

Vaccines and Vaccine Preventable Diseases

Vaccines are a safe and effective way to prevent childhood diseases. Each has been thoroughly tested and licensed for use in the United States by the FDA. The following diseases can be prevented by immunizations:

Polio

Polio is an infectious disease caused by a virus that lives in the throat and intestinal tract. It is spread through person-to-person contact with the stool of an infected person (for instance, by changing diapers). Polio used to be very common in the U.S. and caused severe illness in thousands of people each year before polio vaccine was introduced in 1955. Most people infected with the poliovirus have no symptoms but some infections cause paralysis and even death.

Up to about 95 percent of people infected with polio have no symptoms. However, infected persons without symptoms can still spread the virus and cause others to develop polio. About four to eight percent of infected persons have minor symptoms such as fever, sore throat, upset stomach, or flu-like symptoms and have no paralysis or other serious symptoms. About one to two percent of infected persons develop aseptic meningitis with stiffness of the back, back or legs, and in some persons increased or abnormal sensations. Symptoms typically last from two to ten days, followed by complete recovery. Less than 1 percent of polio cases result in paralysis. The risk of paralysis increases with age.

Diphtheria

Diphtheria is spread when germs are passed from an infected person or carrier to the nose or throat of others. It is a very serious disease, which can block the airway, making it impossible to breathe. Respiratory diphtheria presents as a sore throat with low-grade fever and an adherent membrane of the tonsils, pharynx, or nose. Neck swelling is usually present in severe disease. Cutaneous diphtheria presents as infected skin lesions, which lack a characteristic appearance. Diphtheria remains endemic in developing countries. The countries of the former Soviet Union have reported >150,000 cases in an epidemic which began in 1990. Myocarditis, polyneuritis, and airway obstruction are common complications of respiratory diphtheria; death occurs in 5%-10% of respiratory cases. Complications and deaths are much less frequent in cutaneous diphtheria.

Tetanus (Lockjaw)

Tetanus is caused by a toxin (poison) produced by a bacterium, *Clostridium tetani*. They produce spores that are very difficult to kill as they are resistant to heat and many chemical agents. *C. tetani* spores can be found in the soil and in the intestines and feces of many household and farm animals and humans. The bacteria usually enter the human body through a puncture. Tetanus is not spread from person to person.

The symptoms of tetanus are caused by the tetanus toxin acting on the central nervous system. In the most common form of tetanus, the first sign is spasm of the jaw muscles, followed by stiffness of the neck, difficulty in swallowing, and stiffness of the abdominal muscles. Other signs include fever, sweating, elevated blood pressure, and rapid heart rate. Spasms often occur, which may last for several minutes and continue for 3-4 weeks. Complete recovery, if it occurs, may take months.

Tetanus has a high fatality rate; during 1998-2000, the case-fatality rate for reported tetanus in the United States was 18%. Laryngospasm (spasm of the vocal cords) is a complication that can lead to interference with breathing. Patients can also break their spine or long bones from convulsions. Other possible complications include hypertension, abnormal heart rhythm, and secondary infections, which are common because of prolonged hospital stays. The high possibility of death is a major complication.

Pertussis (Whooping Cough)

Pertussis is a highly communicable, vaccine-preventable disease that lasts for many weeks and is typically manifested in children with spasms of severe coughing, whooping, and vomiting. This disease results in high morbidity and mortality in many countries every year. In the United States, 5000-7000 cases are reported each year. Incidence of pertussis has increased steadily since the 1980s. Major complications are most common among infants and young children and include hypoxia, apnea, pneumonia, seizures, encephalopathy, and malnutrition. Young children can die from pertussis and 13 children died in the United States in 2003. Most deaths occur among unvaccinated children or children too young to be vaccinated. Transmission of Pertussis occurs through direct contact with discharges from respiratory mucous membranes of infected persons. Children who are too young to be fully vaccinated and those who have not completed the primary vaccination series are at highest risk for severe illness. Like measles, pertussis is highly contagious with up to 90% of susceptible household contacts developing clinical disease following exposure to someone with pertussis. Adolescents and adults become susceptible when immunity wanes.

Measles

Measles is an infectious viral disease that occurs most often in the late winter and spring. It begins with a fever that lasts for a couple of days, followed by a cough, runny nose, and conjunctivitis (pink eye). A rash starts on the face and upper neck, spreads down the back and trunk, then extends to the arms and hands, as well as the legs and feet. After about five days, the rash fades the same order it appeared. Measles is highly contagious. Infected people are usually contagious from about 4 days before their rash starts to 4 days afterwards. The measles virus resides in the mucus in the nose and throat of infected people. When they sneeze or cough, droplets spray into the air and the droplets remain active and contagious on infected surfaces for up to two hours.

