

Parents' Guide to Childhood Immunization

Pertussis (Whooping Cough)

Pertussis (Whooping Cough) is caused by a bacterium called *Bordetella pertussis*. If you have ever seen a child with pertussis you won't forget it. The child coughs violently and rapidly, over and over, until the air is gone from her lungs and she is forced to inhale with the loud "whooping" sound that gives the disease its nickname, whooping cough.

Pertussis is a very contagious disease, and one that is fairly common in the United States, even today. In 2005, over 25,000 cases were reported. While this is down considerably from the approximately 150,000 cases a year before the vaccine, it still makes it one of the most common vaccine-preventable childhood diseases in the country. It is spread from person to person through personal contact, coughing and sneezing.

At first pertussis resembles a common cold, with sneezing, runny nose, fever and a mild cough. But after 1 or 2 weeks the severe coughing spells begin. Pertussis is most severe in infants less than 1 year old. More than half of these infants who get the disease must be hospitalized. Older children and adults can get pertussis too, but it is usually not as serious. Many infants who get pertussis catch it from their older brothers and sisters, or from their parents — who might not even know they have the disease.

About 1 child in 10 who get pertussis also gets pneumonia, and about 1 in 50 will have convulsions. The brain is affected in about 1 person out of 250 (this is called encephalopathy). Pertussis causes about 10–20 deaths each year in the United States.

DTaP Vaccine

DTaP combines vaccines against three diseases, Diphtheria, Tetanus and Pertussis into one shot. (The small "a" in the name stands for "acellular," which means that the pertussis component of the vaccine contains only parts of the pertussis bacterium rather than the whole cell.) The diphtheria and tetanus components of the vaccine are not technically vaccines, but "toxoids." In other words, they help the immune system develop protection against the toxins produced by the diseases rather than against the disease bacteria themselves. All three components of DTaP are "inactivated" (killed). Tetanus, diphtheria and pertussis (DTP) vaccines have been in common use since the 1940s. DTaP vaccine (with the acellular pertussis component) was first licensed in 1991.

Children need five DTaP shots for maximum protection. The first three shots are given at 2, 4, and 6 months of age. The fourth (booster) shot is given between 15 and 18 months, and a fifth shot — another booster — is given when a child enters school, at 4–6 years. When it is given according to this schedule, DTaP protects most children from all three diseases (80%–85% from pertussis, 95% from diphtheria, nearly 100% from tetanus). Protection can fade with

time, so booster doses (using Td or Tdap vaccine, see below) are recommended every 10 years. These vaccines are also sometimes given when a person gets a serious wound that could contain tetanus bacteria.

DTaP Vaccine Side Effects

Up to one third of children who get DTaP have local reactions (tenderness, pain, redness, swelling). These are most common after the 4th or 5th doses. When they occur it is usually within 2 days after the shot. Some children also experience swelling of the entire arm or leg after the 4th or 5th DTaP dose. This happens within 3 days of the shot and usually lasts around 4 days, with no aftereffects. Up to about 1 child in 20 will get a fever of over 101°F — also more often after the fourth or fifth dose. And up to about 1 child in 5 may become fussy or lose their appetite for a day or two; nearly half may become drowsy after the shot.

More serious side effects include a fever of 104°F or higher (1 in 3,000), continuous crying for 3 hours or more (separate studies have found this in 1 in 900 to 1 in 8,000), and convulsions (1 in 14,000). Convulsions that occur after DTaP are usually not caused directly by the vaccine, but by a fever, which in turn was triggered by the vaccine. These are called “febrile seizures” and, while they might be alarming, children recover from them quickly and they do not cause permanent harm. Some experts recommend giving a non-aspirin pain reliever, such as acetaminophen, to reduce the chances of a fever. Over the years several cases of permanent brain damage were reported following DTP vaccine (an earlier version of DTaP).

Whether these were true vaccine reactions or merely coincidence is impossible to say, because they occurred so infrequently. Some people used to believe that DTP vaccine could cause Sudden Infant Death Syndrome (SIDS), but studies have discredited that theory.

DTaP Vaccine Precautions

In addition to the normal precautions for all vaccines, shown on page 30, a child who developed **encephalopathy** (brain illness) within 7 days after a dose of DTaP should not get another dose of pertussis-containing vaccine (see DT vaccine, below).

There are several other conditions that might cause a doctor to recommend not getting DTaP. These are: a **temperature of 105°F**, a **collapse or “shock-like” state**, or **continuous crying** for 3 or more hours, occurring within 48 hours of a previous dose; or **convulsions** occurring within 3 days after a previous dose. If your child had any of these conditions after a previous dose of DTaP, be sure to talk with your doctor before getting another dose of the vaccine. He or she might recommend getting a non-pertussis-containing vaccine.

Other Related Vaccines

DT is a tetanus/diphtheria vaccine, which does not contain pertussis. It is used for children younger than 7 years old who should not get pertussis vaccine (for example, because they have had a reaction to pertussis vaccine in the past).

Tdap was licensed in 2005. It contains a full concentration of tetanus and lower concentrations of both diphtheria and pertussis. It is the first pertussis-containing vaccine licensed in the United States for older children, adolescents, and adults. It is currently recommended as a once-only booster for adolescents.

Combination Vaccines

Several vaccines are sometimes combined into a single shot. These are called combination vaccines. Some combination vaccines are used routinely - DTaP is a combination; so is MMR. There are currently four other combination vaccines available for children. One combines DTaP and Hib vaccines; the second Hib and hepatitis B; the third combines DTaP, hepatitis B, and polio, and the fourth combines measles, mumps, rubella and varicella. The advantage of combination vaccines is, of course, that your children get the protection of all the component vaccines while getting fewer injections. Each of these vaccines has certain restrictions, and not all providers carry them. But ask your provider about them if you are interested in reducing the number of shots your child needs.

http://www.cdc.gov/vaccines/vpd-vac/pertussis/downloads/pg_why_vacc_pertussis.pdf