


Acute Otitis Media (AOM)

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Learning Objectives

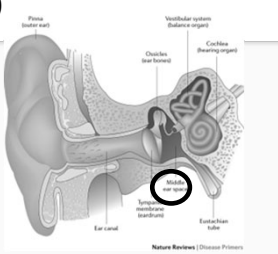
Learner will:

- Describe the epidemiology of acute otitis media in the United States
- Discuss the diagnosis and recommended treatment for acute otitis media
- Identify children with AOM who are candidates for "initial observation" with a "watch-and-wait" approach
- Describe the reasons that parents may desire antibiotic treatment for their children, and formulate a response to this request

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Acute Otitis Media (AOM)

- Disease of early childhood
- Refers to **acute inflammation within the middle ear space**
- Potential complications include: conductive hearing loss, language delay, development of mastoiditis or meningitis



Schlider, A. G. M. et al. (2016) Otitis media. Nat. Rev. Dis. Primers doi:10.1038/nrdp.2016.63

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Epidemiology of AOM

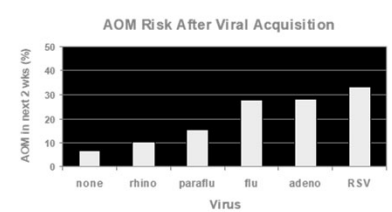
- In children with AOM
 - ~20% due to bacteria only
 - ~70% due to bacteria + viruses
 - Remainder due to viruses alone
- Very common infection in children
 - 23% of children <1 year of age have had ≥ 1 episode
 - 60% of children <3 years of age have had ≥ 1 episode
- Risk factors for AOM
 - Male sex
 - Day care attendance
 - Family history of AOM
 - Possibly pacifier use, supine feedings, tobacco smoke exposure

Pediatrics. 2017;140(3). doi:10.1542/peds.2017.0181
 From: **Epidemiology of Acute Otitis Media in the Postpneumococcal Conjugate Vaccine Era**

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Epidemiology of AOM: Role of Viral Infection

AOM Risk After Viral Acquisition



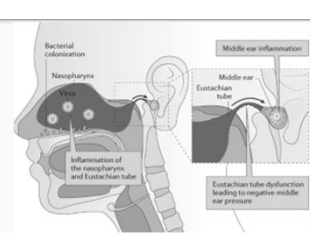
Virus	AOM in next 2 wks (%)
none	~5
rhino	~10
parafflu	~15
flu	~25
adeno	~28
RSV	~35

Henderson et al NEJM 1982;306:1377

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Epidemiology of AOM: role of viral infection

- Viral infection causes inflammation of the nasopharynx and eustachian tube
- 1) Increased adherence of bacteria
- 2) Decreased mucociliary clearance
- 3) Eustachian tube dysfunction with negative middle ear pressure



Schlider, A. G. M. et al. (2016) Otitis media. Nat. Rev. Dis. Primers doi:10.1038/nrdp.2016.63

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Epidemiology of AOM

- Most common organisms:
 - *Streptococcus pneumoniae*
 - *Haemophilus influenzae*
 - *Moraxella catarrhalis*
 - *Streptococcus pyogenes* (Group A strep)
- Incidence of AOM due to *S. pneumo* is decreasing following introduction of conjugate pneumococcal vaccine

From: **Epidemiology of Acute Otitis Media in the Postpneumococcal Conjugate Vaccine Era**
Pediatrics. 2017;140(3). doi:10.1542/peds.2017-0181

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Epidemiology: Reduction in AOM caused by *S. pneumo* after PCV introduction

Figure Legend:
 (A) The frequency of otopathogens isolated from MEF during AOM from 1995 to 2016. (B) The changes in otopathogen prevalence in different vaccine eras (* P < .05). Spn, S pneumoniae; Hflu, H influenzae; and Mcat, M catarrhalis.

From: **Epidemiology of Acute Otitis Media in the Postpneumococcal Conjugate Vaccine Era**
Pediatrics. 2017;140(3). doi:10.1542/peds.2017-0181

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Guidelines

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Important terms in the guidelines

- AOM= acute otitis media
 - Suggests rapid onset with signs of middle ear inflammation
 - Can be **nonsevere** or **severe** (moderate to severe pain and/or temp ≥ 39-C)
- TM= tympanic membrane
- MEE = middle ear effusion
- OME= otitis media with effusion (no signs of inflammation)
 - This may occur following AOM, as the MEE can persist for days-weeks

