

Immunizations

Vaccines and Adults

A Lifetime of Health



Second Edition, 2010



The Children's Hospital of Philadelphia®



VACCINE EDUCATION CENTER

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You've got a job,



a family and a mortgage.

Isn't it time to update your shots?

Adults are 100 times more likely than children to die of diseases that vaccines can prevent. Each year in the United States, vaccine-preventable diseases claim the lives of 500 children and approximately 50,000 adults.

While childhood immunization rates are at an all-time high, most adults don't even realize they need to get vaccines. Adults often don't get vaccines because they don't think they need them, they are worried about how they are going to pay for them and they typically haven't been encouraged to get them.

But they need to — influenza, pneumococcus, hepatitis B, cervical cancer, shingles and whooping cough are all adult diseases that can be prevented by vaccines.

In this booklet, we describe adult vaccines, the diseases they prevent and who should get them. We will remind you why vaccines are an important part of your health and why your doctor feels strongly about their value.



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HOW DO VACCINES WORK?



Vaccines and the immune system

When we get sick from infection with a virus or bacteria, we usually will not get that illness again. That is because our immune systems have memory. Immune cells, called T cells and B cells, monitor our bodies after an infection, and if the same offender comes back, the immune system recognizes and kills the virus or bacteria before it can hurt us.

Vaccines are made with a form of the virus or bacteria that cannot make us sick, but they allow our immune systems to develop memory cells and subsequently protect our bodies.

Did you know?

Our immune system has two parts to fight infections: one part that quickly attacks anything foreign to our bodies, called our innate immune system, and one part that provides specific immune responses to different viruses and bacteria, called our adaptive immune system. The adaptive immune system is the one that vaccines strengthen.

Why do adults need vaccines?

By the time we are adults, our immune systems have seen many infections and developed many memory cells. However, there are several reasons why vaccines are still necessary:

- Sometimes the vaccine does not provide lifelong protection because immunity fades (examples: diphtheria, tetanus and pertussis vaccines).
- Sometimes the virus or bacteria changes through time, so the memory cells will not recognize it as well, or even at all (example: influenza).
- Sometimes the aging immune system becomes susceptible to diseases that were less of a threat at an earlier age (examples: shingles and pneumococcus).

Did you know?

Any HIV vaccine that is developed would need to be adapted to changes that the virus naturally makes. These continual changes, like those of influenza, are one of the reasons that the development of an HIV vaccine has been so difficult.

Types of vaccines

There are several different methods for making vaccines:

- Use the live, weakened virus. Examples of this type are the shingles, chickenpox, measles, mumps, rubella and inhaled influenza vaccines.
- Use the whole, killed virus or bacteria. Examples are the influenza shot and hepatitis A vaccines.
- Use a piece of the virus or bacteria. The hepatitis B, human papillomavirus (HPV), meningococcal and pneumococcal vaccines are made by this method. Sometimes, these pieces of the virus or bacteria are linked to another protein that helps make the immune response stronger.
- In some cases, poisons produced by the bacteria are the cause of disease. To protect people from illness, they must be protected against the poisons more than from the bacteria. These vaccines contain the poisons that have been modified, so that they cannot cause illness. The vaccines for tetanus, diphtheria and pertussis are examples of this type.

Vaccines are made with a form of the virus or bacteria that cannot make us sick.

VACCINE FOR ALL ADULTS

Td (Tetanus-diphtheria) or Tdap Vaccine • Influenza Vaccine



Td/Tdap (Tetanus-diphtheria-acellular pertussis) Vaccine

WHO SHOULD GET THE Td/Tdap VACCINE?

- adults who had their tetanus-diphtheria booster at least five years ago and who have not previously gotten the Tdap vaccine should receive the Tdap version
 - adults should get Td boosters every 10 years
-

What diseases do the Td and Tdap vaccines protect against?

Td vaccine protects against tetanus and diphtheria. Tdap vaccine protects against tetanus and diphtheria as well as pertussis.

The “T” stands for tetanus. Tetanus is a bacterium that typically infects older adults. The tetanus bacterium makes a poison (called a toxin) that causes severe and painful spasms of the muscles, including the muscles of the jaw. (Tetanus is often referred to as “lockjaw.”)

Sometimes, tetanus can be fatal. Muscle spasms of the throat can block the windpipe and cause instant death from suffocation. The tetanus toxin can also cause severe and permanent damage to the heart. About three of every 10 people who get tetanus die from the disease.

The tetanus bacterium is present in the soil and can enter the skin after a cut or puncture wound. Because tetanus bacteria will always be present in soil, the risk of getting infected with tetanus will never go away.

Did you know?

The tetanus vaccine is the only vaccine that protects against a disease not transmitted from one person to another.

The “d” stands for diphtheria. Diphtheria is caused by a bacterium that typically infects children and adolescents. However, recent outbreaks in other countries have been primarily among adults, due to fading immunity as people age.

The diphtheria bacterium causes a thick coating on the back of the throat that makes it difficult to swallow and breathe. Also, the bacterium makes a harmful protein (toxin) that can invade the heart, kidneys and nervous system. In children younger than 5 and adults older than 40 years, one of every five people infected with diphtheria dies from suffocation, heart failure or paralysis.

Diphtheria is very contagious and is spread by coughing and sneezing.

Did you know?

The bacteria that cause diphtheria are only found in people, whereas most other bacteria are found in some animals as well as people.

The “p” stands for pertussis. Pertussis is a bacterium that infects infants, children, adolescents and adults.

Pertussis bacteria make several toxins causing people to have thick, sticky mucus that clogs the windpipe and causes painful spasms of coughing. When people breathe in against their narrowed windpipe, it causes a whooping sound, which is why pertussis is also known as whooping cough. Coughing spasms make it difficult to breathe, eat or drink. People with a cough lasting for several weeks may well be infected with pertussis, a common infection.

Did you know?

Pertussis is also known as the 100-day cough.

Pertussis bacteria can also cause pneumonia, seizures and permanent brain damage.

Young infants are particularly at risk because of their small windpipes. Since adults are known to pass the disease to children, it is important for adults to be immunized as a means of protecting infants who are too young to have completed their immunizations.

Did you know?

While most diseases are passed from children to adults, pertussis is often transmitted in the opposite direction, from adults to children.

What is my chance of getting one of these diseases?

Each year in the United States, there are approximately 40 cases of tetanus with several deaths, two to five cases of diphtheria, and more than 800,000 cases of pertussis with 15 to 20 deaths.

What is the Tdap vaccine?

