

Welcome to the

# Immunization Education Module

Presented by the:  
Immunization Branch  
at the



**COLO RADO**

Department of Public  
Health & Environment



# Introduction

Welcome to the Immunization Education Module. This module will give you an introduction to vaccines and vaccine-preventable diseases and offer additional resources if you would like to learn more. We hope that you enjoy the module and give us feedback on how we can improve it.

This module covers lots of information, but you will be able to navigate to the sections you are most interested in by selecting the section from a menu on the left side of the screen.

This module reviews:

- [How Vaccines Work](#)
- [Vaccines and Vaccine-Preventable Diseases](#)
- [Vaccine Safety](#)
- [Vaccination Schedules](#)
- [Colorado Required School Vaccinations](#)
- [Risks and Benefits for Vaccines](#)
- [Common Vaccine Concerns](#)
- [Additional Information](#)

You will also be able to navigate throughout the course by:

- Clicking on the *Forward* button or the *Backward* button to take you to the next page or the previous page. 

- You can return to the Introduction page by clicking on the *Home* icon. 



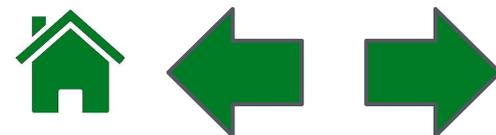


We hope this module provides information about immunizations that help you feel confident in your decision to vaccinate your child.

**Dr. Rachel Herlihy**  
**Division Director**

Disease Control and Environmental  
Epidemiology Division

Colorado Department of Public  
Health and Environment



# How Vaccines Work

Our immune system:

Germs can enter the body in many different ways, but once they are in, they can invade and start to multiply and attack. This invasion is called an infection, and is what causes illnesses.

Your immune system has special cells that recognize these germs as foreign invaders and responds by making proteins called antibodies. These antibodies' first job is to help destroy the germs that are making you sick.

The antibodies' second job is to protect you from future infections. They remain in your bloodstream, and if the same germs try to infect you again they can quickly recognize it and come to your defense. Now your antibodies are experienced at fighting these particular germs and can destroy them before they make you sick.

[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

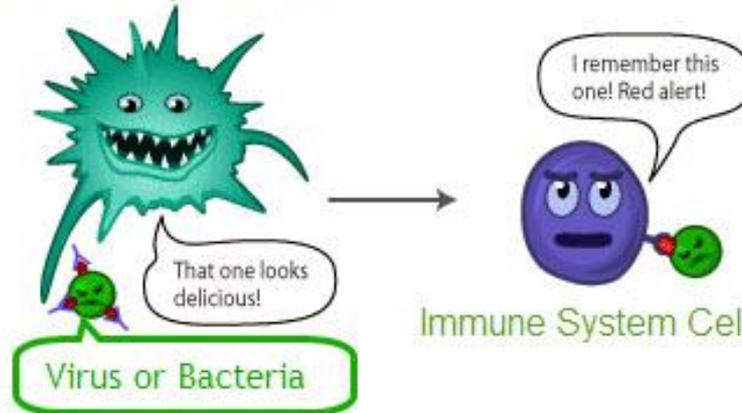
[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)

Immune System Cell



[Learn more about the immune system](#)  
or  
[Immune Response Video.](#)



# How Vaccines Work

Vaccines cause the immune system to respond just as if the body has been attacked by a germ, but without causing you to get sick with the disease.

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

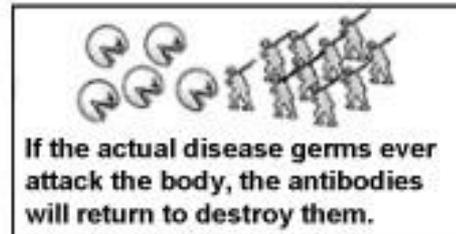
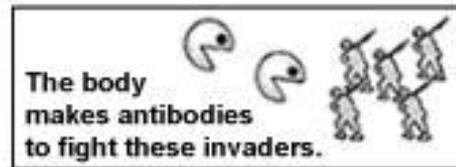
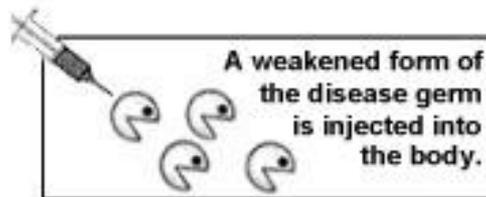
## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

Vaccines are made from the same germs that cause infections, but the germs in vaccines are either killed or weakened so they won't make you sick with the disease.

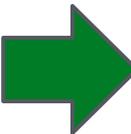


The antibodies destroy the vaccine germs just as they would the disease germs – like a training exercise. Then they stay in your body, giving you immunity. If you are ever exposed to the real disease, the antibodies are there to protect you.

Before we had vaccines, many people were hospitalized or died as a result of infectious diseases. The same germs exist today, but now have vaccines that give us the ability and choice to protect ourselves.

For more information on how vaccines work, visit:

- [Centers for Disease Control \(CDC\)](#)
- [Immunize for Good](#)



# How Vaccines Work

[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

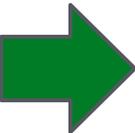
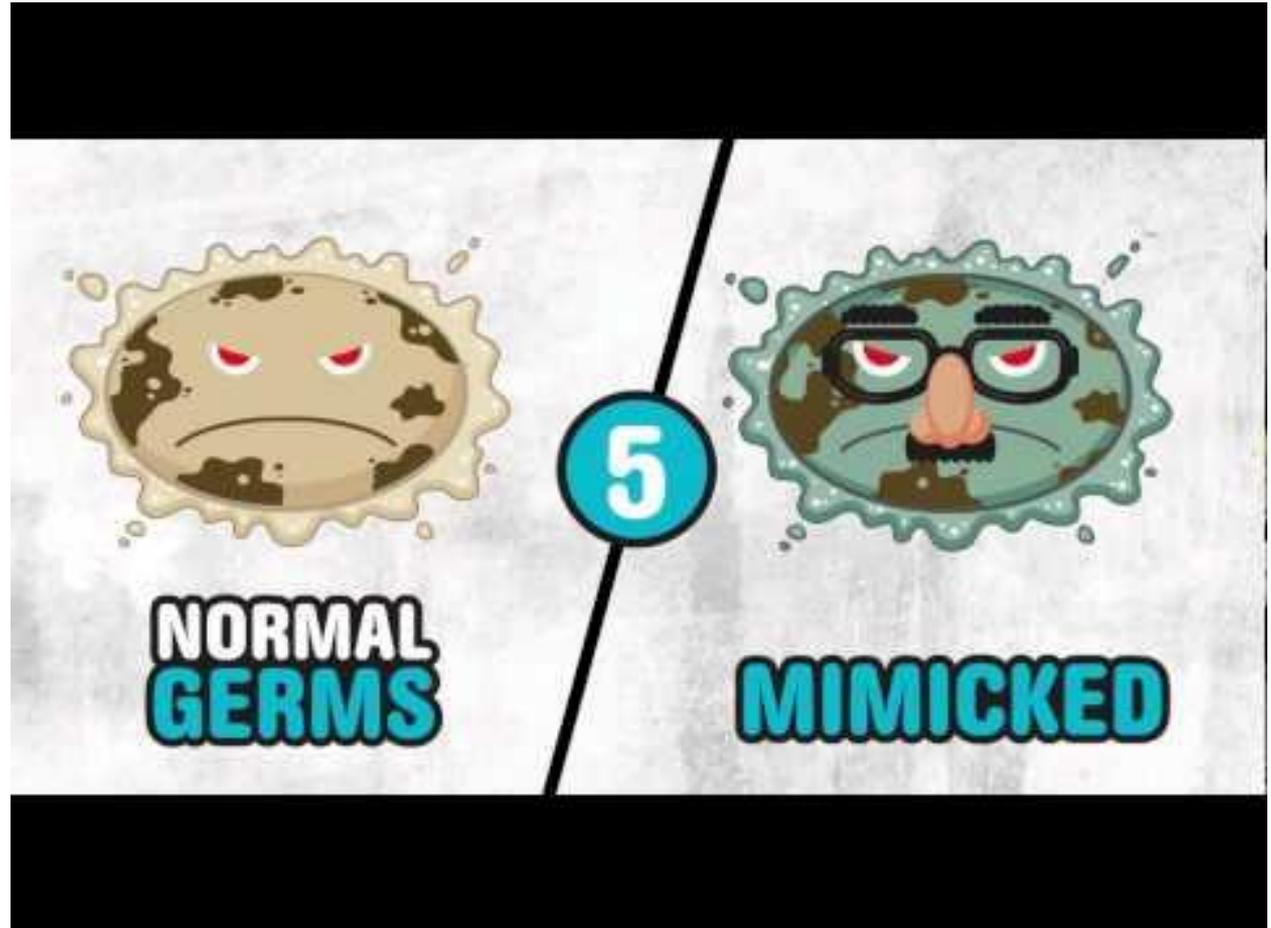
[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)



# Vaccines and Vaccine-Preventable Diseases

[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

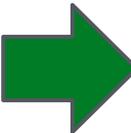
[Common Vaccine Concerns](#)

[Additional Resources](#)

Vaccine-Preventable Diseases	Vaccines
<a href="#">Tetanus, Diphtheria, and Pertussis (Whooping Cough)</a>	<a href="#">DTaP, Tdap, DT, and Td</a>
<a href="#">Hepatitis A</a>	<a href="#">Hep A</a>
<a href="#">Hepatitis B</a>	<a href="#">Hep B</a>
<a href="#">Haemophilus influenzae type b 9 (Hib)</a>	<a href="#">Hib</a>
<a href="#">Human Papillomavirus</a>	<a href="#">HPV</a>
<a href="#">Influenza (seasonal flu)</a>	<a href="#">Flu</a>
<a href="#">Measles, Mumps, and Rubella</a>	<a href="#">MMR</a>
<a href="#">Meningococcal</a>	<a href="#">MCV4 and MPSV4</a>
<a href="#">Pneumococcal</a>	<a href="#">PCV13 and PPSV23</a>
<a href="#">Poliomyelitis (Polio)</a>	<a href="#">Polio</a>
<a href="#">Rotavirus</a>	<a href="#">Rotavirus</a>
<a href="#">Varicella (Chickenpox)</a>	<a href="#">Varicella</a>

This table focuses on the most common childhood vaccines. Visit the [CDC](#) for more information on other vaccines.

This table has links to more information on diseases and vaccines, click the *Next* button on this page when you are ready to move to a new section.



# Tetanus, Diphtheria, and Pertussis (Whooping Cough)

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

## Tetanus

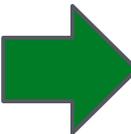
**Type:** Bacteria that makes a toxin (poison).

**Transmission:** Tetanus does not spread from person to person. The bacteria are usually found in soil, dust or manure and enter the body through breaks in the skin, usually cuts or puncture wounds caused by objects with the bacteria.

**Symptoms:** Tetanus symptoms often include muscle tightening and stiffness. It is often called "lockjaw" because the jaw muscles tighten, and the person cannot open their mouth.

Tetanus is uncommon in the U.S. with an average of 29 reported cases per year from 1996 through 2009. Nearly all cases of tetanus are among people who have never received a tetanus vaccine, or adults who don't stay up to date on their booster shots.

[More information on tetanus.](#)



# Tetanus, Diphtheria, and Pertussis (Whooping Cough)

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

## Tetanus



Tetanus in a 46-year-old man, Manila.

