1. **[How do vaccines protect individuals and communities?](https://www.who.int/news-room/q-a-detail/vaccines-and-immunization-what-is-vaccination?adgroupsurvey=%7badgroupsurvey%7d&gclid=EAIaIQobChMI5JreuL7S8QIVy4JLBR2TiQKCEAAYASAAEgJ1bfD_BwE)**

Vaccines work by training and preparing the body’s natural defences – the immune system – to recognize and fight off viruses and bacteria. If the body is exposed to those disease-causing pathogens later, it will be ready to destroy them quickly – which prevents illness.

When a person gets vaccinated against a disease, their risk of infection is also reduced – so they’re also less likely to transmit the virus or bacteria to others. As more people in a community get vaccinated, fewer people remain vulnerable, and there is less possibility for an infected person to pass the pathogen on to another person. Lowering the possibility for a pathogen to circulate in the community protects those who cannot be vaccinated (due to health conditions, like allergies, or their age) from the disease targeted by the vaccine.

'Herd immunity', also known as 'population immunity', is the indirect protection from an infectious disease that happens when immunity develops in a population either through vaccination or through previous infection. Herd immunity does not mean unvaccinated or individuals who have not previously been infected are themselves immune. Instead, herd immunity exists when individuals who are not immune, but live in a community with a high proportion of immunity, have a reduced risk of disease as compared to non-immune individuals living in a community with a small proportion of immunity.

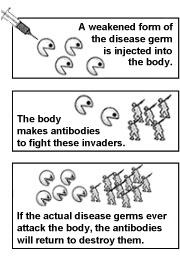
In communities with high immunity, the non-immune people have a lower risk of disease than they otherwise would, but their reduced risk results from the immunity of people in the community in which they are living (i.e. herd immunity) not because they are personally immune. Even after herd immunity is first reached and a reduced risk of disease among unimmunized people is observed, this risk will keep falling if vaccination coverage continues to increase. When vaccine coverage is very high, the risk of disease among those who are non-immune can become similar to those who are truly immune.

WHO supports achieving 'herd immunity' through vaccination, not by allowing a disease to spread through a population, as this would result in unnecessary cases and deaths.

For COVID-19, a new disease causing a global pandemic, many vaccines are in development and some are in the early phase of rollout, having demonstrated safety and efficacy against disease. The proportion of the population that must be vaccinated against COVID-19 to begin inducing herd immunity is not known.  This is an important area of research and will likely vary according to the community, the vaccine, the populations prioritized for vaccination, and other factors.

Herd immunity is an important attribute of vaccines against polio, rotavirus, pneumococcus, Haemophilus influenza type B, yellow fever, meningococcus and numerous other vaccine preventable diseases. Yet it is an approach that only works for vaccine-preventable diseases with an element of person-to-person spread. For example, tetanus is caught from bacteria in the environment, not from other people, so those who are unimmunized are not protected from the disease even if most of the rest of the community is vaccinated.

1. Why Are Childhood Vaccines So Important?



It is always better to prevent a disease than to treat it after it occurs.

Diseases that used to be common in this country and around the world, including polio, measles, diphtheria, pertussis (whooping cough), rubella (German measles), mumps, tetanus, rotavirus and *Haemophilus influenzae* type b (Hib) can now be prevented by vaccination. Thanks to a vaccine, one of the most terrible diseases in history – smallpox – no longer exists outside the laboratory. Over the years vaccines have prevented countless cases of disease and saved millions of lives.

Immunity Protects us From Disease

Immunity is the body’s way of preventing disease. Children are born with an immune system composed of cells, glands, organs, and fluids located throughout the body. The immune system recognizes germs that enter the body as “foreign invaders” (called *antigens*) and produces proteins called *antibodies* to fight them.

The first time a child is infected with a specific antigen (say measles virus), the immune system produces antibodies designed to fight it. This takes time . . . usually the immune system can’t work fast enough to prevent the antigen from causing disease, so the child still gets sick. However, the immune system “remembers” that antigen. If it ever enters the body again, even after many years, the immune system can produce antibodies fast enough to keep it from causing disease a second time. This protection is called [immunity](https://www.cdc.gov/vaccines/vac-gen/immunity-types.htm).

It would be nice if there were a way to give children immunity to a disease without their having to get sick first.

