

DIAGNOSIS AND MANAGEMENT OF

Acute Otitis Media (Ear Infection)

This care process model (CPM), produced by Intermountain Healthcare's Antibiotic Stewardship team and Primary Care Clinical Program, is based on the American Academy of Pediatrics (AAP)^{AAP} Clinical Practice Guidelines; it provides best-practice recommendations for diagnosis and management of acute otitis media (AOM), including guidance for when and which antibiotics should be used.

KEY POINTS

- **Treat uncomplicated AOM without antibiotics to reduce antibiotic resistance.** The 2013 guidelines published by the American Academy of Pediatrics offer observation without antibiotics as a treatment option for AOM. Antibiotics should not be prescribed for uncomplicated AOM, unless the patient is between 6 and 12 months.^{AAP}
- **Most cases of AOM resolve without antibiotics.** According to a systematic literature review, AOM symptoms improved without antibiotics in 61% of children within 24 hours and 80% of children within 2 to 3 days.^{ROS}
- **Diagnosis of AOM should only be made if exam and symptoms meet criteria.** Local infection surveillance programs like **GermWatch** can provide up-to-date information about communicable diseases that affect our communities.
- **For a diagnosis of otitis media with effusion (OME), antibiotics are not the answer.** Antibiotics won't help OME heal faster, and antibiotics expose the patient to unnecessary side effects.
- **Shared decision-making for AOM may lead to less antibiotic usage.** In a study assessing how parents responded to doctor-patient communication styles, parents educated about all AOM treatment options using a shared-decision model showed decreased tendency to choose antibiotics.^{MER}

► Why Focus ON ACUTE OTITIS MEDIA (EAR INFECTION)?

- **Antibiotics are commonly prescribed for otitis media.** For children in the U.S., antibiotics are prescribed for otitis media more than any other condition.^{AAP} With growing concern over antibiotic resistance among pathogens that cause AOM, antibiotic choices are not always straightforward.^{COC}
- **Management of AOM without antibiotics has not declined since the release of the 2004 guidelines.** The percentage of otitis media visits resulting in antibiotic prescriptions has remained relatively stable since the release of the guidelines (80% in 1995–1996 and 76% from 2005–2006).^{COC}

► GOALS

- **Help providers improve accuracy of diagnosis** of acute otitis media.
- **Select appropriate antibiotics** when necessary.
- **Reduce the unnecessary use of antibiotics** for treatment of otitis media with effusion to reduce additional risks (antibiotic side effects), prevent antibiotic resistance, and reduce cost.



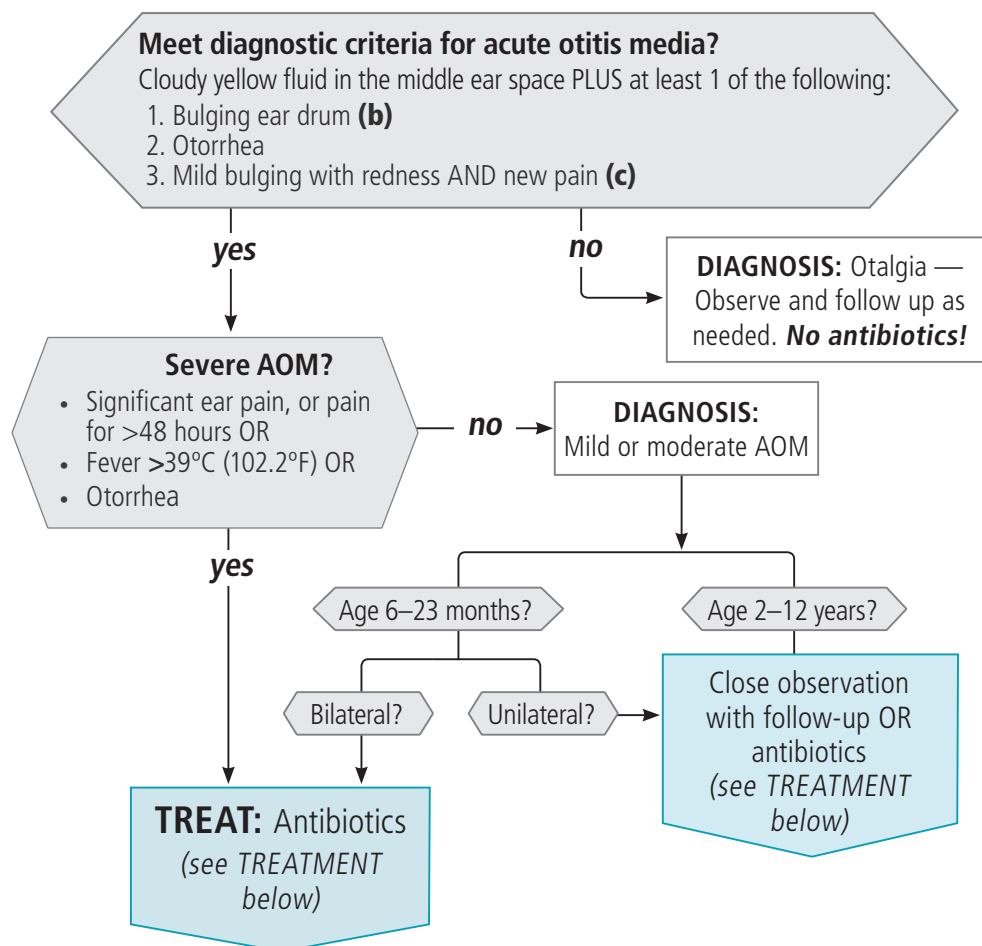
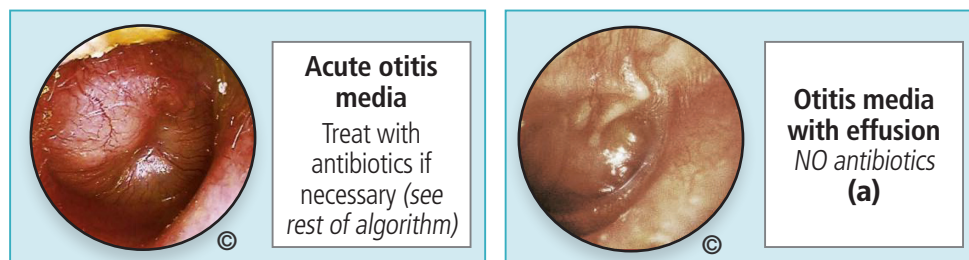
GermWatch is Intermountain's source for up-to-date information about infectious diseases currently circulating in Utah communities.

