Objectives:
- Discuss the AAP Guidelines for Diagnosis and Management of Acute Otitis Media
- Discuss the AAP Guidelines for the Diagnosis and Management of Acute Bacterial Sinusitis in Children
- Be aware of potential warning signs for complications in these conditions!

Otitis Media-Diagnosis
- Clinical Manifestations
  - Fever (may or may not be present)
  - Otalgia
  - Irritability
- Frequent associated with antecedent/concurrent viral URI

Otitis Media-Diagnosis
- Physical Exam findings
  - Erythema and bulging of tympanic membrane
  - Air-fluid level behind the tympanic membrane
  - Decreased tympanic membrane mobility on pneumatic otoscopy
  - Otorrhea
Otitis Media-Diagnosis
Key Action Statements from the 2013 AAP / AAFP updated guidelines regarding making the diagnosis correctly:
– Children presenting with moderate to severe bulging of TM, or new onset otorrhea not associated with otitis externa
– Presentation with mild TM bulging AND recent (>48 hrs) onset ear pain or intense erythema of TM
– Do not diagnose AOM in children who do not have middle ear effusion

How well do we perform and teach otoscopy?
• Training in physical examination begins in medical school, pediatrics clerkship may provide the best opportunity to learn otoscopy
• AOM is the most common reason for prescribing antibiotics to children in the US, and competency in the ear exam is essential for accurate diagnosis
• What is understood about how preceptors teach this skill, and how they view the ambulatory setting as a learning environment for students?

Study Conclusions
• Our students are learning otoscopy in the ambulatory pediatric setting
• Preceptors are our frontline educators
• There is a discrepancy between preceptor knowledge and use of evidence-based practice in clinical settings
• Education leaders are aware of preceptor needs, but only a few know the actual teaching practices occurring in the ambulatory setting, and only half advocate for enhancing preceptor teaching skills
• Accurate physical exam is essential for making the diagnosis of AOM and making appropriate treatment recommendations for the #1 reason children receive antibiotics!

Otitis Media-Epidemiology
• 90% of children have at least one episode by age 2
• Peak incidence between 6-18 mos in the US
• Risk factors:
  – Young age, exposure to other young children, family history
  – Exposure to cigarette smoking, lack of breastfeeding, pacifier use, bottle-propping
• Initial onset in first months of life places infant at increased risk for recurrent/chronic middle ear disease

Otitis Media-Pathophysiology
Viral URI (inflammation and increased secretions) leads to Eustachian tube dysfunction
Leading to middle ear negative pressure
Viral disruption of mucociliary clearance
Increased density of bacterial pathogens within the nasopharynx
Bacterial invasion of the middle ear
Bacterial growth within middle ear leading to influx of inflammatory cells, effusion
Otitis Media-Microbiology

Three pathogens predominate in the US:
- *Streptococcus pneumoniae*
- Non-typeable *Haemophilus influenzae* (NTHi)
- *Moraxella catarrhalis*

4th most common organism: *Streptococcus pyogenes* (almost exclusively in children >5 yrs old in the US)

Otitis Media-Treatment

Pain relief: ibuprofen or acetaminophen

Antimicrobial Therapy—who needs it??
- Antibiotics should routinely be prescribed for AOM in children 6 mos and older with severe signs and symptoms (moderate or severe otalgia, or otalgia for at least 48hrs duration, fever 39°C [102.2°F] or higher)
- Non-severe bilateral symptoms in children 6-23 months old
- Non-severe unilateral symptoms in children 6-23 months, or bilateral in older children—either treatment or observation

Otitis Media-Treatment Options

First-line Therapy
- Amoxicillin 80 mg/kg/d

First Alternative
- Amoxicillin/clavulanate 80-90 mg/kg/d

Consider Alternative therapy in these instances:
- Recent use of amoxicillin (within 30 days)
- History of recurrent AOM, unresponsive to amoxicillin
- Failing amoxicillin at 48-72 hours of therapy (reassess clinically)
- Concurrent purulent conjunctivitis (suggests H. influenzae as pathogen, frequently possess beta-lactamases and are resistant to amoxicillin)

Alternative treatment options:
- Oral or IM cephalosporins
- Type 1 hypersensitivity (urticaria or anaphylaxis) to penicillin:
  - Macrolides
    - Azithromycin or clarithromycin

Indications for changing antibiotic therapy at 48-72 hrs:
- Persistent or recurrent otalgia
- Persistent or recurrent fever
- Development of suppurative complications

Complications of acute otitis media:
- Tympanic membrane perforation
- Mastoiditis
- Facial palsy
- RARE—brain abscess, epidural abscess, venous sinus thrombosis

Otitis Media with Effusion

- Persistent fluid in the middle ear for 2-3 months after an acute infection
- Pathogenesis—either post-infectious inflammatory response or transudative fluid secondary to Eustachian tube dysfunction and negative middle-ear pressure
- Resolves without intervention over months (3-6) in most children
- Primary intervention is surgical: tympanostomy tubes recommended for hearing loss >40db, symptoms including balance or sleep disturbance, intermittent pain, ear fullness/popping
- Antihistamines and decongestants are not recommended
- Antibiotics will not resolve the fluid of OME

Bacterial Sinusitis

Key Guideline:
http://pediatrics.aappublications.org/content/early/2013/06/19/peds.2013-1071.full.pdf+html
Bacterial Sinusitis

When is it sinusitis? When is it “just a cold” (i.e. viral)?
- <1:15 children with colds go on to develop acute sinusitis
- URI - cold symptoms include runny nose initially clear then cloudy, fever for initial 1-2 days, then slow improvement over 7-10 days

Sinusitis-
- Persistent symptoms: runny nose, cough (both) last beyond 10 days
- Severe: fever >102.2F lasting 3 or more days, thick mucus
- Worsening: initial improvement then fever returns or cough/rhinorhea worsen

Bacterial Sinusitis - Treatment

Pain and symptom management
Antibiotic Treatment Strategies:
- 1) Immediate antibiotic treatment
- 2) Observation for an additional 3 days with initiation of antibiotic if no improvement in that time period

Treatment options:
- Amoxicillin—first line therapy for uncomplicated sinusitis
- Amox/clavulanate—treatment option for those with moderate to severe illness, <2 years of age, attending child care, or recently treated with antibiotics

Why these antibiotics? What are the pathogens:
- Streptococcus pneumoniae
- Haemophilus influenzae
- Moraxella catarrhalis

Why will these choices be effective?
- High-dose amoxicillin (80-90mg/kg/d) overcomes S. pneumoniae resistance due to altered PBPs
- H. flu and M. cat. Beta-lactamase positive strains inhibited by the potassium clavulanate in amox/clav

Consider alternative rx if patient not improving in 72 hrs

Take Home Messages

- Accurate diagnosis of AOM and bacterial sinusitis are essential for the practicing pediatrician
- Assess for and manage pain
- Uncomplicated AOM, acute bacterial sinusitis—consider patients for whom observation may be appropriate before antibiotics
- Communicate with families—Reassess response at 48-72 hrs
- Use antibiotics judiciously!