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Slide Title: Immunization Education Module

Select a language to begin: English, Spanish, Chinese, Vietnamese, Somali, Korean, Arabic, Russian

Slide Title: Welcome

This is an online course for people who want to claim a nonmedical exemption from school-required vaccines. It is for parents/guardians, emancipated students, or students 18 years of age and older. You can take this course instead of having the certificate signed by an immunizing provider. After you complete the course, you will receive a certificate of nonmedical exemption for your records.

Slide Title: Overview

This course covers the following topics over the next 20 minutes:

- Your Immune System and How Vaccines Work.
- What is Herd or Community Immunity?
- Vaccine-Preventable Diseases and Their Vaccines.
- Vaccine Safety and Schedules.
- Vaccine Safety Concerns.

Note: This course defines “Health Care Provider” to include Medical Doctor (MD), Doctor of Osteopathy (DO), Advanced Practice Nurse (APN), and delegated Physician Assistant (PA). “Health Care Provider” will be used throughout the course for simplicity.

Slide Title: Your Immune System and How Vaccines Work^{1, 2, 3, 11}

Germs can enter your body in many ways. Once inside, they can start to **grow** and **attack** your body. This is called an **infection** and is what causes people to get sick. Your immune system has special cells that recognize germs as invaders. They respond by making proteins called **antibodies**. Antibodies help destroy the germs that can make you sick, and they stay in your bloodstream to protect you from future infections. If the same germs try to infect you again, your antibodies can quickly recognize them and destroy them before they make you sick.

Scientists and medical experts make vaccines from the same germs that cause disease, but the germs have been killed or, in some cases, weakened. Dead or weakened germs won’t make you sick, but **your body will still make antibodies**. Vaccines teach your immune system to protect you from many diseases that can be harmful. Before vaccines, many people had to go to the hospital or died because of diseases that are now preventable. Those same germs still exist today, but now we have vaccines to protect us against them, so we don’t get sick.

[Watch the video above](#) to learn more about how vaccines work. [Learn more](#) about natural immunity versus immunization.

Slide Title: What is Herd or Community Immunity^{12, 15}

[When the majority of a population is vaccinated](#), diseases can’t spread easily. Even people who cannot be vaccinated, such as babies, seniors, and people with chronic illnesses, are protected. This is called **herd immunity** or **community immunity**.



Depending on the disease, vaccination rates may need to be as high as 95% for herd immunity to occur. Vaccination rates are too low in some Colorado communities to protect them from outbreaks of certain preventable diseases, like measles. [Coverage rates can vary widely by school](#). Some have dangerously low rates -- below 20% -- while some have 100% coverage. Children who are not vaccinated have a higher risk of contracting and spreading disease during an outbreak. Learn more about [herd immunity](#).

Why do we vaccinate? We don't vaccinate only to protect our children. We also vaccinate to protect our grandchildren and their grandchildren. We vaccinate to protect our future. We eliminated smallpox through vaccination. As a result, our children don't get smallpox vaccines anymore because the disease no longer exists. Vaccinations are one of the best ways to put an end to the serious risks of certain diseases.

What if we stopped vaccinating? Thanks to vaccines, there has been a decrease in new cases of certain diseases. If we stop vaccinating, these diseases will return, as we have seen with measles. Before long, we would see widespread levels of these diseases. [Learn more](#).

[See](#) the progress made with vaccines.

Slide Title: Hepatitis A^{14, 15, 16, 24}

How it spreads:

The hepatitis A virus is found in feces (poop). The virus spreads from person to person when someone touches something with the virus on it. This happens when:

- A person with the virus doesn't wash their hands after using the bathroom, then makes or touches food for others.
- Someone touches an object with the virus on it, like diapers or doorknobs, then touches their mouth with unwashed hands.
- A person consumes food or drink that has the virus in it.

The symptoms:

Hepatitis A is a liver infection, and not everyone will have symptoms. Young children often don't have symptoms but can still pass the disease to others, especially in day care settings. Symptoms include:

- Fever.
- Tiredness.
- Loss of appetite.
- Stomach pain.
- Dark urine.
- Yellow skin or eyes (jaundice).
- Joint pain.
- Sudden nausea and vomiting.

The impact of disease:

There is no treatment for hepatitis A. Some people get very sick and must go to the hospital. Before the vaccine, **about 100 people** in the U.S. died each year from hepatitis A. [View a photo of jaundice in a patient with hepatitis A](#).

The vaccine:

There are two vaccines for hepatitis A. Both vaccines are very effective. **Nearly 100%** of adults and children who receive two doses have long-term protection. In Colorado in 2017, about 57% of children 19 to 35 months old had received two doses of the hepatitis A vaccine.



[View case rates of hepatitis A in the U.S.](#) [View hepatitis A vaccine coverage levels in the U.S.](#)

Slide Title: Hepatitis B^{14, 15, 17, 24, 26}

How it spreads:

Hepatitis B spreads when blood, semen, or other body fluids from an infected person enters another person's body. This can happen through sex, sharing needles or syringes, and razors. Mothers can even pass on hepatitis B to their infant at birth.

