



DIAGNOSIS AND MANAGEMENT OF

Acute Cough (Bronchitis)

2013 update

This care process model (CPM) is produced by Intermountain Healthcare's Lower Respiratory Tract Infection Team, a workgroup of the Primary Care Clinical Program. The CPM provides best-practice recommendations for differential diagnosis and management of acute cough and bronchitis.

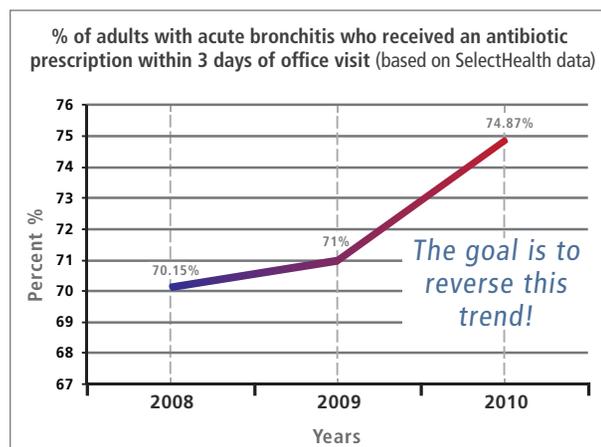
KEY POINTS

- **Diagnosis of acute bronchitis should be made only after ruling out other sources of cough** — including pneumonia, asthma, influenza, pertussis, and acute exacerbations of chronic bronchitis (AECB).¹ The algorithm on pages 2 and 3 guides that evaluation and diagnostic process. Local infection surveillance programs such **Germ Watch** can provide up-to-date information about communicable diseases that routinely affect our communities.
- **If acute bronchitis is the diagnosis, antibiotics are NOT the answer!** Despite ongoing evidence that antibiotics are **NOT** needed for acute bronchitis, latest data show that their use is actually increasing. SelectHealth rates rose from 70% in 2008 to nearly 75% in 2010 (see graph at right), which mirrors the national trend.^{2,3} Unnecessary antibiotic use increases risk for disease complications related to drug-resistance pathogens, and increases healthcare costs.
- **Withholding antibiotics has no significant effect on patient satisfaction or return visits.** Studies show that **education efforts and the time a healthcare provider spends with the patient** are the biggest determinants of patient satisfaction results.^{4,6} See the **ACUTE BRONCHITIS TREATMENT RECOMMENDATIONS** box in the algorithm inside for tips on communicating with patients about cough illnesses and antibiotic resistance.