[Courtesy of Centers for Disease Control and Prevention.](#)

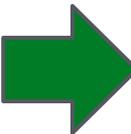
Baby has neonatal tetanus with complete rigidity.

[Courtesy of Centers for Disease Control and Prevention.](#)



Child has painful muscle contractions from tetanus.

[Courtesy of Centers for Disease Control and Prevention.](#)



# Tetanus, Diphtheria, and Pertussis (Whooping Cough)

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

## Diphtheria

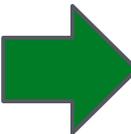
**Type:** Bacteria that makes a toxin (poison).

**Transmission:** Diphtheria is typically spread from person to person, usually through droplets from coughing or sneezing. A person can spread the disease for up to 2 weeks after infection.

**Symptoms:** Diphtheria causes a thick coating in the back of the nose or throat that makes it hard to breathe or swallow. The coating on the throat can get so thick that it blocks the airway, so the person can't breathe. The diphtheria toxin can also affect the heart, causing abnormal heart rhythms and even heart failure. It may affect the nerves and lead to paralysis (unable to move parts of the body).

About 1 out of 10 people who get diphtheria dies. In children younger than 5 years, as many as 1 out of 5 children who get diphtheria dies.

[More information on diphtheria.](#)



# Tetanus, Diphtheria, and Pertussis (Whooping Cough)

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

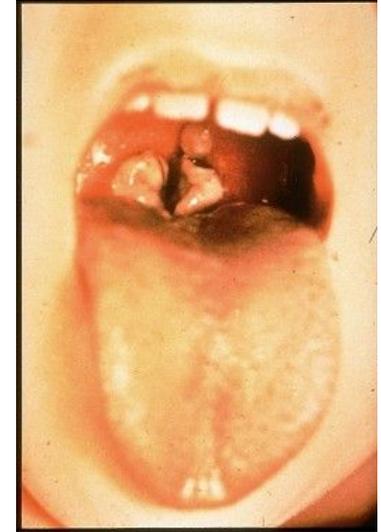
## [Additional Resources](#)

## Diphtheria



Child has "bullneck diphtheria".

[Courtesy of Centers for Disease Control and Prevention.](#)



Child has thick gray coating over back of throat.

[Courtesy of Centers for Disease Control and Prevention.](#)



# Tetanus, Diphtheria, and Pertussis (Whooping Cough)

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

## [Pertussis \(Whooping Cough\)](#)

**Type:** Bacteria

**Transmission:** Whooping cough spreads easily through the air by droplets when a person breathes, coughs, or sneezes.

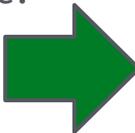
**Symptoms:** Whooping cough, or pertussis, is a very serious respiratory infection. It causes violent coughing and is most harmful for young babies.

The disease can start with mild symptoms like runny or stuffy nose and sneezing and then lead to a more serious symptoms. More serious problems include:

- Coughing very hard, over and over.
- Gasping for breath after a coughing fit. May make a “whooping” sound.
- Difficulty breathing, eating, drinking, or sleeping because of coughing fits.
- Turning blue while coughing from lack of oxygen.
- Vomiting after coughing fits.

Whooping cough can even be deadly. From 2000 through 2012, there were 255 deaths from whooping cough reported in the United States. Almost all of the deaths (221 of the 255) were babies younger than 3 months of age.

[More information on pertussis.](#)



# Tetanus, Diphtheria, and Pertussis (Whooping Cough)

## Pertussis (Whooping Cough)

[Listen to the sounds of pertussis.](#)

[Sounds of Pertussis Website](#)

### [How Vaccines Work](#)

### [Vaccines and Vaccine-Preventable Diseases](#)

### [Vaccine Safety](#)

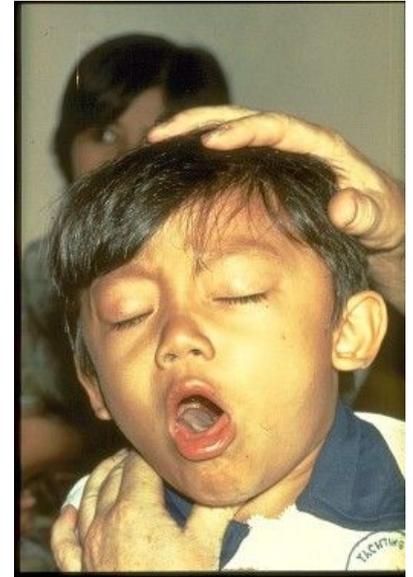
### [Vaccination Schedules](#)

### [Colorado Required School Vaccinations](#)

### [Risks and Benefits of Vaccines](#)

### [Common Vaccine Concerns](#)

### [Additional Resources](#)

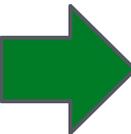


Child with broken blood vessels in eyes and bruising on face due to pertussis coughing.

[Courtesy of Thomas Schlenker, MD, MPH, Chief Medical Officer, Children's Hospital of Wisconsin](#)

Child has pertussis difficult for him to stop coughing and to get air

[Courtesy of Centers for Disease Control and Prevention.](#)



# Tetanus, Diphtheria, and Pertussis (Whooping Cough) Vaccines

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

There are several vaccines used to prevent tetanus, diphtheria, and pertussis. Some include: **DTaP**, **Tdap**, and **Td**.

**DTaP**: Children should get 5 doses of **DTaP**, one dose at each of the following ages:

- 1st Dose: 2 months
- 2nd Dose: 4 months
- 3rd Dose: 6 months
- 4th Dose: 15-18 months
- 5th Dose: 4-6 years.

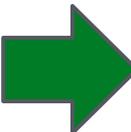
**Td**: is a tetanus-diphtheria vaccine given to adolescents and adults as a booster shot every 10 years, or after an exposure to tetanus under some circumstances.

**Tdap**: is like Td but contains protection against whooping cough. Preteens and teens should get one dose of Tdap at:

- 11-18 years of age, but it is best to get at age 11-12 years

If not received as a teen, adults 19 and older should receive a single dose of Tdap. Women should receive Tdap during each of their pregnancies, preferably between the 27th and 36th weeks of pregnancy.

[DTaP](#), [Td](#), and [Tdap](#) Vaccine Information Statements



# Hepatitis A

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

**Type:** Virus

**Transmission:** Hepatitis A virus is spread from person to person when someone touches feces (poop) with the virus. This happens when:

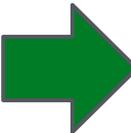
- A person with the virus doesn't wash their hands after using the restroom and then makes or touches food for others.
- Someone touches objects like doorknobs or diapers with the virus and then touches their mouth.
- A person drinks water or eats ice that has the virus.

**Symptoms:** Not everyone with the hepatitis A virus will have symptoms. Children with the virus often don't have symptoms, but can pass the disease to others, including their parents or caregivers.

If symptoms are present, they usually occur suddenly and can include fever, tiredness, loss of appetite, nausea, abdominal pain, dark urine, and jaundice (yellowing of the skin and eyes).

There is no treatment for hepatitis A and some people get so sick that they need to go to the hospital. About 100 people in the U.S. die each year from liver failure caused by hepatitis A.

[More information on hepatitis A.](#)



# Hepatitis A

[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

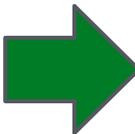
[Common Vaccine Concerns](#)

[Additional Resources](#)



Man with jaundice (yellowing of skin and eyes).

[Courtesy of Centers for Disease Control and Prevention.](#)



# Hepatitis A Vaccine

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

### For children:

- 1st dose: Between 12-23 months.
- 2nd dose: 6-18 months after the 1st dose is given.

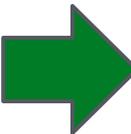
Two doses of the vaccine are needed for lasting protection. A

For others at risk, the hepatitis A vaccine series may be started whenever a person wishes to be protected or is at risk of infection. For more information visit the [CDC website](#).

For travelers, it is best to start the vaccine series at least one month before traveling. For more information see [www.cdc.gov/travel](http://www.cdc.gov/travel).

The Hepatitis A vaccine also comes in a combination form, containing both hepatitis A and B vaccine, that can be given to persons 18 years of age and older. This form is given as 3 shots, over a period of 6 months.

- [Hepatitis A Vaccine Information Statement](#)



# Hepatitis B

Type: Virus

Transmission: Hepatitis B is spread when blood, semen, or other body fluids from a person with the virus enters the body of another person. This can happen through sexual contact, sharing needles or syringes, or from mother to baby at birth.

Symptoms: Hepatitis B is a liver infection. It can be a short-term illness or a long-term, chronic infection. Newborns that get the virus at birth have a 90% chance of having a chronic infection. It is important that infants receive the birth dose of hepatitis B to prevent these infections.

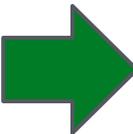
Symptoms of short-term hepatitis B, can include:

- fever
- fatigue
- loss of appetite, nausea, or vomiting
- abdominal pain
- dark urine or clay-colored bowel movements
- joint pain
- jaundice (yellow color in the skin or the eyes)

Chronic Hepatitis B can lead to serious health issues, like cirrhosis or liver cancer.

Approximately 2,000-4,000 people die every year from hepatitis B-related liver disease.

[More information on hepatitis B.](#)



[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)

# Hepatitis B

[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

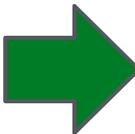
[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)



# Hepatitis B Vaccine

[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)

## Routine Vaccination:

- All infants
- All children or teens younger than 19 years of age who have not been vaccinated.
- People at higher risk of contact with the hepatitis B virus or are more likely to catch hepatitis B disease. For more information visit the [CDC website](#).

## For Children:

- 1st dose: Birth
- 2nd Dose: 1-2 months
- 3rd Dose: 6-18 months

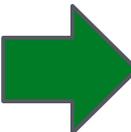
All children should get their 1st dose of Hepatitis B vaccine at birth and complete the vaccine series by 6-18 months of age.

## Adults:

- Any adult who is at risk for Hepatitis B virus infection or who wants to be vaccinated should talk to a health professional about getting the vaccine series.

The Hepatitis B vaccine is usually given as a series of 3 or 4 shots over a 6-month period.

- [Hepatitis B Vaccine Information Statement](#)



# Haemophilus influenzae type b (Hib)

Type: Bacteria

Transmission: The Hib bacteria is spread person to person by contact or through droplets from coughing or sneezing.

Symptoms: Even though this bacteria includes influenzae in its name, it does not cause the flu. The Hib bacteria can cause many kinds of infections that range from mild ear infections to severe diseases, like bloodstream infections.

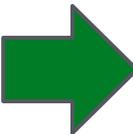
Most common severe infections:

- Blood infections (Bacteremia)
- Infection of the covering of the brain and spinal cord (Meningitis)
- Inflammation of the windpipe and can cause breathing trouble (Epiglottitis)
- Skin infections (Cellulitis)
- Infectious arthritis

Infections occur mostly in infants and children younger than five years of age.

Before Hib vaccine, about 20,000 children in the United States under 5 years old got Hib disease each year, and about 3% - 6% of them died.

[More information on Hib.](#)



[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)

# Haemophilus influenzae type b (Hib)

[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

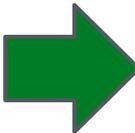
[Common Vaccine Concerns](#)

[Additional Resources](#)



Child has swollen face due to Hib infection.

[Courtesy of Children's Immunization Project, St. Paul, Minnesota.](#)



# Hib Vaccine

[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)

## **Routine Vaccination:**

The Hib vaccine is recommended for all children younger than 5 years old and it is usually given to infants starting at 2 months old.

