

# *Acute Bronchitis*

That Which We Call a Cough By Any Other Name...

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# *Objectives & Outline*

- Characterize the diagnostic features of acute bronchitis
- State the common differential diagnoses of acute bronchitis
- Explain why antibiotics are not recommended for the management of acute bronchitis
- Provide 3 patient-management strategies that can be used to reduce the prescription of antibiotics for acute bronchitis
- Discuss quality metrics related to acute bronchitis

# *Disclosure*

- I do not have (nor does any immediate family member have) a vested interest in or affiliation with any corporate organization offering financial support or grant monies for this continuing education activity, or any affiliation with an organization whose philosophy could potentially bias my presentation
- There was no financial support obtained for this CME Activity
- This presentation may include a discussion of off label medication use

# Acute Bronchitis

- Definition:
  - Acute bronchitis is a self-limiting syndrome characterized by inflammation of the large and mid-sized bronchi
- Signs/Symptoms:
  - Cough  $\pm$  sputum production, AND without pneumonia
  - Congestion, runny nose, sore throat, malaise, watery eyes, headache
  - $\pm$  mild fever, mild myalgia, chills, mild wheezing (e.g. mild flu-like symptoms)
  - Most symptoms generally lasts 7-10 days but cough may persist for >3-6 weeks
- Epidemiology:
  - Occurs year round with peak incidence in fall and winter
  - In the United States, acute bronchitis is the ninth most common illness among outpatients
  - Approximately 5% of Americans annually
  - Accounts for 70% of cough presentations
    - Over 100 million ambulatory care visits annually
  - One of the most common reasons for inappropriate antibiotic prescriptions
    - Over 70% of patients still receive an antibiotic

Harris AM, et al. Ann Intern Med. 2016 Mar 15;164(6):425-34.

Kinkade S, Long NA. AM Fam Physician 2016. Oct 1;94(7):560-65.

Walsh EE. Ch 66. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases. Eighth edition. Philadelphia, PA: Elsevier/Saunders, 2015.

# Regarding Sputum

- Up to 50% of adults may report production of purulent sputum
- Green sputum is NOT suggestive for bacterial cause!
  - Green sputum color is caused by peroxidase enzyme crystallization & is NOT indicative of any specific pathogen (e.g. bacterial vs viral)
- When history is suggestive of acute bronchitis, no need for sputum analysis, viral culture, or serologic analysis

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# *Differential Diagnosis*

- Pneumonia
- Acute exacerbation of chronic obstructive pulmonary disease (AECOPD)
- Asthma exacerbation
- Allergic rhinitis
- Gastroesophageal reflux disease (GERD)
- Heart failure
- ACE inhibitor induced cough
- Lung cancer

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# Community Acquired Pneumonia

- CAP Incidence
  - 25 cases per 10,000 adults
  - Increases with age
- Approximately 10% of patients with CAP will require admission to hospital
  - 670,000 hospital admissions annually
- Significant burden on health-care costs
  - \$10.6 billion dollars annually
- Mortality
  - 50,000 deaths annually
  - Number one cause of infectious-related death (U.S. and worldwide)
  - Eighth leading cause of death overall
  - Average 30-day mortality rate ~5-10%

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# Accuracy Of Clinical Findings In CAP

- For otherwise healthy immunocompetent adults younger than 70 years, pneumonia is unlikely in the absence of all of the following clinical criteria:
  - Tachycardia (heart rate >100 beats/min)
  - Tachypnea (respiratory rate >24 breaths/min)
  - Fever (oral temperature >38 C)
  - Abnormal findings on a chest examination (rales, egophony, or tactile fremitus)
- The negative predictive value 97-99%
- Findings associated with positive likelihood ratio <1
  - Sore throat (0.78)
  - Rhinorrhea (0.78)
  - Asthma (0.1)

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# Etiology

- Almost always of viral origin (>90-95%)
  - Influenza virus, parainfluenza, enterovirus, RSV, adenovirus, rhinovirus, coronavirus, human metapneumovirus
- About 5-10% may be caused by the following:
  - Dust, allergens, strong fumes, smoke, chemical inhalation, etc
  - *B. parapertussis* / *pertussis*, *M. pneumoniae*, *C. pneumoniae*
    - No data to support other bacterial causes in absence of structural lung disease (e.g. COPD, bronchiectasis)
- Data from EPIC study supports that even in CAP requiring hospitalization, viruses predominate

