

# Just the facts: Vaccination protects



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# Let's talk about vaccination

There's a lot of information out there about vaccines and vaccinations, and it can get confusing.

This special section will help you cut through the confusion.

It will cover the basics of what vaccination is, how it works, what it protects against and why it is important.

It will also talk about the safety of vaccines, bust some myths about them and give you a tear-out list of questions that you can take with you to your health care provider.

Finally, it will point you to trustworthy sources where you can find additional information.

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## The immune system: How your body fights disease

Microorganisms, or microbes, are microscopic living organisms such as bacteria, viruses and parasites. Some microbes exist in the body without causing harm – some are even good for you! Others cause disease.

When harmful microbes invade your body, they attack and multiply. This invasion is called an infection, and an infection is what causes you to become sick.

When your immune system encounters a harmful microbe, it recognizes it as foreign (in other words, not a usual part of your system) and begins to produce tools to fight the infection caused by that microbe.

The first time your body encounters a particular microbe, it can take several days for your immune system to produce enough tools to conquer the infection, so you get sick.

After you recover from an infection, your immune system remembers how to protect you against that microbe, so it can't make you sick again. This protection is called immunity.

## How vaccines work

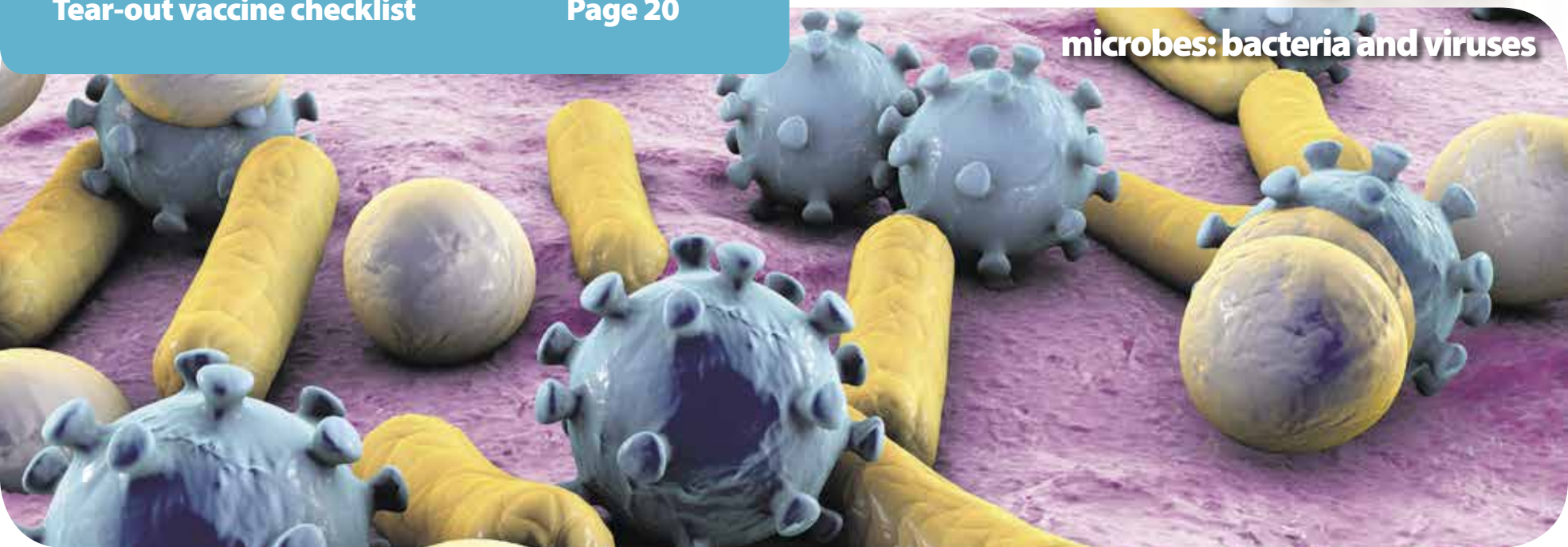
Vaccines help you to develop immunity to diseases without getting sick first.

The active ingredients of vaccines, called antigens, look like disease-causing microbes to your immune system.

The antigens fool your immune system into recognizing them as foreign, destroying them and remembering them. After being vaccinated, if you encounter the real microbe in the future, your immune system can recognize it and destroy the infection before it can make you sick.



**microbes: bacteria and viruses**





# What is community (herd) immunity?

Some people, such as newborn infants, pregnant women, cancer patients, people with HIV and organ transplant patients, may be at much higher risk of serious illness from infectious diseases spread within the community. Although some of these patients may receive certain vaccines, they may not respond to them as well, and therefore count on others around them to be vaccinated.

Also, like any medicine, vaccines are not 100 percent effective. Sometimes, people who are vaccinated against a particular disease can still get that disease (although they usually get a milder case than people who are unvaccinated).

This means that there will always be some people in our community who are vulnerable to these diseases.

Diseases that spread from person to person cannot spread as fast or as widely if most of the population is vaccinated. Even if a few people get sick, there is little opportunity for a widespread outbreak. This helps to protect even unimmunized members of the community because it is less likely that they will be exposed to the disease.

## Types of vaccines

Different types of vaccines are used to prevent disease, depending on what kind of microbe the vaccine is designed to fight. Here are the most common:

■ **Live vaccines** fight viruses. These vaccines contain a version of the living virus that has been weakened so that it does not cause disease in people with healthy immune systems.

Live vaccines are very effective. But, people with weakened immune systems cannot get live vaccines because they could get sick from them.

Examples of live vaccines are the measles, mumps and rubella vaccine (MMR), the rotavirus vaccine and the varicella (chickenpox) vaccine.

■ **Inactivated vaccines** also fight viruses, but unlike live vaccines, they contain killed viruses. Multiple doses of inactivated vaccines may be necessary to build up and maintain immunity because they are not as effective as live vaccines. Inactivated vaccines are safe for people with weakened immune systems.

The polio vaccine is an example of an inactivated vaccine.

■ **Toxoid vaccines** prevent diseases caused by bacteria that produce poisons, or toxins, in the body. These vaccines contain weakened versions of the toxins, called toxoids.

The DTaP vaccine, which protects against diphtheria, tetanus and pertussis (whooping cough), is an example of a toxoid vaccine.



### To learn more:

- Talk to your health care provider
- Call 800-CDC-INFO
- Visit [cdc.gov/vaccines](http://cdc.gov/vaccines)

### Going beyond the text

## Digging deeper

Vaccines help you to develop immunity to diseases without getting sick first. In the medical field, Webster's Dictionary defines immunity as "a condition of being able to resist a particular disease, especially through preventing development of a pathogenic microorganism or by counteracting the effects of its products." Look through the *Tampa Bay Times* to find the word *immunity*. What does the word mean in the context of the article? Is it referencing medical immunity? legal immunity? financial immunity? Research immunity about vaccines and diseases online. Write a blog post explaining why immunity against diseases without getting sick first is an important component of herd immunity.

# What diseases do vaccines protect against?

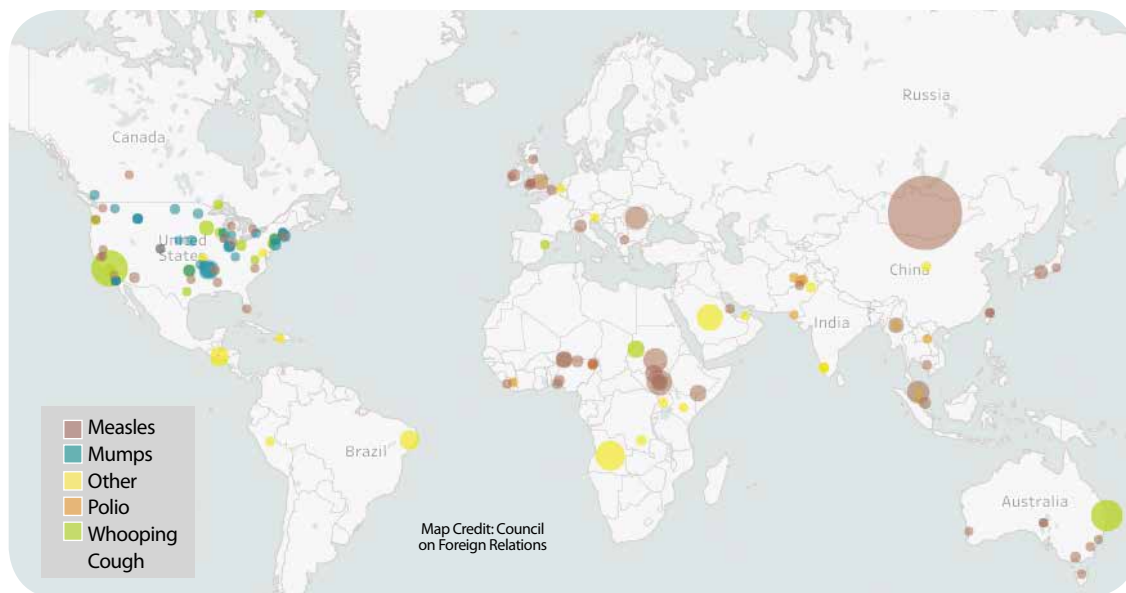
The vaccines that are recommended for children and adolescents can seem like a confusing alphabet soup.

Some of the diseases they protect against are no longer common in the United States – mainly due to vaccination – and you may be unfamiliar with them.

However, many of these diseases are still widespread in other parts of the world and can be brought into the U.S. by travelers. Every year, tens of thousands of Americans get sick from diseases that could be prevented by vaccines. Outbreaks of measles, mumps, meningococemia and pertussis continue to occur in the U.S.

## Global outbreaks of vaccine-preventable diseases in 2016

Many vaccine-preventable diseases are still widespread throughout the world, as this map from the Global Health Program at the Council on Foreign Relations shows. Visit [cfr.org/interactives/GH\\_Vaccine\\_Map](http://cfr.org/interactives/GH_Vaccine_Map) for an interactive version.



## These diseases are preventable by vaccinations required for school entry in the state of Florida:



## Diphtheria

can be prevented by DTaP, Tdap and Td vaccinations

Diphtheria is a very contagious disease caused by the *Corynebacterium diphtheriae* bacterium. It is spread when an infected person coughs or sneezes.