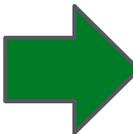
Several different brands of Hib vaccine are available. Children receive either 3 or 4 doses, depending on which vaccine is used.

## **For Children:**

- 1st Dose: 2 months
- 2nd Dose: 4 months
- 3rd Dose: 6 months (if needed, depending on brand of vaccine)
- 4th Dose: 12-15 months

Children over 5 years old and adults usually do not need Hib vaccine, but it may be recommended for older children or adults that are at higher risk for infection from the bacteria.

[Hib Vaccine Information Statement.](#)



# Human Papillomavirus (HPV)

Type: Virus

Transmission: HPV is spread by having vaginal, anal, or oral sex with someone who has the virus.

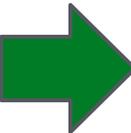
Symptoms: There are many different types of HPV. It can be passed even when an infected person has no signs or symptoms. Most HPV infections don't cause any symptoms, and go away on their own. If these infections do not go away, they can lead to serious health issues like cancer or genital warts. There is no cure for HPV infection, but some of the problems it causes can be treated.

This virus can cause cervical cancer and other types of cancers. It often takes many years to develop cancer after a person gets HPV.

Cervical cancer is the 2nd leading cause of cancer deaths among women around the world. In the United States, about 12,000 women get cervical cancer every year and about 4,000 die from it.

HPV is the most common sexually transmitted infection. It's so common that nearly all sexually active men and women get it at some point in their lives. About 79 million Americans are currently infected with the HPV virus, and about 14 million more get newly infected each year.

[More information on HPV.](#)



[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)

# Human Papillomavirus (HPV)

[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

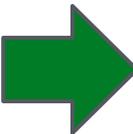
[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)



# HPV Vaccine

[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)

There are 3 different types of HPV vaccines:

- **Cervarix:** protects against 2 types of HPV that can cause cervical cancer. It is given to females only.
- **Gardasil-4:** protects against 4 types of HPV that can cause cervical cancer and other cancers. Also protects against genital warts. Given to both females and males.
- **Gardasil-9:** protects against 9 types of HPV that can cause cervical cancer and other cancers. Also protects against genital warts. Given to both females and males.

**Routine Vaccination:**

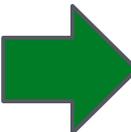
- All boys and girls ages 11 or 12 years should get vaccinated.
- Catch-up vaccines are recommended for males up to age 21 and for females up to age 26, if they did not get the vaccine when they were younger.

**For Teens:**

- First Dose: 11-12 years
- 2nd Dose: 1-2 months after 1st dose is given.
- 3rd Dose: 6 months after the 1st dose is given.

These vaccines can protect against infections and disease if they are given before exposure to the virus. This is why it is important to get the HPV vaccine before teens become sexually active.

Vaccine Information Statements for [Cervarix](#), [Gardasil-4](#), and [Gardasil-9](#)



# Influenza (Seasonal Flu)

Type: Virus

Transmission: The flu virus is spread from person to person through the air by droplets from coughing, sneezing, or talking. Flu season in the U.S. begins as early as October and goes till May.

Symptoms: The flu usually comes on suddenly and can cause mild to serious illness, and can lead to death. This virus is different from a cold and people can feel some or all of these symptoms:

- Fever or feeling feverish/chills, not everyone will have a fever.
- Cough
- Sore throat
- Runny or stuffy nose
- Muscle or body aches
- Headaches
- Fatigue (tiredness)
- Vomiting and diarrhea, but this is more common in children.

**Flu Complications**: Most people who get the flu will recover in less than two weeks, but some people will develop more serious infections like pneumonia, bronchitis, sinus and ear infections. The flu can also make health problems like asthma or congestive heart failure worse.

In the U.S. from 1976-2006, it is estimated that about 3,000 to about 49,000 people died from flu-related illnesses each season. Most of these deaths were in people 65 years and older.

[More information on the flu.](#)

[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

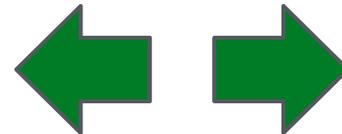
[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)



# Influenza (Seasonal Flu)

[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

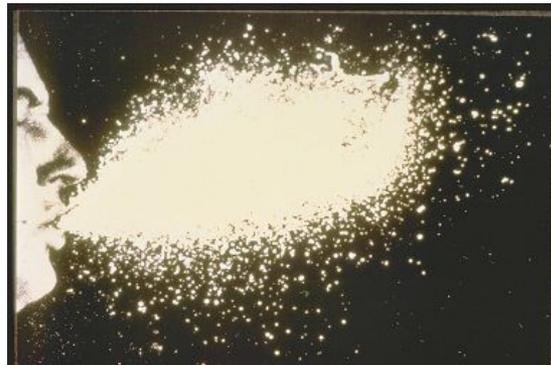
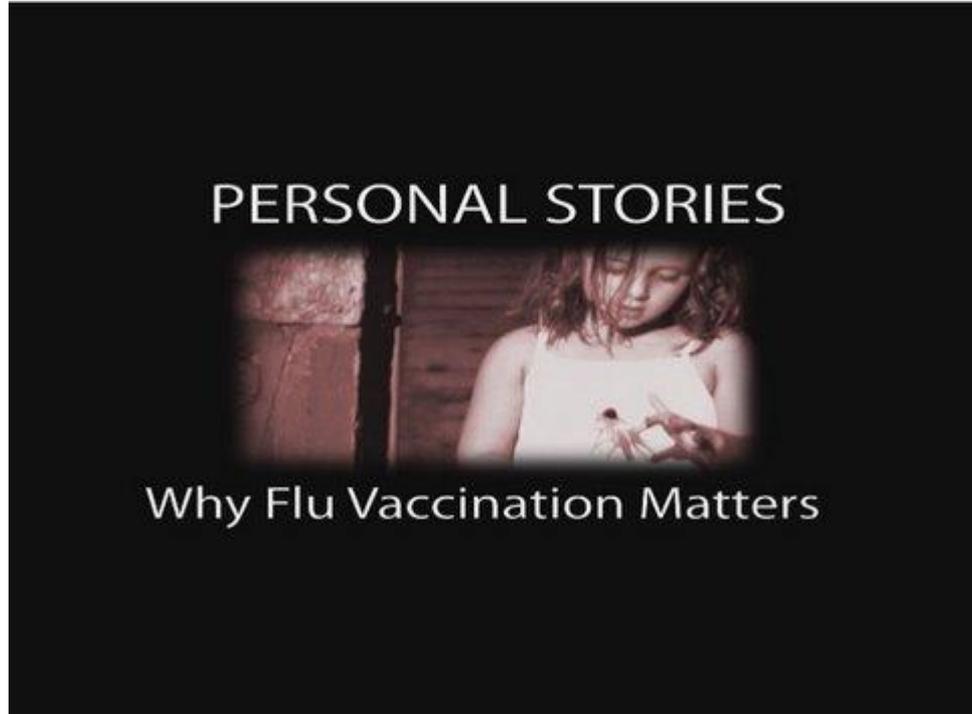
[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

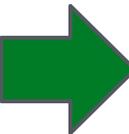
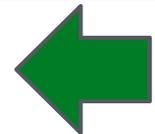
[Additional Resources](#)



[Families Fighting Flu stories.](#)

This is how influenza germs spread through the air when someone coughs or sneezes.

[Courtesy of Centers for Disease Control and Prevention.](#)



# Flu Vaccine

Each year research is done to discover the types of flu viruses that will be around for the next flu season. These viruses are included in the vaccine. Flu viruses can change each year and immunity for the virus can decrease, so it is important to get vaccinated each season.

## Routine Vaccination:

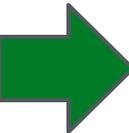
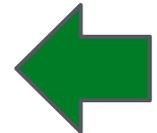
- Everyone 6 months of age and older should get a flu vaccine every season.

## Types of flu vaccines:

- **Flu Shots** - are vaccines given with a needle, usually in the arm. The flu shot uses an inactivated or dead virus to help your body build immunity against the flu. It protects against three or four flu viruses depending on the type of vaccine you receive. Standard flu shot vaccines are grown in eggs, but there are additional vaccines for people 18 or older that are made without eggs. There are also flu shots that are made for people over 65 and one that is injected into the skin with a smaller needle than the standard shot.
- **Nasal Spray Vaccine** - is a mist that is sprayed in the nose. The nasal spray vaccine is made with a live weakened flu virus. It protects against four types of influenza virus and is only for people 2-49 years of age.

Neither of these vaccines can give you the flu illness because the viruses are either dead or too weak to spread the disease. [More information on types of flu vaccines.](#)

[Vaccine Information Statements for Flu.](#)



## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

# Measles, Mumps, and Rubella

## Measles

Type: Virus

Transmission: Measles is spread from person to person through the air by droplets from coughing or sneezing. It is very contagious.

Symptoms: Measles symptoms include:

- High fever
- Cough
- Runny nose
- Red watery eyes
- Rash - breaks out 3-5 days after symptoms begin.

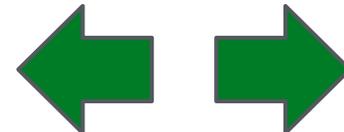
Rash usually lasts 5-6 days and begins at the hairline, moves to the face and upper neck, and proceeds down the body.

Measles can be a serious disease, with 30% of reported cases experiencing one or more complications. Complications from measles are more common among children under 5 years of age and adults older than 20. Death from measles occurs in 2 to 3 per 1,000 reported cases in the United States.

Common Complications	Serious Complications
Ear Infections	Infection of the lungs (Pneumonia)
Diarrhea	Swelling of the brain (Encephalitis)

[More information on measles complications.](#)

[More information on measles.](#)  
[Measles infographic.](#)



[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)

# Measles, Mumps, and Rubella

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

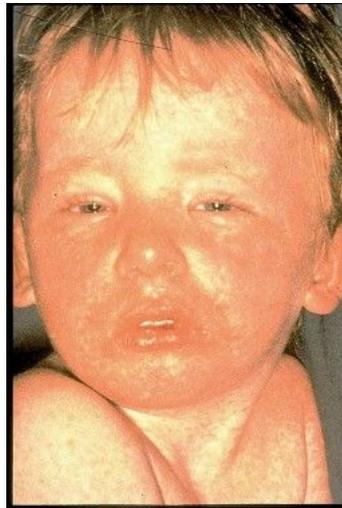
## [Additional Resources](#)



Young child with runny nose, teary eyes caused by measles infection.

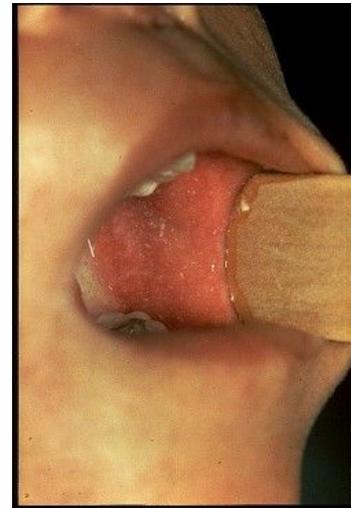
[Courtesy of the Centers of Disease Control and Prevention.](#)

## Measles



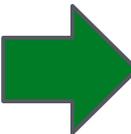
Child has a bad rash caused by measles.

[Courtesy of Centers for Disease Control and Prevention.](#)



White spots inside the mouth are common with measles (Koplik's spots).

[Courtesy of Centers for Disease Control and Prevention.](#)



# Measles, Mumps, and Rubella

## Mumps

Type: Virus

Transmission: Mumps is found in saliva or mucus and can be spread by coughing, sneezing, sharing items like cups or utensils or touching surfaces that have the virus.

