
Pertussis: Questions and Answers

Information about the disease and vaccines

What causes pertussis?

Pertussis is caused by a bacterium, *Bordetella pertussis*.

How does pertussis spread?

Pertussis is spread through the air by infectious droplets and is highly contagious.

How long does it take to show signs of pertussis after being exposed?

The incubation period of pertussis is commonly seven to 10 days, with a range of 4–21 days.

What are the symptoms of pertussis?

Pertussis disease can be divided into three stages:

Catarrhal stage: can last 1–2 weeks and includes a runny nose, sneezing, low-grade fever, and a mild cough (all similar symptoms to the common cold).

Paroxysmal stage: lasts 1–6 weeks, but can persist for up to 10 weeks. The characteristic symptom is a burst, or paroxysm, of numerous, rapid coughs. At the end of the paroxysm the patient suffers from a long inhaling effort that is characterized by a high-pitched whoop (hence the name, “whooping cough”). Infants and young children often appear very ill and distressed, and may turn blue and vomit.

Convalescent stage: usually lasts 2–6 weeks, but may last for months. Although the cough usually disappears after 2–3 weeks, paroxysms may recur whenever the patient suffers any subsequent respiratory infection. The disease is usually milder in adolescents and adults, consisting of a persistent cough similar to that found in other upper respiratory infections. However, these individuals are still able to transmit the disease to others, including unimmunized or incompletely immunized infants.

How serious is pertussis?

Pertussis can be a very serious disease, especially for infants. Rates of hospitalization and complications increase with decreasing age. During the two-year period 2004–05, a total of 66 deaths from pertussis were reported to CDC. Children age 3 months and younger accounted for 85% of these deaths.

As noted above in the section on symptoms, the breathing difficulties associated with this disease can be very distressing and scary for the patient and his or her family.

Although adults are less likely than infants to become seriously ill with pertussis, most make repeated visits for medical care and miss work, especially when pertussis is not initially considered as a reason for their long-term cough. In addition, adults with pertussis infection have been shown to be an important source of infection to infants with whom they have close contact.

What are possible complications from pertussis?

Younger patients have a greater chance of complications from pertussis than older patients. The most common complication is secondary bacterial infection, which is the cause of most pertussis-related deaths. Pneumonia occurs in one out of 20 cases; this percentage is higher for infants younger than age 6 months.

Infants are also more likely to suffer from such neurologic complications such as seizures and encephalopathy, probably due to the reduction of oxygen supply to the brain. Other less serious complications include ear infection, loss of appetite, and dehydration.

Adults with pertussis can have complications such as pneumonia (up to 5% of cases) and rib fracture from coughing (up to 4% of cases). Other reported side effects include (among others), loss of consciousness, female urinary incontinence, hernias, angina, and weight loss.

How do I know if my child has pertussis?

The diagnosis of pertussis is usually made based on its characteristic history and physical examination. A laboratory test may be done, which involves taking a specimen from the back of the patient’s throat (through the nose).

Is there a treatment for pertussis?

Antibiotics are somewhat helpful in treating pertussis. The drug of choice is usually erythromycin that is given to all household and other close contacts of the patient to minimize transmission, regardless of age and vaccination status.

All close contacts younger than seven years of age should complete their DTaP vaccine series if they have not already done so. If they have completed their primary four dose series, but have not had a

dose within the last three years, they should be given a booster dose.

Patients also need supportive therapy such as bed rest, fluids, and control of fever.

How long is a person with pertussis contagious?

Persons with pertussis are most infectious during the catarrhal period and during the first two weeks after onset of the cough (approximately 21 days).

How common is pertussis in the United States?

Before a vaccine against pertussis was available, pertussis (whooping cough) was a major cause of childhood illness and death in the United States. From 1940–1945, over one million cases of pertussis were reported.

With the introduction of a vaccine in the late 1940s, the number of reported pertussis cases in the U.S. declined from approximately 200,000 a year in the pre-vaccine era to a low of 1,010 cases in 1976.

Unfortunately, since then, a steady increase in reported pertussis cases has occurred, with proportionately more cases in adults and adolescents. In 2004, 25,827 cases of pertussis were reported to CDC, the highest number since 1959. Adults, ages 19–64 years, accounted for 27% of these cases. The increase in reported cases of pertussis might be due to a real increase in the disease rate or to increasing availability and use of testing technology to confirm cases and increasing healthcare provider awareness and reporting of pertussis.

Can you get pertussis more than once?

Reinfection appears to be uncommon but does occur. With natural infection, immunity to pertussis will likely wane as soon as seven years following disease; reinfection may present as a persistent cough, rather than typical pertussis. Unfortunately, it is difficult to verify pertussis infection with existing laboratory methods.

If someone has a recent culture-documented case of pertussis, he or she may not need immediate immunization against pertussis; however, a vaccine containing pertussis antigen will not be harmful, and they should continue on the routine immunization schedule for future protection against tetanus, diphtheria, and pertussis. If culture is lacking, even with a history of pertussis, do NOT withhold a dose of pertussis vaccine, if it is recommended per the routine schedule.

When did pertussis vaccine become available?

The first whole-cell pertussis vaccine was developed

in the 1930s and was in widespread use by the mid-1940s, when pertussis vaccine was combined with diphtheria toxoid and tetanus toxoid to make the combination DTP vaccine.

