphylaxis, urticaria, increased long bone fragility, fracture, alcohol intolerance, decreased platelet count, epistaxis, fatigue, hot flashes, hyperlipidemia, insomnia, myalgia, nervousness, paresthesia, peripheral edema, skin reactions, dry hair, dry scalp, oily hair, abnormal hair texture, alopecia, angioedema, contact dermatitis, eye irritation, headache, hypersensitivity reaction, impetigo, pyogenic granuloma (https://www.ncbi.nlm.nih.gov/books/NBK559221/#article-96015.s5). | Azole antifungal (https://www.drugs.com/mtm/ketoconazole.html). | Used on the skin only (https://www.webmd.com/drugs/2/drug-75147-1052/ketoconazole-topical/ketoconazole-cream-topical/details). |
| Ledipasvir and sofosbuvir (Harvoni) | Chronic hepatitis C in adults and children at least 3 years old (https://www.drugs.com/mtm/ledipasvir-and-sofosbuvir.html). | Risk of hepatitis B reactivation, cough, diarrhea, dizziness, fatigue, feeling irritable, headache, insomnia, mildly increased bilirubin level, muscle pain, nausea, SOB, weakness, depression, allergic reaction, suicidal thoughts or behaviors (https://www.healthline.com/health/drugs/harvoni#side-effects). | Antiviral combination (https://www.drugs.com/mtm/ledipasvir-and-sofosbuvir.html). | Sometimes given in combination with ribavirin (https://www.drugs.com/mtm/ledipasvir-and-sofosbuvir.html). |
| Levofloxacin (Levaquin) | Bacterial infections (https://www.webmd.com/drugs/2/drug-14495-8235/levofloxacin-oral/levofloxacin-oral/details). | Photosensitivity, nausea, diarrhea, headache, tendinitis, tendon rupture, hyper-hypoglycemia, seizures, prolonged QT interval, peripheral neuropathy, phototoxicity, increased risk of fungal or bacterial superinfection, hepatotoxicity, increased risk of aortic aneurysm and aortic dissection (https://www.ncbi.nlm.nih.gov/books/NBK545180/#article-37545.s5). | Quinolone (https://www.drugs.com/levofloxacin.html). | Stopping this medication too early could result in a return of the infection (https://www.webmd.com/drugs/2/drug-14495-8235/levofloxacin-oral/levofloxacin-oral/details). |
| Linezolid (Zyvox) | Pneumonia, infections of the skin (https://medlineplus.gov/druginfo/meds/a602004.html). | Decreased platelets or hemoglobin or white blood cell counts, headache, nausea, diarrhea, elevated pancreatic enzymes, elevated liver function tests, neuropathy, serotonin syndrome, hypoglycemia, irreversible peripheral and optic neuropathy when used for 28 days or more, blurred vision during shorter courses, fungal or bacterial infection with prolonged use, lactic acidosis (https://www.ncbi.nlm.nih.gov/books/NBK539793/#article-24291.s5). | Oxazolidinone antibiotic, MAO inhibitor (https://www.drugs.com/mtm/linezolid-oral-injection.html , https://www.webmd.com/drugs/2/drug-18168-6154/linezolid-oral/linezolid-oral/details). | Limiting tyramine intake can help prevent a very serious high blood pressure reaction (https://www.webmd.com/drugs/2/drug-18168-6154/linezolid-oral/linezolid-oral/details). |
| Mebendazole (Emverm, Vermox) | Infections caused by whipworm, pinworm, roundworm, hookworm (https://www.drugs.com/mtm/mebendazole.html). | Loss of appetite, abdominal pain, diarrhea, flatulence, nausea, vomiting, headache, tinnitus, elevated liver enzymes, convulsions, rash, urticaria, angioedema, GI irritation, neutropenia, thrombocytopenia (https://www.ncbi.nlm.nih.gov/books/NBK557705/#article-24812.s5). | Anthelmintic (https://www.drugs.com/mtm/mebendazole.html). | Stopping this medication too early may result in a return of infection (https://www.webmd.com/drugs/2/drug-13591/mebendazole-oral/details). |

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| | Clinical Use | Adverse Events | Notes on Mechanism | Historical and Clinical Notes |
|------------------------|---|--|---|---|
| Metronidazole (Flagyl) | Infections of the vagina, stomach, liver, skin, joints, brain and spinal cord, lungs, heart, or bloodstream; Trichomoniasis (https://www.drugs.com/metronidazole.html). | Confusion, peripheral neuropathy, metallic taste, nausea, vomiting, diarrhea, headache, vaginitis, dizziness, genital pruritus, abdominal pain, xerostomia, dysmenorrhea, urine abnormality, UTI, bacterial infection, candidiasis, flu-like symptoms, upper respiratory tract infection, pharyngitis, sinusitis, leukopenia, neutropenia, black box warning—may be carcinogenic based on animal studies, severe neurological disturbances (risk of cumulative neurotoxicity), fungal or bacterial superinfection (https://www.ncbi.nlm.nih.gov/books/NBK539728/#article-25091.s5). | Amebicide, antibiotic (https://www.drugs.com/metronidazole.html). | Should not be taken if patient recently drank alcohol (https://www.drugs.com/metronidazole.html). |
| Minocycline (Minocin) | Pneumonia; respiratory tract infections; infections of the skin, eye, lymphatic, intestinal, genital, urinary systems; infections spread by ticks, lice, mites, infected animals; Acne; Plague, tularemia, food poisoning, anthrax, meningitis (https://medlineplus.gov/druginfo/meds/a682101.html). | GI distress, photosensitivity, hyperpigmentation of skin, discoloration of nails, staining of teeth, bone growth inhibition, liver toxicity, exacerbation of renal failure, pill esophagitis, dose-limiting vestibular side effects, idiopathic intracranial hypertension, SLE, drug-induced pancreatitis, <i>C. difficile</i> infection (risk lower than with other antibiotics), drug rash with eosinophilia, DRESS resulting in death (https://www.ncbi.nlm.nih.gov/books/NBK554519/#article-25180.s5). | Tetracycline (https://www.drugs.com/minocycline.html). | Some side effects more common in children than adults (https://www.ncbi.nlm.nih.gov/books/NBK554519/#article-25180.s5). |
