Immunization

- a Handbook

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HOW IMMUNIZATION WORKS

The organisms that cause a disease (or materials produced from those organisms) are weakened or killed and then made into vaccines. These vaccines are injected into the body or are taken by mouth. The body reacts by making disease-fighting substances - antibodies - which build up in the system and guard against these diseases for a long time, often for a lifetime. Thus, immunization helps the body to defend itself against a particular disease.

CHILDREN AND IMMUNIZATION

Because they have received antibodies from their mother's blood system, babies are immune to many diseases when they are born. But this immunity wears off during the first year of life. That's why immunization programs, which help young bodies build their own defenses against disease, should be started early and carried out faithfully.

A WORD TO PARENTS

Immunizations are important. The eight childhood diseases (measles, mumps, rubella, diphtheria, tetanus, pertussis, Haemophilus influenza type b, and polio) which are preventable by immunization, can, and do, cause crippling and, sometimes, death. These illnesses are serious and their complications can be terrible.

With the exception of tetanus, these diseases are contagious. They can spread rapidly from child to child and from community to community. As long as children remain unprotected against them, serious outbreaks of disease - even epidemics - can occur. It is important for parents to understand what protection vaccines give and what risk vaccines create for their children. Generally, vaccines are among our safest and most effective medicines.

Like other medicines, however, vaccines can cause side effects. These are usually milk - a slight fever, a sore arm, a mild rash - and don't last long. But on rare occasions they are more serious. If your child receives a vaccine, gets sick and visits a doctor, hospital, or clinic during the 4 weeks after the immunization, this should be reported to the office or clinic where the vaccine was received.

The overwhelming majority of medical experts in this country and abroad believe that the benefits of complete immunization far outweigh the risks. The Public Health Service strongly recommends that all healthy children be immunized against all of the vaccine-preventable childhood diseases. State laws require that children must be immunized before being allowed to enter school, with some exceptions.

The purpose of this booklet, which discusses what you should know about eight dangerous diseases and the vaccines that can prevent them, is to help you make a decision on the basis of accurate information. This booklet covers the eight diseases against which all children should be immunized. New vaccines are now being developed and may be recommended for routine use in the near future.

Please read the material on the following pages and discuss any questions you have with your doctor or with the staff at the health department clinic. Learn all you can about the serious diseases of childhood. Then, make certain that your children are protected.

TETANUS (LOCKJAW)

Tetanus, commonly called lockjaw, is caused by a bacterium that is present just about everywhere, but mostly in the soil, dust, manure, and in the digestive tracts of humans, as well as in many animals.

Tetanus is not transmitted from one person to another. Rather, the germs enter the body through a wound - sometimes one as small as a pinprick or a scratch, but, more often, through deep puncture wounds and lacerations, such as those made by nails and knives. Such wounds are difficult to clean adequately, and if the tetanus bacteria were present on the nail or knife, they may remain deep in the wound, where they may grow and produce a toxin, or poison, that attacks the body's nervous system.

The first symptoms are likely to be headache, irritability and muscular stiffness in the jaw and neck. As the poison increases, the jaw, neck, and limbs become locked in spasm, the abdominal muscles grow rigid, and painful convulsions may occur. Doctors treat the terrible symptoms of tetanus with powerful tranquilizers and anti-spasmodic drugs. The symptoms last for several weeks and require intensive hospital care. Complications of tetanus include pneumonia and fractures, and simple exhaustion from the muscle spasms. In the United States four in every 10 persons who get tetanus die of it.

DIPHTHERIA

Years ago, diphtheria was a widespread and greatly feared disease. Through the 1920s, about 150,000 cases and 15,000 deaths occurred annually. Since that time, the disease has gradually declined. There were 910 cases in 1960, 435 in 1970, 146 in 1976. Today, only a few cases occur each year, thanks to parents who have made certain that their children are immunized against this terrible disease.

Diphtheria is caused by a bacterium that is found in the mouth, throat, and nose of a person infected with the disease. This germ is easily passed to others in the tiny droplets of moisture that are expelled by coughing or sneezing. Carriers - people, who harbor the bacteria but remain in apparent good health, also can spread diphtheria. Usually, diphtheria develops in the throat, where a grayish membrane may form. If the membrane continues to grow, it can interfere with swallowing. If it extends to the windpipe, it can block the passage of air and cause the patient to suffocate. Other early symptoms are sore throat, a slight fever, and chills.

