

VACCINES

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Disease prevention is key to public health. It is always better to prevent a disease than to treat it. Vaccines can protect both the people who receive them and those with whom they come in contact.

Vaccines are responsible for the control of many infectious diseases that were once common around the world, including polio, measles, diphtheria, pertussis (whooping cough), rubella (German measles), mumps, tetanus, and *Haemophilus influenzae* type b. Vaccines also eradicated smallpox, one of the most devastating diseases in history. Over the years, vaccines have prevented countless cases of infectious diseases and saved millions of lives.

It is important to keep immunizing against diseases as long as those diseases are present in the population. Even if there are only a few cases of a given disease today, if we stop immunizing ourselves against it, the disease will gradually spread to more and more people, undoing the progress we've made against it over the years.

Important terms

Let's start by defining basic terms:

- **Immunization:** The process by which a person or animal becomes protected against a disease. This term is often used interchangeably with "vaccination" or "inoculation."
- **Vaccination:** Injection of a killed or weakened infectious organism in order to prevent the disease caused by that organism.
- **Vaccine:** A product that produces immunity and protects the body from a disease. Vaccines are administered through needles, by mouth, or by aerosol.

How do vaccines work?

Vaccines reduce the risk of infection by working with the body's natural defenses to help it safely develop immunity to disease.

When germs, such as bacteria or viruses, invade the body, they attack and multiply. This invasion is called an infection, and the infection is what causes illness. The immune system then has to fight the infection. Once it fights off the infection, the body is left with a supply of cells that help recognize and fight the same infection in the future.

Vaccines help develop immunity by imitating an infection. This "imitation" infection does not cause illness, but it causes the immune system to respond just as it does to a real infection, thus allowing the body to recognize and fight the infection in the future. Sometimes, after getting a vaccine, the imitation infection can cause minor symptoms, such as fever. Such symptoms are normal and should be expected as the body builds immunity.

VACCINES

What diseases can vaccines prevent?

Vaccines are available for all of the following diseases:

- Anthrax
- Diphtheria
- *Haemophilus influenzae* type b
- Hepatitis A
- Hepatitis B
- Human papillomavirus
- Influenza (flu)
- Japanese encephalitis
- Meningococcal disease
- Mumps
- Pertussis
- Pneumonia
- Polio
- Rabies
- Rotavirus
- Rubella
- Shingles (Herpes zoster)
- Smallpox
- Tetanus
- Tuberculosis
- Typhoid
- Varicella (chickenpox)
- Yellow fever

Various vaccine-preventable diseases

Below is more information about some of the diseases preventable by vaccines. All of these vaccines are delivered through shots. Common side effects for these shots include mild pain, swelling, or redness on the arm where the shot was given. It's a good idea to keep your own shot record listing the types and dates of your shots, as well as any side effects or problems.

- **Tetanus** (sometimes called lockjaw) is caused by bacteria found in soil, dust, and manure. It enters the body through cuts in the skin.

- **Diphtheria** is also caused by bacteria. It can affect the tonsils, throat, nose, or skin, and can spread from person to person. Diphtheria is a very serious illness.

Getting a shot is the best way to keep from getting

tetanus and diphtheria. Most people get their first shots for these diseases as children. For adults, a booster shot keeps you protected; it's important to get it every 10 years. Ask your doctor if you need a booster shot.

- If you had chickenpox when you were young, the virus is still in your body. When you are older, the virus may become active again, and you can develop **shingles**. Shingles causes a rash or blisters on the body or face and can be very painful, even after the rash disappears. There is a shot for people 50 or older that may prevent shingles. Ask your doctor if you should get the shingles vaccine.

- **Measles, mumps, and rubella** are rare thanks to the vaccinations that are given to children. However, when these diseases do occur, they are more serious in adults than in children. You can still get the vaccine even if you're not sure whether you've already received it.

In the next sections, we'll discuss two of the most important vaccinations for adults over 65 years old: influenza and pneumonia. The Centers for Disease Control and Prevention (CDC) recommends both pneumonia and flu vaccinations for people older than 65 years. Additionally, flu shots are recommended for everyone working in healthcare.

Influenza

Influenza, or "flu," is a disease that is community based. This means that it is spread in homes and community settings—schools, hospitals, airports, and any other place where people come together. Every year, millions of people in the U.S. get the flu—between 5% and 20% of the population.

The flu season generally runs from August of one year to April of the next year. (Memory tip: Think A to A—August to April—to keep track of the flu season.)

For most people, flu is a minor problem. A mother might need to stay home to care for her daughter with the flu. A college student might miss some classes. For many, the disease passes in a few days, and people can

VACCINES

then resume their daily activities.