| Moxifloxacin (Avelox) | Bacterial infections (https://www.webmd.com/drugs/2/drug-17874/moxifloxacin-oral/details). | Irritated or ruptured tendon, muscle weakness, peripheral neuropathy, CNS effects (https://www.healthline.com/health/drugs/moxifloxacin-oral-tablet). | Quinolone antibiotic (https://www.webmd.com/drugs/2/drug-17874/moxifloxacin-oral/details). | Should only be used to treat acute bacterial exacerbation of chronic bronchitis, acute bacterial sinusitis if no other treatment options exist (https://www.healthline.com/health/drugs/moxifloxacin-oral-tablet). |
| Mupirocin (Bactroban) | Impetigo, other skin infections caused by bacteria (https://medlineplus.gov/druginfo/meds/a688004.html). | Burning, stinging, pain, itching, rash (https://medlineplus.gov/druginfo/meds/a688004.html#side-effects). | Topical antibiotic (https://www.drugs.com/mtm/mupirocin-topical.html). | Cream version should not be used on child under 3 months old, ointment may be used on child as young as 2 months old (https://www.drugs.com/mtm/mupirocin-topical.html). |

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| | Clinical Use | Adverse Events | Notes on Mechanism | Historical and Clinical Notes |
|--|---|---|---|--|
| Nitrofurantoin (Macrobid, Macrochantin, Nitro Macro) | UTI (https://medlineplus.gov/druginfo/meds/a682291.html). | Nausea, vomiting, loss of appetite, diarrhea, pulmonary toxicity, liver injury, peripheral neuropathy (https://www.ncbi.nlm.nih.gov/books/NBK470526/#article-25897.s5). | Urinary anti-infective (https://www.drugs.com/nitrofurantoin.html). | Should not be used by children less than 1 month of age due to risk of hemolytic anemia (https://www.webmd.com/drugs/2/drug-14274-59/nitrofurantoin-oral/nitrofurantoin-oral/details). |
| Nystatin (Bio-Statin) | Yeast infections in the mouth (https://www.drugs.com/mtm/nystatin.html). | Diarrhea, nausea, stomach bloating or pain, irritation or burning of the mouth, hives, rash or itching, difficulty breathing or swallowing (https://medlineplus.gov/druginfo/meds/a682758.html#side-effects). | Polyene (https://www.drugs.com/mtm/nystatin.html). | Not absorbed into bloodstream, will not treat fungal infections in other parts of body, skin (https://www.drugs.com/mtm/nystatin.html). |
| Ofloxacin (Floxin) | Bacterial infections of the skin, lungs, prostate, urinary tract; Pelvic inflammatory disease, Chlamydia, gonorrhea (https://www.drugs.com/mtm/ofloxacin.html). | Serious or disabling side effects that may not be reversible; Tendon problems, nerve damage, mood or behavior changes, low blood sugar (https://www.drugs.com/mtm/ofloxacin.html). | Quinolone (https://www.drugs.com/mtm/ofloxacin.html). | Should not be used for bronchitis and some types of UTI if other treatments are available (https://medlineplus.gov/druginfo/meds/a691005.html). |
| Oseltamivir (Tamiflu) | Infections caused by influenza A, B (https://www.mayoclinic.org/drugs-supplements/oseltamivir-oral-route/description/drg-20067586). | Nausea, vomiting, abdominal pain, diarrhea, headache, insomnia, vertigo, conjunctivitis, epistaxis, allergy, arrhythmia, GI bleeding, erythema multiforme, SJS, toxic epidermal necrolysis, confusion, seizures, neuropsychiatric events, skin reactions, serum aminotransferase elevation, liver injury, jaundice (https://www.ncbi.nlm.nih.gov/books/NBK539909/#article-26358.s5). | Neuraminidase inhibitor (https://www.drugs.com/oseltamivir.html). | Not a substitute for an annual flu shot (https://www.mayoclinic.org/drugs-supplements/oseltamivir-oral-route/description/drg-20067586). |
| Penicillin G potassium (Pfizerpen) | Pneumonia, strep throat, staph infection, diphtheria, meningitis, gonorrhea, syphilis; Prevention of heart valve infection before dental procedures for people with cardiac conditions (https://www.verywellhealth.com/penicillin-g-5075834). | Allergic reaction, skin rash, red or scaly skin, fever, chills, swollen glands, muscle or joint pain, fast heartbeats, general ill feeling, lightheadedness, severe stomach pain, diarrhea that is watery or bloody, little or no urination, bruising, severe tingling, numbness, pain, muscle weakness, seizure, unusual changes in mood or behavior, mild diarrhea, headache, black or hairy tongue; Pain, swelling, bruising, irritation around the IV needle (https://www.drugs.com/mtm/pfizerpen.html#side-effects). | Natural penicillin (https://www.drugs.com/mtm/penicillin-g-potassium.html). | Taken by IV or as an injection (https://www.verywellhealth.com/penicillin-g-5075834). |

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| | Clinical Use | Adverse Events | Notes on Mechanism | Historical and Clinical Notes |
|------------------------|---|---|---|--|
| Penicillin V potassium | Pneumonia, respiratory tract infections, scarlet fever; Infections of the ear, skin, gum, mouth, throat; Prevention of rheumatic fever; Prevention of infections in heart valves in people with certain heart conditions who need dental work or surgery (https://medlineplus.gov/druginfo/meds/a685015.html , https://www.drugs.com/mtm/penicillin-v-potassium.html). | Diarrhea, nausea, vomiting, abdominal pain, black or hairy tongue, rash, hives, itching, hoarseness, wheezing, difficulty swallowing or breathing, swelling, joint pain, return of signs of infection, severe diarrhea that may occur with or without fever and stomach cramps (https://medlineplus.gov/druginfo/meds/a685015.html#side-effects). | Penicillin (https://medlineplus.gov/druginfo/meds/a685015.html). | Liquid may contain phenylalanine (https://www.drugs.com/mtm/penicillin-v-potassium.html). |
| Primaquine | Malaria (https://www.drugs.com/mtm/primaquine.html). | Nausea, vomiting, heartburn, abdominal cramps, tiredness, pale skin, SOB, fast heartbeat, yellowing of skin or eyes, dark colored urine, headache, lack of energy, grey-bluish color of lips and/or skin, nervousness, seizure, weak pulse, confusion, signs of infection, fainting, dizziness, blurred vision (https://medlineplus.gov/druginfo/meds/a607037.html#side-effects). | Antimalarial quinoline (https://www.drugs.com/mtm/primaquine.html). | This drug should not be used by patients with an autoimmune disorder (https://www.drugs.com/mtm/primaquine.html). |
