

# Acute Bronchitis: Evidence Meets Reality

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**No Conflicts of Interest**



A 40-year-old man with no underlying lung disease has a 7-day history of mild shortness of breath with exertion, as well as cough that is now productive of purulent sputum. He reports no paroxysms of cough and no contact with ill persons in his community. He does not appear to be in distress. His temperature is 37°C, his pulse 84 beats per minute, and his respiratory rate 17 breaths per minute. On auscultation of the lungs, no rales are heard; scattered wheezes are heard in the lung bases. How should he be evaluated and treated?

NEJM 2006; 355:2125-30.



## Acute Cough

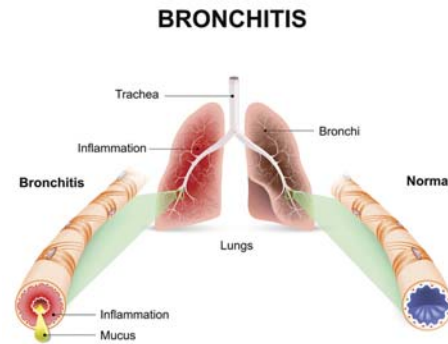
Diagnosis	Associated clinical features
Upper respiratory tract infection (URI), or common cold	Rhinorrhea, nasal obstruction, sneezing, scratchy or sore throat, malaise, headache
Acute bronchitis	Antecedent (URI), absence of high fever or other systemic signs or symptoms, absence of signs of consolidation on chest exam
Pneumonia	Fever, tachycardia, tachypnea, signs of consolidation on chest exam, mental status change in those >75 years old
Post-nasal drip	Post-nasal drainage, need to clear throat, rhinorrhea
Gastroesophageal reflux disorder	Heartburn, regurgitation, dysphagia
Asthma	History of episodic wheezing, shortness of breath, allergen exposure or exercise
ACE inhibitor use	Nonproductive cough, tickling or scratchy sensation in the throat
Heart failure	Shortness of breath, orthopnea, gallop rhythm, elevated jugular venous pulse, peripheral edema
Pulmonary embolism	Tachycardia, shortness of breath, pleuric chest pain, hemoptysis
Lung cancer	Past or present smoking history, change in a chronic "smoker's cough," hemoptysis, signs of focal airway obstruction on chest exam

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## Acute Bronchitis

- Inflammation of bronchi
- Cough +/- sputum production
- Cough lasts  $\geq 5$  days
- Resolves within 3 weeks



<https://www.cdc.gov/antibiotic-use/community/for-patients/common-illnesses/bronchitis.html>



“Self-limiting **inflammation of large airways of lung** characterized by cough without pneumonia”

9<sup>th</sup> most common illness among outpatients

5% of adults affected annually

~10% of ambulatory care visits in US (100 million/year)

NEJM 2006; 355:2125-30.



# Rule Out Pneumonia

## Chest radiography:

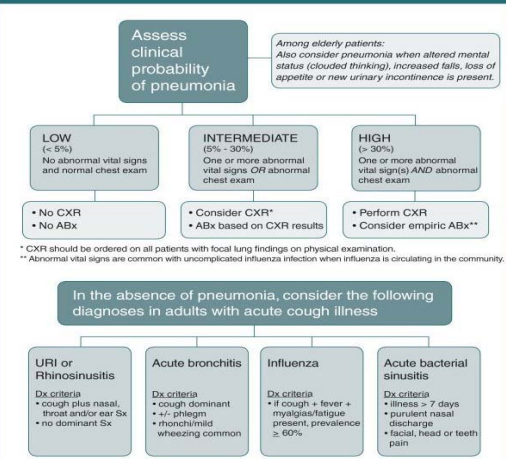
- Dyspnea, bloody/rusty sputum
- Pulse > 100 BPM
- Respiratory rate > 24 breaths/min
- Fever > 100 degrees
- Focal consolidation, egophony, or fremitus on chest examination



Chest. 2006;129(1 suppl):95S-103S



## EVIDENCE-BASED MANAGEMENT OF ACUTE RESPIRATORY TRACT INFECTIONS



The above algorithm is derived from clinical practice guidelines endorsed by the AAFP, ACP-ASIM, CDC and IDSA.  
This algorithm is designed to assist the clinician in the management of acute cough illness. The recommendations herein are not intended to replace a clinician's judgement or to establish a protocol for all patients with a particular condition.