Symptoms: Mumps symptoms include:

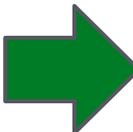
- Fever
- Headache
- Muscle aches
- Tiredness
- Loss of appetite
- Swollen glands under the jaw.

Mumps is typically a mild disease but can cause more serious conditions like:

- Inflammation of the testicles in males
- Swelling of the brain (Encephalitis)
- Inflammation of tissue covering the brain and spinal cord (Meningitis)
- Inflammation of the ovaries and/or breasts in females
- Deafness

There is no cure for mumps, only treatments for the symptoms. In children, mumps is usually a mild disease. Adults may have more serious disease and more complications.

[More information on mumps.](#)



[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)

# Measles, Mumps, and Rubella

## Mumps

[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)

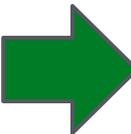
Child very swollen under the jaw and in the cheeks due to mumps.

[Courtesy of Centers for Disease Control and Prevention.](#)



Patient with swelling in his neck due to mumps.

[Courtesy of Centers for Disease Control and Prevention.](#)



# Measles, Mumps, and Rubella

[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)

## Rubella

Type: Virus

Transmission: Rubella is spread from person to person through the air by droplets from coughing or sneezing.

Symptoms: Rubella usually causes the following symptoms in children:

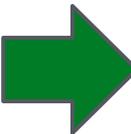
- Rash that starts on the face and spreads to the rest of the body
- Low fever (less than 101 degrees)

These symptoms last 2 or 3 days.

Older children and adults may also have swollen glands and symptoms like a cold before the rash appears. Aching joints occur in many cases, especially among young women. About half of the people who get rubella do not have symptoms.

Rubella, sometimes called German measles or three-day measles can cause birth defects if a pregnant woman catches the virus. Defects can include deafness, cataracts, heart defects, mental retardation, and liver and spleen damage. There is at least a 20% chance of damage to the fetus if a woman is infected early in pregnancy.

[More information on rubella.](#)



# Measles, Mumps, and Rubella

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)



Rash from rubella infection.

[Courtesy of Centers for Disease Control and Prevention.](#)

## Rubella



Infant born with rubella.

[Courtesy of Centers for Disease Control and Prevention.](#)



Cataracts caused when a child was born with rubella.

[Courtesy of Centers for Disease Control and Prevention.](#)



# Measles, Mumps, and Rubella (MMR) Vaccine

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

Children should get 2 doses of MMR vaccine:

- 1st Dose: 12-15 months of age
- 2nd Dose: 4-6 years of age

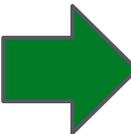
Some infants younger than 12 months should get a dose of MMR if they are traveling out of the country. (This dose will not count toward their routine series.)

Some adults should also get MMR vaccine: Generally, anyone 18 years of age or older who was born after 1956 should get at least one dose of MMR vaccine, unless they can show that they have either been vaccinated or had all three diseases.

There is also a combination vaccine that contains measles, mumps, rubella, and varicella (chickenpox). This is the MMRV vaccine, normally used for the second dose.

[Vaccine Information Statement for MMR.](#)

[Vaccine Information Statement for MMRV.](#)



# Meningococcal

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

**Type:** Bacteria

**Transmission:** Meningococcal bacteria is spread from person to person by droplets in the saliva or throat during close contact. There are several different types of this bacteria.

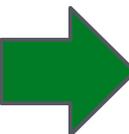
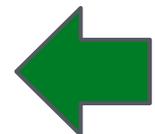
**Symptoms:** This bacteria can cause several infections:

- **Meningitis or meningococcal meningitis**, is the swelling of tissue covering the brain and spinal cord.
- **Septicemia**, is a bloodstream infection that happens when bacteria enter the bloodstream and multiply.
- **Bacteremia**, is a bloodstream infection like septicemia, but is usually less severe.

Meningitis and septicemia are both very serious and can be deadly. Deaths can occur in as little as a few hours.

- Meningitis can also cause permanent disabilities including hearing loss and brain damage.
- Septicemia can cause permanent disabilities including amputation of toes, fingers, or limbs or severe scarring as a result of skin grafts.

[More information on meningococcal.](#)



# Meningococcal

[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

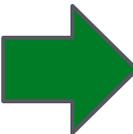
[Common Vaccine Concerns](#)

[Additional Resources](#)



Infant with gangrene of hands and legs due to meningococcal infection.

[Courtesy Centers for Disease Control and Prevention.](#)



# Meningococcal Vaccines

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

**Routine Vaccination for Teens:** Two doses of MCV4 are recommended for 11 through 18 years of age.

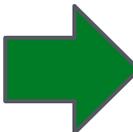
- 1st Dose: 11 or 12 years of age
- 2nd Dose or Booster Dose: 16 years of age

If the 1st dose is given after the 16th birthday, a booster is not needed. Some adults and infants may need to be vaccinated if they are at a higher risk of becoming infected with meningococcal bacteria. [More Information](#).

There are 3 different types of meningococcal vaccines:

- **MCV4** - can protect against 4 types of meningococcal bacteria and is for people under the age of 55.
- **MPSV4** - can protect against 4 types of meningococcal bacteria and is for people older than 55.
- **MenB** - vaccines were recently approved for 10-25 year olds. This vaccine protects against one type of meningococcal bacteria. It is only recommended for [certain people at increased risk of meningococcal disease](#). Your healthcare provider can give you more information.

Vaccine Information Statements for [Meningococcal](#) and [MenB Meningococcal](#).



# Pneumococcal

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

**Type:** Bacteria

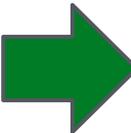
**Transmission:** This bacteria is spread from person to person through droplets in saliva or mucus. Many people, especially children, have the bacteria in their nose or throat and do not become ill. It is not known why some people have the bacteria, but don't get sick.

**Symptoms:** Most people think of pneumonia when they hear about the pneumococcus bacteria. While this bacteria does cause this infection, it can cause many other types of illnesses and some can be life-threatening. Pneumococcal symptoms include:

- Infections of the lungs (Pneumonia)
- Ear infections
- Sinus infections
- Swelling of the covering around the brain and spinal cord (Meningitis)
- Bloodstream infections (Bacteremia)

Some of these infections are considered “invasive”, which means the germs invade parts of the body that are normally free from germs. Invasive infections are rare, but usually very severe and often require treatment in a hospital and can cause death.

[More information on pneumococcal.](#)



# Pneumococcal

[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

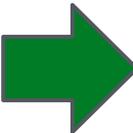
[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)



# Pneumococcal Vaccines

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

There are two types of pneumococcal vaccines:

- **PCV13:** protects against 13 types of pneumococcal bacteria. These bacteria cause the worst infections in children.
- **PPSV23:** PPSV23 protects against 23 types of pneumococcal bacteria.

**PCV13 is routinely given to children:**

- 1st Dose: 2 months
- 2nd Dose: 4 months
- 3rd Dose: 6 months
- 4th Dose: 12-15 months

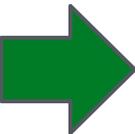
PCV13 vaccine may also be recommended for some older children or adults.

**PPSV23 is recommended for:**

- All adults 65 years of age and older,
- Anyone 2 through 64 years of age with certain long-term health problems or a weakened immune systems.
- Adults 19 through 64 years of age who smoke cigarettes or have asthma.

Healthcare providers can give more information about these recommendations.

Pneumococcal Vaccine Information Statements for [PCV13](#) and [PPSV23](#).



# Poliomyelitis (Polio)

Type: Virus

Transmission: Polio is very contagious and spreads when someone touches feces (poop) with the virus. This happens if you touch an object with the virus and touch your mouth or eat or drink something with the virus.

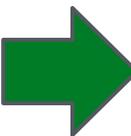
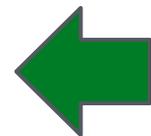
Symptoms: Most people who get infected with poliovirus will not have any visible symptoms. Some people will have symptoms like the flu that last 2-5 days. The poliovirus infection can cause serious symptoms that affect the brain and spinal cord, doesn't happen very often.

<b>Flu-like Symptoms</b>	Sore throat, fever, tiredness, nausea, stomach pain, and headache
<b>Serious Symptoms</b>	<ul style="list-style-type: none"><li>• Feeling of pins and needles in the legs (Paresthesia)</li><li>• Swelling of tissue covering the brain or spinal cord (Meningitis)</li><li>• Not able to move parts of the body (Paralysis) or weakness in the arms, legs, or both.</li></ul>

[More information on polio symptoms.](#)

Paralysis is the most severe symptom with polio because it can lead to disability and death. Between 2-10% of people who have paralysis from the virus die because it affects the muscles that help them breathe.

[More information on polio.](#)



[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)

# Poliomyelitis (Polio)

[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)



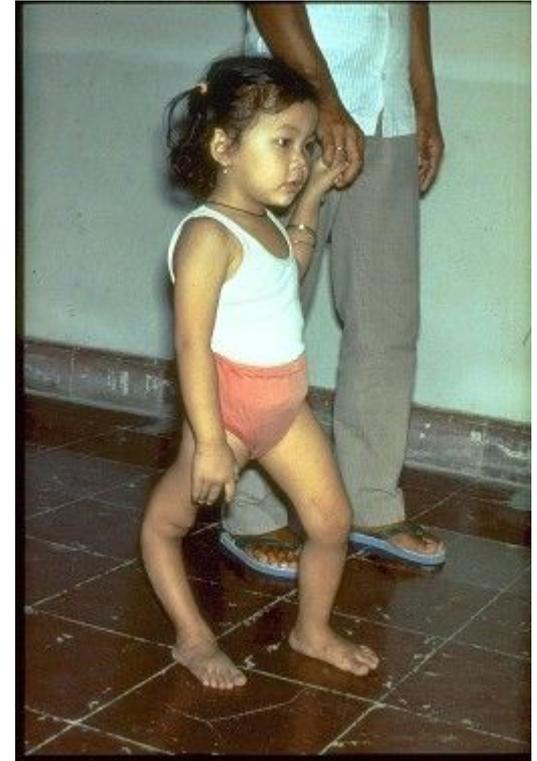
Cheshire Home for Handicapped Children, Freetown, Sierra Leone

[Courtesy of World Health Organization.](#)



Patient in iron lung, Rhode Island polio epidemic, 1960

[Courtesy of Centers for Disease Control and Prevention.](#)



Child with a deformed leg due to polio.

[Courtesy of World Health Organization.](#)



# Polio Vaccine

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

There are two types of vaccine that can prevent polio:

- Inactivated poliovirus vaccine (IPV)
- Oral poliovirus vaccine (OPV).

Only IPV has been used in the United States since 2000; OPV is still used throughout the world.

**For Children:** Doses are recommended at these ages:

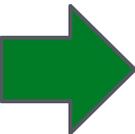
- 1st Dose: 2 months
- 2nd Dose: 4 months
- 3rd Dose: 6 - 18 months
- 4th Booster Dose: 4-6 years

**For Adults:** Most adults 18 and older do not need polio vaccine because they were vaccinated as children. Some adults are at higher risk and should consider polio vaccination if they have never been vaccinated.

- People traveling to areas of the world where polio is common
- Laboratory workers who might handle poliovirus
- Healthcare workers treating patients who could have polio.

Talk to your doctor for more information.

