



Centers for Disease Control and Prevention

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## [Pertussis \(Whooping Cough\)](#)

**<http://www.cdc.gov/pertussis/index.html>**

Pertussis, also known as whooping cough, is a highly contagious respiratory disease. It is caused by the bacterium *Bordetella pertussis*.

Pertussis is known for uncontrollable, violent coughing which often makes it hard to breathe. After fits of many coughs, someone with pertussis often needs to take deep breathes which result in a "whooping" sound. Pertussis most commonly affects infants and young children and can be fatal, especially in babies less than 1 year of age.

The best way to protect against pertussis is [immunization](#).

## Causes and Transmission

<http://www.cdc.gov/pertussis/about/causes-transmission.html>

### Causes

Pertussis, a respiratory illness commonly known as whooping cough, is a very contagious disease caused by a type of bacteria called *Bordetella pertussis*. These bacteria attach to the cilia (tiny, hair-like extensions) that line part of the upper respiratory system. The bacteria release toxins, which damage the cilia and cause inflammation (swelling).

### Transmission

Pertussis is a very contagious disease only found in humans and is spread from person to person. People with pertussis usually spread the disease by coughing or sneezing while in close contact with others, who then breathe in the pertussis bacteria. Many infants who get pertussis are infected by older siblings, parents or caregivers who might not even know they have the disease (Bisgard, 2004 & Wendelboe, 2007). [Symptoms](#) of pertussis usually develop within 7–10 days after being exposed, but sometimes not for as long as 6 weeks.

While pertussis vaccines are the most effective tool we have to prevent this disease, no vaccine is 100% effective. If pertussis is circulating in the community, there is a chance that a fully vaccinated person, of any age, can catch this very contagious disease. If you have been vaccinated, the infection is usually less severe. If you or your child develops a cold that includes a severe cough or a cough that lasts for a long time, it may be pertussis. The best way to know is to contact your doctor.

# Signs and Symptoms

<http://www.cdc.gov/pertussis/about/signs-symptoms.html>

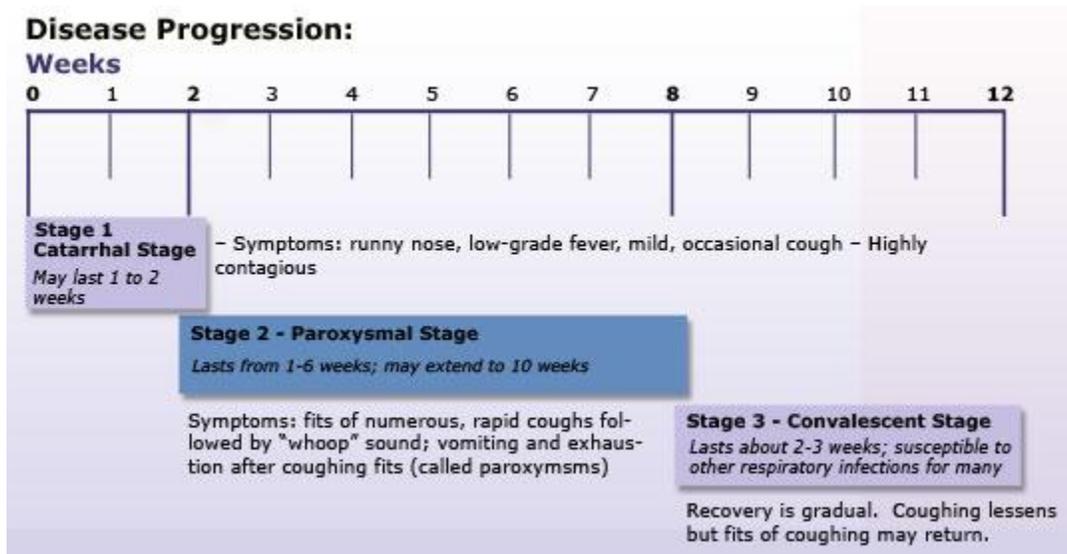
Pertussis (whooping cough) can cause serious illness in infants, children and adults. The disease usually starts with cold-like symptoms and maybe a mild cough or fever. After 1 to 2 weeks, severe coughing can begin. Unlike the common cold, pertussis can become a series of coughing fits that continues for weeks.