For each of these bacteria, the toxins they produce are inactivated with a chemical. The chemical is then washed away, leaving the purified, inactivated toxin (called toxoid).

People with a cough lasting for several weeks may well be infected with pertussis, a common infection.

How is the Tdap vaccine different from the Td vaccine?

Tdap differs from the Td vaccine because it also contains the pertussis toxoid. Both adolescents and adults should get the Tdap vaccine instead of the Td vaccine for their next booster. Subsequent doses (every 10 years) are currently recommended for the Td vaccine.

Does either vaccine cause any reaction?

Both the Tdap and the Td vaccines could cause mild reactions like pain, redness or tenderness at the site of the injection. Headache, fatigue or low-grade fever might also occur.

Occasionally, and particularly in adults, there is an exaggerated local reaction at the injection site resulting in swelling from the shoulder to the elbow.

Do the benefits of the vaccine outweigh the risks?

Every year in the United States, people are infected with these diseases, and some die from them. Although severe reactions are a very rare consequence of these vaccines, these reactions do not result in permanent harm or death. Therefore, the benefits of the vaccine clearly outweigh its risks.



Influenza Vaccine

WHO SHOULD GET THE INFLUENZA VACCINE?

- everyone 6 months of age and older
-

What is influenza?

Influenza is a virus that infects the respiratory system, attacking the lining of the nose, windpipe, large breathing tubes, small breathing tubes and lungs.

Every year in the United States, approximately 200,000 people are hospitalized and thousands to tens of thousands die from severe pneumonia caused by influenza.

Most of the deaths caused by influenza occur in people 65 or older. However, young children are more likely than adults to be hospitalized with infections caused by influenza, and young children commonly transmit influenza virus to their parents and grandparents. In addition, people with diseases such as asthma are, like the elderly, at high risk of severe pneumonia and death from influenza.

What is my risk of getting influenza infection?

Influenza is extremely common. Hundreds of thousands of people are hospitalized each year with fever, croup (infection of the voice box), pneumonia, bronchitis (infection of the large breathing tubes) or bronchiolitis (infection of the small breathing tubes) caused by influenza virus.

What is the influenza vaccine?

There are two different influenza vaccines.

- The inactivated influenza vaccine (the flu shot) is made by taking influenza viruses, growing them in eggs, purifying them and chemically inactivating them so they cannot cause disease.
- The live, weakened influenza vaccine (FluMist®) is made so it cannot grow in the lungs. However, because the weakened influenza viruses can grow in the lining of the nose, they cause an excellent protective immune response. FluMist is also made by growing the viruses in eggs. This vaccine is given as a nasal spray.

Both vaccines are reformulated annually so that they contain the three different strains of influenza viruses expected to cause disease that year.

Does the influenza vaccine cause any reactions?

The influenza vaccine causes fever, muscle aches and fatigue in less than 1 percent of people. These reactions usually begin six to 12 hours after immunization and can persist for one to two days. Reactions are most likely to occur in children who were not immunized with influenza vaccine or were not infected with influenza virus before (typically very young children).

People known to be allergic to eggs will rarely have a severe allergic reaction to the influenza vaccine.

Do the benefits of the influenza vaccine outweigh the risks?

Influenza virus kills thousands to tens of thousands of people every year. In addition, about 200,000 people are hospitalized when influenza virus causes fever, croup, bronchitis, bronchiolitis or pneumonia. Because the vaccine does not cause serious reactions, the benefits of the vaccine clearly outweigh its risks.

Because other viruses cause respiratory illnesses and colds, it is important to remember the influenza vaccine will only protect against influenza viruses.



VACCINES FOR ALL ADULTS 60 YEARS AND OLDER

Td (Tetanus-diphtheria)/Tdap Vaccine •
Influenza Vaccine • Shingles Vaccine

Shingles Vaccine

WHO SHOULD GET THE SHINGLES VACCINE?

- all adults 60 years and older who have not had the vaccine before (even if they have had shingles)
-

What is shingles?

Shingles is a disease caused by a reawakening of the chickenpox virus. Therefore, shingles only occurs in people who have already had chickenpox. Shingles most often occurs in elderly people and people with weakened immune systems.

Common symptoms of shingles include a rash — usually along a nerve path — and severe pain. Sometimes the pain can last for months or years. The pain can be so severe that it leads to sleeplessness, depression and weight loss. Some people are so debilitated from the pain that they cannot complete everyday activities such as bathing and dressing. The severity of the pain also can impair sufferers' normal social activities.

Approximately 15 of every 100 cases of shingles involve the nerves around the eye and might lead to reduced vision or blindness.

What is my chance of getting shingles?

Every year in the United States, shingles affects between 500,000 and 1 million people. Twenty to 30 of every 100 people can expect to get shingles during their lifetime. For people who live to be 85 years old, at least half of them will have a bout with shingles.

Did you know?

Up to five of every 100 people who get shingles will get it again.

How do you catch shingles?

People don't catch shingles from others. People who had chickenpox can get shingles because the virus that causes chickenpox lives silently in their nervous system for many years. The virus reawakens as the immune system is weakened from advancing age, viruses or immune-suppressive drugs, such as those used to treat cancers.

Did you know?

A person with shingles can give chickenpox to a person who has not previously had either chickenpox or a chickenpox vaccine. Transmission occurs by exposure to open blisters. If blisters haven't yet developed or if they are crusted over or covered, transmission is less likely.

What is the shingles vaccine?

The shingles vaccine is a more concentrated version of the chickenpox vaccine that is currently given to children. Both are made from the same live, weakened form of the chickenpox virus.

How is this vaccine different from the chickenpox vaccine?

The shingles vaccine contains about 14 times the amount of weakened chickenpox virus as the vaccine for children. This amount of virus is needed to induce a protective response in people who have already been infected with chickenpox virus but need to boost their immunity.

Does the shingles vaccine cause any reactions?

The shingles vaccine is safe. Common side effects include redness, pain, swelling and itching at the injection site. A few people might also get a rash at the site of injection.

Do the benefits of the vaccine outweigh the risks?

Each year, 500,000 to 1 million people in the United States have shingles. Because the vaccine does not cause serious reactions, the benefits of the vaccine clearly outweigh its risks.



VACCINES FOR ALL ADULTS 65 YEARS AND OLDER

Td (Tetanus-diphtheria)/Tdap Vaccine •
Influenza Vaccine • Shingles Vaccine • Pneumococcal Vaccine

Pneumococcal Vaccine

WHO SHOULD GET THE PNEUMOCOCCAL VACCINE?

