North Carolina SPICE
Statewide Program for Infection Control & Epidemiology

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

Date	Topic
November 29th	Lower Respiratory Tract Infections
January 24th	Pharyngitis, acute otitis media
February 28th	UTI and STI
March 27th	Skin and soft-tissue infections
April 24th	Antibiotic Allergies
May Conference	TBD
June 26th	Ancillary strategies to prevent antibiotic overuse

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

Pneumococcus	*H. flu, Moraxella*	Atypicals
Group A Strep		Oral anaerobes
MSSA		MRSA
E. coli, K. pneumoniae		*Pseudomonas*

Amoxicillin

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Amoxicillin-clavulanate

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Cefdinir

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Azithromycin

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Levofloxacin

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Doxycycline

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ACUTE BRONCHITIS

DEFINITION OF ACUTE BRONCHITIS

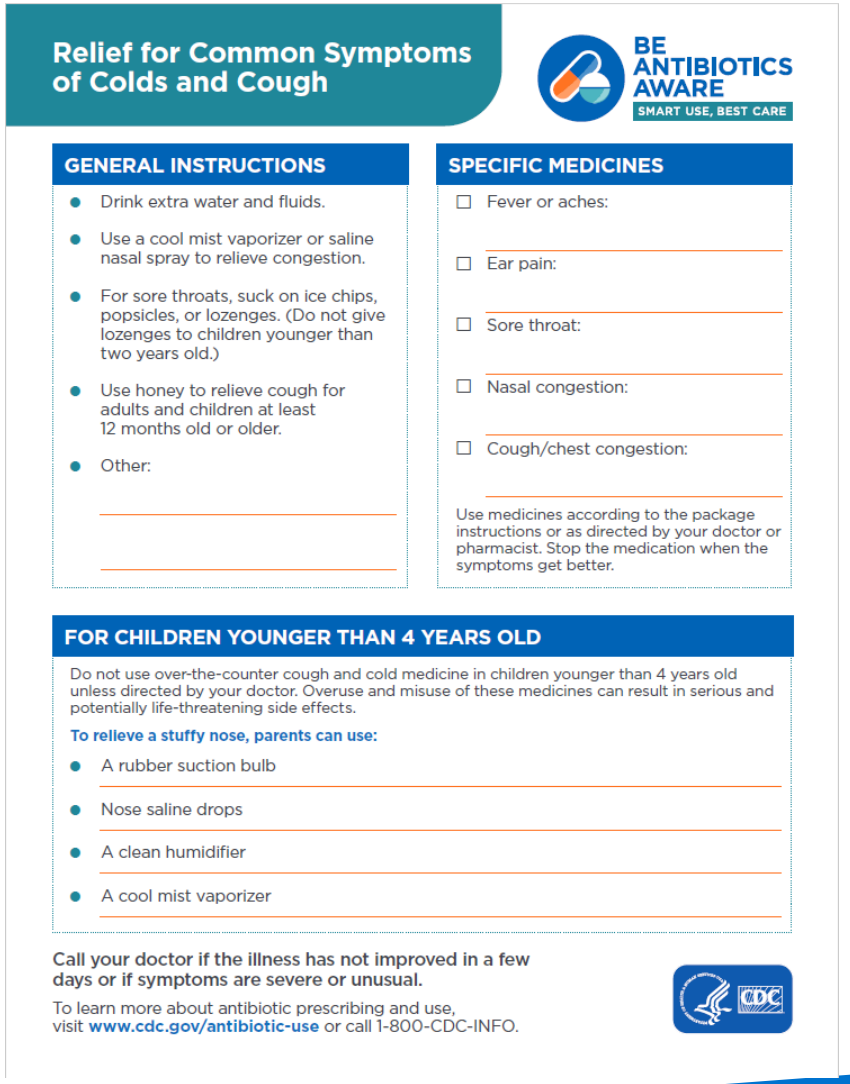
- Infection of the large airways (bronchi) without pneumonia
- No history of COPD, chronic bronchitis, bronchiectasis
- Features:
  - Cough is primary – often productive
  - May have mild dyspnea, wheezing
  - Often preceded by URI symptoms
- Cough duration: 1-3 weeks (median: 18 days)
- Etiology: viruses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

ACUTE BRONCHITIS: MANAGEMENT

- 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



Relief for Common Symptoms of Colds and Cough

BE ANTIBIOTICS AWARE
SMART USE, BEST CARE

GENERAL INSTRUCTIONS

- Drink extra water and fluids.
- Use a cool mist vaporizer or saline nasal spray to relieve congestion.
- For sore throats, suck on ice chips, popsicles, or lozenges. (Do not give lozenges to children younger than two years old.)
- Use honey to relieve cough for adults and children at least 12 months old or older.
- Other: _____

SPECIFIC MEDICINES

- ☐ Fever or aches: _____
- ☐ Ear pain: _____
- ☐ Sore throat: _____
- ☐ Nasal congestion: _____
- ☐ Cough/chest congestion: _____

Use medicines according to the package instructions or as directed by your doctor or pharmacist. Stop the medication when the symptoms get better.

