NC CLASP OUTPATIENT STEWARDSHIP
YEAR 2, SESSION 4

Antimicrobial Stewardship for Ambulatory Patients with Lower Respiratory Infections
November 29, 2023
CONFLICT OF INTEREST DISCLOSURES

The views and opinions expressed in this series are those of the speakers and do not reflect the official policy or position of any agency of the US or NC government or UNC.

Our speakers have the following financial relationships with the manufacturer(s) and/or provider(s) of commercial services discussed in this activity:

- Dr. Willis has performed contracted research with: Pfizer (pediatric nirmatrelvir-ritonavir and maternal RSV vaccine), Novavax (pediatric COVID-19 vaccine), and Merck (monoclonal antibody for RSV prevention)

The speakers do not intend to discuss an unapproved/investigative use of a commercial product/device in this series, and all COI have been mitigated.

These slides contain materials from a variety of colleagues, as well as the CDC, WHO, AHRQ, etc.
INTRODUCTIONS

Please put your name, clinic, and location in the chat!
CME AND CE CREDIT

- CME & CE for participants
  - Attendance and active participation per learning session
  - Click the link in the chat during the session to document your attendance
  - Complete surveys as requested
## OUTLINE: UPCOMING SESSIONS

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<th>Date</th>
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<td>November 29&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Lower Respiratory Tract Infections</td>
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<td>January 24&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Pharyngitis, acute otitis media</td>
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<td>February 28&lt;sup&gt;th&lt;/sup&gt;</td>
<td>UTI and STI</td>
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<td>March 27&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Skin and soft-tissue infections</td>
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<td>April 24&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Antibiotic Allergies</td>
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<td>May Conference</td>
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<td>June 26&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Ancillary strategies to prevent antibiotic overuse</td>
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TODAY’S OVERVIEW

- Acute bacterial sinusitis: quick review
- Lower respiratory tract infections (LRTI):
  - Acute bronchitis and bronchiolitis
  - Community-acquired pneumonia (CAP)
  - COPD exacerbation
QUICK REVIEW: THREE WAYS TO OVERUSE ANTIBIOTICS

1. Prescribing antibiotics when none are indicated

2. Using an antibiotic that is too broad for the infection (or otherwise suboptimal)

3. Using an excessive duration
QUICK REVIEW: ACUTE BACTERIAL SINUSITIS

► Common problems:

1. Overdiagnosis – strict diagnostic criteria
   ► Can be difficult to measure

2. Suboptimal antibiotic choices
   ► Common offenders: Azithromycin, Cefdinir, Levofloxacin
   ► Recommendation: Amox-clav (high-dose)

3. Excessive duration
   ► Recommendations: 5-7 days for adults, 10 days for kids
   ► 10 days commonly observed in all age groups, occasionally 14 days
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**Amoxicillin**

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**Amoxicillin-clavulanate**

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**Doxycycline**

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ACUTE BRONCHITIS
DEFINITION OF ACUTE BRONCHITIS

- Infection of the large airways (bronchi) without pneumonia
- No history of COPD, chronic bronchitis, bronchiectasis
- Features:
  - Cough is primary – often productive
  - May have mild dyspnea, wheezing
  - Often preceded by URI symptoms
- Cough duration: 1-3 weeks (median: 18 days)
- Etiology: viruses – RSV, parainfluenza, metapneumovirus, non-COVID CoVs, rhinovirus, enterovirus
DIAGNOSING ACUTE BRONCHITIS

- Concerning features:
  - Severe paroxysmal cough: consider pertussis
  - Fever: consider influenza, COVID-19, pneumonia
  - Abnormal VS (tachycardia, hypoxia, tachypnea) or mental status changes: pneumonia

- Reasonable to rule out COVID-19 in all patients with RTIs

- Rule out influenza during flu season, especially in patients at risk for severe illness

- Chest X-ray recommended if abnormal vital signs
Effective pharmacologic interventions are limited

Clinicians may use:
- Benzonatate (Tessalon perles)
- Dextromethorphan
- Guaifenesin
- Acetaminophen or NSAIDs for myalgias, sore throat, etc.

AVOID ANTIBIOTICS

Identify and treat influenza and COVID-19
COMMUNITY-ACQUIRED PNEUMONIA
CAP DIAGNOSIS

- Pneumonia is infection of the alveolar spaces
  - Bacterial or viral

- Symptoms:
  - Almost always: Fever, cough (+/- sputum), shortness of breath
  - Sometimes: pleuritic chest pain, GI symptoms, mental status changes (esp in older adults)
  - Progression: hypoxemia, features of sepsis, respiratory distress

- Imaging:
  - CXR is generally recommended
  - Lobar or interstitial infiltrate typically seen

- Microbiologic diagnosis:
  - Recommend obtaining COVID-19 and influenza testing
Most common: Pneumococcus, *H. flu*, atypicalss (*Mycoplasma, Chlamydia*)

Oral anaerobes: generally following aspiration
- Rare in ambulatory population
- Poor dentition an important risk factor

