

Immunizations (Vaccinations)

Because of modern immunizations, many once serious childhood diseases are now rare. Vaccines are carefully tested and monitored to be sure they are safe. Several new vaccines have been introduced in the past few years. It is very important to make sure your child receives all recommended immunizations.

What are immunizations?

Immunizations (also called vaccinations) are recommended to help prevent infection with disease-causing germs. Vaccines are made up of either a part of a germ (such as viruses or bacteria) but not the complete germ that's capable of causing disease, or of a *live* germ that has been changed so that it can't cause serious infection. Immunizations cause the body to produce antibodies, which then protect the person from catching specific diseases.

Immunizations are given by injection (a shot), orally (by mouth), or through the nose (intranasal). Recommended immunizations are given in a series, starting soon after your baby is born. Some diseases can be particularly serious in infants and toddlers, so it is important to get immunizations at the appropriate time.

Most vaccines are given in a repeated series to make sure they are effective. The recommended schedule of immunizations requires up to 16 to 20 shots by age 2 years. If your child has missed any immunizations at the usual age, they can usually be given later. New combination vaccines are being developed that will reduce the number of shots needed.

What are all these immunizations for?

Immunization recommendations are updated frequently. The following list presents the routine immunizations recommended for *nearly all* children as of 2006. It also provides some information on the diseases prevented by immunizations.

- **Hepatitis B.** Infection of the liver caused by a virus, which can lead to chronic liver disease. The hepatitis B virus is spread mainly through contaminated blood or sexual contact; a pregnant woman who is infected may pass the virus to her baby.
 - The first dose of hepatitis B vaccine is given soon after birth. Two more doses are given between 1 and 18 months.
- **Diphtheria, tetanus, pertussis (DTP).** These diseases are caused by bacteria. Diphtheria results in severe infections of the tonsils and throat, causing difficulty breathing. It can also damage the heart. Tetanus results in severe

muscle spasms, caused by a toxin produced by the bacteria (usually found in soil). Pertussis (whooping cough) is an infection of the airways and lungs that is especially severe in infants.

- Four doses of DTP vaccine are given in the first 18 months, another dose between 4 and 6 years, and another dose at 11 to 12 years. Regular "booster shots" against diphtheria and tetanus (Td) are recommended every 10 years.
- **Haemophilus influenzae type B (Hib).** Bacteria that can cause a number of serious infections, including infections of the membranes lining the brain (meningitis), lungs (pneumonia), and skin (cellulitis).
 - Three to four doses of Hib vaccine are given before age 18 months.
- **Polio.** A paralyzing disease caused by the poliovirus.
 - Three doses of oral polio vaccine are given before 18 months; a fourth dose at ages 4 to 6 years.
- **Measles, mumps, rubella (MMR).** All of these diseases are caused by viruses. Measles produces a cough, runny nose, red eyes, and a rash. Complications include pneumonia and infection of the brain (encephalitis). Mumps causes infection of the salivary glands (located below and in front of the ear). It can also cause infections of the brain and other organs. Rubella (German measles) causes cold-like symptoms with a rash. If the woman catches rubella early in pregnancy, it can cause abnormalities of many organs in the developing baby.
 - One dose of MMR vaccine is given at age 1; a second dose at ages 4 to 6 years.
- **Varicella (chickenpox).** Chickenpox is caused by infection with a virus, producing fever and an itchy rash that looks like lots of little blisters. Complications include infections of the skin and brain.
 - One dose of varicella vaccine is given after age 1 if your child hasn't already had chickenpox. Another dose at 4 to 6 years is recommended. (If your child has definitely had chickenpox, he or she doesn't need this vaccine.)
- **Pneumococcal vaccine.** Prevents infection with a bacteria called *Pneumococcus*, which can cause meningitis, ear infections, and pneumonia.
 - Four shots of pneumococcal vaccine are given by age 18 months.
- **Hepatitis A.** Infection of the liver with a virus, which can be passed from person to person.
 - Hepatitis A vaccine is recommended for children ages 1 to 18, beginning at age 1, with a booster shot 6 months later.