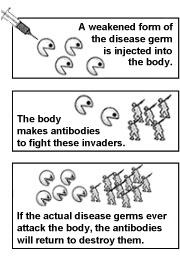
In fact there is:

Vaccines contain the same antigens (or parts of antigens) that cause diseases. For example, measles vaccine contains measles virus. But the antigens in vaccines are either killed, or weakened to the point that they don’t cause disease. However, they *are* strong enough to make the immune system produce antibodies that lead to immunity. In other words, *a vaccine is a safer substitute for a child’s first exposure to a disease*. The child gets protection without having to get sick. Through vaccination, children can develop immunity without suffering from the actual diseases that vaccines prevent.

More Facts

* Newborn babies are immune to many diseases because they have antibodies they got from their mothers. However, this immunity goes away during the first year of life.
* If an unvaccinated child is exposed to a disease germ, the child’s body may not be strong enough to fight the disease. Before vaccines, many children died from diseases that vaccines now prevent, such as whooping cough, measles, and polio. Those same germs exist today, but because babies are protected by vaccines, we don’t see these diseases nearly as often.
* Immunizing individual children also helps to protect the health of our community, especially those people who cannot be immunized (children who are too young to be vaccinated, or those who can’t receive certain vaccines for medical reasons), and the small proportion of people who don’t respond to a particular vaccine.
* Vaccine-preventable diseases have a costly impact, resulting in doctor’s visits, hospitalizations, and premature deaths. Sick children can also cause parents to lose time from work.

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1. Understanding vaccines

## THE VACCINE TIMELINE

It is hard to fully appreciate how vaccines have revolutionized modern medicine. The long schedule of vaccines may seem like a hassle, and rumors about harmful effects unnerve parents. But, the fact is, vaccines have helped save millions and millions of lives. Just a few generations ago, people lived under the constant threat of deadly infectious diseases, like smallpox, polio, and hepatitis.

Let's look at the greatest infectious scourges of the past 1,000 years and how vaccines have mitigated or even eradicated the danger.

**Prior to the 15th Century:** Infectious disease has always impacted humanity, but even as early as 1,000 years ago, there is evidence people recognized the connection between exposure and immunity. The ancient Chinese may have used pulverized smallpox scabs taken from the sick and [inhaled or rubbed](http://www.historyofvaccines.org/content/timelines/diseases-and-vaccines#EVT_000001) them onto skin to immunize themselves. This primitive form of inoculation was practiced in Africa and the Middle East too before spreading to Europe.

**16th Century:** Smallpox, measles, and whooping cough were terribly common in the 1500s, with outbreaks recorded around the world. Contagious diseases like these spread quickly, especially in crowded, dirty cities. Children were especially vulnerable. Records from 16th century England indicate that as many as [30% of all children](https://chnm.gmu.edu/cyh/teaching-modules/166) died before the age of 15, likely from dysentery, scarlet fever, whooping cough, influenza, smallpox, and pneumonia.

**17th Century:** When Christopher Columbus discovered the Americas in 1492, he and the Europeans that followed him unwittingly brought with them smallpox, measles, whooping cough, chicken pox, bubonic plague, typhus, and malaria. The native people, with no history of these diseases and no natural resistance, died by the millions over the 150 years that followed initial contact with European explorers. [An estimated 80% to 95%](http://scholar.harvard.edu/files/nunn/files/nunn_qian_jep_2010.pdf) of the population perished. There is perhaps no more terrible an example from history to illustrate the importance of antibodies in resisting infectious disease.

**18th Century:** The 1700s were a watershed century for vaccine development. Europeans realized that survivors of certain infectious diseases were immune to future exposure, and began a primitive form of inoculation by intentionally infecting themselves with a disease to gain immunity.

The risk of sickness and death with this early approach was high, but it shed light on the basic principles behind immunology and enabled British doctor Edward Jenner to develop the world's [first true vaccine](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1200696/). In 1796, Jenner discovered that if he infected people with the related, though relatively benign, cowpox virus he could inoculate patients with far lower mortality rates.

**19th Century:** After Dr. Jenner's discovery of "cow pox" as the first relatively safe vaccination against smallpox, knowledge of the procedure spread rapidly and became common throughout the world. Vaccine development finally made another major step forward 85 years later when [Louis Pasteur](hhttp://www.bbc.co.uk/timelines/z9kj2hv) identified bacteria as a major culprit behind several diseases and used this knowledge to produce the first "lab-made" vaccination.

