



# Immunizations

A look at the most effective weapons in a doctor's arsenal against infectious diseases, including information on:

- The benefits and side effects of immunizations
- How a vaccine works
- New developments in the field

KID **FILE**

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# Vaccinations, Antibody?

*In this century, medical advances have vanquished many of the diseases once considered child*

Imagine your child's playground closed because of a polio epidemic, or some of his closest friends dying from diphtheria. That's what life was like before vaccines. Immunizations that were rare or unavailable 50 years ago now afford children protection from once-common deadly diseases, as well as from such lesser ailments as mumps and German measles.

Most medical authorities are advocates of early and comprehensive immunization, and they warn that these diseases still lurk in the community. By 1990, the U.S. Surgeon General would like to have 90 percent of the nation's two-year-olds vaccinated against seven major diseases. Here's what you need to know about the benefits and risks of the vaccinations recommended by the American Academy of Pediatrics (AAP).

**Diphtheria, tetanus, and pertussis.** These vaccines, administered together in one shot, protect against a trio of deadly childhood illnesses. Diphtheria is a contagious disease caused by a bacterium that attacks the nose and throat, prompting fever, a painful sore throat, and difficulty in breathing. It can also bring on paralysis and heart failure, and it kills 5 to 10 percent of those who contract it. Prior to the introduction of a diphtheria vaccine nearly 50 years ago, there were as many as 200,000 cases of diphtheria a year in the United States.

Tetanus, also called lockjaw, is a noncontagious disease that takes hold when a certain type of soil bacterium slips into the body through a wound, causing muscle spasms. Tetanus can strike at any age, and it kills nearly 40 percent of its victims through such complications as pneumonia and blood clots in the lungs.

Pertussis, commonly known as whooping cough, is a highly contagious disease that provokes coughing fits so severe a child may have difficulty eating, drinking, or even breathing. Additional complications include pneumonia, convulsions, and brain damage. Also caused by a bacterium, pertussis can afflict people of all ages, but it is especially serious in infants.

The diphtheria-tetanus-pertussis (DTP) immunization has nearly eliminated diphtheria, caused an 85 percent reduction in occurrences of tetanus, and brought down the number of pertussis cases from a high of 200,000 a year to 2,000. The AAP recommends that children receive the vaccine at 2, 4, 6, and 18 months of age, and right before they start school. (Repeated inoculation is important because early vaccination sometimes produces only incomplete or short-lived immunity.)

Your child will probably fuss, and he may develop soreness, redness, and swelling where the DTP shot was administered; half of all children do. Fewer than 5 percent will develop a fever greater than 102 degrees Fahrenheit or cry inconsolably for several hours. Most of these reactions last only 24

hours, and some research suggests you can alleviate them by giving your child acetaminophen, a nonaspirin pain reliever, 30 minutes before the injection. Rarer complications of the vaccine include convulsions or shocklike symptoms (1 in 1,750 doses), a fever higher than 105 degrees (1 in 330 doses), or brain damage (1 in every 330,000 doses). Although these complications have made the DTP vaccine quite controversial, it's not clear whether these problems stem from the shot itself or are coincidental to its administration. As frightening as these rare side effects are, the American Council on Science and Health points out that the risk of brain damage from pertussis itself is 13 times greater than the risk from the vaccine.

**Polio.** This infectious viral disease often deforms and disables its victims, and it kills one in every ten people it afflicts. Before the first polio vaccine was administered in the 1950s, there were some 16,000 cases of paralytic polio in the United States and 1,700 polio-related deaths each year. In 1985, by contrast, there were only 7 cases of polio and 3 polio-related deaths.

Two types of polio vaccines are available. The oral polio vaccine (OPV), made from a weakened, or attenuated, strain of the virus, is administered in drop form. The OPV has no common side effects; however, in 1 out of every 5 to 10 million doses it can cause paralysis in the vaccinated child or in an unvaccinated person caring for the child.

