

Clinical Pathways for the Management of Acute Bronchitis in Family and Community Practice

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Background: Cough is one of the most common symptoms that make patients consult in family practice. Acute bronchitis is usually the diagnosis given to these patients. Existing guidelines for the treatment of acute bronchitis emphasize appropriate clinical evaluation, minimal laboratory tests and symptomatic treatment.

Objective: The general objective of this clinical pathway is to improve outcomes of patients with acute bronchitis being seen in family and community practice. It hopes to achieve this by: 1) promotion of a standardized management of patients with acute bronchitis, and 2) promoting quality improvement initiatives at the clinic and organizational level.

Method: The PAFP Clinical Pathways Group reviewed the previous Clinical Practice Guideline for the Treatment of Acute Bronchitis in Family Practice, a local guideline developed by the Family Medicine Research Group and adopted as policy statement by the Philippine Health Insurance Corporation. A Medline search was done but there is only one guideline published in Dutch for the Diagnosis and Treatment of Cough. The group also reviewed published medical literature to identify, summarize, and operationalize the clinical content of diagnostics, interventions and clinical indicators or outcomes to develop an evidence-based clinical pathway in family medicine practice.

Recommendations: Patient history focusing on the duration of cough, character and sputum production and accompanying symptoms such as fever, difficulty of breathing or chest pain should be done. Other points to focus on the history should include past history of asthma, recurrent respiratory disease, exposure to respiratory viral or bacterial infection, smoking or exposure to toxic inhalants. A complete and thorough physical examination of the upper airways, chest and lungs and peak expiratory flow rate must be done. There is no recommended laboratory test but chest x-ray may be helpful for those with probable pneumonia. Symptomatic treatment for acute bronchitis is recommended i.e. bronchodilators, mucolytics, anti-pyretics and fluids. Herbal and complimentary alternative medication may also be given. Antibiotics are generally not necessary but may be given to those with severe symptoms and highly probable bacterial infection. Health education and assurance about the self-limiting condition of acute bronchitis must be given to the patient.

Implementation: To promote rational antibiotic prescription, outreach visits to individual family physician's clinic have been identified as an intervention that may improve the practice of health care professionals. This type of 'face to face' visit has been referred to educational detailing or academic detailing.

INTRODUCTION

Cough is one of the most common symptoms that make patients consult in family practice. Acute bronchitis is usually the diagnosis given to these patients. This should be differentiated from pneumonia, exacerbation of

chronic bronchitis or asthma. These conditions may need specific treatment different from the ones given for acute bronchitis. Symptoms of acute bronchitis typically last for about a week. The character of the sputum does not reliably differentiate between bacterial and viral infection. However, viruses are responsible for more than 90 percent of

acute bronchitis infections.¹ Thus acute bronchitis is a self-limiting infection. Unfortunately, acute bronchitis affect all age group and has been shown to increase to around 111.9 per 100,000 population.²

Existing guidelines for the treatment of acute bronchitis emphasize appropriate clinical evaluation, minimal laboratory tests and symptomatic treatment. Antibiotics are generally not indicated for bronchitis, and should be used only if there is clear evidence of communicable bacterial infection or if the patient is at increased risk of developing pneumonia. As patient expectations for antibiotics and therapies for symptom management differ from evidence-based recommendations, effective strategies are necessary to provide the effective management of acute bronchitis in family and community practice.¹

Adherence to guidelines in acute bronchitis can be improved in family practice. In a survey among family practitioners patient management was described in accordance with the guidelines in only 6% in 2003 and 20% in 2008. Unnecessary treatments were prescribed in 77% in 2003 vs 60% in 2008, and potentially dangerous treatments in 38% in 2003 vs 22 % in 2008. Fifty-four percent of GPs reported knowing these guidelines, but only 57% of them declared that the latter has modified their practice.³

The general objective of this clinical pathway is to improve outcomes of patients with acute bronchitis being seen in family and community practice. It hopes to achieve this by:

- Promotion of a standardized management of patients with acute bronchitis
- Promotion of quality improvement initiatives at the clinic and organizational level