For physicians: intermountainphysician.org/gw

For parents and patients: germwatch.org

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▶ ALGORITHM: DIAGNOSIS



DIAGNOSIS

- Otitis media with effusion (OME).** If effusion is clear, the infection is not AOM, and antibiotics should not be prescribed.
- Diagnosis for patients with PE tubes.** Children with pressure equalization (PE) tubes (tympanostomy tubes) won't have a bulging ear drum.
- Assessing pain.**
 - **In preverbal children, indicators of pain include:**
 - Holding, tugging, or rubbing the ear
 - Excessive crying, fever, or changes in the child's sleep or behavior patterns
 - **New pain:** Onset of pain in the last 48 hours.

PARENT/PATIENT EDUCATION



Ear Infections
fact sheet



Colds and Coughs in Children and Adolescents: Managing Viral Infections
fact sheet



Viral Infection Rx
handout

PREVENTION TIPS

- Smoking cessation for parents (and limited exposure)
 - Exclusive breastfeeding for at least 6 months
 - Vaccinations: Pneumococcal conjugate, annual influenza
 - Avoidance of pacifiers and supine bottle feedings
 - Avoidance of day care with 6 or more children per room
- Note: Chronic congestion from allergies can increase likelihood of AOM.

▶ ALGORITHM: TREATMENT

Acute Otitis Media

ASSESS pain level; recommend pain relief medications. **(d)**

Severe AOM
OR
Bilateral AOM,
age 6–23 mos

Mild or moderate AOM, age
2–12 years
OR
Mild or moderate, unilateral,
age 6–23 mos

Recurrent AOM (e)

Close observation with
follow-up **(f)** (shared
decision-making) OR antibiotics

- Restart algorithm if new infection.
- Do not prescribe prophylactic antibiotics.
- Refer for tympanostomy tubes (PE tubes) only if 4 AOM infections requiring antibiotics in 6 months OR 6 in 1 year. **(g)**

TREAT: Antibiotics (h)(i)

Initial therapy

First-line choices

- **Amoxicillin:** 80–90 mg/kg/day, in 2 doses (max 2 g/dose)
Note: If patient has taken amoxicillin in past 30 days or has conjunctivitis, treat with amoxicillin-clavulanate.
- **Amoxicillin-clavulanate:** 80–90 mg/kg/day, in 2 doses (max 2 g/dose)

If penicillin allergy

- First-line choices:**
- **Cefdinir:** 14 mg/kg/day, in 1 or 2 doses (max 600 mg/day)
- Alternatives:**
- **Cefuroxime:** 30 mg/kg/day, in 2 doses (max 500 mg/dose)
 - **Cefpodoxime:** 10 mg/kg/day, in 2 doses (max 200 mg/dose)

If no improvement in 48–72 hours (i)

First-line choices:

- **Amoxicillin-clavulanate:** 80–90 mg/kg/day, in 2 doses (max 2 g/dose)
 - **Ceftriaxone:** 50 mg/day IM or IV for 3 days (max 1,000 mg/day)
- Alternatives:**
- **Clindamycin:** 30–40 mg/kg/day, in 3 doses, +/- third-gen cephalosporin (max 600 mg/dose)

NOTE: Azithromycin is NOT recommended due to antibiotic resistance.

Antibiotic treatment duration

- <2 years old AND ALL ages with all severe symptoms: 10 days
- 2–5 years old with mild to moderate symptoms: 7 days
- >5 years old: 5–7 days

FOLLOW-UP: Instruct the parent to follow up if needed; follow up at regular exams. **(j)**



Intermountain measures AOM diagnoses and antibiotic prescriptions.

