Common Respiratory Tract Infections: Evaluation and Therapy

Shabnam Tehrani M.D., MPH
Assistant Professor of Infectious Diseases & Tropical Medicine Research Center,
Shahid Beheshti University of Medical Sciences
Outline

• Introduction

• Evaluation and therapy
  – Acute bronchitis
  – Rhinosinusitis
  – Acute pharyngitis
  – AOM
  – Community-acquired pneumonia

• Conclusion
Common Respiratory Tract Infections

- Acute bronchitis
- Pharyngitis
- Rhinosinusitis
- AOM
- Community-acquired pneumonia
Respiratory Infections are the Most Common Reason for Office Visits

<table>
<thead>
<tr>
<th>Condition</th>
<th>Office Visits (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory Infections</td>
<td>161</td>
</tr>
<tr>
<td>Hypertension</td>
<td>73</td>
</tr>
<tr>
<td>Gastrointestinal Disorders</td>
<td>55</td>
</tr>
<tr>
<td>Diabetes</td>
<td>35</td>
</tr>
<tr>
<td>Depression</td>
<td>26</td>
</tr>
</tbody>
</table>
Over half of Antibiotic Use in Adults is for Respiratory Tract Infections

Adult Oral Antibiotic Use by Diagnosis

- Bronchitis
- Sinusitis
- Pharyngiits
- Pneumonia
- Otitis Media
- UTI
- Skin/soft tissue
- Abdominal/pelvic
- Other
Pathogens

- Respiratory viruses account for the majority of infections
- Bacterial infections are more prominent in acute otitis media and pneumonia
  - *Streptococcus pneumoniae*
  - *Moraxella catarrhalis*
  - *Mycoplasma sp.*
  - *Haemophilus influenzae*
  - *Streptococcus pyogenes*
  - *Chlamydiophila sp.*
- Antibiotic resistance is common among *S. pneumoniae*, *H. influenzae*, and *M. catarrhalis* isolates
Outline

• Introduction
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  – Acute bronchitis
  – Rhinosinusitis
  – Acute pharyngitis
  – Acute otitis media
  – Community-acquired pneumonia
• Conclusion
Acute Bronchitis
Acute Bronchitis

- Definition: An acute respiratory tract infection that may last up to 3 weeks in which cough, is a predominant feature and alveolar inflammation is not present (normal chest radiograph)

- Occurs predominately in the late fall, winter and early spring

- Common: Up to 5% of adults self report an episode each year
Acute Bronchitis
Almost Always a Viral Etiology

• Less than 10% due to bacterial causes
• Etiologic diagnosis not usually attempted unless influenza suspected
• Antibiotic therapy not indicated and should not be offered
• Exception: some episodes of prolonged paroxysmal cough are due to *Bordetella pertussis*

<table>
<thead>
<tr>
<th>Viral Causes of Bronchitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory Syncytial Virus</td>
</tr>
<tr>
<td>Adenovirus</td>
</tr>
<tr>
<td>Parainfluenza virus</td>
</tr>
<tr>
<td>Rhinovirus</td>
</tr>
<tr>
<td>Influenza virus</td>
</tr>
</tbody>
</table>
Patient Management

• Some patients may expect an antibiotic based on past experience or expectations
  – Explain to the patient why an antibiotic is not necessary and that these drugs may have unwanted side-effects

• Suggestions for symptom relief
  – Humidified air
  – Some recommend cough suppressants

  – No role for bronchodilators in absence of asthma or chronic obstructive pulmonary disease (COPD)
Acute Rhinosinusitis (ARS)
Acute Rhinosinusitis

- Broad term describing multiple disease processes affecting the nasal cavity and sinuses with a duration of <4 weeks
  - Allergy
  - Infection (viral, bacterial, fungal)
  - Polyps
Acute Viral Rhinosinusitis (Common Cold)

- Pathogens: Viruses similar to acute bronchitis
- Common symptoms:
  - Nasal congestion
  - Mucous discharge
  - Facial pressure
  - Post-nasal discharge
- Usually symptoms peak at 2-3 days and resolve by day 7-10
Acute Viral Rhinosinusitis