Germ Watch is available at intermountainphysician.org



Unnecessary Antibiotic Use



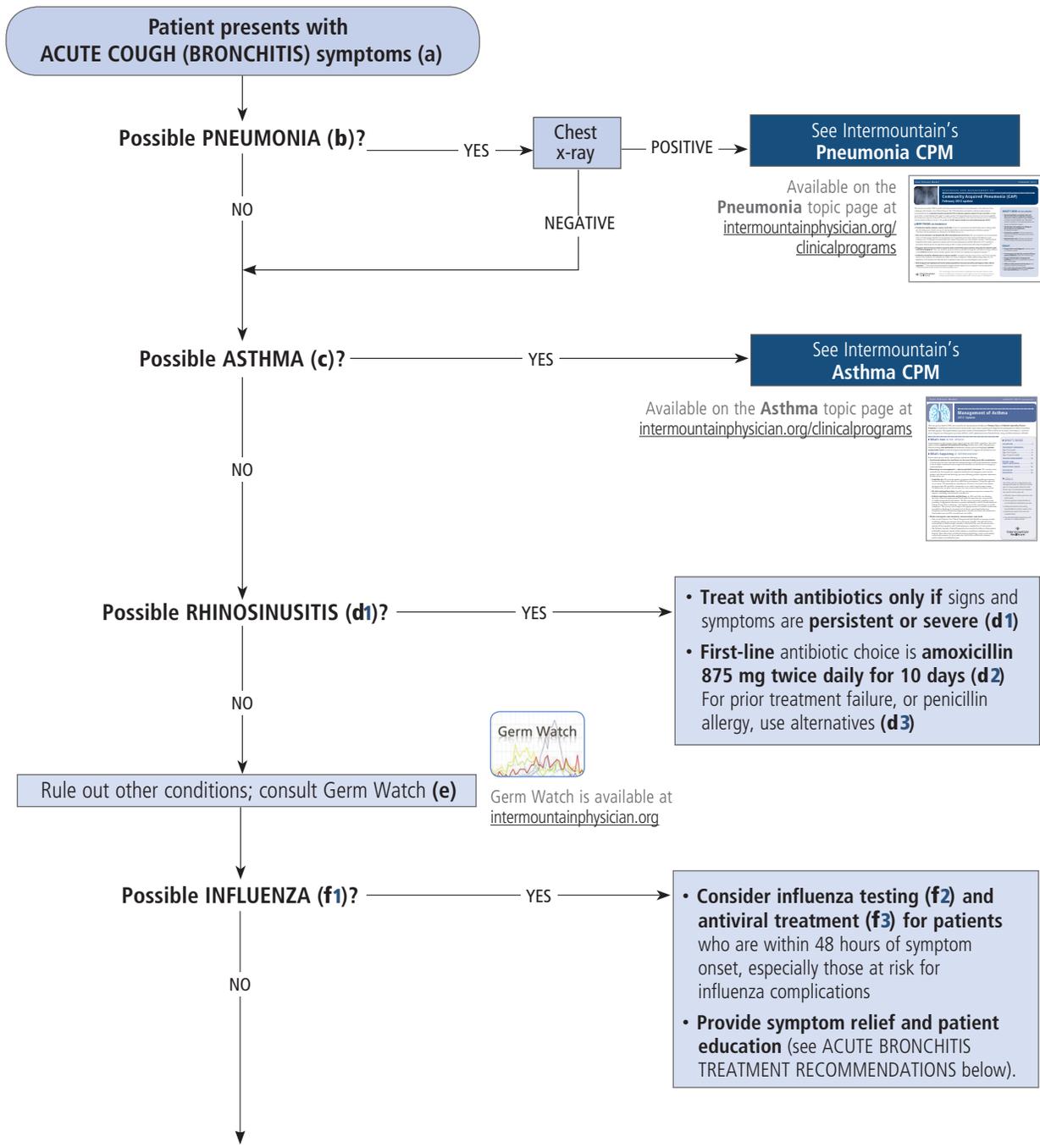
WHAT'S NEW IN THIS UPDATE?

- **New data** showing an upward trend in unnecessary use of antibiotics for treatment of acute bronchitis — reinforcing our **need to do better!**
- **Updated information** on sinusitis, influenza, and pertussis testing and treatment, with links to more information.
- **Summary of evidence base for symptom relief of acute cough** (see **ACUTE BRONCHITIS TREATMENT RECOMMENDATIONS** box inside).
- **New and revised provider and patient education materials** to support physicians in differential diagnosis and evidence-based treatment of acute cough (bronchitis) and related illnesses.

GOALS

- **Help providers improve accuracy of diagnosis** of acute bronchitis and other lower respiratory tract infections.
- **Reduce the unnecessary use of antibiotics for treatment of acute bronchitis**, thereby sparing patients the additional risks and associated costs.

Acute Cough (Bronchitis)



(a) ACUTE COUGH/BRONCHITIS symptoms:

- Acute bronchitis is defined by the CDC as "an acute respiratory infection with a normal chest radiograph that is manifested by cough with or without phlegm production that lasts for up to 3 weeks."^{1,4}

(b) PNEUMONIA is NOT likely if all of the following are absent:¹

- Fever 37.8°C (100°F) or greater
- Heart rate 100 bpm or greater
- Respiratory rate 24 or greater
- O₂ sat 88% or less
- Focal rales
- Decreased breath sounds

(c) ASTHMA signs and symptoms:

- History of recurrent lower respiratory infection
- History of recurrent wheezing and/or cough, especially at night
- History of allergic rhinitis or eczema
- Exertional dyspnea
- Variation of symptoms from day to day

(d) RHINOSINUSITIS⁷

1 Diagnosis. Bacterial rhinosinusitis is only likely if:

- Nasal purulence not improving after 7 days
- AND**
- Unilateral facial or tooth pain or tenderness, or worsening after initial improvement

2 First-line treatment: amoxicillin 875 mg twice daily for 10 days

3 Treatment alternatives:

- If prior treatment failure, high-dose amoxicillin-clavulanate (two 1000 mg XR tablets twice daily, dose based on amoxicillin component) for 10 to 14 days
- If allergic to penicillin, cefdinir 600 mg once daily x 10 days

(e) Germ Watch is a local infection surveillance program accessible from the intermountainphysician.org home page.