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About AOM's Guidelines

- Guidelines for the diagnosis and management of acute and recurrent AOM for healthy children
 - Applies to ages 6 months-12 years
 - Last modified in 2013 by the American Academy of Pediatrics
 - Exclusion criteria: anatomical abnormalities, presence of cochlear implants or tympanostomy tubes, genetic conditions, immune deficiencies, and OME without AOM
- OM remains the most common condition for which antibacterial agents are prescribed for children in the United States

Pediatrics. 2013;131(3):e964-e999. doi:10.1542/peds.2012-3488

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Diagnosis: Clinical manifestations of AOM

- Ear pain: hallmark symptom
 - May manifest in preverbal children as tugging/rubbing/holding of the ear
 - Not always present
- Excessive crying
- Fever
- Changes in the child's sleep or behavior pattern

Pediatrics. 2013;131(3):e964-e999. doi:10.1542/peds.2012-3488

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Diagnosis: Otoscope Exam

- Color:
 - Degree of erythema
 - Presence of hemorrhagic appearance
 - Presence of cloudiness
- Position:
 - Bulging, retracted, or normal
- Mobility:
 - Distinctly impaired, slightly impaired, or normal
- Severe erythema, hemorrhagic appearance, cloudy appearance, bulging TM, and distinct impairment of mobility are all **highly** indicative of a MEE
- Moderate erythema, retracted TM, and slight impairment of mobility are **less** indicative of a MEE

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Diagnosis: Otoscopic exam: "Bulging"

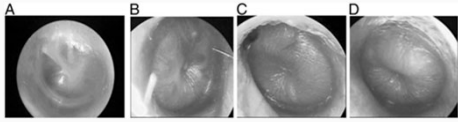


Figure Legend:
A. Normal TM. **B.** TM with mild bulging. **C.** TM with moderate bulging. **D.** TM with severe bulging.
 Courtesy of Alejandro Hoberman, MD.

From: **The Diagnosis and Management of Acute Otitis Media**
 Pediatrics. 2013;131(3):e984-e999. doi:10.1542/peds.2012-3488

American Academy of Pediatrics
 COMMITMENT TO THE HEALTH OF ALL CHILDREN

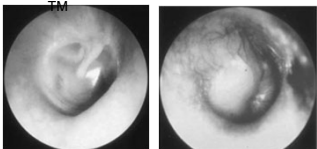
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Recommendations for Diagnosis of AOM

Diagnosis of AOM:
1) Evidence of MEE with
 a) Moderate-severe bulging of TM
 OR
 b) Mild bulging of TM with acute ear pain (<48 hours)
 OR
 c) Mild bulging of TM with intense erythema of the TM

2) Otorrhea
 -not due to otitis externa



Scott Infect Med 2003;20:224

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Recommendations for Treatment of AOM

- There are 2 strategies for management of children with AOM:
 - 1) Initial antibiotic therapy – antibiotics are prescribed at the first encounter when AOM is diagnosed
 - 2) Initial observation – symptomatic relief is provided (i.e. analgesics), with initiation of antibiotics if the child's condition worsens or does not improve after 48-72 hours
 - Observation is only an option
 - In some clinical circumstances (AOM less likely to self-resolve in younger patients, patients with bilateral AOM and/or otorrhea)
 - When there is a mechanism in place to ensure follow-up
 - When parents agree through "shared decision making"

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Recommendations for Treatment of AOM

• Infants <6 months should be treated immediately, regardless of laterality or severity

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 OR
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Clinical presentation	Laterality	Age	Treatment options
Severe AOM • Fever >102.2 • Persistent otalgia for >48h • Toxic appearing • Uncertain follow up	Unilateral or bilateral	All ages	Antibiotic therapy
Non-severe AOM	Bilateral	≥6 months	Antibiotic therapy or observation
		6 months ~2 years	Antibiotic therapy
		≥2 years	Antibiotic therapy or observation
Otorrhea due to AOM	Unilateral or bilateral	All ages	Antibiotic therapy

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Recommendations for Treatment

- If initial observation is chosen:
 - 1) Analgesics should be prescribed or recommended
 - 2) Parental education –AOM is often self limited, especially in children >=2 years; antibiotics have side effects, including diarrhea, rash, and emergence of resistance
 - 3) Provisions for a rescue antibiotic
 - A "wait-and-see" prescription can be provided, with instructions to fill it within 5 days if symptoms worsen or do not improve
 - In prior studies, about 1/3 of patients who undergo initial observation eventually take an antibiotic

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Recommendations for Treatment

- Pain management
 - primary
 - acetaminophen
 - ibuprofen
 - topical therapy
 - benzocaine, lidocaine, procaine
 - >2 years of age
 - Avoid if TM perforation
 - tympanostomy/myringotomy