This bacterium produces a toxin, or poison, that causes a thick coating in the back of the nose or throat of an infected person. This coating makes it hard to breathe or swallow, and it can get so thick that it blocks the airway.

The diphtheria toxin also can cause weakness, sore throat, fever and swollen glands in the neck. It can damage the heart, kidneys and nerves. In serious cases, diphtheria can cause coma, paralysis and death.

About one out of 10 people who gets diphtheria dies. Among children under 5, about one out of five who gets diphtheria dies. Diphtheria continues to cause illness globally.



## Hepatitis B

can be prevented by hepB vaccination

Hepatitis B is a contagious liver disease caused by the hepatitis B virus (HBV). It is spread when body fluid infected with HBV enters the body of a person who is not infected.

Hepatitis B can be either acute or chronic. Acute hepatitis B is a short-term, flu-like illness. Acute infection can lead to chronic hepatitis B.

Chronic hepatitis B is a long-term illness that occurs when HBV remains in a person's body. Chronic hepatitis B can lead to serious liver problems such as cirrhosis (scarring of the liver) and cancer.

The younger a person is when infected with HBV, the greater his or her chance of developing chronic hepatitis B:

- About 90 percent of infants infected at birth with HBV passed from the mother during delivery will develop chronic hepatitis B.
- 25–50 percent of children aged 1 to 5 when infected with HBV will develop chronic hepatitis B.
- 6–10 percent of people over 5 years of age when infected with HBV will develop chronic hepatitis B.

Worldwide, chronic hepatitis B affects 240 million people, and contributes to an estimated 786,000 deaths, every year.



## How do I know what vaccines I/my child/my teenager needs?

Visit [cdc.gov/vaccines/schedules](http://cdc.gov/vaccines/schedules) for easy-to-read vaccine schedules for all ages and interactive online tools to help you know what vaccines you should ask your health care provider about.



## Help paying for vaccinations

The Vaccines for Children (VFC) program offers vaccines at no cost for eligible children under the age of 19 whose parents or guardians may not be able to afford the vaccines.

For more information, visit [cdc.gov/features/VFCprogram](http://cdc.gov/features/VFCprogram) or call 800-CDC-INFO.



## Measles

Photo Credit: American Academy of Pediatrics

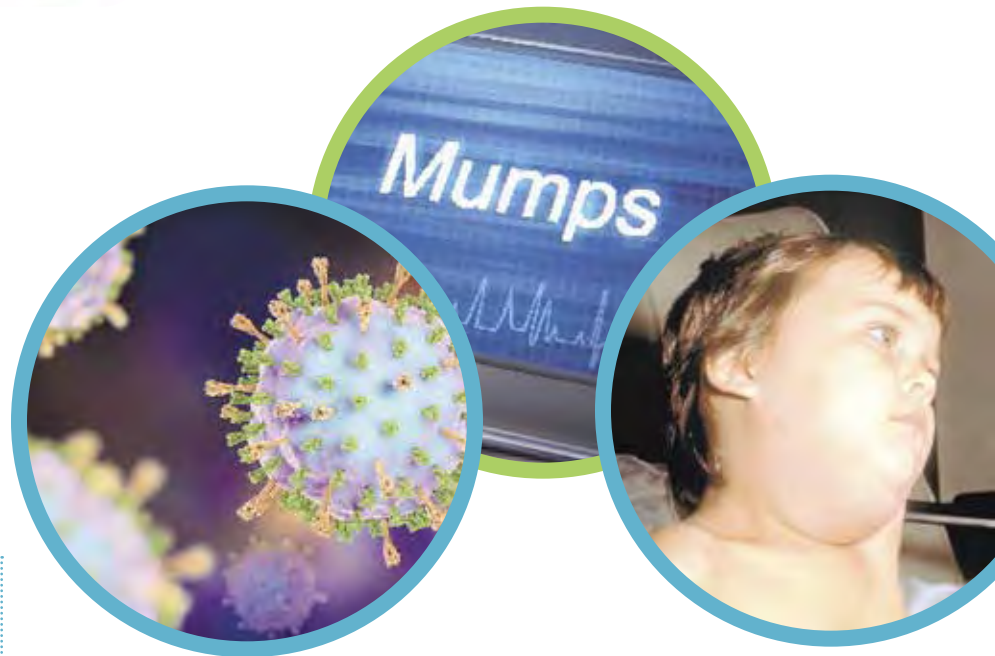
**can be prevented by MMR vaccination**

Measles is a highly contagious respiratory disease caused by the rubeola virus. It is so contagious that just entering a room after a person who has measles has left can lead to infection. Nine out of 10 unimmunized people who come in contact with an infected person will become infected.

Measles symptoms include rash, fever, cough and red, watery eyes. Measles can cause serious health complications, such as pneumonia and encephalitis (swelling of the brain). Measles also may cause a pregnant woman to give birth prematurely or to have a low-birth-weight baby.

Although measles is no longer common in the United States, the disease remains very common in many parts of the world. Worldwide, about 20 million people get measles each year, and about 146,000 die.

- About one out of every four people in the U.S. who gets measles will be hospitalized.
- One out of every 1,000 people in the U.S. with measles will develop encephalitis.
- One to two out of every 1,000 people in the U.S. with measles will die.



## Mumps

Photo Credit: CDC

**can be prevented by MMR vaccination**

Mumps is a contagious disease caused by the mumps virus. It is spread when an infected person coughs or sneezes.

Mumps symptoms include swollen glands under the ears or jaw, fever, muscle aches, tiredness, abdominal pain and loss of appetite.

Severe complications for children who get mumps are uncommon, but can include meningitis (an infection of the covering of the brain and spinal cord), encephalitis, permanent hearing loss or swelling of the testes. Complications are more common in adults.

Sources: Centers for Disease Control and Prevention, World Health Organization



PERTUSSIS

Photo Credit: CDC



# Pertussis (whooping cough)

can be prevented by Tdap and DTaP vaccinations

Pertussis, also known as whooping cough, is a highly contagious respiratory disease caused by the *Bordetella pertussis* bacterium. It is spread when an infected person coughs or sneezes.

Early symptoms of pertussis are similar to the common cold.

Later, pertussis causes fits of violent, rapid coughing until the air is gone from the lungs, causing the person to inhale with a loud “whooping” sound. This extreme coughing also can cause vomiting and exhaustion.

Pertussis is most serious for babies and young children, who can suffer apnea (slowed or stopped breathing), pneumonia, seizures and brain damage.

About half of children younger than 1 year old who get pertussis need to be hospitalized. Of these:

- 3 out of 5 will have apnea
- 1 out of 4 will get pneumonia
- 1 out of 100 will die

Visit [pkids.org/diseases/pertussis.html](http://pkids.org/diseases/pertussis.html) to hear what whooping cough sounds like.

Where can I get vaccinated?

Ask your health care provider or visit [vaccinefinder.org](http://vaccinefinder.org) to find a vaccine provider near you.



Photo Credit: State Archives of Florida

Unidentified twins with polio in Tallahassee, 1960

# Polio

can be prevented by IPV vaccination

Polio is a highly infectious disease caused by the poliovirus. It is primarily spread through contact with the feces (poop) of an infected person, including through contaminated food or water.

About one out of four people with poliovirus infection experiences flu-like symptoms.

More rarely, people with poliovirus infection will develop serious symptoms such as meningitis (infection of the covering of the spinal cord or brain) and weakness or paralysis in the arms or legs.

In about one out of 200 people, poliovirus infection results in irreversible paralysis, usually of the legs. Among those who are paralyzed, between two and 10 children out of 100 die because the virus paralyzes the muscles that help them breathe. Polio can cause total paralysis in a matter of hours.

Polio mainly affects children under 5 years of age. There is no cure for polio.

Vaccination has eliminated polio from the U.S. and most of the world, but it remains common in Afghanistan, Nigeria and Pakistan.



# Travel and vaccines

Many diseases that are very rare in the U.S. remain widespread in other countries. If you are planning to travel to another country, visit [cdc.gov/features/vaccines-travel](http://cdc.gov/features/vaccines-travel) for information about what vaccines are recommended for the countries you plan to visit. You can find an easy online questionnaire at [cdc.gov/travel/destinations/list](http://cdc.gov/travel/destinations/list).



## Rubella (German measles)

can be prevented by MMR vaccination

Photo Credit: CDC

Rubella is a contagious disease caused by the rubella virus. It is spread when an infected person coughs or sneezes.

Although rubella is also known as German measles, it is caused by a different virus than measles.

In children, rubella usually causes a mild illness with a red rash and fever. However, rubella is extremely dangerous to developing fetuses.

If a woman gets rubella while pregnant, especially in her first three months, she is at serious risk of miscarriage or stillbirth.

Babies who survive are at risk for severe birth defects such as heart problems, loss of hearing and eyesight, intellectual disability, and liver or spleen damage. This is known as congenital rubella syndrome (CRS).

A woman infected with rubella during the first three months of pregnancy has up to a 90 percent chance of giving birth to a baby with CRS.

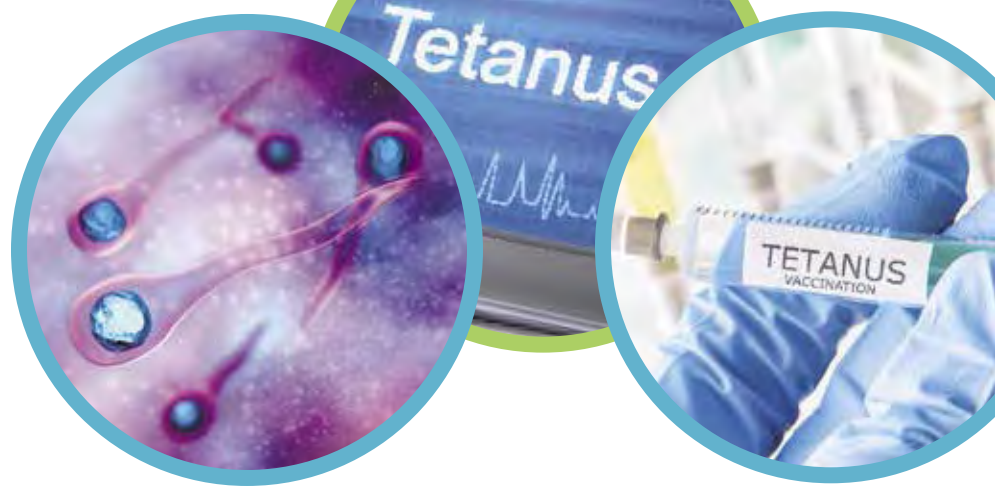
During the last major rubella epidemic in the U.S., about 12.5 million people got rubella; 11,000 pregnant women lost their babies; 2,100 newborns died; and 20,000 babies were born with CRS.

