CARILION CLINIC
Antimicrobial Stewardship

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

Disclaimer: These guidelines are not intended to replace clinical judgment. An Infectious Diseases consultation is always available for complex patients and should be strongly considered for severe infections and healthcare-associated meningitis patients. Please refer to the Carilion Clinic: Antimicrobial Dosing Recommendations for additional antibiotic dosing guidelines.

Additional resources for management of ENT infections on Antimicrobial Stewardship Hub

Resource	Description
Viral Symptom Relief Prescriptions (Adult/Pediatric)	Education tools to provide patients with an action plan to manage symptoms of mild outpatient infections most commonly associated with 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.

Common Microbiology for Sinusitis and Otitis Media

	Streptococcus pneumoniae	***Haemophilus influenzae***	***Moraxella catarrhalis***
Expected Coverage			
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

Otitis Externa: Potential causative pathogens are expanded to include MRSA and *Pseudomonas spp.*

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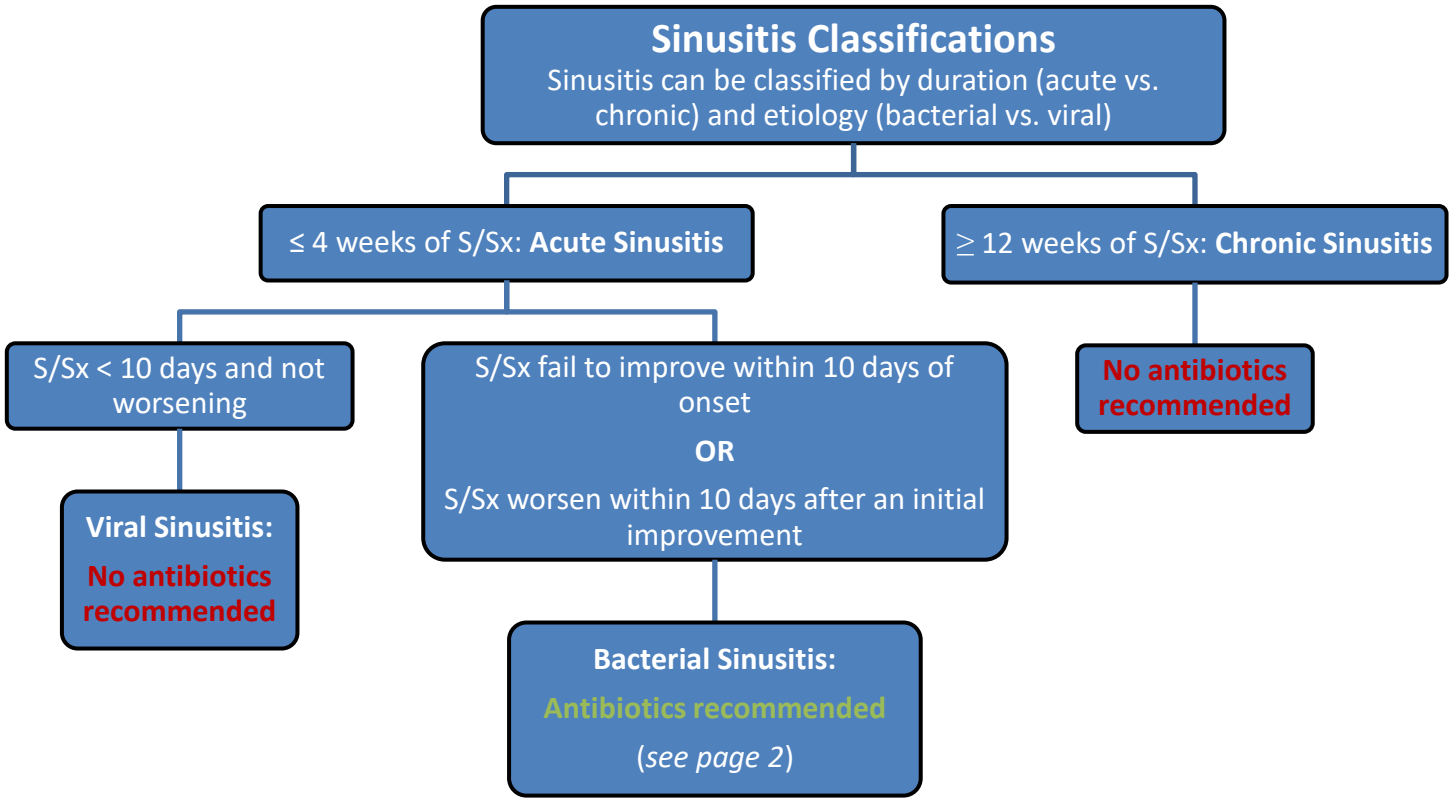
Sinusitis Diagnosis