TREATMENT

(d) Pain treatment. AOM pain can be substantial in the first few days, and antibiotics don't provide symptomatic relief in the first 24 hours. Pain relief should be recommended whether antibiotics are prescribed or not, and continued as long as needed.^{AAP} Relief from pain medications is brief.

(e) Treating recurrent AOM.

- If a patient diagnosed with AOM returns with an effusion, do NOT prescribe antibiotics. Restart the algorithm. Infections sometimes take months to heal, and they can evolve into effusions.
- If infection is persistent but not severe, consider third-generation oral cephalosporin.
- Do NOT prescribe prophylactic antibiotics to reduce infection frequency in children with recurrent AOM.

(f) Close observation and follow-up. Shared decision-making with the parent is essential before choosing observation. If observation is chosen, recommend symptomatic relief with initiation of antibiotics after 48 to 72 hours if the symptoms don't improve.

(g) Tympanostomy tubes (PE tubes).

- There are no studies that show treating OME with tubes can improve speech. The presence of OME is not always an indication for PE tubes. But if hearing loss or speech delay is present, tympanostomy tubes could be considered.
- Refer to an ear, nose, and throat (ENT) physician only if:
 - 4 AOM infections requiring antibiotics in 6 months OR 6 AOM infections requiring antibiotics in 1 year (with at least 1 in the past 6 months) AND
 - There is fluid in the ear when seen by the clinician.
- Tubes should be considered for removal after 3 years if they haven't already fallen out and if the patient is clinically well.

(h) Treating AOM in patients with ear tubes.

- **First line:** Otological antibiotics (e.g., ofloxacin 3%) for 7 days after draining ear is stopped. (Prescribe oral antibiotics if other systemic disease, fever, etc., is present.)
- **Second line:** Oral antibiotics until no drainage for 7 days.
- Do not prescribe Ciprodex as first line (due to cost) or Auralgan.
- If drainage continues for more than 14 days, refer to an ENT.

(i) Antibiotic notes.

- If the patient is allergic to penicillin and cefdinir, prescribe clindamycin and add TMP/SMX if no improvement in 48 hours. Duration of treatment depends on age. (See table at left.)
- Tell the parent to return for follow-up if the patient doesn't improve or worsens in 48 to 72 hours.

(j) Post-treatment follow-up.

- There is no need to routinely verify that an infection or effusion has cleared up at a follow-up appointment; follow up at routine checkups.
- For patients with PE tubes, check tubes annually during checkups.

Vaccine recommendations (cdc.gov/vaccines/pubs/ACIP-list.htm)

- **Influenza.** Annual influenza vaccine is recommended for **ALL children over 6 months of age**, but is particularly important for children and adolescents at increased risk for severe complications, including those who meet any of these criteria:^{CDC1}
 - Immunosuppressed or have any condition that can compromise respiratory function.
 - Receiving long-term aspirin therapy (at risk for Reye's syndrome).
 - Morbidly obese (BMI ≥40).
 - Have chronic pulmonary (including asthma), cardiovascular (except hypertension), renal, hepatic, neurologic, hematologic, or metabolic disorders (including diabetes mellitus).

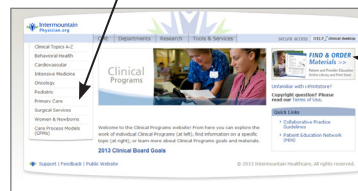
The influenza vaccine is also recommended for **parents and caregivers** of children younger than 5 years.
- **Pneumonia (pneumococcal vaccine).** The pneumococcal vaccine is recommended as follows:
 - PCV13 is recommended for children age 6 to 18 years who have not previously received PCV13 (even if they have received PCV7 or PCV23), or who have immunocompromising conditions, functional or anatomic asplenia, cerebrospinal fluid (CSF) leaks, or cochlear implants.
 - PPSV23 is recommended for children age ≥2 years with increased risk for invasive pneumococcal disease.
- **Pertussis.** DTaP and Tdap vaccines are recommended as follows:
 - DTaP at 2, 4, and 6 months, at 15 to 18 months, and at 4 to 6 years.
 - Tdap for children age 7 to 10 years who are not fully vaccinated.
 - Tdap as a single dose for adolescents age 11 to 18 years (preferred administration at 11 to 12 years).^{CDC2}
 - Hib at 2, 4, 6, and 15 to 18 months.

Where to find resources (intermountainphysician.org)

GermWatch: Physician version is available from the home page of intermountainphysician.org.

Patient/public version available from germwatch.org.

Patient and Provider Education Materials: Available at intermountainphysician.org/clinicalprograms (click **Primary Care** on the left, then **Topics**, then **Antibiotic Best Practices**).



To order copies of materials, go to i-printstore.com.

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This CPM is based on best evidence at the time of publication. It is not meant to be a prescription for every patient. Clinical judgment based on each patient's unique situation remains vital.