The second type, inactivated polio vaccine (IPV), is made from the killed polio virus and is given by injection. Booster shots of the IPV may be needed every five years, and it has no known side effects. Both polio vaccines are given on roughly the same schedule as the DTP shot.

Both the AAP and the U.S. Public Health Service recommend the OPV because of its proven reliability and

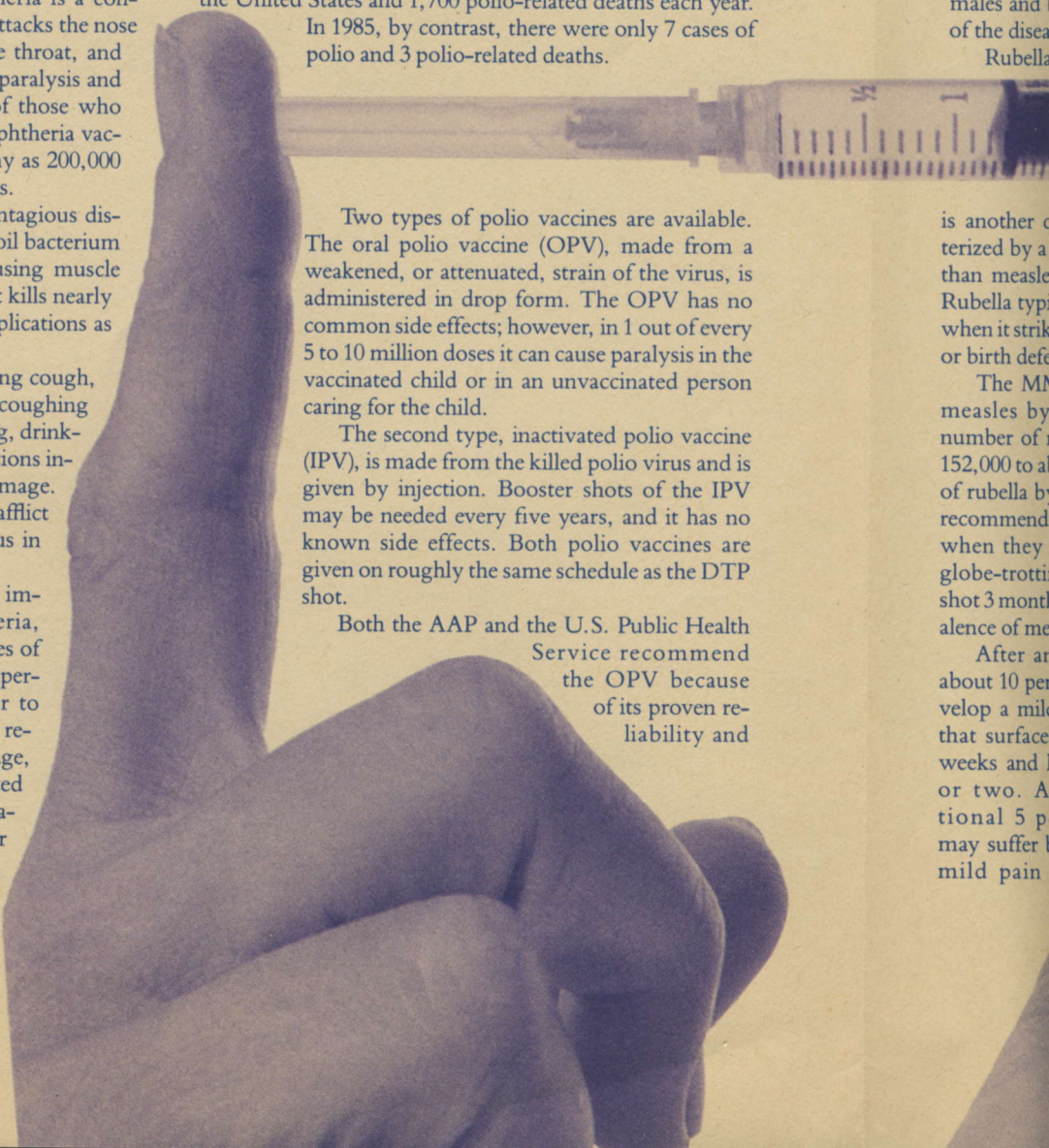
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## idered childhood rites of passage.

painless administration. But the IPV should be used when a child or someone in close contact with him has a lowered resistance to infection due to illness or medication.