| Pyrazinamide | TB (https://www.mayoclinic.org/drugs-supplements/pyrazinamide-oral-route/description/drg-20065679). | Upset stomach, fatigue, skin rash, fever, vomiting, loss of appetite, yellowing of the skin or eyes, darkened urine, pain and swelling in the joints, unusual bleeding or bruising, difficult urination (https://medlineplus.gov/druginfo/meds/a682402.html#side-effects). | Antituberculosis agent (https://www.drugs.com/mtm/pyrazinamide.html). | Should be taken until the full prescribed amount is finished, even if symptoms disappear (https://www.webmd.com/drugs/2/drug-7398/pyrazinamide-oral/details). |
| Quinine | Malaria (https://www.mayoclinic.org/drugs-supplements/quinine-oral-route/description/drg-20065753). | Allergic reaction, fever, chills, body aches, flu symptoms, sores in the mouth and throat, easy bruising, unusual bleeding, purple or red pinpoint spots under the skin, headache with chest pain and severe dizziness, fainting, fast or pounding heartbeats, sudden numbness or weakness, sudden severe headache, slurred speech, problems with balance, chest pain, sudden cough, wheezing, rapid breathing, coughing up blood, problems with vision or hearing, pain or swelling or warmth or redness in one or both legs, severe pain in side or lower back, blood in urine, little or no urine, low blood sugar, loss of appetite, dark urine, clay-colored stools, jaundice, severe skin reaction, vision changes, sweating or flushing, mild dizziness, spinning sensation, ringing in ears, upset stomach, vomiting, stomach pain (https://www.drugs.com/mtm/quinine.html#side-effects). | Antimalarial quinoline (https://www.drugs.com/mtm/quinine.html). | Newer treatments may replace quinine as a malaria treatment due to quinine's adverse effects at therapeutic doses (https://www.medicalnewstoday.com/articles/323692#quinine-uses). |
| Rifampin | Bacterial infections, TB (https://www.ncbi.nlm.nih.gov/books/NBK557488/#article-28588.s5). | Discoloration of body fluids, GI symptoms, nausea, anorexia, diarrhea, pseudomembranous colitis, constipation, asymptomatic hepatitis, liver toxicity, hypersensitivity reactions, flu-like symptoms, thrombocytopenia, hemolysis, renal failure (https://www.ncbi.nlm.nih.gov/books/NBK557488/#article-28588.s5). | Rifamycin derivative (https://www.drugs.com/mtm/rifampin.html). | Can help prevent spread of meningitis but will not treat an active meningitis infection (https://www.drugs.com/mtm/rifampin.html). |

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| | Clinical Use | Adverse Events | Notes on Mechanism | Historical and Clinical Notes |
|---|---|---|--|--|
| Ritonavir (Norvir) | HIV/AIDS (booster for other protease inhibitors) (https://www.ncbi.nlm.nih.gov/books/NBK544312/#article-28627.s5). | Malaise, dizziness, insomnia, GI side effects, metabolic side effects (https://www.ncbi.nlm.nih.gov/books/NBK544312/#article-28627.s5). | Antiviral booster, protease inhibitor (https://www.drugs.com/mtm/ritonavir.html). | Given metabolic side effects, lipid-lowering agents may be indicated to reduce cardiovascular disease risk (https://www.ncbi.nlm.nih.gov/books/NBK544312/#article-28627.s5). |
| Simeprevir (Olysio) | Chronic hepatitis C infection (https://go.drugbank.com/drugs/DB06290). | Itching, nausea, muscle pain, difficulty breathing, rash, mouth sores or ulcers, red or swollen eyes ("pink eye") (https://medlineplus.gov/druginfo/meds/a614013.html#side-effects). | Protease inhibitor (https://www.drugs.com/cdi/simeprevir.html). | Approved by the FDA in 2014 (https://go.drugbank.com/drugs/DB06290). |
| Streptomycin | TB (https://www.ncbi.nlm.nih.gov/books/NBK555886/#article-29536.s5). | Hypersensitivity reactions, hypomagnesemia, immune-allergic hemolytic anemia (https://www.ncbi.nlm.nih.gov/books/NBK555886/#article-29536.s5). | Aminoglycoside, streptomycetes derivative (https://www.drugs.com/mtm/streptomycin.html). | Originally isolated from the bacteria <i>Streptomyces griseus</i> (https://www.ncbi.nlm.nih.gov/books/NBK555886/#article-29536.s5). |
| Sulfamethoxazole/trimethoprim (Bactrim, Septra) | UTI, middle ear infections, bronchitis, traveler's diarrhea, shigellosis, <i>Pneumocystis carinii</i> pneumonia, <i>Pneumocystis jirovecii</i> pneumonia (https://www.mayoclinic.org/drugs-supplements/sulfamethoxazole-and-trimethoprim-oral-route/description/drg-20071899). | Allergic reaction, severe skin reaction, severe stomach pain, diarrhea that is watery or bloody, skin rash, yellowing of skin or eyes, seizure, new or unusual joint pain, increased or decreased urination, swelling, bruising, irritation around the IV needle, increased thirst, dry mouth, fruity breath odor, new or worsening cough, fever, trouble breathing, high blood potassium, low blood cell counts, nausea, vomiting, loss of appetite (https://www.drugs.com/bactrim.html#side-effects). | Sulfonamide (https://www.drugs.com/bactrim.html). | Should not be used by children under 2 months old due to risk of serious side effects (https://www.webmd.com/drugs/2/drug-3409-9071/sulfamethoxazole-trimethoprim-oral/sulfamethoxazole-trimethoprim-oral/details). |
| Terbinafine (Lamisil) | Fungal infections affecting the fingernails and toenails; Fungal infection of scalp hair follicles in children at least 4 years old (https://www.drugs.com/mtm/terbinafine.html). | Severe liver damage leading to liver transplant or death (https://www.drugs.com/mtm/terbinafine.html). | Antifungal; Inhibits squalene epoxidase (https://www.drugs.com/mtm/terbinafine.html , https://www.ncbi.nlm.nih.gov/books/NBK545218/). | FDA approved to treat onychomycosis suspected or proven to be caused by dermatophyte organisms (https://www.ncbi.nlm.nih.gov/books/NBK545218/). |