(f) INFLUENZA (www.cdc.gov/flu/professionals)

1 Symptoms. Influenza is likely if:

- Sudden fever over 102°F / 39°C with a cough, sore throat, or other respiratory symptoms
- AND**
- In flu season

2 Testing. Consider influenza testing in these cases:

- **If the results will change clinical care of the patient** (e.g., use of antibiotics or antiviral medications, further diagnostic tests, homecare, etc.)
- **If the results will influence clinical practice for other patients** (e.g., confirm influenza virus circulation in the community, etc.)

Possible PERTUSSIS (g1)?

NO

Possible AECB (acute exacerbation of chronic bronchitis) - (h)?

NO

Diagnose as ACUTE BRONCHITIS (Chest Cold)

YES

YES

- Test (g2) and treat (g3) if patient has signs and symptoms of pertussis AND either a known household or healthcare exposure or a local outbreak.
- Make sure patient's pertussis vaccination is up to date (see page 4).

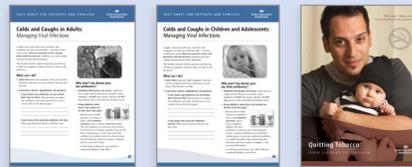
See Intermountain's COPD CPM ("Exacerbation" section, pages 8-9)

Available on the COPD topic page at intermountainphysician.org/clinicalprograms



ACUTE BRONCHITIS TREATMENT RECOMMENDATIONS

- **Withhold antibiotics.** Antibiotics are NOT routinely indicated for uncomplicated acute bronchitis, regardless of duration of cough.
- **Educate patients. Tips for talking with patients:**^{1,4,8}
 - Identify and validate patient concerns and spend time answering patients questions.
 - Refer to cough illness as a "chest cold" rather than bronchitis.
 - Explain how antibiotics increase the risk of antibiotic-resistance infections, which can be serious.
 - Provide information about expected duration of cough and offer a contingency plan if symptoms worsen. Recommend specific suggestions for symptom relief (see below).
 - Provide patient education materials to reinforce the above (at right).
- **Recommend symptom relief:**
 - **For fever, aches, and pains:** Nonsteroidal antiinflammatories and/or acetaminophen *may* help relieve aches and pains
 - **For nasal congestion and other cold symptoms:** Nasal decongestants *may* be helpful for associated symptoms of common cold
 - **For cough relief:** Unfortunately, evaluation of overall efficacy of acute cough remedies is difficult due to low quality of most clinical trials or trial results that varied significantly. See the table at right for a summary of study findings.⁹⁻¹⁶
- **Follow up:**
 - Have patient make a follow-up appoint for new or worsening symptoms, or if cough lasts for more than 3 weeks total (refer patient to tips on the *Colds and Coughs* fact sheets for when to call the doctor)
 - Re-evaluate; Consider chest x-ray
 - Patients can still have bronchial hyperresponsiveness for 5-6 weeks. If cough lasts more than 3 weeks and less than 8 weeks, and chest x-ray is normal and pertussis has been ruled out, consider diagnosis of postinfectious cough. Antibiotics are still not indicated. Consider trial of ipratropium. If ipratropium is ineffective, and cough affects quality of life, consider inhaled corticosteroids.¹⁷
- **Encourage prevention:** Regular hand washing, vaccines (see back page), smoking cessation.



The *Colds and Coughs in Adults* fact sheet, *Colds and Coughs in Children and Adolescents* fact sheet, and the *Quitting Tobacco* booklet can be accessed and ordered at i-printstore.com.

Effectiveness of various acute cough remedies⁹⁻¹⁶

MEDICATION	EFFECTIVENESS
ipratropium 80 ug 4 times daily	may be effective
tiotropium 18 ug daily	may be effective
guaifenesin 200 to 400 mg four times daily	may be effective
beta 2 agonists (albuterol)	may be effective if wheezing or asthma present; otherwise not effective
benzonatate	not more effective than placebo
codeine	not more effective than placebo
1st generation antihistamines	inconsistent evidence on effectiveness
2nd generation antihistamines	not more effective than placebo
Zinc	not effective

NOTE: Keep in mind the limitations of influenza testing. During flu season, positive tests are reliable, but false-negative tests are more prevalent. Patients with severe respiratory symptoms or acute respiratory illness, who are at higher risk for influenza complications (e.g., chronic diseases, immunosuppression, etc.), should still be considered for antiviral treatment despite a negative rapid flu test, unless illness can be attributed to another cause.

3 Treatment with antiviral medications:

- **When started within the first 2 days of symptoms**, antivirals can reduce illness severity and shorten duration of illness — and may also prevent serious influenza-related complications. However, these meds have not been shown to be effective if started more than 48 hours after onset.
- **Currently, either oseltamivir or zanamivir are recommended.** Oseltamivir is approved for treatment of patients 1 year of age and older; zanamivir is approved for treatment of patients 7 years of age and older. The recommended duration of treatment with either drug is 5 days.