[Polio Vaccine Information Statement.](#)



# Rotavirus

Type: Virus

Transmission: Rotavirus enters the body and then goes into your feces (poop). The virus then can be spread when it enters another person's mouth and causes infection. Rotavirus can be spread if the virus is in or on:

- Objects (toys, surfaces) - It can live for months on surfaces.
- Food or water

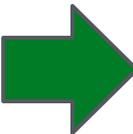
Symptoms: Children with rotavirus may have:

- Severe watery diarrhea
- Vomiting
- Fever
- Stomach pain

Additional symptoms include loss of appetite and loss of body fluids. These can be harmful for babies and young children. Adults who get rotavirus disease have milder symptoms.

Rotavirus used to be common and cause serious health problem in the US. Almost all children had at least one rotavirus infection before their 5th birthday. More than 400,000 young children had to see a doctor for rotavirus illness and more than 200,000 had to go to the emergency room. The rotavirus vaccine reduced hospitalizations and emergency visits dramatically.

[More information on rotavirus.](#)



[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)

# Rotavirus

[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

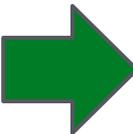
[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)



# Rotavirus Vaccine

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

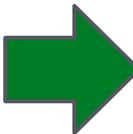
Rotavirus is an oral vaccine that is given as drops in a child's mouth. There are two brands of vaccine and babies will get either 2 or 3 doses, depending on which vaccine brand is used.

### For Children:

- 1st Dose: 2 months
- 2nd Dose: 4 months
- 3rd Dose: 6 months (if needed, depending on brand of vaccine)

Children should get the 1st dose of rotavirus vaccine before 15 weeks of age, and the last by age 8 months. Rotavirus vaccine may safely be given at the same time as other vaccines.

### [Rotavirus Vaccine Information Statement.](#)



# Varicella (Chickenpox)

**Type:** Virus

**Transmission:** Chickenpox is spread from person to person through the air by droplets from coughing or sneezing. It can also be spread by touching or breathing in the virus from the chickenpox blisters. It is highly contagious.

**Symptoms:** Chickenpox symptoms include:

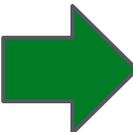
- Rash that turns into itchy, fluid-filled blisters and then eventually turns into scabs.

The rash may first show up on the face, chest, and back and then spread to the rest of the body, including inside the mouth, eyelids, or genital area. It usually takes about one week for all the blisters to become scabs.

**Chickenpox Complications:** can occur, but they are not as common in otherwise healthy people. Some people with serious complications from chickenpox can become so sick that they need to be hospitalized. In very rare cases, chickenpox can also cause death.

Chickenpox used to be very common in the US. About 4 million people would get the disease and 10,600 people were hospitalized each year. 100 to 150 died each year because of chickenpox. The vaccine has dramatically reduced the disease.

[More information on chickenpox.](#)



[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)

# Varicella (Chickenpox)

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)



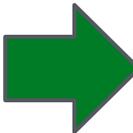
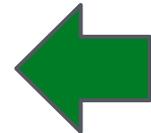
Chickenpox lesions on the face of a young child.

[Courtesy of the Centers for Disease Control and Prevention.](#)



This child has typical chickenpox” lesions.

[Courtesy of the Centers for Disease Control and Prevention.](#)



# Chickenpox Vaccine

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

Children should get 2 doses of the chickenpox vaccine:

- 1st Dose: 12-15 months
- 2nd Dose: 4-6 years

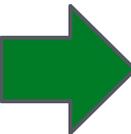
People 13 years of age and older (who have never had chickenpox or received the chickenpox vaccine) should get two doses at least 28 days apart.

Most people who get chickenpox vaccine will not get chickenpox. But if someone who has been vaccinated does get chickenpox, it is usually very mild. They will have fewer blisters, are less likely to have a fever, and will recover faster.

There is also a combination vaccine that contains measles, mumps, rubella, and varicella (chickenpox). This is the MMRV vaccine, usually given as the 2nd dose.

[Vaccine Information Statement for varicella.](#)

[Vaccine Information Statement for MMRV.](#)



# Vaccine Safety

Before any vaccine can be used, it must go through lab testing and clinical trials. These studies are monitored by the Food and Drug Administration (FDA) to ensure that the vaccines are both safe and effective.

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

Before a new vaccine is ever given to people, extensive lab testing is done that can take several years. Once testing in people begins, it can take several more years before clinical studies are complete and the vaccine is licensed.

### HOW A NEW VACCINE IS DEVELOPED, APPROVED AND MANUFACTURED

Food and Drug Administration (FDA) sets rules for the three phases of clinical trials to ensure the safety of the volunteers. Researchers test vaccines with adults first.

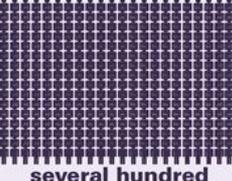
#### PHASE 1



20-100 healthy volunteers

Is this vaccine safe?  
Does this vaccine seem to work?  
Are there any serious side effects?  
How is the size of the dose related to side effects?

#### PHASE 2



several hundred VOLUNTEERS

What are the most common short-term side effects?  
How are the volunteers' immune systems responding to the vaccine?

#### PHASE 3



HUNDREDS or THOUSANDS of VOLUNTEERS

How do people who get the vaccine and people who do not get the vaccine compare?  
Is the vaccine safe?  
Is the vaccine effective?  
What are the most common side effects?

**FDA licenses the vaccine only if:**

- It's safe and effective
- Benefits outweigh risks



Vaccines are made in batches called lots.



Manufacturers must test all lots to make sure they are safe, pure and potent. The lots can only be released once FDA reviews their safety and quality.



The FDA inspects manufacturing facilities regularly to ensure quality and safety.

FOR MORE INFORMATION, VISIT [HTTP://WWW.FDA.GOV/CBER](http://www.fda.gov/cber)

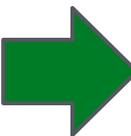
If the FDA licenses a vaccine, experts may consider adding it to the recommended immunization schedule.

The FDA inspects where and how vaccines are made to make sure these processes are safe.

Vaccine data is also reviewed by the Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics, and the American Academy of Family Physicians before a vaccine is officially recommended.

## [Vaccine Safety Video](#)

## [Ensuring the Safety of Vaccines](#)



# Vaccine Safety

To make sure vaccines continue to be safe, the FDA and the CDC created the Vaccine Adverse Event Reporting System (VAERS). All doctors must report serious side effects of vaccines to VAERS so these effects can be studied. Parents can also file reports with VAERS.

## How Vaccines Work

## Vaccines and Vaccine-Preventable Diseases

## Vaccine Safety

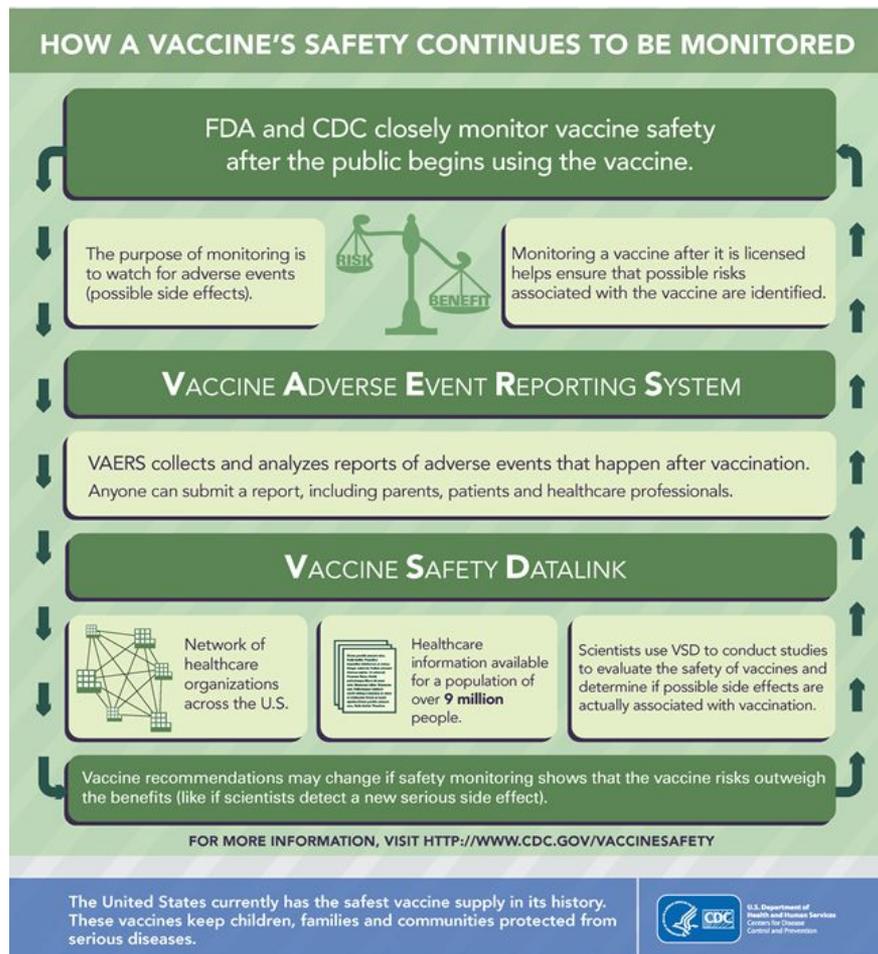
## Vaccination Schedules

## Colorado Required School Vaccinations

## Risks and Benefits of Vaccines

## Common Vaccine Concerns

## Additional Resources



If a side effect from a vaccine is found, changes are made as soon as possible to protect people.

If a vaccine is no longer safe, the the vaccine will not be given and removed from the recommended schedule.

Safety alerts are sent to health care providers if there are any new side effects found.



# Vaccine Safety

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

CDC's Immunization Safety Office has 3 vaccine safety systems:

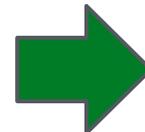
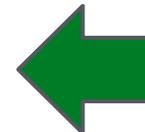
- [Vaccine Adverse Event Reporting System \(VAERS\)](#) - is an early warning system where people can report vaccine concerns. This allows the CDC and FDA to detect possible side effects or serious reactions following vaccination.
- [Vaccine Safety Datalink \(VSD\)](#) - is a partnership between CDC and healthcare organizations to monitor serious events following vaccination.
- [Clinical Immunization Safety Assessment \(CISA\) Network](#) - is a partnership between CDC and medical research centers in the US that conducts research into how or if any serious events might be caused by vaccines.

For more information about VAERS, [visit www.vaers.hhs.gov](http://www.vaers.hhs.gov) or call the toll-free VAERS information line at 1-800-822-7967.

In the rare case that a child has serious side effects from vaccine, parents can contact the [National Vaccine Injury Compensation Program \(VICP\)](#) at 1-800-338-2382. This federal program was created to help pay for the care of people who have been harmed.

For additional information:

- [CDC Vaccine Safety](#)
- [American Academy of Pediatrics, Vaccine Safety: The Facts](#)
- [CDC Immunization Safety Office](#)
- [HealthyChildren.org, How Safe are Vaccines](#)



# Vaccination Schedules

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

## HOW A VACCINE IS ADDED TO THE U.S. RECOMMENDED IMMUNIZATION SCHEDULE

The Advisory Committee on Immunization Practices (ACIP) is a group of medical and public health experts. Members of the American Academy of Pediatrics (AAP) and American Academy of Family Physicians (AAFP) are among some of the groups that also bring related immunization expertise to the committee. This group carefully reviews all available data about the vaccine from clinical trials and other studies to develop recommendations for vaccine use.