However, flu can be dangerous and even fatal. The CDC warns that more than 90% of the deaths from flu occur in persons older than age 65. Older people are more susceptible to the flu because their immune systems are not as strong as they once were. This means that if they get the flu, older people might take longer to get well. They can also develop other medical problems brought on by the flu, such as pneumonia, bronchitis, and sinus or ear infections.

There are several myths about the flu. A myth is something that people believe even though it is not true, such as young children believing in the tooth fairy. Adults can believe in myths, too. The following are some myths about the flu and the truth behind each myth:

- 1. Getting a flu shot will give you the flu.** The virus in the flu shot is dead and cannot cause the flu. The virus is inactivated, or killed, before being made into a vaccine.
- 2. It is okay to wait until everyone is getting the flu before getting a flu shot.** The flu vaccination is not instantly effective. It takes about two weeks after getting the vaccine for the body to build antibodies.
- 3. Older people should get two flu shots to boost their protection.** Studies do not show that getting two flu shots protects better than one shot. In 2009, two shots were needed because of the H1N1 outbreak, but this is rare; in most years a single injection is all that's needed. If multiple shots are necessary, the CDC will advise as appropriate.
- 4. If you don't get the flu vaccine by Thanksgiving, it's too late.** Not true. A flu shot can protect from flu outbreaks that occur as late as May. Most years, the flu season peaks in January and February, but it can vary from year to year.
- 5. If you got a flu shot last year, you don't need one this year.** The flu virus mutates, or changes, almost every year, so a new flu shot is needed every year to fight the changed virus.

Research shows that flu shots reduce the number of

people who get flu. In healthcare, more flu shots means fewer people miss work, which keeps the quality of patient care high (staff members who fill in for sick employees may not know the patients as well). The patients being treated do not get flu as often, which also cuts down on flu complications for elderly and very young patients: pneumonia, bronchitis, and ear infections. There are also fewer deaths from flu and its complications. Getting a flu shot can be a lifesaver for your patients.

Rhode Island started requiring flu shots for healthcare workers in 2012. Some agencies, hospitals, and other healthcare providers also require staff to get flu shots.


Pneumonia

Pneumonia is an infection in the lungs. Around the world, pneumonia kills more people every year than malaria, AIDS, or tuberculosis. The CDC reports that more than 50,000 people in the U.S. die each year from pneumonia, making it one of the country's top 10 causes of death.

Over a million people are hospitalized every year, for an average of five days, with pneumonia diagnoses. At any one time, more than 20,000 home health care patients are being seen for pneumonia-related problems.

Although the flu does not cause pneumonia, it weakens the immune system, which allows for the spread of infection. Some people get pneumonia by breathing in disease-causing microbes from another person's sneeze or cough. The microbes infect the lungs and cause inflammation, and pneumonia may be the result if the person's immune system cannot fight off the infection.

The microbes living in people's own bodies can sometimes cause a pneumonia infection. Everyone carries microbes in their mouth, nose, and throat. Normally, the body maintains a balance between helpful microbes and those that cause disease. But for a person with an impaired immune system, these microbes can enter the lungs and grow to become pneumonia.

The CDC recommends a pneumonia vaccine for all persons older than age 65. Young people can receive a pneumonia vaccine that is sprayed into the nose, but older people must receive the vaccine via injection. 

CNA Professor

VACCINES

Mark the correct response.

Name: _____

Date: _____

1. What disease has been eradicated through vaccines?
 - a. Smallpox
 - b. Measles
 - c. Rubella
 - d. Mumps
2. An injection with a weakened form of a disease that helps the body build antibodies to prevent that disease in the future is called a(n) _____.
 - a. antigen
 - b. vaccination
 - c. immune response
 - d. antibody
3. Vaccines reduce the risk of infection by working with the body's natural defenses to help it safely develop immunity to disease.
 - a. True
 - b. False
4. Which of these is a disease that is preventable through a vaccine?
 - a. Rabies
 - b. Influenza
 - c. Tetanus
 - d. All of the above
5. The Centers for Disease Control and Prevention recommends both pneumonia and influenza shots for people over 40 years old.
 - a. True
 - b. False
6. Who should get a flu vaccination?
 - a. Everyone older than 65 and healthcare workers
 - b. People in high-risk areas such as schools
 - c. Everyone
 - d. Everyone older than six months
7. Which of these is a myth about flu?
 - a. Many people die of the flu every year
 - b. Anyone can get the flu regardless of age
 - c. Getting a flu shot will give you the flu
 - d. Flu can lead to pneumonia in older people
8. Who should get a pneumonia vaccination?
 - a. Everyone
 - b. Everyone older than six months
 - c. Everyone older than 21 years
 - d. Everyone older than 65 years
9. Once you have had a vaccine for something, you can never get the same vaccine again.
 - a. True
 - b. False
10. When is flu season?
 - a. January to September
 - b. Only in winter months
 - c. August to April
 - d. All year round