**Measles, mumps, and rubella.** One shot, known as the MMR, protects against all three of these childhood illnesses. Measles is a contagious disease caused by a virus and is characterized by a red and itchy rash that usually begins on the face and works its way down. About 1 in every 2,000 cases also causes brain damage or death. Prior to the introduction of the measles vaccine in 1963, almost everyone in the United States contracted the disease.

Mumps causes painful swelling of the salivary glands in the face and neck. Prompted by a virus, it is highly contagious and occurs primarily in children between 5 and 15 years of age. One in every 15,000 individuals who gets mumps suffers severe and lasting hearing loss, and many more end up with milder auditory damage. Sterility in males and brain damage are extremely rare complications of the disease.

Rubella, also known as German measles,

is another contagious viral disease. Characterized by a faint, red rash and swollen glands, it is milder than measles and rarely leads to brain damage or death. Rubella typically occurs in children under 9 years old, but when it strikes a pregnant woman it can cause a miscarriage or birth defects.

The MMR vaccine has reduced the incidence of measles by more than 99 percent, shrunk the number of mumps cases from an annual high of 152,000 to about 5,000, and slashed the incidence of rubella by more than 95 percent. The AAP recommends that babies be given the MMR when they are 15 months old, although globe-trotting babies should receive the shot 3 months earlier because of the prevalence of measles overseas.

After an MMR vaccination, about 10 percent of children develop a mild fever or a rash that surfaces within two weeks and lasts a day or two. An additional 5 percent may suffer brief, mild pain in

