

Antibiotic Commonsense

"An investment in knowledge always pays the best interest." Benjamin Franklin



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Antibiotic Stewardship: When to Withhold and When to Stop Antibiotics (Part 1)

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Researchers estimate that up to 50% of all antimicrobials prescribed are inappropriate or unnecessary.¹ Antibiotic resistance is directly associated with antibiotic use and most antibiotic-resistant infections will occur in the general community.

When necessary to treat true bacterial infection, antibiotic use is always justified. However, the challenge often lies in the diagnosis of bacterial infection. Reducing inappropriate prescribing can help slow the spread of resistant bacteria.

Antibiotic use is not benign with ramifications that include the development of *Clostridium difficile* infection,² adverse effects and toxicities of treatment. It can also cause alterations to the microbiome which may have unforetold implications.

Over the next several issues of *Antibiotic Commonsense*, we will review current evidence for diagnosing and treating selected common infections in an effort to improve prescribing practices in our community.

Acute Pharyngitis

Pharyngitis is most commonly caused by viral organisms and as such will often not respond to antibiotics.³⁻⁵ This self-limiting infection is best managed with supportive care including analgesic and antipyretic agents, as needed. The use of corticosteroids is not recommended.

Group A beta hemolytic streptococcus is implicated in up to 5–15% of adult and 15–30% of pediatric cases. It is very difficult to distinguish viral from bacterial pharyngitis on clinical exam, although symptoms such as rhinorrhea, cough, hoarseness, oral ulcers, conjunctivitis, and diarrhea are usually associated with viral infection.

Rapid antigen detection testing (RADT) should be provided to all children over the age of three years and adults that meet two or more Centor criteria:

- Tender anterior cervical lymphadenopathy³
- Tonsillar exudates

- Absence of cough
- History of fever

While testing is generally not recommended for children under the age of three years due to a low incidence in this age group, it may be indicated depending on other risk factors, such as exposure to older siblings with confirmed streptococcal pharyngitis. Antibiotics should be reserved for patients with positive RADT, with confirmation of negative results by subsequent culture in children.

Despite these established recommendations, many patients continue to receive antibiotics for viral pharyngitis. A recent analysis of 8,191 outpatient adult sore throat visits to primary care and ED providers from 1997–2010 showed 60% of patients were treated with antibiotics (95% CI, 57–63%).⁶ A similar review of 4,158 visits by children over the period from 1995–2003 showed antibiotic prescription rates of 53% (95% CI, 49–56%).⁷ Both of these prescribing rates vastly exceed the expected prevalence of true Group A streptococcal pharyngitis noted previously.

When indicated for bacterial infection, the antibiotic of choice is penicillin or amoxicillin, with clarithromycin, clindamycin, or azithromycin reserved for cases of penicillin-allergy. Therapy should continue for 10 days (five for azithromycin due to long half-life). Alternately, one dose of benzathine penicillin G may be administered intramuscularly. Cultures or RADT are not necessary as a test of cure.



Acute Otitis Media

Acute otitis media (AOM) is the most common indication for pediatric antibiotic use in the United States⁸ but its management does not always require antibiotics.^{5,8} Significant care must be taken to differentiate AOM from otitis media with effusion which is a non-infectious condition.

Culture obtained via tympanocentesis is the gold standard but is rarely performed in the community setting. When collected in surveillance studies of children with AOM, growth of bacterial organisms occurred in 70% of samples, viral organisms in 20%, and no pathogen identified in 25% (total exceeds 100% as 15% of samples included both bacteria and virus).⁹ *Streptococcus pneumoniae* and *Haemophilus influenzae* are the most common pathogens identified. *Moraxella catarrhalis* occurs in a smaller proportion of patients.

Current guidelines recommend evaluating for the presence of middle ear effusion with pneumatic otoscopy or tympanometry.⁸ In the presence of effusion, AOM is diagnosed by moderate to severe bulging of the tympanic membrane (TM) or acute otorrhea not related to otitis externa. Mild TM bulging with intense erythema or onset of otalgia in the past 48 hours is also diagnostic.

Depending on assessment and patient characteristics, either initial treatment with antibiotics or initial observation may be indicated (Table 1). In most children, AOM will resolve without antibiotics although bilateral AOM, the presence of otorrhea, and *S. pneumoniae* infections show a significant benefit with initial antibiotic treatment.^{8,10} Of note, unilateral AOM in children age 3–13 is predominantly viral and will usually resolve spontaneously.

When managed with initial observation, antibiotics should be considered if the child worsens or fails to improve within 48–72 hours. However, numerous studies have shown only approximately 1/3 of children require subsequent antibiotic therapy after an initial observation approach.

Table 1. AAP Guidelines for treatment of AOM⁸

Age	Otorrhea with AOM	Unilateral or bilateral AOM with severe symptoms*	Bilateral AOM without otorrhea	Unilateral AOM without otorrhea
6 Mo to 2 y	Antibiotic therapy	Antibiotic therapy	Antibiotic therapy	Antibiotic therapy or observation
≥ 2 y	Antibiotic therapy	Antibiotic therapy	Antibiotic therapy or observation	Antibiotic therapy or observation

*Persistent otalgia greater than 48 h or temperature ≥ 102.2°F in past 48 h

Whether or not antibiotic use is indicated, patients should receive supportive care to include the use of analgesic agents.⁸ Nasal saline spray is a good option to thin secretions and minimize further movement along and blockage of the Eustachian tube. Prophylactic antibiotics should not be used to prevent AOM in patients with recurrent infection. Antihistamine or corticosteroid use has not been shown to improve outcomes and the former may actually prolong the duration of effusion.¹¹

When indicated, antibiotic selection depends on patient factors such as previous antibiotic use and medication allergies. High-dose amoxicillin is the agent of choice for children who have not received it in the past 30 days or do not have concomitant conjunctivitis in which case high-dose amoxicillin/clavulanate is recommended.⁸ Cefdinir, cefuroxime, cefpodoxime, or ceftriaxone may be considered in cases of penicillin allergy. Clindamycin may not provide coverage of all typical organisms and would likely need to be given in combination with a third generation cephalosporin. Antibiotic therapy is usually given for 10 days although only studies in children under the age of 2 years have the most evidence for this duration. In fact, 7 days has been shown to be effective for children between 2–5 years with moderate AOM and courses of 5–7 days are adequate for those over the age of 6 years. Up to 60–70% of children may have middle ear effusions that persist beyond successful antibiotic treatment.



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