- Diagnosis relies on exam.
- Radiographs not sensitive or specific
- Treat with:
  - topical and oral decongestants
  - nasal irrigation, +/- topical corticosteroids
- No indication for antibiotics
Acute Bacterial Rhinosinusitis (ABRS)

- Pathogens: *S. pneumoniae*, *H. influenzae*, *M. catarrhalis*, *Streptococcus sp*, *S. aureus*, anaerobes
- Much less frequent than viral ARS
- Follows <2.0% of viral ARS cases
- CT imaging only indicated for severe infection with suspected orbital or intracranial extension

### Symptoms Suggesting Bacterial Infection

<table>
<thead>
<tr>
<th>Symptoms &gt; 10 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset with severe symptoms or signs at the beginning of illness</td>
</tr>
<tr>
<td>Unilateral maxillary sinus tenderness</td>
</tr>
<tr>
<td>Double sickening (symptoms improve then worsen)</td>
</tr>
<tr>
<td>Green or colored nasal discharge and cough do not predict ABRS.</td>
</tr>
</tbody>
</table>
ABRS treatment

• First-line antibiotic therapy:
  – Amoxicillin-clavulanate

   Penicillin allergy in adults:
    ➢ doxycycline
    ➢ levofloxacin or moxifloxacin
“High-dose” amoxicillin-clavulanate is recommended for children and adults with ABRS:

- from geographic regions with high endemic rates (≥10%) of PRSP
- those with severe infection (fever of 39°C or higher, or suppurative complications)
- attendance at daycare
- age ≤2 or ≥65 years
- recent hospitalization
- antibiotic use within the past month
- who are immunocompromised
• A β-lactam agent (amoxicillin clavulanate) rather than a respiratory fluoroquinolone is recommended for initial empiric antimicrobial therapy of ABRS
Macrolides (clarithromycin and azithromycin) are not recommended for empiric therapy due to high rates of resistance among S. pneumoniae (≥30%)
Trimethoprim-sulfamethoxazole (TMP/SMX) is **not recommended** for empiric therapy because of high rates of resistance among both *S. pneumoniae* and *Haemophilus influenzae* (≥30%–40%)
• Second-and third-generation oral cephalosporins are **no longer recommended** for empiric monotherapy of ABRS due to variable rates of resistance among S. pneumoniae.

• Combination therapy with a **third-generation oral cephalosporin** (cefixime or cefpodoxime) plus clindamycin may be used as second-line therapy for children with **non–type I penicillin allergy** or from geographic regions with high endemic rates of PNS S. pneumoniae.
• **adults** who are allergic to penicillin:

  - *doxycycline* (not suitable for children) or
  - *respiratory fluoroquinolone* (levofloxacin or moxifloxacin)
• Levofloxacin is recommended for children with a history of type I hypersensitivity to penicillin;

• combination therapy with clindamycin plus a third-generation oral cephalosporin (cefixime or cefpodoxime) is recommended in children with a history of non–type I hypersensitivity to penicillin
5–7 days & 10–14 days?

• The recommended duration of therapy for uncomplicated ABRS in adults is 5–7 days.

• In children with ABRS, the longer treatment duration of 10–14 days is still recommended.
Adjunctive treatment