- adults 65 years of age and older
 - people with chronic illnesses such as cardiovascular disease, pulmonary disease, diabetes, alcoholism or chronic liver disease (cirrhosis)
 - people without a spleen
 - people with Hodgkin's disease, lymphoma, multiple myeloma, chronic renal failure, kidney disease or organ transplantation
 - people undergoing chemotherapy
 - people infected with the AIDS virus
 - people living in high-risk environments or social settings
 - people who smoke
-

What is pneumococcus?

Pneumococcus is a bacterium that causes several different types of serious infections, the most common of which is pneumonia. People with pneumonia have high fever, cough and rapid, difficult breathing. Sometimes, an accumulation of pus can cause a lung to collapse. Pneumococcus can also infect the blood (bacteremia), or the brain and spinal cord (meningitis).

What is my chance of getting pneumococcus?

Each year in the United States, approximately 175,000 people are hospitalized with pneumonia caused by pneumococcus, which is how the bacteria got its name. The elderly are particularly vulnerable to this infection, especially those in nursing homes. Among the elderly, five to seven of every 100 people die from pneumonia caused by pneumococcus. If the bacteria reach



the bloodstream, approximately six of 10 elderly people with this disease could die from it. In addition, there are 3,000 to 6,000 cases of pneumococcal meningitis in the nation each year. Eight of every 10 elderly people who get pneumococcal meningitis die from their infections.

How do you catch pneumococcus?

Pneumococcal infections are passed from one person to another by coughing and sneezing. The pneumococcal bacteria live in the noses and throats of 25 of every 100 people. Transmission occurs more often in crowded settings, and during the winter and early spring.

What is the pneumococcal vaccine?

There are two vaccines to protect against pneumococcus. The one for adults has been used since the early 1980s. It contains the sugar coating (called polysaccharides) from 23 different types of pneumococcal bacteria. These 23 types are responsible for most pneumococcal disease in adults. The vaccine is called the pneumococcal polysaccharide vaccine.

The second pneumococcal vaccine was developed for very young children because they are also at increased risk for this infection, but the polysaccharide vaccine did not protect them. In this version, polysaccharides from the most common causes of pneumococcal infections in children are attached (or conjugated) to a harmless protein that allows children to be better protected. This vaccine is referred to as the pneumococcal conjugate vaccine.

Did you know?

Interest in developing a pneumococcal vaccine waned after the discovery of penicillin. However, with the emergence of antibiotic resistance, interest in vaccine development was reignited about 20 years later.

Does either of the two pneumococcal vaccines cause any reactions?

In both cases, the vaccine might cause mild pain, redness and tenderness at the site of the injection. In a small subset of patients, a mild fever might also occur.

Do the benefits of the vaccine outweigh the risks?

Every year in the United States, people die from infections caused by pneumococcus. Because pneumococcal vaccines do not cause severe reactions, the benefits of getting the vaccine outweigh the risks.

Each year in the United States, approximately 175,000 people are hospitalized with pneumonia caused by pneumococcus.



VACCINES FOR SOME ADULTS

- Pneumococcal Vaccine • Human Papillomavirus (HPV) Vaccine
 - Hepatitis A Vaccine • Hepatitis B Vaccine
 - Varicella (Chickenpox) Vaccine
 - Measles-Mumps-Rubella (MMR) Vaccine
 - Meningococcal Vaccine

Pneumococcal Vaccine — Some groups of adults are recommended to get the pneumococcal vaccine regardless of their age, including:

- people with chronic illnesses such as cardiovascular disease, pulmonary disease, diabetes, alcoholism or chronic liver disease (cirrhosis)
- people without a spleen
- people with Hodgkin's disease, lymphoma, multiple myeloma, chronic renal failure, kidney disease or organ transplantation
- people undergoing chemotherapy
- people infected with the AIDS virus
- people living in high-risk environments or social settings
- people who smoke

Refer to pages 12 – 14 for more information.

Human Papillomavirus Vaccine (HPV)

WHO SHOULD GET THE HPV VACCINE?

- all adolescents and young adults up to 26 years of age who have not previously received three doses of the vaccine
-

What is human papillomavirus?

Human papillomavirus (HPV) is a virus that infects the genital area and the lining of the cervix. There are many different types of HPV. Some types cause genital warts in men and women and other types cause cervical cancer.



Did you know?

The HPV vaccine is the second vaccine to prevent a form of cancer. The first cancer-prevention vaccine was the hepatitis B vaccine, developed in the early 1980s.

What is my chance of getting HPV?

Every year in the United States, 6 million people are newly infected with HPV. About 20 million people in the United States are already infected. About 10,000 women are diagnosed with cervical cancer each year, and 4,000 die.

How do you catch HPV?

HPV is transmitted by genital contact, most often during sex. Although condoms are helpful, they are not completely protective.

What is the HPV vaccine?

The HPV vaccine is made using a protein from the surface of the HPV virus. The vaccine contains this protein from four different types of HPV — the two that most commonly cause cervical cancer and the two that most often cause genital warts.

Do women who get this vaccine still need to get Pap tests?

Yes. The HPV vaccine does not protect against other papillomavirus strains that account for about 30 percent of cervical cancers, so women should still be screened regularly.

Do women who get this vaccine still need to worry about sexually transmitted diseases?

Yes. The HPV vaccine does not protect against all types of HPV, nor does it prevent other types of sexually transmitted infections such as syphilis, gonorrhea, chlamydia and herpes.

Does the HPV vaccine cause any reactions?

The vaccine might cause pain or redness at the site of injection. A small number of people also get a slight fever.

Do the benefits of the vaccine outweigh the risks?

Every year, thousands of people are infected with HPV and some die from their infections. Since the vaccine does not cause any serious reactions, the benefits of getting the vaccine clearly outweigh the risks.

Hepatitis A Vaccine

WHO SHOULD GET THE HEPATITIS A VACCINE?

- people traveling to countries with moderate or high rates of hepatitis A
 - men who have sex with men
 - people who share needles using injection drugs
 - people who have chronic liver disease or who receive clotting factor concentrates
 - laboratory workers who work with hepatitis A virus
 - people who want to be protected against hepatitis A virus
-

What is hepatitis A?

Hepatitis A is a virus that infects the liver. Some adults who catch hepatitis A don't have any symptoms. Some have loss of appetite, vomiting, nausea, fatigue and jaundice (yellowing of the eyes and skin). Hepatitis A virus infections are often much less severe than hepatitis B virus infections. *(See next page.)*

However, hepatitis A virus can cause a rapid, overwhelming infection of the liver and death; this usually occurs in people with chronic liver disease.

