



District Health Department #10



Report to the Boards of Health

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Pertussis (Whooping Cough)

Pertussis, or whooping cough, is caused by a bacterium called *Bordetella pertussis*. Whooping cough was recognized in the middle ages and the first recorded outbreak was in Paris in 1598. Before vaccination was available, nearly every child was infected at some point in his/her life. Unfortunately, one out of every 200 children in the United States died from pertussis in the early 1900s.

Pertussis is very contagious and spread through coughing and sneezing. A person with pertussis can, on average, infect up to 12 to 15 other people. The incubation period is usually 7 to 10 days, but can range from 4 to 21 days. The illness starts out like a common cold, with runny nose, sneezing, low-grade fever, and mild, occasional cough. The cough gradually gets more severe, and after one to two weeks, bursts or fits of rapid coughing occurs, usually followed by a whooping sound as there is a struggle to inhale. Sometimes, the coughing person turns blue, passes out, vomits, or is exhausted after coughing. These coughing fits are more frequent at night and nothing helps. Typically, the person does not seem ill between the coughing fits. This severe cough typically lasts 6 to 10 weeks. The cough will then gradually get better over 2 to 3 weeks but can be triggered to recur for many months.

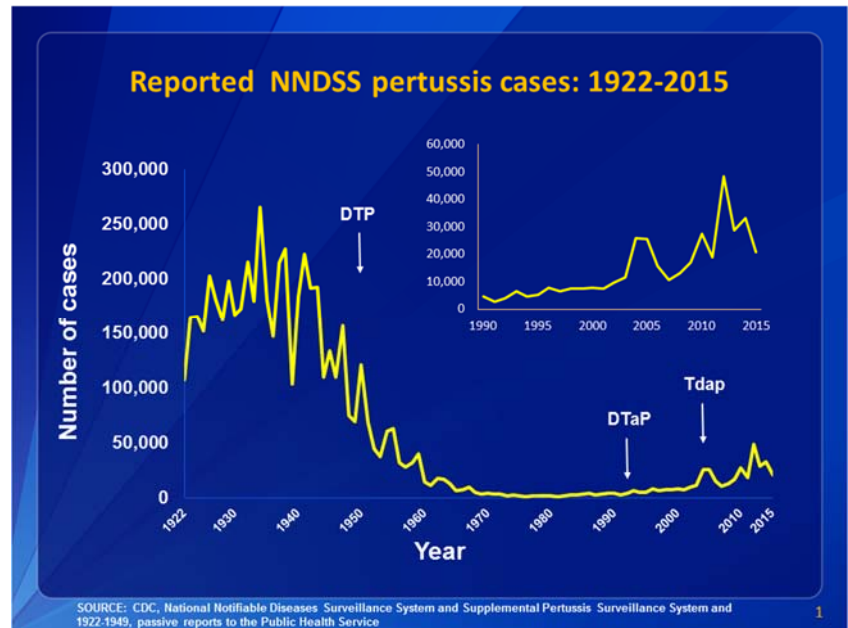
Not everyone with whooping cough whoops. Babies may not cough at all, but may struggle to breath or have life-threatening pauses in breathing called apnea. Adolescents and adults usually have more mild illness and may not have the classic whooping cough. Typically, the cough keeps them up at night. A great deal of pertussis remains undiagnosed due to the different ways it may present. Many studies have repeatedly found that about 1 out of 5 adolescents and adults with a cough lasting 2 weeks or more have pertussis. While they are not seriously ill, they serve as a source of illness to others. Most concerning is spread to young infants. Babies get pertussis from those that are around them: 55% get pertussis from their parent, 16% from a sibling, 10% from an aunt or uncle, 10% from a friend or cousin, 6% from a grandparent, and 2% from a caretaker. About half of babies under one-year old that get pertussis will need to be cared for in the hospital. Of those that have to be in the hospital, one out of 100 will die.