When making recommendations, ACIP considers:



- How safe is the vaccine when given at specific ages?
- How well does the vaccine work at specific ages?
- How serious is the disease this vaccine prevents?
- How many children would get the disease the vaccine prevents if we didn't have the vaccine?

ACIP recommendations are not official until the CDC Director reviews and approves them and they are published. These recommendations then become part of the United States official childhood immunization schedule.

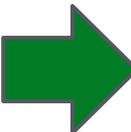
**New vaccine to protect your child against a disease is added to the schedule.**

FOR MORE INFORMATION, VISIT [HTTP://WWW.CDC.GOV/VACCINES](http://www.cdc.gov/vaccines)

*After being added to the U.S. Recommended Immunization Schedule, health experts continue to monitor the vaccine's safety and effectiveness.*

## [What determines the right age for vaccines?](#)

## [More information on the ACIP and vaccination schedules.](#)



# Childhood Vaccination Schedule

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

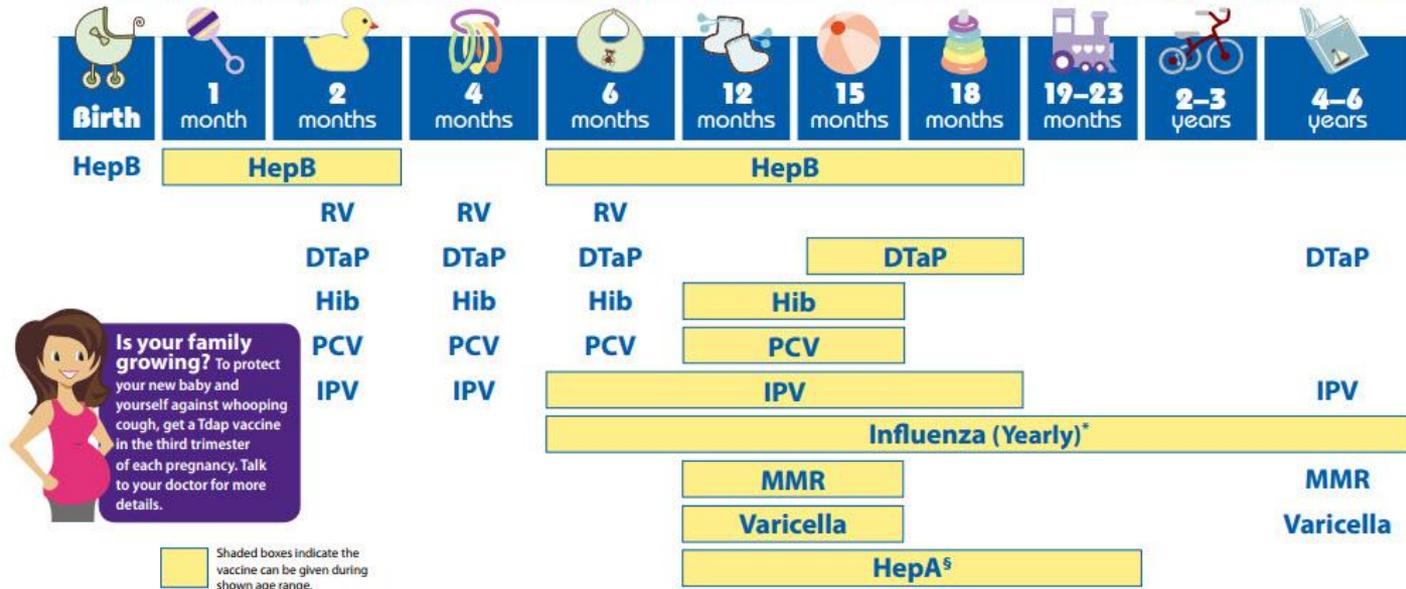
## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

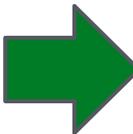
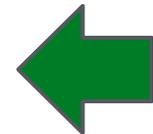
## [Additional Resources](#)

The vaccination schedule below shows what ages are best for children to get each vaccine. Children need vaccinations at different ages to ensure they are protected before they come in contact with a disease and to make sure their immune system is prepared to fight off a disease.

### 2015 Recommended Immunizations for Children from Birth Through 6 Years Old



[More information on the childhood vaccination schedule.](#)



# Teen Vaccination Schedule

## How Vaccines Work

## Vaccines and Vaccine-Preventable Diseases

## Vaccine Safety

## Vaccination Schedules

## Colorado Required School Vaccinations

## Risks and Benefits of Vaccines

## Common Vaccine Concerns

## Additional Resources

Similar to the childhood schedule, preteens and teens need vaccinations too. Listed in yellow are the type of vaccine recommended. The vaccines in green are for children behind on their vaccinations and in purple are vaccines recommended for kids with certain health issues.

### 2015 Recommended Immunizations for Children from 7 Through 18 Years Old

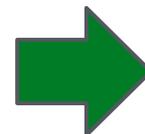
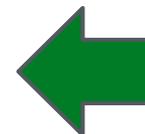


These shaded boxes indicate when the vaccine is recommended for all children unless your doctor tells you that your child cannot safely receive the vaccine.

These shaded boxes indicate the vaccine should be given if a child is catching-up on missed vaccines.

These shaded boxes indicate the vaccine is recommended for children with certain health conditions that put them at high risk for serious diseases. Note that healthy children **can** get the HepA series<sup>6</sup>. See vaccine-specific recommendations at [www.cdc.gov/vaccines/pubs/ACIP-list.htm](http://www.cdc.gov/vaccines/pubs/ACIP-list.htm).

[More information on the adolescent vaccination schedule.](#)



# Adult Vaccination Schedule

## How Vaccines Work

## Vaccines and Vaccine-Preventable Diseases

## Vaccine Safety

## Vaccination Schedules

## Colorado Required School Vaccinations

## Risks and Benefits of Vaccines

## Common Vaccine Concerns

## Additional Resources

If you are this age, talk to your healthcare professional about these vaccines →

If you are this age, ↓	Flu Influenza	Td/Tdap Tetanus, diphtheria, pertussis	Shingles Zoster	Pneumococcal		Meningococcal	MMR Measles, mumps, rubella	HPV Human papillomavirus		Chickenpox Varicella	Hepatitis A	Hepatitis B	Hib Haemophilus influenzae type b
				PCV13	PPSV23			for women	for men				
19 - 21 years									3 doses				
22 - 26 years							1 or 2 doses	3 doses	3 doses				
27 - 49 years		1 dose of Tdap*			1 dose	1 or 2 doses							
50 - 59 years	Flu vaccine every year	Td booster every 10 years								2 doses	2 doses	3 doses	1 or 3 doses
60 - 64 years			1 dose		1 dose	1 dose							
65+ year					1 dose	1 dose							

### More Information:

There are several flu vaccines available. Talk to your healthcare professional about which flu vaccine is right for you.

\* If you are pregnant, you should get a Tdap vaccine during the 3<sup>rd</sup> trimester of every pregnancy to help protect your babies from pertussis (whooping cough).

You should get zoster vaccine even if you've had shingles before.

There are two different types of pneumococcal vaccine: PCV13 (conjugate) and PPSV23 (polysaccharide). Talk with your healthcare professional to find out if one or both pneumococcal vaccines are recommended for you.

Your healthcare professional will let you know how many doses you need.

If you were born in 1957 or after, and don't have a record of being vaccinated or having had measles, mumps and rubella, talk to your healthcare professional about how many doses you may need.

Recommended for you if you did not get it when you were a child.

There are two HPV vaccines but only one HPV vaccine (Gardasil<sup>®</sup>) should be given to men.

If you are a male 22 through 26 years old and have sex with men you should complete the HPV vaccine series if you have not already done so.

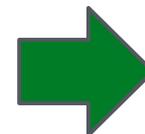
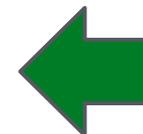
Your healthcare professional will let you know how many doses you need.



**Recommended For You:** This vaccine is recommended for you *unless* your healthcare professional tells you that you cannot safely receive it or that you do not need it.

**May Be Recommended For You:** This vaccine is recommended for you if you have certain risk factors due to your health, job, or lifestyle that are not listed here. Talk to your healthcare professional to see if you need this vaccine.

[More information on the adult vaccination schedule.](#)



# Colorado Required School Vaccinations

In 1978, Colorado passed a law requiring children attending all licensed child care centers and schools to follow vaccination requirements. The [Colorado Board of Health](#) is responsible for creating and updating rules in the law to make sure children are protected from vaccine-preventable diseases.

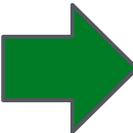
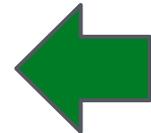
The board requires children to receive the following vaccinations:

- Hepatitis B (HBV)
- Diphtheria, Tetanus, Pertussis (DTap and Tdap)
- Haemophilus Influenzae Type B (Hib)
- Pneumococcal (PCV13)
- Polio (IPV)
- Measles, Mumps, Rubella (MMR)
- Varicella (VAR)

Under the law, these vaccines must be given at the recommended age from the [Advisory Committee on Immunization Practices \(ACIP\) Vaccination Schedule](#).

In order to follow the immunization law, children must have ONE of the following:

- Be up-to-date on all required vaccinations and have paperwork on file with their school or child care.
- Have a signed [exemption](#) form on file with their school or child care.
- Have an “in process” form on file with the



## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

# Colorado Exemptions for School Required Vaccinations

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

There are 3 types of exemptions that can be filed with a school or child care. If there is a disease outbreak, children with an exemption may be excluded from school to prevent illness and spread of the disease.

**Medical Exemption** - May be filed if a child is unable to receive vaccination due to a medical or health issue. This form must be signed by a health care provider.

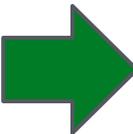
### **Non-Medical Exemptions:**

Forms must be completed and signed by a parent or guardian.

- **Religious Exemption** - May be filed if there is a religious belief against vaccinations.
- **Personal Belief Exemption** - May be filed if there is a personal belief against vaccinations.

Exemption forms are part of the Certificate of Immunization form and may be found on our [webpage](#) or at your child's school or child care.

The exemption process will be changing for the 2016-2017 school year. Information will be updated as this process is finalized.



# Risks and Benefits of Vaccines

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

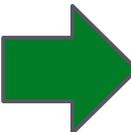
## [Additional Resources](#)

If you've ever hesitated to have your child vaccinated, keep in mind the risks of not getting the vaccines. It may be tempting to say "no" to vaccination and "leave it to nature", but deciding not to vaccinate puts your child at risk of catching a range of potentially serious or fatal diseases.

Some parents choose not to immunize because they don't want to take any risks, but choosing not to immunize your child is also a risk. Your child can contract the illness and suffer problems. Your child can give the disease to others, including those who may get sick more easily, like young infants or those with immune problems.

Any medicine can cause a reaction, even aspirin. Vaccines are no exception. The risk from a vaccine is the chance it will cause a child serious harm. This risk is extremely small. Even life-threatening allergic reactions can be brought under control by staff in a doctor's office. The benefit of vaccination is protection from disease. When you vaccinate your child, you are not just protecting them, you are also protecting their friends and schoolmates and their families.

## [Vaccine Infographic](#)



# Risks and Benefits of Vaccines

Thanks to vaccines, we have seen a dramatic decrease of new cases of certain diseases. If we stop vaccinating we will see these diseases return. Below is an example of the amazing strides we've already taken with vaccines.

