

# ADULT ANTIBIOTIC PRESCRIBING GUIDELINES

## Adult Outpatient Treatment Recommendations 2017: Summary of Guidelines<sup>1</sup>

### Acute rhinosinusitis<sup>2-4</sup>

90-98% of cases are viral

Antibiotics may NOT help even if cause is bacterial

Diagnosis	Management
<p>Presentations consistent with acute bacterial sinusitis are:</p> <ul style="list-style-type: none"><li>• Symptoms of acute rhinosinusitis lasting <math>\geq 10</math> days without improvement</li><li>• Severe symptoms lasting <math>\geq 3</math> days:<ul style="list-style-type: none"><li>• Fever <math>\geq 39^{\circ}\text{C}</math> (<math>102.2^{\circ}\text{F}</math>)</li><li>• Purulent nasal discharge</li><li>• Facial Pain</li></ul></li><li>• "Double worsening", following a typical URI that lasted 5-6 days with new onset:<ul style="list-style-type: none"><li>• Fever</li><li>• Headache</li><li>• increased nasal discharge</li></ul></li></ul> <p>Sinus radiographs are NOT routinely recommended.</p>	<p>If bacterial, watchful waiting encouraged for uncomplicated infections with reliable follow-up. Evidence-based supportive care:</p> <ul style="list-style-type: none"><li>• Saline nasal irrigation</li><li>• Intranasal glucocorticoids</li><li>• Oral decongestants when there is Eustachian tube dysfunction</li><li>• OTC analgesics and antipyretics</li></ul> <p>Macrolides (such as azithromycin) are NOT recommended due to high levels of <i>S. pneumoniae</i> antibiotic resistance (<math>\sim 40\%</math>).</p> <p>If mild/moderate and no risk factors for resistance:</p> <ul style="list-style-type: none"><li>• amoxicillin/clavulanate 500/125 mg PO 3x/day or 875/125 mg PO 2x/day x 5-10 days (Some experts recommend amoxicillin.)</li></ul> <p>If severe disease or risk factors for resistance (<math>&gt;65</math> yo, antibiotics within 30 days, recent hosp, <math>\geq 10\%</math> penicillin non-susceptible <i>S. pneumoniae</i>, immunocompromised):</p> <ul style="list-style-type: none"><li>• amoxicillin/clavulanate 2 g/125 mg PO 2x/day x 7-10 days.</li></ul> <p>Penicillin-allergic patients:</p> <ul style="list-style-type: none"><li>• doxycycline 100 mg PO 2x/day or 200 mg PO 1x/day x 5-10 days</li></ul> <p>See references for additional treatment options, including re-treatment after initial treatment failure, and other important information.</p>

### Acute uncomplicated bronchitis<sup>5-7</sup>

Viruses cause  $>90\%$  of acute bronchitis

Cough typically lasts 5 days to 3 weeks, up to 6 weeks

Diagnosis	Management
<p>Focus on ruling out pneumonia, which is rare among otherwise healthy adults without abnormal vital signs (heart rate <math>&gt;100</math> beats/min, respiratory rate <math>&gt;24</math> breaths/min, or oral temperature <math>&gt;38^{\circ}\text{C}</math> (<math>100.4^{\circ}\text{F}</math>)) and abnormal lung examination (focal consolidation, egophony, fremitus).</p> <p>Colored sputum does NOT indicate bacterial infection.</p> <p>For most cases, chest radiography is NOT indicated.</p> <p>Promote appropriate antibiotic use by labeling acute bronchitis as a 'chest cold' or 'viral upper respiratory infection'.</p>	<p>Routine treatment of uncomplicated acute bronchitis with antibiotics is NOT recommended, regardless of cough duration.</p> <p>Patients may benefit from symptomatic therapy:</p> <ul style="list-style-type: none"><li>• Cough suppressants</li><li>• Expectorants</li><li>• First-generation antihistamines</li><li>• Decongestants</li></ul> <p>Consider pertussis especially with cough paroxysms, post-tussive emesis, or during known outbreaks.</p> <p>See references for additional treatment options, and other important information..</p>