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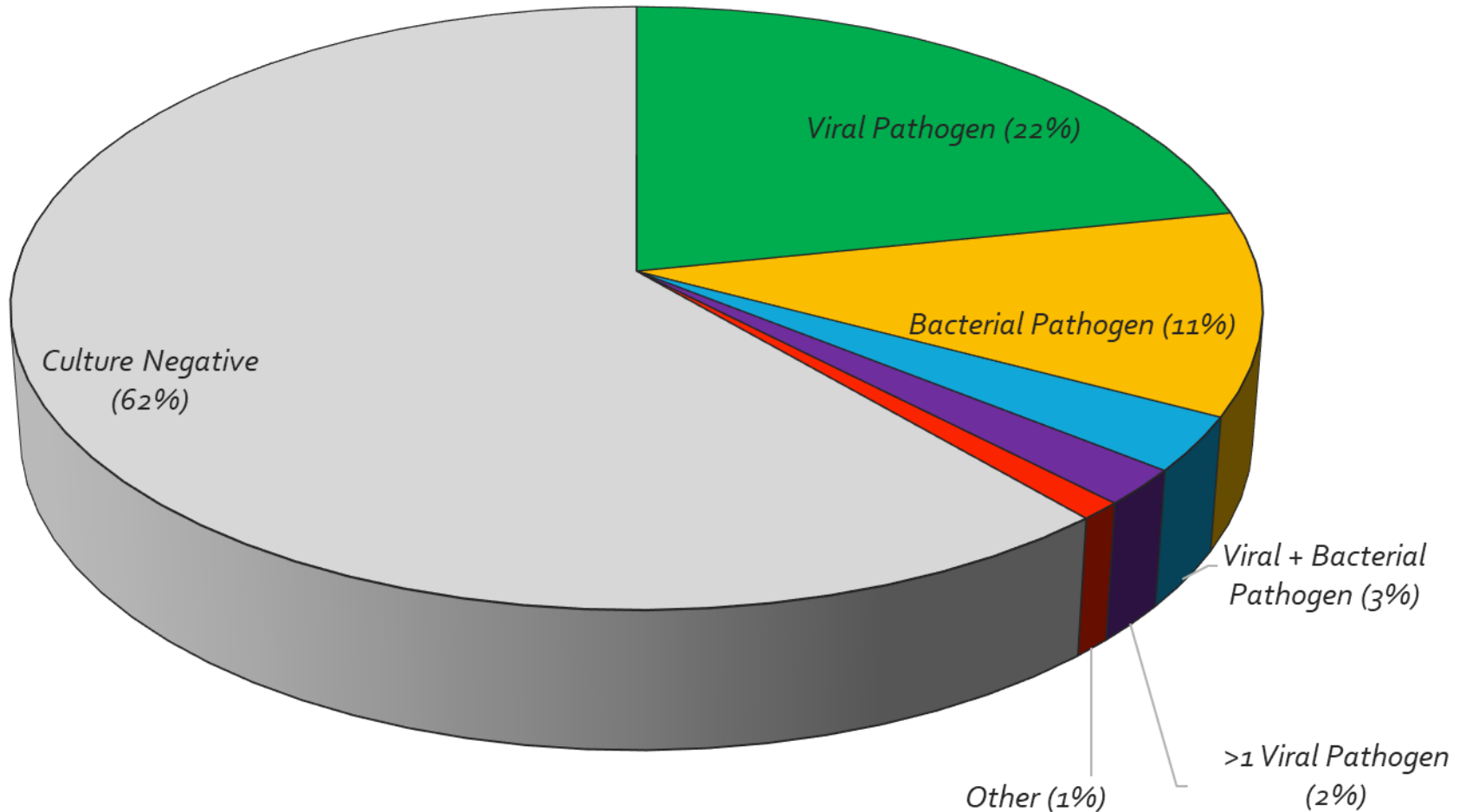
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# Viruses Are Dominant Pathogens

Percent of Pathogens Identified in Hospitalized Patients with Radiographically Confirmed CAP



# Acute Bronchitis Treatment

- Antibiotics are **NOT** indicated for uncomplicated acute bronchitis in the absence of pneumonia (i.e. >95% of cases)
- Treatment is largely symptomatic
  - Cough suppressants (dextromethorphan or codeine)
  - Expectorants (guaifenesin)
  - First-generation antihistamines (diphenhydramine)
  - Decongestants (phenylephrine)
  - $\beta$ -agonists (albuterol) in those with asthma or COPD
  - Anti-pyretics (acetaminophen, NSAIDs)
- Symptomatic therapy has not been shown to shorten the duration of illness
- Counsel patient that cough typically resolves in 2-3 weeks, but may persist for up to 3-6 weeks