Methods of Development and Implementation

The PAFP Clinical Pathways Group reviewed the previous Clinical Practice Guideline for the Treatment of Acute Bronchitis in Family Practice, a local guideline developed by the Family Medicine Research Group and adopted as policy statement by the Philippine Health Insurance Corporation. A Medline search was done but there is only one guideline

published in Dutch for the Diagnosis and Treatment of Cough. The group also reviewed published medical literature to identify, summarize, and operationalize the clinical content of diagnostics, interventions and clinical indicators or outcomes to develop an evidence-based clinical pathway in family medicine practice. The reviewers then developed a time-related representation of recommendations on patient care processes, in terms of history and physical examination, laboratory tests, pharmacologic and non-pharmacologic interventions as well as social and community strategies to treat hypertension and prevent complications.

The group adopted several strategies in developing the recommendations. The first strategy is emphasizing on evidence-based recommendations as recommended assessments and interventions. The second strategy is recognition of potential variations between-patient and between specific practice settings. The third strategy is the recognition of “stakeholder groups” outside of family and community practice with careful attention to getting their opinion and support but without sacrificing the objectives of the project. The fourth strategy is emphasis on the commitment to establishment of the ultimate goal of improving the effectiveness, efficiency and quality of patient care in family and community practice.

The evidences for the patient care processes were reviewed and summarized as notes on the recommendations. The clinical pathway was then disseminated to the selected PAFP chapters and members and other stakeholders for consensus development. Dissemination was publication in the Filipino Family Physician journal, conference presentations and focused group discussions.

The implementation of clinical pathways to be adopted by the PAFP will be quality improvement activities in a form of patient record reviews, audit and feedback. Audit standards will be the assessment and intervention recommendations in the clinical pathway. Implementation of clinical pathways will be at the practice level and the organizational level. Practice level can be a simple count of family and community medicine practitioners using and applying the clinical pathways. Organizational outcomes can be activities of the PAFP devoted to the promotion,

development, dissemination and implementation of clinical pathways.

Grading of the Recommendations

The PAFP QA Committee met as a panel and graded the recommendations as shown in Table 1. The grading system was a mix of the strength of the reviewed published evidence and the consensus of a panel of experts. In some cases the published evidence may not be applicable in Philippine family practice setting, so a panel grade based on the consensus of clinical experts was also used. Thus if the recommendation was based on a published evidence that is a well done randomized controlled trial and the panel of expert voted unanimously for the recommendation, it was given a grade of A-I. If the level of evidence is based on an observational study but the panel still unanimously considered the recommendation, the grade given was A-II and if the level of evidence is just an opinion but the panel still unanimously recommended it, the grade was A-III.

Table 1. Grading of the recommendations

Panel Grade Level	Evidence Grade Level		
	1	2	3
A	A-I	A-II	A-III
B	B-I	B-II	B-III
C	C-I	C-II	C-III

Panel Grade Levels

- A - All the panel members agree that the recommendation should be adopted because it is relevant, applicable and will benefit many patients.
- B - Majority of the panel members agree that the recommendation should be adopted because it is relevant, applicable in many areas and will benefit many patients.

- C - Panel members were divided that the recommendation should be adopted and is not sure if it will be applicable in many areas or will benefit many patients.

Evidence Grade Levels

- I - The best evidence cited to support the recommendation is a well-conducted randomized controlled trial. The CONSORT standard may be used to evaluate a well-conducted randomized controlled trial.
- II - The best evidence cited to support the recommendation is a well-conducted observational study i.e. match control or before and after clinical trial, cohort studies, case control studies and cross-sectional studies. The STROBE statement may be used to evaluate a well-conducted observational study.
- III - The best evidence cited to support the recommendation is based on expert opinion or observational study that did not meet the criteria for level 2.

In the implementation of the clinical pathways, the PAFP QA committee strongly recommend compliance to guideline recommendations that are graded as either A-I, A-II or B-I. However, the committee also recommend using sound clinical judgment and patient involvement in the decision making before applying the recommendations.