FOR CHILDREN YOUNGER THAN 4 YEARS OLD

Do not use over-the-counter cough and cold medicine in children younger than 4 years old unless directed by your doctor. Overuse and misuse of these medicines can result in serious and potentially life-threatening side effects.

To relieve a stuffy nose, parents can use:

- A rubber suction bulb _____
- Nose saline drops _____
- A clean humidifier _____
- A cool mist vaporizer _____

Call your doctor if the illness has not improved in a few days or if symptoms are severe or unusual.

To learn more about antibiotic prescribing and use, visit www.cdc.gov/antibiotic-use or call 1-800-CDC-INFO.

CDC

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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

CAP MICROBIOLOGY

Pneumococcus	*H. flu, Moraxella*	Atypicals
Group A Strep		Oral anaerobes*
MSSA^		MRSA^
E. coli, K. pneumoniae		*Pseudomonas*

- Most common: Pneumococcus, *H. flu*, atypicals (*Mycoplasma, Chlamydophila)*
- 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

DIFFERENTIATING CAP AND ACUTE BRONCHITIS

Feature	Acute Bronchitis	Pneumonia
Fever	Uncommon, usually not >38.3	Common
Dyspnea and Tachypnea	None or mild	Mild to severe
Hypoxemia	Never	None to severe
Productive cough	Common	Common
Focal rales	Absent	Usually present
Chest X-ray (if done)	Normal or nonspecific bronchial thickening	Focal or multifocal consolidations

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*Anaerobes 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.

Amoxicillin

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Levofloxacin

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Doxycycline

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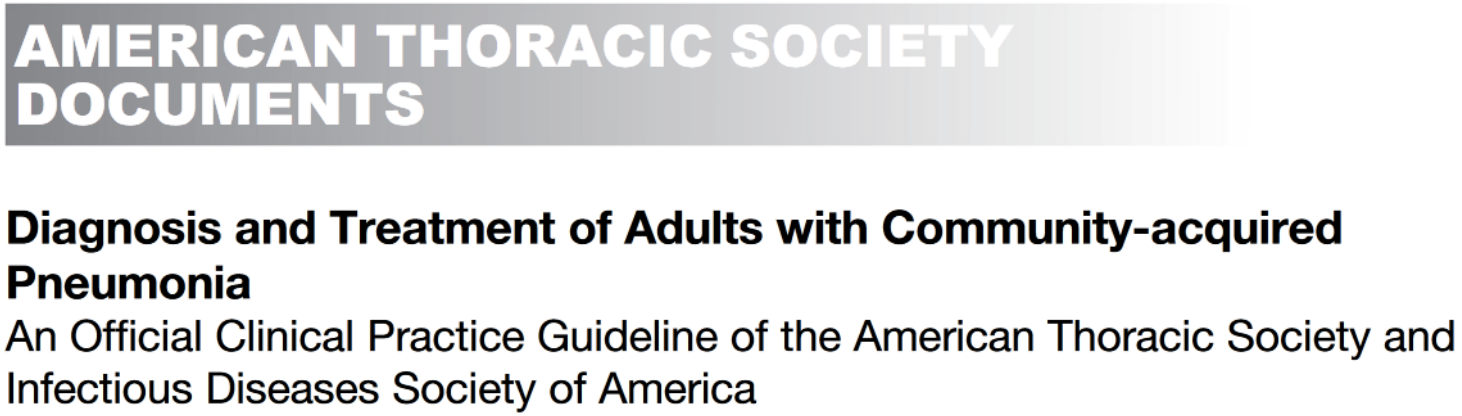
CAP: GUIDELINES