Measles itself is unpleasant, but the complications are dangerous. Six to 20 percent of the people who get the disease will get an ear infection, diarrhea, or even pneumonia. One out of 1000 people with measles will develop inflammation of the brain, and about one out of 1000 will die.

Rubella (German Measles)

Rubella is caused by a virus that is spread when germs pass from an infected person to the nose or throat of others. It is usually a mild sickness with fever, swollen glands and a rash that lasts for about three days. If a pregnant woman contracts rubella, she can lose her unborn baby, or the baby can be born with birth defects such as deafness, cataracts, heart defects, mental retardation, and liver and spleen damage (at least a 20% chance of damage to the fetus if a woman is infected early in pregnancy).

Hib Meningitis

Haemophilus influenzae type b (Hib) germs are spread from an infected person to the nose or throat of others. Hib causes meningitis (brain damage), pneumonia, and infection of the blood, joints, bones, throat and heart covering. This disease is very serious for children under 5 years old, especially infants. Although Hib vaccine has greatly decreased the incident rate of the disease, Hib remains a major cause of lower respiratory tract infections in infants and children in developing countries where vaccine is not widely used. 3%-6% of cases are fatal; up to 20% of surviving patients have permanent hearing loss or other long-term sequelae.

Mumps

Mumps is an acute viral illness caused by the mumps virus. The mumps virus replicates in the upper respiratory tract and is spread through direct contact with respiratory secretions or saliva or through fomites. The infectious period or time that an infected person can transmit mumps to a non-infected person is from 3 days before symptoms appear to about 9 days after the symptoms appear. The incubation time, which is the period from when a person is exposed to virus to the onset of any symptoms, can vary from 16 to 18 days (range 12-25 days).

Symptoms of mumps include Fever, headache, muscle aches, tiredness, and loss of appetite; followed by swelling of salivary glands. The parotid salivary glands (which are located within your cheek, near your jaw line, below your ears) are most frequently affected. Severe complications are rare. However, mumps can cause inflammation of the brain and/or tissue covering the brain and spinal cord (encephalitis/meningitis), inflammation of the testicles (orchitis), inflammation of the ovaries and/or breasts (oophoritis and mastitis), spontaneous abortion, and deafness, usually permanent.

Hepatitis B

Hepatitis B is an infection of the liver caused by a virus. This virus causes a flu-like illness with loss of appetite, nausea, vomiting, rashes, joint pain and jaundice (yellowing of the eyes and skin). An infected pregnant woman can expose her newborn to this virus during birth. The virus stays in the liver of some people for the rest of their lives. Later, they can develop severe liver diseases, or cancer. Hepatitis B spreads through contact with blood or other body fluids. This can happen through sexual contact, by sharing a razor, toothbrush, needles used to inject drugs or to tattoo. Chronic infection occurs in 90% of infants infected at birth, 30% of children infected at age 1 - 5 years, and 6% of persons infected after age 5 years. Death from chronic liver disease occurs in 15-25% of chronically infected persons.

Varicella (Chickenpox)

Chickenpox is an infectious disease caused by the varicella-zoster virus which results in a blister-like rash, itching, tiredness and fever. The rash appears first on the trunk and face, but can spread over the entire body causing between 250 to 500 itchy blisters. Most cases of chickenpox occur in persons less than 15 years old.

Chickenpox is highly infectious and spreads from person to person by direct contact or through the air from an infected person's coughing or sneezing. A person with chickenpox is contagious

1-2 days before the rash appears and until all blisters have formed scabs. It takes from 10-21 days after contact with an infected person for someone to develop chickenpox.

Serious complications from chickenpox include bacterial infections which can involve many sites of the body including the skin, tissues under the skin, bone, lungs (pneumonia), joints and the blood. Other serious complications are due directly to the virus infection and include viral pneumonia, bleeding problems and infection of the brain (encephalitis). Many people are not aware that, before a vaccine was available, there were approximately 11,000 hospitalizations and 100 deaths from chickenpox in the U.S. every year. One child and one adult died each week.

Rotavirus

Rotavirus is the most common cause of severe diarrhea among children, resulting in the hospitalization of approximately 55,000 children each year in the United States and the death of over 600,000 children annually worldwide. The incubation period for rotavirus disease is approximately 2 days. The disease is characterized by vomiting and watery diarrhea for 3 - 8 days, and fever and abdominal pain occur frequently. Immunity after infection is incomplete, but repeat infections tend to be less severe than the original infection.

