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Summary

Cough in acute bronchitis is typically worse at night or with exercise; lasts >2 weeks in half of patients and 4 weeks in a quarter of patients; may be associated with bronchospasm and/or excessive mucus production.

Diagnosis is primarily clinical. Other causes for acute cough such as pneumonia, asthma, or postnasal drip should be ruled out if suspected.

Treatment is aimed at symptom reduction until infection is resolved and bronchial damage repaired. Antibiotics are not recommended in the majority of patients.

Complications are rare; the primary complication is a postbronchitis syndrome, which can produce a cough lasting several months.

Definition

Acute bronchitis is defined as a self-limiting lower respiratory tract infection, to distinguish this condition from common colds and other upper respiratory ailments. Bronchitis refers specifically to infections causing inflammation in the bronchial airways, whereas pneumonia denotes infection in the lung parenchyma resulting in consolidation of the affected segment or lobe.

Although there is no universally accepted definition for acute bronchitis, the criteria proposed by MacFarlane offer a practical approach: (a) an acute illness of <21 days; (b) cough as the predominant symptom; (c) at least 1 other lower respiratory tract symptom, such as sputum production, wheezing, chest pain; (d) no alternative explanation for the symptoms.[1] While the MacFarlane criteria state that the symptoms usually last for <3 weeks, other studies have shown that cough may linger for >30 days in about a quarter of patients with acute bronchitis.[2] Consequently, acute bronchitis can still be present in patients with coughs lasting for >1 month.

This topic focuses on acute bronchitis in adults.
Epidemiology

One of the most common conditions encountered in clinical practice. Acute bronchitis is among the most common adult outpatient diagnoses with approximately 100 million (10%) ambulatory care visits in the US each year.[3] In the UK, respiratory tract infections account for 300 to 400 consultations per 1000 patients annually.[4] The highest incidence is in the autumn and winter.

Aetiology

Most cases of acute bronchitis are viral infections. The most common viruses implicated in acute bronchitis are the same as those that cause upper respiratory infections and include coronavirus, rhinovirus, respiratory syncytial virus, and adenovirus. In some younger populations of military recruits and college students, other pathogens such as *Chlamydia pneumoniae* and *Mycoplasma pneumoniae* have been isolated from patients with acute bronchitis. However, these pathogens have been identified in only a minority of patients with acute bronchitis and it is unclear if these agents are involved in causing the symptoms. The uncertainty about the role of these organisms is supported by a study that identified *Mycoplasma* in a subset of patients presenting with acute bronchitis but found that treatment of these patients with a macrolide resulted in no quicker recovery than patients without *Mycoplasma* who were treated with the same antibiotic.[5] Rarely, *Bordetella bronchiseptica* may be observed, but to date has only been reported in immunocompromised individuals.[6]

Pathophysiology

The symptoms of acute bronchitis are due to acute inflammation of the bronchial wall, which causes increased mucus production together with oedema of the bronchus. This leads to the productive cough that is the hallmark of a lower respiratory tract infection. While the infection may clear in several days, repair of the bronchial wall may take several weeks. During the period of repair, patients will continue to cough. Pulmonary function studies of patients with acute bronchitis demonstrate bronchial obstruction similar to that in asthma. As the symptoms of acute bronchitis abate, pulmonary function returns to normal.

Half of all patients with acute bronchitis continue to cough for >2 weeks.[7] In a quarter of patients, cough may last for >1 month. This is termed post-bronchitis syndrome. This period probably reflects ongoing repair to the bronchial walls after the clearance of the acute infection.

Case history

**Case history #1**

A 34-year-old woman with no known underlying lung disease has had a 12-day history of cough that has become productive of sputum. Initially she was not short of breath, but now she becomes short of breath with exertion. She initially had nasal congestion and a mild sore throat, but now her symptoms are all related to a productive cough without paroxysms. She denies any sick contacts. On physical examination she is not in respiratory distress and is afebrile with normal vital signs. No signs of upper respiratory tract infection are noted. Scattered wheezes are present diffusely on lung auscultation.
Other presentations

Acute bronchitis can also present as wheezing that resembles asthma with minimal cough, or as a nocturnal cough only. While most patients with acute bronchitis will have a productive cough, patients in later phases of the illness may have a non-productive cough.
Approach

The diagnosis is primarily clinical. Investigations are performed to rule out other causes of symptoms.

History

Patients typically present with cough, which may be productive, and symptoms suggestive of bronchial obstruction (such as intermittent wheeze or dyspnoea). However, the key point is that the cough and bronchial obstructive symptoms are acute and related to other signs of a respiratory infection, such as rhinorrhoea, sore throat, and low-grade fever. There is no universally accepted definition for acute bronchitis. Criteria suggested by MacFarlane state that the acute illness lasts for <21 days.[12] However, the cough lasts for >2 weeks in 50% of patients and may last up to 4 weeks in 25% of patients.[7]

It is important to enquire about symptoms of chronic respiratory conditions (such as asthma) or other lower respiratory tract infections, such as pneumonia (dyspnoea, cough, pleuritic chest pain, fever, rigours, malaise, and haemoptysis). Patients whose cough has progressed beyond 30 days also should be suspected of having a chronic pulmonary inflammatory disorder (sarcoidosis, Goodpasture’s syndrome) or malignancy (lung cancer), especially if haemoptysis or other systemic symptoms such as weight loss are present.