- Hydration, analgesics, antipyretics
- Irrigation with physiologic or hypertonic saline
- Intranasal corticosteroids for those with concurrent allergic rhinitis
- Topical or oral decongestants or antihistamines not indicated due to lack of effect
<table>
<thead>
<tr>
<th>Indication</th>
<th>First-line (Daily Dose)</th>
<th>Second-line (Daily Dose)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial empirical therapy</td>
<td>• Amoxicillin-clavulanate (45 mg/kg/day PO bid)</td>
<td>• Amoxicillin-clavulanate (90 mg/kg/day PO bid)</td>
</tr>
<tr>
<td>β-lactam allergy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type I hypersensitivity</td>
<td>• Levofloxacin (10–20 mg/kg/day PO every 12–24 h)</td>
<td></td>
</tr>
<tr>
<td>Non-type I hypersensitivity</td>
<td>• Clindamycin® (30–40 mg/kg/day PO tid) plus cefixime (8 mg/kg/day PO bid) or cefpodoxime (10 mg/kg/day PO bid)</td>
<td></td>
</tr>
<tr>
<td>Risk for antibiotic resistance or failed initial therapy</td>
<td>• Amoxicillin-clavulanate (90 mg/kg/day PO bid)</td>
<td>• Clindamycin® (30–40 mg/kg/day PO tid) plus cefixime (8 mg/kg/day PO bid) or cefpodoxime (10 mg/kg/day PO bid)</td>
</tr>
<tr>
<td>Severe infection requiring hospitalization</td>
<td>• Levofloxacin (10–20 mg/kg/day PO every 12–24 h)</td>
<td>• Ampicillin/sulbactam (200–400 mg/kg/day IV every 6 h)</td>
</tr>
<tr>
<td></td>
<td>• Ceftriaxone (50 mg/kg/day IV every 12 h)</td>
<td>• Cefotaxime (100–200 mg/kg/day IV every 6 h)</td>
</tr>
<tr>
<td></td>
<td>• Levofoxacin (10–20 mg/kg/day IV every 12–24 h)</td>
<td></td>
</tr>
</tbody>
</table>
## Table 10. Antimicrobial Regimens for Acute Bacterial Rhinosinusitis in Adults

<table>
<thead>
<tr>
<th>Indication</th>
<th>First-line (Daily Dose)</th>
<th>Second-line (Daily Dose)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial empirical therapy</td>
<td>● Amoxicillin-clavulanate (500 mg/125 mg PO tid, or 875 mg/125 mg PO bid)</td>
<td>● Amoxicillin-clavulanate (2000 mg/125 mg PO bid)</td>
</tr>
<tr>
<td>β-lactam allergy</td>
<td></td>
<td>● Doxycycline (100 mg PO bid or 200 mg PO qd)</td>
</tr>
<tr>
<td>Risk for antibiotic resistance or failed initial therapy</td>
<td></td>
<td>● Doxycycline (100 mg PO bid or 200 mg PO qd)</td>
</tr>
<tr>
<td>Severe infection requiring hospitalization</td>
<td></td>
<td>● Levofloxacin (500 mg PO qd)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Moxifloxacin (400 mg PO qd)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Levofloxacin (500 mg PO qd)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Moxifloxacin (400 mg PO qd)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Ampicillin-sulbactam (1.5–3 g IV every 6 h)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Levofloxacin (500 mg PO or IV qd)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Moxifloxacin (400 mg PO or IV qd)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Ceftriaxone (1–2 g IV every 12–24 h)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Cefotaxime (2 g IV every 4–6 h)</td>
</tr>
</tbody>
</table>

Abbreviations: bid, twice daily; IV, intravenously; PO, orally; qd, daily; tid, 3 times a day.
Acute Pharyngitis
Acute Pharyngitis

- Classically the triad of fever, sore throat and pharyngeal inflammation

- Pathogens:
  - Viruses: respiratory viruses, Epstein-Barr, Cytomegalovirus, enteroviruses, Herpes simplex type I
  - Bacteria: Group A *Streptococcus* (GAS), Non-group A *Streptococcus*, *Arcanobacterium hemolyticum*, and *Fusobacterium spp.*
Acute Pharyngitis

- Pharyngitis in 85-95% of adults and 80-85% of children is due to viruses

- For uncomplicated pharyngitis, antibacterial therapy is reserved for GAS infection
## Clinical Features of Pharyngitis

<table>
<thead>
<tr>
<th>Features suggestive of GAS etiology</th>
<th>Features suggestive of viral etiology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sudden onset sore throat</td>
<td>Absence of fever</td>
</tr>
<tr>
<td>Fever</td>
<td>Conjunctivitis</td>
</tr>
<tr>
<td>Headache</td>
<td>Coryza</td>
</tr>
<tr>
<td>Tonsillopharyngeal inflammation</td>
<td>Cough</td>
</tr>
<tr>
<td>Tonsillopharyngeal <strong>exudate</strong></td>
<td>Hoarseness</td>
</tr>
<tr>
<td>Palatal petechiae</td>
<td>Ulcerative mouth lesions</td>
</tr>
<tr>
<td>Tender <strong>anterior</strong> cervical adenopathy</td>
<td>Viral type rash</td>
</tr>
<tr>
<td>Winter-early spring presentation</td>
<td></td>
</tr>
<tr>
<td><strong>Age 5-15 years</strong></td>
<td></td>
</tr>
<tr>
<td>History of exposure to GAS pharyngitis</td>
<td></td>
</tr>
</tbody>
</table>

Overlap between GAS and viral pharyngitis may be considerable
Acute Pharyngitis Diagnosis

- For adults and children with features that strongly suggest a viral etiology, *testing is not indicated*.