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| | Clinical Use | Adverse Events | Notes on Mechanism | Historical and Clinical Notes |
|---|--|--|---|---|
| Tetracycline | Pneumonia, respiratory tract infections; Infections of skin, eye, lymphatic, intestinal, genital, urinary systems; Infections spread by ticks, lice, mites, infected animals; Acne, plague, tularemia, anthrax (https://medlineplus.gov/druginfo/meds/a682098.html). | GI distress, discoloration of the teeth, impairment of fetal long bone growth (https://www.ncbi.nlm.nih.gov/books/NBK549905/#article-30000.s5). | Tetracycline (https://www.drugs.com/tetracycline.html). | Should be avoided in children under age 8 due to association with tooth discoloration (https://www.ncbi.nlm.nih.gov/books/NBK549905/#article-30000.s5). |
| Tigecycline (Tygacil) | Complicated skin and soft-tissue infections, complicated intra-abdominal infections, community-acquired pneumonia (https://www.merckmanuals.com/professional/infectious-diseases/bacteria-and-antibacterial-drugs/tigecycline). | Increased risk of mortality (black box warning) (https://www.merckmanuals.com/professional/infectious-diseases/bacteria-and-antibacterial-drugs/tigecycline). | Glycylcycline; Inhibits protein synthesis by binding 30S ribosomal subunit (https://www.drugs.com/mtm/tigecycline.html , https://www.merckmanuals.com/professional/infectious-diseases/bacteria-and-antibacterial-drugs/tigecycline). | The first available glycylcycline antibiotic (https://www.merckmanuals.com/professional/infectious-diseases/bacteria-and-antibacterial-drugs/tigecycline). |
| Trimethoprim (Primsol, Trimplex, Proloprim) | Bladder infections, kidney infections, ear infections (https://www.drugs.com/mtm/trimethoprim.html). | Upset stomach, vomiting, diarrhea, rash (hives), itching, difficulty breathing or swallowing, sore throat, fever or chills, mouth sores, unusual bruising or bleeding, yellowing of the skin or eyes, paleness, joint aches, bluish-colored fingernails or lips or skin (https://medlineplus.gov/druginfo/meds/a684025.html#side-effects). | Urinary anti-infective (https://www.drugs.com/mtm/trimethoprim.html). | Not approved for use by anyone under 2 months old, should not be used to treat ear infections in children under 6 months old (https://www.drugs.com/mtm/trimethoprim.html). |
| Valacyclovir (Valtrex) | Cold sores, chickenpox, shingles (https://www.webmd.com/drugs/2/drug-6279/valAcyclovir-oral/details). | Blood clotting problems, serious kidney problems, headaches, nausea, stomach pain, diarrhea, fever, dizziness, runny nose, sore throat, menstrual cramps, joint pain, rash (https://www.goodrx.com/valacyclovir/what-is#side-effects). | Purine nucleoside (https://www.drugs.com/valacyclovir.html). | May not work as well if treatment is delayed (https://www.webmd.com/drugs/2/drug-6279/valAcyclovir-oral/details). |
| Vancomycin | Colitis that may occur after antibiotic treatment, prevention of endocarditis in patients having dental work or surgery on upper respiratory tract (https://medlineplus.gov/druginfo/meds/a604038.html). | Nausea, vomiting, stomach pain, diarrhea, gas, headache, back pain, signs of infection, hives, rash, itching, sores or blisters in mouth, difficulty breathing or swallowing, redness of skin above the waist, pain and muscle tightness in chest and back, ringing in the ears, decreased urination, unusual tiredness or weakness, swelling (https://medlineplus.gov/druginfo/meds/a604038.html#side-effects). | Glycopeptide antibiotic; Fights bacteria in the intestines (https://www.drugs.com/vancomycin.html , https://www.drugs.com/vancomycin.html). | Oral form only in the intestines, will not treat other types of infection; Injectable form available to treat serious infections in other parts of the body (https://www.drugs.com/vancomycin.html). |
| Musculoskeletal | | | | |

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| | Clinical Use | Adverse Events | Notes on Mechanism | Historical and Clinical Notes |
|------------------------------|---|--|--|--|
| Acetaminophen | Pain and fever (https://www.ncbi.nlm.nih.gov/books/NBK482369/#article-17074.s5). | Serious and potentially fatal liver disease, skin rash, hypersensitivity reactions, nephrotoxicity, hematological effects, metabolic and electrolyte effects, nausea, vomiting, constipation, pruritus, abdominal pain, anaphylactic reactions, serious and fatal skin reactions (https://www.webmd.com/drugs/2/drug-362/acetaminophen-oral/details , https://www.ncbi.nlm.nih.gov/books/NBK482369/#article-17074.s5). | Analgesic (https://www.drugs.com/acetaminophen.html). | FDA boxed warning for liver failure (https://www.ncbi.nlm.nih.gov/books/NBK482369/#article-17074.s5). |
| Alendronate (Fosamax) | Osteoporosis caused by menopause, steroid use, or gonadal failure, Paget's disease of bone (https://www.drugs.com/mtm/alendronate.html). | Transient hypocalcemia, transient hypophosphatemia, GI symptoms, myalgia, joint pain, headache, dizziness, peripheral edema, back pain, weakness, toxic epidermal necrosis, oropharyngeal ulceration, osteonecrosis of the jaw, esophageal ulcers, hypersensitivity reactions, pustular skin reactions on both calves (https://www.ncbi.nlm.nih.gov/books/NBK526073/#article-17348.s5). | Bisphosphonate (https://www.drugs.com/mtm/alendronate.html). | Physician should offer a drug holiday to patients on alendronate therapy (https://www.ncbi.nlm.nih.gov/books/NBK526073/#article-17348.s5). |
| Aspirin | Fever, inflammation, heart attack, stroke, angina (https://www.drugs.com/aspirin.html). | GI upset, hypersensitivity, Reye syndrome, intracranial bleeding (https://www.ncbi.nlm.nih.gov/books/NBK519032/#article-28695.s5). | Platelet aggregation inhibitor, salicylate (https://www.drugs.com/aspirin.html). | Should be taken for cardiovascular conditions under a doctor's supervision (https://www.drugs.com/aspirin.html). |