The symptoms:

Hepatitis B is a liver infection and can be a short illness or a long-term infection. Symptoms of short-term illness can include:

- Fever.
- Tiredness.
- Loss of appetite or vomiting.
- Stomach pain.
- Dark urine or clay-colored feces (poop).
- Yellow skin or eyes (jaundice).
- Joint pain.

Long-term (chronic) hepatitis B infections can lead to serious health issues like liver damage or cancer of the liver. People infected at a younger age have a higher risk of chronic infection. This is why all newborns need to get their first dose of the hepatitis B vaccine at birth.

The impact of disease:

In the U.S., **between 3,000 and 4,000** people die every year from hepatitis B-related cirrhosis (scarring of the liver). **Between 1,000 and 1,500** people die each year of hepatitis-B related liver cancer. [View a photo of someone with liver cancer caused by hepatitis B.](#)

The vaccine:

Getting three doses of the hepatitis B vaccine protects **more than 90%** of healthy adults and **more than 95%** of infants. Vaccination is the best protection against hepatitis B. In Colorado in 2017, about 88% of children 19 to 35 months old and 94% of children 13 to 17 years old had received three doses of the hepatitis B vaccine.

[View case rates of hepatitis B in the U.S.](#) [View hepatitis B vaccine coverage levels in the U.S.](#)

Slide Title: Haemophilus influenzae type b (Hib)^{14, 15, 17, 24}

How it spreads:

Hib is a bacteria spread person-to-person by contact, coughing, or sneezing.

The symptoms:

Hib can cause:

- Lung infections (bronchitis and pneumonia).
- Ear infections.
- Blood infections (bacteremia).
- Swelling of the tissue covering the brain and spinal cord (meningitis).
- Inflammation of the windpipe, making it difficult to breathe (epiglottitis).
- Skin infections (cellulitis).



The impact of disease:

Infection is most likely in children younger than 5 years old. Before the vaccine, **about 20,000** young children got Hib each year and **1,000** of them died. Today, **less than 50** young children in the U.S. get Hib each year. Most of those cases are in children who don't have the recommended doses of vaccine. [View a photo of a child with cellulitis from Hib.](#)

The vaccine:

The Hib vaccine protects **93% to 100%** of children from serious infections called 'invasive diseases.' Invasive means that germs are in parts of the body that normally are free of germs. Invasive diseases like pneumonia and meningitis are usually very serious, especially for children. Since 1991, serious cases of Hib have **decreased by 99%** - thanks to the vaccine. In Colorado in 2017, almost 89% of children 19 to 35 months old had received three doses of the Hib vaccine.

[View Hib incidence rates in the U.S.](#) [View Hib vaccine coverage levels in the U.S.](#)

Slide Title: Diphtheria^{14, 15}

How it spreads:

Diphtheria spreads from person-to-person in air droplets when an infected person coughs or sneezes. It also spreads when someone touches a surface with the bacteria on it, and then touches their mouth or nose with unwashed hands. A person can spread the disease for up to two weeks.

The symptoms:

- Fever.
- Weakness.
- Sore throat.
- Swollen neck glands.
- Thick coating in the back of the nose or throat that makes it hard to breathe and swallow.

The impact of disease:

Serious complications can include damage to the heart, kidneys, and nervous system. **About 1 in 10** people who get diphtheria will die. Without treatment, **almost 5 in 10** people will die. [View a photo of a child with a swollen neck from diphtheria.](#)

In 1921, before there was a vaccine, **over 15,000 people**, including young children and babies, died of diphtheria. Today, diphtheria is **rare** in the U.S. because of widespread vaccination. But there have been large outbreaks in places where the vaccination rates are low. Vaccinating is the best way to prevent diphtheria from happening in your community. [View case rates of diphtheria in the U.S.](#)

Slide Title: Pertussis (Whooping Cough)^{14, 15}

How it spreads:

Whooping cough spreads easily through the air by droplets when an infected person breathes, coughs, or sneezes. Those who are infected are most contagious up to about two weeks after the cough begins.

The symptoms:

Whooping cough usually starts with cold-like symptoms. This includes a runny nose, low fever, cough, and apnea (a pause in breathing). Over time, whooping cough will get worse and symptoms can include:

- Coughing, which can last for more than 10 weeks and make it hard to breathe, eat, drink, and sleep.
- Fits of many, rapid coughs followed by a high-pitched "whoop" sound.
- Vomiting after coughing.