In infants, the cough can be minimal or not even there. Infants may have a symptom known as "apnea." Apnea is a pause in the child's breathing pattern. Pertussis is most dangerous for babies. About half of infants younger than 1 year of age who get the disease are hospitalized. Learn more about [pertussis complications](#).

Pertussis can cause violent and rapid coughing, over and over, until the air is gone from the lungs and you are forced to inhale with a loud "whooping" sound. This extreme coughing can cause you to throw up and be very tired. The "whoop" is often not there and the infection is generally milder (less severe) in teens and adults, especially those who have been vaccinated.

Early symptoms can last for 1 to 2 weeks and usually include:

- Runny nose
- Low-grade fever (generally minimal throughout the course of the disease)
- Mild, occasional cough
- Apnea — a pause in breathing (in infants)



Because pertussis in its early stages appears to be nothing more than the common cold, it is often not suspected or diagnosed until the more severe symptoms appear. Infected people are most contagious up to about 2 weeks after the cough begins. Antibiotics may shorten the amount of time someone is contagious.

## Would You Know Pertussis?

### [Hear how the cough may sound](#)

It is important to know that not everyone with pertussis coughs or "whoops".

As the disease progresses, the traditional symptoms of pertussis appear and include:

- Paroxysms (fits) of many, rapid coughs followed by a high-pitched "whoop"
- Vomiting (throwing up)
- Exhaustion (very tired) after coughing fits

The coughing fits can go on for up to 10 weeks or more. In China, pertussis is known as the "100 day cough."

Although you are often exhausted after a coughing fit, you usually appear fairly well in-between. Coughing fits generally become more common and severe as the illness continues, and can occur more often at night. The illness can be milder (less severe) and the typical "whoop" absent in children, teens, and adults who have been vaccinated with a pertussis vaccine.

Recovery from pertussis can happen slowly. The cough becomes less severe and less common. However, coughing fits can return with other respiratory infections for many months after pertussis started.

## Diagnosis and Treatment

<http://www.cdc.gov/pertussis/about/diagnosis-treatment.html>

### Diagnosis

Pertussis (whooping cough) can be diagnosed by taking into consideration if you have been exposed to pertussis and by doing a:

- History of typical [signs & symptoms](#)
- Physical examination
- [Laboratory test](#) which involves taking a sample of secretions (with a swab or syringe filled with saline) from the back of the throat through the nose — see Figure 1 and [video demonstrations](#).
- Blood test

**Figure 1:** Proper technique for obtaining a nasopharyngeal specimen for isolation of *Bordetella pertussis*

Image: Manual for the Surveillance of Vaccine-Preventable Diseases, 4th ed, 2008

### Treatment

Pertussis is generally treated with antibiotics and early treatment is very important. Treatment may make your infection less severe if it is started early, before coughing fits begin. Treatment can also help prevent spreading the disease to close contacts (people who have spent a lot of time around the infected person). Treatment after three weeks of illness is unlikely to help because the bacteria are gone from your body, even though you usually will still have symptoms. This is because the bacteria have already done damage to your body.

There are several antibiotics available to treat pertussis. If you or your child is diagnosed with pertussis, your doctor will explain how to treat the infection. [Learn more about the antimicrobial treatment recommended by CDC for treatment of pertussis.](#)

Pertussis can sometimes be very serious, requiring treatment in the hospital. Infants are at greatest risk for severe [complications](#) from pertussis. View [photos](#) of an infant being treated for pertussis in the hospital.

## If Your Child is Treated for Pertussis at Home

Do not give cough medications unless instructed by your doctor. **Giving cough medicine probably will not help** and is often [not recommended for kids younger than 4 years old](#).