Smith FM, et al. Cochrane Database of Systematic Reviews 2017, Issue 6. Art. No.: CD000245. DOI: 10.1002/14651858.CD000245.pub4

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# Considerations & Caveats

- Things that should prompt further investigation:
  - Immunosuppressed, cystic fibrosis, premature infants, patients with significant heart, lung, liver, renal, or neuromuscular disease
  - Age  $\geq 65$  with  $\geq 2$  of the following OR age  $\geq 80$  with  $\geq 1$  of following:
    - Hospitalization in previous year
    - Diabetes
    - Heart failure
    - Current use of glucocorticoids
- Other considerations that may prompt additional testing
  - Pertussis
  - Walking pneumonia
  - Recent travel history
  - Chronic cough

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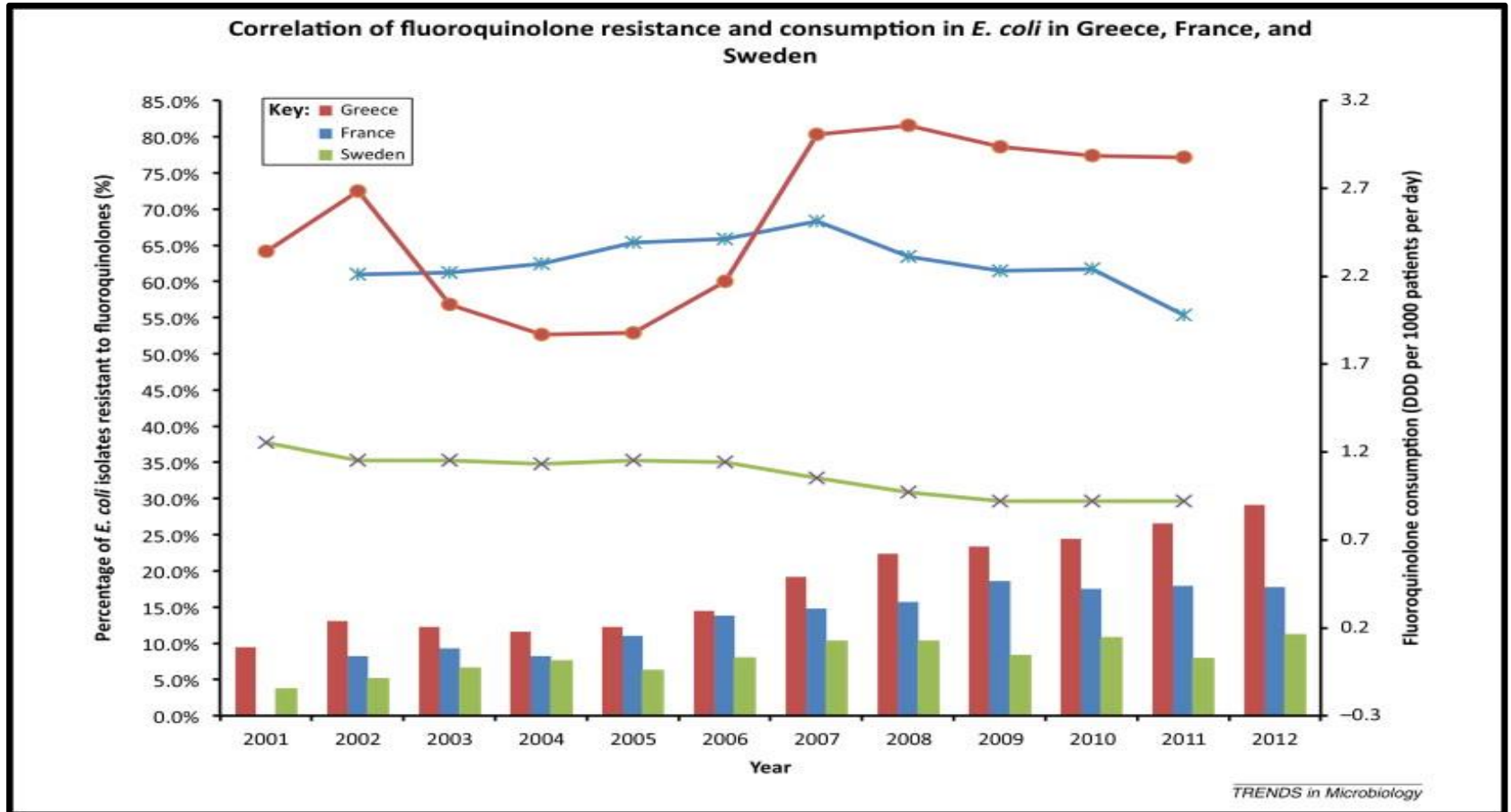
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# The Cost Of Antibiotic Use