Several medication or environmental exposures can also cause acute cough. These include the use of ACE inhibitors or occupational exposures to dusts or chemicals. In many of these cases, such as ACE inhibitor use, the cough is non-productive. In occupational exposures, symptoms are generally restricted to the cough, without any other systemic symptoms such as fever, headaches, or lethargy.

There is limited evidence for an association between household air pollution (from domestic solid fuel use) and the risk of acute lower respiratory infection.[8]

Physical examination

The physical examination may reveal signs of upper respiratory tract infection, such as coryza, nasal congestion, and pharyngeal hyperaemia. There may also be evidence of bronchial obstruction (which can include prolonged expiratory phase) and wheezing, which may be brought out by forced expiration in the prone position, or rhonchi. The presence of rales on physical examination should prompt investigation for pneumonia or congestive heart failure (CHF).

Pulmonary function tests (PFT)

Pulmonary function testing is not recommended in patients with acute bronchitis. If done because underlying asthma is suspected, clinicians should be aware that patients with acute bronchitis will show mild to moderate bronchial obstruction that clears with resolution of their infection and should not be confused with asthma. If underlying asthma is suspected, PFTs should be delayed until the patient has fully recovered from their infection.

Laboratory investigations

Laboratory studies are not needed in the diagnosis of acute bronchitis. In particular, examination of the sputum by either Gram stain or culture is not helpful. If other diagnoses are suspected (e.g., pneumonia), laboratory studies may be selected to confirm these.

In the UK, Public Health England recommend that C-reactive protein should be ordered if antibiotic therapy is being considered to help guide therapy.[13]
Acute bronchitis

Imaging

Routine imaging is not indicated in patients with suspected acute bronchitis. In situations where other respiratory conditions may be present, such as pneumonia, CHF, or bronchiectasis, or in the presence of haemoptysis,[14] appropriate imaging studies should be performed. However, these should be directed at ruling out other causes of cough rather than confirming acute bronchitis.

Emerging investigations

Procalcitonin is emerging as a promising biomarker for the diagnosis of bacterial infections as it tends to be higher in severe bacterial infections and low in viral infections. The US Food and Drug Administration has approved procalcitonin as a test for guiding antibiotic therapy in patients with acute respiratory tract infections. A Cochrane review of studies employing procalcitonin to differentiate between bacterial versus viral respiratory infections may indicate some value in reducing the use of antibiotics for this condition. Although most patients in the study had pneumonia, sepsis, or other potentially serious infections, the study did include a subset of patients who presented with acute bronchitis and had reductions in antibiotic use when this test was used. Further research is required.[15]

History and exam

Key diagnostic factors

presence of risk factors (common)

• Key risk factors include smoking and exposure to infection.

duration of cough <30 days (common)

• Patients with acute bronchitis generally have a cough lasting for <30 days; however, some studies have shown that cough lingers for >30 days in about a quarter of patients.[7] Consequently, acute bronchitis can still be present in patients with coughs that have persisted for >1 month.

productive cough (common)

• The cough may be productive with clear, white, or discoloured sputum.

no history of chronic respiratory illness (common)

• Acute bronchitis should only be diagnosed in a patient in whom underlying respiratory problems such as asthma have been excluded as causes. The main difference between asthma and acute bronchitis is the chronicity of bronchospasm. In asthma, bronchospasm is recurrent and progressive.

exclusion of other respiratory and cardiac illness as cause for symptoms (common)

• Acute bronchitis may be diagnosed once other illnesses such as pneumonia, congestive heart failure (CHF), and postnasal drip are excluded as causes. Rales on examination suggest pneumonia or CHF.

Other diagnostic factors

fever (common)

• Low-grade fever may be present.
**wheezes (uncommon)**
- Wheezing may be present, especially on forced expiration.

**rhonchi (uncommon)**
- Rhonchi may be present.

### Risk factors

**Strong**

**viral or atypical bacterial infection exposure**
- Because acute bronchitis is related to viral illnesses and atypical bacterial infections, exposure is the greatest risk for the disease. This accounts for the seasonal increase in winter months and in patients exposed to close contacts who are ill with a respiratory infection.

**Weak**

**cigarette smoking**
- While cigarette smoking is clearly linked to chronic bronchitis and worsening asthma, there is scant population-based evidence that cigarette smoking increases the risk of acute bronchitis. However, because of the underlying bronchial inflammation present in smokers, there is conjecture that smokers are more likely to have more severe episodes and seek care when they develop acute bronchitis.