Diphtheria is a treatable disease, but if the treatment is inadequate, or if it is not begun in time, a powerful toxin, or poison, may be produced by the diphtheria bacteria and may spread throughout the body. The poison may cause serious complications such as paralysis that may last for as long as 3 or 4 months, heart failure, or broncho-pneumonia. About 1 in every 10 persons who get diphtheria dies of it.

PERTUSSIS (WHOOPING COUGH)

Pertussis, or whooping cough, as it is more commonly known, is a highly contagious disease. Pertussis is caused by a bacterium that is found in the mouth, nose, and throat of a person infected with it. It is spread to others in the tiny droplets of moisture that are expelled by coughing or sneezing.

Pertussis causes severe spells of coughing which can interfere with eating, drinking, and breathing. In the United States, approximately 70 percent of reported pertussis cases occur in children younger than 5 years, more than half in infants less than 1 year of age. Pertussis is most serious in young children, and more than half of the children who get this disease are hospitalized. In recent years, over 2,000 cases of pertussis in the United States have been reported each year to the Centers for Disease Control.
Complications occur in a substantial proportion of reported cases. Pneumonia occurs in 1 in every 6 children with pertussis. For every 1,000 reported children with pertussis, 20 develop convulsions, and 4 develop inflammation of the brain (encephalitis). In recent years, an average of 9 deaths due to pertussis occurred each year.

DTP IMMUNIZATION

Immunization with DTP vaccine is one of the best ways to prevent these diseases. DTP vaccine is actually three vaccines, diphtheria, tetanus, and pertussis, combined into one shot. The vaccine is given by injection starting early in infancy. Several shots are needed to get good protection. Young children should be given three DTP shots in the first year of life and a fourth shot at about 15 months of age. A booster shot is important for children who are about to enter school, and should be given between their fourth and seventh birthdays.

The vaccine provides protection against tetanus in over 95 percent of those who get the recommended number of shots. Although the diphtheria and pertussis parts of the vaccine are not quite as effective, they still prevent most children from getting diphtheria or whooping cough, and make the diseases milder for those who do catch them.

Because pertussis is not very common or serious in older children, those 7 years of age and older should take combined diphtheria and tetanus vaccine that does not contain the pertussis part. Also, because reactions to the diphtheria part of the DTP vaccine may occur more often in older children, those 7 years of age and older should take a combined tetanus and diphtheria vaccine that has a lower concentration of the diphtheria part. This vaccine which contains no pertussis part and a lower concentration of the diphtheria part is called Td vaccine. Booster shots of Td vaccine should be taken every 10 years throughout life.

Some children, who are less than 7 years of age and have had certain reactions such as a convulsion, following receipt of a previous DTP shot should not receive the pertussis vaccine. Children who have a history of a convulsion prior to receipt of any

DTP vaccine, or who have other neurological disorders should check with their doctor before receiving DTP vaccine. A diphtheria and tetanus vaccine preparation called DT is available for children who should not receive pertussis vaccine. Children who have a family history of convulsions in parents or siblings have a very small increase in risk for a convulsion following a DTP shot. However, because of the overall risk of whooping cough, such children should be immunized with DTP. In the event of a convulsion at any time, including following the receipt of DTP, a doctor should see the child as soon as possible.

You should report any reactions to your health care provider. He or she can then determine whether you child should continue to receive DTP or receive DT instead. Possible Side Effects and Adverse Reactions to Diphtheria, Tetanus, and Pertussis Immunization . With DTP vaccine, most children will have a slight fever and will be irritable for up to 2 days after getting the shot. One half of children develop some soreness and swelling in the area where the shot was given. More serious side effects can occur. A temperature of 105F or greater may follow 1 in every 330 DTP shots. Continuous crying lasting 3 or more hours may occur after 1 in every 100 shots, and unusual, high-pitched crying may occur after 1 in every 900 shots.

Convulsions or episodes of limpness and paleness may each occur after 1 in every 1,750 shots. Children who have previously had a convulsion may be more likely to have another one after pertussis shots. Rarely, after about 1 in every 110,000 shots, other more severe problems of the brain may occur, and permanent brain damage may occur after about 1 in every 310,000 shots. Side effects from DT or Td vaccine are not common and usually consist only of soreness and slight fever. As with any drug or vaccine, there is a rare possibility that allergic or more serious reaction or even death could occur. Although some people have questioned whether DTP shots might cause Sudden Infant Death Syndrome (SIDS), the majority of evidence indicates that DTP shots do not cause SIDS.