Manage pertussis and reduce the risk of spreading it to others by:

- Following the schedule for giving antibiotics exactly as your doctor prescribed.
- Keeping your home free from irritants - as much as possible - that can trigger coughing, such as smoke, dust, and chemical fumes.
- Using a clean, cool mist vaporizer to help loosen secretions and soothe the cough.
- Practicing good handwashing.
- Drinking plenty of fluids, including water, juices, and soups, and eating fruits to prevent dehydration (lack of fluids). **Report any signs of dehydration to your doctor immediately.** These include dry, sticky mouth, sleepiness or tiredness, thirst, decreased urination or fewer wet diapers, few or no tears when crying, muscle weakness, headache, dizziness or lightheadedness.
- Eating small, frequent meals to help prevent vomiting if occurring.

## If Your Child is Treated for Pertussis in the Hospital

Your child may need help keeping breathing passages clear, which may require suctioning (drawing out) of thick respiratory secretions. Breathing is monitored and oxygen will be given, if needed. Intravenous (IV, through the vein) fluids might be required if your child shows signs of dehydration or has difficulty eating. Precautions, like practicing good hand hygiene and keeping surfaces clean, should be taken.

# Complications

<http://www.cdc.gov/pertussis/about/complications.html>

## Infants and Children

Pertussis (whooping cough) can cause serious and sometimes life-threatening complications in infants and young children, especially those who are not fully vaccinated.

In infants younger than 1 year of age who get pertussis, about half are hospitalized. The younger the infant, the more likely treatment in the hospital will be needed. Of those infants who are hospitalized with pertussis about:

- 1 in 4 (23%) get pneumonia (lung infection)
- 1 or 2 in 100 (1.6%) will have convulsions (violent, uncontrolled shaking)
- Two thirds (67%) will have apnea (slowed or stopped breathing)
- 1 in 300 (0.4%) will have encephalopathy (disease of the brain)
- 1 or 2 in 100 (1.6%) will die

## Teens and Adults

Teens and adults can also get complications from pertussis. They are usually less serious in this older age group, especially in those who have been vaccinated with a pertussis vaccine. Complications in teens and adults are often caused by the cough itself. For example, you may pass out or fracture a rib during violent coughing fits.

In one study, less than 5% of teens and adults with pertussis were hospitalized. Pneumonia (lung infection) was diagnosed in 2% of those patients. The most common complications in another study of adults with pertussis were:

- Weight loss (33%)
- Loss of bladder control (28%)
- Passing out (6%)
- Rib fractures from severe coughing (4%)

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## Resources for Adults

- [Vaccine Information Statement \(Td/Tdap\)](#)  (66 KB, 2 pages)
- [Adolescent and Adult Vaccine Quiz](#)

# FREQUENTLY ASKED QUESTIONS

## *Q: Can pertussis be prevented with vaccines?*

**A:** Yes. Pertussis, or whooping cough, can be prevented with vaccines. Before pertussis vaccines became widely available in the 1940s, about 200,000 children got sick with it each year in the US and about 9,000 died as a result of the infection. Now we see about 10,000–40,000 cases reported each year and unfortunately about 10–20 deaths.

Pertussis vaccines are recommended for people of all ages. Infants and children should get 5 doses of DTaP for maximum protection. A dose is given at 2, 4 and 6 months, at 15 through 18 months, and again at 4 through 6 years. A booster dose of Tdap is given to preteens at 11 or 12 years of age.

Any adolescents or adults who didn't get Tdap as a preteen should get one dose. Getting Tdap is especially important for pregnant women. It's also important that those who care for infants are up-to-date with pertussis vaccination. You can get the Tdap booster dose no matter when you got your last regular tetanus booster shot (Td). Also, you need to get Tdap even if you were vaccinated as a child or have been sick with pertussis in the past.

Whooping cough can be deadly for babies. Learn how to protect them through vaccination. [See this infographic.](#)

## *Q: Why is the focus on protecting infants from pertussis?*

**A:** Infants are at greatest risk for getting pertussis and then having severe complications from it, including death. About half of infants younger than 1 year old who get pertussis are hospitalized, and 1 or 2 in 100 hospitalized infants die.

There are two strategies to protect infants until they're old enough to receive vaccines and build their immunity against this disease.

First, [vaccinate pregnant women with Tdap during each pregnancy](#), preferably at 27 through 36 weeks. By getting Tdap during pregnancy, mothers build antibodies that are transferred to the newborn, likely providing protection against pertussis in early life, before the baby can start getting DTaP vaccines at 2 months old. Tdap also helps protect mothers during delivery, making them less likely to transmit pertussis to their infants.