### Common cold or non-specific upper respiratory tract infection (URI)<sup>8,9</sup>

Most adults get 2-4 colds annually

Management
<p>Antibiotic treatment is NOT recommended for non-specific URIs.</p> <ul style="list-style-type: none"><li>• OTC analgesics can be given to relieve symptoms</li><li>• Decongestants combined with a first-generation antihistamine may provide short-term relief of nasal symptoms and cough.</li><li>• Evidence does NOT support antihistamines (as monotherapy), intranasal corticosteroids, and nasal saline irrigation as effective treatments for cold symptom relief.</li><li>• Providers and patients must weigh the benefits and harms of symptomatic therapy.</li></ul>



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## Pharyngitis<sup>7, 10, 11</sup>

Group A Streptococcus (GAS) is the only common indication for antibiotics

Only 5-10% cases in adults are caused by GAS

Diagnosis	Management
<p>Clinical features alone do NOT distinguish between GAS and viral pharyngitis; a rapid antigen detection test is necessary to establish a GAS pharyngitis diagnosis.</p> <p>Adults with sore throat and 2 (3 if <math>\geq 45</math> yo) or more of the following features should get a rapid test:</p> <ol style="list-style-type: none"><li>1. Lack of cough</li><li>2. Tonsillar exudates</li><li>3. History of fever</li><li>4. Swollen and tender anterior cervical lymphadenopathy</li></ol> <p>Throat cultures after negative rapid test are NOT routinely recommended for adults.</p>	<p>Antibiotic treatment is NOT recommended for patients with negative rapid test results. GAS resistance to clindamycin and azithromycin is increasingly common.</p> <p>First-line therapy for GAS:</p> <ul style="list-style-type: none"><li>• penicillin V 250 mg PO 4x/day or 500 mg PO 2x/day x10 days</li><li>• amoxicillin 1 g PO 1x/day or 500 mg 2x/day x10 days</li></ul> <p>Non-type I penicillin allergy:</p> <ul style="list-style-type: none"><li>• cephalexin 500 mg PO 2x/day x10 days</li><li>• cefadroxil 1 g PO 1x/day x10 days</li><li>• clindamycin 300 mg PO 3x/day x10 days</li><li>• azithromycin 500 mg PO 1x/day x5 days</li><li>• clarithromycin 250 mg PO 2x/day x10 days</li></ul> <p>Immediate type I penicillin allergy:</p> <ul style="list-style-type: none"><li>• clindamycin, clarithromycin, or azithromycin as dosed above</li></ul> <p>See references for additional treatment options and other important information.</p>

## Acute uncomplicated cystitis<sup>12, 13, 14</sup>

Diagnosis	Management
<p>Nitrites and leukocyte esterase are the most accurate indicators of acute uncomplicated cystitis</p> <p>Antibiotic treatment of asymptomatic bacteriuria is NOT recommended for healthy adults EXCEPT:</p> <ul style="list-style-type: none"><li>• pregnant women</li><li>• before some urological procedures</li></ul>	<p>First-line therapy in healthy non-pregnant, premenopausal women:</p> <ul style="list-style-type: none"><li>• nitrofurantoin 100 mg PO 2x/day x5 days (nitrofurantoin is NOT recommended if suspicious for early pyelonephritis)</li><li>• TMP-SMX 160/800 mg PO (one DS tablet) 2x/day x3 days (where local resistance is <math>&lt; 20\%</math>)</li><li>• fosfomycin 3g PO x1 dose</li></ul> <p>Reserve fluoroquinolones (e.g. ciprofloxacin) for situations in which other agents are NOT appropriate.</p> <p>See references for additional treatment options and other important information especially if early pyelonephritis is suspected.</p>

## Adult Outpatient References

1. Centers for Disease Control and Prevention. Adult treatment recommendations. Get Smart: Know When Antibiotics Work in Doctor's Offices. 2016 March 4; <https://www.cdc.gov/getsmart/community/for-hcp/outpatient-hcp/adult-treatment-rec.html>.
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14. Nicolle LE, Bradley S, Colgan R, et al. Infectious Diseases Society of America guidelines for the diagnosis and treatment of asymptomatic bacteriuria in adults. *Clin Infect Dis.* 2005;40:643-54.

