CARILION CLINIC
Antimicrobial Stewardship

Guideline for the Treatment of Sinusitis, Acute Otitis Media and Acute Otitis Externa

Disclaimer: These guidelines are not intended to replace clinical judgment. Please refer to the Carilion Clinic: Antimicrobial Dosing Recommendations for additional antibiotic dosing guidelines.

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Additional resources for management of ENT infections

Resource	Description
Viral Symptom Relief Prescriptions (Adult/Pediatric)	Education tools provide patients with an action plan to manage symptoms of common mild outpatient infections viral illnesses. May be useful for cases of sinusitis and otitis media.
Pediatric Otitis Media Algorithm	Short algorithm for triage and evaluation of otitis media in pediatric patients. Co-developed with pediatric medicine to improve management.

Most sinusitis and AOM cases are viral. In the few cases that are bacterial, the organisms below are most common:

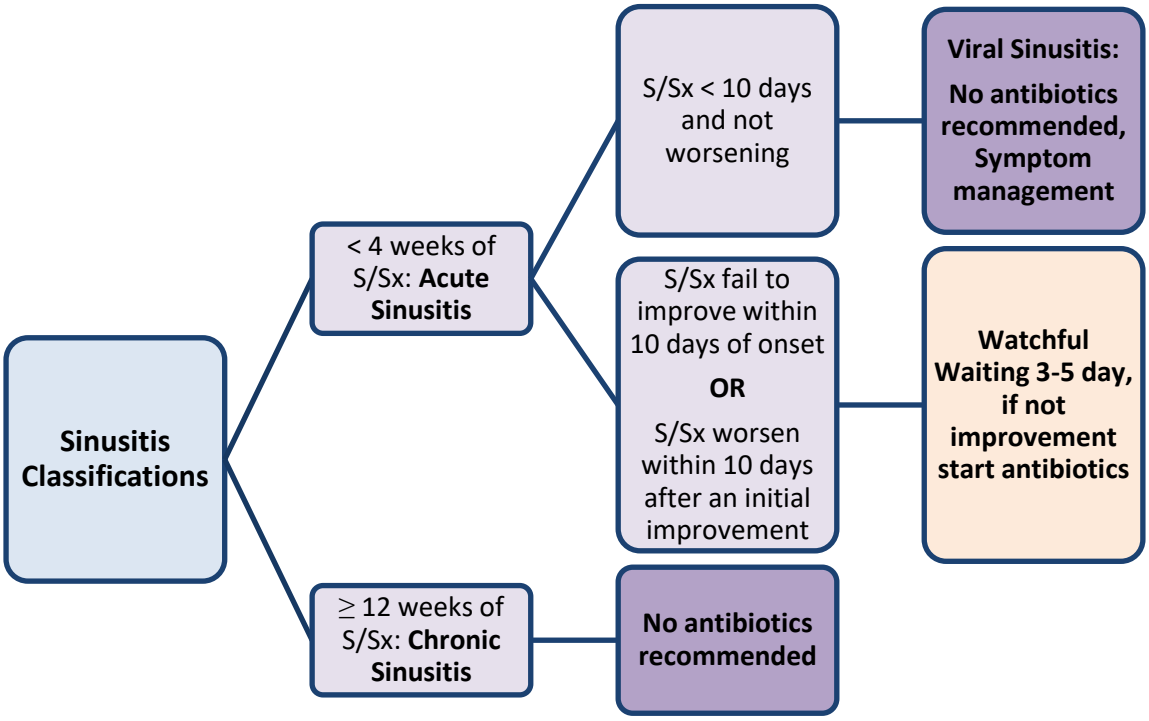
Expected Coverage	*Streptococcus pneumoniae*	*Haemophilus influenzae*	*Moraxella catarrhalis*
Amoxicillin-clavulanate			
Doxycycline			
Cephalexin			
Levofloxacin, Moxifloxacin			
Cefpodoxime, Cefdinir			
Azithromycin*			
Amoxicillin			
Penicillin VK			
Trimethoprim-sulfamethoxazole**			
Clindamycin			

*Increasing S. *pneumoniae* resistance

**Trimethoprim-sulfamethoxazole lacks any activity against Group B Streptococcus

Sinusitis

Greater than 1 in 5 antibiotic prescriptions in adults are for sinusitis, the 5th most common diagnosis that antibiotics are prescribed in the outpatient setting. However, only 0.5-2% of acute sinusitis is complicated by bacterial infection. Antibiotic treatment side effects for sinusitis carry twice the risk of antibiotic benefit in the treatment of uncomplicated sinusitis. Bacterial sinusitis is diagnosed based on the presence of purulent nasal drainage and nasal obstruction and/or facial pain-pressure-fullness.