Did you know?

Hepatitis A used to be known as infectious hepatitis because it is transmitted through contaminated food and water, whereas hepatitis B was known as serum hepatitis because it is transmitted in blood.

People who catch hepatitis A often don't have any symptoms.

What is my risk of getting hepatitis A infection?

Hepatitis A virus is usually spread from one person to another or in contaminated food or water. Every year, tens of thousands of people in the United States get hepatitis A virus infections and about 100 die from the disease.

What is the hepatitis A vaccine?

The hepatitis A vaccine is made by taking hepatitis A virus, purifying it and completely inactivating it with a chemical (formaldehyde).

Does the hepatitis A vaccine cause any reactions?

The vaccine might cause pain, warmth or swelling where the shot was given, or a headache.

Do the benefits of the hepatitis A vaccine outweigh the risks?

Every year, thousands of people in the United States are infected with hepatitis A virus, and some die. The hepatitis A vaccine does not cause any severe reactions. Therefore, the benefits of the hepatitis A vaccine clearly outweigh its risks.

Hepatitis B Vaccine

WHO SHOULD GET THE HEPATITIS B VACCINE?

- healthcare workers who may have contact with blood
- sexually active people who are not in long-term, mutually monogamous relationships
- men who have sex with men
- people with any sexually transmitted diseases
- people who live with or are physically intimate with a chronically infected person
- people with chronic liver disease
- people traveling to countries with moderate or high rates of hepatitis B
- people receiving hemodialysis
- prison inmates
- people who share needles using injection drugs
- clients and staff of institutions for persons with developmental disabilities

What is hepatitis B?

Hepatitis B is a virus that infects the liver. Every year in the United States, about 4,500 new cases of hepatitis B are diagnosed. Most people who catch hepatitis B virus don't have any symptoms. Some have loss of appetite, vomiting, nausea, fatigue and jaundice (yellowing of the eyes and skin).

Hepatitis B virus can also cause a rapid, overwhelming infection of the liver, a long-term liver disease called cirrhosis, and liver cancer. Young infants infected with hepatitis B virus are more likely to develop cirrhosis than older children or adults; however, every year in the United States, thousands of people die from the complications of hepatitis B virus infections.

Did you know?

Since hepatitis B vaccine is now recommended for all children, scientists predict a dramatic decrease in the number of cases of liver cancer as these children become adults.



What is my risk of getting hepatitis B?

A common misconception is that hepatitis B virus is spread only by sexual contact among adults. The reality is that hepatitis B virus can also be spread in other ways:

- Mothers who are infected with hepatitis B virus can pass the infection on to their babies at birth.
- Because hepatitis B can be present at low levels in saliva, the virus can also be transmitted by sharing toothbrushes or washcloths.

Because most people infected with hepatitis B virus don't have any symptoms, they often don't know they are infected. Up to 2 million people in the United States are infected with hepatitis B virus and can spread the infection to others.

What is the hepatitis B vaccine?

The hepatitis B vaccine is made by isolating the protein coat that surrounds the virus (called the hepatitis B surface protein). Immunity to this protein protects people from infection with the virus.

Does the hepatitis B vaccine cause any reactions?

The hepatitis B vaccine can cause pain, redness and tenderness at the site of the shot. Rarely, the hepatitis B vaccine causes fever. The hepatitis B vaccine can also rarely cause a severe hypersensitivity (allergic) reaction. This reaction occurs in about one of every 600,000 people given the vaccine. Symptoms include hives, rash or low blood pressure and usually occur within 30 minutes of receiving the vaccine.

Do the benefits of the hepatitis B vaccine outweigh the risks?

Every year, thousands of people are permanently harmed or killed by hepatitis B virus. Many of these people catch the infection from friends, family members or relatives who didn't know they were infected. On the other hand, severe reactions to the hepatitis B vaccine are extraordinarily rare. Therefore, the benefits of the hepatitis B vaccine clearly outweigh its risks.



Varicella (Chickenpox) Vaccine

WHO SHOULD GET THE VARICELLA VACCINE?

- adults who have not been diagnosed with chickenpox by a healthcare provider or who have not received the chickenpox vaccine
 - adults who previously received only a single dose of the chickenpox vaccine
-

What is varicella?

Varicella (chickenpox) is a very contagious virus that is spread by coughing and sneezing. People infected with varicella usually develop fever as well as about 300 to 500 blisters over their entire body.

Varicella can also infect the lungs (pneumonia) and the brain (encephalitis) and can set the stage for severe skin infections (caused by “flesh-eating” bacteria). While varicella more commonly infects young children, teens and adults tend to suffer more severe complications when infected. For example, only about five of every 100 cases of chickenpox are in adults; however, approximately 35 of every 100 deaths from chickenpox are in adults. Varicella can also infect unborn babies during pregnancy, causing birth defects or fetal death.

Did you know?

People infected with chickenpox are at a greater risk of having an infection with something commonly known as “flesh-eating bacteria.” This happens when open blisters become infected with bacteria. These infections are one of the most common causes of hospitalization for people with chickenpox.

What is my risk of getting varicella?

Before the varicella vaccine, almost everyone got varicella during childhood. Since the varicella vaccine first became available in 1995, the incidence of varicella infections has decreased tenfold. However, varicella infections are still fairly common in the United States.

People infected with varicella usually develop fever as well as about 300 to 500 blisters over their entire body.

What is the varicella vaccine?

The varicella vaccine is a live, weakened form of the chickenpox virus. The vaccine is made by growing the virus in specialized cells in the laboratory. As the virus gets better at growing in the laboratory cells, it gets worse at growing in people. So, when used as a vaccine, the immune system remembers the chickenpox virus, but the person does not get ill from it.



Does the varicella vaccine cause any reactions?

Some people develop reactions like pain, redness or tenderness at the site of injection. Less than 5 percent of recipients will develop a few blisters after receiving the vaccine.

Do the benefits of the varicella vaccine outweigh the risks?

Before the varicella vaccine became available, every year, thousands of people were hospitalized and some were killed by varicella. The varicella vaccine has decreased, but not eliminated, chickenpox infections in the United States.

Because varicella infections are still fairly common, and because the disease is highly contagious, a choice not to get the varicella vaccine is a choice to risk getting varicella. Because the vaccine does not cause any serious reactions, the benefits of the varicella vaccine clearly outweigh its risks.

Less than 5 percent of recipients will develop a few blisters after receiving the varicella vaccine.

Measles-Mumps-Rubella (MMR) Vaccine

WHO SHOULD GET THE MMR VACCINE?