Group A Strep and *Staph aureus*: generally rare in CAP
- Both can be seen as postviral pneumonia – especially with influenza
- Would be unusual to remain ambulatory

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# DIFFERENTIATING CAP AND ACUTE BRONCHITIS

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<th>Acute Bronchitis</th>
<th>Pneumonia</th>
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<tr>
<td>Fever</td>
<td>Uncommon, usually not &gt;38.3</td>
<td>Common</td>
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<tr>
<td>Dyspnea and Tachypnea</td>
<td>None or mild</td>
<td>Mild to severe</td>
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<tr>
<td>Hypoxemia</td>
<td>Never</td>
<td>None to severe</td>
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<tr>
<td>Productive cough</td>
<td>Common</td>
<td>Common</td>
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<tr>
<td>Focal rales</td>
<td>Absent</td>
<td>Usually present</td>
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<tr>
<td>Chest X-ray (if done)</td>
<td>Normal or nonspecific bronchial thickening</td>
<td>Focal or multifocal consolidations</td>
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*Aerobes rare outside of significant aspiration event, especially in presence of poor dentition

^S. aureus is a rare cause of CAP, but may occur in viral coinfection, especially with influenza.

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CAP: GUIDELINES

- ATS/IDSA 2019: “Diagnosis and Treatment of Adults with Community-Acquired Pneumonia”

- IDSA 2011: “The Management of Community-Acquired Pneumonia in Infants and Children Older Than 3 Months of Age: Clinical Practice Guidelines by the Pediatric Infectious Diseases Society and the Infectious Diseases Society of America”
ADULT CAP TREATMENT

Diagnosis and Treatment of Adults with Community-acquired Pneumonia
An Official Clinical Practice Guideline of the American Thoracic Society and Infectious Diseases Society of America

- No comorbidities: amoxicillin OR doxycycline OR macrolide (if local pneumococcal resistance is <25%)
- Comorbidities (many included):
  - Amox-clav OR cephalosporin PLUS azithromycin or doxycycline
  - OR respiratory FQ
- Antimicrobial stewardship recommendation:
  - Young, healthy patients: amoxicillin x 5-7 days +/- azithromycin x 5 days
  - Older adults (>=65 years) or comorbidities: Amox-clav x 5-7 days plus azithromycin
  - Penicillin allergy: doxycycline
PEDIATRIC CAP TREATMENT

The Management of Community-Acquired Pneumonia in Infants and Children Older Than 3 Months of Age: Clinical Practice Guidelines by the Pediatric Infectious Diseases Society and the Infectious Diseases Society of America

- Infants and preschool-age: amoxicillin x 10 days
- School-age and adolescents: amoxicillin x 10 days +/- azithromycin x 5 days

(Note: 10-day duration is likely excessive, guideline update pending)
VIRAL AND ATYPICAL COVERAGE

- Viruses cause pneumonia!
  - Look for and treat COVID-19 and influenza
  - Ready availability of PCR → empiric antiviral treatment should be rare

- Common atypical bacteria: *Mycoplasma pneumoniae, Chlamydophila pneumoniae, Legionella*
  - Harder to distinguish atypical and typical pneumonia than we thought
  - Azithromycin, doxycycline, levofloxacin generally have good coverage
  - Debate about when coverage is necessary
  - In most studies of generally healthy children and younger adults, atypical coverage does not improve outcomes
ANTIBIOTICS TO AVOID WHENEVER POSSIBLE

- Fluoroquinolones (Levofloxacin and moxifloxacin)
  - Excessively broad-spectrum
  - Greater risk of *C. difficile*
  - Multiple uncommon but potentially severe toxicities
    - QT prolongation, neurotoxicity, tendinopathy, arthropathy
  - BUT: great coverage, useful in treatment failure, true antibiotic allergies

- Cephalosporins (Cefdinir, etc)
  - Broad against irrelevant Gram-negative enterics
  - Poor activity against pneumococcus

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Variation in Antibiotic Prescribing Across a Pediatric Primary Care Network

Gerber JS, et al., *Journal of the Pediatric Infectious Diseases Society*, 2015

- 29 pediatric primary care practices
- CAP diagnosis rate varied 5x (0.4% - 2% of sick visits)
- Broad-spectrum antibiotic use ranged from 0% - 70%
COPD EXACERBATION
COPD EXACERBATIONS

~6.4% of Americans have COPD
  ~50% of patients with COPD have at least one exacerbation each year
  80% of exacerbations are treated with antibiotics

Symptoms:
  Mild: mild increase in dyspnea and cough
  Severe: respiratory failure

Triggers:
  Minority – environmental (i.e., particulate matter)
  Most often: respiratory infections – mostly viral, occasionally bacterial

Treatment: bronchodilators, ipratropium, steroids; antibiotics
COPD: When to Treat