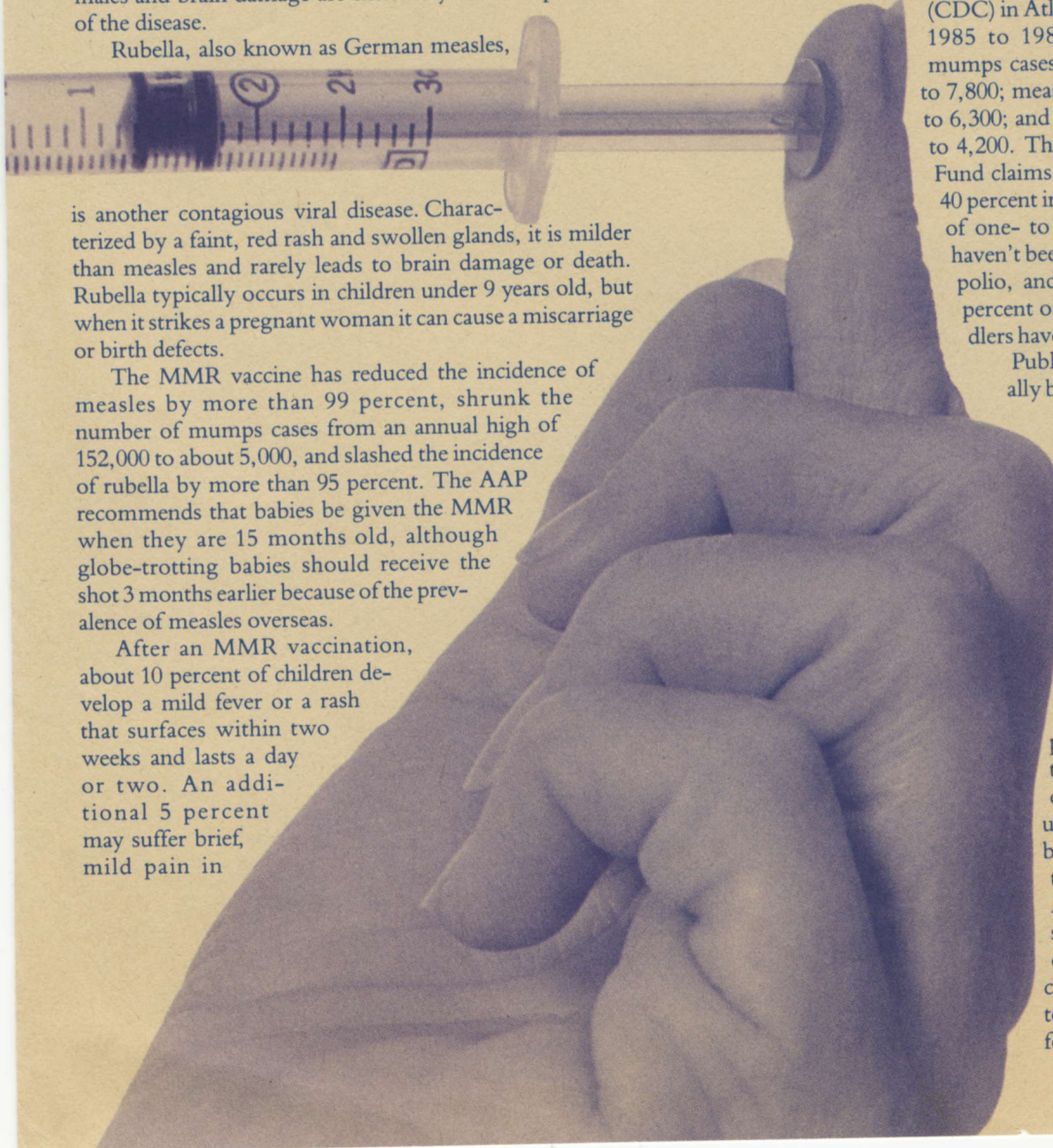
the small joints of their hands and feet two weeks or so after being immunized. And in about one in a million cases, the vaccine brings on more serious reactions, such as inflammation of the brain. As with the oral polio vaccine, children whose immune systems are impaired should not receive the MMR shot.

**Hib.** The bacterium *Hemophilus influenzae* type b—Hib for short—fosters about 12,000 cases of bacterial meningitis in the United States each year. This infection of the membranes that encase the brain and spinal cord can lead to mental retardation, paralysis, hearing loss, and various types of nerve damage if not treated promptly, and 10 percent of those who contract the disease die of it. *Hemophilus* also induces epiglottitis—a sudden swelling of the throat—as well as ear, joint, and skin infections, and pneumonia.

Since 1985, a vaccine for Hib has been available for children 2 years of age and older, and a new vaccine protects children as young as 18 months. The vaccine causes no serious side effects, although it brings on local irritation in about 2 percent of children and a fever in fewer than 1 percent.

**Going, going, but not gone.** Although the country's immunization program has greatly reduced the occurrence of many childhood ailments, some recent statistics warn parents against becoming too complacent. The national Centers for Disease Control (CDC) in Atlanta report that from 1985 to 1986, the number of mumps cases jumped from 3,000 to 7,800; measles went from 2,800 to 6,300; and pertussis from 3,600 to 4,200. The Children's Defense Fund claims that there has been a 40 percent increase in the number of one- to four-year-olds who haven't been immunized against polio, and that a troubling 80 percent of non-Caucasian toddlers have not been inoculated.

Public health officials usually blame this backsliding on parents who are lax about having their children vaccinated because they believe that the diseases have been eradicated or they are alarmed about possible side effects. Federal and state officials have mounted aggressive publicity campaigns to promote the vaccines, and the CDC urges that all children be vaccinated—before they reach school age. As a CDC spokesperson says, "If parents don't vaccinate their children, we'll be back to where we were before vaccines."