- people born during or after 1957 who have not had measles, mumps or rubella or the MMR vaccine (Adolescent girls and women who are not pregnant and have not had rubella are of particular concern because of risk to their future babies.)
 - people entering college
 - healthcare workers
 - international travelers
-

What diseases does the MMR vaccine protect against?

MMR vaccine protects against three diseases:

1. The first “M” stands for measles. Measles is a virus that infects the lining of the back of the throat and nose. People with measles have cough, runny nose, fever, pink eye and a rash that starts on the face and spreads to the rest of the body. Measles virus can also infect the lungs (causing pneumonia) and the brain (causing permanent brain damage or death). Measles is very contagious and is spread by coughing and sneezing.
2. The second “M” stands for mumps. Mumps is a virus that typically causes a painful swelling of the glands located just below the ear (parotid glands). Mumps also infects the lining of the brain and spinal cord (meningitis) and can cause permanent hearing loss. Mumps can also infect the unborn child in the first trimester of pregnancy and cause fetal death.

3. The “R” stands for rubella. Rubella is a virus that typically causes swelling of the glands behind the ear, mild rash and fever. Rubella infections are usually mild in young children. However, when a woman is infected with rubella virus during pregnancy, the virus can cause permanent and severe birth defects or miscarriage.

What is my chance of getting one of these diseases?

In 2005, the Centers for Disease Control and Prevention (CDC) declared that rubella had been eliminated from the United States. Several hundred cases of mumps and fewer than 100 cases of measles are reported each year in this country. However, as immunization coverage has improved, the relative number of adults getting disease during outbreaks has increased. For example, since 1990, people

15 years and older have accounted for 30 to 40 percent of the cases of mumps. In addition, adults who get these diseases tend to experience more complications.

What is the MMR vaccine?

The vaccine contains live, weakened forms of the measles, mumps and rubella viruses. The vaccine is made in the same manner as the chickenpox vaccine. (*See page 22.*)

Does the MMR vaccine cause any reactions?

Some people given the MMR vaccine develop pain, redness or tenderness at the site of injection. The vaccine might also cause fever or a rash that occurs eight to 10 days after the vaccine is given. This happens in approximately five to 15 people out of every 100 who get the vaccine.

The MMR vaccine can also cause a decrease in the number of cells in the bloodstream that help the blood clot (platelets). This reaction is extremely rare (occurring in about one in 24,000 people) and is not a cause of death or prolonged hospitalization.

The rubella component can also cause a short-lived swelling of the small joints (arthritis). The arthritis is temporary and occurs primarily in adolescent girls and women given the vaccine.

Did you know?

Some people feared that the MMR vaccine was a cause of autism. This led to decreased rates of vaccine coverage and subsequent disease outbreaks.

Ten large, carefully performed scientific studies have now clearly shown that the MMR vaccine does not cause autism.

Do the benefits of the MMR vaccine outweigh the risks?

Although infections with these three viruses are uncommon in the United States, they are common in other parts of the world. So a drop in immunization rates would increase the likelihood of outbreaks in this country. For example, as recently as 2008, about 140 people got measles and several children were hospitalized. Similarly, thousands of young adults developed mumps in 2006 in the United States.

Because severe reactions to the MMR vaccine are extraordinarily rare, the benefits of the vaccine clearly outweigh its risks.

Meningococcal Vaccine

WHO SHOULD GET THE MENINGOCOCCAL VACCINE?

- people without a spleen
 - people with an uncommon immune problem called complement deficiency
 - travelers to areas where meningococcal disease is present
 - military recruits
 - lab workers who might be exposed to the bacteria
 - college freshmen living in dorms
-

What is meningococcus?

Meningococcus is a bacterium that lives on the lining of the nose and throat of some people. Approximately one of every 10 adolescents and adults lives with these bacteria lining their throat and don't have any symptoms of infection.

What is my chance of getting meningococcus?

Every year, about 2,500 people in the United States get meningococcus and some 120 die from their infections. Approximately 400 people who survive are left with permanent disabilities, such as seizures, loss of limbs, kidney disease, deafness and mental retardation.

Did you know?

There is an area across sub-Saharan Africa where outbreaks of meningitis occur so commonly that it is known as the "meningitis belt."



How do you catch meningococcus?

Meningococcal bacteria are passed from person to person by coughing or sneezing.

What is the meningococcal vaccine?

There are two types of meningococcal vaccines. Both are made using purified sugars from the protein coating of the bacteria and both contain four of the five different types of meningococcus. One version of the vaccine includes another harmless protein that isn't part of meningococcus, but helps improve immunity to the meningococcal sugars in the vaccine; it is called the meningococcal conjugate vaccine. The other vaccine does not contain this helper protein; it is called the meningococcal polysaccharide vaccine.

Does the meningococcal vaccine prevent all cases of meningitis?

No. Meningitis refers to an infection of the lining of the brain and spinal cord. Meningococcal bacteria are not the only cause of meningitis, so while preventing meningococcal infections will reduce the number of cases of meningitis, it will not prevent all cases of meningitis.

Does the meningococcal vaccine cause any reactions?

Some people receiving the vaccine may develop pain or redness at the site of the injection.

Do the benefits of the vaccine outweigh the risks?

Every year, people in the United States are severely debilitated or die from infections with meningococcal bacteria. Since the vaccine does not cause severe reactions, the benefits clearly outweigh the risks.





VACCINES FOR SPECIAL POPULATIONS

- pregnant women
- healthcare workers
- child care workers
- travelers



Pregnant women

Women who are considering becoming pregnant should check with their healthcare providers to be sure they are up to date on their vaccines. This is particularly important for the MMR vaccine since the main purpose of the rubella vaccine is to prevent birth defects due to infection with rubella during pregnancy. Anyone receiving either the MMR or varicella (chickenpox) vaccine should wait for four weeks before becoming pregnant. If a woman is already pregnant, she should wait to get either of these vaccines until after delivery.

Women who are pregnant should get the inactivated influenza shot if they will be pregnant during the flu season. This is important because expectant mothers are at a higher risk of complications from influenza compared with the general population.

Women should also receive the Tdap vaccine prior to becoming pregnant.

The main purpose of the rubella vaccine is to prevent birth defects due to infection with rubella during pregnancy.

Healthcare workers

Healthcare workers should have immunity to measles, mumps, rubella and varicella. They should receive a hepatitis B vaccine if they could be exposed to blood or body fluids. If they are working in a lab where they might be exposed to the bacteria that cause meningococcal infections, they should receive the meningococcal vaccine. All healthcare workers, especially those with direct patient contact, should receive an influenza vaccine every year.