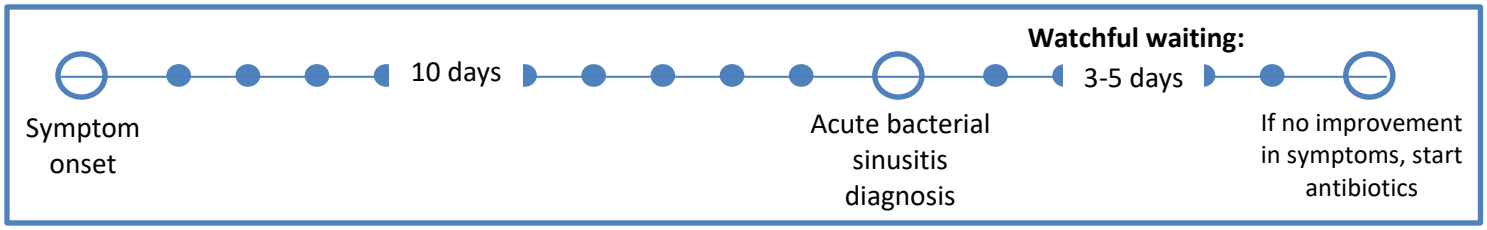


1. Symptom Management

Fever and Pain	Nasal Passage Irrigation	Facial Pain/Pressure/Congestion
• Acetaminophen • Ibuprofen	• Nasal saline	• Fluticasone • Oxymetazoline (limit use to 3 days)

2. Antibiotics vs. Watchful Waiting

- **Watchful waiting** approach allows delaying antibiotic prescribing for up to 3-5 days after diagnosis to allow for the symptoms to improve on their own (indicative of viral sinusitis).



- Current treatment guidelines have variable recommendations for watchful waiting versus initiating antibiotic therapy as the initial management strategy.

Guideline	Treatment Recommendation
IDSA, 2012	Antibiotic therapy for all patients
AAO-HNS*, 2025 update	Watchful waiting for uncomplicated disease with assurance of follow-up
European, 2020	Watchful waiting for mild symptoms; Antibiotic therapy for severe illness
Canadian, 2014	Intranasal steroid and watchful waiting

*AAO-HNS: American Academy of Otolaryngology-Head and Neck Surgery

- Antibiotic therapy or watchful waiting are both appropriate options for therapy. Initial choice should be a case-by-case determination based on the potential benefits versus risks of antibiotic therapy for the patient (i.e. side effects and emergence of drug-resistant bacteria).

3. Antibiotic Selection

- **Amoxicillin-clavulanate** is **recommended** as initial empiric therapy due to increase in beta-lactamase producing H. *influenzae* and *M. catarrhalis.*

Phase of Care	Antibiotic
Initial Empiric Therapy	**Amoxicillin-Clavulanate**
Beta-Lactam Allergy	**Doxycycline (Preferred)**
	Cefpodoxime
	Levofloxacin
	Moxifloxacin
Treatment Failure	Amoxicillin-Clavulanate
	Levofloxacin
	Moxifloxacin

FDA Safety Warning: Fluoroquinolone Use Restricted

Serious side effects associated with fluoroquinolone use involving the tendons, muscles, joints, and CNS can outweigh the benefits that a patient would receive if being treated for acute sinusitis.

Fluoroquinolone use should be reserved for patients who do not have alternative treatment options.

4. Duration of Therapy – 5-7 days

- **Prolonged antibiotic course is not necessary**. No evidence to suggest a higher rate of clinical success with >7 days of therapy. It has been shown that most patients with confirmed acute bacterial sinusitis have both symptomatic and bacteria eradication within 72 hours after initiation of antibiotic therapy.
- 5 days are appropriate unless **severe** symptoms persist beyond 5 days.

Acute Otitis Media (See also Pediatric Acute Otitis Media Algorithm)

1. **Antibiotics vs. Observation**
   a. Evidence has shown a small difference in the presence of pain and fever in children with unilateral acute otitis media (AOM) who are treated with antibiotics.
   b. Observational therapy may be appropriate in some patients. Symptomatic relief should be initiated at presentation and antibiotic therapy initiated only if the condition worsens at any time or clinical improvement is not seen within 48-72 hours.
   c. Antibiotics have been shown to be most useful in children <2 years of age with bilateral acute otitis media and in children with otorrhea.

Recommendations for the Initial Management of Uncomplicated Acute Otitis Media				
Age	**Otorrhea with AOM**	**Unilateral/Bilateral AOM with Severe Symptoms**	**Bilateral AOM without Otorrhea**	**Unilateral AOM without Otorrhea**
6*-23 months	Antibiotic therapy	Antibiotic therapy	Antibiotic therapy	Observation or antibiotic therapy
≥ 2 years	Antibiotic therapy	Antibiotic therapy	Observation or antibiotic therapy	Observation or antibiotic therapy

* Research is limited in children < 6 months of age and treatment guidelines do not directly address this age group. Most physicians recommend treating AOM in children < 6 months of age with antibiotics.

