

## Pertussis (Whooping Cough) — Definition and Treatment

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**Pertussis is a bacterial infection caused by *Bordetella pertussis*. Patients present with paroxysmal whooping cough, that is persistent for two weeks or more. Polymerase chain reaction for detection of the organism's DNA or culture and sensitivity testing is indicated for the confirmation of the diagnosis. Serologic testing is also helpful, especially in patients who present late to the health-care provider but its implementation in clinical practice is still under development. Antibiotic therapy, with azithromycin, is the main treatment for pertussis.**



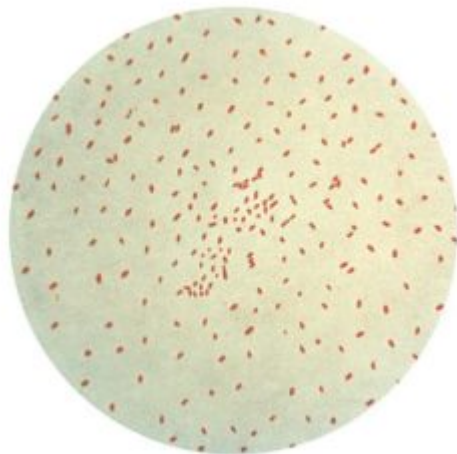
### Definition of Pertussis

The Centers for Disease Control and Prevention (CDC) define pertussis based on clinical criteria, laboratory criteria, and case probability. The clinical definition of a clinical case of pertussis is a **paroxysmal cough** that lasts for **two weeks or more** and associated with **vomiting** or an **inspiratory whoop**.

The diagnosis is said to be confirmed if the patient who has this characteristic cough also has a positive polymerase chain reaction test result for ***Bordetella pertussis*** or a positive culture for the organism. **Probable pertussis** is defined as the presentation of a classical picture of whooping paroxysmal cough without laboratory confirmation of the diagnosis.

# Epidemiology of Pertussis

Pertussis is more common in the **developing world** with a case fatality rate of 3% in infants in developing countries. Before the 1940s, pertussis was a common disease in the United States with an estimated 200,000 cases per year. After the introduction of the **whole-cell pertussis vaccination**, the condition was put under control. Pertussis is still reported in the United States with the last estimate of 48,277 new cases in 2012.



[Image:](#) "Gram stain of the bacteria Bordetella pertussis." by CDC Public Health Image Library - This media comes from the Centers for Disease Control and Prevention's Public Health Image Library (PHIL), with identification number #2121. License: Public Domain

While most cases of pertussis in the United States are reported in children older than 11 years, deaths are more common in young infants. The condition is most common among **adolescents**.

Pertussis can occur in outbreaks that usually originate from schools and other crowded places with children. Pertussis is common and more severe in infants who haven't completed their vaccination schedule. Additionally, many cases that present to the clinical practice also report a similar cough in the mother or siblings, hence the condition is considered **highly contagious**.

## Prevention of Pertussis

**Vaccination** against pertussis has helped decrease the number of cases per year and the severity of the condition is lower. The current vaccination for pertussis is an **acellular vaccine**. Pertussis acellular vaccine is usually administered with diphtheria and tetanus toxoids.

**Diphtheria-tetanus toxoids and acellular pertussis (DTaP)** should be given to all healthy infants at the age of 2, 4 and 6 months. DTaP should also be administered at the age of 15-18 months and once more at the age of 4-6 years.

Adolescents aged between 11 and 18 years should receive **tetanus toxoid, reduced diphtheria toxoid and acellular pertussis vaccine (Tdap)**. Tdap should be repeated again in adulthood. **Pregnant women** should also receive Tdap in their third trimester. Finally, health-care providers who can transmit the disease or get infected should also

receive a booster dose of Tdap.

## Pathophysiology of Pertussis

Pertussis is caused by the bacterium **Bordetella pertussis**. This organism has a **long incubation period**, one week up to 10 days. Most patients report having made contact with someone who had a similar cough one to two weeks before, in contrast to viral causes of a cough where contact is usually reported a few days before the onset of symptoms.

## Clinical Presentation of Pertussis

Patients who are infected with *Bordetella pertussis* usually have the onset of the symptoms starting one to two weeks after contact with someone who had the condition. The disease usually has **three different clinical stages** where the symptoms might be different and the test of choice to confirm the diagnosis is also different.

Patients in the **catarrhal stage** are usually in the first one to two weeks of their illness. These patients complain of fatigue, runny nose, and a mild **cough**. Fever might be present in this acute stage of the disease but its absence does not exclude the diagnosis. Perhaps the most important difference in this presentation from that caused by **viral upper respiratory tract infections** is the longer incubation period for pertussis compared to viral etiologies.

Two weeks up to one month after the onset of pertussis, patients are considered to be in the **paroxysmal phase**. During this phase, patients develop the more characteristic cough that is persistent for more than two weeks, paroxysmal in nature and associated with a **whoop**. A cough during this stage is more common during night hours.

Patients can then develop a less severe but persistent cough up to 3 months after the onset of the illness. Once the patient's symptoms become less severe and have been persistent for more than one month, the patient is considered to be in the **convalescent stage**.

### Catarrhal stage

- Nonspecific presentation
- URI symptoms

### Paroxysmal stage

- Severe coughing spells
- "Whoop" in older children
- Apnea in infants

### Convalescent stage

- Spread of organism

## Diagnostic Workup for Pertussis

Patients presenting with the classical clinical picture of pertussis, usually in the paroxysmal stage, should be evaluated for possible pertussis. Confirmation of the diagnosis can be done based on **epidemiological questions** related to the patient's



**Antitussive therapy** is not very effective in the treatment of the cough in pertussis and according to a recent Cochrane review, there are no evidence-based therapies for whooping cough in this group of patients. This is very unfortunate because patients usually have a severe cough that can really affect their quality of life.

Patients who have very severe symptoms might benefit from **corticosteroids** administration or **exchange transfusion therapy**. The fact that steroids and exchange transfusion therapy have some efficacy in severe cases indicates a possible **immunologic role** in the semiology of pertussis.

## References

[Whooping cough in 2014 and beyond: an update and review](#) via nih.gov

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