Pneumococcal

Pneumococcal disease is an infection caused by a type of bacteria called *Streptococcus pneumoniae*. When these bacteria invade the lungs, they can cause pneumonia. They can also invade the bloodstream, causing bacteremia, and/or invade the tissues and fluids surrounding the brain and spinal cord, causing meningitis. Pneumococcal disease can also cause middle ear infection and sinus infections. Invasive pneumococcal disease kills nearly 5,000 people in the United States each year, most of them 65 years of age or older. It is also the most common cause of invasive bacterial infection in American children. Pneumococcal disease can, in young children, lead to meningitis, bacteremia, otitis media (ear infections) and, in some cases, death. Children under 2 years of age fall into the highest general risk group for invasive pneumococcal infections.

Hepatitis A

Hepatitis A is a liver disease caused by the hepatitis A virus. Hepatitis A can affect anyone and can be spread from person to person by putting something in the mouth that has been contaminated with the stool of a person with hepatitis A. This type of transmission is called "fecal-oral." For this reason, the virus is more easily spread in areas where there are poor

sanitary conditions or where good personal hygiene is not observed. Most infections result from contact with a household member or sex partner who has hepatitis A. Casual contact, as in the usual office, factory, or school setting, does not spread the virus.

Persons with hepatitis A virus infection may not have any signs or symptoms of the disease. If symptoms occur, you might experience any or all of the following: jaundice (yellowing of the skin and whites of the eyes), fever, loss of appetite, fatigue, dark urine, joint pain, abdominal pain, diarrhea, nausea, and vomiting. Very rarely, a recently acquired case of viral hepatitis can cause liver failure and death. Sometimes in these instances, a liver transplant (if a liver is available) can save a life. Older persons are more likely to have symptoms than children.

Meningococcal

Meningococcal is a rare but severe bacterial infection that can cause meningitis, bloodstream infection, and other localized infections. Meningitis is characterized by fever, headache, and stiff neck. Other symptoms may include nausea, vomiting, and mental status changes.

Meningococcal bacteremia is a severe bloodstream infection characterized by sudden onset of fever and a petechial or purpuric rash. Meningitis can lead to death or permanent neurologic impairment. Meningococcal bacteremia can result in multiple organ system failure, shock, and death. Other manifestations of meningococcal disease include pneumonia, and less commonly, pericarditis, myocarditis, arthritis, conjunctivitis, urethritis, pharyngitis and cervicitis.

Meningococcal is spread by contact with large droplet respiratory secretions (kissing, mouth-to-mouth resuscitation). Close household contacts of persons with meningococcal disease are at greatly increased risk of infection.

Influenza

Influenza is a highly infectious virus illness. Symptoms of influenza include fever and chills, dry cough, runny nose, body aches, headache, sore throat (Note: Adults rarely have upset stomachs or diarrhea from influenza. The "stomach flu" is not influenza.) Infection of influenza can cause a worsening of existing health problems, like heart disease or asthma; pneumonia; ear and sinus infections. Influenza spreads mainly through coughs and sneezes of infected persons but may also be spread by touching an object contaminated with influenza and then touching the mouth or nose.

Human Papillomavirus (HPV)

[Genital HPV infection](#) is a sexually transmitted disease (STD) that is caused by human papillomavirus (HPV). Human papillomavirus is the name of a group of viruses that includes more than 100 different strains or types. More than 30 of these viruses are sexually transmitted, and they can infect the genital area of men and women including the skin of the penis, vulva (area outside the vagina), or anus, and the linings of the vagina, cervix, or rectum.

Approximately 20 million people are currently infected with HPV. At least 50 percent of sexually active men and women acquire genital HPV infection at some point in their lives. By age 50, at least 80 percent of women will have acquired genital HPV infection. About 6.2 million Americans get a new genital HPV infection each year. Most HPV infections have no signs or symptoms; therefore, most infected persons are unaware they are infected, yet they can transmit the virus to a sex partner.

All types of HPV can cause mild Pap test abnormalities which do not have serious consequences. Approximately 10 of the 30 identified genital HPV types can lead, in rare cases, to development of cervical cancer. Research has shown that for most women (90 percent), cervical HPV infection becomes undetectable within two years. Although only a small proportion of women have persistent infection, persistent infection with "high-risk" types of HPV is the main risk factor for cervical cancer.

This information was gathered from the Centers for Disease Control and Prevention (CDC). For a more in-depth description of these diseases, check out the CDC website at www.cdc.gov.