NOTE: Clinicians should be alert to changes in antiviral recommendations due to antiviral resistance data (www.cdc.gov/flu/professionals/antivirals).

(g) PERTUSSIS (www.cdc.gov/pertussis/clinical)

- Signs and symptoms that may indicate pertussis:**
 - Cough lasting 2 to 3 weeks or longer, with characteristic "whoop" and/or coughing to the point of vomiting
- AND
- Known household or healthcare exposure or local community outbreak.

2 Testing:

- **Send nasopharyngeal swab for PCR.** Despite a high false-positive rate, this is becoming the standard test in the outpatient setting since results are available within 2-3 days.

OR

- **Obtain a nasopharyngeal culture.** This has been considered the "gold standard," but has a poor yield in the outpatient setting and takes 3 to 5 days for results. **Note:** Empiric therapy may be initiated while obtaining a diagnostic test for confirmation - see below.

3 Treatment:

- Treat with a macrolide antibiotic and 5 days isolation
- NOTE:** Antibiotic treatment decreases transmission, but has little effect on symptom resolution.

(h) AECB (acute exacerbation of chronic bronchitis) signs and symptoms (see COPD CPM for treatment):

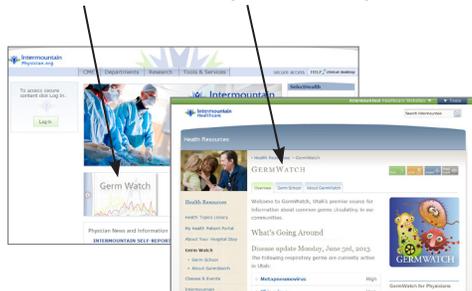
- Previous diagnosis of chronic bronchitis (productive cough present 3 months/year x 2 years) or COPD
- Increased dyspnea and cough
- Possible increased sputum volume or purulence

Vaccine recommendations (cdc.gov/vaccines/hcp/acip-recs/index.html)

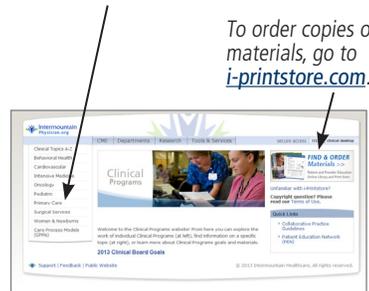
- **Influenza.** Annual influenza vaccine is recommended for all patients over 6 months of age, but is particularly important for the following patients who are at increased risk for severe complications:
 - All children aged 6 months to 4 years (59 months) and all adults >50 years
 - Children and adolescents receiving long-term aspirin therapy at risk for Reye's syndrome
 - Women who will be pregnant during the influenza seasons
 - Adults and children with chronic pulmonary, CV, renal, hepatic, hematological, or metabolic disorders
 - Adults and children who have immunosuppression or any condition that can compromise respiratory function or the handling of respiratory secretions or that can increase the risk for aspiration
- **Pneumonia.** Pneumococcal vaccine is recommended for all patients 65 years old or older, as well as patients with serious long-term health problems and/or conditions that lower resistance to infections. All Alaskan Natives and certain Native American populations should also be vaccinated. Vaccination is generally good for life, but a single revaccination is recommended in the following cases:
 - At age 65 or older, second dose is recommended if patient received first dose >5 years previously and was aged <65 years at the time. If the first dose was given at age 65 or older, revaccination is not recommended.
 - For immunocompromised patients between ages 2 and 64, second dose is recommended 5 years after the initial dose.
- **Pertussis.** Tdap vaccine is recommended as follows:
 - For individuals ages 11–64 years in place of one booster dose of the tetanus and diphtheria toxoids (Td) vaccines to provide added protection against pertussis, along with protection against tetanus and diphtheria.
 - For pregnant women without updated pertussis vaccine during the late second trimester (after 20 weeks) or third trimester, rather than immediately after delivery.
 - For adults 65 years or older who have close contact with infants, or for anyone in this age group who desires the vaccines and has not previously received it.
 - For postexposure prophylaxis for all healthcare personnel who have contact with high-risk patients, regardless of vaccination status. Personnel who don't have contact with high-risk patients can either receive postexposure prophylaxis or be monitored for 21 days after pertussis exposure and treated at the first onset of symptoms.