2. **Antibiotic Selection (**see table on next page**)**

   a. ***Use high-dose amoxicillin alone as first-line antibiotic.*** Amoxicillin-clavulanate should be chosen if patient has received amoxicillin in past 30 days, has concurrent conjunctivitis, or has a history of recurrent AOM unresponsive to amoxicillin.
   b. If symptoms do not improve within 48-72 hours of initial therapy, the causative bacteria may be resistant to the chosen antibiotic and another agent should be chosen.
      i. If patient was initially treated with amoxicillin, antibiotic should be switched to amoxicillin-clavulanate.
      ii. If patient was initially treated with amoxicillin-clavulanate, antibiotic should be switched to ceftriaxone.
   c. Recent data suggest that cross-reactivity between penicillins and cephalosporins is ~0.1-1%, excluding patients with a documented IgE mediated reaction (i.e., urticaria, angioedema, bronchospasm, pruritus, and anaphylaxis), Stevens-Johnson Syndrome, or toxic epidermal necrolysis.
   d. A cephalosporin is recommended therapy in cases without severe and/or recent penicillin allergic reaction (< 5 years).

Antibiotic Selection for Otitis Media		
Initial antibiotic treatment		**Treatment failure (48-72 hours after initial)**
First-line therapies		***First-line therapies***
Amoxicillin 45 mg/kg/dose (max 2 g) PO BID	→	Amoxicillin-clavulanate 45 mg/kg/dose (max 2 g) PO BID
Amoxicillin-clavulanate* 45 mg/kg/dose (max 2 g) PO BID	→	Ceftriaxone 50 mg/kg/dose (max 1000 mg) IV/IM daily**
Alternatives		***Alternatives***
Cefdinir 7 mg/kg/dose (max 300 mg) PO BID	→	Ceftriaxone 50 mg/kg/dose (max 1000 mg) IV/IM daily
Cefpodoxime 5 mg/kg/dose*** (max 200 mg) PO BID	→	
Ceftriaxone 50 mg/kg/dose (max 1000 mg) IV/IM daily		Clindamycin 10-13 mg/kg/dose (max 600 mg) PO TID **PLUS** Cefpodoxime 5 mg/kg/dose (max 200 mg) PO BID***

*The 14:1 amoxicillin-to-clavulanate formulation should be used for pediatric patients ≥3 months weighing <40 kg
**Recommended if patient has failed two antibiotics
*** Preferred oral third-generation cephalosporin due to favorable pharmacokinetics, although cost may be a barrier for patients

3. Duration of Therapy

Patient Age	Recommended Duration of Therapy	
< 2 years with AOM	10 days	Ceftriaxone IV/IM: 1 or 3 days*
2-5 years with AOM	5-7 days	
≥ 6 years with AOM	5 days	
>18 years with AOM	5 days	

*A one-time dose of IV/IM ceftriaxone may be an adequate initial first-line therapy in pediatric patients, although concern regarding inadequate bacterial eradication with single-dose therapy does exist, specifically in refractory cases

Acute Otitis Externa

1. **Topical Antimicrobial Therapy**
    a. **Recommendations**
        i. Since acute otitis externa (AOE) is cellulitis of the ear canal skin, topical antimicrobials with or without topical corticosteroids are first-line therapy.
    b. **Preferred Agents**
        i. First-line therapy is dependent upon status of tympanic membrane.
        ii. If the tympanic membrane isn't intact, the use of aminoglycosides can lead to toxicities.

First-Line Therapy	
Tympanic membrane intact:	-Neomycin/polymyxin B/hydrocortisone otic preparation
Tympanic membrane not intact or status unknown:	-Ofloxacin -Ciprofloxacin/dexamethasone

Optimal duration of topical therapy is recommended as 7 days.

If symptoms persist at end of treatment course, therapy should be extended to 10 days.

Medication	Dosage	Inpatient Formulary	Use if tympanic membrane perforation?	Comments
Acetic acid 2% (Vosol)	3-5 drops 4-6x daily	No	No	-May cause pain and irritation - Used prophylactically
Ciprofloxacin 0.3%/ dexamethasone 0.1% (Ciprodex)	4 drops 2x daily	Yes	Yes	- Low risk of sensitization
Ciprofloxacin 0.3%* (ophth) + dexamethasone 0.1% (opthal)	4 drops each 2x daily	Yes	Yes	- Ophthalmic product can be used in ear
Neomycin/polymyxin B/ hydrocortisone (Cortisporin)	3-4 drops 3-4x daily	Yes	No	- Ototoxic - High risk of contact hypersensitivity - Avoid in chronic eczematous otitis externa
Ofloxacin 0.3%	5-10 drops 1x daily	Yes	Yes	- Low risk for sensitization

2. **Systemic Antimicrobial Therapy**
    a. Systemic antibiotics have shown no significant benefit in pain reduction or clinical cure rate when compared to topical therapy alone.

    b. Use increases risk of side effects and drug resistance.
    c. Systemic antibiotics should only be prescribed if a patient has specific factors:
        i. Extension outside of ear canal, uncontrolled diabetes, immunocompromised, history of local radiotherapy and inability to effectively deliver topical products

Systemic Antibiotic of Choice	
Levofloxacin	
Adult	750 mg daily x 10-14 days
6 months to <5 year	8-10 mg/kg/dose BID x 10-14 days
>/= 5 years	10 mg/kg/dose daily (max 750 mg) x 10-14 days

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