The impact of disease:

Whooping cough, sometimes called the “100-day cough,” can last much longer than the actual infection. It mostly affects children too young to have all of their vaccines. It is less severe in teenagers and adults, but they can spread it to infants who often must go to the hospital. Almost all whooping cough deaths in the U.S. are babies younger than 3 months old. [Hear why it’s called “whooping cough.”](#)

Before the vaccine, 200,000 children got whooping cough and 9,000 died from it each year in the U.S. [View case rates of whooping cough in the U.S.](#)

Slide Title: Tetanus^{14,15}

How it spreads:

Tetanus doesn’t spread from person-to-person. The bacteria that causes tetanus are in dust and soil. It can enter the body through broken skin, like cuts or puncture wounds. This usually happens after an injury from an object that has the bacteria on it. People can also get tetanus from burns.

The symptoms:

- Jaw cramping/lockjaw.
- Fever.
- Sweating.
- Muscle tightening, stiffness, and/or spasms.
- Seizures.
- Weak bones.
- Pneumonia.
- Difficulty breathing and/or swallowing.
- Possible death.

The impact of disease:

About 10% to 20% of tetanus cases are fatal. [View a photo of a child with painful muscle contractions from tetanus.](#)

Tetanus cases are rare in the U.S., thanks to the tetanus vaccine. There are only about 30 cases reported in the U.S. each year. Most cases are people who never got the vaccine, didn’t get all of the vaccines, or adults who haven’t gotten their boosters. [View case rates of tetanus in the U.S.](#)

Slide Title: Tetanus, Diphtheria, & Pertussis Vaccines^{14,15,17,24}

Several vaccines can prevent tetanus, diphtheria, and pertussis, including DTaP and Tdap. Babies and children younger than 7 years old receive DTaP. Older children and adults receive Tdap. The tetanus toxoid-containing vaccines have been in widespread use since the late 1940s.

After the right amount of doses based on age, the vaccine protects **more than 95%** of people from diphtheria.

Getting a full series of the DTaP vaccines is **80 to 85% effective** at preventing serious whooping cough. It’s important for children to get vaccinated against pertussis on schedule. This helps to protect young children and babies from the serious risks of whooping cough.

A complete vaccine series is **virtually 100% effective** at protecting people from tetanus.



In Colorado in 2017, about 92% of children 19 to 35 months old received three or more DTaP doses.

[View DTP/DTaP/DT vaccine coverage levels in the U.S.](#)

Slide Title: Human Papillomavirus (HPV)^{14, 15, 17, 18, 20}

How it spreads:

HPV is the most common sexually transmitted infection. It spreads through vaginal, anal, or oral sex with someone who has the virus. We recommend children get vaccinated at ages 11 or 12. This is when the vaccine is most effective at building protection. Even though they may not be sexually active at that age, getting the vaccine then gives them better protection from the cancers that HPV can cause.

The symptoms:

There are many different types of HPV virus. Most HPV infections don't cause problems and will go away on their own. However, if the infection doesn't go away, HPV can cause:

- Cervical cancer (the second leading cause of cancer deaths in women).
- Cancers of the vulva, vagina, penis, anus, and certain head and neck cancers.
- Genital warts.

[View a photo of warts in the mouth caused by HPV.](#)

The impact of disease:

HPV is thought to cause **more than 90%** of anal and cervical cancers, **about 70%** of vaginal and vulvar cancers, and **60%** of penile cancers. In the past, tobacco and alcohol often caused most cases of cancer of the throat. But recent studies show that HPV **possibly causes 60% to 70%** of those cases now.

There is no cure for HPV, but some of the problems it causes are treatable. In the U.S., nearly 35,000 people each year are affected by cancer caused by HPV infection. **Of the 12,000** women who get cervical cancer each year, **over 4,000** will die from it.

The vaccine:

HPV vaccination works extremely well. It can prevent more than 90% of HPV-attributable cancers. Since its first recommendation in 2006, there has been a large reduction in HPV infections. This vaccine does not lose the ability to protect against new HPV infections over time. In 2019, over 60% of Colorado teens 13 to 17 were up-to-date for the HPV vaccine. [Learn more](#) about HPV vaccine safety.

Slide Title: Influenza (Seasonal Flu)^{14, 15, 17, 19, 25}

How it spreads:

The flu virus spreads from person-to-person through air droplets when an infected person coughs, sneezes, or talks. Flu season in the U.S. can begin as early as October and last through May.

The symptoms:

The flu usually comes on fast and can cause mild to serious illness, including death. Common flu symptoms include:

- Fever or chills.
- Cough.
- Sore throat.
- Runny or stuffy nose.
- Muscle or body aches.
- Headaches.



- Tiredness.
- Vomiting and diarrhea (more common in children).

Most people who get the flu will recover in about two weeks. Some people get more serious infections like lung (pneumonia) or ear infections. It can also make other health problems, like asthma or heart disease worse.

The impact of disease:

In 2009, the H1N1 flu pandemic in the U.S. resulted in **358** flu-associated deaths in children. According to the Centers for Disease Control (CDC), flu-related hospitalizations in children under 5 have ranged from **6,000 to 26,000** each year in the U.S. since 2010. Older people, young children, and pregnant women are at the highest risk of serious complications from the flu, including death. By getting the flu vaccine, we are protecting them.