| Butorphanol (Stadol) | Pain (https://www.medicinenet.com/butorphanol_injection/article.htm#what_are_the_side_effects_of_butorphanol). | Drowsiness, dizziness, nausea, vomiting, nasal congestion, insomnia, palpitations, flushing, anxiety, confusion, euphoria, headache, nervousness, tingling, cold/clammy skin, sweating, itchiness, anorexia, constipation, stomach pain, dry mouth, tremor, weakness, blurred vision, ringing in the ears, difficulty breathing, mental and physical dependence (https://www.medicinenet.com/butorphanol_injection/article.htm#what_are_the_side_effects_of_butorphanol). | Opioid, narcotic analgesic (https://www.drugs.com/pro/butorphanol.html). | Prevents pain in a similar way to morphine, hydrocodone, oxycodone, and other opioids (https://www.medicinenet.com/butorphanol_injection/article.htm). |
| Carisoprodol (Soma, Vanadom) | Pain, injury (https://www.drugs.com/carisoprodol.html). | Drowsiness, dizziness, headache, sedation, hypotension, dependence or withdrawal or misuse with prolonged use, seizure (https://www.ncbi.nlm.nih.gov/books/NBK553077/#article-18952.s5). | Skeletal muscle relaxant; Blocks pain sensations between the nerves and brain (https://www.drugs.com/carisoprodol.html). | Should only be used for short periods, up to 2-3 weeks (https://www.drugs.com/carisoprodol.html). |
| Celecoxib (CeleBREX, Elyxyb) | Arthritis, ankylosing spondylitis, menstrual pain, juvenile RA in children at least 2 years old, hereditary polyps in the colon (https://www.drugs.com/celecoxib.html). | Increased risk of heart attacks and strokes, GI effects, new or worsening hypertension, fluid retention in patients with congestive heart failure, renal toxicity, liver toxicity, anaphylactic reactions, skin changes (https://www.ncbi.nlm.nih.gov/books/NBK535359/#article-19094.s5). | Cox-2 inhibitor; NSAID (https://www.drugs.com/celecoxib.html). | When used to treat migraine, Elyxyb will only treat headaches, but will not prevent a headache that has already begun (https://www.drugs.com/celecoxib.html). |

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| | Clinical Use | Adverse Events | Notes on Mechanism | Historical and Clinical Notes |
|---|--|---|--|--|
| Codeine | Chronic pain (https://www.ncbi.nlm.nih.gov/books/NBK526029/). | Sedation, drowsiness, depressed breathing (https://www.medicinenet.com/codeine/article.htm). | Antitussive, opioid, narcotic analgesic; Precise mechanism not known, small amount is converted to morphine in the body (https://www.drugs.com/codeine.html , https://www.medicinenet.com/codeine/article.htm). | Approved by the FDA in 1950 (https://www.medicinenet.com/codeine/article.htm). |
| Codeine + APAP (Tylenol #3) | Mild to moderately severe pain not well-controlled with OTC medication (https://www.verywellhealth.com/tylenol-3-4801492). | Addiction; Serious, life-threatening, or fatal respiratory depression (https://www.drugs.com/cons/apap-w-codeine.html). | Narcotic analgesic combination (https://www.drugs.com/cons/apap-w-codeine.html). | Misuse of opioid medicine can cause addiction, overdose, or death (https://www.drugs.com/mtm/acetaminophen-and-codeine.html). |
| Cyclobenzaprine (Flexeril) | Muscle spasms (https://www.ncbi.nlm.nih.gov/books/NBK513362/#article-20197.s5). | Somnolence, dry mucous membranes, dizziness, confusion, xerostomia, ileus, tachycardia, mydriasis, confusion, urinary retention, hallucinations, may contribute to reflex tachycardia; Chronic use can cause minor ALT elevation (https://www.ncbi.nlm.nih.gov/books/NBK513362/#article-20197.s5). | Skeletal muscle relaxant; Blocks nerve impulses to the brain (https://www.drugs.com/cyclobenzaprine.html). | Used together with rest and physical therapy to treat skeletal muscle conditions (https://www.drugs.com/cyclobenzaprine.html). |
| Denosumab (Prolia, Xgeva) | Giant cell tumor of the bone, hypercalcemia of malignancy, prevention of broken bones and other bone problems (https://www.cancer.gov/about-cancer/treatment/drugs/denosumab). | Peripheral edema, hypertension, angina pectoris, fatigue, headache, sciatica, skin rash, dermatitis, eczema, hypophosphatemia, severe hypophosphatemia, hypocalcemia, grade 3 hypokalemia, grade 3 hypomagnesemia, severe (symptomatic) hypocalcemia, diarrhea, nausea, decreased appetite, vomiting, constipation, flatulence, anemia, thrombocytopenia, new malignant neoplasm, serious infection, weakness, back pain, arthralgia, limb pain, musculoskeletal pain, ostealgia, myalgia, osteonecrosis of the jaw, cataract, dyspnea, cough, upper respiratory tract infection, pneumonia, nasopharyngitis (https://www.ncbi.nlm.nih.gov/books/NBK535388/#article-37779.s5). | Bone resorption inhibitor (https://www.drugs.com/mtm/denosumab.html). | Administration should be via subcutaneous injection only (not IV or intramuscular) (https://www.ncbi.nlm.nih.gov/books/NBK535388/). |
| Diclofenac (Cataflam, Voltaren, Cambia) | Mild to moderate pain, osteoarthritis, RA, ankylosing spondylitis (Voltaren), menstrual cramps (Cataflam), migraine (Cambia) (https://www.drugs.com/diclofenac.html). | Diarrhea, constipation, gas, bloating, headache, dizziness, ringing in the ears, unexplained weight gain, SOB, difficulty breathing, swelling, excessive tiredness, lack of energy, nausea, loss of appetite, itching, pain in the upper right part of the stomach, yellowing of the skin or eyes, flu-like symptoms, fever, blisters, rash, hives, hoarseness, pale skin, fast heartbeat, cloudy or discolored or bloody urine, back pain, difficult or painful urination (https://medlineplus.gov/druginfo/meds/a689002.html#side-effects). | NSAID (https://www.drugs.com/diclofenac.html). | Cambia will only treat a headache that has already begun, will not prevent headaches (https://www.drugs.com/diclofenac.html). |