- In persons with findings suggestive of GAS infection, confirmation with a rapid antigen detection test (RADT) or culture is needed.
• In children and some adolescents a negative RADT has a low negative predictive value and should be backed up with a throat culture for GAS.

• Positive RADTs do not necessitate a back-up culture because they are highly specific
Diagnostic studies for GAS are **not indicated** for:

- **children <3 years old:**
  - acute rheumatic fever is rare in children <3 years old and
  - the incidence of streptococcal pharyngitis and the classic presentation of streptococcal pharyngitis are uncommon in this age group.

- Selected children <3 years old who have other risk factors, such as an older sibling with GAS infection, may be considered for testing
Anti-streptococcal antibody titers (ASO) are not recommended in the routine diagnosis of acute pharyngitis as they reflect past but not current events.
Modified Centor Score and Culture Management Approach for Pharyngitis

CRITERIA POINTS

• Temperature $> 38^\circ$ C 1
• Absence of cough 1
• Swollen, tender anterior cervical nodes 1
• Tonsillar swelling or exudate 1
• Age
  • 3-14 yr 1
  • 15-44 yr 0
  • 45 yr or older −1
<table>
<thead>
<tr>
<th>SCORE</th>
<th>RISK OF STREPTOCOCCAL INFECTION</th>
<th>SUGGESTED MANAGEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤0</td>
<td>1%-2.5%</td>
<td>No further testing or antibiotic</td>
</tr>
<tr>
<td>1</td>
<td>5%-10%</td>
<td>Culture all: AB only for positive</td>
</tr>
<tr>
<td>2</td>
<td>11%-17%</td>
<td>Culture all: AB only for positive</td>
</tr>
<tr>
<td>3</td>
<td>28%-35%</td>
<td>Culture all: AB only for positive</td>
</tr>
<tr>
<td>≥4</td>
<td>51%-53%</td>
<td>Treat empirically with AB</td>
</tr>
</tbody>
</table>
Treatment

• Drug of choice for those non-allergic to these agents
  • penicillin or amoxicillin

• Amoxicillin: 50 mg/kg once daily, 10 days
penicillin

• **IM Regimen:**
  - Benzathine penicillin G:
    - 600000 u for <27 kg, single dose
    - 1.2 mu for >27 kg, single dose

• **Oral Regimen:**

• Penicillin V
  - Children: 250 mg bid or tid, 10 days
  - Adolescent: 250 mg tid or qid, 10 days
penicillin-allergic

• non–type I hypersensitivity to penicillin:
  
✓ first generation cephalosporin:

• Cephalexin 20mg/kg/dose twice daily (max=500mg/dose) for 10 days.
- type I hypersensitivity to penicillin:
  - Clindamycin 7mg/kg/dose 3 times daily (max=300mg/dose), for 10 days
  - clarithromycin 7.5mg/kg/dose twice daily (max=250mg/dose), for 10 days
  - azithromycin 12mg/kg once daily (max=500mg) **for 5 days**
Adjunctive therapy

- **Analgesic/antipyretic** (acetaminophen or NSAID): for treatment of moderate to severe symptoms or control of high fever associated with GAS pharyngitis

- Adequate oral hydration

- **Corticosteroids not recommended**
• Follow-up posttreatment throat cultures or RADT are not recommended routinely, but may be considered in special circumstances.