Did you know?

Healthcare workers who are infected with influenza have transmitted it to their patients. Check if your healthcare providers have been immunized if you are visiting them during flu season.

Child care workers

Because of their environment, child care workers come in contact with many viruses and bacteria, so they should be up to date on the vaccines recommended for adults. In addition, they should get an influenza vaccine each year.

Travelers

People traveling to other countries should check with their primary care physician, local health department or a travel clinic to be sure they receive the necessary immunizations. It is important to begin this process as early as possible because:

- Some vaccines require more than one dose to be effective and there are usually minimum time requirements between doses.
- Many healthcare professionals do not store travel vaccines because of a lack of demand for them. They might need to order the vaccine or refer you to another location.
- Travel vaccines are not always covered by insurance and tend to be more expensive, so you will have time to find out what is covered and what your out-of-pocket expenses will be for everyone in your family who is traveling.

People should consider two issues before traveling. First, travelers should be up to date with the vaccines recommended for them in this country. Second, they should be given vaccines necessary for their travel destination. To determine which vaccines they need, providers should know the location, duration, activities, dates and purpose of the trip. Details like the time of year or whether one is staying in a city

or rural area of a country are also important in determining which vaccines are necessary.

Recommended vaccines that are important to check include diphtheria, polio, hepatitis B, measles, pertussis, influenza, mumps, rubella, tetanus and hepatitis A.

Did you know?

Influenza season occurs at different times in the northern and southern hemispheres and is present year-round in the tropics, so an influenza vaccine might be necessary for travel even if it is not influenza season in the United States.

Vaccines that might be necessary depending upon the trip include Japanese encephalitis, meningococcus, rabies, tick-borne encephalitis (TBE), typhoid and yellow fever.

Did you know?

Some countries require proof of receipt of the yellow fever vaccine before crossing the border. This vaccine can be given only by certified yellow fever vaccine centers.



Influenza season occurs at different times in the northern and southern hemispheres and is present year-round in the tropics.

PAYING FOR VACCINES

If you need immunizations and you have private insurance, call your insurance company to see if it covers the costs of the vaccines that you require.

If you are a recipient of Medicaid or are 65 years or older and Medicare-enrolled, you should be eligible for most immunizations. Discuss vaccines with your healthcare provider.

If you do not have insurance or vaccines are not covered by your insurance provider, you should do the following:

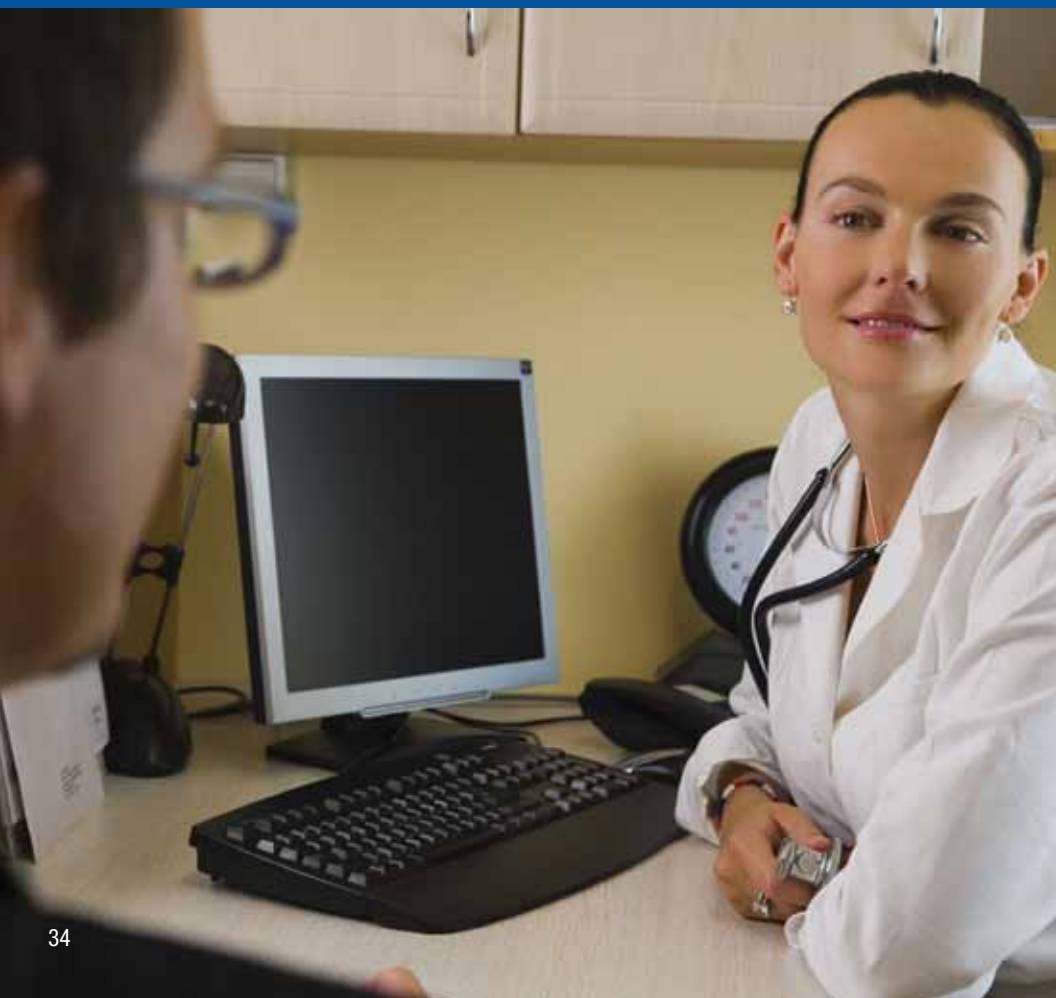
- Contact your local health department to see if you qualify for free vaccines through any existing programs.
- Contact your employee health department to see if you qualify for any vaccines due to a work-related risk. For example, healthcare workers might be able to get the hepatitis B vaccine because they are at increased risk if they are exposed to blood or blood products.
- If you have insurance that does not cover vaccines, contact the benefits office at your place of employment to voice your concern that immunizations are not covered by your current insurance plan.

- Ask both your healthcare provider and your local health department if they are aware of any place where you can get the vaccines that you need at a reduced cost. An example is the annual flu vaccine for which clinics are often set up throughout the community. These might be less expensive than getting the vaccine from your doctor.