The vaccine:

Flu viruses change every year. New vaccines are made each year based on what flu viruses are making people sick. As the virus changes, our protection from it decreases, so it is important to get the new vaccine each season. The quadrivalent flu vaccine protects against four different types of the flu virus.

The flu vaccine can protect you from getting the flu or reduce your illness if you do get it. The vaccine can also help prevent complications from flu for people with chronic health conditions like diabetes, high blood pressure, and heart and lung diseases. The flu vaccine **cannot** give you the flu because the virus is dead or too weak to spread the disease. The vaccine is usually **50% to 60%** effective at preventing hospitalizations and **80%** effective in preventing death among elderly people. How well the flu vaccine works can change every year. It's important to remember that even if you still get the flu, your symptoms will be less severe because you got the vaccine. In Colorado during the 2017-2018 flu season, **62%** of children six months to 17 years received a flu vaccine.

The impact of the flu vaccine: During the 2018-2019 flu season, the flu vaccine prevented an estimated **4.4 million** flu illnesses, **2.3 million** flu-associated medical visits, **58,000** flu-associated hospitalizations, and **3,500** flu-associated deaths.

[View flu vaccine coverage levels in the U.S.](#)

Slide Title: Meningococcal Disease^{14, 15, 21}

How it spreads:

Meningococcal bacteria spread from person-to-person through direct contact with droplets when an infected person coughs or sneezes. The bacteria are also found in saliva or drainage from the nose and can spread through close contact, like kissing.

The symptoms:

At first, infection may look like a cold, but will quickly worsen and can include:

- Fever.
- Headache and stiff neck.
- Nausea and vomiting.
- Sensitivity to light.
- Confusion.



Serious complications can include swelling of the tissue covering the brain and spinal cord (meningitis), bloodstream infection (septicemia or bacteremia), hearing loss, and brain damage. Meningitis and septicemia can both cause death in just a few hours. Septicemia can kill tissue, which may result in amputation.

The impact of disease:

Even with antibiotic treatment, **1 out of 10** people infected with meningococcal disease will die. [View a photo of a young child with gangrene due to meningococcal disease.](#)

The vaccine:

Recommendations for the vaccine began in 2005 for preteens and teens. Since then, rates of meningococcal disease have **decreased by 90%**. In 2019, 89.4% of Colorado's 13- to 17 year-olds were up-to-date on their meningococcal vaccine.

There are different meningococcal vaccines to protect against different strains of the bacteria: **MenACWY** and **MenB**. These vaccines work well, but cannot prevent all cases of the disease. Studies show that they can protect **85% or more** of vaccinated children and adults during meningococcal outbreaks.

[View case rates of meningococcal disease in the U.S.](#) [View meningococcal disease vaccine coverage data by state or region.](#)

Slide Title: Measles^{14, 15, 22}

How it spreads:

Measles spreads from person-to-person through the air by droplets when an infected person coughs or sneezes. People with measles can spread it to others before they even know they are sick. It is so contagious that if someone has it, 9 out of 10 people around them will also get the disease, if they aren't vaccinated.

The symptoms:

- High fever (usually over 101° F).
- Cough.
- Runny nose.
- Red, watery eyes.
- Small, white spots inside the mouth.
- Rash (usually starts on the face along the hairline then spreads down).

The impact of disease:

About 1 in 3 people infected with measles have complications, including ear infections and diarrhea. Serious complications can include lung infection (pneumonia), brain swelling (encephalitis), brain damage, deafness, and death. Children under 5 and adults older than 20 are most vulnerable to measles. **About 1 out of 5** people with measles will be hospitalized. [View a photo of a measles rash.](#)

The U.S. declared measles **eliminated** in 2000. But cases are coming back and have been rising as fewer people get vaccinated for measles. In 2010, there were **63 cases** of measles in the U.S. Nine years later in 2019, there were over **1,200 cases**. [View case rates of measles in the U.S.](#)

Slide Title: Mumps^{14, 15}

How it spreads:

Mumps spreads from person-to-person in saliva and air droplets from the mouth, nose, or throat. People with the virus can spread it when they cough or sneeze, or when they share items like cups or utensils. It



also spreads when someone touches a surface with the virus on it, and then touches their mouth or nose with unwashed hands. People with mumps can spread the disease before their glands have begun swelling and up to 5 days after the swelling begins.

The symptoms:

- Fever.
- Puffy cheeks (swollen jaw and salivary glands).
- Headaches.
- Muscle aches.
- Loss of appetite.

The impact of disease:

Serious complications are more common in adults and can include swelling of the testicles (orchitis), swelling of the brain (encephalitis), swelling of the tissue covering the brain and spinal cord (meningitis), swelling of the ovaries and/or breasts (oophoritis and/or mastitis), deafness, and infertility. [View a photo of a child with swollen glands from mumps.](#)

There is no cure for mumps, only treatment of symptoms. In children, mumps is usually a mild disease but it can be more serious in adults. It's important to get vaccinated to protect those who are at higher risk. Before the widespread use of the vaccine, mumps was a very common childhood disease. Since then, cases of mumps in the U.S. have **decreased more than 99%**, but it still exists. [View case rates of mumps in the U.S.](#)

Slide Title: Rubella^{14, 15}

How it spreads:

Rubella spreads through direct contact with droplets when an infected person coughs or sneezes. Also, if a woman is infected with rubella while she is pregnant, she can pass it to her developing baby and cause serious harm.

The symptoms:

- Fever lower than 101 °F.
- Rash that starts on the face and spreads to the rest of the body.
- Sore throat.
- Swollen glands.
- Cold-like symptoms.
- Aching joints.

Rubella carries an increased risk for pregnant women. If infected, especially early in pregnancy, rubella can cause:

- Deafness.
- Eye problems (congenital cataracts).
- Heart damage/problems.
- Brain damage/intellectual disability.
- Possible death.

The impact of disease:

There is a **20% chance** a baby will be born with a disability if a woman has rubella in early pregnancy. Infection can also increase the risk of losing the pregnancy. The rubella vaccine prevents **up to 5,000** miscarriages each year. [View a photo of a baby with skin lesions from congenital rubella syndrome.](#)



The last rubella epidemic in the U.S. infected 12.5 million people from 1964 to 1965. **Vaccination programs eliminated rubella from the U.S. in 2004.** Because rubella still exists in other countries, an unvaccinated traveler could get the disease and spread it. This is why it's important to keep vaccinating against rubella to keep it out of the U.S. [View case rates of rubella in the U.S.](#)

Slide Title: Measles, Mumps & Rubella Vaccine (MMR)^{14, 15, 17, 20}

There are two types of vaccine available in the U.S. that protect against measles, mumps and rubella: **MMR** and **MMRV**. The MMR vaccine protects against measles, mumps, and rubella. The MMRV vaccine protects against measles, mumps, rubella, and chickenpox.

The MMR vaccine is very effective. One dose of the vaccine is **93% effective** against measles, **78% effective** against mumps, and **97% effective** against rubella.

Two doses of the vaccine are **97% effective** against measles and **88% effective** against mumps. It would be rare for a vaccinated person to get one of these diseases. But if they do, their symptoms would be less severe.

In Colorado in 2019, 91% of children 13- to 17 years old had received two or more doses of the MMR vaccine.

[View MMR vaccine coverage levels in the U.S.](#)

Slide Title: Pneumococcal Disease^{14, 15, 17, 23, 24}

How it spreads:

The pneumococcal bacteria spreads from person-to-person through direct contact with droplets in saliva (spit) or mucus (snot).

The symptoms:

One to three days after exposure:

- Rapid onset of fever and chills.
- Chest pain.
- Shortness of breath.
- Wet, productive cough.
- Rapid heart rate.
- Muscle weakness.

The impact of disease:

Serious illness can include infection of the lungs (pneumonia), ear and/or sinus infections, swelling of the tissue covering the brain and spinal cord (meningitis), and bloodstream infections (bacteremia). Invasive infections, like meningitis, don't happen often but can be very serious. Many people have to be hospitalized and without treatment, they may die. **Eight percent of children** who get pneumococcal meningitis will die.

The vaccine:

There are two vaccines that protect against pneumococcal disease. Studies show that at least one dose of the vaccine protects **at least 8 in 10 babies** and **75 in 100 adults 65 or older** from invasive infections. In Colorado in 2017, 90% of children 19 to 35 months old had three or more doses of the vaccine. [View pneumococcal vaccine coverage among children two years old by state or region.](#) [View rates of pneumococcal disease among children under five.](#)



Slide Title: Poliomyelitis (Polio)^{14, 15, 17, 24}

How it spreads:

Polio virus is found in feces (poop). The virus spreads from person to person when someone comes in contact with the virus, like when changing a diaper, and then touches their mouth with unwashed hands. The virus can also spread when a person eats or drinks food or water with the virus in it.

The symptoms:

Most people with polio won't have symptoms, but they can still spread the disease. Symptoms often imitate flu-like symptoms, including:

- Fever.
- Sore throat.
- Tiredness.
- Nausea.
- Stomach pain.
- Headache.

The impact of disease:

Serious illness can include feelings of 'pins and needles' in the legs, swelling of the tissue covering the brain and spinal cord (meningitis), weakness in the arms and legs, and paralysis (when you can't move parts of your body). Paralysis is the most serious symptom because it can cause disability or death. People who have paralysis may die because the virus weakens the muscles that help them breathe. **There is no cure for polio.** [View a photo of a young child who has to wear leg braces from polio.](#)

The vaccine:

Almost all children (99 out of 100) who get all the recommended doses of polio vaccine are protected from polio. Thanks to the widespread use of the polio vaccine, **the U.S. has been polio-free since 1979.** But polio still exists in other countries, so an unvaccinated traveler could get the disease and spread it. This is why it's so important to keep vaccinating against polio to keep it out of the U.S. In Colorado in 2017, almost 91% of children 19 to 35 months old had received three or more doses of the polio vaccine.

[View case rates of polio in the U.S.](#) [View polio vaccine coverage levels in the U.S.](#)

Slide Title: Rotavirus^{14, 15, 17, 24}

How it spreads:

Rotavirus spreads when someone touches infected feces (poop), and then touches their mouth before washing their hands. The virus can be found on objects like toys, where it can live for months, as well as in food and water.

The symptoms:

- Severe diarrhea.
- Vomiting.
- Fever.
- Stomach pain.
- Loss of appetite.
- Loss of bodily fluids (dehydration).

The impact of disease:



Rotavirus is most serious in babies and young children. Before the vaccine, more than 200,000 people in the U.S. with rotavirus had to go to the emergency room each year because of dehydration. Of these, 20 to 60 would die. Most of those were children 3- to 35-months-old.

The vaccine:

The rotavirus vaccine has reduced hospital and emergency room visits. The vaccine protects about 9 out of 10 children from severe illness. About 7 to 8 out of 10 children are completely protected from rotavirus. In 2017, almost 74% of Colorado children ages 19 to 35 months old were vaccinated for rotavirus.

[View rotavirus vaccine coverage levels in the U.S.](#)

Slide Title: [Varicella \(Chickenpox\)](#)^{14, 15, 17, 24}

How it spreads:

Chickenpox spreads very easily from person to person by air droplets when an infected person coughs or sneezes. It can also spread by touching chickenpox blisters.

The symptoms:

Chickenpox symptoms first show up 10 to 14 days after being exposed.

- A rash that spreads across the body and turns into itchy blisters and can last for 4-7 days.
- High fever.
- Loss of appetite.
- Headaches.
- Tiredness.

Blisters can spread over the entire body including inside the mouth, eyelids, or genital area. Healthy children may get as many as 200 to 500 blisters. [View a photo of blisters from chickenpox.](#)

The impact of disease:

Chickenpox isn't always serious, but some people need hospitalization and some may die. Children with weaker immune systems are at high risk of hospitalization from chickenpox. Pregnant women are at a higher risk for severe illness, too. We get vaccinated so we can protect these people from getting chickenpox and having worse outcomes. Every year, the vaccine prevents 3.5 million cases, 9,000 hospitalizations, and 100 deaths from chickenpox.

The vaccine:

There are two chickenpox vaccines: **Varivax** and **MMRV**, which includes a vaccine against measles, mumps, and rubella too. About 90% of people who get both doses of the chickenpox vaccine will not get chickenpox. People who get the vaccine but still get chickenpox will have a less severe illness with fewer blisters and a quicker recovery. In 2018, almost 91% of Colorado children 13 to 17 years old received two or more doses of the varicella vaccine.

[View chickenpox vaccine coverage levels in the U.S.](#)

Slide Title: [Vaccine Safety](#)^{14, 5}

[In the U.S.](#), vaccines have to be proven safe and effective before they make it to your health care provider's office. [The journey of a vaccine](#) includes three phases of clinical trials before it makes it onto the recommended immunization schedule. It usually takes the Food and Drug Administration (FDA) years of testing before they license a vaccine for use in the U.S.



The CDC and health care providers also review vaccine testing information. This happens before vaccines are recommended for children or adults.

For more vaccine safety information, visit:

- CDC [Vaccine Safety](#) and [Vaccine Safety Research](#)
- [Ensuring the Safety of Vaccines](#)
- American Academy of Pediatrics & HealthyChildren.org- [Vaccine Safety: The Facts](#)
- [CDC Immunization Safety Office](#)

Slide Title: Vaccine Safety 2⁶

[To make sure vaccines continue to be safe](#), the FDA and CDC created the [Vaccine Adverse Event Reporting System \(VAERS\)](#) and established partnerships to monitor vaccine safety. All health care providers must report serious side effects that occur after a vaccine is given into the Vaccine Adverse Event Reporting System. These side effects are studied to see if there is a pattern. Parents can also file reports with VAERS. [Vaccine Safety Datalink \(VSD\)](#) and the [Clinical Immunization Safety Assessment \(CISA\) Network](#) are two partnerships that monitor the ongoing safety of vaccines after people have received them.

Vaccine recommendations may change if safety monitoring finds new information about vaccine risks. Safety alerts are sent to health care providers if there are any new problems. In some cases, a vaccine may be removed from the market. For example, in 1999 RotaShield®, a vaccine for rotavirus, was taken off the U.S. market after reports of increased cases of bowel obstructions in infants who had received the vaccine. [Learn more about vaccine recalls](#). [View safety information by vaccine](#).

Slide Title: Vaccine Schedules^{7, 8, 10}

Vaccine schedules are carefully made by hundreds of the country's top doctors, public health professionals, and scientists. The timing of the vaccines protects children from 14 potentially serious diseases when they are most at risk from the disease. Independent experts review the data [before adding the vaccine to the U.S. Recommended Immunization Schedule](#). Click on the image to the right to zoom in.

Young babies are at the highest risk for serious complications from diseases. Think of whooping cough. For you, it may be an annoying cough for a few weeks. For your baby, it can be very serious, even deadly. Vaccines take some time to work and may take more than one dose. You want to protect your child before they are exposed to a disease, just like you put them in their car seat before you start driving.

Getting more than one vaccine at a time [is safe](#), but some parents choose a [delayed vaccine schedule](#). There is no data to support that spacing out vaccines provides safe or effective protection from these diseases. We recommend that you follow routine vaccine schedules.

Remember, adults also need vaccines to protect themselves and their loved ones from disease.

Select an age group to view the routine vaccine schedule: [Child](#) and [Teen](#).

[Learn more about ACIP and vaccine schedules](#).

Slide Title: Vaccine Safety Concerns^{9, 11}

Like any medication, vaccines can cause side effects. But the risks of vaccines are much lower than the risks of the diseases they prevent. Without a vaccination, your child can get the disease and spread it to others, including young babies or people with immune problems.



Side effects are usually mild and usually go away within a few days. Most side effects are a sign that your body is starting to build protection. They include:

- Soreness where the shot was given.
- Mild fever.
- Feeling tired.
- Muscle and joint aches.

All medical procedures can cause fainting, including [vaccines](#). Some infants may experience [febrile seizures](#). They can be scary, but last for less than one to two minutes and don't cause any permanent harm. They can happen with any illness that causes a fever. Serious side effects, such as severe allergic reactions, are extremely rare. Health care providers and clinic staff complete training to deal with these events. The chance of a person experiencing a serious allergic reaction from a vaccine is one to two in a million.

Many studies have shown that there is [no link between vaccines and autism](#).

In the very rare case that a child has a serious problem from a vaccine, parents can file a petition with the [National Vaccine Injury Compensation Program \(VICP\)](#).

Myths and misinformation about vaccines and their safety are confusing. They can make it difficult to know the facts. Vaccines are safe and healthcare providers are trained to administer them safely. For example, providers look at your medical history to make sure you don't have an illness that would result in serious reactions from a vaccine. [Frequently asked questions about vaccines answered by doctors and experts](#). Learn more about vaccines and other conditions not already mentioned.

- [Arthritis](#).
- [Asthma and allergies](#).
- [Diabetes](#).
- [Guillain-Barré syndrome](#).
- [Multiple Sclerosis](#).
- [Sudden Infant Death Syndrome \(SIDS\)](#).

Slide Title: Vaccine Ingredients and Misconceptions¹³

Some parents worry about the ingredients included in vaccines, but they are proven to be safe. Click on each piece of the circle to learn more about vaccine ingredients and their purposes.

Type of Ingredient	Example(s)	Purpose	Most common source found
Preservatives	Thimerosal (only in multi-dose vials of flu vaccine)*	To prevent contamination	From eating foods such as certain kinds of fish
Adjuvants	Aluminum salts	To help boost the body's response to the vaccine	From drinking water, baby formula, or health products such as antacids, aspirin, and antiperspirants
Stabilizers	Sugars, gelatin	To keep the vaccine	-From eating food such



		effective after it's manufactured	as Jell-O -Resides in body naturally
Residual cell culture materials	Egg protein [^]	To grow enough of the virus or bacteria to make the vaccine	From eating foods containing eggs
Residual inactivating ingredients	Formaldehyde [†]	To kill viruses or inactivate toxins during the manufacturing process	Resides in body naturally (there is more in your body than in vaccines) Found in automobile exhaust, household furnishing like carpet
Residual antibiotics	Neomycin	To prevent contamination by bacteria during the manufacturing process	Antibiotics that people are most likely to be allergic to - like penicillin - aren't used in vaccines

* Thimerosal has a different form of mercury (ethylmercury) than the kind that causes mercury poisoning (methylmercury). It is only in multi-dose vials of the flu vaccine. People can choose to get a single dose of the flu vaccine that does not have thimerosal in it. [Learn more](#) about thimerosal, mercury, and vaccine safety.

[^] Flu vaccine is made in eggs, so egg proteins are present in the final products. However, there are two new flu vaccines now available for people with egg allergies. You can ask your health care provider about this option.

[†]The amount of formaldehyde in some vaccines is so small compared to how much occurs naturally in the body. It is not a safety concern.