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| | Clinical Use | Adverse Events | Notes on Mechanism | Historical and Clinical Notes |
|--|--|---|---|---|
| Fentanyl (Duragesic) | Severe pain (https://www.cdc.gov/opioids/basics/fentanyl.html). | Euphoria, confusion, respiratory depression, drowsiness, nausea, visual disturbances, dyskinesia, hallucinations, delirium (e.g., “narcotic delirium”), analgesia, constipation, narcotic ileus, muscle rigidity, constipation, addiction, loss of consciousness, hypotension, coma, death (https://www.ncbi.nlm.nih.gov/books/NBK459275/#article-21694.s5). | Synthetic opioid https://www.cdc.gov/opioids/basics/fentanyl.html . | Typically used for advanced cancer pain (https://www.cdc.gov/opioids/basics/fentanyl.html). |
| Hydrocodone/acetaminophen (Vicodin, Lortab, Norco) | Severe pain (https://www.mayoclinic.org/drugs-supplements/hydrocodone-and-acetaminophen-oral-route/description/drug-20074089). | Allergic reaction, slowed or stopped breathing, death, severe skin reaction, noisy breathing, sighing, shallow breathing, breathing that stops during sleep, lightheadedness, liver problems, low cortisol, high levels of serotonin, possible impact on fertility, dizziness, drowsiness, tiredness, nausea, vomiting, stomach pain, constipation, headache (https://www.drugs.com/acetaminophen_hydrocodone.html#side-effects). | Narcotic analgesic combination (https://www.drugs.com/acetaminophen_hydrocodone.html#side-effects). | Used to relieve pain severe enough to require opioid use and when other medicines do not work well enough or cannot be tolerated (https://www.mayoclinic.org/drugs-supplements/hydrocodone-and-acetaminophen-oral-route/description/drug-20074089). |
| Ibandronate (Boniva) | Osteoporosis in postmenopausal women (https://www.drugs.com/cdi/ibandronate-tablets.html). | Nausea, stomach pain, diarrhea, constipation, weakness, dizziness, headache, signs of infection, frequent or urgent need to urinate, painful urination, new or worsening heartburn, difficulty swallowing, pain swallowing, upper chest pain, rash, painful or swollen gums, loosening of teeth, numbness or heavy feeling in the jaw, poor healing of the jaw, dull or aching pain, may increase risk of breaking thigh bones (https://medlineplus.gov/druginfo/meds/a605035.html#side-effects). | Bisphosphonate (https://www.drugs.com/cdi/ibandronate-tablets.html). | Tablet must be swallowed whole, may cause throat irritation (https://www.mayoclinic.org/drugs-supplements/ibandronate-oral-route/proper-use/drug-20068079). |
| Ibuprofen (Advil) | Inflammatory diseases, rheumatoid disorders, mild to moderate pain, fever, dysmenorrhea, osteoarthritis (https://www.ncbi.nlm.nih.gov/books/NBK542299/#article-23330.s5). | GI bleeding, diminished renal function, rash, DRESS syndrome, hypertension, increased incidence of hyperbilirubinemia and bilirubin displacement (https://www.ncbi.nlm.nih.gov/books/NBK542299/#article-23330.s5). | NSAID (https://www.drugs.com/ibuprofen.html). | Available OTC for pain (https://www.ncbi.nlm.nih.gov/books/NBK542299/#article-23330.s5). |
| Indomethacin (Indocin, Tivorbex) | Severe osteoarthritis, RA, gouty arthritis, ankylosing spondylitis, shoulder pain, bursitis, tendinitis (https://www.drugs.com/mtm/indomethacin.html). | Headache, dizziness, dyspepsia, nausea, hypersensitivity reactions, indigestion, nausea, constipation, diarrhea, peptic ulcer, elevated liver enzymes, jaundice, tinnitus, vertigo, depression, dizziness, aseptic meningitis, psychosis, cognitive dysfunction, renal insufficiency, hyperkalemia, acute interstitial nephritis, hematologic effects, cardiopulmonary effects, nasal polyps, respiratory difficulties, generalized fatigue, somnolence, increased risk of cardiovascular thrombotic events including myocardial infarction and stroke, increased risk of serious GI bleeding or ulcers or perforation (https://www.ncbi.nlm.nih.gov/books/NBK555936/#article-23461.s5). | NSAID (https://www.drugs.com/mtm/indomethacin.html). | Heart attack or stroke is more likely if this drug is taken for a long time (https://www.webmd.com/drugs/2/drug-8880-5186/indomethacin-oral/indomethacin-oral/details). |

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| | Clinical Use | Adverse Events | Notes on Mechanism | Historical and Clinical Notes |
|---|--|--|--|---|
| Ketorolac | Short-term treatment of moderate to severe pain in adults (https://www.webmd.com/drugs/2/drug-3919/ketorolac-oral/details). | GI risks, renal risks, cardiovascular risks (https://www.ncbi.nlm.nih.gov/books/NBK545172/#article-23880.s5). | NSAID (https://www.ncbi.nlm.nih.gov/books/NBK545172/#article-23880.s5). | Usually used before or after medical procedures or surgery (https://www.webmd.com/drugs/2/drug-3919/ketorolac-oral/details). |
| Lidocaine | Topical medication for pain reduction (https://www.drugs.com/mtm/lidocaine-topical.html). | Transient radicular irritation syndrome (https://www.ncbi.nlm.nih.gov/books/NBK539881/#article-24262.s5). | Topical anesthetic (https://www.drugs.com/mtm/lidocaine-topical.html). | A valuable agent in anesthesiology, cardiology, pain management (https://www.ncbi.nlm.nih.gov/books/NBK539881/#article-24262.s5). |
| Meloxicam (Mobic, Anjeso, Vivlodex, Qimz) | RA, osteoarthritis, juvenile RA in children at least 2 years old, moderate to severe pain in adults (Anjeso) (https://www.drugs.com/meloxicam.html). | Diarrhea, constipation, gas, sore throat, fever, blisters, rash, skin blisters or peeling, hives, itching, swelling, difficulty breathing or swallowing, hoarseness, pale skin, fast heartbeat, SOB or difficulty breathing, unexplained weight gain, swelling, nausea, excessive tiredness, lack of energy, yellowing of skin or eyes, pain in upper right part of stomach, flu-like symptoms, cloudy or discolored or bloody urine, back pain, difficult or painful urination (https://medlineplus.gov/druginfo/meds/a601242.html#side-effects). | NSAID (https://www.drugs.com/meloxicam.html). | Vivlodex is only used for adults (https://www.drugs.com/meloxicam.html). |
| Meperidine (Demerol) | Moderate to severe pain (https://medlineplus.gov/druginfo/meds/a682117.html). | Serious or life-threatening breathing problems, sedation, or coma (https://medlineplus.gov/druginfo/meds/a682117.html). | Opioid, narcotic analgesic; Acts on the CNS to relieve pain (https://www.drugs.com/mtm/meperidine.html , https://www.mayoclinic.org/drugs-supplements/meperidine-oral-route/description/drg-20074223). | Used when pain is severe enough to require opioid treatment and when other pain medicines did not work well or cannot be tolerated (https://www.mayoclinic.org/drugs-supplements/meperidine-oral-route/description/drg-20074223). |
| Methadone (Methadose) | Extreme pain, addiction to heroin or narcotic painkillers (https://www.webmd.com/mental-health/addiction/what-is-methadone#1). | Diaphoresis, flushing, pruritus, nausea, dry mouth, constipation, sedation, lethargy, respiratory depression, QTc prolongation leading to cardiac dysfunction and severe hypoglycemia (https://www.ncbi.nlm.nih.gov/books/NBK562216/#article-25067.s5). | Opioid, narcotic analgesic (https://www.drugs.com/methadone.html). | Slower effects than those of other strong painkillers (https://www.webmd.com/mental-health/addiction/what-is-methadone#1). |

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| | Clinical Use | Adverse Events | Notes on Mechanism | Historical and Clinical Notes |
|------------------------------|--|---|---|--|
| Methylnaltrexone | Constipation caused by opioid pain medications in patients with chronic pain not caused by cancer (but that may be related to cancer treatment) (https://medlineplus.gov/druginfo/meds/a616047.html). | Vomiting, sweating, chills, anxiety, yawning, headache, abdominal pain and swelling, muscle spasms, runny nose, severe diarrhea, severe abdominal pain (https://medlineplus.gov/druginfo/meds/a616047.html#side-effects). | Peripherally acting mu-opioid receptor antagonist; Protects the bowel from the effects of opioid medications (https://medlineplus.gov/druginfo/meds/a616047.html). | Taken once a day, at least 30 minutes before first meal of the day (https://medlineplus.gov/druginfo/meds/a616047.html). |
| Morphine (Kadian, MS Contin) | Moderate to severe pain (https://www.drugs.com/ms_contin.html). | Constipation, CNS depression, nausea, vomiting, urinary retention, respiratory depression, lightheadedness, sedation, dizziness, euphoria, dysphoria, agitation, dry mouth, anorexia, biliary tract spasm, cardiovascular effects, pruritus, urticaria, edema, skin rashes (https://www.ncbi.nlm.nih.gov/books/NBK526115/#article-25271.s5). | Opioid, narcotic analgesic (https://www.drugs.com/morphine.html). | Due to nausea and vomiting, in many EDs, morphine administered with an antiemetic such as ondansetron (https://www.ncbi.nlm.nih.gov/books/NBK526115/#article-25271.s5). |
| Nalbuphine | Moderate to severe pain (https://www.ncbi.nlm.nih.gov/books/NBK534283/). | Sedation, sweating, nausea, vomiting, dizziness, vertigo, dry mouth, headache, CNS effects, cardiovascular effects, GI effects, respiratory effects, dermatologic effects, allergic reactions; Black box warning—concomitant use of benzodiazepines or other CNS depressants may result in respiratory depression, coma, death (https://www.ncbi.nlm.nih.gov/books/NBK534283/#article-25515.s5). | Opioid, narcotic analgesic (https://www.drugs.com/pro/nalbuphine.html). | Used when an opioid agent is required and alternative treatments have been insufficient (https://www.ncbi.nlm.nih.gov/books/NBK534283/). |
| Naloxone | Rapid reversal of opioid overdose (https://nida.nih.gov/publications/drugfacts/naloxone). | Anxiety, aggression, nausea, vomiting, diarrhea, abdominal pain, rhinorrhea, noncardiogenic pulmonary edema (https://www.ncbi.nlm.nih.gov/books/NBK441910/#article-25518.s5). | Opioid antagonist; Attaches to opioid receptors, reverses and blocks effects of other opioids (https://nida.nih.gov/publications/drugfacts/naloxone). | No absolute contraindications to use of naloxone in an emergency (https://www.ncbi.nlm.nih.gov/books/NBK441910/#article-25518.s5). |
| Nabumetone (Relafen) | RA, osteoarthritis (https://www.drugs.com/mtm/nabumetone.html). | Increased risk of fatal heart attack or stroke, potentially fatal stomach or intestinal bleeding (https://www.drugs.com/mtm/nabumetone.html). | NSAID (https://www.drugs.com/mtm/nabumetone.html). | Should not be used just before or after heart bypass surgery (https://www.drugs.com/mtm/nabumetone.html). |
| Naproxen (Aleve) | Arthritis, ankylosing spondylitis, tendinitis, bursitis, gout, menstrual cramps, acute pain (https://www.drugs.com/naproxen.html). | Increased risk of fatal heart attack or stroke (https://www.drugs.com/naproxen.html). | NSAID (https://www.drugs.com/naproxen.html). | Should not be used just before or after heart bypass surgery (https://www.drugs.com/naproxen.html). |

A general note: This table is intended to be non-exhaustive (it does not cover, e.g., every medication used by healthcare providers or every adverse event that any given medication might cause). According to U.S. government statistics in November 2021, there were over 20,000 prescription drug products approved by the Food and Drug Administration (FDA) for marketing, and the FDA was overseeing more than 6,700 different medical device product categories (source: <https://www.fda.gov/about-fda/fda-basics/fact-sheet-fda-glance>). This table does not provide medical advice and is not a substitute for advice from a medical professional. Please also independently verify that information in this table remains up-to-date. The table was last updated on February 28, 2023.