Rubella is no longer common in the U.S., but it is still widespread in other parts of the world. Globally, there are more than 100,000 babies born with CRS every year.

Going beyond the text

## Getting the word out

The purpose of an advertisement is to sell something or to provide information. The purpose of a public service announcement (PSA), a type of advertisement, is to inform, educate or persuade the public. A PSA that you read in the newspaper will be different from one you see on the Internet, in a text or on television. Look through the *Tampa Bay Times* to find examples of traditional advertisements and public service announcements. Notice the difference in the visuals, language used and rhetoric being presented. With a partner or in a small group, use the information on the pages of this publication and the links provided to create one PSA to be printed in the newspaper and one to be presented on television or the Internet. The focus of your PSA will be that certain diseases are a preventable public health challenge. Share your PSA with your classmates.



## Tetanus (lockjaw)

can be prevented by Tdap vaccination

Tetanus is an infection caused by bacteria called *Clostridium tetani*. These bacteria are found in soil, dust and manure. They enter the body through a puncture, cut or sore on the skin.

The *Clostridium tetani* bacteria produce a toxin that causes severe, painful muscle stiffness and spasms so strong that they can break bones.

Tetanus often results in "locking" of the jaw so a person cannot open his or her mouth, swallow or breathe. Complete recovery from tetanus can take months. Ten to 20 percent of people infected with tetanus die, usually from suffocation.

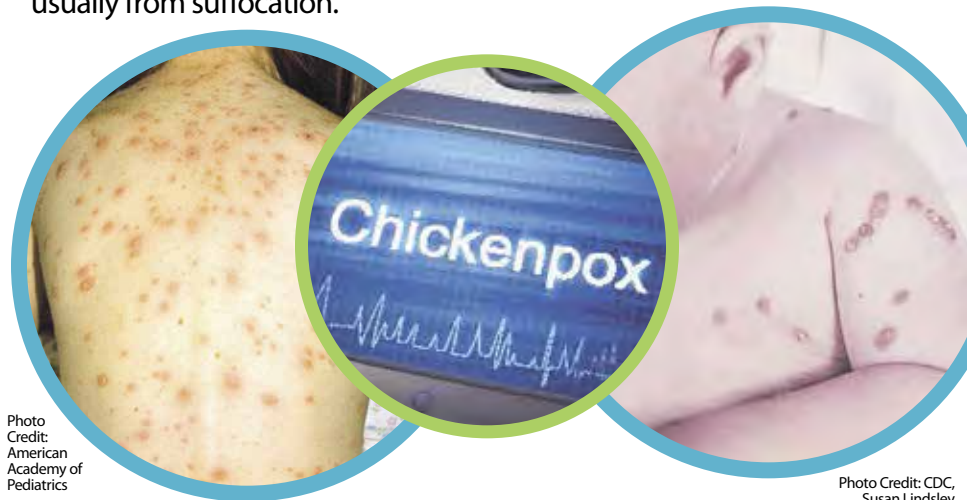


Photo Credit: American Academy of Pediatrics

Photo Credit: CDC, Susan Lindsley

## Varicella (chickenpox)

can be prevented by varicella vaccination

Chickenpox is a very contagious disease caused by the varicella-zoster virus. It is spread when an infected person coughs or sneezes and also can spread from the blisters on the skin caused by the disease.

Chickenpox symptoms include an itchy, blister-like rash, fever and tiredness. In some cases, children may develop a serious secondary bacterial infection of the skin called cellulitis, resulting in hospitalization.

Babies, pregnant women and people with weakened immune systems are at risk for more severe symptoms such as skin infections, pneumonia and encephalitis.

Before the varicella vaccine was available, about 4 million people got chickenpox each year in the United States. About 10,600 of those people were hospitalized, and 100 to 150 died each year.

Sources: Centers for Disease Control and Prevention, World Health Organization

# Recommended vaccines for children, preteens and teens

## Influenza (flu) vaccine:

**Recommended for everyone 6 months of age and older annually.**

Flu is a contagious respiratory illness caused by influenza viruses. It is mainly spread when an infected person coughs or sneezes. You also can get flu by touching a surface that has flu virus on it and then touching your mouth or nose.

Flu can cause mild to severe illness and death in healthy adults and children, and survivors of serious illness can experience complications. Common symptoms include fever, cough, sore throat, body aches, headaches and tiredness. Flu is most common during flu “season,” which runs from November through March in Florida.

Young children, pregnant women, people over 65 and people with chronic health conditions are at higher risk for complications such as sinus and ear infections, pneumonia and encephalitis.

In the U.S., millions of people get sick, hundreds of thousands are hospitalized and thousands die from flu every year.

There are several different types of influenza virus. Over the course of a flu season, different types of influenza virus circulate and cause illness. Influenza viruses also mutate, or change, over time.

Because of this, the flu vaccine is updated each year to help protect against the influenza viruses that research predicts will be most common that season. This is why you should get a flu shot every year.



## Can the flu vaccine give me the flu?

No. You can't catch flu from the flu vaccine. Injectable flu vaccines are made with either killed viruses or with only part of the virus, so they can't get you sick. However, side effects of mild fever and aches are fairly common, which is why people sometimes think they are sick with the flu.

The nasal spray flu vaccine does contain live viruses. However, the viruses are weakened so that they don't cause illness. The nasal spray flu vaccine is not recommended for use in 2016-2017.

## Meningococcal vaccine:

**Recommended for all preteens, teens and first-year college students living in dorms.**

Meningococcal disease is caused by the *Neisseria meningitidis* bacterium. It is spread through close or lengthy contact, such as kissing or living in the same household.

Meningococcal disease is not very common, but it is extremely serious.

Meningococcal bacteria can cause severe disease, including meningitis (infection of the lining of the brain and spinal cord) and septicemia (infection of the bloodstream).

About 10 to 15 percent of people with meningococcal disease die, even with treatment. Of those who recover, up to 20 percent suffer from permanent disabilities.

## Meningococcal meningitis

The symptoms of meningococcal meningitis include sudden onset of fever, headache, stiff neck, nausea, increased sensitivity to light and confusion. These symptoms can appear quickly or over several days. Immediate care is required.

Meningococcal meningitis can cause death or permanent disabilities such as hearing loss and brain damage. In fatal cases, death can occur in as little as a few hours.

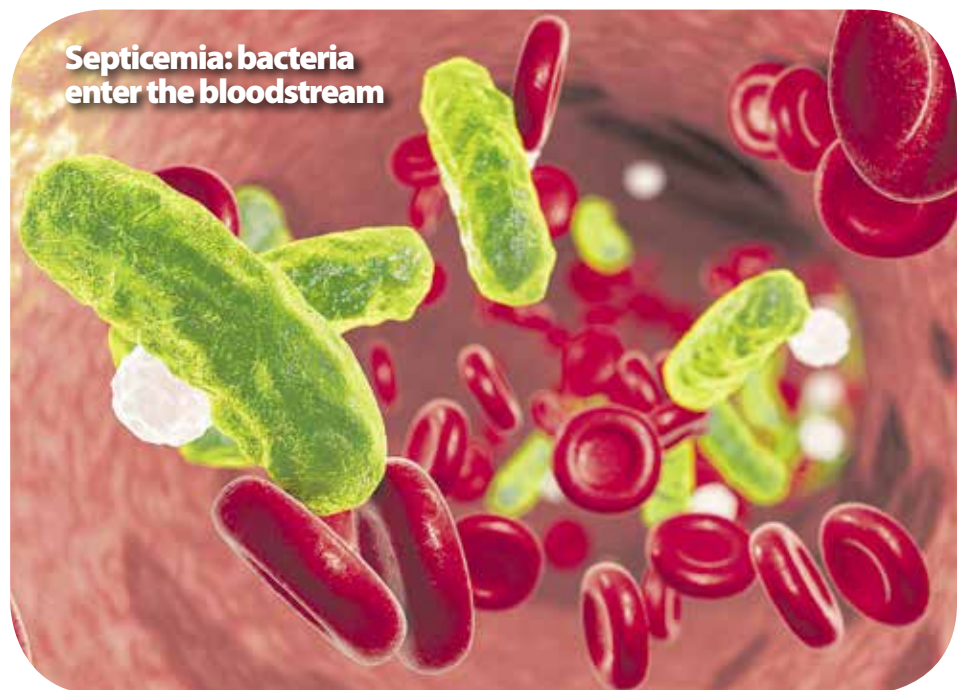
## Meningococcal septicemia

In meningococcal septicemia, the bacteria enter the bloodstream, causing bleeding into the skin and organs.

Symptoms of septicemia include fever, fatigue, vomiting, cold hands and feet, severe pain in muscles, joints, chest or belly, rapid breathing, diarrhea and a dark purple rash.

Meningococcal septicemia can cause death or permanent disabilities such as amputation of toes, fingers or limbs. In fatal cases, death can occur in as little as a few hours.

Children, teens and young adults are at increased risk of meningococcal disease.





# Pneumococcal vaccine:

**Recommended for all children younger than 5 and all adults 65 or older.**

Pneumococcal disease is an infection caused by *Streptococcus pneumoniae* bacteria. *Streptococcus pneumoniae* bacteria also are known as pneumococcus.

Pneumococcal bacteria are spread through direct contact with spit or mucus.

Pneumococcus can cause many types of illnesses, including ear infections, sinus infections, pneumonia, meningitis and infections of the bloodstream.

Children under 2, adults over 65, people without a functioning spleen and people with a chronic illness or compromised immune systems are most at risk of pneumococcal disease, although anyone can get it.

Most pneumococcal infections are mild, but some can be severe and cause death or long-term problems such as brain damage or hearing loss.

## Pneumonia

Pneumonia is the most common serious form of pneumococcal disease. Symptoms of pneumonia include fever and chills, cough, rapid breathing or difficulty breathing and chest pain.

Complications of pneumococcal pneumonia can include infection of the space between the lungs and chest wall, inflammation of the sac surrounding the heart and blockage of the airway that allows air into the lungs.

About five out of 100 people with pneumococcal pneumonia will die from it.