Prior to vaccine development, more than 200,000 cases of pertussis occurred each year in the United States and about 9,000 deaths resulted – nearly all in infants under the age of 6 to 12 months. Now, about 10,000 to 40,000 cases are reported each year with around 10 to 20 deaths still occurring. Pertussis-related death is typically due to secondary pneumonia. Other complications can occur such as seizures, encephalopathy, dehydration, pneumothorax, subdural hematomas, hernias, rectal prolapse, and broken bones. Nearly all complications are a result of coughing or lack of oxygen. Pertussis continues to be endemic, meaning it has never gone away and is still a potential cause of illness. It does not follow any seasonal pattern and there are increases in cases every 2 to 5 years.

The best way to prevent pertussis is vaccination. Current vaccination recommendations are for babies and children to get five doses of DTaP (D=diphtheria, T=tetanus, aP=acellular pertussis.) These are ideally given at 2, 4, and 6 months, at 15 to 18 months, and again at 4 through 6 years. A booster, Tdap, should be given at 11 or 12 years of age and also given to any adult that has not yet received it. It is also given to women during the third trimester of each pregnancy so that her high amount of antibodies can be passed to the baby prior to birth. This has been proven to help decrease the number of infants that die from pertussis. Antibiotics can kill the bacteria when someone is infected with

pertussis and help prevent those exposed to pertussis from getting ill. Unfortunately, once the cough has started, antibiotics don't do much to improve the course of the illness.

In the 1990s, there was a change in the pertussis vaccine. Previously, it was a whole cell vaccine (DTP.) The whole cell vaccine did have a higher rate of side effects such as fever, injection pain, and swelling at the injection sight. There were also concerns more serious side effects were related to the whole cell vaccine; but there has never been conclusive evidence for this. Due to concerns, the United States and many other countries switched to an acellular vaccine (DTaP.) This vaccine is made up of pieces of the bacteria, rather than the entire cell. Rates of pertussis have been increasing since this change in vaccine and studies have found that those that have received even just one dose of whole cell vaccine have less risk of pertussis infection than those that only received acellular vaccine. However, rates may also be increasing because more providers are aware of pertussis thereby diagnosing it more, and the diagnostic tests are easier, faster, and better. It is also possible that the bacteria may be changing in some way that is causing it to spread more easily.



Fortunately, there is still nowhere near the number of cases or deaths there once was. The series of five DTaP vaccines provide great protection and at least 9 out of 10 kids that get them are fully protected against pertussis. By age 11 or 12, 7 out of 10 kids are fully protected and the other three are partially protected. The discovery that immunity to the acellular vaccine fades with time led to the development of the Tdap booster. It is estimated that Tdap is 70% protective after being administered, and is about 40% effective 4 years later. While those that are vaccinated may still get pertussis, their illness is much less likely to be serious. The cough usually does not last as long, there are not as many coughing fits, and they are less likely to spread the disease to others.

The primary objective with pertussis control is to reduce the spread of pertussis to babies, who are not yet fully vaccinated and at the highest risk for complications and death. Vaccinating all family members and others that will be around the baby is important. Giving Tdap to a pregnant woman in her third trimester helps provide antibodies to the baby while the DTaP series is started. Children who are not vaccinated are at least eight times more likely to get pertussis than children that have received all five childhood doses of DTaP. Because immunity after natural infection is not life-long, immunity from vaccination can wane with time, and pertussis can spread very easily. Herd immunity, or relying of the immunity of those around you for protection, does not work in the case of pertussis.

Healthy Living Recommendations:

1. Continue to encourage routine vaccination of children and adults as the best way to prevent whooping cough, as well as the 15 other diseases that are prevented with the recommended routine vaccinations.
2. Report all suspected and confirmed cases to the health department to ensure quick infection control.

Sources:

- Centers for Disease Control and Prevention. Epidemiology and Prevention of Vaccine-Preventable Diseases. Hamborsky J, Kroger A, Wolfe S, eds. 13th ed. Washington D.C. Public Health Foundation, 2015.
- Edwards, K., & Decker, M. (2013). Pertussis vaccines. In S. Plotkin, W. Orenstein & P. Offit (Eds.), Vaccines (Sixth ed., pp. 447-492). Saunders.
- Clark, T. A. (2014). Changing pertussis epidemiology: everything old is new again. Journal of Infectious Diseases, 209(7), 978-981.
- Centers for Disease Control and Prevention (2017, August 7). Pertussis (Whooping Cough). Retrieved November 6, 2017, from <https://www.cdc.gov/pertussis/index.html>