Purulent nasal drainage accompanied by:		
Nasal obstruction	**OR**	Facial pain/pressure/fullness



Acute Bacterial Sinusitis

1. **Antibiotics vs. Watchful Waiting**
   a. **Watchful waiting** approach allows delaying antibiotic prescribing for up to 7 days after diagnosis to allow for the symptoms to improve on their own (indicative of viral sinusitis).
   b. 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*, 2015	Choice of watchful waiting or antibiotic therapy
European, 2012	Watchful waiting for mild symptoms; Antibiotic therapy for severe illness
Canadian, 2011	Watchful waiting

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

c. 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).

Phase of Care	Antibiotic
Initial Empiric Therapy	Amoxicillin-Clavulanate
	Cephalexin
	Doxycycline
Beta-Lactam Allergy	Doxycycline
	Levofloxacin
	Moxifloxacin
Treatment Failure	Amoxicillin-Clavulanate
	Levofloxacin
	Moxifloxacin

2. Antibiotic Selection

a. **Amoxicillin-clavulanate** is **recommended over amoxicillin** as initial empiric therapy due to high resistance rates with S. *pneumoniae* as well as clinical data demonstrating an increase in beta-lactamase producing H. *influenzae.*

b. **FDA Safety Warning: Fluoroquinolone Use Restricted**

   a. 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.

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

3. Duration of Therapy

a. **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.

Recommended duration of therapy is **5-7 days**.

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

1. Classifying Acute Otitis Media

Non-Severe **Middle ear effusion AND ANY** of the following:	Severe if **ANY** of the following are present:
• Moderate/severe bulging of tympanic membrane (TM) • Mild bulging of TM with new otalgia (ear pain) < 48 hours ago • Mild bulging of TM with severe erythema (redness) • New otorrhea (discharge from ear) without otitis externa **Patients with pressure equalizer (PE) tubes do not have bulging TM*	• Temperature ≥ 102.2°F (39°C) • Moderate/severe otalgia • Otalgia for >48 hours • Otorrhea

2. 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.

3. 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
Ceftriaxone 50 mg/kg/dose (max 1000 mg) IV/IM daily	→	Clindamycin 10 mg/kg/dose (max 300 mg) PO TID **PLUS** cefdinir 7 mg/kg/dose (max 300 mg) PO BID*

*Recommended if patient has failed two antibiotics

4. Duration of Therapy

Patient Age	Recommended Duration of Therapy	
< 2 years with mild or moderate AOM OR any age with severe AOM	10 days	Ceftriaxone IV/IM: 3 days
2-5 years with mild or moderate AOM	7 days	
> 5 years with mild or moderate AOM	5-7 days	

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

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.
      i. 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**

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

2. Systemic Antimicrobial Therapy

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

ii. Use increases risk of **side effects** and **drug resistance**.

iii. Systemic antibiotics should only be prescribed if a patient has **specific factors:**

Factors Indicating Need for Systemic Therapy
Extension outside of ear canal
Tympanostomy tube
Uncontrolled diabetes
Immunocompromised
History of local radiotherapy
Inability to effectively deliver topical products

iv. **If** systemic therapy is **indicated**, it should be **added to topical therapy**.

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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