**household pollution exposure**
- There is limited evidence for an association between household air pollution (from domestic solid fuel use) and the risk of acute lower respiratory infection.[8]

### Investigations

#### 1st test to order

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>clinical diagnosis</td>
<td>features of acute bronchitis</td>
</tr>
<tr>
<td>- Acute bronchitis is generally diagnosed clinically, though tests may be needed to exclude other diagnoses such as asthma or pneumonia.</td>
<td></td>
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</table>
### Other tests to consider

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
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</thead>
<tbody>
<tr>
<td><strong>pulmonary function test</strong></td>
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<tr>
<td></td>
<td>Not recommended in patients with acute bronchitis but can be helpful in evaluating for asthma; pulmonary function will improve over time with acute bronchitis.</td>
</tr>
<tr>
<td><strong>CXR</strong></td>
<td></td>
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<tr>
<td></td>
<td>May be helpful to rule out pneumonia as cause of cough and fever.</td>
</tr>
<tr>
<td><strong>C-reactive protein</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Should be ordered if after clinical assessment a diagnosis of pneumonia has not been made, and antibiotic therapy is being considered to help guide therapy. Point of care testing may be considered in primary care.[13]</td>
</tr>
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### Emerging tests

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
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<tbody>
<tr>
<td><strong>procalcitonin</strong></td>
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<tr>
<td></td>
<td>Emerging as a promising biomarker for the diagnosis of bacterial infections as it tends to be higher in severe bacterial infections and low in viral infections.</td>
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<td>The US Food and Drug Administration has approved procalcitonin as a test for guiding antibiotic therapy in patients with acute respiratory tract infections.</td>
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<td></td>
<td>A Cochrane review of studies employing procalcitonin to differentiate between bacterial versus viral respiratory infections may indicate some value in reducing the use of antibiotics for this condition. Although most patients in the study had pneumonia, sepsis, or other potentially serious infections, the study did include a subset of patients who presented with acute bronchitis and had reductions in antibiotic use when this test was used. Further research is required.[15]</td>
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</table>
# Differentials

<table>
<thead>
<tr>
<th>Condition</th>
<th>Differentiating signs / symptoms</th>
<th>Differentiating tests</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coronavirus disease 2019 (COVID-19)</strong></td>
<td>• Residence in/travel to a country/area or territory with local transmission, or close contact with a confirmed or probable case of COVID-19, in the 14 days prior to symptom onset. &lt;br&gt; • The situation is evolving rapidly; see our COVID-19 topic for further information.</td>
<td>• Real-time reverse transcription polymerase chain reaction (RT-PCR): positive for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) RNA.</td>
</tr>
<tr>
<td><strong>Pneumonia</strong></td>
<td>• Patients with pneumonia often have a higher fever than patients with acute bronchitis, may appear more ill, and have rales on lung examination.</td>
<td>• CXR will detect an infiltrate from pneumonia that will not be present in acute bronchitis.</td>
</tr>
<tr>
<td><strong>Allergic rhinitis</strong></td>
<td>• Patients with allergic rhinitis often have postnasal drip causing a cough. &lt;br&gt; On examination, acute rhinitis should be evident on nasal examination and from posterior pharyngeal drainage.</td>
<td>• None.</td>
</tr>
<tr>
<td><strong>Asthma</strong></td>
<td>• Patients with asthma have bilateral wheezing; the main difference between asthma and acute bronchitis is the chronicity of bronchospasm. &lt;br&gt; In asthma, bronchospasm is recurrent and progressive.</td>
<td>• Pulmonary function test may be useful between bouts of acute bronchitis to diagnose asthma in patients who have residual obstructive findings.</td>
</tr>
<tr>
<td><strong>Pertussis infection</strong></td>
<td>• Cough has characteristic whoop in children with pertussis, although this is usually not present in adolescents and adults with the infection.</td>
<td>• Cultures, polymerase chain reaction, or direct fluorescent antibody testing for <em>Bordetella pertussis</em> will be positive.</td>
</tr>
<tr>
<td><strong>Congestive heart failure (CHF)</strong></td>
<td>• Patients with CHF may cough but also have other symptoms and signs such as dyspnoea on exertion, orthopnoea, rales on lung examination, peripheral oedema, raised jugular venous pressure, and a history of cardiac problems.</td>
<td>• CXR shows pulmonary vascular congestion and may show cardiomegaly in CHF.</td>
</tr>
<tr>
<td>Condition</td>
<td>Differentiating signs / symptoms</td>
<td>Differentiating tests</td>
</tr>
<tr>
<td>-----------------------------------------</td>
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<td>---------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Reflux oesophagitis</td>
<td>• Aspiration from reflux oesophagitis may cause a non-productive cough that is usually chronic in nature. Burning and chest pain characteristic of reflux may be helpful in differentiating this from acute bronchitis. If wheezing is present, often it is only on the right, where aspiration is most common.</td>
<td>• Upper gastrointestinal endoscopy may show oesophageal inflammation or erosions with reflux. pH monitoring also can be helpful for detecting acid in the distal oesophagus.</td>
</tr>
<tr>
<td>Upper respiratory infection/common cold</td>
<td>• Viral upper respiratory infections and acute bronchitis may be indistinguishable. Indeed, many advocate calling acute bronchitis a 'chest cold' to denote that viral bronchitis is often simply an extension from an upper respiratory illness. The productive cough from a common cold can be from inflammation of the trachea or bronchial tree or can result from postnasal drainage from an upper respiratory infection.</td>
<td>• None.</td>
</tr>
<tr>
<td>Upper airway cough syndrome</td>
<td>• Cough ≥8 weeks (usually dry). • Unpleasant sensation in the throat is a key diagnostic feature. • Postnasal drip. • Oropharyngeal examination reveals a cobblestone appearance to the posterior oropharyngeal wall and local upper airway structures.</td>
<td>• Response to trial of empirical therapy with a first-generation antihistamine plus a decongestant within 2 weeks.</td>
</tr>
<tr>
<td>Medication/environmental exposures</td>
<td>• Several medication or environmental exposures can also cause an acute cough. These include the use of ACE inhibitors or occupational exposures to dusts or chemicals. In many of these cases, such as ACE inhibitor use, the cough is non-productive. In occupational exposures, generally symptoms are restricted to the cough without any other systemic signs.</td>
<td>• None; the diagnosis should be made based on history of exposure to agents that can cause a cough.</td>
</tr>
</tbody>
</table>
### Diagnosis

