

# Acute Otitis Media

**Acute otitis media (AOM) is a common, symptomatic infection of the middle ear. Nasopharyngeal secretions that contain viruses and bacteria can enter the middle ear via the eustachian tube. If there is eustachian tube swelling, fluid from the middle ear may not drain properly. Under these conditions, bacteria and viruses can multiply, creating clinical AOM. This document is intended for children 6 months of age or older.**

## Diagnosis

AOM presents within several days of symptom onset. Often, especially in pre-verbal children, these symptoms are non-specific (such as fever, crying and/or irritability) and can be similar to other viral or bacterial infections. Diagnosis rests on detailed examination of the middle ear to identify whether or not there is probable bacterial infection, irrespective of the presence of fever at time of presentation.

» **The TWO required criteria for AOM are:**

**1. Presence of a middle ear effusion as evidenced by:**

- » a full or bulging tympanic membrane (TM) **-OR-**
- » loss of bony landmarks or presence of an air-fluid level on the TM **-OR-**
- » absent or significant decreased motility of the TM with a pneumatic otoscope

**2. Signs of inflammation in the middle ear:**

- » distinct intense erythema or hemorrhagic patches over a bulging TM **-OR-**
- » yellow TM

- » An acutely **ruptured TM** in the setting of acute otitis media occurs due to a bacterial infection (usually Group A streptococcus) and should always be treated with systemic antibiotics. A bacterial culture should be considered if pus is present in the ear canal.
- » **AOM should be distinguished from chronic suppurative otitis media** (greater than 3 weeks of painless otorrhea without acute symptoms) through a previously ruptured TM or a myringotomy tube. In these cases, cultures of the fluid should be obtained to direct therapy. Topical or systemic therapy can be prescribed empirically depending on the clinical severity of illness pending culture results. If symptoms persist despite treatment, children should be referred to ENT as there is a risk of chronic mastoiditis.
- » **Acute** otorrhea in the setting of a myringotomy tube or chronic perforation is **NOT** AOM and can be treated topically (Ciprofloxacin 0.3%/dexamethasone 0.1% otic drops, 4 drops to affected ear(s) BID for 7 days).

## THE FOLLOWING SIGNS ARE NOT CONSISTENT WITH THE DIAGNOSIS OF AOM

- » Chronic ear drainage
- » TM with limited mobility but no evidence of inflammation
- » Isolated erythema or opacity of TM
- » Retracted or neutral position of TM

## Deciding who requires immediate treatment with antibiotics

### MILD SYMPTOMS

- » AOM associated with mild symptoms will often resolve spontaneously and should not be treated with antibiotics. Overuse of antibiotics for this condition could lead to an increase in bacterial resistance and may subject the child to unnecessary side effects from antibiotics.
- » Children **6 months of age and older** can be observed for 24-48 hrs to see if symptoms resolve on their own **if they are:**
  - » **Mildly ill** (e.g. alert, responsive, responding well to analgesia) **-AND-**
  - » Have been symptomatic for **less than 48 hours** **-AND-**
  - » Have a temperature **less than 39° C**
- » Counsel caregivers to follow-up with a healthcare provider if symptoms worsen or persist after 48 hrs. Alternatively, provide an expectant prescription to be filled in 24-48 hours if symptoms persist.

### MODERATE OR SEVERE SYMPTOMS

Children should be treated with oral antibiotics to relieve symptoms and prevent complications **if they are:**

- » **Moderately or severely ill** (e.g. difficulty sleeping, severe pain despite analgesia, poor feeding and/or irritable) **-OR-**
- » Have been symptomatic for **greater than 48 hours** **-OR-**
- » Have a temperature **greater than or equal to 39° C** **-OR-**
- » Have an **acutely perforated TM** (pus noted in the ear canal or perforation seen on examination)

## Treatment of AOM

- » It is important to manage the child's pain while treatment is underway using oral ibuprofen and/or oral acetaminophen. Most children will not need analgesia after 24-36 hours of effective treatment. (See TREKK Pain Treatment Recommendations)
- » Since most cases of AOM are due to *S. pneumoniae* and Group A streptococci, amoxicillin is the drug of choice as initial treatment.