- 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



- 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

Levofloxacin

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

Cefdinir

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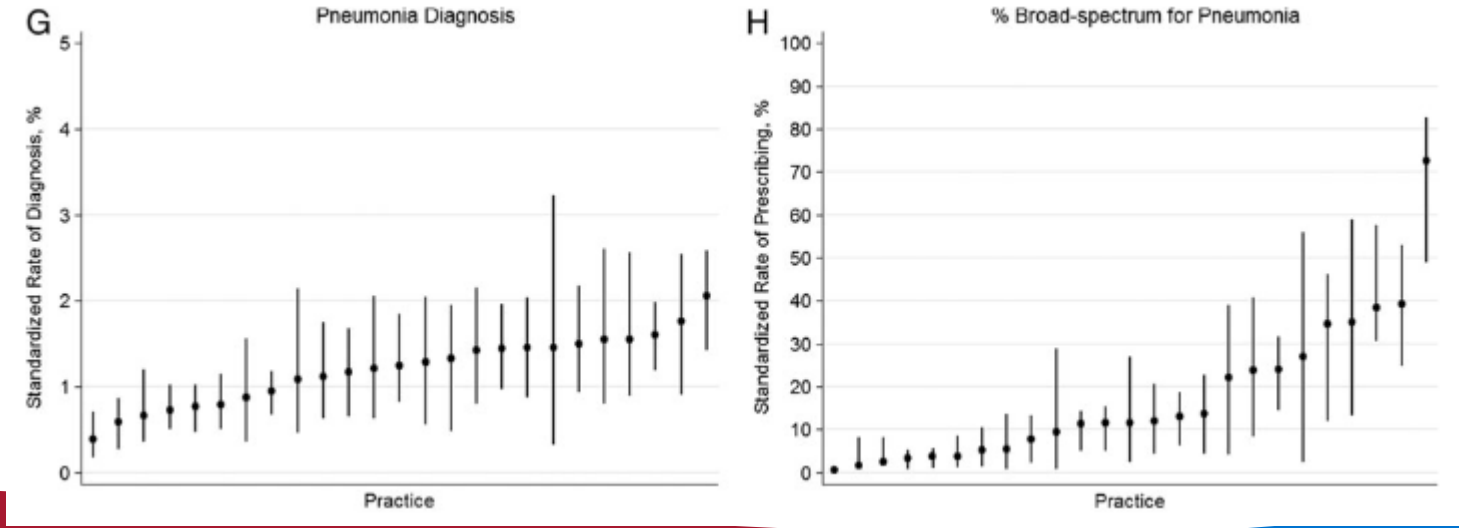
Variation in Antibiotic Prescribing Across a Pediatric Primary Care Network

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, ipratroprium, 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

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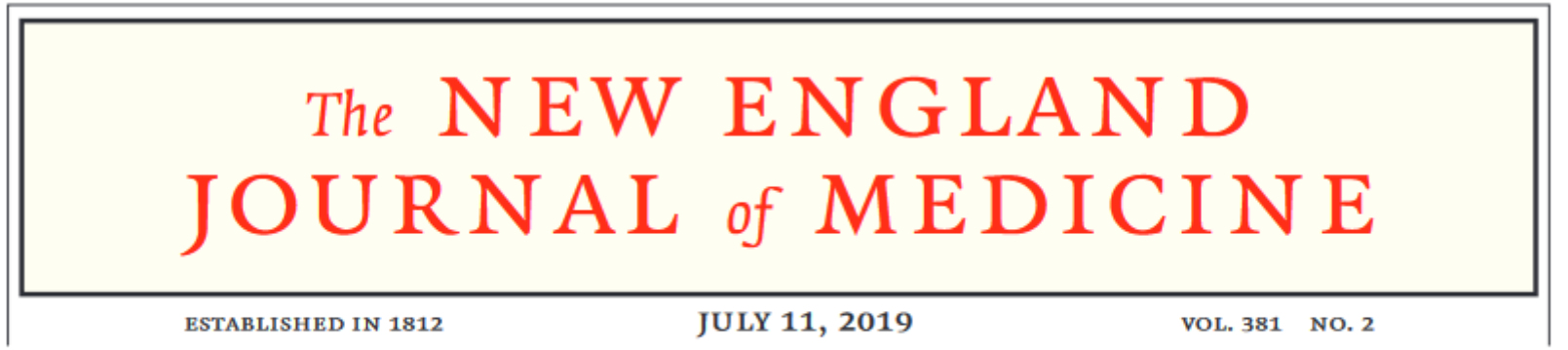
ANTIBIOTIC STEWARDSHIP FOR LOWER RESPIRATORY TRACT INFECTIONS