**GOLD Report** (international guidelines)

- Antibiotics are indicated if:
  - Patient has purulent sputum plus either increased sputum or increased dyspnea
- Antibiotic duration: ≤5 days
- Antibiotic selection: amox-clav, azithromycin, doxycycline
- Prophylactic Abx not recommended (toxicity, resistance in trials)
- Cultures recommended only in severe exacerbations or in patients with frequent exacerbations or severe underlying disease
ANTIBIOTIC STEWARDSHIP FOR LOWER RESPIRATORY TRACT INFECTIONS
LRTI: ANTIBIOTIC PRESCRIBING PROBLEMS

- Prescribing antibiotics for acute bronchitis
  - Rarely indicated
- Overdiagnosis of CAP
  - Difficult to measure, suggested by variance
- Excessive spectrum or duration for CAP
  - 10-day courses traditionally used
  - Fluoroquinolones commonly overused
- Overuse of antibiotics in COPD exacerbations that are unlikely to be bacterial
HEDIS MEASURE: AVOIDANCE OF ANTIBIOTICS FOR BRONCHITIS

HEDIS Measures:
- Developed by National Committee for Quality Assurance (NCQA)
- Implemented by payors to reward high-quality care
  - Payors may select specific HEDIS measures that will have reimbursement impacts

AAB HEDIS Measure:
- What percentage of patients >3 months of age with an encounter for acute bronchitis do NOT receive antibiotics?
  - Multiple comorbidities (e.g., HIV or cancer) and concurrent conditions (e.g., pneumonia) excluded

Results:
- 2006 (pre-measure): ~29% of bronchitis encounters did not receive antibiotics
- 2021: ~50% did not receive antibiotics
Open-label RCT of CRP use to guide antibiotic therapy

Patients in the CRP group were less likely to receive antibiotics

- 57% vs 77%
- No difference in clinical outcomes

Practical limitation: point-of-care CRP not readily available for most PCPs
**HEDIS LIMITATIONS**

**Unintended Consequences of a Quality Measure for Acute Bronchitis**

- HEDIS measure implemented before 2008-09 winter
- ICD-9 codes:
  - 466.0 (Acute bronchitis): measured by HEDIS
  - 490 (Bronchitis NOS): not measured
- Results:
  - Total number of bronchitis diagnoses fell slightly
  - Huge shift from 466.0 to 490
  - No significant change in antibiotic prescribing rates for either code

LRTI: STEWARDSHIP INTERVENTIONS

- Avoid antibiotics for acute bronchitis
  - Patient education materials
  - Provider education/emphasis
  - “Chest cold” may be more favorable terminology
  - Communications training, positive treatment recommendations, and contingency planning

- CAP treatment:
  - Durations should be 5-7 days (except azithromycin)
  - Guideline-recommended antibiotic selection

- COPD exacerbation:
  - Provider education on GOLD criteria to treat with antibiotics
  - Emphasize non-antibiotic management strategies
LRTI: REMEMBER THE BENEFIT OF VACCINATION

- **S. pneumoniae**: Pneumococcal Conjugate Vaccine (PCV-20, or combination of older PCV-15 + polysaccharide vaccine (PPSV-23)

- **TDaP**: If not vaccinated as an adult. Pertussis (Whooping Cough) is an adult disease as well as a childhood infection

- **Influenza**

- **COVID-19**

- **Respiratory Syncytial Virus**: >60yrs and/or chronic lung, cardiac, other diseases. Involve patient in this decision.

  - "Do you want a pneumonia shot?"

  - "We need to get you up-to-date on your pneumonia vaccination, I'll have the nurse get that ready."
ANTIBIOTIC STEWARDSHIP METRICS: LRTI

- Avoiding antibiotics for acute bronchitis
  - Percentage of acute bronchitis encounters with no antibiotics prescribed
  - Beware of diagnosis shifting!

- Broad-spectrum antibiotic use
  - Fluoroquinolones, cephalosporins

- CAP antibiotic durations >7 days

- COPD exacerbation antibiotic treatment rates
BREAKOUT SESSION

¬ What are the real-world obstacles to avoiding antibiotics in patients with acute bronchitis?

¬ What antibiotics are often overused in LRTI treatment?

¬ Are COPD exacerbations an important target in your patient population?
THE NORTH CAROLINA CLINICAL ANTIBIOTIC STEWARDSHIP PARTNERS (NC CLASP)

- All the information from today’s session will be on our website
  https://spice.unc.edu/ncclasp/
RESOURCES

- **New York State Antibiotic Prescribing Guide**
  - Compendium of diagnostic and treatment guidelines for common outpatient conditions

- **CDC Treatment Recommendations**
  - Summarizes professional society guidelines, management of penicillin allergy

- **ATS/IDSA 2019: “Diagnosis and Treatment of Adults with Community-Acquired Pneumonia”**

- **IDSA 2011: “The Management of Community-Acquired Pneumonia in Infants and Children Older Than 3 Months of Age: Clinical Practice Guidelines by the Pediatric Infectious Diseases Society and the Infectious Diseases Society of America”**

- **GOLD Report 2023**
  - Comprehensive COPD guidelines. Antibiotics on pp 142-143