Notes on the Recommendations

First Visit

History and Physical Examination

Cough is a common reason for consultation in family practice. A patient history focusing on the duration of cough, character and sputum production must be obtained. Other accompanying symptoms such as fever, difficulty of breathing or chest pain must also be inquired. Other points

Pathway Recommendations

Visit	Pathway Tasks				Patient Outcomes
	History and Physical Examination	Laboratory	Pharmacologic Intervention	Non-pharmacologic Interventions	
First Visit	<p>___ Patient history focusing on the duration of cough, character and sputum production and accompanying symptoms such as fever, difficulty of breathing or chest pain (A-II)</p> <p>___ Other points to focus on the history should include past history of asthma, recurrent respiratory disease, exposure to respiratory viral or bacterial infection, smoking or exposure to toxic inhalants. (A-II)</p> <p>___ A complete and thorough physical examination of the upper airways, chest and lungs must be done. (A-II)</p> <p>___ Peak expiratory flow rate (A-II)</p>	<p>___ There is no recommended laboratory test (A-II)</p> <p>___ Chest x-ray may be helpful for those with probable pneumonia (A-II)</p>	<p>___ Symptomatic treatment for acute bronchitis is recommended i.e. bronchodilators, mucolytics, anti-pyretics and fluids (A-I)</p> <p>___ Herbal and complimentary alternative medication may also be given (A-I)</p> <p>___ Antibiotics may be given to those with severe symptoms and highly probable bacterial infection (A-I)</p>	<p>Patient Intervention</p> <p>___ Health education and assurance about the self-limiting condition of acute bronchitis (A-I)</p> <p>___ Advice cough etiquette (A-III)</p> <p>___ Lifestyle modification such as smoking cessation or avoidance (A-I)</p> <p>Family Intervention</p> <p>___ Advice smoking cessation if present in family member (A-II)</p> <p>Community Intervention</p> <p>___ Promote smoke-free environment in public and enclosed places (E0 26) (A-III)</p>	<p>___ Awareness of the self-limiting condition of acute bronchitis (A-III)</p> <p>___ Awareness of the drugs prescribed, dose and potential side effects (A-III)</p> <p>___ Intention to follow behavioral lifestyle advice (A-III)</p>
Variations					

Visit	Pathway Tasks				Patient Outcomes
	History and Physical Examination	Laboratory	Pharmacologic Intervention	Non-pharmacologic Interventions	
Second Visit	<p>___ Review history focusing on the change in cough, character and sputum production and change in accompanying symptoms such as fever, difficulty of breathing or chest pain (A-II)</p> <p>___ Other points to focus on the history should include response to medication and compliance to behavioral change and other non-pharmacologic advice. (A-II)</p> <p>___ A complete and thorough physical examination of the upper airways, chest and lungs must be done. Note the change from previous consultation. (A-II)</p> <p>___ Peak expiratory flow rate (A-II)</p>	<p>___ Acute bronchitis is a self-limiting condition. There is no need for follow-up laboratory test (A-II)</p>	<p>___ Acute bronchitis is a self-limiting condition. There is no need for maintenance medication. (A-I)</p>	<p>___ Enhance health education and assurance about the self-limiting condition of acute bronchitis (A-II)</p> <p>___ Enhance behavioral modification such as smoking cessation or avoidance (A-I)</p>	<p>___ Resolution of symptoms (A-I)</p> <p>___ Patient satisfaction (A-I)</p> <p>___ Compliance to lifestyle modification (A-II)</p>
Variations					

to focus on the history should include past history of asthma, recurrent respiratory disease, exposure to respiratory viral or bacterial infection, smoking or exposure to toxic inhalants. A complete and thorough physical examination of the upper airways, chest and lungs must be done. A low cost and readily available office procedure is measurement of the peak expiratory flow using the peak flow meter. Pulse oxymetry may also help in acute situations and in follow-up and monitoring of patients with chronic respiratory diseases.⁴

To be considered as acute bronchitis, the cough must be productive purulent sputum for at least 2 days but no more

than 2 weeks with no evidence of pneumonia clinically or radiographically. The cough may be accompanied by fever, rhonchi or wheezing. This definition is based on a survey among family physicians defining acute bronchitis as cough of at least two days duration usually productive of purulent sputum wherein the presence or absence of fever or rhonchi would not matter. In the survey the to make a diagnosis of acute bronchitis, 58 % of physicians who respondent believe that cough should be productive and 60% responded that sputum should be purulent; 72% felt that wheezing or rhonchi need not be present.⁵ Family physicians assign a great deal of predictive value to the color of sputum

despite evidence that the appearance of these secretions alone is not predictive of bacterial infection. When sputum was described as discoloured, physicians were more likely to label the illness as acute bronchitis rather than as upper respiratory tract infection. Forty percent of patients with acute bronchitis will have abnormal chest findings on physical examination.