**Table 1. Recognized Causes of Acute Bronchitis and Options for Therapy.<sup>10</sup>**

Pathogen	Comments <sup>11</sup>	Options for Therapy
<b>Virus</b>		
Influenza virus	Precipitous onset with fever, chills, headache, and cough. Myalgias are common and may be accompanied by myositis, myoglobinuria, and elevated serum levels of muscle enzymes.	Oseltamivir (Tamiflu, Roche) for 5 days at a dose of 75 mg twice daily <sup>11</sup> or zanamivir (Relenza, GlaxoSmithKline) for 5 days at a dose of two puffs (5 mg/puff) twice daily, for a total daily dose of 20 mg <sup>11</sup>
Parainfluenzavirus	Epidemics may occur in autumn. Outbreaks may occur in nursing homes. Croup in a child at home suggests the presence of the organism.	None available
Respiratory syncytial virus	Family history is important: approximately 45% of family members exposed to an infant (<1 yr of age) with bronchiolitis become infected. <sup>12</sup> Outbreaks occur in winter or spring. Twenty percent of adults have ear pain. <sup>13</sup>	None available
Coronavirus	Pathogen can cause severe respiratory symptoms in elderly patients. Epidemics of strain OC43 with high attack rates have been reported among military recruits. <sup>14</sup>	None available
Adenovirus	Infection is clinically similar to influenza, with abrupt onset with fever.	None available
Rhinovirus	Fever is uncommon, and infection is generally mild.	None available
<b>Atypical bacteria</b>		
<i>Bordetella pertussis</i>	Incubation period is 1–3 wk. Primarily affects adolescents and young adults. In some series, 10 to 20% of patients have cough with a duration of >2 wk. <sup>15</sup> Whooping occurs in a minority of patients. <sup>16</sup> Fever is uncommon. A marked leukocytosis with lymphocytic predominance can occur.	Macrolides as first-line therapy <sup>17</sup> : Azithromycin (Zithromax, Pfizer) for 5 days at a dose of 500 mg on day 1 and 250 mg on days 2–5 or Erythromycin (Ery-Tab, Abbott) for 14 days at a dose of 500 mg 4 times daily or Clarithromycin (Biaxin, Abbott) for 7 days at a dose of 500 mg twice daily Second-line therapy <sup>17</sup> : Trimethoprim-sulfamethoxazole (Bactrim, Roche) for 14 days at a dose of 1600 mg once daily or 800 mg twice daily
<i>Mycoplasma pneumoniae</i>	Incubation period is 2–3 wk. Gradual onset (2–3 days) distinguishes this infection from influenza. Clusters occur among military recruits and students in boarding schools.	Azithromycin for 5 days at a dose of 500 mg on day 1 and 250 mg on days 2–5 or doxycycline (Vibramycin, Pfizer) for 5 days at a dose of 100 mg twice daily or no therapy <sup>17</sup>
<i>Chlamydia pneumoniae</i>	Incubation period is 3 wk. Onset of symptoms, which include hoarseness before cough, is gradual. Clusters reported among military recruits, college students, and patients in nursing homes.	Azithromycin for 5 days at a dose of 500 mg on day 1 and 250 mg on days 2–5 or doxycycline for 5 days at a dose of 100 mg twice daily or no therapy <sup>17</sup>

“90% Caused by Virus”