Ingredient Misconceptions

- [DNA](#): When vaccines are made, chemicals are used to destroy or break apart DNA from the virus or bacteria in the vaccine. This can result in very small amounts of DNA in the vaccine. It is impossible for DNA from a vaccine to become part of our DNA.
- [Fetal tissue](#): Some childhood vaccines, such as the rubella vaccine, are made by growing viruses in a type of embryo cell (fetal tissue). These embryo cells were obtained in the 1960s from the legal, elective termination of two pregnancies. The cells were used to start a cell line which is still in use today. These cells are kept under strict federal guidelines. No new embryo cells are used.

Slide Title: Vaccines Required for School Entry

In 1978, Colorado passed a law requiring children going to a licensed child care center or school to follow vaccine rules. This law helps protect people from vaccine-preventable diseases. [The Colorado Board of Health](#) is in charge of making public health rules in Colorado. This includes rules about school-required immunizations. Colorado statute gives the Board of Health the authority to make these rules so they are the law.



The Board requires children to get these vaccines for school entry:

- Hepatitis B.
- Diphtheria, Tetanus, Pertussis (DTaP and Tdap).
- Haemophilus Influenzae type B (Hib).
- Inactivated poliovirus (IPV).
- Measles, Mumps, Rubella (MMR).
- Pneumococcal conjugate or polysaccharide (PSV23).
- Varicella (chickenpox).

By law, children must get these vaccines at the ages recommended in the [Advisory Committee on Immunization Practices \(ACIP\) Vaccination Schedule](#). The law requires children between the ages of 4 and 6 years to get their final doses of DTaP, IPV, MMR, and varicella before they start kindergarten. Students are also required to receive Tdap before starting 6th grade. One final dose of Tdap is required for students in 6th through 12th grades.

To follow the law, children must have **ONE** of the following:

- A complete vaccination record on file at their school or child care.
- An in-process form on file at their school or child care.
- A signed certificate of exemption on file at their school, child care, or with the state health department.
 - There are two types of vaccine exemptions in Colorado. Click each for more information: Medical, Nonmedical.
- Medical exemptions:
 - For children who can't get vaccines due to a medical or health issue.
 - A medical professional, like a doctor, advanced practice nurse, or a physician's assistant must sign the medical exemption.
- Nonmedical exemptions:
 - For children who aren't getting vaccines for reasons other than medical or health issues.
 - A signature from an immunizing provider OR the completion of this course is required to receive a nonmedical exemption.

Slide Title: Make a Plan

If you choose not to have your child vaccinated, you may have to take extra precautions in the event of a disease outbreak in your area. During an outbreak, your child:

- May be excluded from school.
- May be asked to quarantine or isolate.
- Will be expected to complete missed schoolwork.

Public health agencies or your school may ask you to take these precautions to protect your child and to keep an outbreak from growing. If your child cannot go to school, this may affect your ability to go to work. You may need a plan that includes:

- Child care when your child cannot attend school.
- Making sure your children don't attend school activities or extracurricular events, or see their friends/family members.
- Financial backup in case you are unable to work.

[View immunization rates at Colorado's schools and child cares.](#)



[View the potential impact a measles outbreak could have on Colorado schools.](#)

Slide Title: Vaccinations Are Simple

- You can vaccinate your child at your doctor's office or local public health agency. Immunization visits don't always require an appointment with a health care provider.
- Most private insurance covers the cost of vaccines.
- If your child is uninsured or underinsured, on Medicaid or Medicaid eligible, or is Alaskan Native/American Indian, they qualify for vaccines at no cost through the Vaccines for Children (VFC) program.
 - There are about 550 VFC provider offices, community health centers, and local public health agencies in the VFC Program in Colorado. [Check your eligibility and find a VFC provider near you.](#)
- If you don't qualify for the VFC Program, but worry about the cost of vaccinations, your local public health agency can help you to find a solution. [Find your local public health agency based on your county.](#) [Learn more about paying for adult vaccines.](#)
- [Find a vaccinating provider near you.](#)

Immunization Branch Contact Information

- Phone: 303-692-2700
- Fax: 303-691-6118
- Email: cdphe.dcdimmunization@state.co.us
- Mailing:

Immunization Branch
Colorado Department of Public Health and Environment
Division of Disease Control and Public Health Response
4300 Cherry Creek Drive South
Denver, CO 80246

[Immunization Education Module Feedback Form](#)

Additional Vaccine Resources for Parents:

- [Centers for Disease Control and Prevention \(CDC\)](#)
- [Immunization Action Coalition \(IAC\)](#)
- [Children's Hospital of Philadelphia \(CHOP\) Vaccine Education Center](#)
- [American Academy of Pediatrics](#)
- [Vaccinate Your Family](#)
- [National Foundation for Infectious Diseases \(NFID\)](#)

[View references](#)

Slide Title: End

You have completed the Immunization Education Module. Please continue to the next slide to complete information for the nonmedical exemption form. You will be able to fill out the form for more than one child without retaking the course.