• Diagnostic testing or empiric treatment of asymptomatic household contacts of patients with acute streptococcal pharyngitis is not routinely recommended
Acute Otitis Media
Acute Otitis Media (AOM)

- Acute illness with fluid and mucosal inflammation of the middle ear space
- Extremely common in young children: By age 3, two-thirds have had at least one episode

- Much less common in adults

- Increased risk with some ethnic groups, exposure to polluted air (including tobacco smoke), and with children who attend daycare
AOM Pathogenesis

- Anatomic and physiologic disruption of eustachian tube drainage of the middle ear with subsequent fluid accumulation and bacterial infection

- Often follows viral respiratory infection

- Incidence due to *S. pneumoniae* decreasing due to vaccination of children starting in 2000

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Proportion of cultures (2001-2003) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>S. pneumoniae</em></td>
<td>23</td>
</tr>
<tr>
<td><em>H. influenzae</em></td>
<td>36</td>
</tr>
<tr>
<td><em>M. catarrhalis</em></td>
<td>3</td>
</tr>
<tr>
<td>Group A <em>Streptococcus</em></td>
<td>1.3</td>
</tr>
<tr>
<td>None</td>
<td>41</td>
</tr>
</tbody>
</table>
• **Symptoms/signs**
  
  - Fever, chills, ear pain, ear drainage, hearing loss, lethargy, irritability.

• **Exam:**
  
  - Tympanic membrane erythema, loss of landmarks and bulge
  
  - Presence of middle ear fluid on pneumatic otoscopy or tympanometry, or otorrhea
  
  - If there is no middle ear fluid by above tests AOM should not be diagnosed
AOM: Treatment

- Many cases of AOM (~25%) are due to viruses and will not respond to antibiotics
- A significant number of cases due to bacteria will spontaneously resolve without antibiotics

If antibiotics are indicated:

- **use high dose amoxicillin**: 90 mg/kg/d
  - If child has received amoxicillin in last 30 days: **Amoxicillin-clavulanate**
  - Penicillin allergy: 2nd or 3rd generation cephalosporin
## AOM Treatment

<table>
<thead>
<tr>
<th>Age</th>
<th>Severe Symptoms</th>
<th>Mild symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;6 mo</td>
<td>Antibacterial therapy</td>
<td>Antibacterial therapy</td>
</tr>
<tr>
<td>6 mo -2 yr</td>
<td>Antibacterial therapy</td>
<td>Antibacterial therapy if bilateral ear involvement; Observation option if unilateral</td>
</tr>
<tr>
<td>≥ 2 yr</td>
<td>Antibacterial therapy</td>
<td>Observation option</td>
</tr>
</tbody>
</table>

**Observation option:** After discussion with parents the risks and benefits of antibiotics, they are either started at that time or deferred. If deferred, and the child is not better or worsening after 48-72 hrs antibiotics are started at that time.
Acute Otitis Media

• Symptom relief
  – Oral analgesics
  – Topical analgesic spray/drops
  – Warm, moist cloths over ear
  – Avoid narcotics

• Prevention
  – Conjugate pneumococcal and Haemophilus vaccination
  – Influenza vaccination

AAP. Pediatrics. 2013; 131:e964
Community-Acquired Pneumonia
Community-Acquired Pneumonia

Overview

- 3-4 million cases/year
- Approximately 80% are mild to moderate in severity and treated as outpatients
- 500,000 hospitalizations and 45,000 deaths/year

Mortality
- 1% in outpatients
- 5% in inpatients
- 25-50% in patients admitted to ICU
Community-Acquired Pneumonia

Symptoms

• Cough
• Fever
• Pleuritic chest pain
• Dyspnea
• Sputum production
Community-Acquired Pneumonia Diagnosis

- Common physical examination findings:
  - Fever
  - Respiratory rate > 24 breaths/minute
  - Heart rate > 100 beats/minute
  - Crackles/râles usually present on auscultation
  - Evidence of consolidation on exam
Diagnosis

- Peripheral white blood cell count (WBC) usually elevated
- Chest x-ray (CXR) should be used to confirm diagnosis
## Community-Acquired Pneumonia