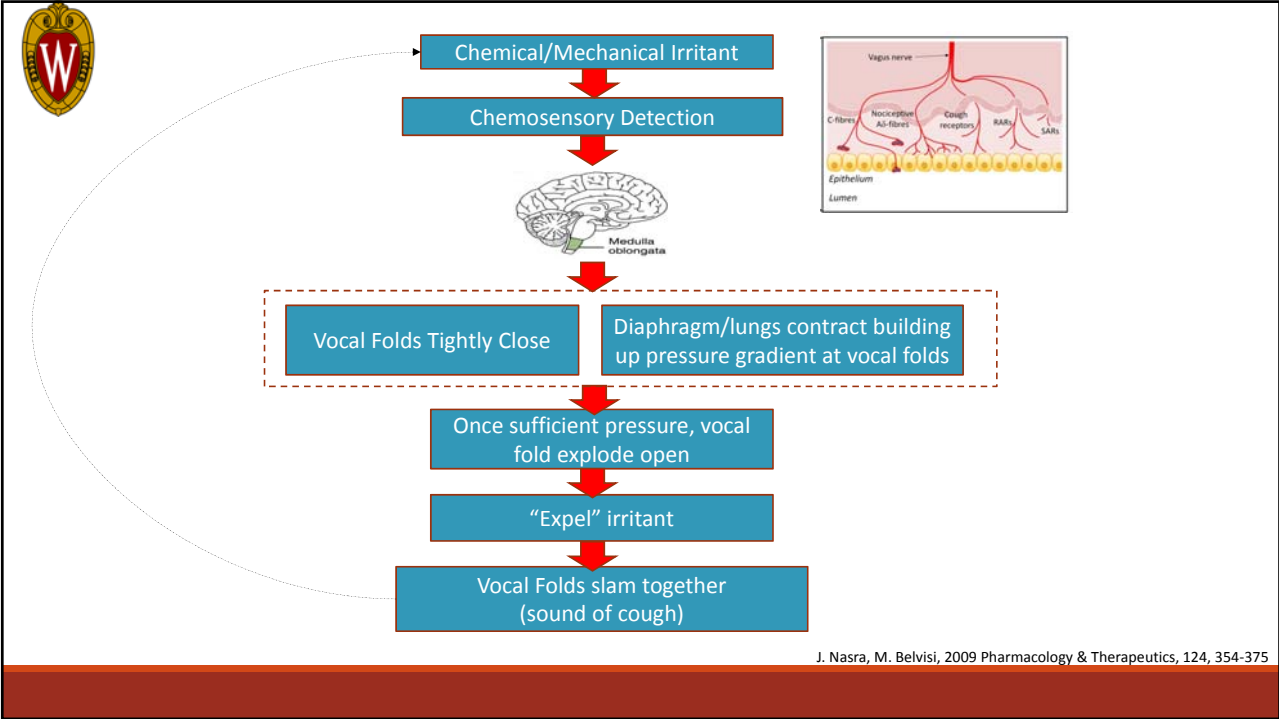
NEJM 2006; 355:2125-30.



## “I have green mucus”

- Purulent sputum is NOT predictive of bacterial infection
- 95% of patients with purulent sputum do not have pneumonia!

J Chron Dis 1984; 37: 215



**Most symptoms are self-limiting**



## “Don’t Just Stand There, Do Something”



## OTC Medication - Cough

- “There is no good evidence for or against the effectiveness of OTC medicines in acute cough.”



Over-the-counter (OTC) medications for acute cough in children and adults in community settings (Review)

Smith SM, Schroeder K, Fahey T



## OTC Medication - Antihistamines

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- Antihistamines vs placebo – no benefit in relieving cough symptoms
- Decongestant/antihistamines more likely to have adverse effects and limited or no improvement in cough symptoms



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## OTC Medication - Expectorant

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- Cochrane review of 3 trials showed some benefit of guaifenesin when compared with placebo



Over-the-counter (OTC) medications for acute cough in children and adults in community settings (Review)

Smith SM, Schroeder K, Fahey T





## OTC Medication – Ibuprofen

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- Not shown to be more effective than placebo for reducing severity or duration of cough in RCTs
- Can be used for other symptoms like headaches, malaise, muscle aches, etc.



*BMJ. 2013;347:f6041;  
BMJ. 2013;347:f5762.*



## OTC Medication - Antitussives

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- Codeine – no evidence of effectiveness
  - American College of Chest physicians does **NOT** recommend use
- Dextromethorphan - reduction of 8-10 fewer coughing bouts per 30 minutes in 3 trials
- Benzonatate - some evidence of improvement when used in combination with guaifenesin

*Chest. 2006;129(1 suppl):95S–103S  
Ann Intern Med. 2016;164:425–434*



## OTC Medication - Beta-agonists

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- Not shown to benefit patients without asthma or chronic obstructive lung disease
- Some benefit when patient is wheezing at clinic visit



*Cochrane Database Syst Rev. 2015;(9):CD001726.*



Antibiotic use is **NOT** indicated  
and may increase the risk of  
antibiotic-resistant infections

*BMJ 1998;316:906; Chest 2006;129:955-1035*



**If a cold is treated energetically it will get well in 7 days,  
while if left to itself it will get better in a week.**



## Key Recommendations for Practice

Clinical Recommendation	Evidence Rating
Avoid prescribing antibiotics for uncomplicated acute bronchitis.	A

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series.

American family physician. 2016 Oct 1;94(7).



## Key Recommendations for Practice

Clinical Recommendation	Evidence Rating
Consider using dextromethorphan, guaifenesin, or honey to manage acute bronchitis symptoms.	B

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series.

American family physician. 2016 Oct 1;94(7).