Where to find resources (intermountainphysician.org)

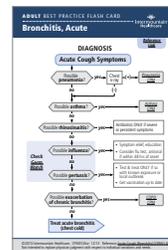
GermWatch: Physician version is available from the home page of intermountainphysician.org. Patient/public version available from germwatch.org.



Patient and Provider Education Materials: Available at intermountainphysician.org/clinicalprograms (click **Primary Care** on the left, then **Topics**, then **Bronchitis**).



Adult Acute Bronchitis Flash Card: Also available on the **Bronchitis** topic page.



REFERENCES

1. Braman SS. Chronic cough due to acute bronchitis: ACCP evidence-based clinical practice recommendations. *Chest*. 2006;129(1 Suppl):95S-103S. http://chestjournal.org/cgi/content/abstract/129/1_suppl/95S. Accessed October 14, 2011.
2. QUALITY COMPASS® 2011. National Committee for Quality Assurance (NCQA) web site. <http://www.ncqa.org/tabid/177/Default.aspx> (password required to view data). Accessed October 14, 2011.
3. SelectHealth. Unpublished claims data, 2008-2010.
4. Gonzales R, Bartlett JG, Besser RE, et al. Principles of appropriate antibiotic use for treatment of uncomplicated acute bronchitis: background. *Ann Intern Med* 2001;134(6):521-529.
5. Gonzales R, Steiner JF, Maselli J, Lum A, Barrett PH Jr. Impact of reducing antibiotic prescribing for acute bronchitis on patient satisfaction. *Eff Clin Pract*. 2001;4(3):105-111.
6. Bateman K, Wallin A. Intermountain Healthcare Urgent Care Bronchitis Project. Unpublished study, 1998-1999.
7. Anon JB, Jacobs MR, Poole MD, et al; Sinus And Allergy Health Partnership. Antimicrobial treatment guidelines for acute bacterial rhinosinusitis. *Otolaryngol Head Neck Surg*. 2004;130(1 Suppl):1-45.
8. Centers for Disease Control and Prevention. Acute cough illness (acute bronchitis) <http://www.cdc.gov/getsmart/campaign-materials/info-sheets/adult-acute-cough-illness.pdf>. Accessed October 14, 2011.
9. Smith SM, Schroeder K, Fahey T. *Cochrane Database of Syst Rev*. Over-the-counter (OTC) medication for acute cough in children and adults in ambulatory settings. 2008;(1):CD001831.doi:10.1002/14651858.CD001831.
10. Dicipingaitis PV. Currently available antitussives. *Pulm Pharmacol Ther*. 2009;22(2):148-151
11. Dicipingaitis PV, Gale YE, Solomon G, Gilbert RD. Inhibition of cough-reflex sensitivity by benzonatate and guaifenesin in acute viral cough. *Respir Med*. 2009;103(6):902-906.
12. Bolser DC. Cough suppressant and pharmacologic protussive therapy: ACCP evidence based clinical practice guidelines. *Chest*. 2006;129(1 Suppl):238S-249S.
13. Dicipingaitis PV, Spinner L, Santhyaadka G, Negassa A. Effect of tiotropium on cough reflex sensitivity in acute viral cough. *Lung*. 2008;186(6):369-374.
14. Smucy J, Becker LA, Glazier R. Beta 2-agonists for acute bronchitis. *Cochrane Database of Syst Rev*. 2006;(4):CD001726.
15. Kim SY, Chang YJ, Cho HM, et al. Non-steroidal anti-inflammatory drugs for the common cold. *Cochrane Database of Syst Rev*. 2009;(3):CD006362.
16. Eccles R. Importance of placebo effect in cough clinical trials. *Lung*. 2010;188(Suppl 1):S53-S61.
17. Braman S. Postinfectious cough: ACCP evidence-based clinical practice guidelines. *Chest*. 2006; 129(1 Suppl):138S-146S.

LOWER RESPIRATORY WORKGROUP

- Nathan Dean, MD
- Tony Wallin, MD
- Wayne Cannon, MD
- Sarah Daly, DO
- Richard Ensign, PharmD
- David Hale, PharmD, MHA
- Sharon Hamilton, RN
- Matt Mitchell, PharmD
- Jan Orton, RN
- David Pombo, MD
- Lorrie Roemer, RN
- Jason Spaulding, MD
- Tracy Vayo, MA

This CPM may need to be adapted to meet the individual needs of a specific patient. It should not replace clinical judgment. As always, the Lower Respiratory Infection Team welcomes comments or recommendations for improvement. Contact Dr. Anthony Wallin at 801-269-2441 or e-mail anthony.wallin@intermountainmail.org.