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

## Impact of Vaccines in the 20<sup>th</sup> & 21<sup>st</sup> Centuries

### Comparison of 20<sup>th</sup> Century Annual Morbidity & Current Morbidity

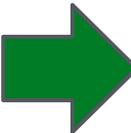
Disease	20 <sup>th</sup> Century Annual Morbidity*	2013 Reported Cases <sup>†</sup>	% Decrease
Smallpox	29,005	0	100%
Diphtheria	21,053	0	100%
Pertussis	200,752	28,639	86%
Tetanus	580	26	96%
Polio (paralytic)	16,316	1	>99%
Measles	530,217	187	>99%
Mumps	162,344	584	>99%
Rubella	47,745	9	>99%
CRS	152	1	99%
<i>Haemophilus influenzae</i>	20,000 (est.)	31 <sup>§</sup>	>99%

#### Sources:

\* JAMA. 2007;298(18):2155-2163

† CDC. MMWR August 15, 2014;63(32);702-715. (MMWR 3013 final data)

§ *Haemophilus influenzae* type b (Hib) <5 years of age. An additional 10 cases of Hib are estimated to have occurred among the 185 reports of Hi (<5 years of age) with unknown serotype.



# Common Vaccine Concerns

Myths and misinformation about vaccine safety are confusing and can make it difficult to know factual information. Here are links for more information on common myths about vaccines. () will link to an outside source including (CDC) and (CHOP).

## [How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)

## General Concerns

[Delaying vaccination schedule \(CHOP\)](#)

[Fainting \(CDC\)](#)

[Febrile Seizures \(CDC\)](#)

[HPV Vaccine Safety \(CDC\)](#)

[Multiple Vaccines and the Immune System \(CDC\)](#)

[Natural Infection Compared to Vaccination \(CHOP\)](#)

[Vaccine Ingredients](#)

[Vaccines during Pregnancy \(CDC\)](#)

[Vaccine Recalls \(CDC\)](#)

[Vaccine Safety on Specific Vaccines \(CDC\)](#)

## Concerns for Other Conditions

[Arthritis \(CHOP\)](#)

[Asthma or Allergies \(CHOP\)](#)

[Autism \(CDC\)](#)

[Diabetes \(CHOP\)](#)

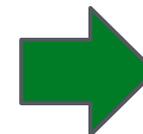
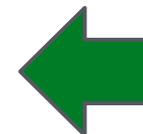
[Guillain-Barré Syndrome \(CDC\)](#)

[Multiple Sclerosis \(CHOP\)](#)

[Sudden Infant Death Syndrome \(CDC\)](#)

[Frequently Asked Questions on Vaccinations \(NFID\)](#)

This page has links to more information, click the *Next* button on this page when you are ready to move to a new section.



# Vaccine Ingredients

All ingredients in vaccines play an important role making the vaccine work correctly. Ingredients help the immune system respond to the vaccine, make the vaccine last longer, and help keep the vaccine safe from bacteria and fungus.

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

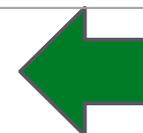
## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

Vaccine Ingredients	Purpose	Example
<a href="#">Antigens</a>	Ingredients in vaccines that create the immune response in the body.	Whole viruses or bacteria, Parts of the viruses or bacteria, or Products made by bacteria, called toxins.
<a href="#">Adjuvants</a>	Substances added to vaccines to help the body create a stronger immune response against the disease.	<a href="#">Aluminum</a>
<a href="#">Stabilizers</a>	Used in vaccines to protect the antigens during manufacturing, storage and transportation.	<a href="#">Gelatin</a>
<a href="#">Preservatives</a>	Used in some vaccines to prevent bacteria or fungus from getting into the vaccine.	<a href="#">Thimerosal</a>
<a href="#">Manufacturing By-products</a>	Are chemicals or cell by-products used during vaccine production that may remain in the final vaccine in small amounts	<a href="#">Antibiotics, Eggs, and Formaldehyde</a>

Additional information on vaccines and [DNA](#) and [fetal tissue](#).



# Common Vaccine Concerns

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

**Aluminium:** is a naturally occurring element. It is found in plants, soil, water and air. We are all exposed to aluminum every day. Infants ingest aluminum at every feeding in breast milk and formula. Aluminium is used in some vaccines because it boosts the immune response. It allows vaccine ingredients to be released more slowly after the vaccination. This gives the immune system more time to respond to the vaccine. A longer response time leads to better protection from the disease.

- [More information on aluminum salts.](#)
- [Vaccines and aluminum video.](#)

**Gelatin:** is a product associated with food that is used in some vaccines as a stabilizer. A stabilizer is an ingredient that keeps the vaccine in stable or stops it from changing when it is exposed to extreme conditions like heating or freezing. People who are allergic to gelatin should not receive vaccines that contain gelatin. This varies by vaccine, so it would be best to ask your healthcare professional to check about ingredients if you are allergic to gelatin.

- [More information on gelatin.](#)



# Common Vaccine Concerns

[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)

**Thimerosal:** Thimerosal is a preservative used to prevent contamination from bacteria or fungus in some vaccines. Thimerosal is a type of mercury called ethylmercury. This type of mercury is a different than the type that is found in the environment or in fish like tuna. Ethylmercury is broken down and is quickly released by the body. Research has shown thimerosal in vaccines to be safe and effective.

Methylmercury is found in seafood, is more easily absorbed, and stays in the body longer.

In 1999, the Food and Drug Administration (FDA) reviewed amounts of mercury in many products, including vaccines. The decision was made to remove mercury from most vaccines. This decision was a made as a precaution to decrease overall exposure to mercury. Thimerosal, as a preservative, is no longer contained in childhood vaccines, with the exception of the certain flu vaccines.

More information on thimerosal:

- [The Children's Hospital of Philadelphia, Vaccine Education Center](#)
- [Centers for Disease Control and Prevention](#)



# Common Vaccine Concerns

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

**Antibiotics**: are commonly used medicines that kill bacteria. They are included in some vaccines to prevent bacteria from growing. The amount of antibiotics in each vaccine is very small. Allergies to antibiotics usually happen from certain types of antibiotics, and these are not included in vaccines. The tiny amounts and the type of antibiotics included in vaccines make it very unlikely that a severe allergic reaction would result from a vaccine.

- [More information on antibiotics.](#)

**DNA**: Chemicals used when vaccines are made destroy or break apart DNA. This means the amount of DNA in the final vaccine is very small and the DNA is broken into pieces. Because the DNA is in pieces, it cannot create a whole protein or affect the DNA in our bodies. It is also not possible for DNA from a vaccine to become part of our DNA, making any tiny DNA in a vaccine low risk.

- [More information on DNA.](#)

**Fetal tissue**: Some childhood vaccines are made by growing viruses in a type of embryo cells. These cells were obtained in the 1960's from the legal, elective termination of two pregnancies. They were used to start a cell line, which is still in use today. These cells are maintained under strict federal guidelines. No new fetal cells are used. The rubella vaccine uses these cells, but rubella disease increases the risk of spontaneous abortion, and the vaccination prevents up to 5,000 miscarriages each year.

- [More information on fetal tissue.](#)



# Common Vaccine Concerns

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

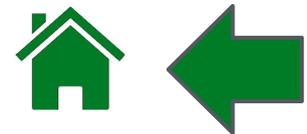
## [Additional Resources](#)

**Egg proteins**: are included when the flu and yellow fever vaccines are made. Scientists grow these vaccines in chicken eggs. Once there is enough virus grown, the virus is removed from the eggs to make the vaccine. Advances in technology have decreased the amount of egg proteins in the flu vaccine and people with egg allergies can get the vaccine. To be safe, people with egg allergies should stay at their doctor's office after the shot to make sure they do not have a reaction. Egg proteins in the yellow fever vaccine can cause allergic reactions for people with this allergy, please check with your doctor if you need this vaccination and have an egg allergy.

- [More information on egg proteins.](#)

**Formaldehyde**: is produced naturally in the human body. It helps produce the building blocks of proteins, which are essential for the body to function. Very small amounts of formaldehyde may be found in some vaccines when they are made. It is used to break apart the viruses or the bacteria toxins in vaccines. This allows the immune system to respond to the vaccines and help the body build immunity without making you sick.

- [More information on formaldehyde.](#)



# Additional Resources

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

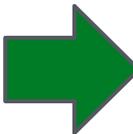
## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

Below are other resources with vaccination information:

- [Evaluating Internet Information from the American Academy of Pediatrics](#)
- [Centers for Disease Control and Prevention](#)
- [Immunization Action Coalition](#)
- [Vaccine Education Center from The Children's Hospital of Philadelphia](#)
- [Colorado Children's Immunization Coalition](#)
- [Immunize for Good](#)
- [American Academy of Pediatrics](#)
- [Every Child by Two \(ECBT\)](#)



# Contact Us

[How Vaccines Work](#)

[Vaccines and Vaccine-Preventable Diseases](#)

[Vaccine Safety](#)

[Vaccination Schedules](#)

[Colorado Required School Vaccinations](#)

[Risks and Benefits of Vaccines](#)

[Common Vaccine Concerns](#)

[Additional Resources](#)

Immunization Branch

303-692-2700

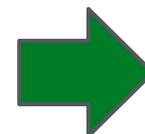
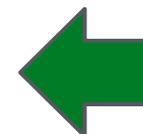
303-691-6118 fax

[cdphe.dcdimmunization@state.co.us](mailto:cdphe.dcdimmunization@state.co.us)

If you are having technical difficulties with the education module, please check that you are using the Google Chrome web browser. This module works best with that browser. If you have further difficulties, please contact our office.

We want your feedback, let us know your thoughts on the module.

[Immunization Education Feedback Form](#)



# Sources

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

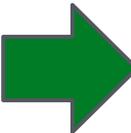
## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

- About Diphtheria. (2013, May 13). Retrieved June 23, 2015, from <http://www.cdc.gov/diphtheria/about/index.html>
- About Haemophilus influenzae Disease. (2012, September 25). Retrieved August 6, 2015, from <http://www.cdc.gov/hi-disease/about/index.html>
- About Rubella. (2014, December 17). Retrieved August 17, 2015, from <http://www.cdc.gov/rubella/about/index.html>
- About Tetanus. (2013, January 9). Retrieved June 11, 2015, from <http://www.cdc.gov/tetanus/about/index.html>
- Benefits vs. Risks. (n.d.). Retrieved September 9, 2015, from <http://www.immunizeforgood.com/factor-fiction/benefits-vs.-risks>
- Causes & Transmission of Meningococcal Disease. (2015, June 11). Retrieved August 17, 2015, from <http://www.cdc.gov/meningococcal/about/causes-transmission.html>
- Causes and Transmission. (2015, September 8). Retrieved September 17, 2015, from <http://www.cdc.gov/pertussis/about/causes-transmission.html>
- Complications of Chickenpox. (2011, November 16). Retrieved July 16, 2015, from <http://www.cdc.gov/chickenpox/about/complications.html>
- Complications of Mumps. (2015, May 29). Retrieved August 14, 2015, from <http://www.cdc.gov/mumps/about/complications.html>
- Diphtheria and the Vaccine (Shot) to Prevent it. (2014, February 1). Retrieved June 11, 2015, from <http://www.cdc.gov/vaccines/vpd-vac/diphtheria/downloads/PL-dis-diphtheria-color-office.pdf>
- Diphtheria, Tetanus, and Pertussis (DTaP) VIS. (2013, June 18). Retrieved August 3, 2015, from <http://www.cdc.gov/vaccines/hcp/vis/vis-statements/dtap.html>
- Ensuring the Safety of Vaccines in the United States. (2013, February 1). Retrieved June 3, 2015, from <http://www.cdc.gov/vaccines/hcp/patient-ed/conversations/downloads/vacsafe-ensuring-bw-office.pdf>
- Frequently Asked Questions. (n.d.). Retrieved September 1, 2015, from <http://www.family-vaccines.org/faq>
- Genital HPV Infection - Fact Sheet. (2015, February 23). Retrieved August 11, 2015, from <http://www.cdc.gov/std/hpv/stdfact-hpv.htm>
- HPV (Human Papillomavirus) Cervarix® VIS. (2013, June 18). Retrieved August 11, 2015, from <http://www.cdc.gov/vaccines/hcp/vis/vis-statements/hpv-cervarix.html>
- HPV (Human Papillomavirus) Gardasil® VIS. (2013, June 18). Retrieved August 11, 2015, from <http://www.cdc.gov/vaccines/hcp/vis/vis-statements/hpv-gardasil.html>
- HPV (Human Papillomavirus) Gardasil®-9 VIS. (2015, April 15). Retrieved August 11, 2015, from <http://www.cdc.gov/vaccines/hcp/vis/vis-statements/hpv-gardasil-9.html>