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Antibiotic therapy choice for AOM

Initial Antibiotic Therapy		Treatment Failure after 48-72h of initial antibiotics	
First Line Treatment	Penicillin allergic	First line treatment	Penicillin allergic
Amoxicillin Dosing: 80–90 mg/ kg/day divided BID • Most children	Cefdinir 14 mg/kg/day given in 1 or 2 doses Cefuroxime 30 mg/kg/day divided BID	Amoxicillin-clavulanate Dosing: 90 mg/kg/day of amoxicillin component divided BID, (14:1 formulation)	Ceftriaxone 50mg/kg IM or IV 3days
Amoxicillin-clavulanate Dosing: 90 mg/kg/day of amoxicillin component divided BID, (14:1 formulation) • Child has received amoxicillin in the last 30 days • Child has purulent conjunctivitis as well • History of recurrent AOM that did not respond to amoxicillin	Cefpodoxime 10 mg/kg/day divided BID Ceftriaxone 50mg/kg IM or IV for 1-3 d	Ceftriaxone 50 mg/kg IM or IV x3 days	Clindamycin 30–40 mg/kg/day divided TID WITH or WITHOUT a 3 rd generation cephalosporin Tympanocentesis or consult ENT

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Duration of Therapy Based on Age/Symptoms

Age	Days
<2 years, severe symptoms, recurrent symptoms, or otorrhea	10
2-5 years	7
≥ 6 years	5-7

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Acute Otitis Media: Clinical Course

- Clinical response to antibiotics within 48-72 hrs
 - 1st 24 hours
 - stabilization of clinical condition
 - 2nd 24 hours
 - improvement
 - fever, pain, irritability, sleeping, eating
- If a patient is undergoing "watchful waiting"
 - Scheduled phone/video follow up at 48-72 hours OR
 - Ask caregiver to call at 48-72 hours if symptoms have not improved
 - Explain warning signs to parent: involvement of mastoid, meningismus, lethargy, cranial nerve palsy

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Prevention of AOM

Recommend:

- Vaccines
 - Pneumococcal conjugate vaccine
 - Annual influenza vaccine
- Encourage exclusive breastfeeding for first 6 months of life
- Hand hygiene

Discourage:

- Exposure to tobacco smoke
- Pacifier use
- Supine bottle feedings ("bottle propping")

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Common Myths

Swimming or getting water in the ear is a common cause of AOM

Swimming can be associated with otitis externa (which is referred to as swimmers' ear), which also can cause otorrhea

Teething is a cause of AOM

All ear infections need to be treated

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When to Refer

Consider referral to ENT when a child meets criteria for recurrent AOM

- 3 episodes in a 6 month period or 4 episodes in a 12 month period (with 1 episode in the preceding 6 months)
- Episodes should be documented

Other reasons for referral include

- An episode of AOM that does not improve despite multiple courses of antibiotics
- Severe pain with AOM that does not respond to typical analgesic medications

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Managing Family Expectations

- Parents/caregivers of children with AOM have reported that it causes emotional and financial stress
 - They may demand antibiotics due to impact of AOM on family, including absence from work or child care
- Parents/caregivers may also be concerned about the risks of not treating an infection
- Parents/caregivers commonly turn to their child's provider as a trusted source of information
- Shared decision making is the recommended model for decisions regarding antibiotic initiation where observation is an option

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Patient Scenarios

"I do not want my child to receive vaccines"

Response: I respect your decision about your child's care. I want to ensure that you are fully informed about your decision. Ear infections are caused by several infections including influenza, COVID19, and other viruses and bacteria. Vaccines have proven to be safe and reduce the occurrence the of AOM. Is there anything in particular that you would like to discuss about the vaccines?

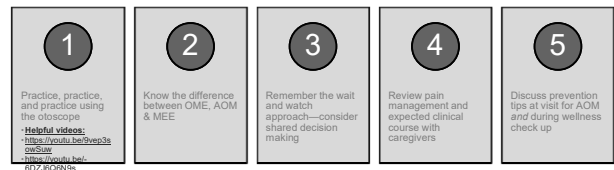
"I would like to wait on using antibiotics for infections" OR "I thought ear infections require antibiotics to resolve"

Response: I understand your hesitancy (or eagerness) to resolve the infection. Antibiotics are not warranted for every infection, and sometimes, the child's body may be able to eliminate the infections without medication. Let us review your child's history and symptoms thoroughly and let us see if the wait and watch approach or antibiotics are best for this situation.

Acknowledgement for this slide: Shontay Butler, DNP, ENP-C, FNP-C

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Take Away Points



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