

## Amoxicillin

**Introduction:** A semisynthetic antibiotic, an analog of ampicillin, with a broad spectrum of bactericidal activity against many gram-positive and gram-negative microorganisms.

**Mechanism of action:** Amoxicillin binds to penicillin-binding protein 1A (PBP-1A) located inside the bacterial cell wall. Penicillins acylate the penicillin-sensitive transpeptidase C-terminal domain by opening the lactam ring. This inactivation of the enzyme prevents the formation of a cross-link of two linear peptidoglycan strands, inhibiting the third and last stage of bacterial cell wall synthesis. Cell lysis is then mediated by bacterial cell wall autolytic enzymes such as autolysins; it is possible that amoxicillin interferes with an autolysin inhibitor.

**Pharmacology:** Amoxicillin is a moderate-spectrum antibiotic active against a wide range of Gram-positive, and a limited range of Gram-negative organisms. It is usually the drug of choice within the class because it is better absorbed, following oral administration, than other beta-lactam antibiotics. Amoxicillin is susceptible to degradation by  $\beta$ -lactamase-producing bacteria, and so may be given with clavulanic acid to increase its susceptibility. The incidence of  $\beta$ -lactamase-producing resistant organisms, including *E. coli*, appears to be increasing. Amoxicillin is sometimes combined with clavulanic acid, a  $\beta$ -lactamase inhibitor, to increase the spectrum of action against Gram-negative organisms, and to overcome bacterial antibiotic resistance mediated through  $\beta$ -lactamase production.

**Indications:** Capsules, chewable tablets, and oral suspensions of amoxicillin may be given without regard to meals. The 400-mg suspension, 400-mg chewable tablet, and the 875-mg tablet have been studied only when administered at the start of a light meal. However, food effect studies have not been performed with the 200-mg and 500-mg formulations.

**Dosage:** Neonates and Infants Age

**≤12 Weeks (≤3 Months):** Due to incompletely developed renal function affecting elimination of amoxicillin in this age group, the recommended upper dose of AMOXICILLIN is 30 mg/kg/day divided q12h.

### Adults and Pediatric Patients >3 Months

Infection	Severity*	Usual Adult Dose	Usual Dose for Children >3 Months <sup>†‡</sup>
Ear/Nose/Throat	Mild/Moderate	500 mg every 12 hours or 250 mg every 8 hours	25 mg/kg/day in divided doses every 12 hours <b>or</b> 20 mg/kg/day in divided doses every 8 hours
	Severe	875 mg every 12 hours or 500 mg every 8 hours	45 mg/kg/day in divided doses every 12 hours <b>or</b> 40 mg/kg/day in divided doses every 8 hours
Lower Respiratory Tract	Mild/Moderate or Severe	875 mg every 12 hours or 500 mg every 8 hours	45 mg/kg/day in divided doses every 12 hours <b>or</b> 40 mg/kg/day in divided doses every 8 hours
Skin/Skin Structure	Mild/Moderate	500 mg every 12 hours or 250 mg every 8 hours	25 mg/kg/day in divided doses every 12 hours <b>or</b> 20 mg/kg/day in divided doses every 8 hours

	Severe	875 mg every 12 hours or 500 mg every 8 hours	45 mg/kg/day in divided doses every 12 hours <b>or</b> 40 mg/kg/day in divided doses every 8 hours
Genitourinary Tract	Mild/Moderate	500 mg every 12 hours or 250 mg every 8 hours	25 mg/kg/day in divided doses every 12 hours <b>or</b> 20 mg/kg/day in divided doses every 8 hours
	Severe	875 mg every 12 hours or 500 mg every 8 hours	45 mg/kg/day in divided doses every 12 hours <b>or</b> 40 mg/kg/day in divided doses every 8 hours
Gonorrhoea Acute, uncomplicated anogenital and urethral infections in males and females		3 grams as single oral dose	<u>Prepubertal children:</u> 50 mg/kg AMOXICILLIN , combined with 25 mg/kg probenecid as a single dose.

**Side effects:** As with other penicillins, it may be expected that untoward reactions will be essentially limited to sensitivity phenomena. They are more likely to occur in individuals who have previously demonstrated hypersensitivity to penicillins and in those with a history of allergy, asthma, hay fever, or urticaria. The following adverse reactions have been reported as associated with the use of penicillins:

**Infections and Infestations:** Mucocutaneous candidiasis.

**Gastrointestinal:** Nausea, vomiting, diarrhea, black hairy tongue, and hemorrhagic/pseudomembranous colitis.

**Hypersensitivity Reactions:** Anaphylaxis

Serum sickness-like reactions, erythematous maculopapular rashes, erythema multiforme, Stevens-Johnson syndrome, exfoliative dermatitis, toxic epidermal necrolysis, acute

generalized exanthematous pustulosis, hypersensitivity vasculitis and urticaria have been reported.

**Liver:** A moderate rise in AST (SGOT) and/or ALT (SGPT) has been noted, but the significance of this finding is unknown. Hepatic dysfunction including cholestatic jaundice, hepatic cholestasis and acute cytolytic hepatitis have been reported.

**Renal:** Crystalluria has also been reported

**Hemic and Lymphatic Systems:** Anemia, including hemolytic anemia, thrombocytopenia, thrombocytopenic purpura, eosinophilia, leukopenia, and agranulocytosis has been reported during therapy with penicillins. These reactions are usually reversible on discontinuation of therapy and are believed to be hypersensitivity phenomena.

**Central Nervous System:** Reversible hyperactivity, agitation, anxiety, insomnia, confusion, convulsions, behavioral changes, and/or dizziness have been reported rarely.

**Miscellaneous:** Tooth discoloration (brown, yellow, or gray staining) has been rarely reported. Most reports occurred in pediatric patients. Discoloration was reduced or eliminated with brushing or dental cleaning in most cases.

**Precautions:**

**General:** The possibility of superinfections with mycotic or bacterial pathogens should be kept in mind during therapy. If superinfections occur, amoxicillin should be discontinued and appropriate therapy instituted. A high percentage of patients with mononucleosis who receive ampicillin develop an



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erythematous skin rash. Thus, ampicillin-class antibiotics should not be administered to patients with mononucleosis.

**Pregnancy: Teratogenic Effects:** There are no adequate and well-controlled studies in pregnant women, this drug should be used during pregnancy only if clearly needed.

**Nursing Mothers:** Amoxicillin use by nursing mothers may lead to sensitization of infants. Caution should be exercised when amoxicillin is administered to a nursing woman.

**Pediatric Use:** Because of incompletely developed renal function in neonates and young infants, the elimination of amoxicillin may be delayed. Dosing of amoxicillin should be modified in pediatric patients 12 weeks or younger ( $\leq 3$  months).

**Geriatric Use:** This drug is known to be substantially excreted by the kidney, and the risk of toxic reactions to this drug may be greater in patients with impaired renal function. Because elderly patients are more likely to have decreased renal function, care should be taken in dose selection, and it may be useful to monitor renal function.

**Contraindication:** A history of allergic reaction to any of the penicillins is a contraindication.

**How supplied: Customized as per Request.**



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