<table>
<thead>
<tr>
<th>Condition</th>
<th>Differentiating signs / symptoms</th>
<th>Differentiating tests</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>symptoms such as fever, headaches, or lethargy.</td>
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<tr>
<td>Lung cancer</td>
<td>• Symptoms persist beyond 30 days. May see haemoptysis and/or systemic signs such as weight loss or poor appetite.</td>
<td>• CT of chest or chest radiograph may detect lesion. • Bronchoscopy may find bronchial lesion.</td>
</tr>
</tbody>
</table>

### Criteria

**Acute bronchitis[1]**

The criteria of MacFarlane offer a practical approach:

- An acute illness of <21 days
- Cough as the predominant symptom
- At least 1 other lower respiratory tract symptom such as sputum production, wheezing, chest pain
- No alternative explanation for the symptoms.
Acute bronchitis

Management

Approach

Treatment strategies are directed at minimising symptoms until the illness resolves. For many patients with minimal cough that disrupts neither daily activity nor sleep, the best approach may be to offer no treatment. For patients with significant symptoms who desire treatment, medications to reduce symptoms include cough suppressants or bronchodilators. Mucolytics, corticosteroids, and antibiotics are of limited effectiveness in treating patients with acute bronchitis.[16] If fever is present, antipyretics may be helpful for patient comfort.

Patient education about acute bronchitis being a self-limited illness that usually resolves in up to 4 weeks without treatment can help with patient satisfaction.

Symptomatic treatment

Treatment of patients with acute bronchitis may include the use of cough suppressants or, if wheezing is present, a bronchodilator. The choice of whether to use a bronchodilator or cough suppressant should be based on the previous experience of the patient, whether symptoms are related to activity, and whether symptoms are wheezing in nature (in which case a bronchodilator may be effective) or focused primarily on the discomfort associated with frequent coughing (in which case a cough suppressant might be most helpful).

The use of salbutamol is based on observations that pulmonary function tests in patients with acute bronchitis resemble those of patients with mild/moderate asthma and that salbutamol can reverse impairments in the forced expiratory volume at 1 second (FEV1) in patients with acute bronchitis.[7] [17] For patients with acute bronchitis who experience wheezing, salbutamol has been shown to be helpful for reducing cough and wheezing. However, this potential benefit is not well supported by the available data and must be weighed against the adverse effects associated with its use.[18] In the UK, the National Institute for Health and Care Excellence (NICE) does not recommend an oral or inhaled bronchodilator unless the patient has an underlying airways disease (e.g., asthma).[19]

Antitussives may be effective treatments for acute management of severe cough. They are often combined with other agents such as guaifenesin (an expectorant) or antihistamines, but these are of unproven benefit in acute bronchitis.[20] Codeine and dextromethorphan have potential for abuse and dependence. Cough and cold medications that include opioids, such as codeine or hydrocodone, should only be used in adults aged 18 years and older as the risks (slowed or difficult breathing, misuse, abuse, addiction, overdose, and death) outweigh the benefits when used for cough in younger patients.[21] Mucolytics are not recommended.[19]

Clinicians and patients should consider the potential adverse effects of treatment and how these treatments might affect the patient's daily activities. For individuals whose work or hobbies involve fine motor movements, the use of a beta-agonist might produce tremors that would be more disruptive than the cough. Similarly, for individuals who are required to be alert during the day, the use of codeine or other opioid-containing cough suppressants might be contraindicated.