# PEDIATRIC ANTIBIOTIC PRESCRIBING GUIDELINES

## Pediatric Outpatient Treatment Recommendations: Summary of Guidelines<sup>1</sup>

### Acute rhinosinusitis<sup>2-3</sup>

90–98% of cases are viral

Antibiotics may NOT help even if cause is bacterial

Diagnosis	Management
<p>Presentations consistent with acute bacterial sinusitis are:</p> <ul style="list-style-type: none"> <li>Symptoms of acute rhinosinusitis lasting <math>\geq 10</math> days without improvement</li> <li>Severe symptoms lasting <math>\geq 3</math> days:                             <ul style="list-style-type: none"> <li>Fever <math>\geq 39^{\circ}\text{C}</math> (<math>102.2^{\circ}\text{F}</math>)</li> <li>Purulent nasal discharge</li> <li>Facial Pain</li> </ul> </li> <li>“Double worsening”, following a typical URI that lasted 5-6 days with new onset:                             <ul style="list-style-type: none"> <li>Fever</li> <li>Headache</li> <li>increased nasal discharge</li> </ul> </li> </ul> <p>Halitosis, fatigue, headache, decreased appetite, but most physical exam findings are non-specific and do NOT distinguish bacterial from viral causes.</p> <p>Imaging tests are no longer recommended for uncomplicated cases.</p>	<p>If bacterial, consider watchful waiting for up to 3 days if NOT severe or worsening and with reliable follow up.</p> <p>If mild/moderate and no risk factors for resistance:</p> <ul style="list-style-type: none"> <li>amoxicillin/clavulanate 45 mg/kg/day PO of the amoxicillin component in 2 divided doses (max 1.75 g/day) x10-14 days. (Some experts recommend amoxicillin.)</li> </ul> <p>If severe or risk factors for resistance (age &lt;2yo, daycare, antibiotics within 30 days, recent hosp, under immunized with PCV, <math>\geq 10\%</math> penicillin non-susceptible <i>S. pneumoniae</i>, immunocompromised):</p> <ul style="list-style-type: none"> <li>amoxicillin/clavulanate 90 mg/kg/day PO of the amoxicillin component in 2 divided doses (max 4g/day) x10-14 days.</li> </ul> <p>Non-type I penicillin allergy:</p> <ul style="list-style-type: none"> <li>clindamycin 30-40 mg/kg/day PO in 3 divided doses plus (cefixime 8 mg/kg/day PO in 2 divided doses or cefpodoxime 10 mg/kg/day PO in 2 divided doses) x10-14 days.</li> </ul> <p>Cannot tolerate oral medication:</p> <ul style="list-style-type: none"> <li>ceftriaxone 50 mg/kg IM x1 dose then oral antibiotics if improving.</li> </ul> <p>Macrolides (such as azithromycin) are NOT recommended due to high levels of <i>S. pneumoniae</i> antibiotic resistance (~40%).</p> <p>See references for more details, additional treatment options, including re-treatment after initial treatment failure, supportive care, and other important information.</p>

### Acute otitis media (AOM)<sup>4,5</sup>

4-10% of children with AOM treated with antibiotics experience adverse effects.