The definition and how acute bronchitis is diagnosed is based on surveys conducted among family physicians. In the US, the character of cough and sputum production are the most important items used in diagnosing acute bronchitis. Cough should be productive, and 60% stated that the sputum should be purulent. Majority did not feel that wheezing or rhonchi need to be present. The diagnosis also varies depending on physician's practice setting. Younger physicians were more likely to define acute bronchitis as the presence of a productive cough with purulent sputum, physicians from an academic setting were more likely to define acute bronchitis as a productive cough while physicians from practices serving managed care patients included wheezing or rhonchi in the definition of acute bronchitis.⁶ In UK, cough associated with fever is diagnosed as upper respiratory tract infection and when sputum and chest signs were also present, acute bronchitis in young patients and lower respiratory tract infection in old patients were given.⁷ In Europe, a survey was conducted among Dutch general showed no clear relationship between signs and symptoms of the patients and the diagnosis made. The diagnosis of pneumonia was made too often probably because of the decision whether or not to prescribe an antibiotic. As a result, physicians expressed the need for guidelines for diagnosis and treatment of patients with acute bronchitis and related conditions.⁸

Laboratory Tests

There is no definitive diagnostic procedure for acute bronchitis. The evaluation of adults with acute bronchitis should focus on ruling out serious illness, particularly pneumonia. In patients with cough lasting 3 weeks or longer, chest radiography may be warranted in the absence

of other known causes.⁹ But while chest x-ray might help to exclude other pathology it is underperformed because of low specificity. Studies have shown that the diagnosis of acute bronchitis in adult patients are mostly based on clinical parameters.⁵

Acute bronchitis has no definite microbiologic etiology. Hemophilus influenzae, Chlamydia, Moraxella, Streptococcus pneumoniae, Branhamella catarrhalis and certain viruses have been implicated. Sputum cultures is the easiest and most simple way to identify the organism involved. However it will ordinarily yield bacteria, whether or not infection is present and such growth is just as likely to represent upper respiratory colonization as lower respiratory tract infection.⁵ In another study, serology was used to identify microbiologic infection. Using this methodology, only 16% showed probable infection while the other 84% showed negative for serology. C-reactive protein, an inflammatory marker, was also shown to be low. It is difficult to come close to a precise aetiology with respect to infectious agents of acute bronchitis in family practice.¹⁰ Thus a microbial identification is not necessary.

Pharmacologic Interventions

Antibiotics are generally not recommended for acute bronchitis. However antibiotics may be given for faster relief of symptoms among patients where bacterial etiology is highly probable or has more severe symptoms like fever, cough with purulent sputum with or without rhonchi, wheezes and in those with co-morbidity factors like more than 65 years of age, diabetes, congestive heart failure and immunocompromised patients.⁵

Inhaled bronchodilators may be given for patients with acute bronchitis and distressing cough with or without wheezing. Oral bronchodilators may be given as an alternative if inhaled bronchodilator is not available. Addition of a mucolytic agent to an antibiotic regimen for the treatment of patients with acute bronchitis improves clinical response rate. However, there is no evidence to recommend mucolytic treatment alone for the treatment of acute bronchitis.⁵

The value of mucolytics in acute bronchitis is still debated. However, they are frequently prescribed for children and adults with acute bronchitis. These drugs are believed to be effective and well tolerated. Mucolytics are sometimes prescribed to avoid prescription of antibiotics but where the patients request drug therapy.¹¹ In study among 248 patients, mucolytics effectively change the viscosity and character of sputum with resultant ease of expectoration and cough severity. There was a notable improvement in the presence of rhonchi, crepitations and symptoms including dyspnoea at rest. Tolerability was good, with 77% of patients experiencing no side-effects.¹² While this was done among patients with chronic bronchitis, this may also apply with acute bronchitis.