# Sources

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

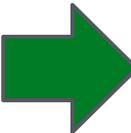
## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

- Haemophilus Influenzae Type b (Hib) VIS. (2015, April 2). Retrieved August 11, 2015, from <http://www.cdc.gov/vaccines/hcp/vis/vis-statements/hib.html>
- Hepatitis A Questions and Answers for the Public. (2015, September 2). Retrieved September 10, 2015, from <http://www.cdc.gov/hepatitis/hav/afaq.htm#vacWho>
- Hepatitis A VIS. (2015, September 2). Retrieved August 10, 2015, from <http://www.cdc.gov/vaccines/hcp/vis/vis-statements/hep-a.htm>
- Hepatitis A and the Vaccine (Shot) to Prevent It. (2014, November 10). Retrieved September 17, 2015, from <http://www.cdc.gov/vaccines/vpd-vac/hepa/fs-parents.html>
- Hepatitis A: Questions and Answers Information about the disease and vaccines. (n.d.). Retrieved August 2, 2015, from <http://www.immunize.org/catg.d/p4204.pdf>
- Hepatitis B FAQs for the Public. (2015, May 31). Retrieved August 8, 2015, from <http://www.cdc.gov/hepatitis/hbv/bfaq.htm#overview>
- Hepatitis B VIS. (2013, June 18). Retrieved August 12, 2015, from <http://www.cdc.gov/vaccines/hcp/vis/vis-statements/hep-b.html>
- How Vaccines Work. (n.d.). Retrieved June 4, 2015, from <http://www.immunizeforgood.com/vaccines/how-vaccines-work>
- How Vaccines Work. (2015, July 30). Retrieved June 4, 2015, from <http://www.vaccineinformation.org/how-vaccines-work/>
- Immunization Schedules for Adults. (2015, August 21). Retrieved September 14, 2015, from <http://www.cdc.gov/vaccines/schedules/easy-to-read/adult.html>
- Immunization Schedules for Infants and Children. (2015, January 26). Retrieved September 13, 2015, from <http://www.cdc.gov/vaccines/schedules/easy-to-read/child.html>
- Immunization Schedules for Preteens and Teens. (2015, February 9). Retrieved September 14, 2015, from <http://www.cdc.gov/vaccines/schedules/easy-to-read/preteen-teen.html>
- Immunology 101 Series: Adjuvants, Aluminum, and Gelatin! Oh My! The Scientific Scoop on Vaccine Ingredients. (2014, July 11). Retrieved July 16, 2015, from <http://teamvaccine.com/2014/07/11/immunology-101-series-adjuvants-aluminum-and-gelatin-oh-my-the-scientific-scoop-on-vaccine-ingredients/>



# Sources

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

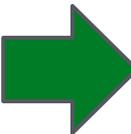
## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

- Key Facts about Influenza (Flu) & Flu Vaccine. (2015, August 7). Retrieved August 19, 2015, from <http://www.cdc.gov/flu/keyfacts.htm>
- Live Attenuated Influenza Vaccine [LAIV] (The Nasal Spray Flu Vaccine). (2015, September 4). Retrieved September 8, 2015, from <http://www.cdc.gov/flu/about/qa/nasalspray.htm>
- MMR (Measles, Mumps, & Rubella) VIS. (2013, June 18). Retrieved August 17, 2015, from <http://www.cdc.gov/vaccines/hcp/vis/vis-statements/mmr.html>
- MMRV (Measles, Mumps, Rubella & Varicella) VIS. (2013, June 18). Retrieved August 17, 2015, from <http://www.cdc.gov/vaccines/hcp/vis/vis-statements/mmr.html>
- Meningococcal VIS. (2013, June 18). Retrieved August 13, 2015, from <http://www.cdc.gov/vaccines/hcp/vis/vis-statements/mening.html>
- Mumps: Questions and Answers Information about the disease and vaccines. (n.d.). Retrieved August 14, 2015, from <http://www.immunize.org/catg.d/p4211.pdf>
- Pneumococcal Conjugate (PCV13) VIS. (2013, June 18). Retrieved September 11, 2015, from <http://www.cdc.gov/vaccines/hcp/vis/vis-statements/pcv13.html>
- Pneumococcal Polysaccharide VIS. (2015, April 24). Retrieved September 10, 2015, from <http://www.cdc.gov/vaccines/hcp/vis/vis-statements/ppv.html>
- Polio VIS. (2013, June 18). Retrieved August 27, 2015, from <http://www.cdc.gov/vaccines/hcp/vis/vis-statements/ipv.html>
- Prevention. (2014, April 2). Retrieved September 2, 2015, from <http://www.cdc.gov/hidisease/about/prevention.html>
- Risk Factors and Transmission of Pneumococcal Disease. (2015, June 10). Retrieved September 10, 2015, from <http://www.cdc.gov/pneumococcal/about/risk-transmission.html>
- Rotavirus VIS. (2015, April 16). Retrieved September 4, 2015, from <http://www.cdc.gov/vaccines/hcp/vis/vis-statements/rotavirus.html>
- Seasonal Flu Shot. (2014, September 9). Retrieved September 3, 2015, from <http://www.cdc.gov/flu/about/qa/flushot.htm>
- Serogroup B Meningococcal (MenB) VIS. (2015, August 14). Retrieved August 19, 2015, from <http://www.cdc.gov/vaccines/hcp/vis/vis-statements/mening-serogroup.html>
- Severe Vaccine Reaction or Lightning Strike: What's More Likely? (n.d.). Retrieved May 31, 2015, from <http://imgur.com/gallery/SXgr2kU/>



# Sources

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

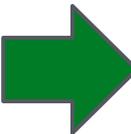
## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

- Signs & Symptoms of Chickenpox. (2011, November 16). Retrieved July 17, 2015, from <http://www.cdc.gov/chickenpox/about/symptoms.html>
- Signs & Symptoms of Meningococcal Disease. (2014, April 1). Retrieved August 23, 2015, from <http://www.cdc.gov/meningococcal/about/symptoms.html>
- Signs and Symptoms of Measles. (2015, February 17). Retrieved August 21, 2015, from <http://www.cdc.gov/measles/about/signs-symptoms.html>
- Symptoms and Complications of Pneumococcal Disease. (2015, June 10). Retrieved September 10, 2015, from <http://www.cdc.gov/pneumococcal/about/symptoms-complications.html>
- Symptoms of Rotavirus. (2014, May 12). Retrieved September 1, 2015, from <http://www.cdc.gov/rotavirus/about/symptoms.html>
- Td (Tetanus, Diphtheria) VIS. (2015, February 24). Retrieved July 31, 2015, from <http://www.cdc.gov/vaccines/hcp/vis/vis-statements/td.html>
- Tdap (Tetanus, Diphtheria, Pertussis) VIS. (2015, February 24). Retrieved August 4, 2015, from <http://www.cdc.gov/vaccines/hcp/vis/vis-statements/tdap.html>
- The Immune System - Overview. (n.d.). Retrieved July 17, 2015, from <http://www.nobelprize.org/educational/medicine/immunity/immune-overview.html>
- The Journey of Your Child's Vaccine. (2013, February 8). Retrieved June 10, 2015.
- Transmission of Chickenpox. (2011, November 16). Retrieved July 8, 2015, from <http://www.cdc.gov/chickenpox/about/transmission.html>
- Transmission of Measles. (2015, March 31). Retrieved August 21, 2015, from <http://www.cdc.gov/measles/about/transmission.html>
- Transmission of Rotavirus. (2014, May 12). Retrieved September 3, 2015, from <http://www.cdc.gov/rotavirus/about/transmission.html>
- Types of Infection of Pneumococcal Disease. (2015, June 10). Retrieved September 9, 2015, from <http://www.cdc.gov/pneumococcal/about/infection-types.html>
- Understanding How Vaccines Work. (2013, February 1). Retrieved July 1, 2015, from <http://www.cdc.gov/vaccines/hcp/patient-ed/conversations/downloads/vacsafe-understand-color-office.pdf>



# Sources

## [How Vaccines Work](#)

## [Vaccines and Vaccine-Preventable Diseases](#)

## [Vaccine Safety](#)

## [Vaccination Schedules](#)

## [Colorado Required School Vaccinations](#)

## [Risks and Benefits of Vaccines](#)

## [Common Vaccine Concerns](#)

## [Additional Resources](#)

- Understanding Thimerosal, Mercury, and Vaccine Safety. (2013, February 1). Retrieved September 1, 2015, from <http://www.cdc.gov/vaccines/hcp/patient-ed/conversations/downloads/vacsafe-thimerosal-color-office.pdf>
- Vaccine Information - Diphtheria, Tetanus, and Pertussis Vaccines. (2015, June 3). Retrieved August 2, 2015, from <http://www.cdc.gov/vaccines/vpd-vac/pertussis/#vacc>
- Vaccine Ingredients. (n.d.). Retrieved August 20, 2015, from <http://www.chop.edu/centers-programs/vaccine-education-center/vaccine-ingredients#.Ve-E-dLBzGd>
- Vaccine Ingredients - DNA. (n.d.). Retrieved September 11, 2015, from <http://www.chop.edu/centers-programs/vaccine-education-center/vaccine-ingredients/dna#.VfdghtJViko>
- Vaccine Ingredients - Egg Products. (n.d.). Retrieved September 4, 2015, from <http://www.chop.edu/centers-programs/vaccine-education-center/vaccine-ingredients/egg-products#.VfpFvNJViko>
- Vaccine Ingredients - Fetal Tissues. (n.d.). Retrieved September 3, 2015, from [http://www.chop.edu/centers-programs/vaccine-education-center/vaccine-ingredients/fetal-tissues#.Vfs\\_KtJVikp](http://www.chop.edu/centers-programs/vaccine-education-center/vaccine-ingredients/fetal-tissues#.Vfs_KtJVikp)
- Vaccine Ingredients - Thimerosal. (n.d.). Retrieved September 5, 2015, from <http://www.chop.edu/centers-programs/vaccine-education-center/vaccine-ingredients/thimerosal#.Ve8EntLBzGc>
- What Is Polio? (2014, October 15). Retrieved August 31, 2015, from <http://www.cdc.gov/polio/about/index.htm>
- Whooping Cough and the Vaccine (Shot) to Prevent It. (2015, July 1). Retrieved July 29, 2015, from <http://www.cdc.gov/vaccines/vpd-vac/pertussis/downloads/PL-dis-pertussis-color-office.pdf>