## Meningitis

The symptoms of pneumococcal meningitis include fever, headache, stiff neck, nausea, increased sensitivity to light and confusion.

Meningitis is the most severe type of pneumococcal disease. Of children younger than 5 years old who get pneumococcal meningitis, about one out of 15 dies of the infection. Survivors may experience long-term problems such as hearing loss or developmental delay.

## Bacteremia

Pneumococcal bacteremia is an infection of the bloodstream. Symptoms include fever, chills and low alertness. About one out of 100 children younger than 5 years old with bacteremia die of it.

Going beyond the text

## Vaccine wars

Watch the PBS *Frontline* video *The Vaccine War: The Growing Debate Over Vaccine Safety* at [pbs.org/wgbh/pages/frontline/teach/vaccine](https://pbs.org/wgbh/pages/frontline/teach/vaccine). Write a short essay in response to the four discussion questions at the end of the video. Next, look through this Newspaper in Education publication to find responses to some of the claims the people in the video make. Do you agree or disagree with their thoughts? Using the comics in the *Tampa Bay Times* as models, create a panel cartoon dialogue of two characters discussing the main issues presented in the video.



# What is human papillomavirus (HPV)?

HPV is a group of more than 150 related viruses that are passed from one person to another through sexual contact. HPV is the most common sexually transmitted infection in the U.S.

HPV is so common that almost all sexually active people will get it at some point in their lives. About 79 million Americans are currently infected with HPV, and about 14 million people become newly infected each year.

HPV can be spread even when an infected person has no signs or symptoms.

Most of the time, the body naturally fights off HPV before it causes any health problems. In fact, most people never develop any symptoms and never even know they have been infected. Nine out of 10 HPV infections go away by themselves within two years.

In some cases, the body is unable to fight off HPV, and the infection persists. HPV infections that don't go away can cause changes in cells in the infected area, which can lead to cancer or genital warts. There is no way to know which people will develop cancer or genital warts and which won't.

## HPV and cancer

Out of the more than 150 types of HPV, at least 13 can cause cancer. Each HPV virus is assigned a number to identify it. This is called its *HPV type*.

- **Cervical cancer:** Almost all cervical cancer is caused by HPV. HPV types 16 and 18 cause 70 percent of all cases of cervical cancer.
- **Anal cancer:** About 91 percent of anal cancers are caused by HPV. Most of these are caused by HPV type 16.
- **Throat cancers:** About 72 percent of cancers of the soft palate, the base of the tongue and the tonsils are caused by HPV. Most of these are linked to HPV type 16.
- **Other cancers:** HPV causes about 75 percent of cancers of the vagina, 69 percent of cancers of the vulva and 63 percent of cancers of the penis. Most of these are caused by HPV type 16.

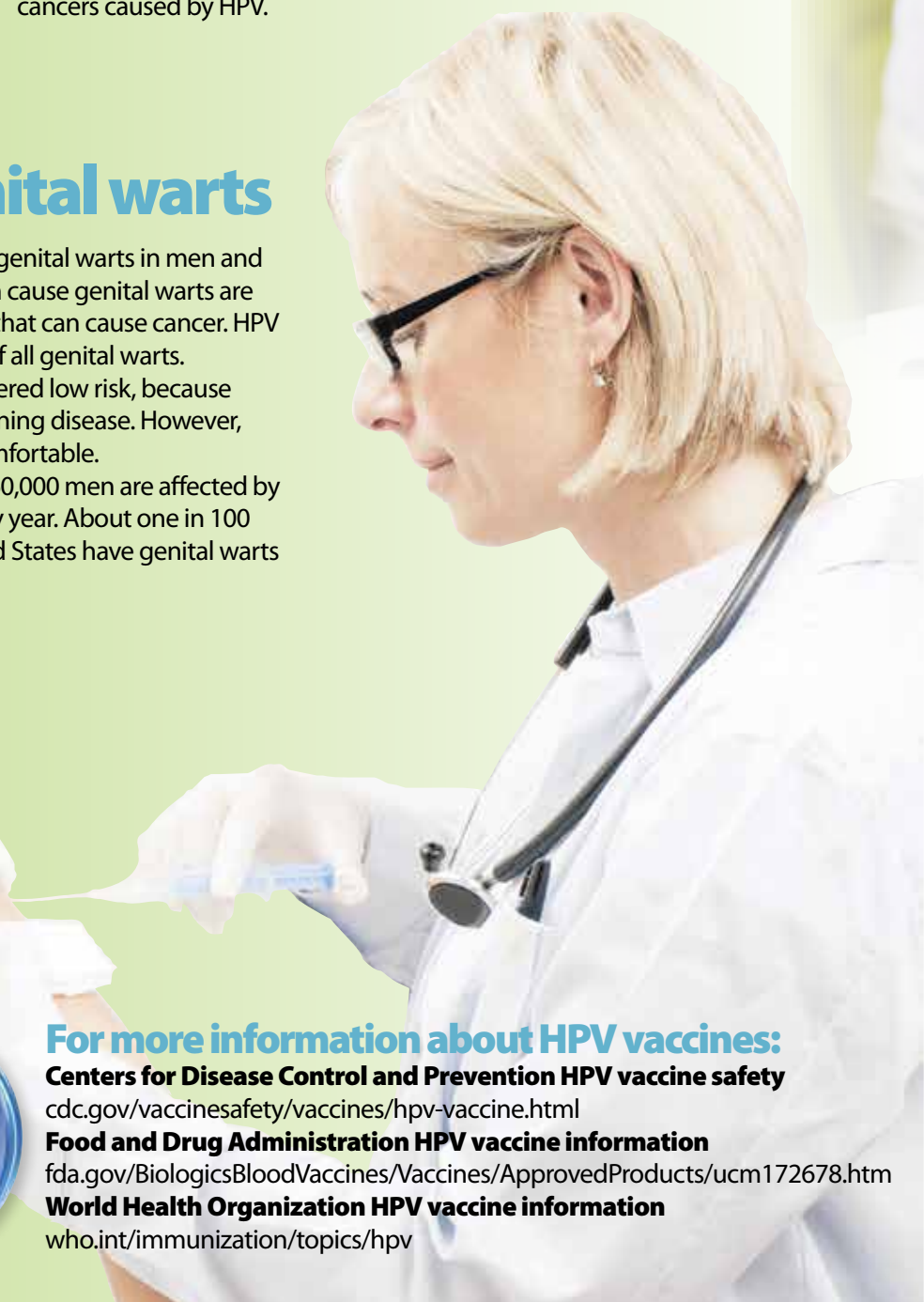
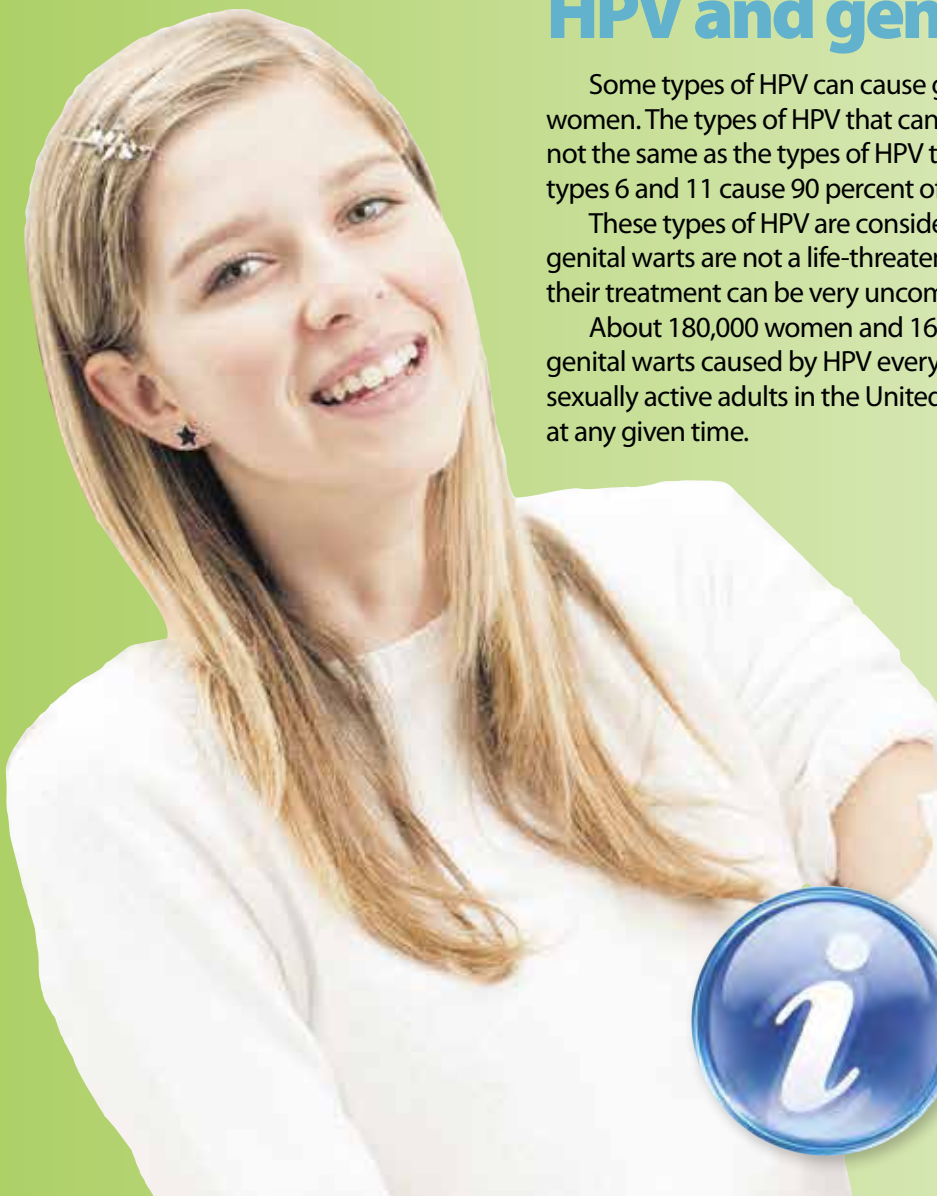
Every year, about 17,600 women and 9,300 men are affected by cancers caused by HPV.

## HPV and genital warts

Some types of HPV can cause genital warts in men and women. The types of HPV that can cause genital warts are not the same as the types of HPV that can cause cancer. HPV types 6 and 11 cause 90 percent of all genital warts.