Categories: Cardiovascular, Endocrine/Metabolic, Gastrointestinal, Genetic, Hematological/Oncological, Immunological, **Microbiological**, **Musculoskeletal**, Neurological, Ophthalmological, Psychiatric, Renal/Urological, Reproductive, Respiratory, Surgical, Toxicological

Recurring acronyms: ALT: alanine aminotransferase, CNS: central nervous system, DRESS: drug-induced hypersensitivity syndrome, DVT: deep vein thrombosis, PE: pulmonary embolism, RA: rheumatoid arthritis, SIADH: syndrome of inappropriate antidiuretic hormone secretion, SJS: Stevens-Johnson Syndrome, SOB: shortness of breath, SSRI: selective serotonin reuptake inhibitor, UTI: urinary tract infection

| | Clinical Use | Adverse Events | Notes on Mechanism | Historical and Clinical Notes |
|---------------------------|---|---|---|--|
| Oxycodone (OxyContin) | Moderate to severe pain (https://www.verywellhealth.com/oxycodone-5093105). | Asthenia, constipation, dizziness, dry mouth, headache, nausea, pruritus, somnolence, sweating, vomiting, bradycardia, hypotension, palpitations, diaphoresis, photosensitivity, rash, anorexia, abdominal pain, diarrhea, glossitis, confusion, drowsiness, hallucinations, increased CSF pressure, irritability, sedation, seizures, cough, respiratory depression (https://www.ncbi.nlm.nih.gov/books/NBK482226/#article-26488.s5). | Opioid, narcotic analgesic (https://www.drugs.com/oxycodone.html). | High abuse potential (https://www.verywellhealth.com/oxycodone-5093105). |
| Oxycodone/APAP (Percocet) | Moderate to severe pain (https://www.goodrx.com/oxycodone-acetaminophen). | Dangerously slow breathing, overdose, opioid withdrawal, serious allergic skin reaction, dizziness, sleepiness, nausea, vomiting, constipation, itching, sweating, headache, heartburn, bloating, changes in taste, stomach pain, muscle pain, changes in blood pressure, changes in heartbeat (https://www.goodrx.com/percocet/what-is#side-effects). | Oxycodone is an opioid receptor agonist, acetaminophen is an analgesic (https://www.goodrx.com/percocet/what-is). | Risk for abuse and addiction (https://www.webmd.com/drugs/2/drug-7277/percocet-oral/details/). |
| Pentazocine (Talwin) | Moderate to severe pain (https://medlineplus.gov/druginfo/meds/a601092.html#side-effects). | Feeling very tired, lightheadedness, drowsiness, mood changes, headache, upset stomach, constipation, stomach pain, rash, difficulty urinating, difficulty breathing, changes in heartbeat, agitation, hallucinations, fever, sweating, confusion, fast heartbeat, shivering, severe muscle stiffness or twitching, loss of coordination, nausea, vomiting, diarrhea, loss of appetite, weakness, inability to keep an erection, irregular menstruation, decreased sexual desire, fainting (https://medlineplus.gov/druginfo/meds/a601092.html#side-effects). | Opioid, narcotic analgesic (https://www.drugs.com/mtm/pentazocine.html). | May be habit forming, especially with prolonged use (https://medlineplus.gov/druginfo/meds/a601092.html#side-effects). |
| Raloxifene (Evista) | Osteoporosis in postmenopausal women (https://www.drugs.com/mtm/raloxifene.html). | Hot flashes, flu-like symptoms, muscle spasms, arthralgias, infection, insomnia, vomiting, sinusitis, DVT, bronchitis, pharyngitis, breast pain, peripheral edema, muscle spasms/leg cramps, cholelithiasis, venous thrombotic events, PE, retinal vein thrombosis (https://www.ncbi.nlm.nih.gov/books/NBK544233/#article-28224.s5). | Antineoplastic, selective estrogen receptor modulator (https://www.drugs.com/mtm/raloxifene.html). | Not for use in men (https://www.drugs.com/mtm/raloxifene.html). |
| Risedronate (Actonel) | Paget's disease, prevention or treatment of osteoporosis (https://www.healthline.com/health/drugs/risedronate-oral-tablet#side-effects , https://www.webmd.com/drugs/2/drug-7835-394/risedronate-oral/risedronate-30-mg-oral/details). | Back pain, joint pain, pain in stomach area, upset stomach, diarrhea, influenza, ulcers in esophagus, bone death of the jaw, broken bones (https://www.healthline.com/health/drugs/risedronate-oral-tablet#side-effects). | Bisphosphonate (https://www.drugs.com/mtm/risedronate.html). | Foods or supplements may interfere with absorption of this drug (https://www.webmd.com/drugs/2/drug-7835-394/risedronate-oral/risedronate-30-mg-oral/details). |
| Tramadol (Ultram) | Pain (https://www.ncbi.nlm.nih.gov/books/NBK537060/#article-30446.s5). | CNS effects, neuromuscular effects, GI effects, cardiovascular effects, dermatologic effects, endocrine effects, genitourinary effects, visual system effects, nausea, dizziness, constipation, vomiting, somnolence, headache, respiratory depression that may result in death (https://www.ncbi.nlm.nih.gov/books/NBK537060/#article-30446.s5). | Opioid, narcotic analgesic (https://www.drugs.com/tramadol.html). | Considered a class IV drug by the FDA since July 2014 (https://www.ncbi.nlm.nih.gov/books/NBK537060/#article-30446.s5). |