Patients could fall into more than one symptom category during the course of their illness, in which case therapy can either be added on to that previously prescribed, or, if prior therapy is found to be ineffective, it should be stopped and a different option considered. Adverse effects and interactions should be considered prior to prescribing additional treatment.
Antibiotic therapy

Most major regulatory bodies recommend against the use of empirical antibiotic therapy in acute bronchitis as it is usually caused by a virus, and inappropriate antibiotic use can lead to adverse events and contribute to antimicrobial resistance. Local guidance should be consulted to aid treatment decisions, including antibiotic choice.

The Centers for Disease Control and Prevention and the American College of Physicians recommend against routine antibiotic treatment in acute uncomplicated bronchitis in the absence of pneumonia.[3]

In the UK, NICE recommends antibiotics only in patients who are systemically unwell or at a higher risk of complications. Patients who are at higher risk of complications include:[19]

- People with a pre-existing comorbidity (e.g., significant renal, hepatic, cardiac, respiratory, or neuromuscular disease, immunosuppression)
- Young children who were born prematurely
- Patients aged ≥80 years with one or more of the following, or patients aged ≥65 years with two or more of the following:
  - Hospitalisation in the past year
  - Current oral corticosteroid use
  - Type 1 or type 2 diabetes mellitus
  - History of congestive heart failure.

Antibiotic therapy is recommended in patients who are systemically unwell. Immediate antibiotic therapy or a delayed prescription can be considered in patients who are at a higher risk of complications.


NICE recommends that C-reactive protein (CRP) should be ordered if antibiotic therapy is being considered to help guide therapy. Antibiotics are not routinely recommended if CRP is <20 mg/L and symptoms are present for more than 24 hours. Delayed antibiotics are recommended if CRP is 20-100 mg/L, and immediate antibiotics are recommended if CRP is >100 mg/L.[13]

A delayed prescription for antibiotics can be considered alongside advice on the natural history of the illness and symptomatic treatments. Other strategies include shared-decision making and procalcitonin-guided antibiotic therapy.[22] However, in one study, procalcitonin levels did not result in less use of antibiotics in patients with suspected lower respiratory tract infection.[23] One cohort study of 28,883 participants found that delayed prescribing may result in a reduced number of repeat consultations for worsening illness.[24] Other studies also support the use of delayed prescribing strategies, as they are associated with substantially reduced antibiotic use compared with immediate prescribing.[25] [26] One Cochrane review found that delayed antibiotics achieved lower rates of antibiotic use (31%) compared with immediate antibiotics (93%), with similar rates of patient satisfaction.[27]

One Cochrane review of 17 trials (3936 participants) found that there is limited evidence to support the use of antibiotics in the treatment of acute bronchitis. Some patients may recover faster with antibiotic treatment; however, the difference (half a day over an 8- to 10-day period) was not considered significant.
Acute bronchitis

Management

Antibiotics may have a beneficial effect in some patients (e.g., elderly, existing comorbidities); however, this should be balanced against potential adverse effects and contribution to the development of resistance.[28]

Despite these recommendations, inappropriate prescribing of antibiotics in acute respiratory infections is widespread. Acute bronchitis leads to more inappropriate antibiotic prescribing than any other acute respiratory tract infection.[3] One German study found that 78% of antibiotic prescriptions for acute bronchitis were not in accordance with local guideline recommendations.[29] Similarly, an Australian study found that the antibiotics are prescribed at rates 4 to 9 times higher than what local guidance recommends.[30]

Treatment of persistent cough

Evaluation for other causes of persistent cough should be considered. A careful history to look for occupational or environmental exposures can help indicate whether inhalants could be causing the cough. In patients with risk factors or other symptoms suspicious for gastro-oesophageal reflux disease, an empirical trial with an H2 antagonist or proton-pump inhibitor may be warranted.

Patients whose cough persists for >4 weeks may benefit from a short-acting beta-agonist bronchodilator, although routine use of beta-agonists for chronic cough associated with acute bronchitis is generally not recommended unless the patient has an underlying airways disease.[18] [19]

Antibiotics are not indicated simply because of a prolonged duration of cough in acute bronchitis, but may be considered in select patients who are systemically unwell or are at high risk of complications.