- Antimicrobial resistance (AMR) & secondary superinfections are on the rise globally
  - MRSA, CDI, VRE, ESBL-producing organisms, CRE, and Pan-drug resistant organisms
  - Two million people are infected with MDROs
- Morbidity, mortality, and costs due to AMR and superinfections are increasing
  - Approximately 23,000 deaths annually in U.S.
  - Approximately 700,000 deaths globally
- AMR is one of the biggest threats to global health, food security, and the economy that we face today

# Why Is AMR On The Rise?



# Use It And Lose It

- Antibiotics (ABX) are the second most commonly used class of drugs in the United States
- 30-50% of all hospitalized patients receive ABX
- Up to 50% of all ABX prescribed in US acute care hospitals are either unnecessary, inappropriate, or suboptimal
  - Number jumps up to 75% in long-term care facilities
- 33% of all outpatient antibiotic prescriptions are unnecessary
- 70% of outpatients receive antibiotics for upper respiratory infections (URI)
  - Over 100 million ambulatory care visits annually

# Maintaining the Status Quo

## Antimicrobial resistance a 'greater threat than cancer by 2050'

UK chancellor George Osborne to tell IMF that 10m people a year could die without radical action



- Mortality to increase by 10-fold (>10 million)
- Total costs to exceed \$100 trillion annually
  - Global GDP to decrease 2-3.5%
  - GDP of US = \$16 trillion
  - 2009 recession decreased UK and US GDP by ~2-3%
- Advanced medical procedures and practice will be nearly impossible
  - Surgery
  - Chemotherapy
  - Transplants



# Post-Antibiotic Era?

A post-antibiotic era means, in effect, an end to modern medicine as we know it. Things as common as strep throat or a child's scratched knee could once again kill.

Dr Margaret Chan

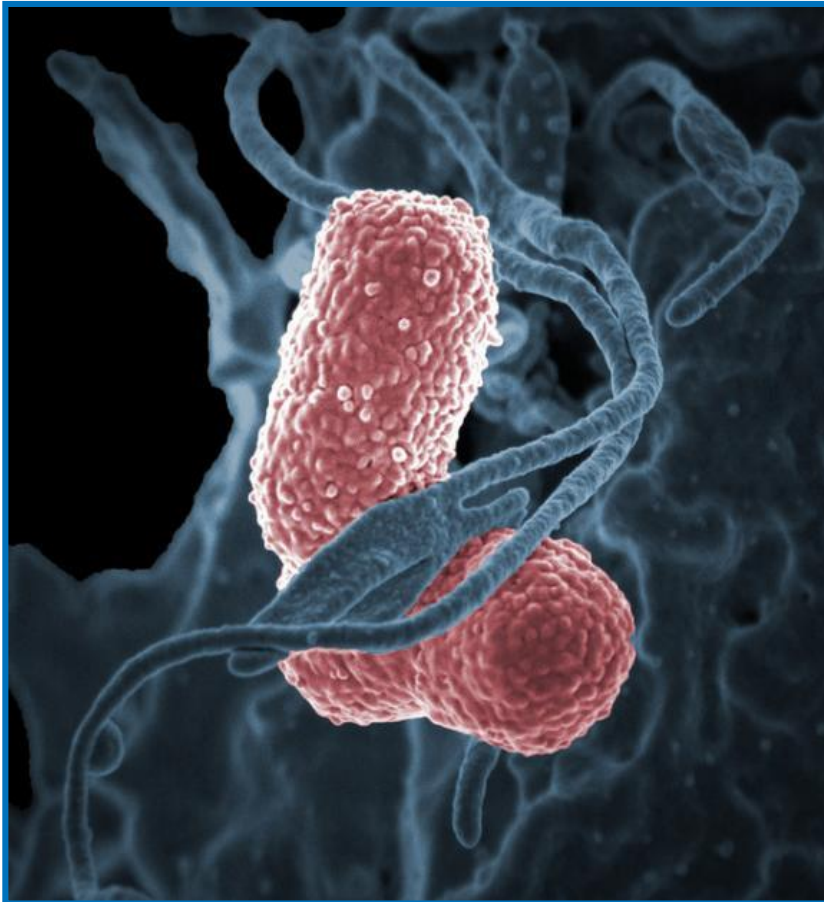
Superbug known as 'phantom menace' on the rise in U.S.