A systematic review including meta-analysis on the use of bronchodilators for patients with acute bronchitis in family practice was conducted. Two trials in children with cough and five trials in adults with or without obvious airway obstruction did not find any benefits from bronchodilators. Studies that enrolled more wheezing patients were more likely to show benefit. Patients given bronchodilators were more likely to report tremor, shakiness, or nervousness than those in the control groups. In summary bronchodilators may be recommended for acute bronchitis with evidence of airflow obstruction, but this potential benefit must be weighed against the adverse effects.¹³

Complementary and alternative medicines are also used commonly for respiratory diseases including acute bronchitis.¹⁴ Foreign literature are abound with robust studies on herbal treatment for acute bronchitis. They have been shown to improve symptoms¹⁵ as well as health-related quality of life.¹⁶ In one study, the roots of *Pelargonium sidoides* was compared to placebo in a randomized trial for the treatment of acute bronchitis in adults. After 7 days of treatment, the bronchitis symptoms significantly decreased compared to placebo. There were no serious adverse events during the trial.¹⁷ Locally, there are studies to show that *Lagundi* improve respiratory symptoms comparative to theophylline.

Acute bronchitis is most often caused by viral infection, thus symptomatic treatment will be enough. However, many

physicians treat acute bronchitis with antibiotics.¹⁸ A survey on how family physicians in the US treat patients with acute bronchitis showed a high prescription rate for antibiotics. Sixty-three percent give antibiotic for generally healthy, non-smoking adult with acute bronchitis. Some physicians reported using beta 2 agonist bronchodilators as their first choice of treatment. If the patient is a smoker, physicians reported that they prescribe antibiotics 90% of the time.¹⁹ In the UK, purulent sputum, fever and crepitation/crackles on chest examination were the most important reasons for prescribing antibiotics. They were given usually to maintain patient satisfaction. Around half advised the use of bronchodilators, and almost everyone recommended the symptomatic use of paracetamol and fluids.²⁰ In Australia the rate of antibiotic prescribing for acute bronchitis was 79.6%. They are usually given to patients present with chest or systemic signs.²¹

Most antibiotics are prescribed in primary care. There is strong consensus that they are overprescribed, especially for conditions such as upper respiratory tract infections and acute bronchitis. In one study antibiotics were prescribed in 21.6% of encounters for URTI and 73.1% of encounters for acute bronchitis/bronchiolitis. These figures are higher than justified by guidelines.²² Patients are prescribed with antibiotics when there is inflammation signs such as fever, more severe symptoms, and when patients expected an antibiotic prescription.²³ Thus antibiotic prescription is very common when the empirical diagnosis are either bacterial pharyngitis/tonsillitis, acute bronchitis, unspecified bacterial superinfection and acute sinusitis.²⁴ Adults were more likely to receive antibiotics than children.²⁵ Despite the findings in controlled trials that antibiotics provide limited benefit, studies have also shown that antibiotic prescribing for respiratory illness has been associated with small reductions in return visits.²⁶

Treatment with an appropriate antimicrobial agent significantly decreases the bacterial burden and reduces the risk of a patient progressing to a more severe infection. When evaluating the use of antibiotics, practitioners should consider such factors as the local resistance patterns of common respiratory pathogens, the likelihood of infection

with a resistant organism, and the potential for treatment failure. For patients with risk factors predictive of treatment failure, beta-lactams (usually in combination with a beta-lactamase inhibitor or a macrolide) and fluoroquinolones are most commonly recommended.²⁷ (Basri RS, et al. 2008) Prior antibiotic use for the present condition is a risk factor for treatment failure, so a more appropriate tests should probably be done before continuing antibiotic treatment.