There is no evidence that the use of corticosteroids, either inhaled or systemic, is effective for postbronchitic cough. A randomised controlled trial comparing a 5-day course of prednisolone with placebo found that there was no difference in duration of cough, symptom severity, or peak flow in adults with acute cough and at least one lower respiratory tract symptom and no indication for antibiotic treatment. The authors concluded that oral corticosteroids should not be used for this indication in patients without asthma.[31] NICE guidance supports this stance.[19]

Treatment algorithm overview

Please note that formulations/routes and doses may differ between drug names and brands, drug formularies, or locations. Treatment recommendations are specific to patient groups: see disclaimer

<table>
<thead>
<tr>
<th>Acute cough ≤4 weeks</th>
<th>(summary)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st observation</td>
<td></td>
</tr>
<tr>
<td>adjunct antipyretic</td>
<td></td>
</tr>
<tr>
<td>adjunct short-acting beta-agonist bronchodilator</td>
<td></td>
</tr>
<tr>
<td>adjunct antitussive</td>
<td></td>
</tr>
<tr>
<td>systemically unwell; high risk of complications plus consider immediate or delayed antibiotics</td>
<td></td>
</tr>
<tr>
<td>Ongoing</td>
<td>( summary )</td>
</tr>
<tr>
<td>---------------------------------------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>cough &gt;4 weeks</td>
<td>1st evaluate for other causes</td>
</tr>
<tr>
<td></td>
<td>adjunct short-acting beta-agonist bronchodilator</td>
</tr>
<tr>
<td></td>
<td>systemically unwell; high risk of complications</td>
</tr>
</tbody>
</table>
Treatment algorithm

Please note that formulations/routes and doses may differ between drug names and brands, drug formularies, or locations. Treatment recommendations are specific to patient groups: see disclaimer.
Acute bronchitis

Management

cough ≤4 weeks

1st observation

» Because acute bronchitis is most commonly related to virally-mediated infections, treatment strategies are directed at minimising symptoms until the illness resolves. For many patients with a minimal cough that does not disrupt daily activity or interrupt sleep, the best approach may be to offer no treatment.

» Patient education about acute bronchitis being a self-limited illness that usually resolves in up to 4 weeks without treatment can help with patient satisfaction.

adjunct antipyretic

Treatment recommended for SOME patients in selected patient group

Primary options

» paracetamol: 500-1000 mg orally every 4-6 hours when required, maximum 4000 mg/day

» An antipyretic may be helpful for patient comfort if fever is present.

adjunct short-acting beta-agonist bronchodilator

Treatment recommended for SOME patients in selected patient group

Primary options

» salbutamol: 100-200 micrograms (1-2 puffs) inhaled every 4-6 hours when required; 2.5 mg nebulised every 4-6 hours when required

» Salbutamol can be used for patients with wheezing. However, this potential benefit is not well supported by the available data and must be weighed against the adverse effects associated with its use.[18] In the UK, the National Institute for Health and Care Excellence does not recommend an oral or inhaled bronchodilator unless the patient has an underlying airways disease (e.g., asthma).[19]

» Use is associated with reductions in cough frequency at 1 week and overall symptom improvement at 1 week.[32][33] Combining salbutamol with an antibiotic has showed no additional benefit over salbutamol alone,[32] although outcomes at >1 week have not been studied. The treatment benefits must be balanced by the adverse effects of nervousness.
Acute bronchitis

Management

Acute and tremor, which may be more disruptive to the patient than the underlying cough.

**adjunct antitussive**

Treatment recommended for SOME patients in selected patient group

**Primary options**

» dextromethorphan: 20 mg orally every 4 hours when required, or 30 mg every 6-8 hours when required; maximum 120 mg/day OR

» codeine phosphate: 15-30 mg orally every 6-8 hours when required, maximum 120 mg/day

» May be effective for acute management of severe cough. Antitussives are often combined with other agents such as guaifenesin (an expectorant) or antihistamines, but these are of unproven benefit in acute bronchitis. Codeine and dextromethorphan have potential for abuse and dependence.[20]

» Cough and cold medications that include opioids, such as codeine or hydrocodone, should only be used in adults aged 18 years and older as the risks (slowed or difficult breathing, misuse, abuse, addiction, overdose, and death) outweigh the benefits when used for cough in younger patients.[21]

**systemically unwell; high risk of complications**

plus consider immediate or delayed antibiotics

Treatment recommended for ALL patients in selected patient group

» Most major regulatory bodies recommend against the use of empirical antibiotic therapy in acute bronchitis. Local guidance should be consulted to aid treatment decisions, including antibiotic choice.

» The Centers for Disease Control and Prevention and the American College of Physicians recommend against routine antibiotic treatment in acute uncomplicated bronchitis in the absence of pneumonia.[3]

» In the UK, the National Institute for Health and Care Excellence (NICE) recommends antibiotics only in patients who are systemically unwell or at a higher risk of complications (i.e., people with a pre-existing comorbidity; young children who were born prematurely; patients aged ≥80 years with one or more of the following, or...
### Management

| Acute patients aged ≥65 years with two or more of the following: hospitalisation in the past year, current oral corticosteroid use, type 1 or 2 diabetes, or a history of congestive heart failure.[19] |

» NICE also recommends that C-reactive protein (CRP) be used to guide therapy if after clinical assessment a diagnosis of pneumonia has not been made. Antibiotics are not routinely recommended if CRP is <20 mg/L and symptoms are present for more than 24 hours. Delayed antibiotics are recommended if CRP is 20-100 mg/L, and immediate antibiotics are recommended if CRP is >100 mg/L.[13]

