

## Protracted Bacterial Bronchitis (PBB) in Children

Protracted bacterial bronchitis is a common cause of chronic wet cough in children. With PBB, a bacterial infection in the airways (bronchi) causes an increase of mucus and continual cough. A chronic cough is one that lasts more than 4 weeks. It can cause missed days of school, reduced sleep, and recurrent need for medications. Cough is common with acute respiratory infections caused by viruses. One should suspect PBB if the cough lasts more than 4 weeks.



### What is protracted bacterial bronchitis?

There are many causes of cough in children. Chronic cough, or cough lasting more than 4 weeks, can be burdensome for patients and their families. Protracted bacterial bronchitis causes daily wet cough. PBB is a chronic bacterial infection of the airways (called bronchi).

Protracted bacterial bronchitis is also known as:

- Persistent bacterial bronchitis
- Chronic suppurative lung disease
- Persistent endobronchial infection
- Chronic bronchitis of childhood

### Why does PBB occur?

There are several theories as to why children get bacterial bronchitis. One thought is that frequent viral illnesses, commonly seen in younger kids, cause airway injury and inflammation making it easier for bacteria to grow and cause infection. We do know that children who attend daycare (and typically get more viral infections) are at higher risk of PBB. We also know that children who have problems with the cartilage of the trachea (windpipe), known as tracheomalacia, are at higher risk. Tracheomalacia results in the walls of the trachea being floppy, and can lead to trapping of mucus in the airways. Also see ATS Patient Information Series fact sheet on Tracheomalacia.

### How is PBB different from other causes of cough?

The cough in PBB usually occurs at various times of the day (and at night), and sounds wet with mucus. Sometimes a child will not spit out or cough up mucus, but the cough sounds wet because of excess mucus in the airways. Wheezing (a whistling sound when breathing out) can

occur in PBB, similar to what is heard with asthma. It might be worth adding a statement like, "Coughing and wheezing from PBB, however, does not usually respond to therapies commonly used for asthma, like inhaled bronchodilators." Children with PBB related cough do respond to treatment with antibiotics, in fact, over 60% of PBB does resolve after a two week course of "broad spectrum" antibiotics.

PBB is often misdiagnosed as asthma, leading to overuse of corticosteroids, which do not help. People with asthma typically have a dry sounding cough and shortness of breath, and do not necessarily cough every day. The healthcare provider may suspect PBB in a child with asthma if he/she has a chronic wet cough and does not respond well to albuterol and inhaled steroids.

The cough from PBB can sometimes be difficult to distinguish from other causes. For example, some upper respiratory tract illnesses (URIs, such as sinus infections) can lead to prolonged cough as well. However, the cough from a URI should not last more than 4 weeks unless there is a complication. There are other chronic lung diseases such as cystic fibrosis that may give a child a chronic wet cough. These often start early in life and the cough may persist or require other treatments. Another problem, seen more commonly in children 2-4 years of age, is cough related to accidental inhalation or aspiration of a foreign body (such as toys or food). Many times with foreign body aspiration, a child will have a choking episode associated with the aspiration, but sometimes no choking event can be recalled. Talk to your healthcare provider about your child's cough, including anything specific you've noticed about the cough itself, what helps, what does not help. This will help you and your provider develop a treatment plan that works best for your child.

### How is PBB diagnosed?

Protracted bacterial bronchitis is largely a clinical diagnosis, meaning it is based on a good history and physical with careful questioning by your healthcare provider to rule out other causes of cough. The current criteria for diagnosing PBB are as follows:

- Wet cough lasting at least 4 weeks
- Absence of other findings to identify another cause of the cough
- Resolution of the cough with at least 2 weeks of an antibiotic

A chest x-ray may be done to exclude other causes, but often does not show any specific signs with PBB.

If the child is old enough to do lung function testing, a pattern of airway obstruction may be seen.

Your healthcare provider may obtain a sputum (mucus) sample for culture in order to recover the bacteria that cause PBB and prescribe more specific antibiotic. A flexible bronchoscopy may be done to look at the airways and get mucus for cultures. Also see ATS Patient Information Series fact sheets on *Flexible Bronchoscopy* and *Lung Function Testing in Children*.

### Can protracted bacterial bronchitis recur?

Yes, in fact, around 40% of all children who have PBB will have one or more episodes again in the future. Sometimes, the wet cough can recur more than once. Many times, your healthcare provider will prescribe another course of antibiotics for a recurrence. A flexible bronchoscopy could also be performed if the chronic wet cough does not resolve after repeated antibiotic treatment. In this case a culture of respiratory secretions could be done in order to determine the exact bacteria that are causing PBB.

### What complications can occur with this illness?

Repeated episodes of PBB can occur, which sometimes can lead to more difficulty in treatment, and the need to change antibiotics. Repeated episodes also increase the risk of damage to the lungs.

Bacteria in the airways causing infection can eventually lead to permanent damage to those airways, called bronchiectasis. Bronchiectasis can lead to trapping of mucus and infection, resulting in a vicious cycle (infection-obstruction-airway damage) that is more difficult to treat. For more information, see ATS Patient Information fact sheet on Bronchiectasis.

### How do we treat PBB?

A course of antibiotics for PBB is suggested when the cough persists and no other cause is identified. The goal of the therapy is to get rid of the bacteria, so the symptoms do not return.

Often a person needs to take an extended course of antibiotics to treat the infection, usually 2-6 weeks in duration. The antibiotics are used to treat the most commonly seen bacteria. If a sputum culture is available, the choice will be made based on what bacteria are found. Choices of antibiotics commonly used to treat PBB include: amoxicillin-clavulanic acid, trimethoprim-sulfamethoxazole, and cefdinir.

Rarely, your doctor may consider admission to the hospital for bronchoscopy and IV antibiotics, if the cough persists after multiple courses of oral antibiotics.

Your healthcare provider may advise doing some form of airway clearance (chest physiotherapy) to help loosen the mucus. This can include chest clapping and/or use of a device that helps loosen and move mucus up to cough out. In addition, nebulized treatments, such as hypertonic saline, may be used to thin the mucus. A machine is used to make a mist that the child inhales using a mask or mouthpiece.

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## Rx Action Steps

- ✓ If your child has a wet cough lasting more than 4 weeks, ask your healthcare provider if he or she needs further testing or a course of antibiotics.
- ✓ Make a list of questions and what you have noticed about the cough. Not all causes of cough have the same treatment plan.
- ✓ Make sure your child takes all doses of medicines prescribed by your healthcare provider. If you have concerns about a medicine, call your healthcare provider right away.
- ✓ Ensure good nutrition, regular physical activity, and avoid exposure to tobacco smoke to help keep your child healthy.

**Healthcare Provider's Contact Number:**

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## Resources

### American Thoracic Society

- [www.thoracic.org/patients/](http://www.thoracic.org/patients/)
  - Flexible bronchoscopy
  - Lung Function Testing in Children

### American Academy of Allergy, Asthma, and Immunology (AAAAI)

- <https://www.aaaai.org/conditions-and-treatments/library/allergy-library/cough-in-children>

### American Academy of Pediatrics

- <https://www.healthychildren.org/English/health-issues/conditions/chest-lungs/Pages/Why-Does-My-Child-Have-a-Chronic-Cough.aspx>

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