These types of HPV are considered low risk, because genital warts are not a life-threatening disease. However, their treatment can be very uncomfortable.

About 180,000 women and 160,000 men are affected by genital warts caused by HPV every year. About one in 100 sexually active adults in the United States have genital warts at any given time.



### For more information about HPV vaccines:

**Centers for Disease Control and Prevention HPV vaccine safety**

[cdc.gov/vaccinesafety/vaccines/hpv-vaccine.html](https://cdc.gov/vaccinesafety/vaccines/hpv-vaccine.html)

**Food and Drug Administration HPV vaccine information**

[fda.gov/BiologicsBloodVaccines/Vaccines/ApprovedProducts/ucm172678.htm](https://fda.gov/BiologicsBloodVaccines/Vaccines/ApprovedProducts/ucm172678.htm)

**World Health Organization HPV vaccine information**

[who.int/immunization/topics/hpv](https://who.int/immunization/topics/hpv)



## Help paying for HPV vaccinations

Most health insurance plans cover HPV vaccinations.

If your health insurance doesn't cover HPV vaccination or you don't have health insurance and you can't pay, there is assistance available:

### For children and teens under 19 years of age

The Vaccines for Children (VFC) program offers vaccines at no cost for eligible children under 19 years of age who meet certain requirements.

For more information, visit [cdc.gov/features/VFCprogram](http://cdc.gov/features/VFCprogram) or call 800-CDC-INFO.

### For young adults ages 19 and older

The Merck Vaccine Patient Assistance Program provides Gardasil 9 for free to people ages 19 to 26 who do not have health insurance or cannot afford to pay for the vaccine. For more information, visit [merckhelps.com/GARDASIL%209](http://merckhelps.com/GARDASIL%209) or call 800-293-3881.

Going beyond the text

## Looking at different angles

Since the discovery of the human papillomavirus (HPV) vaccine, there has been controversy surrounding whether or not to mandate the vaccine for adolescents. In order to sway others, people often use biased opinions or logical fallacies disguised as facts to present articles in the media. Read the following articles published in the *New York Times*:

■ "A Vital Discussion, Clouded" [nytimes.com/learning/teachers/featured\\_articles/20070306tuesday.html](http://nytimes.com/learning/teachers/featured_articles/20070306tuesday.html)

■ "Furor on Rush to Require Cervical Cancer Vaccine" [nytimes.com/learning/students/pop/articles/17vaccine\\_LN.html](http://nytimes.com/learning/students/pop/articles/17vaccine_LN.html)

On a sheet of paper, separate the facts and opinions in each article. Next, write a response to each article. What are your thoughts about what the author is writing? Do you agree or disagree? Does the author rely on facts or opinions? Is the information in the article misleading?

## Is the HPV vaccine safe?

Yes. All three HPV vaccines went through years of safety testing before they were licensed by the Food and Drug Administration.

Cervarix was studied in clinical trials with more than 30,000 females. Gardasil trials included more than 29,000 females and males, and Gardasil 9 trials included more than 15,000 females and males.

No serious safety concerns were identified in these clinical trials.

The Centers for Disease Control and Prevention and the Food and Drug Administration continue to monitor HPV vaccines to make sure they are safe and beneficial for the public.

## HPV vaccines: recommended for preteens, teens and young adults

HPV vaccination is important because it protects against cancers caused by HPV infection. HPV vaccination is a series of two or three shots given over several months.

HPV vaccine is recommended for preteen boys and girls at age 11 or 12, so that they are protected before ever being exposed to the virus. HPV vaccines offer the best protection to girls and boys who receive all the vaccine doses and have time to develop an immune response before they become sexually active.

Preteens should receive two doses of HPV vaccine at least six months apart. Teens and young adults who start the series at ages 15 through 26 years should receive three doses of HPV vaccine.

Sources: Centers for Disease Control and Prevention, Food and Drug Administration, National Cancer Institute at the National Institutes of Health, World Health Organization

# Myths and facts about vaccines

**Myth:** It is better to be immunized through disease than through vaccines.

**Fact:** MOSTLY FALSE.

It is true that natural immunity usually results in better immunity than vaccination – but the risks are much greater.

The diseases that we prevent through vaccination are not minor. Vaccine-preventable infections can result in serious complications such as pneumonia, encephalitis, paralysis and death.

Vaccines produce an immune response similar to that produced by the natural infection, but they do not cause the disease or put you at risk of its potential complications. Vaccines are specifically designed to help you to develop immunity to diseases without having to get sick first.

**Myth:** Giving a child more than one vaccine at a time can “overload” his or her immune system.

**Fact:** FALSE.

Vaccines do not overload the immune system. Every day, a healthy immune system successfully fights off millions of germs. Even if a baby or child receives several vaccinations in one day, it is only a tiny fraction of the germs that he or she encounters every day in the environment.

Many vaccines are recommended

early in life to protect young children from dangerous infectious diseases. In order to reduce the number of shots a child receives in a doctor’s visit, some vaccines are offered as combination vaccines (two or more different vaccines that have been combined into a single shot).

In addition, it is common to give more than one shot during the same doctor’s visit. This means fewer office visits for the child and helps to get them protected as quickly as possible.

Research has shown that getting multiple vaccines at the same time is effective and safe.

For more information, visit [cdc.gov/vaccinesafety/concerns/multiple-vaccines-immunity.html](http://cdc.gov/vaccinesafety/concerns/multiple-vaccines-immunity.html).

**Myth:** Vaccines can cause autism.

**Fact:** “PANTS ON FIRE” FALSE.

Vaccines do not cause autism.

The false link between vaccines and autism was created by one study that has been completely discredited.

In 1998, a study of 12 children suggested a possible link between the MMR vaccine, intestinal problems and autism.

The study’s data were later found to be falsified by its lead author, Andrew Wakefield, whose medical license has been taken away for dishonesty and ethical violations.

Wakefield also was found to have a serious financial conflict of interest: He had received more than half a million dollars from a law firm that was planning to sue vaccine manufacturers.

Ten out of the paper’s 12 co-authors have withdrawn their names from the study. The medical journal that published it, *The Lancet*, has issued a retraction.

Numerous follow-up studies during the past two decades have found no link between the MMR vaccine (or any other vaccine) and autism.

In 2015, researchers studied more than 95,000 children in the largest study of its kind. They again found that the MMR vaccine did not increase the risk for autism. The report was published in the *Journal of the American Medical Association*. You can watch a JAMA video report about the study at [jamanetwork.com/learning/video-player/10234769](http://jamanetwork.com/learning/video-player/10234769).

One of the reasons so many people are taken in by false

information about vaccines and autism is that autism is often diagnosed around the same time as the MMR vaccination is given.

According to Autism Speaks, autism cannot be definitely diagnosed until a child is 18 to 24 months old. The recommended age for the first dose of the MMR vaccine is 12 to 15 months old. So, the diagnosis will often follow vaccination by just a few months. However, all the research indicates that this is just an unfortunate coincidence.



**Myth:** Vaccines contain mercury.

**Fact:** MOSTLY FALSE.

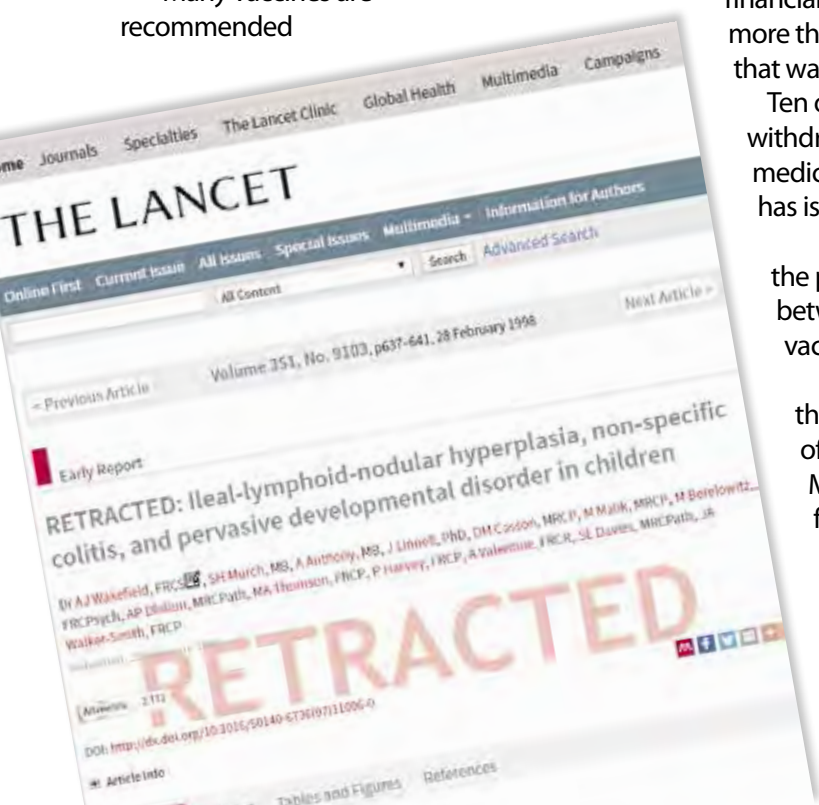
Since the 1930s, a mercury-based preservative called thimerosal has been used in drugs, including vaccines, to prevent the growth of dangerous bacteria and mold.

The type of mercury in thimerosal is ethyl mercury. This is not the same as methylmercury, which is the type of mercury found in certain kinds of fish and which can be toxic to people at high exposure levels.

Since 2001, thimerosal has been removed from all routine childhood vaccines licensed for use in the U.S. Only multidose flu vaccines still contain thimerosal as a preservative. The single dose flu vaccines used by most health care providers do not contain thimerosal.

Thimerosal is still used to prevent the growth of microbes during the manufacturing process of multidose influenza vaccines. When thimerosal is used this way, it is removed later in the process and only very tiny amounts remain. Research has shown these vaccines to be safe.

For more information about thimerosal and charts showing the thimerosal content in vaccines, visit [www.fda.gov/BiologicsBloodVaccines/SafetyAvailability/VaccineSafety/UCM096228](http://www.fda.gov/BiologicsBloodVaccines/SafetyAvailability/VaccineSafety/UCM096228).



**Myth:** Vaccines contain antifreeze.

**Fact:** "PANTS ON FIRE" FALSE.

No vaccine contains, or has ever contained, antifreeze.