» Delayed prescription can be considered alongside advice on the natural history of the illness and symptomatic treatments.[19] One cohort study found that delayed prescribing may result in a reduced number of repeat consultations for worsening illness.[24] Other studies also support the use of delayed prescribing strategies, as they are associated with substantially reduced antibiotic use compared with immediate prescribing.[25] [26] One Cochrane review found that delayed antibiotics achieved lower rates of antibiotic use (31%) compared with immediate antibiotics (93%), with similar rates of patient satisfaction.[27]

» One Cochrane review of 17 trials (3936 participants) found that there is limited evidence to support the use of antibiotics in the treatment of acute bronchitis. Some patients may recover faster with antibiotic treatment; however, the difference (half a day over an 8- to 10-day period) was not considered significant. Antibiotics may have a beneficial effect in some patients (e.g., elderly, existing comorbidities); however, this should be balanced against potential adverse effects and contribution to the development of resistance.[28]
Ongoing cough >4 weeks

1st evaluate for other causes

- Evaluation for other causes of persistent cough should be considered.
- A careful history to look for occupational or environmental exposures can help indicate whether inhalants could be causing the cough.
- In patients with risk factors or other symptoms suspicious for gastro-oesophageal reflux disease, an empirical trial with an H2 antagonist or proton-pump inhibitor may be warranted.

adjunct short-acting beta-agonist bronchodilator

Treatment recommended for SOME patients in selected patient group

Primary options

- salbutamol inhaled: 100-200 micrograms (1-2 puffs) inhaled every 4-6 hours when required; 2.5 mg nebulised every 4-6 hours when required

- Patients whose cough persists for >4 weeks may benefit from a short-acting beta-agonist bronchodilator, although routine use of beta-agonists for chronic cough associated with acute bronchitis is generally not recommended unless the patient has an underlying airways disease.\[18\] [19]

- Salbutamol can be used for wheezing in patients with persistent symptoms. However, this potential benefit is not well supported by the available data and must be weighed against the adverse effects associated with its use.\[18\]

- Use is associated with reductions in cough frequency at 1 week and overall symptom improvement at 1 week.\[32\] [33]

- Combining salbutamol with an antibiotic has showed no additional benefit over salbutamol alone,\[32\] although outcomes at >1 week have not been studied.

- The treatment benefits must be balanced by the adverse effects of nervousness and tremor, which may be more disruptive to the patient than the underlying cough.

systemically unwell; high risk of complications adjunct consider immediate or delayed antibiotics

Treatment recommended for SOME patients in selected patient group
### Management

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Acute bronchitis

Management

Ongoing

Some patients may recover faster with antibiotic treatment; however, the difference (half a day over an 8- to 10-day period) was not considered significant. Antibiotics may have a beneficial effect in some patients (e.g., elderly, existing comorbidities); however, this should be balanced against potential adverse effects and contribution to the development of resistance.[28]
Emerging

Alternative/herbal medicines

Several natural products have been studied for the treatment of acute bronchitis. Based on a small number of studies conducted in Eastern Europe, *Pelargonium sidoides* (also known as EPs 7630) has been shown to reduce acute bronchitis symptom duration and intensity.[34] [35] [36] [37] [38] A single small placebo-controlled randomised trial in China indicated that use of Gankeshuangqing may decrease acute bronchitis (called wind-heat syndrome) symptoms, with no adverse events reported.[39] Further studies suggest that ivy extract may reduce coughing fits and overall cough in patients with acute bronchitis.[40] [41] Cineole (eucalyptol), the main component of eucalyptus oil, has been observed to increase mucociliary beat rates and has bronchodilating effects. One randomised placebo-controlled trial found that it improved bronchitis symptoms scores, owing to a decrease in cough.[42] Similar results were obtained in another randomised controlled trial of a preparation containing cineole, in which patients had a reduction in several cough-related symptoms, including night cough, coughing fits, and overall impairment.[43] More trials are needed to assess the overall effectiveness and safety of these products.

Primary prevention

Counselling patients who smoke that they should discontinue cigarette use is the most effective approach to preventing acute bronchitis. In addition, there is some evidence that the use of vitamin A and vitamin D could reduce the risk of acute bronchitis and other respiratory infections.[9] [10] [11]

Patient discussions

Patient education about acute bronchitis being a self-limited illness that usually resolves in up to 4 weeks without treatment can help with patient satisfaction.

For patients with wheezing who might benefit from the use of salbutamol, it is important that they receive instructions on the appropriate use of a metered-dose inhaler (MDI). When used properly, short-acting bronchodilators delivered by MDI are just as effective as when administered with a nebuliser. For optimal use of an MDI, patients should hold the inhaler slightly away from their mouth so that the medication does not coat their tongue and palate. The addition of a spacer can help those for whom appropriate use may be difficult, such as frail adults or patients with tremors.