If your child meets any of the following conditions, you should check with your child's doctor before any of the diphtheria, tetanus, pertussis vaccines are given.

1. Anyone who is sick at the time with something more serious than a cold

2. Anyone who has had a convulsion or is suspected to have a problem of the nervous system

3. Anyone who has had a serious reaction to DTP, DT or Td shots before, such as an allergic reaction to any vaccine component. A temperature of 105F or greater; an episode of limpness and paleness; prolonged continuous crying; an unusual, high-pitched cry; or a convulsive or other more severe problem of the brain.

4. Anyone taking a drug or undergoing a treatment that lowers the body's resistance to infection, such as cortisone, prednisone, certain anticancer drugs, or irradiation as the degree of protection provided by DTP - may be decreased.

HAEMOPHILUS INFLUENZA (HIB)

Haemophilus influenza type b disease, also called Haemophilus b or "Hib" disease can be a very serious disease. It is especially threatening to children under 5 years of age. About 12,000 cases of meningitis (inflammation of the covering of the brain) caused by Hib occur in the United States each year, mostly in the under 5 age group. About 1 child in every 20 who gets meningitis caused by Hib dies of it and about 1 in every 4 develops permanent brain damage. Hib can also cause pneumonia and infections of the blood, joints, bones, soft tissues, throat, and the covering of the heart.

Haemophilus b - Hib Immunization

The vaccine available for protection against Hib disease is called Haemophilus b conjugate vaccine or Hib vaccine. It is recommended to be given routinely to children at 18 months of age, and may be given to children between 1 1/2 and 5 years (18-60 months) of age. This vaccine has not been licensed for use in children younger than 18 months, so they should not be immunized. When given to children between 18 months and 5 years of age, the current Hib vaccine will protect for at least 1 1/2 to 3 years. In the future, Hib vaccines may become available to protect children younger than 18 months.

Possible Side Effects and Adverse Reactions to Hib Immunization:

This vaccine is among the safest of all vaccine products. The vaccine cannot cause meningitis. About 1 in every 8 children who receive the current Hib vaccine will have some slight redness or swelling or tenderness in the area where the shot was given. About 1 in every 140 children will develop a fever higher than 102.2 F. These reactions begin within 24 hours after the shot, but usually go away quickly.

MEASLES

Measles, also called rubella, can cause very serious illness. Usually it causes a rash, high fever, cough, runny nose, and watery eyes lasting 1 or 2 weeks. Sometimes it is more serious. It causes an ear infection or pneumonia in nearly 1 in every 10 children who get it. Approximately 1 child in every 1,000 who get measles has an inflammation of the brain (encephalitis). This can lead to convulsions, deafness, or mental retardation. About 2 children in every 10,000 who get measles dies from it. Measles can also cause a pregnant woman to have a miscarriage or give birth to a premature baby.

People catch measles by breathing in particles of the measles virus that a person infected with measles has expelled while coughing, sneezing, or simply talking. This disease is so contagious that, before vaccine was available, measles struck nearly all children by the time they were 15 years old and caused great many deaths. Measles is such a highly contagious illness that children who are not immunized have a high risk of getting measles either now or later in life.

Measles Immunization

All healthy children who have never had measles or been immunized against measles should be immunized at 15 months of age or later. The vaccine, first licensed for use in 1963, is very effective, and one injection produces long-lasting, probably lifelong, protection. Measles vaccine can be given alone or in combination vaccines that protect against measles and rubella (MR) or measles, mumps, and rubella (MMR). The measles vaccine or the combination vaccines containing measles vaccine should be given at 15 months of age.

MUMPS

Mumps has been a common disease of children. Usually it causes fever, headache, and inflammation of the salivary glands, which causes the cheeks to swell. Sometimes it is more serious. It causes a mild inflammation of the coverings of the brain and spinal cord (meningitis) in about 1 child in every 10 who get it. More rarely, it can cause inflammation of the brain itself (encephalitis) which usually goes away without leaving permanent damage. Mumps can also cause deafness. About 1 in every 4 adolescent or adult males who get mumps develops painful inflammation and swelling of the testicles. People catch mumps by breathing in particles of the mumps virus that a person infected with mumps has expelled while coughing, sneezing, or simply talking.

