

Antibiotic Prescribing Guidelines for Outpatient Management in Otherwise Healthy Children

Antibiotics are the most common medication class prescribed in children. Approximately 20% of pediatric outpatient visits result in an antibiotic prescription. Unfortunately, almost half of these antibiotic prescriptions may be inappropriate (unnecessary, overly broad or incorrectly prescribed).¹ Even when prescribed appropriately, antibiotics can result in adverse events or the development of antibiotic resistance.

The goal of this guideline is to help clinicians choose the most narrowly focused antibiotics based on the most likely bacterial pathogens and treat for the shortest effective duration.

These recommendations are generally meant to apply to children who are previously healthy, appropriately vaccinated based on their age and well enough to be treated in an outpatient setting.

These guidelines are not a substitute for good clinical judgement. Clinicians may need to consider alternative treatment regimens based on epidemiologic and clinical history, physical exam and illness severity. This is not a comprehensive guideline for overall management.

Primary Antibiotic Selection	Alternative Selection	Comments
Respiratory Tract Infections		
Group A Streptococcal (GAS) Pharyngitis		
<p>GAS pharyngitis is characterized by fever, pharyngitis, exudative tonsillitis and cervical lymphadenitis.</p> <p>Diagnostic stewardship is important as children may be colonized with GAS in their posterior pharynx. Avoid testing for GAS if the child also has symptoms of a viral upper respiratory tract infection (congestion, rhinorrhea, mouth sores, hoarseness and/or cough).</p>		
Primary pathogen: <i>Streptococcus pyogenes</i>		
Amoxicillin 25mg/kg/dose BID x 10 days (Max 500 mg/dose) OR Penicillin VK ≤ 27kg: 250mg BID x 10 days > 27kg: 500mg BID x 10 days	Penicillin allergy (non-anaphylactic) Cephalexin 20mg/kg/dose BID x10 days (Max 500mg/dose) Penicillin allergy (anaphylactic) Clindamycin 10mg/kg/dose TID x 10 days (Max 300mg/dose)	For penicillin allergic patients, clarify the penicillin allergy to verify it's a true allergy .
Odontogenic abscesses		
Primary pathogens: <i>Viridans</i> and other streptococci, <i>Peptostreptococcus</i> spp, <i>Bacteroides</i> spp and other oral anaerobes.		
Amoxicillin/clavulanate (7:1 formulation) 22.5mg amox/kg/dose BID x 7 days (Max 875mg/dose of amoxicillin)	Clindamycin 10mg/kg/dose TID x 10 days (Max 300mg/dose)	Drainage of the abscess if possible. Monitor improvement especially if clindamycin is given.

Primary Antibiotic Selection	Alternative Selection	Comments
Respiratory Tract Infections (continued)		
Acute Otitis Media		
<p>Acute otitis media (AOM) is inflammation of the middle ear with fluid in the middle ear accompanied by ear pain, a perforated eardrum and drainage. A diagnosis of AOM is appropriate in children who present with at least one of the following:</p> <ul style="list-style-type: none"> - Moderate to severe bulging of the tympanic membrane - New onset of otorrhea not due to acute otitis externa 		
Primary pathogens: <i>Streptococcus pneumoniae</i> , non-typeable <i>Haemophilis influenzae</i> and <i>Moraxella catarrhalis</i>		
Amoxicillin 45mg/kg/dose BID (Max 2000mg/dose) OR Amoxicillin/clavulanate (14:1 formulation) 45mg amox/kg/dose BID (Max 1800mg/dose of amoxicillin)	Cefdinir 14mg/kg/dose daily (Max 600mg/dose) OR Ceftriaxone 50mg/kg (max 1000mg/dose) intramuscular injection per day for 1-3 days	<p>Consider watchful waiting in patients (6mo – 2yrs) with unilateral non-severe symptoms and in patients (\geq 2yrs) with unilateral or bilateral non-severe symptoms.</p> <p>Amoxicillin/clavulanate is preferred for patients who have received antibiotics within the preceding 30 days, have a history of otitis media unresponsive to amoxicillin or have associated conjunctivitis (<i>H. influenzae</i>).</p> <p>Duration:</p> <ul style="list-style-type: none"> • < 2 years or severe symptoms: 10 days² • \geq 2 years: 5 days

Primary Antibiotic Selection	Alternative Selection	Comments
Respiratory Tract Infections (continued)		
Acute Bacterial Rhinosinusitis		
<p>The diagnosis of sinusitis should be based on one of three clinical scenarios:</p> <ul style="list-style-type: none"> - Persistent illness with any nasal drainage or daytime cough for greater than 10 days without improvement - Worsening or new onset nasal drainage, daytime cough or fever after initial improvement ("double sickening") - Severe onset with $\geq 102^{\circ}\text{F}$ temperature and purulent nasal discharge for at least three consecutive days 		
Primary pathogens: Nontypeable <i>H. influenzae</i> , <i>S. pneumoniae</i> and <i>M. catarrhalis</i>		
Amoxicillin 45mg/kg/dose BID x 10 days (Max 2000mg/dose) OR Amoxicillin/clavulanate (14:1 formulation) 45mg amox/kg/dose BID x 10 days (Max 1800mg amoxicillin/dose)	Cefdinir 14mg/kg/dose daily (Max 600mg/dose) OR Levofloxacin < 5 years: 10mg/kg/dose BID x 5 days ≥ 5 years: 10mg/kg/dose daily x 5 days (Max 500mg/day)	Broaden coverage if no improvement in 3-5 days. Consider amoxicillin/clavulanate for severe disease or daycare attendance. Children who attend daycare may be at increased risk for <i>H. influenzae</i> .
Community-Acquired Pneumonia (CAP)		
Primary pathogens: - <i>S. pneumoniae</i> is the most common bacterial cause of CAP. - Consider atypical coverage for <i>Mycoplasma pneumoniae</i> and <i>Chlamydia pneumoniae</i> in children ≥ 5 years of age.		
Amoxicillin 45mg/kg/dose BID x 5 days (Max 2000mg/dose) ADD for atypical coverage Azithromycin 10mg/kg/dose on day 1, then 5mg/kg/dose on days 2-5 (Max 500mg on day 1 and 250mg day 2-5)	Clindamycin 10mg/kg/dose TID x 5 days (Max 600mg/dose) OR Cefuroxime 15mg/kg/dose BID x 5 days (Max 500mg/dose) OR Levofloxacin < 5 years: 10mg/kg/dose BID x 5 days ≥ 5 years: 10mg/kg/dose daily x 5 days (Max 750mg/day)	Viral etiology is more common in children between 3 months and 5 years of age. Mild cases of pneumonia are overwhelmingly caused by viruses. Consider amoxicillin/clavulanate (14:1 formulation) 45mg amox/kg/dose BID (max 1800mg amox/dose) if concerned for <i>H. influenzae</i> . If levofloxacin given, azithromycin is not needed for atypical coverage.

Primary Antibiotic Selection	Alternative Selection	Comments
Skin and Soft Tissue Infections		
Acute Bacterial Lymphadenitis		
Primary pathogens: <i>Staphylococcus aureus</i> and GAS		
Clindamycin 10mg/kg/dose TID (max 600mg/dose)	Cephalexin 20mg/kg/dose TID x 5 days (Max 500mg/dose)	Use cephalexin with caution if concerned for MRSA. Duration: 7 days and reassess
Impetigo		
Primary pathogens: Non-bullous impetigo: GAS Bullous impetigo: <i>S. aureus</i> including MRSA		
Mupirocin 2% ointment TID x 3-5 days Cephalexin 20mg/kg/dose TID x 5 days (Max 500mg/dose)	In penicillin allergy or concern for MRSA Clindamycin 10mg/kg/dose TID x 5 days (Max 450mg/dose)	Oral antibiotics are preferred if the patient has numerous lesions. Mupirocin ointment is significantly less expensive than mupirocin cream.
Cellulitis (Non-Purulent)		
Primary pathogens: GAS and <i>S. aureus</i> Methicillin-resistant <i>S. aureus</i> (MRSA) is an unusual cause of non-purulent cellulitis.		
Cephalexin 20mg/kg/dose TID (Max 500mg/dose)	Clindamycin 10mg/kg/dose TID (Max 450mg/dose)	Duration: 5 days and reassess

Primary Antibiotic Selection	Alternative Selection	Comments
Skin and Soft Tissue Infections (Continued)		
Cellulitis (Purulent) or Abscess		
<p>Primary pathogens: <i>S. aureus</i> including MRSA and GAS</p> <p>If the skin infection was acquired in water, also consider Gram negative rod infections (e.g. <i>Aeromonas</i> spp if freshwater, <i>Vibrio</i> spp if saltwater, <i>Mycobacterium marinum</i> if exposure to fish tank).</p> <p>TMP/SMX is trimethoprim/sulfamethoxazole.</p>		
Clindamycin 10mg/kg/dose TID x 7 days (Max 450mg/dose)	TMP/SMX 5mg TMP/kg/dose BID x 7 days (Max 160mg TMP/dose)	<p>Small abscesses (< 1cm) without cellulitis can be managed with drainage alone.</p> <p>Either Clindamycin or TMP/SMX can be used interchangeably</p>
Bite Wounds (human, dog or cat)		
<p>Primary pathogens: In addition to <i>S. aureus</i> and GAS, consider oral anaerobes, <i>Pasteurella multocida</i>, <i>Capnocytophagia</i> spp, and <i>Eikenella corrodens</i>.</p>		
Amoxicillin/clavulanate (7:1 formulation) 22.5mg amoxicillin/kg/dose BID (Max 875mg amoxicillin/dose)	Clindamycin 10mg/kg/dose TID (Max 450mg/dose) AND TMP/SMX 5mg TMP/kg/dose BID (Max 160mg TMP/dose)	<p>For animal bites also review tetanus immunization status and consider the need for rabies prophylaxis.</p> <p>Duration: Prophylaxis: 3-5 days Treatment: 7 days and reassess</p>

Primary Antibiotic Selection	Alternative Selection	Comments
Genitourinary Tract Infections		
Urinary tract infections (UTIs): <ul style="list-style-type: none"> - Uncomplicated cystitis: no fever, no back pain, and no systemic symptoms - Mild uncomplicated UTI: fever but no other systemic symptoms and no flank pain - Pyelonephritis: fever with other systemic symptoms such as malaise/chills and/or flank pain, nausea/vomiting Infants and children who are not toilet-trained: <ul style="list-style-type: none"> - Urinalysis and culture - Urine culture by catheterization or suprapubic aspiration Verbal toilet-trained children ≥ 2 years of age who are afebrile: <ul style="list-style-type: none"> - Urinalysis with reflex to urine culture if abnormal - Urine culture by clean voided specimen 		
Primary pathogens: <i>Escherichia coli</i> is the most common cause of UTIs accounting for the vast majority of UTIs. <i>Klebsiella pneumoniae</i> is the second most common cause.		
<u>Uncomplicated cystitis</u> Nitrofurantoin 1.5mg/kg/dose every 6 hours (Max 100mg/dose) OR Cephalexin 20mg/kg/dose BID (Max 1000mg/dose) <u>Mild uncomplicated UTI</u> Cephalexin 20mg/kg/dose BID (Max 1000mg/dose) OR Cefuroxime 15mg/kg/dose BID (Max 500mg/dose) OR Cefprozil 15mg/kg/dose BID (Max 500mg/dose)	<u>Pyelonephritis</u> Cefuroxime 15mg/kg/dose BID (Max 500mg/dose) OR Cefprozil 15mg/kg/dose BID (Max 500mg/dose) Or Cefixime 8mg/kg/dose once daily (Max 400mg/day) OR Cefdinir 14mg/kg/dose once daily (Max 600mg/day)	Nitrofurantoin can only be used for treatment of uncomplicated cystitis. For febrile UTI, consider local susceptibility when choosing cephalexin. Only 12-18% of cefdinir is excreted in the urine as unchanged drug. Duration: <ul style="list-style-type: none"> • Uncomplicated cystitis: 3 days • Mild uncomplicated UTI: 5 days • Pyelonephritis: 5 days and reassess

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