Second, [make sure everyone around the infant is immunized](#). This includes parents, siblings, grandparents (including those 65 years and older), other family members, babysitters, etc. They should be up-to-date with the age-appropriate vaccine (DTaP or Tdap) at least two weeks before coming into close contact with the infant. Unless pregnant, only one dose of Tdap is recommended in a lifetime.

These two strategies should reduce infection in infants, since health data have shown that, when the source of pertussis could be identified, mothers were responsible for 30-40% of infant infections and all household members were responsible for about 80% of infections.

It's also critical that healthcare professionals are up-to-date with a one-time Tdap booster dose, especially those who care for infants.

Learn more about [infant complications](#).

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***Q: Do pertussis vaccines protect for a lifetime? If I've had whooping cough, do I still need a pertussis booster?***

**A:** Getting sick with pertussis or getting pertussis vaccines doesn't provide lifelong protection, which means you can still get pertussis and pass it onto infants.

Pertussis vaccines are effective, but not perfect. They typically offer high levels of protection within the first 2 years of getting vaccinated, but then protection decreases over time. This is known as waning immunity. Similarly, natural infection may also only protect you for a few years.

In general, DTaP vaccines are 80-90% effective. Among kids who get all 5 doses of DTaP on schedule, effectiveness is very high within the year following the 5th dose – at least 9 out of 10 kids are fully protected. There is a modest decrease in effectiveness in each following year. About 7 out of 10 kids are fully protected 5 years after getting their last dose of DTaP and the other 3 out of 10 kids are partially protected – protecting against serious disease.

Our current estimate is that Tdap vaccination protects 7 out of 10 people who receive it. Since Tdap vaccines were only licensed in 2005, we don't yet have results on long-term vaccine protection. We're still working to understand how that protection declines over time or might differ based on which vaccine was received during early childhood (i.e., DTaP or DTP). CDC will be conducting an evaluation in collaboration with health departments in Washington and California to better understand how long Tdap vaccines protect from pertussis. The data from these evaluations will help guide discussions on how best to use vaccines to control pertussis.

Keeping up-to-date with recommended pertussis vaccines is the best way to protect you and your loved ones.

Learn more about [protection from vaccines and infection](#).

***Q: Do pertussis vaccines protect from severe disease?***

**A:** If you've been vaccinated and get pertussis, you are less likely to have a severe infection. Typically, your cough won't last as many days and coughing fits, whooping, and vomiting after coughing fits won't occur as often. When vaccinated children get pertussis, fewer have apnea (life-threatening pauses in breathing), cyanosis (blue/purplish skin coloration due to lack of oxygen), and vomiting.

Learn more about [pertussis symptoms](#).

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***Q: Why are reported cases of pertussis increasing?***

**A:** Since the early 1980s, there has been an overall trend of an increase in reported pertussis cases. Pertussis is naturally cyclic in nature, with peaks in disease every 3-5 years. But for the past 20-30 years, we've seen the peaks getting higher and overall case counts going up. There are several reasons that help explain why we're seeing more cases as of late. These include: increased awareness, improved diagnostic tests, better reporting, more circulation of the bacteria, and waning immunity.

When it comes to waning immunity, it seems that the acellular pertussis vaccine (DTaP) we use now may not protect for as long as the whole cell vaccine (DTP) we used to use. Throughout the 1990s, the US switched from using DTP to using DTaP for infants and children. Whole cell vaccines are associated with higher rates of minor and temporary side effects such as fever and pain and swelling at the injection site. Rare but serious

neurologic adverse reactions including chronic neurological problems rarely occurred among children who had recently received whole cell vaccines. While studies have had inconsistent results that the vaccine could cause chronic neurological problems, public concern in the US and other countries led to a concerted effort to develop a vaccine with improved safety. Due to these concerns, along with the availability of a safe and effective acellular vaccine, the US switched to acellular pertussis vaccines.

Learn more about [DTaP waning immunity](#)  [140 KB, 1 page] and [pertussis outbreaks](#).

