



# Antibiotics

**Introduction:** Antibiotics are medicines designed to treat **bacterial** infections. They are ineffective against viruses and molds. Since rhinosinusitis is a condition where the sinuses may be infected by bacteria, antibiotics can be an important component of your therapy. The choice of antibiotics may be based on the bacteria that can be identified from a sample of pus taken from your nose or sinuses (i.e., a culture). However, it is occasionally not necessary, or possible, to obtain an adequate culture. In many cases, therefore, your physician may prescribe an antibiotic for you based on what bacteria are most likely to be causing the infection. Sometimes more than one antibiotic will be prescribed to increase the likelihood of more effectively eliminating an infection. Because the penetration of the antibiotic inside the sinuses can be limited, an extended treatment is often necessary. Four-six weeks of continuous therapy for chronic rhinosinusitis is common initially. Protracted use of antibiotics may promote antibiotic resistance and the development of unwanted side effects. (see below)

**Dosing:** You should always take your antibiotic exactly as prescribed unless you are experiencing an adverse reaction to the medication. Otherwise always complete the entire course of antibiotic, even if you start feeling better before you are due to finish. By failing to complete the entire course of your treatment, you may be increasing the number of resistant bacteria. This could make further antibiotic therapy ineffective.

Antibiotics are prescribed to be taken by mouth the great majority of the time. Occasionally, for a more resistant or serious infection (such as when bone is infected, or if resistant bacteria are causing the infection), intravenous antibiotics may be needed.

**Adverse effects:** As with any medication, antibiotics can cause side-effects. Any antibiotic can cause an allergic reaction, ranging from a rash on the skin, with or without itching, to a swollen mouth or tongue, wheezing, and/or trouble breathing. In all cases of an allergic reaction, you should stop taking the drug immediately and call your physician. Most allergic skin reactions will resolve with little or no treatment. A drug reaction, somewhat different from an allergy, can develop from using antibiotics and cause fever and/or joint pain and swelling.

Perhaps the most common adverse effect of antibiotics is the gastrointestinal symptoms they produce. These can include stomach pain, nausea, vomiting, and diarrhea. If these symptoms are mild and tolerable they are probably not of concern, but if they are severe, you should stop the antibiotic and inform your physician. In rare cases, antibiotics can cause a severe diarrhea known as "pseudomembranous colitis." Patients with this disorder have severe watery diarrhea (not simply loose stools). In this case you should stop the antibiotic and notify your doctor or your family physician immediately. Do not try to treat yourself with an anti-diarrheal medication or hope that a severe diarrhea problem will subside.

Because antibiotics alter the normal bacteria in the body, as well as the disease-causing bacteria, they can cause other side effects. A yeast infection, most commonly in the mouth or vagina, is one such complication.

To minimize the risk of both diarrhea and yeast from antibiotics, **we recommend daily ingestion of *Lactobacillus acidophilus*, popularly known as acidophilus.** This can be important because with chronic rhinosinusitis you may need to be on antibiotics for an extended period of time. Acidophilus can be found in two forms; yogurt with active cultures, and capsule preparations. We recommend eating 8 ounces of yogurt with active cultures daily while on antibiotics, and to continue doing so for another week or two following completion of your course of antibiotics. Some brands of yogurt do not contain active cultures, so read the container carefully. Although yogurt is the preferred source of acidophilus, acidophilus capsules are an acceptable alternative if you have a milk allergy or for some reason cannot eat yogurt. You can purchase acidophilus tablets at most health food stores.

*This advisory includes selected information only and may not include all side effects of this medicine or interactions with other medicines. Consult your healthcare provider, or pharmacist for more information if you have further questions.*



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Be sure to inform your doctor if any of the following apply to you: impaired kidney function, rash when previously given an antibiotic, ulcerative colitis, mononucleosis (mono), anemia, abnormal liver function, myasthenia gravis, pregnancy, breast feeding, other medications, mitral valve prolapse or prosthetic devices. **If you are using an oral contraception while on antibiotics a back up method of contraception is highly recommended.**

## Antibiotic Preparations:

**Penicillins** (penicillin/*Pen-Vee K*®, amoxicillin/*Amoxil*®, ampicillin/*Omnipen*®, amoxicillin+clavulanate/*Augmentin*®): **skin** rash and gastrointestinal disturbances (nausea, diarrhea) are the most common adverse effects.