- **Influenza.** A virus that sometimes causes severe infections of the respiratory tract (throat, airways, and lungs).
 - A yearly “flu” shot is now recommended for all children between 6 months and 5 years old. It is also recommended for family members and others in close contact with children under 5.
- **Meningococcal vaccine.** Prevents infection with bacteria that can cause meningitis.
 - Recommended for children ages 11 to 12. Also recommended at the beginning of high school and for college freshmen living in dormitories.
- **Human papillomavirus (HPV).** A family of viruses that causes genital warts, a sexually transmitted disease. These viruses are also an important cause of cancer of the cervix (the opening of the womb). Preventing HPV infection significantly lowers the rate of cervical cancer.
 - The new HPV vaccine is now recommended for all girls—three shots beginning at ages 11 to 12.
 - Future recommendation may also include boys.
- **Rotavirus.** This virus is the most common cause of severe diarrhea in children in the United States and worldwide. The new rotavirus vaccine is a live “attenuated” vaccine, which means that the virus has been changed so that it doesn’t usually cause disease.
 - Three doses of the oral rotavirus vaccine are given in early infancy.

Additional immunizations may be recommended in special circumstances, such as travel abroad.



A few children should not be immunized with certain live vaccines. Children with cancer or other serious diseases are at higher risk of getting severe disease from the virus used in the vaccine. Fortunately, as long as most other children in the community are immunized, the risk of spreading these diseases is low.

Are immunizations safe?

Yes. Modern vaccines are tested for years before they are used in your child. Once in use, vaccines are continuously monitored to make sure they are safe and effective.

- Getting many vaccinations early in life does not reduce your child’s ability to fight off disease. Instead, it protects him or her from the most dangerous childhood diseases.
- It is not true that mercury (thimerosal), which has been used in some vaccines, causes autism or other diseases. Most vaccines no longer contain thimerosal. There is also no scientific evidence that the MMR vaccine causes autism.

What are some possible complications of immunizations?

The doctor will give you information on possible reactions to vaccines every time your child receives an immunization.

- Most complications of vaccines are mild and temporary. By far the most common are mild skin reactions (redness and warmth at the injection area).
- Sometimes children seem to get sick soon after a vaccine. Parents may think this means that the vaccine has caused the disease it was supposed to prevent. Most of the time, however, illness after a vaccine is just a coincidence.
- Rarely, a vaccine is not completely effective. Your child may get the disease he or she has been vaccinated against.
- Allergic reactions to vaccines are rare. If your child has a serious allergic reaction to a vaccine, later doses may be skipped.

What if my child is ill?

If your child is moderately to severely ill at the time of a scheduled vaccination, the dose will be delayed. If he or she is only mildly ill, the dose can be given as usual.

Vaccine recommendations are different for children with certain chronic diseases, such as human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS), absent spleen (asplenia), kidney failure, or diabetes. Additional vaccines may be recommended to prevent diseases that your child’s immune system may be unable to fight off.

Children with below-normal immune function (for example, those receiving cancer treatment or infected with HIV) may not receive some of the “live” vaccines containing active germs.

What if my child misses a recommended immunization?

If a recommended vaccine was not given at the scheduled time, your child can receive “catch-up” immunizations.



When should I call your office?

Call our office if:

- You are unsure whether your child’s immunizations are up-to-date or you have questions about the latest recommendations.
- You think your child may be having a serious reaction to a vaccine, such as difficulty breathing, severe swelling, or hives.

Where can I get more information?

- The American Academy of Pediatrics’ Childhood Immunization Support Program. Online at www.cispimmunize.org.
- The National Immunization Program of the Centers for Disease Control (CDC) provides information on vaccine safety. (The CDC is a federal agency that deals with various aspects of infections on the national level.) Online at www.cdc.gov/nip/vacsafe/vacsafe-parents.htm.
- You can also call the CDC’s Immunization Hotline: 1-800-232-2522 (English), 1-800-232-0233 (Spanish).