Before mumps vaccine was available, nearly every child got mumps before reaching adulthood. Now, because of the wide use of mumps vaccine, the number of cases of mumps is much lower. However, if children are not immunized, they still have a high risk of getting mumps.

Mumps Immunization

Children are to be considered susceptible to mumps unless they can provide proof of (1) physician-diagnosed mumps or laboratory evidence of mumps immunity, or (2) of having been immunized with live mumps virus vaccine at age 12 months or older. All healthy children who have never had mumps should be immunized on or after their first birthday. If in doubt, it is safe to be immunized or reimmunized against mumps, even if you actually are immune. The vaccine, which has been in use since 1967, also can be given to older children and adults. It is highly effective, and one injection produces long-lasting, probably lifelong, protection.

Mumps vaccine is available by itself or in combination vaccines that protect against mumps an rubella, or against measles, mumps, and rubella (MMR). The combination MMR vaccine, which is given at 15 months of age because it includes measles vaccine, protects the child against all three diseases.

RUBELLA (GERMAN MEASLES)

Rubella, also called German measles and 3-day measles, is usually a mild disease of childhood. However, it also affects adults, and outbreaks are common among unimmunized teenagers and young adults. If a woman gets rubella early in pregnancy she stands a 20 to 25 percent or greater chance of giving birth to a deformed baby. Miscarriages are also common.

The usual symptoms of rubella are mild discomfort, a slight fever for perhaps 24 hours, and a rash that appears on the face and neck and lasts for two or three days. Young adults who get rubella may experience swollen glands in the back of the neck and some temporary pain and stiffness in the joints (arthritis). Recovery from rubella is almost always speedy and complete.
Rubella occurs most often in the winter and spring and is quite contagious. People catch it by breathing in particles of the rubella virus that a person infected with rubella has expelled while coughing, sneezing, or simply talking.

The most common birth defects caused by the rubella virus are blindness, damage to the heart and major arteries, deafness, abnormally small brains, and mental retardation.
The best way to protect expectant mothers and their offspring from these tragic effects is to immunize children (thereby eliminating the usual source of infection) and to ensure that women are immune before they become pregnant. In addition to protecting the children, the child who can't catch rubella can't spread it to his or her mother or to other pregnant women.

Rubella Immunization

All healthy children should be immunized after their first birthday. The rubella vaccine, which has been in use since 1969, is highly effective and one injection produces long-lasting, probably lifelong, protection.
Rubella vaccine is available by itself or in combination vaccines that protect against measles and rubella (MR), or mumps and rubella, or measles, mumps, and rubella (MMR). Any combination, which contains the measles vaccine, should be given at 15 months of age.

Experts also recommend that adolescents and adults - especially women of childbearing age - who are not known to be immune to rubella should receive rubella vaccine (or MMR if they might also be susceptible to measles or mumps). Persons should consider themselves immune to rubella ONLY if they can document that they

were immunized on or after their first birthday or that they had a blood test indicating they are immune. Because clinical diagnosis is not reliable, having had an illness, which was called rubella (even by a doctor), is not proof of immunity. If in doubt, it is safe to get immunized or reimmunized against rubella, even if you actually are immune.

Women should not receive the vaccine if they are pregnant or might become pregnant within 3 months. However, rubella immunization during pregnancy is not ordinarily an indication for interruption of pregnancy.

Possible Side Effects and Adverse Reactions to Measles, Mumps, and Rubella Immunization

MEASLES - About 1 in every 5 children will develop a rash or slight to moderate fever beginning 1 to 2 weeks after receiving measles vaccine and lasting for a few days. These common reactions usually do not harm the child in any way.

MUMPS - In very rare instances, mumps vaccine produces a mild brief fever. This fever may occur 1 to 2 weeks after receiving the mumps vaccine. Occasionally, there is some swelling of the salivary glands. Serious reactions are extremely rare.

RUBELLA - About 1 in every 7 children will develop a rash or some swelling in the lymph glands within a week or two after receiving rubella vaccine. These side effects usually last only a day or two. About 1 in every 20 children and as many as 40 percent of adults who receive the vaccine will have some pain and stiffness in the joints. This condition may appear from 1 to 3 weeks after the immunization. It is usually mild and lasts for only 2 or 3 days. Other temporary side effects, such as pain, numbness, or tingling in the hands and feet, have also occurred, but are uncommon. It is safe to have a child immunized even if there is a pregnant person in the household. The rubella vaccine virus is not spread from one person to another.