Some vaccines contain polyethylene glycol. Polyethylene glycol is an FDA-approved food additive used in many products, such as toothpaste, eye drops and skin creams. Polyethylene glycol is used to purify vaccines during the manufacturing process. It is also used to inactivate the flu virus in some flu vaccines.

It is important not to confuse polyethylene glycol with ethylene glycol. Ethylene glycol is much more toxic and is never used in vaccines. It is often found in antifreeze.

**Myth:** These diseases barely exist here. We don't need to vaccinate against them.

**Fact:** FALSE.

Some vaccine-preventable diseases, such as whooping cough and chickenpox, remain common in the United States.



Others, such as measles and rubella, are no longer common in the U.S. because of vaccines, but remain very common in other parts of the world.

Even if you don't travel abroad, you could easily come into contact with an international traveler. In 2016, more than 11 million overseas visitors came to Florida!

If we stopped vaccinating for these diseases, the few cases we have in the United States could very quickly become tens or even hundreds of thousands of cases.

In 2015, the U.S. experienced a large, multi-state measles outbreak that is believed to have originated with a Disneyland guest who became infected overseas and then visited the park.

**Myth:** Better hygiene, sanitation and good "gut health" are more important to overall health than vaccines.

**Fact:** FALSE.

Handwashing, clean water and improved nutrition absolutely help

protect people from infectious diseases.

But many serious infections can spread regardless of how clean we are.

For example, measles is so contagious that just entering a room after a person who has measles has left can lead to infection. Tetanus infections can result from a small accidental cut or scrape.

The history of vaccine-preventable diseases shows that the number of cases starts to drop when a vaccine is licensed, regardless of the state of sanitation – and that diseases can quickly reappear when vaccination rates drop.



Sources: American Academy of Pediatrics, *British Medical Journal*, Centers for Disease Control and Prevention, Children's Hospital of Philadelphia Vaccine Education Center, Food and Drug Administration, Immunization Action Coalition, World Health Organization

## Going beyond the text Graphing the impact of vaccination

Using the data tables provided, plot a single graph showing measles vaccination rates, reported measles cases and reported measles deaths in the United States between 1980 and 2013. Plot the number of measles cases and deaths as a bar graph and the percentage of children vaccinated as a line graph above it. Interpret your graph to answer the following questions. Write a paragraph explaining your findings for each.

1. What are the overall trends in vaccination rates and reported cases between 1980 and 2013?
2. Why do you think there were changes in the vaccination rates and number of cases? What may have influenced the changes?
3. What is the relationship between these two figures? How do they impact each other?

The number of measles cases in the U.S. spiked between 1989 and 1991, with large outbreaks in California, Texas, Chicago, New York City and Philadelphia. Use the Internet to research these outbreaks and their possible causes. Next, research the Disneyland outbreak of 2015. Write a short essay comparing the outbreaks of 1989-1991 to the outbreak of 2015. How many people were affected? What were the causes? How were the outbreaks brought under control?

Source: Adapted from e-Bug: Vaccinations Lesson Plan, e-bug.eu

Child vaccination rates in the United States  
Measles, % of children, 1980-2013

Year	Percent	Year	Percent
1980	86	1997	91
1981	97	1998	92
1982	97	1999	92
1983	98	2000	91
1984	98	2001	91
1985	97	2002	91
1986	97	2003	93
1987	82	2004	93
1988	98	2005	92
1989	94	2006	92
1990	90	2007	92
1991	87	2008	92
1992	83	2009	90
1993	84	2010	92
1994	89	2011	92
1995	88	2012	92
1996	91	2013	91

Source: Organisation for Economic Co-operation and Development, [data.oecd.org/healthcare/child-vaccination-rates.htm](http://data.oecd.org/healthcare/child-vaccination-rates.htm)

Reported Cases and Deaths from Measles,  
United States, 1980-2013

Year	Cases	Deaths	Year	Cases	Deaths
1980	13,506	11	1997	138	2
1981	3,124	2	1998	100	0
1982	1,714	2	1999	100	2
1983	1,497	4	2000	86	1
1984	2,587	1	2001	116	1
1985	2,822	4	2002	44	0
1986	6,282	2	2003	56	1
1987	3,655	2	2004	37	0
1988	3,396	3	2005	66	No data
1989	18,193	32	2006	55	0
1990	27,786	64	2007	43	0
1991	9,643	27	2008	140	0
1992	2,237	4	2009	71	No data
1993	312	0	2010	63	No data
1994	963	0	2011	220	No data
1995	309	2	2012	55	No data
1996	508	1	2013	187	No data

Source: Centers for Disease Control and Prevention, [cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/e/reported-cases.pdf](http://cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/e/reported-cases.pdf)

# Vaccines



## Vaccine side effects

A vaccine side effect is any health problem shown by research studies to be caused by a vaccine.

Like any medication, vaccines can cause side effects. Usually vaccine side effects are minor – such as a sore arm or a mild fever – and go away on their own within a few days.

More rarely, vaccine side effects can be serious, such as a severe allergic reaction. When you or your child receives a vaccine, you will be told about the possible side effects and what to look for.

Every vaccine licensed for use in the U.S. has a Vaccine Information Statement (VIS) that provides detailed information about the vaccine and its possible side effects.

VISs are available online at [cdc.gov/vaccines/hcp/vis/index.html](http://cdc.gov/vaccines/hcp/vis/index.html) or from your health care provider.

The CDC's Vaccine Safety website ([cdc.gov/vaccinesafety](http://cdc.gov/vaccinesafety)) provides in-depth information about the safety of vaccines, answers common questions about vaccine safety and provides links to vaccine safety research.

## Vaccine Adverse Event Reporting System (VAERS)

[vaers.hhs.gov](http://vaers.hhs.gov)

An “adverse event” is any health problem that happens after the use of a medical product. An adverse event might be caused by the product, or it might just be coincidence.

The Vaccine Adverse Event Reporting System (VAERS) is a national vaccine safety program that collects information about adverse events that happen after the administration of vaccines.

VAERS records reports of any adverse event that occurs after vaccination, even if the person reporting it is not sure that the event was caused by the vaccine.

By monitoring such events, VAERS helps to identify any important new safety concerns about vaccines.

Anyone can file a VAERS report, including health care providers and vaccine recipients or their parents or guardians. Vaccine recipients or their parents or guardians are encouraged to seek the help of their health care provider in filling out the VAERS form.

## National Vaccine Injury Compensation Program (VICP)

[hrsa.gov/vaccinecompensation](http://hrsa.gov/vaccinecompensation)

In very rare cases, a vaccine can cause a serious problem, such as a severe allergic reaction.

In these instances, the National Vaccine Injury Compensation Program (VICP) may provide financial compensation to the injured person.

Any individual who received a covered vaccine and believes he or she was injured as a result can file a petition.

Sources: Centers for Disease Control and Prevention, Immunization Action Coalition, *New York Times*, [Vaccines.gov](http://Vaccines.gov)

# What are the other ingredients in vaccines and what do they do?

In addition to the active ingredients that protect against disease (called antigens), vaccines also contain very small amounts of other ingredients.

These inactive ingredients either help the vaccine to be safe and effective or are used in making the vaccine.

**Preservatives** prevent vaccines from being contaminated with bacteria and mold. Examples include 2-phenoxyethanol and phenol.

**Adjuvants** are substances that are added to vaccines to improve your immune system's response to the vaccine. Examples include aluminum salts.

**Stabilizers** protect the active ingredients during manufacture, storage and transport. Examples include gelatin.

**Residuals** are left over from the vaccine production process. Examples include formaldehyde, antibiotics, egg protein and yeast protein.

## About aluminum

Aluminum is the most common metal on Earth. It is naturally present in plants, soil, water and air.

A typical adult ingests 30 to 50 milligrams of aluminum every day, mainly from foods, drinking water and medicines. Infants receive more aluminum in breast milk or formula than they do through vaccines.

Large quantities of aluminum can cause serious neurologic effects in humans. But the amounts found in vaccines are too small to cause damage. Not all vaccines contain aluminum, but those that do typically contain less than 1 milligram per dose.

Aluminum-containing vaccines have been used for decades and have been given to more than 1 billion people. The National Vaccine Program Office and the Global Advisory Committee on Vaccine Safety (part of the World Health Organization) have found no evidence of health risks.



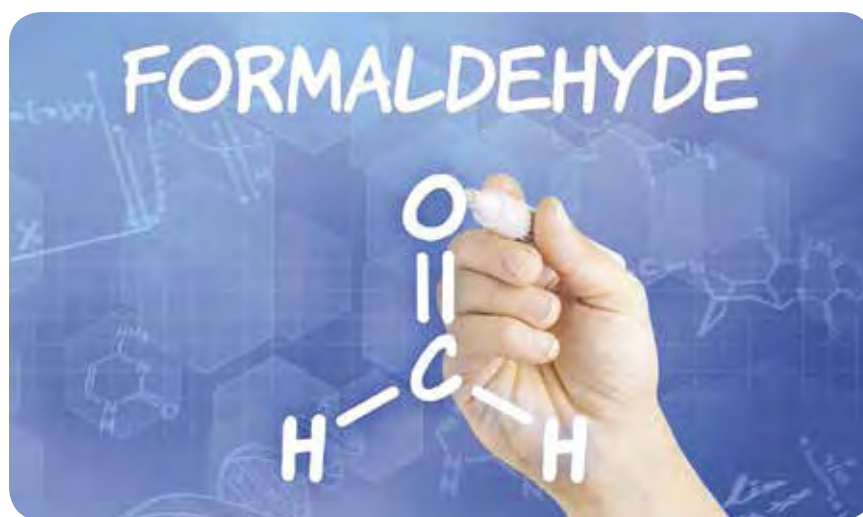
## For more information about vaccine ingredients:

- **Vaccine Education Center's Vaccine Ingredients**  
[chop.edu/centers-programs/vaccine-education-center/vaccine-ingredients](http://chop.edu/centers-programs/vaccine-education-center/vaccine-ingredients)
- **Centers for Disease Control and Prevention Vaccines Ingredients Fact Sheet** –  
[cdc.gov/vaccines/vac-gen/additives.htm](http://cdc.gov/vaccines/vac-gen/additives.htm)

## About formaldehyde

Small amounts of formaldehyde are used to sterilize the vaccine fluid during the manufacturing process. Very tiny amounts remain in the final version of several vaccines.