Doxycycline and co-amoxiclav were compared in a randomized clinical trial involving adult patients with acute suppurative tracheobronchitis. Both antibiotic regimens proved equally efficacious, with rates of clinical response (cure or improvement) of 89% and 91% for doxycycline and coamoxiclav, respectively. Gastrointestinal side effects were more common in the co-amoxiclav group, but rarely caused cessation of treatment.²⁸ Cefuroxime and amoxicillin are also good first line antibiotics. In one randomized controlled trial analysis of patients on an intention-to-treat basis 24–72 hours after completion of the course of study medication showed that amoxicillin afforded clinical cure or improvement in 80.4% of patients and cefuroxime axetil in 76.2%. But 5.9% of patients receiving cefuroxime axetil relapsed and required further treatment, whereas 20.8% of those receiving amoxicillin needed further treatment. There were no differences between the two treatments in the numbers of patients experiencing adverse events, which were generally mild and transient.²⁹

Non-pharmacologic Interventions

Acute bronchitis is a simple and self-limiting respiratory problem. Non-pharmacologic intervention should include basic advice and assurance. However, some adults especially smokers or those with occupational exposure may need special health education intervention. However, health education must be more intensive and must be accompanied by behavioural modification. In a group of male with bronchitis who were encouraged to alter their behaviour in an attempt to improve their health, group educational sessions have been tried but the impact on was minimal.³⁰ A more intensive behavioural modification

program similar to that of smoking cessation strategy may be needed.

The uncertainty of the value of antibiotics for acute bronchitis must be shared with the patient. In one study, patients who received information about the limited role of antibiotic in simple acute bronchitis took less antibiotics compared with those who did not receive information (49% v 63%; $P=0.04$). Reassuring these patients and sharing the uncertainty about prescribing antibiotic is a safe strategy and reduces antibiotic use.³¹

Patient Outcomes

During the first visit, the patient must understand the benign nature of acute bronchitis. Prescription and/or self-medication with antibiotics are not necessary.

Second Visit

History and Physical Examination

Acute bronchitis is usually a benign respiratory illness that resolves with symptomatic treatment. It is expected that the signs and symptoms should resolve upon return visit. The history and physical examination may be focused on the compliance to prescribed pharmacologic non-pharmacologic intervention and resolution of the previous symptoms. If symptoms persisted other respiratory condition should be considered i.e. pneumonia, tuberculosis or an obstructive or restrictive lung disorder.

Patient Outcomes

Assessment of response to treatment in acute bronchitis depends on clinical findings. Cough, difficulty of breathing, wheezing, crackles and sometimes fever are the most common manifestation. Resolution of these signs and symptoms are the most common treatment outcome being monitored. A formal symptom scoring like the Bronchitis Symptom Score (BSS) may also be used. The BSS correlates with outcomes reported by patients with acute bronchitis.³²

Patient satisfaction or experience have also been measured in family practice. More patients are satisfied in walk-in clinics of family physicians than in emergency or outpatient department of hospitals. The satisfaction is significant when waiting time is addressed. However when quality of care is measured the scores in emergency departments were significantly higher than that for family practices.³³ Family and community medicine practices must therefore strive to improve its quality to obtain a higher level of satisfaction from their patients.

Recommendations for Implementation

Clinic Level

Antibiotic resistance is a significant problem in primary care. In a meta-analysis, seven studies of respiratory tract bacteria (2605 participants), showed a pooled ORs of 2.4 (1.4 to 3.9). The longer duration and multiple antibiotics were associated with higher rates of resistance. The effect is greatest a month after treatment and may persist for up to 12 months.³⁴ If there will be quality improvement initiative for acute bronchitis in family and community practice, it should be towards rational antibiotic prescription to prevent resistance.

Outreach visits to individual family physician's clinic have been identified as an intervention that may improve the practice of health care professionals. This type of 'face to face' visit has been referred to educational detailing or academic detailing. In a meta-analysis that included 18 studies involving more than 1896 physicians, educational outreach visits combined with social marketing, appear to be a promising approach to modify health professional behaviour, especially prescribing.³⁵ This approach may be used when implementing this clinical pathway. Appropriate antibiotic prescribing may be the objective of such implementation.

A multi-dimensional educational program was evaluated to promote reduction in antibiotic overuse for acute respiratory tract infections. Effective intervention

include performance feedback, clinician education, and patient educational materials, including an interactive computer located in the waiting room. These were shown to reduce antibiotic overuse in the treatment of patients with upper respiratory tract infections and acute bronchitis.³⁶

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