**Cephalosporins** (cefadroxil/*Duricef*®, cefprozil/*Cefzil*®, cephalexin/*Keflex*®, and cefuroxime/*Ceftin*®): distant cousins to the penicillin's, with similar adverse effects; not recommended for patients with a history of immediate or severe penicillin reaction.

**Sulfonamides** (sulfamethoxazole+trimethoprim/*Bactrim*®, *Septra*®): **may** interact with other drugs, such as oral hypoglycemics, anticoagulants (Coumadin), anti-seizure medications, and thiazide diuretics; avoid if you have G6PD (an enzyme deficiency); stop at first sign of skin rash; may cause sensitivity to sunlight. Not to be taken if you are allergic to sulfa.

**Quinolones** (ciprofloxacin/*Cipro*®, levofloxacin/*Levaquin*®, gatifloxacin/*Tequin*®, moxifloxacin/*Avelox*®), anticoagulants (may elevate coumadin blood levels), Patients on theophylline may need to decrease their dosage; may increase effects of caffeine; patients should avoid unprotected sun exposure while taking; may cause dizziness or light-headedness, so avoid driving or operating machinery until you know how you will react to this drug. If you are taking vitamins, antacids, or yogurt you should take them two hours before or four hours after. There is a very unlikely, but real risk of developing tendonitis while on these antibiotics.

**Should you feel tenderness in your muscles in tendons, do not push or exert further.** Tendon rupture has been reported and the risk appears increased when these are used in conjunction with systemic steroids such as Medrol or prednisone.

**Tetracyclines** (doxycycline/*Vibramycin*®, minocycline/*Minocin*®): skin requires protection from sunlight while on these drugs; should not be taken antacids, oral contraceptives, barbiturates, phenytoin or carbamazepine; do not take milk products at the same time as tetracyclines, iron and vitamin supplements. Recommend taking on empty stomach with at least 8 oz. of water (except *Vibramycin*®, which must be taken with food). If you are taking vitamins, antacids, or yogurt you should take them two hours before or four hours after. Monitor INR levels if on an anticoagulants.

**Macrolides** (Erythromycin/*PCE*®, clarithromycin/*Biaxin*, and azithromycin/*Zithromax*®): nausea and stomach upset occurs most commonly; may interact with digoxin, carbamazepine, warfarin (Coumadin), and cisapride (*Propulsid*®). Theophylline dosage may need to be reduced. With *Biaxin*® use alternative or stop taking "statins" (Cholesterol lowering agents such as *Lipitor*®) during treatment.

**Monobactams:** should be avoided in patients with a history of cephalosporin-allergy. (*Lorabid*®)

**Ketolides: (telithromycin/ Ketek)** These are cousins of the erythromycins/macrolides. Telithromycin may cause vision problems such as difficulty focusing, blurred vision, or double vision. Use caution when driving, operating machinery, or performing other hazardous activities. (see above) Do not take telithromycin if you are taking cisapride (*Propulsid*) or pimozone (*Orap*). If you have a low potassium, or cardiac arrhythmia do not take this medicine unless otherwise discussed with your healthcare provider.

## Miscellaneous:

**Metronidazole /Flagyl®:** it is important to avoid alcoholic beverages and alcohol-containing medications (such as cough syrups) for at least 24 hours after taking this medication; may interact with anticoagulants, anticonvulsants, lithium and cimetidine; may cause dark urine. Drug should be stopped should you develop numbness, tingling, weakness in hands or feet.

**Clindamycin /Cleocin®:** diarrhea is the most common adverse reaction and can be severe; should not be taken with neuromuscular blocking agents.

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