Diagnosis	Management
<p>Definitive diagnosis requires either:</p> <ul style="list-style-type: none"> <li>Moderate or severe bulging of tympanic membrane (TM) or new onset otorrhea NOT due to otitis externa.</li> <li>Mild bulging of the TM AND recent (&lt;48h) onset of otalgia (holding, tugging, rubbing of the ear in a nonverbal child) or intense erythema of the TM.</li> </ul> <p>AOM should NOT be diagnosed in children without middle ear effusion (based on pneumatic otoscopy and/or tympanometry).</p> <p>Severe AOM: moderate or severe otalgia or otalgia for <math>\geq 48</math> hours, or temperature <math>\geq 39^{\circ}\text{C}</math> (<math>102.2^{\circ}\text{F}</math>).</p>	<p>Treat with antibiotics:</p> <ul style="list-style-type: none"> <li>AOM in &lt;6 mo</li> <li>Age 6-23 mo with bilateral AOM</li> <li>Severe AOM, regardless of age</li> </ul> <p>Consider watchful waiting (if reliable follow-up):</p> <ul style="list-style-type: none"> <li>Age 6-23 mo with unilateral AOM</li> <li><math>\geq 2</math> yo with unilateral or bilateral AOM</li> </ul> <p>If mild/moderate and no risk factors for resistance:</p> <ul style="list-style-type: none"> <li>amoxicillin 80-90 mg/kg/day PO in 2 divided doses (max 2 g/dose)</li> </ul> <p>If severe or risk factors for resistance (recent beta-lactam therapy, purulent conjunctivitis, or history of recurrent AOM unresponsive to amoxicillin):</p> <ul style="list-style-type: none"> <li>amoxicillin/clavulanate 80-90 mg/kg/day and 6.4 mg/kg/day PO, in 2 divided doses (max 2 g/dose)</li> </ul> <p>Non-type I penicillin allergy:</p> <ul style="list-style-type: none"> <li>cefdinir 14 mg/kg/day IM daily or in 2 divided doses</li> <li>cefuroxime 30 mg/kg/day PO in 2 divided doses</li> <li>cefpodoxime 10 mg/kg/day PO in 2 divided dose</li> </ul> <p>Duration of treatment:</p> <ul style="list-style-type: none"> <li>&lt;2 yo or severe symptoms: 10 days</li> <li>2-5 yo, mild-moderate symptoms: 7 days</li> <li><math>\geq 6</math> yo, mild-moderate symptoms: 5-7 days</li> </ul> <p>See references for more details, additional treatment options, and other important information.</p>

### Common cold or non-specific upper respiratory tract infection (URI)<sup>6,8</sup>

Colds usually last around 10 days.

Diagnosis	Management
<p>Usually nasal discharge begins as clear and changes throughout the course of the illness.</p> <p>Fever, if present, occurs early in the illness.</p>	<p>Antibiotics are NOT helpful and should NOT be used. Focus on symptomatic relief.</p> <p>OTC cough and cold medications are NOT recommended for use in children younger than 6 yo. These substances are among the top 20 substances leading to death in children &lt;5 yo.</p> <p>Low-dose inhaled corticosteroids and oral prednisolone do NOT improve outcomes in non-asthmatic children.</p> <p>See references for more details, additional treatment options, and other important information.</p>



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## Pharyngitis<sup>6,7</sup>

During winter and spring, up to 20% of **asymptomatic** children can be colonized with GAS, leading to false positives from rapid-testing and increases in unnecessary antibiotic exposure.

Streptococcal pharyngitis is primarily a disease of children 5-15 yo and is rare in preschool children.