The amounts of formaldehyde in vaccines are very small and considered safe. In fact, humans naturally have formaldehyde in their blood at concentrations far higher than that of vaccines.



## Going beyond the text Do the research

A drug is any nonfood substance that, when put into the body, changes the way the body or mind works. This includes over-the-counter drugs such as non-prescription painkillers, preventive drugs such as vaccines and prescription drugs such as antibiotics.

All drugs have some type of side effects. The Centers for Disease Control and Prevention (CDC) monitors the safety of vaccines. Do some research about the United States' vaccine safety program by going to [cdc.gov/vaccinesafety](http://cdc.gov/vaccinesafety). Learn about the what the CDC does to try to ensure the vaccines are safe. In addition, use the *Tampa Bay Times* as a source for your research. Find one more source to round out your research. Do you find any articles or editorials that conflict with the information you have found on the CDC website? Write a short essay discussing what you have learned, and present what you have learned to your class.



### To learn more:

- Talk to your health care provider
- Call 800-CDC-INFO
- Visit [cdc.gov/vaccines](http://cdc.gov/vaccines)

# Public health success story: The eradication of smallpox

Smallpox, a contagious disease caused by the variola virus, is one of the deadliest and most destructive diseases in human history.

Smallpox killed up to 30 percent of those it infected. Of its survivors, up to one-third were left blind, and most were severely scarred. There is no cure for smallpox.

Smallpox is a very ancient disease. Researchers have found evidence that it existed in ancient Egypt, China and India. Historians believe that it contributed to the fall of the Roman, Aztec and Incan empires.

By the 1700s, an estimated 400,000 people were dying of smallpox every year just in Europe.

The development and spread of vaccination began to turn the tide in the 1800s and early 1900s. The last reported case of smallpox in the United States was in 1949.

However, smallpox was still widespread in Africa and Asia at the end of the 1960s.

In 1967, the World Health Organization launched the Smallpox Eradication Programme with the goal of eliminating smallpox worldwide. That year, there were an

estimated 10 to 15 million cases of smallpox, resulting in 2 million deaths. Smallpox was still reported in 44 countries.

Over the next decade, this global effort combined vaccination campaigns with preventive measures aimed at stopping transmission.

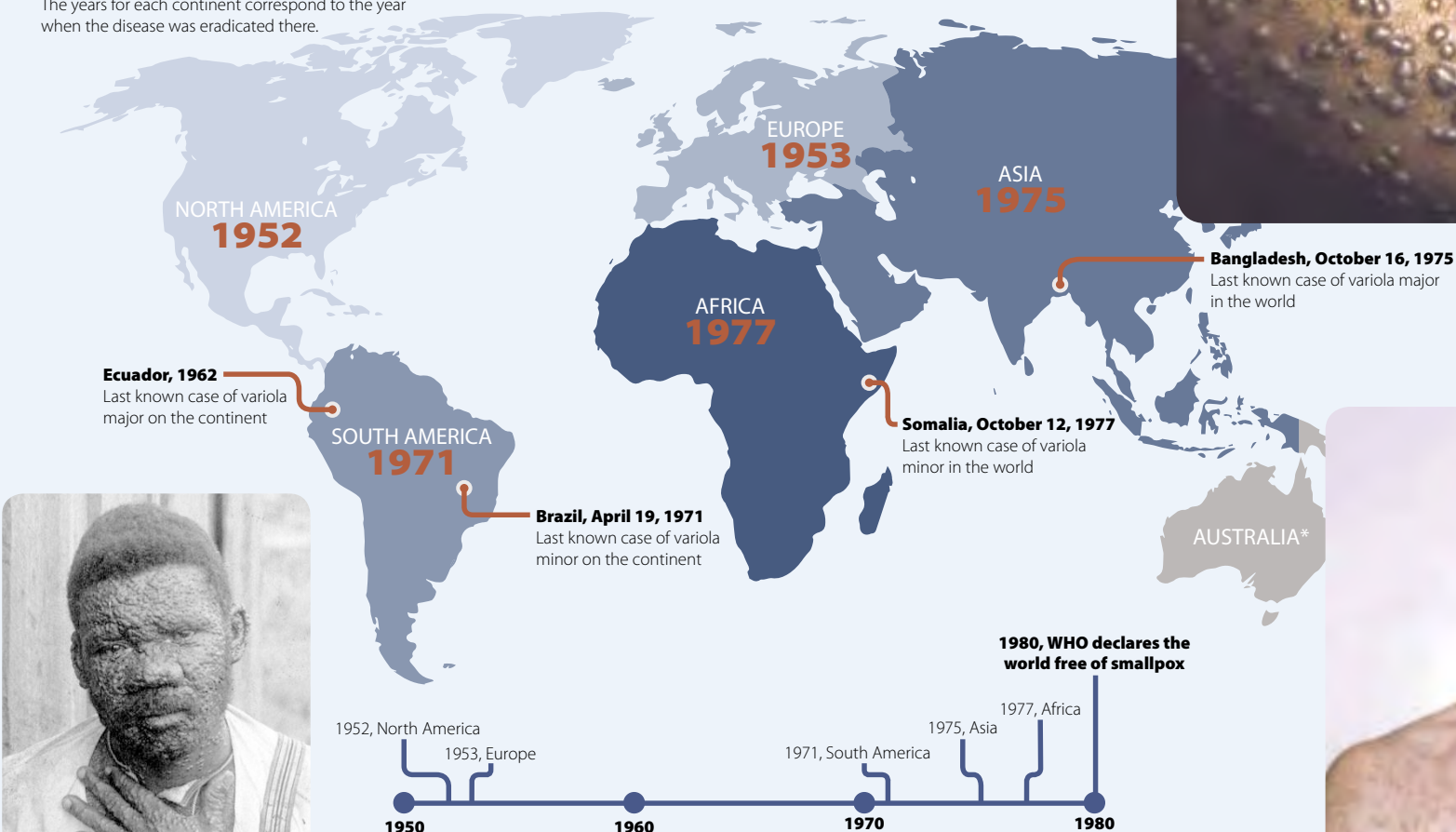
The last known natural case of smallpox was in Somalia in 1977. Smallpox was officially declared eradicated in 1980.

The eradication of smallpox has saved millions of lives. It is considered the greatest achievement in international public health.

## GLOBAL SMALLPOX ERADICATION

The historically important dates highlighted in the map show countries in which the last naturally acquired cases of smallpox occurred.

The years for each continent correspond to the year when the disease was eradicated there.



Map Credit: Centers for Disease Control and Prevention

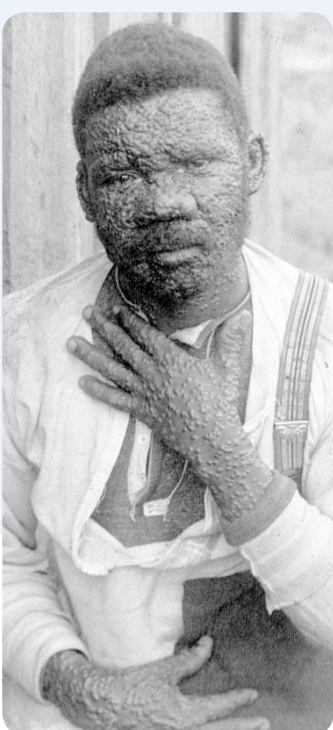


\*Smallpox was never endemic (widespread) in Australia. CS265471-A



Photo Credit: CDC, Dr. John Noble Jr.

Photo Credit: CDC, Carl Flint, Armed Forces Institute of Pathology



Smallpox patient in Walton County, Fla., 1904

Photo Credit: State Archives of Florida - Byrd



Sources: Centers for Disease Control and Prevention, History.com, Mayo Clinic, World Health Organization





Photo Credit: CDC, Charles Farmer

# Public health in progress: eliminating polio worldwide

Polio is a highly infectious disease caused by a virus that invades the brain and spinal cord. It is one of the most-feared diseases of the 20th century.

One in 200 polio infections leads to irreversible paralysis, usually of the legs. Among those paralyzed, 5 to 10 percent die when their respiratory muscles become immobilized and they can no longer breathe. Polio can cause total paralysis in a matter of hours.

Polio mainly affects children under 5 years of age. There is no cure for polio.

The first known polio outbreak in the United States was in 1894. In 1916, a polio epidemic infected 27,000 people and killed 6,000. Epidemics continued to occur in the U.S.

throughout the first half of the 20th century.

In the late 1940s to the early 1950s, polio paralyzed an average of more than 35,000 people in the U.S., and hundreds of thousands across the world, every year.

Beginning in the 1950s, the introduction of effective vaccines for polio resulted in a rapid decline in infections in the industrialized world. Between 1955 and 1957, the incidence of polio in the U.S. fell by more than 85 percent. The last natural case of polio in the U.S. was in 1979.

Vaccination campaigns also reduced the occurrence of polio in the developing world dramatically during the 1970s. In 1988, the World Health Assembly adopted a resolution for the worldwide eradication of polio:

the Global Polio Eradication Initiative (GPEI).

When the GPEI began, polio paralyzed more than 1,000 children worldwide every day. Since then, polio cases have decreased by more than 99 percent. Today, 80 percent of the world's population lives in certified polio-free regions.

Although only 35 cases of polio were reported in 2016, the disease remains a threat in conflict zones and hard-to-reach and underserved areas such as Afghanistan, Nigeria and Pakistan.

Sources: Centers for Disease Control and Prevention, Global Polio Eradication Initiative, History.com, National Museum of American History, Rotary International, Vaccines.gov, World Health Organization

Going beyond the text

## Control versus eradication

The National Institutes of Health note that "Mass immunization campaigns have succeeded in driving down the global prevalence of certain vaccine-preventable-diseases but complete eradication of a human disease requires an additional set of strategies. As long as herd immunity is maintained in a population, it is possible to halt endemic transmission of a vaccine-preventable diseases thereby drastically reducing its prevalence. In the case of disease eradication, however, eliminating pockets of resistance is critical to driving global vaccine-preventable-diseases prevalence down to zero. Eradication is the deliberate use of interventions to reduce disease incidence to zero, whereas disease control refers to lowering disease incidence to an acceptable level."

Using this publication, the *Tampa Bay Times* and the Internet, research what the "pockets of resistance" may be that are preventing diseases such as measles and polio from being eradicated worldwide. Write a letter to the editor of the *Times* based on the information you have learned. Be sure to cite your sources.