# Building Defenses

*How immunizations work, and shots of things to come.*

**The makings of a vaccine.** Babies are born with natural defenses against many diseases, a legacy from maternal antibodies. Breastfeeding affords additional protection, but these immunological benefits wear off, leaving small children easy prey to a host of infectious diseases.

Vaccinations pick up where nature left off. Vaccines are made up of killed or weakened strains of disease-causing organisms (pathogens). The strains used in vaccines aren't strong enough to bring on a full-blown case of the disease, but they do contain portions of the pathogens, called antigens, which cause the body to build and store infection-fighting cells. These cells then circulate throughout the body like diligent sentries. Because of the vaccine's effect, when these cells come in contact with disease-causing organisms, they are primed to recognize them and kill them off, often before any outward signs of the disease appear.

**Future shots.** Dr. David Klein, bacterial vaccines program officer of the National Institute for Allergies and Infectious Diseases, is a man with a hopeful vision for tomorrow's children. "The idea is to try to eliminate infectious disease," he says. "The day may come when a vaccinated child won't have to go to a doctor more than once a year, for a general checkup."

Klein's pronouncement may sound like a pipe dream, but he and other medical professionals are heartened by new developments in the field of immunization. For instance, a vaccine that appears to provide safe and effective protection against chicken pox was developed in Japan 15 years ago and is undergoing tests there and in the United States. Some medical researchers are optimistic about the vaccine's being made available for widespread use in this country within the next 2 years.

Researchers in

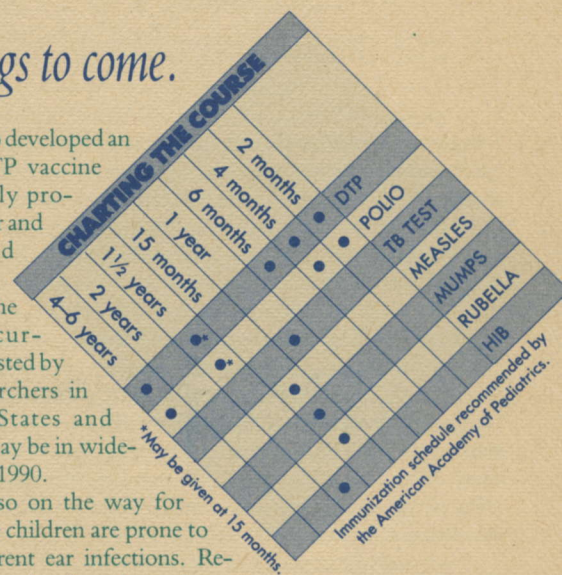
Japan have also developed an improved DTP vaccine that reportedly produces less fever and fussiness and fewer other side effects. The vaccine is currently being tested by medical researchers in the United States and abroad, and may be in widespread use by 1990.

Help is also on the way for parents whose children are prone to painful, recurrent ear infections. Researchers have developed vaccines to combat the two most common causes of middle-ear infections: the bacteria *Streptococcus pneumoniae* and nontypable *hemophilus influenzae*. These vaccines are still being refined, however, and they aren't expected to be marketed until 1995 at the earliest.

Kids may soon be spared bouts of the flu, thanks to a new breed of influenza vaccines. Initial tests showed they may be safer and more effective than the flu vaccines currently in use. (Unless children have respiratory problems, these vaccines are not routinely recommended.) Children will be happier about these new vaccines because they're given in nose-drop form rather than by injection. Further testing is required, and it may take another few years before the vaccines are generally available.

Vaccines for some forms of croup, diarrhea, and bronchitis are in the works, and pediatricians' waiting rooms will become considerably less crowded if this newest battery of children's vaccines makes it to the market as expected. □

*This month's Kidfile was researched and written by Margie Patlak, a freelance writer who specializes in medical issues.*



*On the horizon: new vaccines that will help children ward off many common childhood diseases.*