In 1991, DTaP vaccine was licensed in the United States. The pertussis component of this vaccine is a more purified “acellular” version, which produces fewer side effects.

In 2005, two new tetanus toxoid-diphtheria-acellular pertussis (Tdap) vaccines were licensed. These vaccines are the first acellular pertussis-containing vaccines that make it possible to vaccinate adolescents and adults against pertussis.

Pertussis is not available as a single vaccine.

What kind of vaccine is it?

DTaP and Tdap vaccines are “inactivated” vaccines. Inactivated vaccines do not contain live bacteria or virus and cannot reproduce, which is why multiple doses are needed to produce immunity.

For the pertussis component of DTaP and Tdap vaccines, purified components of the bacterium are grown and then inactivated. DTaP is for children younger than 7 years and has a higher concentration of pertussis than Tdap, which is intended for persons 10 years and older.

How is this vaccine given?

The DTaP and Tdap vaccines are given as a shot in the muscle.

Is there more than one brand of pertussis vaccine?

At the present time, there are three different brands of DTaP vaccines available in the U.S. All three vaccines are equally effective and safe, and are given on the same schedule at two, four, six, 15–18 months, and 4–6 years. DTaP is also part of four childhood combination vaccines that include other vaccines (e.g., IPV, Hib, HepB). Two companies produce the Tdap vaccines that are approved for use in adolescents and adults through the age of 64 years.

Who should get this vaccine?

All infants should receive DTaP vaccine as part of their routine immunization unless they have a medical reason not to. Persons 10 years and older should receive Tdap vaccine in place of a one-time routine booster dose of adult Td vaccine.

Women who are pregnant or who have recently given birth should be given a one-time dose of Tdap to protect their newborn. Because other adults who have close contact with infants also pose a risk of

spreading pertussis to the infant, family members and other caregivers of new infants should receive Tdap vaccine.

Tdap vaccine is also recommended for healthcare personnel in hospitals and ambulatory care settings who have direct patient contact, especially those working with infants, regardless of when they received their previous dose of Td vaccine.

How many doses of DTaP vaccine are required?

The usual schedule for infants is a series of four doses given at two, four, six, and 15–18 months of age. A fifth dose, or booster, is recommended at 4–6 years of age, unless the fourth dose was given late (after the fourth birthday). All adolescents and adults younger than age 65 years should receive a one-time dose of Tdap.

Who recommends this vaccine?

The Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), and the American Academy of Family Physicians (AAFP) all recommend this vaccine.

How safe is this vaccine?

Most children have no serious reactions from this combined vaccine. The most common reactions are local reactions at the injection site, such as soreness, redness, and swelling, especially after the fourth or fifth dose. Other possible reactions may include fussiness, mild fever, loss of appetite, tiredness, and vomiting. The use of the more purified DTaP instead of the whole cell DTP has decreased these mild reactions substantially. Tdap is a new vaccine but trials have shown it to be safe.

What side effects have been reported with this vaccine?

About 20%–40% of children have some local reaction such as pain, redness, or swelling after the first three doses of DTaP. Such local reactions seem to be more frequent after the fourth and/or fifth doses. A temperature of 101° F or higher is reported in 3%–5% of DTaP recipients. Less common reactions (e.g., persistent crying, higher fever, febrile seizure) are rare and generally occur in fewer than 1 in 10,000 doses.

If a child has a medical reason not to receive the pertussis vaccine, they can and should still be vaccinated against diphtheria and tetanus with DT (pediatric) vaccine.

The most frequently reported side effects following vaccination with Tdap are headache, generalized body aches, and tiredness.

How effective is this vaccine?

In general, inactivated vaccines are not as effective in producing immunity as are live vaccines. In studies of acellular pertussis vaccine, children who received three or four doses were 80%–85% less likely to develop pertussis than unvaccinated children. Tdap vaccine is believed to be similar in effectiveness and duration of immunity as pediatric DTaP vaccines.

Who should NOT receive pertussis vaccine?

People who had a serious allergic reaction to a previous dose of DTaP or Tdap vaccine, or who developed encephalopathy (brain injury) not due to another identifiable cause, should not receive another dose.

Certain rare adverse events following pertussis vaccination usually serve as a precaution against receiving further doses. Such events include a temperature of 105°F or higher, collapse or shock-like state, persistent crying for more than three hours, or convulsions within three days. Even if one of these precautions exists, there may be occasions when the benefit of immunization outweighs the risk (for example, during a community-wide outbreak of pertussis). A person who developed one of these adverse events after pediatric DTaP vaccine may receive Tdap as an adolescent or adult.

A person with a recognized, possible, or potential neurologic condition should delay receiving DTaP or Tdap vaccine until the condition is evaluated, treated, and/or stabilized. Although DTaP vaccine does not cause neurological disorders, receiving the vaccine can cause an already-present underlying condition to show itself.

Persons with a moderate or severe illness should postpone receiving the vaccine until they are well.

Can the vaccine cause pertussis?

No.

Can a pregnant woman receive Tdap vaccine?

Tdap is not contraindicated during pregnancy. It should be administered to a pregnant woman who is in contact with an infant younger than age 12 months, is in an outbreak setting, or is a healthcare provider who sees children. If there is no risk to the pregnant woman of acquiring or transmitting pertussis, the CDC's Advisory Committee on Immunization Practices recommends that Tdap vaccination be deferred until the immediate postpartum period. The new mother should receive Tdap before hospital discharge, even if she is breastfeeding.