## Key Recommendations for Practice

Clinical Recommendation	Evidence Rating
Avoid using beta2 agonists for the routine treatment of acute bronchitis unless wheezing is present.	B

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series.

American family physician. 2016 Oct 1;94(7).



## Key Recommendations for Practice

Clinical Recommendation	Evidence Rating
Employ strategies to reduce antibiotic use, such as asking patients to call for or pick up antibiotic or to hold antibiotic prescription for a set amount of time.	A

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series.

American family physician. 2016 Oct 1;94(7).



## Antibiotic Resistance in US

- 47 million unnecessary antibiotic prescriptions
- Most for respiratory conditions caused by “viruses” and other irritants (e.g., bronchitis)

JAMA: 2016; 315(17): 1864-73



## Antibiotic Resistance in US

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- ~2 million people per year infected with antibiotic-resistant bacteria
- 23,000 deaths per year result from these infections

<https://www.cdc.gov/drugresistance/index.html>



## HEDIS Measure: NCQA

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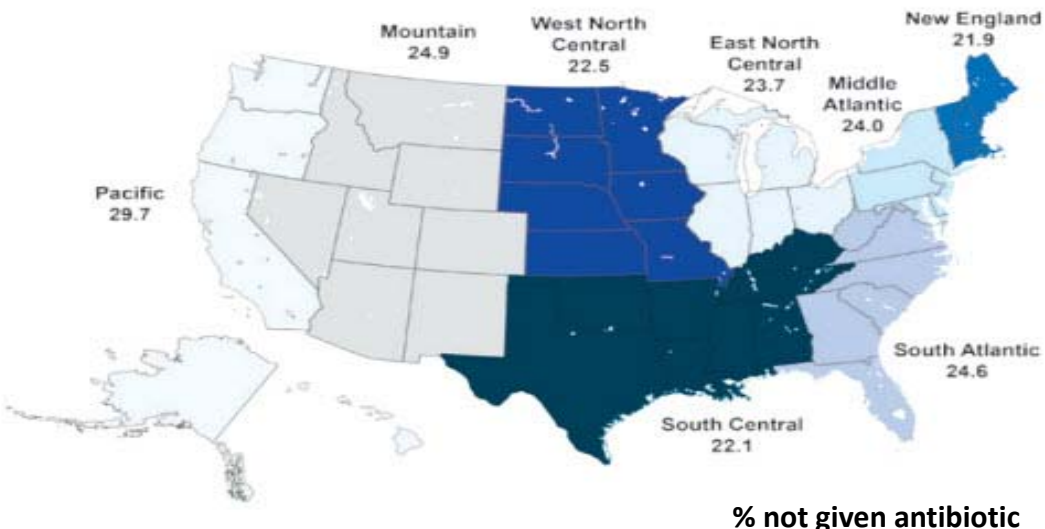
**Avoidance of Antibiotic Treatment in Adults with Acute Bronchitis**

### **This HEDIS Measure**

Assesses adults 18-64 years of age with a diagnosis of acute bronchitis who were not dispensed an antibiotic prescription (a higher rate is better).



### Geographic Variability in HEDIS Measures: Acute Bronchitis



<https://www.cdc.gov/antibiotic-use/stewardship-report/outpatient.html>

**% not given antibiotic**



# What should we do?



## 1. Acknowledge patient's misery

"It sounds like you have a really bad bug."

J Fam Pract 2016; 65(12): 862



## 1. Acknowledge patient's misery

## 2. Tell the patient what he or she doesn't have

"Your lungs sound good, and your throat doesn't look too bad, so that means you don't have strep throat or pneumonia. That's good news!"

J Fam Pract 2016; 65(12): 862





1. Acknowledge patient's misery
2. Tell the patient what he or she doesn't have
- 3. Explain what viruses are "making the rounds"**

"I have seen several patients with symptoms like yours this week"

J Fam Pract 2016; 65(12): 862



1. Acknowledge patient's misery
2. Tell the patient what he or she doesn't have
3. Explain what viruses are "making the rounds"
- 4. Set realistic expectations**

Tell patients how long cough is likely to last. Duration of typical cough is about **17 days**. Most patients (and doctors) think bad cold should be gone in 7 days

J Fam Pract 2016; 65(12): 862



1. Acknowledge patient's misery
2. Tell the patient what he or she doesn't have
3. Explain what viruses are "making the rounds"
4. Set realistic expectations
- 5. Choose terms carefully**

J Fam Pract 2016; 65(12): 862



**Cough  $\neq$  Inflammation of Bronchi**



# “Bronchitis”



Chest Cold

Acute cough illness

Viral Upper Respiratory Infection



Use of benign-sounding labels such as **chest cold** when a patient presents for an acute URI may not affect patient satisfaction, but does improve satisfaction with not being prescribed an antibiotic.