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

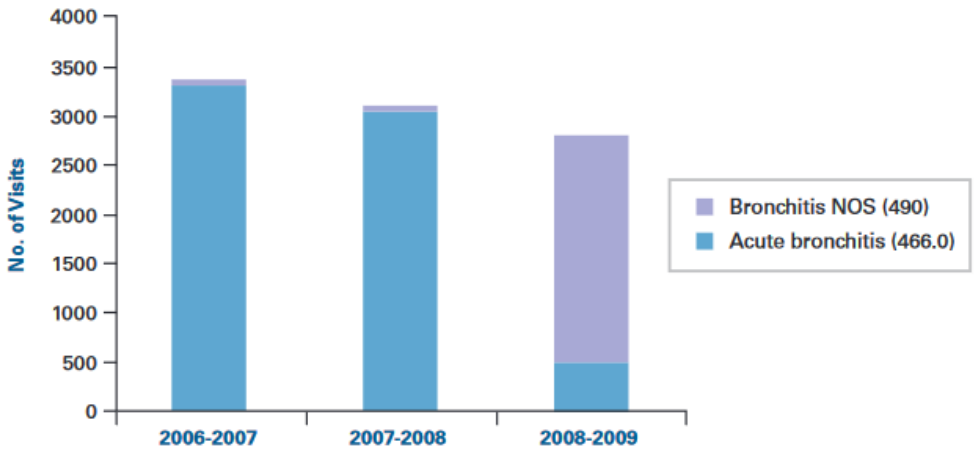
- HEDIS Measures:
  - Developed by National Committee for Quality Assurance (NCQA)
  - Implemented by payors to reward high-quality care
    - Payors may select specific HEDIS measures that will have reimbursement impacts
- AAB HEDIS Measure:
  - What percentage of patients >3 months of age with an encounter 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



Roth S, et al. *American Journal of Managed Care,* 2012

- 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

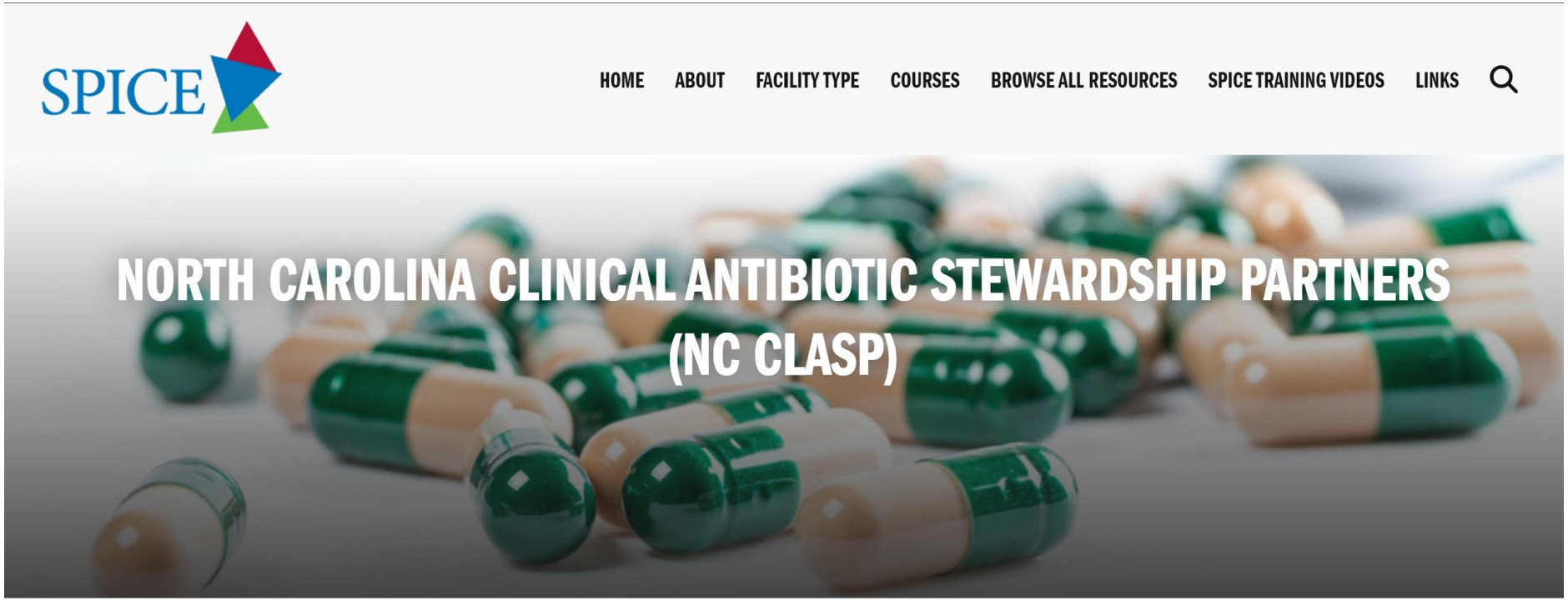
- Avoiding antibiotics for acute bronchitis
  - Percentage of acute bronchitis encounters with no antibiotics prescribed
  - Beware of diagnosis shifting!
- Broad-spectrum antibiotic use
  - Fluoroquinolones, cephalosporins
- CAP antibiotic durations >7 days
- COPD exacerbation antibiotic treatment rates

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