Although experts are not sure, it seems that on rare occasions, children who receive these vaccines (i.e. measles, mumps, and rubella) may have a more serious reaction, such as inflammation of the brain (encephalitis). Parents should be aware of this possibility. Medical authorities agree that the benefits of immunization far outweigh the risks.

POLIO

As recently as the 1950s, polio was a fairly common disease, much feared by parents of small children. With the development of the first inactivated polio vaccine, in 1954 that was given by injection, this picture began to change. Over the next several years, as this vaccine gained acceptance and as the newer oral vaccine (first licensed in 1961) came into use, the number of cases of paralytic polio plummeted, from more than 20,000 in 1952 until today when only a few cases occur each year

Poliomyelitis is a contagious viral disease that, in its severe form, can cause permanent paralysis, and occasionally death. Polio is an extremely dangerous disease, and every parent should know about it. A virus that lives in the nose throat and, especially, in the intestinal tract of a person infected with it causes polio. Many people who are infected by the poliovirus have no symptoms but may still spread the infection to others.

The milder forms of polio usually begin abruptly and last, at most, a few days. When symptoms are present, they include fever, sore throat, nausea, headache, and stomachache. Sometimes, the patient will feel pain and stiffness in the neck, back, and legs. Paralytic polio begins with these same symptoms, but severe muscle pain is usually present, and if paralysis occurs, it does so within the first week. There is no specific treatment for polio, and the degree of recovery varies from patient to patient. About half of all patients who recover have mild disabilities or none at all. The rest may suffer permanent paralysis.
Our success in preventing the spread of wild poliovirus has been so great that most of the recent cases have resulted from the rare side effects of oral polio vaccine. Because of this fact, some people have asked why we should continue to use oral polio vaccine. The reason is that, even though we may not have much wild poliovirus spreading here now, there are thousands of cases in the rest of the world; therefore, there is a risk of polio being reestablished here if our children are not immunized. Oral polio vaccine is thought to establish a more effective community barrier to polio infection than inactivated polio vaccines.

Polio Immunization

All healthy infants and young people between the ages of 6 weeks and 18 years who have never been immunized against polio should receive polio vaccine in a series of properly spaced doses.

Immunizations with "live" oral polio vaccine (OPV) are one of the best ways to prevent polio. It is given by mouth starting in early infancy. Several doses are needed to provide good protection. Young children should get two or more doses in the first year of life and another dose at 15 months of age. An additional dose is important for children when they enter school or when there is a high risk of polio, such as during an epidemic or when travelling to a place where polio is common.

The vaccine is easy to take and is effective in preventing the spread of polio. A primary series of OPV gives protection in over 90 percent of those who receive the vaccine, probably for life. Because OPV viruses live for a time in the intestinal tract of the person who is immunized, some of the viruses pass in the stool and can spread from the immunized person to those in close contact (usually household members). This may help to immunize these persons and is one of the advantages of OPV.
Besides the "live" oral polio vaccine (OPV), there is also an inactivated (killed) polio vaccine (IPV) given by injection which protects against polio after several shots. Because OPV seems to provide stronger immunity in the intestinal tract (where infection first occurs), is simpler to administer, and is more effective in preventing the spread of poliovirus than IPV; most polio experts feel that the oral vaccine is more effective for controlling polio.

Inactivated polio vaccine is recommended for persons needing polio immunization who have low resistance to serious infections or who live with persons with low resistance to serious infections. It may also be recommended for previously unimmunized adults who plan to travel to a place where polio is common or for previously unimmunized adults whose children are to be immunized with OPV. It is not widely used in this country at the present time, but it is available.

Possible Side Effects and Adverse Reactions to Polio Immunization

Very rarely (about 1 in every 7.8 million doses distributed), oral polio vaccine (OPV) causes paralytic polio in the person who is immunized. The risk is higher following receipt of the first dose of OPV and in persons with abnormally low resistance to infection and may be higher in adults being immunized. Also, on rare occasions (about 1 in every 5.5 million doses of OPV distributed), paralytic polio may develop in a close contact of a person recently immunized with OPV. This risk also is somewhat higher to contacts of persons receiving their first dose of OPV. These risks are very low, but they should be recognized and balanced against the risk of disease. Inactivated polio vaccine (IPV) is not known to produce any side effects other than minor local pain and redness.