If such a superbug spread, it would take the world back to a time when there were no antibiotics, says Dr. Tom Frieden, director of the Centers for Disease Control and Prevention.

**"IT IS THE END OF THE ROAD FOR ANTIBIOTICS UNLESS WE ACT URGENTLY."**

# *Pan-Resistant Organisms Are Here*



- August 2016- Following recent trip to India, a Nevada woman expired due to septic shock from an infected hip seroma
- *K. pneumoniae*- carbapenemase producing CRE (CP-CRE)
  - NDM-1
  - Lacked *mcr-1* gene
- Resistant to ALL antibiotics available in the U.S.

# Antibiotic ADEs

- Antibiotic use in acute bronchitis is not innocuous
  - Antibiotics responsible for ~20% of all emergency department visits
  - Cochrane review shows higher rates of ADEs in those receiving antibiotic prescriptions
  - Increased childhood courses of antibiotics associated with IBD
- Macrolides:
  - QTc prolongation and sudden cardiac death, GI upset
- Fluoroquinolones:
  - FDA warning against use if other options available
  - QTc prolongation, sudden cardiac death, dysglycemia, altered mental status, tendon rupture, retinal detachment
  - POTENT risk factor for cross-class AMR
  - High risk of inducing CDI, VRE, MRSA, ESBL, CRE
- Sulfamethoxazole-trimethoprim
  - Hyperkalemia, sudden cardiac death, acute kidney injury, rash, warfarin/phenytoin drug interactions

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# *BCBSNE 2020 Quality Measure*

- Avoidance of antibiotic treatment for acute bronchitis/bronchiolitis
- Measure Description
  - The percentage of episodes for members aged  $\geq 3$  months with a diagnosis of acute bronchitis/ bronchiolitis that did not result in an antibiotic dispensing event on or within three days after diagnosis
- Measure Interpretation
  - A higher rate indicates appropriate treatment (e.g. the proportion of episodes that did not result in an antibiotic dispensing event)
  - The denominator for this measure is based on episodes, not on members
- Exclusions (with documented evidence)
  - A competing diagnosis (e.g., other bacterial infection) or comorbid condition such as HIV, certain malignant neoplasms, emphysema, COPD
  - Hospice care/services

# *How To Improve*

- Practice good antimicrobial stewardship
- Educate and reassure patients regarding viral vs bacterial infections and the role of antibiotics
  - Antibiotic ADEs and AMR issues
- Ensure proper coding of all diagnoses
  - Acute bronchitis ICD-10: J20.3-J20.9, J21.0, J21.1, J21.8, J21.9
- Remember to continually update your differential diagnosis list appropriately
- Improve communication and collaboration with surrounding health care facilities

# Alternatives To Antibiotics

- Educate patients
  - Almost always viral and antibiotics do not work against viruses
  - Most cases of pharyngitis, sinusitis, and even pneumonia are usually caused by viruses as well, and antibiotics do not work against viruses
  - Antibiotics have serious side effects that may be worse than their cold
- Establish realistic expectations
  - Don't assume the patient wants an antibiotic
  - Cough typically resolves in 2-3 weeks, but may persist for up to 3-6 weeks
- Provide reassurance to patient
  - If/when using lay language, call it a "chest cold" or similar
  - Use language that implies you're confident in your viral diagnosis
  - Provide contact information if patient gets worried and/or symptoms get worse
- Use available resources to reinforce above strategies
  - Provide patient handouts to educate, reassure, and support your plan
  - Utilize extenders and surrogates (e.g. pharmacists and nurses)

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# *Acute Bronchitis Summary*

- Antibiotic overuse is an issue at the patient & population level
  - Increased acute ADEs (including sudden cardiac death)
  - Increased AMR leading to increased healthcare costs, morbidity, and mortality
- >95% due to viral pathogens, self-limiting, and do not require antibiotics
- Ensure documentation of differential diagnoses are addressed and updated appropriately
- Strongest driver of antibiotic prescription is the provider's belief that the patient desires an antibiotic
- Strategies to reduce antibiotic prescription
  - Patient education regarding viral illnesses
  - Using confident and reassuring language
  - Shaping realistic expectations and providing a “plan B”
  - Providing symptomatic remedies instead of antibiotics
- Utilize extenders and surrogates to help reinforce your recommendations and relationship with patients

# Questions?

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Halo secure message

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