Diagnosis	Management
<p>Clinical features alone do NOT distinguish between GAS and viral pharyngitis.</p> <p>Children with sore throat plus 2 or more of the following features should undergo a rapid test:</p> <ol style="list-style-type: none"><li>1. Lack of cough</li><li>2. Tonsillar exudates</li><li>3. History of fever</li><li>4. Swollen and tender anterior cervical lymphadenopathy</li><li>5. Age younger than 15 yo</li></ol> <p>Testing should generally NOT be performed in children younger than 3 yo in whom GAS rarely causes pharyngitis and rheumatic fever is uncommon.</p> <p>In children and adolescents, negative rapid tests should be confirmed with a throat culture; positives do NOT require a follow up culture.</p>	<p>First-line therapy:</p> <ul style="list-style-type: none"><li>• amoxicillin 50 mg/kg/day PO (max 1 g/day) daily or in 2 divided doses x 10 days</li><li>• penicillin V 250 mg PO 2-3x/day (adolescents and adults: 250 mg 4x/day or 500 mg 2x/day) x 10 days</li></ul> <p>Non-type I penicillin allergy:</p> <ul style="list-style-type: none"><li>• cephalexin 40 mg/kg/day PO (max 1 g) in 2 divided doses x 10 days</li><li>• cefadroxil 30 mg/kg/day PO (max 1 g) daily x 10 days</li><li>• clindamycin 21 mg/kg/day PO (max 900 mg) in 3 divided doses x 10 days</li><li>• azithromycin 12 mg/kg/day PO (max 500 mg) daily x 5 days</li><li>• clarithromycin 15 mg/kg/day PO (max 500 mg) in 2 divided doses x 10 days</li></ul> <p>Immediate type I penicillin allergy:</p> <ul style="list-style-type: none"><li>• clindamycin, clarithromycin, or azithromycin dosed as above</li></ul> <p>See references for more details, additional treatment options, and other important information.</p>

## Bronchiolitis<sup>9</sup>

Diagnosis	Management
<p>Routine laboratory tests and radiologic studies are NOT recommended, but a chest x-ray may be warranted in atypical disease (absence of viral symptoms, severe distress, frequent recurrences, lack of improvement).</p>	<p>Antibiotics are NOT helpful and should NOT be used.</p> <p>Usually patients worsen between 3-5 days, followed by improvement.</p> <p>Nasal suctioning is mainstay of therapy.</p> <p>Unless hospitalized, neither albuterol nor nebulized racemic epinephrine should be administered to infants and children with bronchiolitis.</p> <p>There is no role for corticosteroids, ribavirin, or chest physiotherapy in the management of bronchiolitis.</p> <p>See references for more details, additional treatment options, and other important information.</p>

## Urinary tract infections (UTIs)<sup>10,11</sup>

Diagnosis	Management
<p>In infants, fever and or strong-smelling urine are common. A definitive diagnosis requires both a urinalysis suggestive of infection and at least 50,000 CFUs/mL of a single uropathogen from urine obtained through catheterization or suprapubic aspiration. Diagnosis cannot be made from urine collected in a bag.</p> <p>Urine testing for all children 2-24 mo with unexplained fever is no longer recommended.</p> <p>Urinalysis is suggestive of infection with the presence of pyuria (leukocyte esterase or <math>\geq 5</math> WBCs per high powered field), bacteriuria, or nitrites.</p> <p>Nitrites are NOT a sensitive measure for UTI in children and cannot be used to rule out UTIs.</p>	<p>Initial antibiotic treatment should be based on local antimicrobial susceptibility patterns.</p> <p>Suggested agents:</p> <ul style="list-style-type: none"><li>• TMP/SMX 6-12 mg/kg/day of TMP component PO in 2 divided doses</li><li>• amoxicillin/clavulanate 20-40 mg/kg/day PO of amoxicillin component in 3 divided doses</li><li>• cefixime 8 mg/kg/day PO daily</li><li>• cefpodoxime 10 mg/kg/day PO in 2 divided doses</li><li>• cefprozil 30 mg/kg/day PO in 2 divided doses</li><li>• cephalexin 50-100 mg/kg/day PO in 4 divided doses</li></ul> <p>Duration of treatment: 7-14 days</p> <p>Antibiotic treatment of asymptomatic bacteriuria in children is NOT recommended.</p> <p>Antibiotic prophylaxis to prevent recurrent UTIs is NOT recommended.</p> <p>See references for more details, additional treatment options, and other important information.</p>

## Pediatric Outpatient References

1. Centers for Disease Control and Prevention. Pediatric treatment recommendations. Get Smart: Know When Antibiotics Work in Doctor's Offices. 2017 February 1; <https://www.cdc.gov/getsmart/community/for-hcp/outpatient-hcp/pediatric-treatment-rec.html>
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