### Microbiology and Proportion of Deaths in Adults

<table>
<thead>
<tr>
<th>Microbial Agent</th>
<th>Proportion of Hospital Admissions</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>S. pneumoniae</em></td>
<td>20-60%</td>
<td>66%</td>
</tr>
<tr>
<td><em>H. influenzae</em></td>
<td>3-10%</td>
<td>7%</td>
</tr>
<tr>
<td><em>S. aureus</em></td>
<td>3-5%</td>
<td>6%</td>
</tr>
<tr>
<td>Gram Negative Rods</td>
<td>3-10%</td>
<td>3%</td>
</tr>
<tr>
<td>Miscellaneous Bacteria</td>
<td>3-5%</td>
<td>9%</td>
</tr>
<tr>
<td>“Atypical” Bacteria</td>
<td>10-20%</td>
<td>6%</td>
</tr>
<tr>
<td><em>Legionella spp.</em></td>
<td>2-8%</td>
<td>5%</td>
</tr>
<tr>
<td><em>Mycoplasma spp.</em></td>
<td>1-6%</td>
<td>1%</td>
</tr>
<tr>
<td><em>C. pneumoniae</em></td>
<td>4-6%</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Viral (including influenza)</td>
<td>2-15%</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Aspiration</td>
<td>6-10%</td>
<td>ND</td>
</tr>
</tbody>
</table>
Antibiotic Considerations

- Therapy is almost always empiric initially
- Most important pathogen to target is *S. pneumoniae*
- Local prevalence of macrolide-resistant *S. pneumoniae* influences antibiotic choice
- “Atypical pathogens” more common among older children and adults

If an etiology is identified, therapy should be de-escalated and directed at that pathogen.
Community-Acquired Pneumonia
Treatment Recommendations for Outpatients

<table>
<thead>
<tr>
<th>Clinical Characteristic</th>
<th>Treatment Regimen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previously healthy and no risk factors for drug-resistant <em>S. pneumoniae</em></td>
<td>• Macrolide*&lt;br&gt;• Doxycycline</td>
</tr>
<tr>
<td>Risk factors for drug resistant <em>S. pneumoniae</em></td>
<td>• Respiratory fluoroquinolone**&lt;br&gt;• High dose amoxicillin plus macrolide*&lt;br&gt;• HD Amoxicillin/clavulanate plus macrolide*&lt;br&gt;• Alternative: Ceftriaxone, cefpodoxime or cefuroxime plus macrolide*</td>
</tr>
<tr>
<td>• Presence of comorbidities or immunocompromised</td>
<td></td>
</tr>
<tr>
<td>• Use of antimicrobials within the previous 3 months</td>
<td></td>
</tr>
<tr>
<td>• Regions with a high rate (&gt;25%) of macrolide-resistant <em>S. pneumoniae</em></td>
<td></td>
</tr>
</tbody>
</table>

* Azithromycin, Clarithromycin or Erythromycin
** Gemifloxacin, Levofloxacin or Moxifloxacin
# Community-Acquired Pneumonia

## Treatment Recommendations for Inpatients

<table>
<thead>
<tr>
<th>Clinical Characteristic</th>
<th>Treatment Regimen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-ICU Admission</td>
<td>• Respiratory fluoroquinolone**&lt;br&gt;• Cefotaxime or ceftriaxone plus macrolide*&lt;br&gt;• Ampicillin sulbactam plus macrolide*&lt;br&gt;• Ertapenem plus macrolide*</td>
</tr>
<tr>
<td>ICU Admission</td>
<td>• Cefotaxime or ceftriaxone or ampicillin-sulbactam **&lt;br&gt;PLUS&lt;br&gt;• Azithromycin or Respiratory fluoroquinolone</td>
</tr>
</tbody>
</table>

* Azithromycin, Clarithromycin or Erythromycin

** Gemifloxacin, Levofloxacin or Moxifloxacin
Outline

• Introduction
• Evaluation and therapy
  – CAP
  – Acute bronchitis
  – Rhinosinusitis
  – Acute pharyngitis
  – Acute otitis media
• Conclusion
Conclusion

- Antibiotics are frequently given for respiratory tract infections in outpatient and inpatient settings
- Inappropriate antibiotic use is common for these diagnoses
- Misdiagnosis of pneumonia is common
- Most upper respiratory infections are viral and do not need antibiotic treatment
- Observation without antibiotics is an option for children with acute otitis media
QUESTIONS ?
THANKS FOR YOUR ATTENTION