***Q: I've heard about parents refusing to get their children vaccinated and travelers to the U.S. spreading disease; are they to blame for pertussis outbreaks?***

**A:** Even though children who haven't received DTaP vaccines are at least 8 times more likely to get pertussis than children who received all 5 recommended doses of DTaP, they are not the driving force behind the large scale outbreaks or epidemics. However, their parents are putting them at greater risk of getting a serious pertussis infection and then possibly spreading it to other family or community members.

We often see people blaming pertussis outbreaks on people coming to the US from other countries. This is not the case. Pertussis was never eliminated from the US like measles or polio, so there's always the chance for it to get into a community. Plus, every country vaccinates against pertussis.

Learn more about [pertussis in other countries](#).

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***Q: Are most coughs pertussis and does everyone with pertussis "whoop"?***

**A:** There are a lot of causes behind a person's cough and not every cough is pertussis. In general, pertussis starts off with cold-like symptoms and maybe a mild cough or fever. But after 1 to 2 weeks, severe coughing can begin. Unlike the common cold, pertussis can become a series of coughing fits that continues for weeks. The best way to know if you have pertussis is to see your doctor, who can make a diagnosis and prescribe antibiotics if needed.

The name "whooping cough" comes from the sound people make gasping for air after a pertussis coughing fit. However, not everyone with pertussis will cough and many who cough will not "whoop."

Teens and adults, especially those who haven't been vaccinated, may have a prolonged cough that keeps them up at night. Those who do get the coughing fits say it's the worst cough of their lives. And the cough may last for weeks or months, causing major disruptions to daily life and complications like broken ribs and ruptured blood vessels.

Infants may not cough at all. Instead, they may have life-threatening pauses in breathing or struggle to breathe. Any time someone is struggling to breathe, get them to a doctor right away.

Learn more about [pertussis symptoms](#).

***Q: Are pertussis bacteria changing and causing an increase in pertussis cases?***

**A:** CDC is evaluating potential causes of increasing rates of pertussis, including changes in disease-causing bacteria types ("strains"). Unlike a foodborne illness where one strain causes an outbreak, multiple types or strains of pertussis bacteria can be found causing disease at any given time, including during outbreaks. There is a lot of diversity in strains causing pertussis in the US. While strains have changed over time, strain changes do not seem to be the cause of the increase in pertussis we've been seeing. And there's no direct evidence that strain changes have reduced the effectiveness of the vaccines. It's more likely that waning immunity is the driving force behind the increase in cases.

Learn more about CDC's [Pertussis and Diphtheria Laboratory](#).

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***Q: How contagious is pertussis?***

**A:** Pertussis spreads easily from person to person through coughing and sneezing. A person with pertussis can infect up to 12 to 15 other people. That's why being up-to-date with pertussis vaccines and practicing good [cough etiquette](#) are so important.

Many infants who get pertussis are infected by older siblings, parents or caregivers who might not know they have the disease. If pertussis is circulating in the community, there's a chance that even a fully vaccinated person of any age can catch this very contagious disease. But if you've been vaccinated, your infection is usually less severe.

If you or your child develops a cold that includes a severe cough or a cough that lasts a long time, it may be pertussis. The best way to know is to contact your doctor.

Learn more about [pertussis transmission](#).

***Q: Doesn't herd immunity protect most people?***

**A:** Herd immunity, or community immunity, is a situation in which, through vaccination or prior illness, a sufficient proportion of a population is immune to an infectious disease, making its spread from person to person unlikely. Even individuals not vaccinated (such as newborns and those with chronic illnesses) are typically protected because the disease has little opportunity to spread within their community. Since pertussis spreads so easily and vaccine protection decreases over time, we can't rely on herd immunity to protect everyone.

Vaccines are the most effective tool we have to provide protection against pertussis. Adult vaccination is an important part of community protection. However, fewer than 13% of adults have gotten their Tdap booster dose, so we can't yet measure how well herd immunity could work for pertussis. So it's even more important that everyone get their recommended pertussis vaccines to protect themselves.

Learn more about [vaccine coverage](#).