J Am Board Fam Pract 2005; 18(6):459-63



## Do I really need antibiotics?



**SAY YES TO ANTIBIOTICS**  
when needed for certain infections caused by **bacteria**.



**SAY NO TO ANTIBIOTICS**  
for **viruses** such as colds and flu, or runny noses, even if the mucus is thick, yellow or green. Antibiotics also won't help for some common bacterial infections including most cases of bronchitis, many sinus infections, and some ear infections.

Antibiotics are only needed for treating certain infections caused by bacteria.

Antibiotics do not work on viruses.

To learn more about antibiotic prescribing and use, visit [www.cdc.gov/antibiotic-use](http://www.cdc.gov/antibiotic-use).





**Why does taking antibiotics lead to antibiotic resistance?**

Any time antibiotics are used, they can cause side effects and lead to antibiotic resistance. Antibiotic resistance is one of the most urgent threats to the public's health. Always remember:

1. Antibiotic resistance does not mean the body is becoming resistant to antibiotics; it is that bacteria have become resistant to the antibiotics designed to kill them.
2. When bacteria become resistant, antibiotics cannot fight them, and the bacteria multiply.
3. Some resistant bacteria can be harder to treat and can spread to other people.

**Each year in the United States, at least 2 million people get infected with antibiotic-resistant bacteria. At least 23,000 people die as a result.**



**What is the right way to take antibiotics?**

**If you need antibiotics, take them exactly as prescribed.**

Improving the way healthcare professionals prescribe antibiotics, and the way we take antibiotics, helps keep us healthy now, helps fight antibiotic resistance, and ensures that these life-saving drugs will be available for future generations.

Talk with your doctor if you have any questions about your antibiotics, or if you develop any side effects, especially diarrhea, since that could be *Clostridium difficile* infection (also called *C. difficile* or *C. diff*), which needs to be treated. *C. diff* can lead to severe colon damage and death.

**What are the side effects?**

Common side effects range from minor to very severe health problems and can include:

- Rash
- Dizziness
- Nausea
- Diarrhea
- Yeast infections

More serious side effects can include:

- *Clostridium difficile* infection
- Severe and life-threatening allergic reactions


To learn more about antibiotic prescribing and use, visit [www.cdc.gov/antibiotic-use](http://www.cdc.gov/antibiotic-use).



**Antibiotics Aren't Always the Answer.**



**BE ANTIBIOTICS AWARE**  
SMART USE. BEST CARE



1. Acknowledge patient's misery
2. Tell the patient what he or she doesn't have
3. Explain what viruses are "making the rounds"
4. Set realistic expectations
5. Choose terms carefully
- 6. When all else fails considered a delayed prescription**

J Fam Pract 2016; 65(12): 862



## Last Resort:

RCTs of delayed antibiotic strategy show that fewer than 50% of patients actually fill prescriptions

Spurling et al. Cochrane Database Syst Review 2013



## To Feel Better:

- ◆ Get plenty of rest
- ◆ Drink plenty of fluids
- ◆ Use a clean humidifier or cool mist vaporizer
- ◆ Breathe in steam from a bowl of hot water or shower
- ◆ Use lozenges (*do not give lozenges to children younger than 4 years of age*)
- ◆ Ask your healthcare professional or pharmacist about over-the-counter medicines that can help you feel better

<https://www.cdc.gov/antibiotic-use/community/downloads/Flyer-Bronchitis.pdf>



## Prevention

- ◆ Practice good hand hygiene
- ◆ Make sure you and your child are up-to-date with all recommended vaccines
- ◆ Don't smoke and avoid secondhand smoke, chemicals, dust, or air pollution
- ◆ Always cover your mouth and nose when coughing or sneezing
- ◆ Keep your distance from others when you are sick, if possible

<https://www.cdc.gov/antibiotic-use/community/downloads/Flyer-Bronchitis.pdf>



## Conclusions

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- "Acute bronchitis" is clinical diagnosis
- Imprecise terminology, instead **chest cold, acute cough...**
- Symptoms self-limiting
- Antibiotics **NOT** indicated
- Symptomatic therapy recommended



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