An episode of acute bronchitis is also an opportunity to discuss smoking cessation with patients who use tobacco. Even though direct evidence for an association between cigarette use and acute bronchitis is lacking, this is still an opportunity to intervene in smokers.
Acute bronchitis

Monitoring

Long-term monitoring of patients with acute bronchitis is rarely necessary. Symptoms resolve in most patients within a few weeks. For patients with post-bronchitis syndrome, further evaluation to rule out other causes of chronic cough such as asthma, postnasal drip, oesophageal reflux, ACE-inhibitor use, or infections (e.g., tuberculosis) may be necessary.

Complications

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<tr>
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<th>Timeframe</th>
<th>Likelihood</th>
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<tr>
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About 25% of patients will cough for >4 weeks, and a subset of these will cough for up to 6 months (post-bronchitis syndrome). Treatment for persistent cough should be with salbutamol or similar short-acting bronchodilators as needed, until the cough resolves.

Prognosis

Duration of illness

Nearly all patients with acute bronchitis recover within 6 weeks of their initial symptoms. Patients generally return to full function with no residual symptoms following acute bronchitis.

Recurrence

Recurrence of acute bronchitis is common in subsequent viral infection seasons, especially in smokers.

Counselling opportunities

Because recurrent infections are more common in smokers, clinicians can use the acute bronchitis episode as a stimulus to attempt to motivate the patient to stop using cigarettes.
## Diagnostic guidelines

### Europe

**Cough (acute): antimicrobial prescribing** (https://www.nice.org.uk/guidance/NG120)

*Published by:* National Institute for Health and Care Excellence  
*Last published:* 2019

### North America

**ACR appropriateness criteria: hemoptysis** (http://www.acr.org/Quality-Safety/Appropriateness-Criteria)

*Published by:* American College of Radiology  
*Last published:* 2019

**Classification of cough as a symptom in adults and management algorithms** (http://www.chestnet.org/Publications/CHEST-Publications/Guidelines-Consensus-Statements)

*Published by:* American College of Chest Physicians  
*Last published:* 2018

**Chronic cough due to acute bronchitis: ACCP evidence-based clinical practice guidelines** (http://www.chestnet.org/Publications/CHEST-Publications/Guidelines-Consensus-Statements)

*Published by:* American College of Chest Physicians  
*Last published:* 2006

## Treatment guidelines

### Europe

**Cough (acute): antimicrobial prescribing** (https://www.nice.org.uk/guidance/NG120)

*Published by:* National Institute for Health and Care Excellence  
*Last published:* 2019
North America

Management of children with chronic wet cough and protracted bacterial bronchitis (http://www.chestnet.org/Publications/CHEST-Publications/Guidelines-Consensus-Statements)

Published by: American College of Chest Physicians

Last published: 2017

Appropriate antibiotic use for acute respiratory tract infection in adults: advice for high-value care (https://www.acponline.org/clinical-information/guidelines)

Published by: American College of Physicians; Centers for Disease Control and Prevention

Last published: 2016

Chronic cough due to acute bronchitis: ACCP evidence-based clinical practice guidelines (http://www.chestnet.org/Publications/CHEST-Publications/Guidelines-Consensus-Statements)

Published by: American College of Chest Physicians

Last published: 2006
Online resources

Key articles


References


Acute bronchitis

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Interpretation of numbers

Regardless of the language in which the content is displayed, numerals are displayed according to the original English-language numerical separator standard. For example 4 digit numbers shall not include a comma nor a decimal point; numbers of 5 or more digits shall include commas; and numbers stated to be less than 1 shall be depicted using decimal points. See Figure 1 below for an explanatory table.

BMJ accepts no responsibility for misinterpretation of numbers which comply with this stated numerical separator standard.

This approach is in line with the guidance of the International Bureau of Weights and Measures Service.

Figure 1 – BMJ Best Practice Numeral Style
Acute bronchitis

5-digit numerals: 10,000
4-digit numerals: 1000
numerals < 1: 0.25

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Contact us
+ 44 (0) 207 111 1105
support@bmj.com

BMJ
BMA House
Tavistock Square
London
WC1H 9JR
UK
Contributors:

// Authors:

William J. Hueston, MD
Senior Associate Dean for Academic Affairs
Professor of Family and Community Medicine, Medical College of Wisconsin, Milwaukee, WI
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// Peer Reviewers:

David L. Hahn, MD
Clinical Professor
School of Medicine and Public Health, University of Wisconsin-Madison, WI
DISCLOSURES: DLH declares that he has no competing interests.

Cristine Radojicic, MD
Staff Physician
Cleveland Clinic, Cleveland, OH
DISCLOSURES: CR declares that she has no competing interests.

Philip W. Ind, BA (Cantab), MB BChir, MA (Cantab), FRCP
Consultant Physician
Honorary Senior Lecturer, Imperial College Healthcare Trust, Hammersmith Hospital, London, UK
DISCLOSURES: PWI declares that he has no competing interests.