If you get any vaccines outside of your healthcare provider's office, you should ask the person giving the vaccine to provide you with the necessary information so it can be added to your permanent medical record the next time you see your provider. A convenient vaccine record is provided in the back of this booklet.



COMMON QUESTIONS AND CONCERNS ABOUT VACCINES



Are vaccines safe?

To best answer this question, we must first define what we mean when we say “safe.” If by “safe” we mean completely risk-free, then vaccines aren’t 100 percent safe. Like all medicines, vaccines have mild side effects, such as pain, tenderness or redness at the site of injection. And some vaccines have very rare, but more serious, side effects.

But nothing is harmless. Anything that we put into our bodies (like vitamins or antibiotics) can have side effects. Even the most routine activities can be associated with hidden dangers. For example, consider seat belts. It’s possible that in an accident a seat belt could cause a minor injury, like a bruise. But if you measure the risk of wearing a seat belt against the risk of not wearing one, the decision to wear a seat belt is an easy one. Likewise, for each of the recommended vaccines, the benefits far outweigh the risks.

Do we still need vaccines?

Vaccines are still given for three reasons:

- For common diseases (like chickenpox, pertussis or pneumococcus), a choice not to get a vaccine is a choice to risk natural infection. For example, every year hundreds of thousands of people are infected with pertussis and some die from the disease. Therefore, it’s important to get the vaccine.
- Some diseases (like measles or mumps) still occur in the United States at low levels. If immunization rates drop, even by as little as 10 to 15 percent, these diseases will come back.
- While some diseases (like polio, rubella or diphtheria) have been either completely or virtually eliminated from the United States, they still occur in other parts of the world. Polio still commonly paralyzes people in Africa, diphtheria still kills people in Russia, and rubella still causes birth defects and miscarriages in many parts of the world. Because international travel is common, these diseases are only a plane ride away from coming back into the United States.

If by “safe” we mean completely risk-free, then vaccines aren’t 100 percent safe.

Why do adults need vaccines?

Adults need vaccines for the following reasons:

- To boost immunity. Some vaccines do not provide enough immunity to last throughout life, so additional doses are necessary as adults. Examples of this type include tetanus, diphtheria and pertussis.
- To protect against diseases that have not been encountered. For example, since the introduction of the chickenpox vaccine, there is less opportunity for the immune system to “see” varicella virus, and since adults who get chickenpox tend to be more ill, it is important for adults who have not had chickenpox to get the vaccine.
- To protect against viruses that change. Some viruses adapt to their environment in a “survival of the fittest” manner, so that older versions of the vaccine are no longer effective in protecting against the disease. An example of this type is the yearly influenza vaccine.
- To protect against diseases that tend to infect particular age groups. The pneumococcal vaccine is an example of this type because it primarily

Some vaccines do not provide enough immunity to last throughout life, so additional doses are necessary as adults.

infects those younger than 2 years old, immunocompromised people and those 65 and older. Since there was not a vaccine available when most adults were children, and the susceptibility increases beyond age 65, the vaccine is recommended for this age group. Some adults with particular immune-related conditions that increase their susceptibility are also recommended to receive this vaccine.

Similarly, since the chickenpox virus lives silently in the nervous system, it can reactivate to cause shingles at any time; however, most frequently this occurs when a person’s immune system is weakened by other diseases or treatments or through aging. This is why the shingles vaccine is recommended for everyone 60 years of age and older.

Do vaccines weaken the immune system?

No. But sometimes, infections with natural viruses can weaken the immune system. For example, people infected with influenza virus are at risk of developing severe bacterial pneumonia. Also, people infected with chickenpox virus are at risk of developing severe infections of the skin caused by “flesh-eating” bacteria.

However, because the bacteria and viruses contained in vaccines are highly weakened versions of natural bacteria and viruses, they do not weaken the immune system. On the contrary, vaccines prevent infections that weaken the immune system.



Can vaccines cause long-term diseases like multiple sclerosis, diabetes or asthma?

When one event precedes another, we often wonder whether they are related. For example, some people who smoke a lot of cigarettes get lung cancer. But when scientists wanted to know whether cigarette smoking caused lung cancer, a number of studies performed in the 1960s compared the incidence of lung cancer in people who smoked cigarettes with that in people who didn't smoke. The best studies matched these two groups of people with regard to age, general health, medications and so on. By matching these groups, they made sure the only difference between them was cigarette smoking. The result was clear: Cigarette smoking caused lung cancer. Similarly, some people who use cell phones get brain cancer. To answer the question of whether cell phones caused brain

cancer, the incidence of brain cancer in people who used cell phones was compared with that in people who didn't. Again, these groups were matched to make sure the only difference between them was cell-phone use. The result was also clear: Cell phones didn't cause brain cancer.

Because vaccines are given to nearly everyone, many people with chronic diseases will have received vaccines. And some of these people will have received vaccines close in time to the appearance of the chronic condition. The question is: "Did the vaccine cause the disease?" The best way to answer this question is to do studies similar to those described for smoking and cell phones. Although not all potential associations have been studied, many have. *What we do know is that vaccines don't cause autism, diabetes, multiple sclerosis, allergies, asthma or permanent brain damage.*

If I have an egg allergy, can I get vaccines?

The influenza and yellow fever vaccines might have enough egg proteins to cause an allergic reaction.

People with egg allergies who are at high risk for influenza infection can get the influenza vaccine under specialized methods of administration. Please talk to your healthcare provider for more information.

VACCINE SCHEDULE

Below is a schedule for all routinely recommended vaccines for adults.

Recommended Schedule for ALL Adults

Age	Vaccine(s)
Younger than 60 years	<ul style="list-style-type: none">• immunity to MMR and varicella• Tdap once and Td every 10 years• influenza annually
60 years or older	<ul style="list-style-type: none">• shingles – 1 dose• influenza annually• Tdap once and Td every 10 years
65 years or older	<ul style="list-style-type: none">• pneum – 1 dose• shingles if not had previously• influenza annually• Tdap once and Td every 10 years

Vaccines that MIGHT be necessary

HPV	Hep A
Mening	Hep B

See previous pages to determine your individual needs.

Abbreviations:

Tdap – tetanus-diphtheria-acellular pertussis vaccine

Td – tetanus-diphtheria vaccine

Influenza – influenza vaccine

Shingles – shingles vaccine

Pneum – pneumococcal vaccine

HPV – human papillomavirus vaccine

Hep A – hepatitis A vaccine

Hep B – hepatitis B vaccine

Varicella – varicella (chickenpox) vaccine

MMR – measles-mumps-rubella vaccine

Mening – meningococcal vaccine

RESOURCES



We hope the information in this booklet has answered your questions about vaccines. If you would like to know more about vaccines, vaccine safety, the science behind vaccines or the process by which they are tested and approved for use, here are some other useful sources of information.

