

## Information Sheet: Vaccines

### *What is a vaccine?*

A vaccine is a substance that attempts to protect people against disease. They are usually administered by injection. The Center for Disease Control (CDC) recommends that all children be vaccinated against thirteen different diseases. The 13 diseases that have vaccinations are: Bacterial Meningitis, Diphtheria, Hepatitis A, Hepatitis B, Influenza, Measles, Mumps, Pertussis (Whooping Cough), Pneumococcal Disease, Polio, Rubella (German Measles), Tetanus (lockjaw), and Varicella (Chickenpox). At least one vaccine is needed for each of these diseases, and for some several doses are required in order to be fully protected. Several “combination vaccines” exist in which multiple vaccines are given in a single shot, reducing the number of shots needed. Vaccines are most often given to children, although you can be vaccinated as an adult.

### *How does the body naturally form immunity?*

The human immune system is comprised of intricate and complex mechanisms for producing and maintaining immunity. When your body is exposed to foreign microbes, the body responds by producing antibodies. Antibodies are protein molecules that fight against the viruses and bacteria. When you recover from an illness, your body maintains some of these antibodies in the form of memory cells. Future exposure results in the body producing antibodies as soon as the virus or bacteria is recognized and destroying the pathogen before the onset of illness. Once your body has produced the antibodies against a particular disease, the presence of them are permanent. This is immunity

### *How do vaccines work?*

Vaccines are made from the virus or bacteria that cause the disease the vaccine is designed to fight. The principle of vaccination is administer enough of the disease-causing agent is given to a person in a killed or weakened form (or in the form of proteins genetically engineered to look like a disease-causing agent), in order to stimulate the production of antibodies to fight off the disease. Your body will produce antibodies at such a high concentration that you will not become sick with the disease. As long as you maintain a certain concentration of antibodies against a specific disease, you have immunity. Unlike natural immunity, vaccines do stimulate production of memory cells. If your body stops making antibodies in response to the vaccine, you will no longer have protection against the disease.

### *What are the benefits of vaccines?*

Vaccines have transformed the medicine and the way we approach disease. Before vaccines, in the United States, every year:

- Polio would paralyze 10,000 children.
- Rubella (German measles) would cause birth defects and mental retardation in as many as 20,000 newborns.
- Measles would infect about 4 million children, killing 3,000.
- Diphtheria would be one of the most common causes of death in school-aged children.

- A bacterium called *Haemophilus influenzae* type b (Hib) would cause meningitis in 15,000 children, leaving many with permanent brain damage.
- Pertussis (whooping cough) would kill thousands of infants.

Vaccines have reduced and, in some cases, eliminated many diseases that killed or severely disabled people just a few generations before.

*What are the risks of vaccination?*

Risks vary with the vaccine. Some risks which are common to several vaccines are:

- People may be allergic to a component of the vaccine, such as eggs or neomycin. Occasionally, these allergies can lead to anaphylactic shock (epinephrine can guard against this risk).
- Vaccines can produce the same symptoms as the disease (in a milder form, and with less frequent incidence of the risks associated with the disease).
- Live vaccines in particular can be risky for people with weakened immune systems, who have less ability to resist even the weakened form of the disease.
- Adverse reactions such as soreness or swelling at the injection site and fever.

Another risk is the risk that the vaccination will wear off, and the recipient will get the disease later. Depending on the illness, the disease could be either less or more harmful to adults. This risk can be dealt with by giving boosters. In some case getting the vaccine and then not following later with a booster might lead to increased risk.

The disappearance of many childhood diseases has raised the question whether vaccines are still necessary. Further, a growing number of parents are concerned that vaccines may actually be the cause of diseases such as autism, hyperactivity, developmental delay, attention deficit disorder, diabetes, multiple sclerosis (MS), and sudden infant death syndrome (SIDS) among others. These concerns have caused some parents to delay or withhold vaccines for their children.

*Where can I get more information about diseases and vaccinations?*

Center for Disease Control: [www.cdc.gov/NIP/](http://www.cdc.gov/NIP/)

World Health Organization: [www.who.int](http://www.who.int)