Clinical Scenario	Antibiotic	Notes
Uncomplicated AOM	Amoxicillin 80-90 mg/kg/day PO divided BID (max 4 g/day)	» Treat children 6 months to less than 2 years for 10 days; treat children equal to or greater than 2 years for 5-7 days.
AOM with acute perforation	Amoxicillin 45-60 mg/kg/day PO divided TID (max 4 g/day)	» No evidence for addition of topical antibiotics <sup>1, 2</sup> » Treat for 10 days in all ages
AOM with suspected penicillin allergy (rare in children)	Cefuroxime-axetil suspension 30 mg/kg/day PO divided BID (max 1 g/day) or Cefuroxime tablet (if patient able to swallow tablets whole) 250 mg PO BID <b>-OR-</b> If prior life-threatening allergy: Clarithromycin 15 mg/kg/day PO divided BID (max 1 g/day)	» Verify that the history is consistent with a severe cutaneous reaction (e.g. Steven Johnson syndrome) or anaphylaxis (difficulty breathing, hypotension). » Patients with penicillin allergy label should be referred to an allergy specialist for further evaluation. » More treatment failures are seen with use of clarithromycin. » Duration of treatment as per uncomplicated AOM or AOM with acute perforation.
AOM with treatment failure or recurrence (persistent pain and/or fever after 48 hours or AOM in past 30 days)	Amoxicillin-clavulanate 45-60 mg/kg/day PO divided TID (max 2625 mg/day or 875 mg/dose) <b>-OR-</b> Ceftriaxone 50 mg/kg/day IV/IM Q24H (max 1 g/dose)	» Dosing based on amoxicillin component only; 7:1 formulation is preferred product; treat for 10 days in all ages. » Ceftriaxone: treat for 3 days » Children who have bacterial AOM should be at least somewhat better within 24 hours; most children have symptom resolution by 24 hours. » Verify diagnosis and rule out any complications (e.g. acute mastoiditis).

**Note: Refer to local formulary for more specific dosing information**

## Complications due to AOM

- » Complicated AOM can develop if infections of the middle ear spread to adjacent structures.
- » Carefully assess patients with AOM to rule these complications in or out.
- » Acute mastoiditis manifests as pain and/or swelling over the mastoid bone. There can be associated petrous bone inflammation that causes unilateral facial palsy (CN VII) and/or diplopia on lateral gaze (CN VI).
- » Venous sinus thrombosis or meningitis can manifest as a persistent or severe headache and/or cranial nerve palsies.
- » Any concern regarding acute mastoiditis, venous sinus thrombosis and/or meningitis requires immediate consultation with your Pediatric Referral Site. These conditions require separate considerations for medical and surgical management, subspecialty consultation (e.g. ENT), and admission to hospital.

**The purpose of this document is to provide healthcare professionals with key facts and recommendations for the diagnosis and treatment of acute otitis media in children in the emergency department.** This summary was produced by the acute otitis media content advisor for the TREKK Network, Dr. Nicole Le Saux of the Children's Hospital of Eastern Ontario, and uses the best available knowledge at the time of publication. However, healthcare professionals should continue to use their own judgment and take into consideration context, resources and other relevant factors. The TREKK Network is not liable for any damages, claims, liabilities, costs or obligations arising from the use of this document including loss or damages arising from any claims made by a third party. The TREKK Network also assumes no responsibility or liability for changes made to this document without its consent.

This summary is based on:

1. Le Saux N, Robinson JL. [Management of acute otitis media in children six months of age and older](#). Paediatr Child Health 2016; 21:39-50.
2. Liberthal A et al. & American Academy of Pediatrics. [The diagnosis and management of acute otitis media](#). Pediatrics 2013;131 (3)
3. Hoberman A, et al. [Treatment of acute otitis media in children under 2 years of age](#). N Engl J Med 2011; 364:105-15.
4. Shaikh N, Hoberman A, Kaleida P, Ploof D, Paradise J. [Diagnosing Otitis Media – Otoscopy and Cerumen Removal \(Video\)](#). N Engl J Med 2010; 362:e62.
5. Tähtinen PA, Laine MK, Huovinen P, Jalava J, Ruuskanen O, Ruohola A. [A placebo-controlled trial of antimicrobial treatment for acute otitis media](#). N Engl J Med 2011; 364:116-26.
6. Costelloe C, Metcalfe C, Lovering A, Mant D, Hay AD. [Effect of antibiotic prescribing in primary care on antimicrobial resistance in individual patients: systematic review and meta-analysis](#). BMJ 2010; 340:c2096.
7. Venekamp RP, Sanders SL, Glasziou PP, Del Mar CB, Rovers MM. [Antibiotics for acute otitis media in children](#). Cochrane Database Syst Rev 2015: CD000219