Books

Complete Idiot's Guide to Vaccinations (Penguin Group USA, 2009) was co-written by Michael J. Smith, M.D., and Laurie Bouck.

Do Vaccines Cause That?! A Guide for Evaluating Vaccine Safety Concerns (i4ph, 2008) was co-written by Martin G. Meyers, M.D., and Diego Pineda.

Vaccinated: One Man's Quest to Defeat the World's Deadliest Diseases (Smithsonian Books, 2007) was written by Paul A. Offit, M.D.

Pamphlets and Informational Sheets

Vaccine Information Statements (VIS) on all childhood and adult vaccines are offered by the Centers for Disease Control and Prevention (CDC) and can be found at www.cdc.gov/vaccines/pubs/vis/.

Various informational tear sheets are available for download from the Vaccine Education Center at The Children's Hospital of Philadelphia at vaccine.chop.edu/resources.

Videos

Two videos are available from the Vaccine Education Center at The Children's Hospital of Philadelphia at vaccine.chop.edu/resources.

Videos of families affected by vaccine-preventable diseases are available from Parents of Kids with Infectious Diseases (PKIDS) at www.pkids.org/im_videos.

The Pennsylvania Department of Health, Pennsylvania Immunization Coalition (PAIC) and several immunization coalitions from Southeastern Pennsylvania collaborated to produce a 17-minute video regarding the importance of adult immunizations during different life moments at www.immunizepa.org/news/article/adult_immunization_psa.

Hotlines

The Centers for Disease Control and Prevention Contact Center answers questions about vaccines in English or Spanish; the Center can be reached by calling 1-800-CDC-INFO [800-232-4636] or completing the form at www.cdc.gov/vaccines/about/contact/nipinfo_contact_form.htm.

Social Media

Vaccinate Your Baby is on Facebook and Twitter; go to www.vaccinateyourbaby.org.

Shot of Prevention is a blog hosted by ECBT; go to www.shotofprevention.com.

PKIDS is on Facebook, Twitter, Flickr, YouTube, Delicious and other social media sites. They also have a blog; learn more at www.pkids.org.

Professional and Parent Groups

The Vaccine Education Center at The Children's Hospital of Philadelphia (VEC) is composed of physicians, scientists and parents interested in explaining the science of vaccines in a clear and straightforward manner. The website is vaccine.chop.edu.

Parents PACK is a program administered by the VEC that people can join to receive monthly e-mail newsletters and updates about vaccines. The website is vaccine.chop.edu/parents. Vaccine information is provided for all age groups.

The American Medical Association (AMA) is an organization of physicians interested in promoting the health and well-being of adults and adolescents. The website is www.ama-assn.org.

The American Academy of Pediatrics (AAP) is an organization of pediatricians interested in promoting the health and well-being of children. The AAP has information about vaccines on its website. See www.aap.org/immunization.

National Network for Immunization Information (NNii) is an organization that provides excellent, up-to-date information about vaccines and vaccine safety. The website is www.immunizationinfo.org.

Immunization Action Coalition (IAC) is a nonprofit organization that works to boost immunization rates and prevent disease. The IAC provides excellent and timely information, including practical tips about vaccine use. In addition, the IAC translates vaccine information into many languages. The website is www.immunize.org.

Vaccine Information for the Public is a site administered by the IAC and is designed for the public and healthcare professionals. The website is www.vaccineinformation.org.

PATH Vaccine Resource Library gathers the world's best immunization resources into a single, easy-to-use website at www.path.org/vaccineresources.

Every Child by Two was founded by former First Lady Rosalynn Carter and Betty Bumpers and works to increase awareness of the need for immunizations by 2 years of age. The website is www.ecbt.org.

Vaccinate Your Baby is an immunization awareness campaign administered by ECBT and can be found at www.vaccinateyourbaby.org.

Institute for Vaccine Safety is based at Johns Hopkins Bloomberg School of Public Health and provides excellent, thorough and up-to-date information on vaccine safety. The website is www.vaccinesafety.edu.

Albert B. Sabin Vaccine Institute aims to reduce needless human suffering from infectious and neglected tropical diseases through innovative vaccine research and development; and to advocate for improved access to vaccines and essential medicines for citizens around the globe. The website is www.sabin.org.

National Influenza Vaccine Summit is a program co-sponsored by the American Medical Association and the Centers for Disease Control and Prevention, and is interested in addressing and resolving influenza and influenza vaccine issues. The website is www.preventinfluenza.org.

National Foundation of Infectious Diseases has a website dedicated to adult immunizations at www.adultvaccination.com.

Families Fighting Flu is a nonprofit public organization composed of families and pediatricians who have experienced first-hand what it is like to lose a child to the flu or to have a child experience severe medical complications from the flu. The website is www.familiesfightingflu.org.

PKIDS is a nonprofit public organization devoted to supporting children who have been affected by viral hepatitis, HIV/AIDS and other chronic, viral infectious diseases and to educating the public about effective disease prevention practices. The website is www.pkids.org.

IMMUNIZATION RECORD

Below is a list of the recommended adult immunizations. Please keep this with your permanent medical information and have your physician or other healthcare professional fill in the dates you receive vaccines and any notes.

Immunization Record for: _____

Date of Birth: _____

- MMR**
- Born before 1957
 - History of Measles
 - History of Mumps
 - History of Rubella
 - Immunization on _____
 - Immunization on _____

- Varicella**
- History of Varicella
 - Immunization on _____
 - Immunization on _____

- Hepatitis A**
- Immunization on _____
 - Immunization on _____

- Hepatitis B**
- Immunization on _____
 - Immunization on _____
 - Immunization on _____

- HPV**
- Immunization on _____
 - Immunization on _____
 - Immunization on _____

- Shingles**
- Immunization on _____

- Pneumococcal**
- Immunization on _____

Immunization Record for: _____

Date of Birth: _____

Tdap Immunization on _____

Td Immunization on _____

Immunization on _____

Immunization on _____

Immunization on _____

Immunization on _____

Immunization on _____

Immunization on _____

Immunization on _____

Influenza

Immunization dates:

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____





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The Vaccine Education Center is funded by endowed chairs from The Children's Hospital of Philadelphia. The Center does not receive support from vaccine companies.

For more information about vaccines, visit the Vaccine Education Center websites at vaccine.chop.edu and vaccine.chop.edu/parents.

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