## Iron lung

The iron lung, invented in 1928, helped polio patients whose breathing muscles were paralyzed to breathe. It consisted of a sealed cylinder that enclosed a person's entire body except for his or her head. It worked by increasing and decreasing the air pressure inside the tank to draw air into and force air out of the patient's lungs.

Sources: Smithsonian National Museum of American History, Wood Library-Museum of Anesthesiology

Photo Credit: CDC

# Public health in progress: eliminating measles worldwide

Measles is a highly contagious respiratory disease caused by a virus.

It is so contagious that nine out of 10 unimmunized people who come in contact with an infected person also will become infected. The measles virus can live for up to two hours in the air after an infected person has coughed or sneezed.

Measles can cause serious health complications such as blindness and pneumonia.

Before the measles vaccine became available, nearly all children got measles by the time they were 15 years old.

The Centers for Disease Control and Prevention estimates that 3 to 4 million people in the U.S. were infected each year. Of those, 48,000 were hospitalized; 4,000 suffered encephalitis; and 400 to 500 people died.

In 2000, measles was declared eliminated from the U.S. In 2016, it was declared eliminated from the Americas. Worldwide, measles deaths have decreased from 544,000 deaths in 2000 to 146,000 in 2013.

However, measles remains common in Africa, Asia, Europe and the Pacific.

An estimated 20 million people still get measles each year.

Because of this, cases continue to occur in the U.S., mostly caused by travelers who become infected overseas and then come into contact with an unvaccinated person.

The Global Measles and Rubella Strategic Plan 2012-2020 has set regional goals for the elimination of measles and rubella by 2020.

Sources: Centers for Disease Control and Prevention, vaccines.gov, World Health Organization

Photo Credit: CDC







# Reading and interpreting scientific research

The Internet has made scientific papers widely accessible. But because they are written for medical and scientific professionals, they can be difficult for people without a medical or scientific background to understand.

This doesn't mean that you shouldn't read them, though, if you are willing to put in some work! Reading a scientific research paper is a completely different process from reading an article about science – but it is a skill that can be learned.

**Here are some tips to get you started**, adapted from “How to read and understand a scientific paper: a guide for non-scientists” by Jennifer A. Raff, Ph.D.

**1.** Before you begin reading, look up the authors and their institutional affiliations. Some institutions are well-respected; others may appear to be legitimate but are actually agenda-driven. Also look up the journal in which the article was published. Look for peer-reviewed journals, which have a group of experts in the same field review articles before publication. Avoid non-peer-reviewed journals.

**2.** Begin by reading the introduction, not the abstract.

**3.** Identify the big question. Not “What is this paper about?” but “Why is this research being done?” Look closely for evidence of agenda-motivated research.

**4.** Summarize the background information in five sentences or less. What work has been done before to answer the big question? What, according to the authors, needs to be done next? You need to be able to explain why this research has been done in order to understand it.

**5.** Identify the specific question(s). What exactly are the authors trying to answer with their research? Write the question(s) down.

**6.** Identify the approach. What are the authors going to do to answer the specific question(s)? Write down what they plan to do.

**7.** Read the methods section. Draw a diagram for each experiment, showing exactly what the authors did. Include as much detail as you need to fully understand the work.

**8.** Read the results section. Write a summary of the results for each experiment, each figure and each table. Pay special attention to the words “significant” and “non-significant,” which have precise statistical meanings. Also identify the sample size. Has the study been conducted on 10 people or 10,000 people? For most studies, larger is better.

**9.** Determine whether the results answer the specific question(s). What do you think they mean? Don't move on until you have thought about this.

**10.** Read the conclusion/discussion/interpretation section. What do the authors think the results mean? Do you agree with them? Can you come up with any alternative way of interpreting them? Do the authors identify any weaknesses in their own study? Do you see any weaknesses that the authors missed? What do they propose to do as a next step? Do you agree with that?

**11.** Go back to the beginning and read the abstract. Does it match what the authors said in the paper? Does it fit with your interpretation of the paper?

**12.** Find out what other researchers say about the paper. Use the Internet to identify who the experts are in this particular field and what they think of this research. Do they have criticisms of the study that you haven't thought of, or do they generally support it? Think critically about what other researchers say.

**A full-length version of this article originally appeared on the author's personal blog at [violentmetaphors.com/2013/08/25/how-to-read-and-understand-a-scientific-paper](http://violentmetaphors.com/2013/08/25/how-to-read-and-understand-a-scientific-paper).**

## Going beyond the text Evaluating sources

Where do you get most of your news and information? Are these sources trustworthy? How do you know? Make a list of all the sources you get information from, including websites, newspapers, television, social media and people. For one week, Monday through Sunday, write down political facts you learn from these sources. Write down at least two unique facts per day. On the following Monday, check these facts using sources such as [politifact.com](http://politifact.com) and [snopes.com](http://snopes.com). Was the information you found correct? Was it biased? Were your sources legitimate?

# Resources

**American Academy of Pediatrics**  
healthychildren.org/english/safety-prevention/immunizations

**Centers for Disease Control and Prevention**  
cdc.gov/vaccines

**Every Child By Two  
Carter/Bumpers Champions for Immunization**  
ecbt.org

**Florida Department of Health**  
floridahealth.gov/programs-and-services/immunization

**History of Vaccines by  
the College of Physicians of Philadelphia**  
historyofvaccines.org

**Immunization Action Coalition**  
vaccineinformation.org

**National Foundation for Infectious Diseases**  
nfid.org

**U.S. Department of Health and Human Services**  
vaccines.gov

**Vaccine Education Center  
at the Children's Hospital of Philadelphia**  
chop.edu/centers-programs/vaccine-education-center

**World Health Organization**  
who.int/topics/vaccines

## Editor's Note

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The mission of Pfizer's office of Independent Grants for Learning & Change (IGLC) is to partner with the global health care community to improve patient outcomes in areas of mutual interest through support of measurable learning and change strategies. For more information about IGLC, visit [pfizer.com/responsibility/grants\\_contributions/independent\\_grants](http://pfizer.com/responsibility/grants_contributions/independent_grants).

## About NIE

The Tampa Bay Times Newspaper in Education program (NIE) is a cooperative effort between schools and the Times Publishing Co. to encourage the use of newspapers in print and electronic form as educational resources – a "living textbook." Our educational resources fall into the category of informational text, a type of nonfiction text. The primary purpose of informational text is to convey information about the natural or social world.



NIE serves educators, students and families by providing schools with class sets of the daily newspaper plus award-winning original educational publications, teacher guides, lesson plans, educator workshops and many more resources at no cost to schools, teachers or families. Each year, more than 4 million newspapers and electronic licenses are provided to Tampa Bay teachers and students free of charge thanks to individual, corporate and foundation sponsors. NIE teaching materials cover a variety of subjects and are aligned to the Florida Standards.

NIE is a member of Florida Press Educational Services (FPES), a nonprofit 501(c)(3) organization of newspaper professionals that promotes literacy, particularly for young people.

For more information about NIE, visit [tampabay.com/nie](http://tampabay.com/nie), call 727-893-8138 or email [ordernie@tampabay.com](mailto:ordernie@tampabay.com). Follow us on Twitter at [Twitter.com/TBTimesNIE](https://twitter.com/TBTimesNIE).

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## Florida Standards

The Florida Standards reflect the Florida Department of Education's foundational expectations of what all students should know and be able to do in each grade, from kindergarten through 12th grade. This publication and its activities incorporate the following Florida Standards for middle and high school students.

**Health:** HE.612.B.3.1; HE.612.B.3.3; HE.612.B.3.4; HE.612.B.4.2; HE.612.B.4.3; HE.612.B.5.1; HE.612.B.5.2; HE.612.B.5.3; HE.612.B.5.4; HE.612.B.5.5; HE.612.C.1.8; HE.612.C.2.1; HE.612.C.2.2; HE.612.C.2.3; HE.612.C.2.4; HE.612.C.2.5; HE.612.C.2.6; HE.612.C.2.7; HE.612.C.2.8; HE.612.C.2.9; HE.612.P.7.1; HE.612.P.7.2; HE.612.P.8.2; HE.612.P.8.3; HE.612.P.8.4 **Science:** SC.6.L.14.6; SC.68.CS-PC.2.1; SC.68.CS-PC.2.2; SC.68.CS-PC.2.3; SC.68.CS-PC.3.2; SC.68.CS-PC.3.3; SC.912.CS-PC.2.1; SC.912.CS-PC.2.10; SC.912.CS-PC.2.11; SC.912.CS-PC.2.3; SC.912.CS-PC.2.4; SC.912.CS-PC.2.5; SC.912.CS-PC.2.7; SC.912.CS-PC.3.1; SC.912.CS-PC.3.2; SC.912.CS-PC.3.4; SC.912.CS-PC.4.7; SC.912.L.6 **Language Arts:** LAFS.612.L.1.1; LAFS.612.L.1.2; LAFS.612.L.2.3; LAFS.612.L.3.4; LAFS.612.RH.1.1; LAFS.612.RH.1.2; LAFS.612.RH.1.3; LAFS.612.RH.2.4; LAFS.612.RH.3.7; LAFS.612.RI.1.1; LAFS.612.RI.2.5; LAFS.612.RI.2.6; LAFS.612.RI.3.7; LAFS.612.SL.1.1; LAFS.612.SL.1.2; LAFS.612.SL.1.3; LAFS.612.SL.2.4; LAFS.612.SL.2.5; LAFS.612.SL.2.6; LAFS.612.W.1.1; LAFS.612.W.1.2; LAFS.612.W.2.4; LAFS.612.W.2.5; LAFS.612.W.2.6; LAFS.612.W.3.7; LAFS.612.W.3.8; LAFS.612.W.3.9; LAFS.612.W.4.10

# Tear-out checklist to take to your health care provider

1) What vaccines do you recommend at this time for me/my child/my teenager?

2) Do I/my child/my teenager need any boosters?

3) What are the common side effects of the vaccine(s) I/my child/my teenager is receiving today?

4) What are the potentially serious side effects of the vaccine(s) I/my child/my teenager is receiving today?

5) What should I do if a bad reaction to the vaccine occurs?

6) I would like a copy of the Vaccine Information Statements for any vaccines I/my child/my teenager receives today.

7) Write down any other questions or concerns here in advance of your visit so that you don't forget to ask them: