

# **Common Ear and Throat Infections in Primary Care**

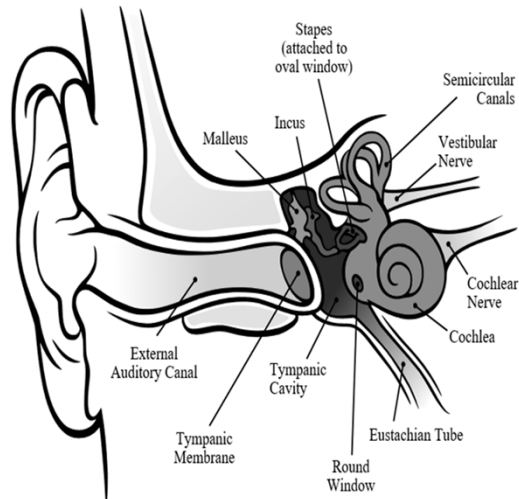
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## **Objectives**

- **Recognize and diagnose the most common ear and throat infections.**
- **Be familiar with treatment guidelines for common ear and throat infections including when to refer to specialists.**
- **Understand the etiology of ear and throat infections and recommendations for prevention.**
- **Recognize the complications of common ear and throat infections, as well as, the uncommon and life threatening infections of the ear and throat**

# Ear Infections

- Otitis externa
- Otitis media
- Labyrinthitis
- Other conditions presenting with ear pain



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Jing I need help

(mobile) • Mar 17, 9:10 AM

What is it

Mar 17, 9:11 AM

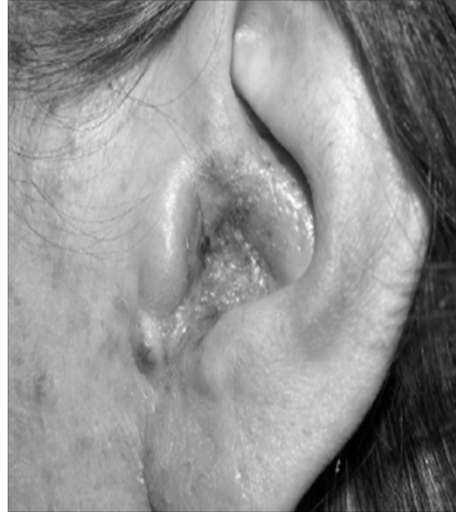
My outer ear (Tragus) started hurting last night and its gotten worse.  
It's tender when  
I touch it and when I pull on my ear lobe it hurts too

When I lay on the side of thst ear it also hurts

If I push the skin of the inner part of the ear lobe against my skull it  
hurts too

# Otitis Externa

- Occurs at any age but uncommon <2 years old
- More common in summer
- Causes: infectious, allergic, dermatologic
- Risk factors:
  - Breakdown of skin-cerumen barrier including trauma
  - Water or excess moisture
  - Devices in the ear canal
  - Some dermatologic conditions
  - Anatomic abnormalities or damage



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## Acute Otitis Externa

### Diagnosis:

1. Rapid onset (within 48 hours)
2. Symptoms of canal inflammation including otalgia, pruritus, or fullness
3. Signs of canal inflammation including: tenderness of tragus, pinna, canal edema or erythema
  - Can also have otorrhea, lymphadenitis, tympanic membrane erythema, local cellulitis

- Microbiology
  - *Pseudomonas aeruginosa*
  - *Staphylococcus aureus*
  - Gram-negative organisms
- Treatment:
  - Control pain
  - Topical antiseptic or antibiotics
  - Avoid water penetration
  - Limit external devices

**Table 6.** Common topical otic preparations approved by the Food and Drug Administration for treating diffuse acute otitis externa.

Active Drug(s)	Name	<u>Bottle</u>	<u>Cost, US\$<sup>a</sup></u>	
		Size, mL	Trade	Generic
Acetic acid 2.0% solution	Acetic acid otic (generic)	15.0	—	33
Acetic acid 2.0%, hydrocortisone 1.0%	Acetasol HC (generic)	10.0	—	23
Ciprofloxacin 0.2%, hydrocortisone 1.0%	Cipro HC (trade)	10.0	170	—
Ciprofloxacin 0.3%, dexamethasone 0.1%	Ciprodex (trade)	7.5	144	—
Neomycin, polymyxin B, hydrocortisone	Cortisporin Otic (trade)	10.0	85	30
Ofloxacin 0.3%	Floxin Otic (trade)	5.0	76	18

<sup>a</sup>Approximate price in New York metropolitan region (<http://www.goodrx.com>).

Rosenfeld RM, Schwartz SR, Cannon CR, Roland PS, Simon GR, Kumar KA, Huang WW, Haskell HW, Robertson PJ. Clinical practice guideline: acute otitis externa. Otolaryngol Head Neck Surg. 2014 Feb;150(1 Suppl):S1-S24.

- If tympanic membrane is not intact, choose non-ototoxic preparation
- Aural toilet and ear wicks can aid in drug delivery
- Treat for 7 days – can extend if symptoms are not completely resolved
- Avoid systemic antibiotics unless there is a clear reason for them.

Rosenfeld RM, Schwartz SR, Cannon CR, Roland PS, Simon GR, Kumar KA, Huang WW, Haskell HW, Robertson PJ. Clinical practice guideline: acute otitis externa. Otolaryngol Head Neck Surg. 2014 Feb;150(1 Suppl):S1-S24.

# Back to our case...

**Additional information: Patient wears in-ear headphones every night**

**His friendly emergency room colleague looks in his ear and reports swelling, redness and a lot of wax.**

**He starts ciprofloxacin-dexamethasone drops and feels much better the next day.**

**He complains that the drops cost him \$40**

## Otitis Externa

### Non-bacterial causes

- **Dermatologic**
  - Atopic dermatitis
  - Contact dermatitis
  - Seborrhea
  - Psoriasis
  - Lupus
- **Viral**
  - Herpes zoster oticus (Ramsay Hunt)
  - Herpes simplex virus
  - Measles
- **Otomycosis**
  - Aspergillus niger
  - Candida

### Prevention

- Removing obstructing cerumen
- Acidifying drops with swimming
- Avoiding trauma

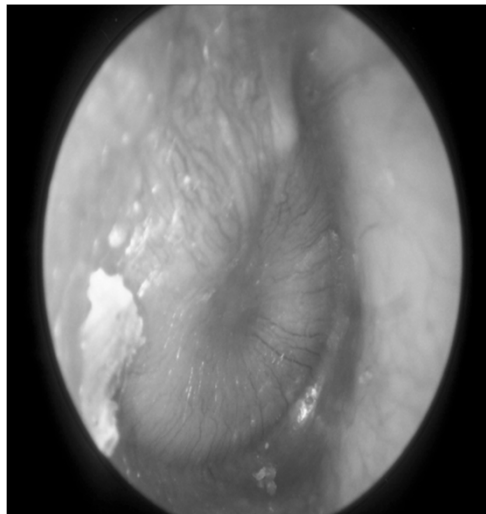
# Complications

- **Malignant (necrotizing) otitis externa**
  - Aggressive infection usually affecting immunocompromised individuals
  - Disease can spread to skull base, soft tissue, middle & inner ear or even brain
  - Signs include facial paralysis
  - Elevated ESR and imaging can aid in diagnosis
- **Refer to Otolaryngologist:**
  - Patients who do not respond to treatment
  - Malignant otitis externa

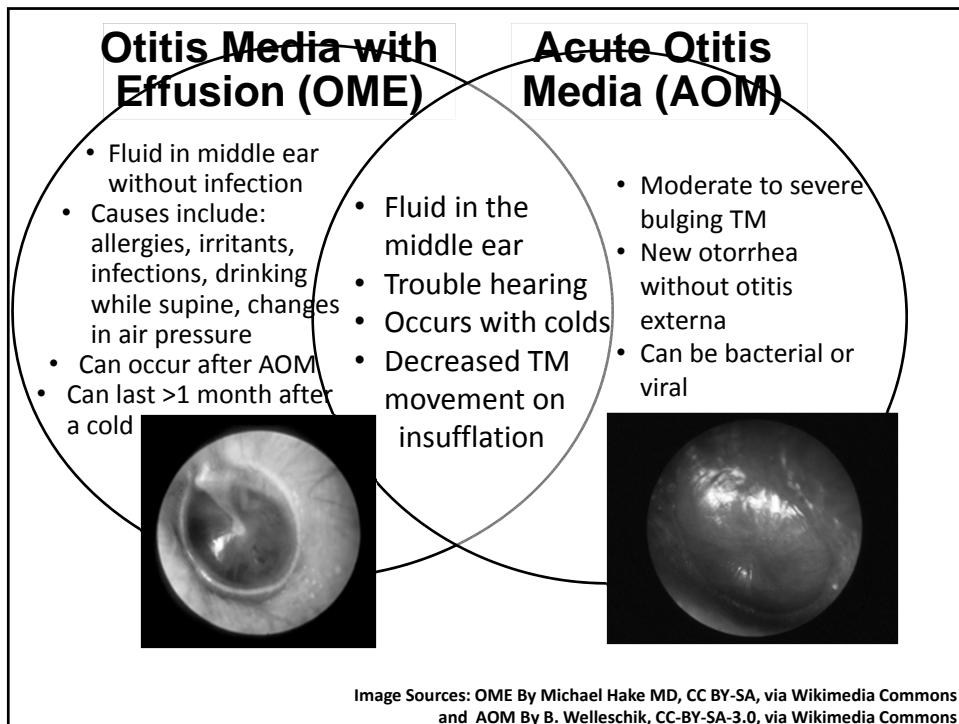
**15 month old previously healthy Caucasian male comes in for sick visit.**

**Parents report:**

- Cold symptoms for 1 week including cough, congestion, rhinorrhea
- Seemed to be getting better until yesterday he spiked a temperature of 101.5F
- He usually sleeps through the night but woke up twice last night and has been irritable
- He has been sticking his fingers in his ears



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## Acute Otitis Media

- Peak incidence: 6 months to 1 year of age
  - 60% have had it by age 3
  - Increased risk in males (<1), Caucasians, family history, day care and early AOM, anatomical abnormalities
  - Breastfeeding in first 6 months is protective
- ### Symptoms

  - Ear pain
  - Pulling at ears
  - Excessive crying or fussiness
  - Ear discharge/drainage
  - Fever
  - Headache
  - Trouble hearing

### Common bacteria:

  - Streptococcus pneumonia
  - Haemophilus influenzae
  - Moraxella catarrhalis

### Common virus:

  - Respiratory syncytial virus
  - Rhinovirus
  - Influenza
  - Adenovirus

# Treatment of Acute Otitis Media

- **Watchful waiting**
  - **OME does not benefit from antibiotics. Steroids and decongestants generally are not recommended. Auto-insufflation can help.**
  - **AOM often resolves without antibiotics**
  - **If symptoms do not improve in 2-3 days or worsen, antibiotics may be beneficial for AOM (delayed prescribing)**
- **Analgesics – eg Acetaminophen, Ibuprofen**

## Antibiotics for Acute Otitis Media

Use if:

- **Severe symptoms (pain or fever >39C)**
- **age < 2 years and bilateral AOM**
- **Symptoms worsen with watchful waiting or do not improve in 2-3 days**

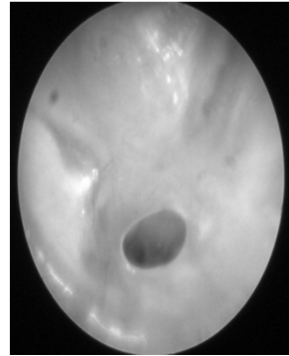
**Reassess if symptoms worsen or do not respond within 48-72 hours on antibiotics**

Antibiotic	When to use
Amoxicillin	First-line if not used within 30 days and no purulent conjunctivitis
Amoxicillin-Clavulanate	<ul style="list-style-type: none"> <li>• Has concurrent purulent conjunctivitis</li> <li>• Not responsive to Amoxicillin</li> <li>• Recent Amoxicillin use within 30 days</li> </ul>
Cefdinir, Cefuroxime, Cefpodoxime, Ceftriaxone	Penicillin-allergic (all less effective against S.pneumonia except Ceftriaxone)
Ceftriaxone	Unresponsive to first line therapy



# Complications

- Tympanic membrane perforation - Chronic suppurative otitis media
- Conductive hearing loss and speech delay
- Mastoiditis
- Intracranial abscess



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# Indications to Refer

- Treatment failure
- Recurrent AOM (3 episodes in 6 months or 4 episodes in 1 year)
- OME lasting >3 months or if hearing loss is present
- Complications of AOM including perforations that do not heal on their own

**Note:** for acute tympanostomy tube otorrhea

- Treat with topical antibiotic eardrops - quinolones

# Prevention

- **Vaccinations (including pneumococcal, influenza)**
- **Breastfeeding – preferably to 6-12 months**
- **Avoid bottle propping**
- **Avoid foreign objects (including cotton swabs) in ear canal**
- **Avoid cigarette smoke and secondhand smoke**

# Labyrinthitis

- **Inflammation of inner ear**
- **Sometimes known as Vestibular Neuritis - inflammation of vestibular portion of eight cranial nerve**
- **Usually occurs in middle age**
- **Commonly viral or post-viral but can be bacterial**
- **Symptoms:**
  - **Vertigo**
  - **Nausea & vomiting**
  - **Gait instability**
  - **Hearing loss**
  - **Tinnitus**



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# Labyrinthitis

## Signs:

- Nystagmus
- Positive head thrust
- Normal brain imaging
- Gait instability but able to walk
- No other neurologic signs

## Treatment:

- Usually self-limited and benign and does not recur
  - Acute symptoms rapidly improve and usually last <6 weeks but can have residual symptoms for months
- Symptomatic treatment:
  - Antihistamines
  - Antiemetics
  - Benzodiazepines
  - Vestibular rehabilitation

## Other diagnoses to consider

- Upper respiratory infections
- Eustachian tube dysfunction
- Cerumen impaction
- TMJ dysfunction
- Cancer
- Dental problems
- Foreign body



# **Common Ear and Throat Infections in Primary Care**

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## **Case**

**You are seeing an otherwise healthy 21 year old man in your clinic for sore throat. It started one day ago. He has had associated fevers to 103. He has associated cough. No known sick contacts but he is currently in school. No other chronic medical problems.**

**On exam, his temperature is 102.5, heart rate is 98, respiratory rate is 16, blood pressure is 100/60, oxygen saturation on room air is 99%. He is in no distress. His tympanic membranes are clear bilaterally, there is no conjunctival injection, there is no sinus tenderness, and no cervical lymphadenopathy.**



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What do you do next? Test for strep? If so, what test?  
Treat for strep? If so, empirically or after testing?

## Diagnosing group A streptococcal pharyngitis in adults - Centor Criteria

1. Fever
2. Exudative pharyngitis/tonsillitis
3. Absence of cough
4. Tender anterior cervical lymphadenopathy

- How are these criteria used?
  - 3 or more → do testing
  - 2 or fewer → do not do testing
- Remember, this not a diagnostic test

Number of criteria met	% with confirmed GAS infection
1	7
2	21
3	38
4	57

## **Diagnosing group A streptococcal pharyngitis in children and adolescents**

- Clinical scoring systems not typically used (neither sensitive nor specific), although sometimes the modified Centor criteria/McIsaac criteria are used
- Do NOT test those with clear viral illnesses → cough, conjunctivitis, runny nose, ulcerative or vesicular lesions, vomiting, diarrhea
- Test those with typical symptoms of strep pharyngitis → exudative pharyngitis, tender anterior cervical adenopathy, headache, abdominal pain, palatal petechiae

## **Diagnosing group A streptococcal pharyngitis the very young (age < 3)**

- Strep pharyngitis is uncommon but possible
- They can present with “streptococcosis”
  - Prolonged, low-grade fevers, purulent nasal discharge, tender anterior cervical lymph nodes
  - They may not have pharyngitis
- Low risk of acute rheumatic fever
- Generally, strep is not a big concern in this age group but considered reasonable to test/treat if symptomatic and there is a well-documented exposure

## **Diagnosing strep pharyngitis - testing**

- **Rapid antigen detection testing**
  - **Variable sensitivity (70-90%) – negative testing in children requires follow up culture or molecular testing (not typically necessary in adults)**
  - **Very specific**
- **Throat culture**
  - **Very sensitive**
  - **Long turn around time**
- **Molecular assays**
  - **Highly sensitive and specific – follow up testing thought not to be needed**
- **Serologies**
  - **Not indicated for acute pharyngitis**

## **Treatment**

- **First line is penicillin or amoxicillin (for kids)**
- **Can also do intramuscular penicillin**
- **For penicillin allergic**
  - **Cephalosporins (if no anaphylaxis)**
  - **Clindamycin**
  - **Clarithromycin/Azithromycin**
- **Duration – generally 10 days (Azithromycin is 5 days)**
- **Adjunctive therapy**
  - **NSAIDs**
  - **Steroids?? Generally, these should not be used**
  - **Topical therapies**
- **Return to work/school – generally 24 hours**

## Complications – Suppurative

- Peritonsillar abscess/cellulitis
- Retro/parapharyngeal abscess
- Otitis media
- Sinusitis
- Meningitis
- Jugular vein septic thrombophlebitis



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## Complications – nonsuppurative

- Acute rheumatic fever
  - One of the main goals of treating GAS infections is to prevent this complication
  - Jones criteria
    - 2 major
    - 1 major and 2 minor
    - Also need evidence of streptococcal infection (this is where serologies are helpful)
    - Indolent carditis or chorea can by themselves indicate rheumatic fever

### Jones Criteria - major

Polyarthritits

Erythema marginatum

Carditis

Subcutaneous nodules

Sydenham's chorea

### Jones Criteria - Minor

Fever

Elevated inflammatory markers

Arthralgias

Leukocytosis

EKG with heart block

Prior episode of rheumatic fever or inactive heart disease



## Complications – nonsuppurative

- **Post-streptococcal glomerulonephritis**
  - 1-3 weeks following pharyngitis (post-pharyngitic)
  - 3-6 weeks following skin infection
  - Antibiotics do not prevent this complication
  - One of the hypocomplementemic glomerulonephritides



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## Complications – nonsuppurative

- **Scarlet fever**
  - Delayed-type skin reaction to exotoxin
  - Diffuse, erythematous, small papules
  - “sandpaper” feel
  - Starts in axilla and groin
  - Strawberry tongue
  - Pastia’s lines



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## **Complications – nonsuppurative**

- **Post-streptococcal reactive arthritis**
  - **Make sure there are not other Jones criteria present to meet the definition of acute rheumatic fever**
- **Toxic shock syndrome**
  - **These patients look sick**
  - **Hypotension**
  - **Evidence of end-organ damage/dysfunction**
  - **Erythematous rash that desquamates**

## **Case**

**You are seeing an otherwise healthy 17 year old with fever, sore throat, and fatigue. He was seen in urgent care two days ago for two days of symptoms. A rapid strep test at that time was negative. You see that a follow up culture was also done and was negative. You decide to do some additional testing and send a CBC with diff. You are called by the lab later and are told there is a lymphocyte predominant leukocytosis with several atypical lymphocytes.**

**What is the likely diagnosis?**

## Other causes of pharyngitis

- **Mononucleosis**
  - EBV and CMV
  - Generally, for EBV start with a monospot (heterophile antibodies)
- **Sexually transmitted infections**
  - Acute HIV – you need to have a high index of suspicion and send a viral load (the patient will not yet have antibodies)
  - Gonorrhea, chlamydia, HSV
- **Group C and group G streptococcus**
  - Need a culture
- **Mycoplasma**
  - Usually will also have bronchitis/pneumonia

## Other causes of pharyngitis

- **Other viruses**
  - Adenovirus – high fever and conjunctivitis
  - Coxsackie virus – herpangina/hand, foot, and mouth/gingivostomatitis)
  - Parainfluenza – croup (laryngotracheitis)
  - Rhinovirus common cold
  - Influenza (more on this later)



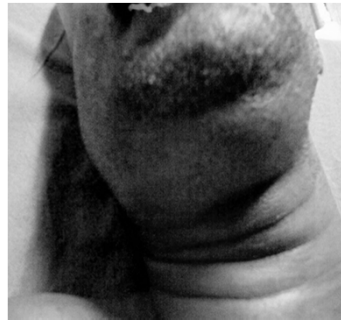
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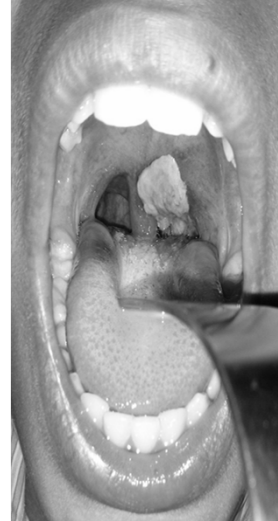
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## Other causes of pharyngitis

- And some rare, but dangerous causes
  - Ludwig's angina
  - Epiglottitis
  - Diphtheria



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## Treatment of non-GAS pharyngitis

- Antibiotics for strains of streptococcus, mycoplasma, gonorrhea, chlamydia (avoid antibiotics unless you document a bacterial cause!!)
- Antivirals for HIV, HSV
- Supportive care for mono. Restrict from contact sports due to the risk of splenic rupture from splenomegaly (generally, 3-4 weeks)
- Steroids for croup – single dose of dexamethasone
- Symptomatic treatment
  - Topical therapies – salt water gargles, warm or cold drinks, honey, lozenges, chloraseptic spray
  - Systemic therapies – NSAIDs, rarely opiates

## Effect of Dexamethasone Without Immediate Antibiotics vs Placebo on Acute Sore Throat in Adults

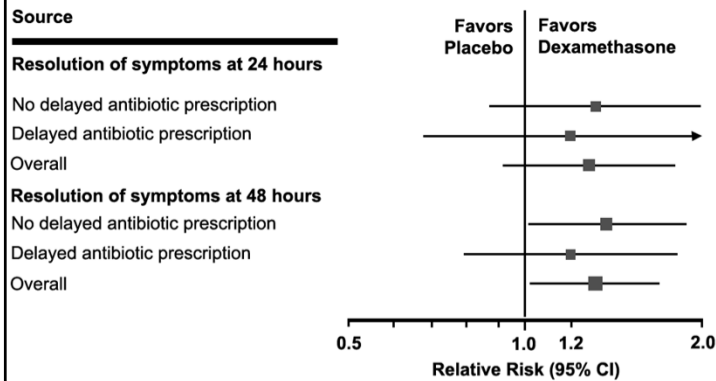


Figure Legend:

Effect of Dexamethasone Without Immediate Antibiotics vs Placebo on Acute Sore Throat in Adults

Image revised from following source: JAMA. 2017;317(15):1535-1543. doi:10.1001/jama.2017.3417

## Case

It is January and you are seeing a 45 year old man with a history of ischemic cardiomyopathy with an LVEF of 40%, coronary artery disease s/p DES to his LAD, hypertension, type 2 diabetes, and COPD Gold stage III. He is presenting with acute onset of fevers, chills, generalized malaise, cough, and myalgias. Symptoms started one day ago. On exam he has a fever to 103, his heart rate is 90, his blood pressure is 120/82, and his respiratory rate is 14. He is coughing but is in no distress. His TMs are clear. His oropharynx is erythematous. He has no cervical lymphadenopathy. His lungs are clear to auscultation. He has a normal S1 and S2 with no murmurs, rubs, or gallops. How would you treat this patient?

# Influenza

- **Who should you test? Those in whom testing will change management.**
- **What type of test should you send?**
  - **PCR – highly sensitive and specific**
  - **Rapid antigen detection – sensitivity can be 70-90% in children and 40-60% in adults**
  - **Immunofluorescent antibody staining**

# Influenza

- **Treatment**
  - **Generally, reserve treatment for high-risk individuals, illness requiring hospitalization, progressive or severe illness, pregnant women**
  - **Healthy individuals with mild disease generally do not need treated. You can consider treatment if they are presenting within 48 hours of symptom onset to help reduce the duration of illness**
  - **Do not withhold treatment to a high risk or very ill patient even if it is to be started > 48 hours after symptom onset**
- **Consider chemoprophylaxis**
- **Vaccinate!!!**

# Case

**You are seeing a 47 year old woman who presents with 4 days of subjective fever, clear rhinorrhea, nasal congestion, frontal headache, and cough. She states her sinuses are acting up and her prior doctor would always give her a Z-pak a couple of times per year to knock this kind of thing out. On exam, she has no fever, her heart rate is 72, her respiratory rate is 12, and her BP is 110/70. She is well-appearing and is in no distress. Her TM's are clear bilaterally. She has diffuse sinus tenderness over the bilateral frontal and maxillary sinuses. She has some edema of her nasal turbinates bilaterally with some thin yellow mucus stranding. Her oropharynx is mildly erythematous but there is no exudate. She has no cervical lymphadenopathy. Her lungs are clear to auscultation.**

**What antibiotic do you prescribe for her?**

## Rhinosinusitis

- Antibiotics are commonly used for rhinosinusitis and are often used inappropriately
- 1/5 ED visits for adverse medication reactions is due to antibiotics
- High-Value Care Advice
  - Clinicians should not prescribe antibiotics for patients with the common cold
  - Clinicians should reserve antibiotic treatment for acute rhinosinusitis for patients with:
    - Persistent symptoms for more than 10 days
    - Onset of severe symptoms or signs of high fever (> 39C) and purulent nasal discharge or facial pain lasting for at least 3 consecutive days
    - Onset of worsening symptoms following a typical viral illness that last five days that was initially improving

# **Take Home Points**

**Shengyi Mao, MD and Nathan Richards, MD**  
**The Ohio State University Wexner Medical Center**

## **Take home points – Ears**

- **Otitis externa is best treated with topical therapy**
- **Antibiotics, steroids and decongestants are not beneficial for OME**
- **AOM often resolves without treatment but antibiotics can help for severe or refractory cases**
- **Not all ear pain is due to infection, also consider other causes**



## **Take home points – throat**

- **Don't treat for strep without confirmatory testing**
- **Consider the many other causes of pharyngitis and look for the clinical clues that might tip you off to one of these causes**
- **Remember to assess patients for complications of strep pharyngitis**
- **In general, do not use steroids for symptomatic treatment of pharyngitis**

## **Take home points – nose and influenza**

- **Be selective in who you treat with antibiotics when patients present with rhinosinusitis**
- **A large number of these cases will self-resolve**
- **We are doing harm with overuse of antibiotics**
- **Testing for flu is not necessary in healthy individuals with mild disease. Do it if it will change management.**

# Resources

**CDC – free print materials for both patients and providers**

- “Get Smart”: <https://www.cdc.gov/getsmart/>
- “Healthy Swimming: <https://www.cdc.gov/healthywater/swimming/swimmers/rwi/ear-infections.html>

**Society Guidelines:**

- Acute Otitis Media – AAP & AAFP – 2013
- Otitis Media with Effusion – AAOHNS 2016
- Acute Otitis Externa – AAOHNS 2014
- Streptococcal pharyngitis – IDSA 2012
- Influenza – IDSA 2009
- Appropriate use of antibiotics in acute respiratory infections – ACP and CDC high value care guidelines 2016

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