**20th Century:** At the start of the 20th century, infectious diseases like yellow fever and polio still ravaged populations in Europe and the United States. But as the century progressed, scientists built upon the immunological fundamentals discovered over the past century and [developed individual vaccinations](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2864074/) for 27 major infectious diseases. By the year 2000, centuries-old scourges like smallpox and measles were virtually eliminated from the developed world, along with yellow fever, polio and several others.

**21st Century:** Since 1995, five new vaccines were added to the children's immunization schedule in the U.S., which the CDC estimated saved thousands of lives. The [pneumococcal conjugate vaccine](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6019a5.htm), added in 2001, likely saved 13,000 U.S. lives from 2001 to 2008. And the rotavirus vaccination, added in 2006, [is now estimated](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6019a5.htm?s_cid=mm6019a5_w) to prevent 40,000 – 60,000 hospitalizations yearly.

On the global scale, health organizations continue to distribute vaccines to poorer countries. Thanks to increased access to the measles vaccine internationally, the annual death toll from the disease has fallen from almost 600,000 in 2000 to just 122,000 in 2012, [a reduction of 79%](http://www.who.int/mediacentre/factsheets/fs286/en/).

**Future of Vaccines:** While existing vaccines continue to be improved and distributed, the scientific community continues to work on a few difficult diseases. There is no working vaccine for HIV, malaria, or tuberculosis (there is a [TB vaccine](http://www.cdc.gov/tb/) for children, but not adults). Consequently, these diseases continue to kill millions around the world.

A new generation of [cancer vaccines](http://www.cancer.gov/about-cancer/causes-prevention/vaccines-fact-sheet), designed to train the body to better fight cancer, is also in early stages of development. The scientific community believes these drugs hold great promise for addressing growing rates of cancer, now the second most common cause of death in the United States.

1. 10 Myths About The COVID-19 Vaccine That Aren't True

*Posted on December 21, 2020 by****Henry Ford Health System Staff***

 229366

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Almost a year after [COVID-19](https://www.henryford.com/blog/2020/12/covid-and-brain-fog) was first seen in humans, [vaccines](https://www.henryford.com/blog/2020/12/why-we-need-multiple-covid-vaccines)to protect us from the virus are here. (The Pfizer and Moderna vaccines were the first to be approved for emergency use by the Food and Drug Administration, but more are surely coming.) Scientists and researchers worked quickly and thoroughly to find effective, safe vaccines that could be given to the public in record time.

As supplies are initially limited, not everyone can receive the vaccine right now. Frontline healthcare workers who are caring for COVID-19 patients were among the first to be vaccinated. But once vaccines are available in widespread quantities—which could be by Spring 2021—a large percentage of the public can be vaccinated. That’s a critical piece of the puzzle to ensure [COVID-19](https://www.henryford.com/blog/2020/08/is-it-covid-flu-cold-or-allergies) will no longer be a pandemic that threatens the lives of those in our community and around the world.

But as happens with everything that’s new, rumors have been circulating about these vaccines. To set the record straight, [Dennis Cunningham, M.D.](https://www.henryford.com/services/infectious-diseases), medical director of infection control and prevention with Henry Ford Health System, debunks 10 vaccine [myths](https://www.henryford.com/blog/2020/04/covid19-separating-fact-from-fiction).

1. **Myth: The vaccines aren’t safe because they were developed quickly. This is FALSE.**“The COVID-19 vaccines themselves were developed quickly, but the clinical trials, which examine safety and efficacy, weren’t rushed at all,” Safety was not compromised in any way. What happened quickly was finding the vaccine to test. In the 1980s, it took scientists so long to do this, but thanks to scientific advances we’ve made over the years, we can find viruses so quickly.” Also, he adds, COVID-19 is similar to other coronaviruses we’ve seen in humans, like MERS and SARS, so there was previous research that could be used to speed up the process.
2. **Myth: The vaccines can lead to long-term effects. This is FALSE.**  
   “With vaccines, if there is going to be a complication or side effect (like an allergic reaction, for example) it will occur within minutes to hours of receiving the vaccine,” “If we’re not seeing serious side effects now, we can pretty much know it will be safe down the road.”
3. **Myth: You can get COVID-19 from the vaccines. This is FALSE.**  
   “There’s no live virus in the vaccines, so they can’t infect you,” says “Basically, the vaccines make our bodies produce one single protein from the virus—the protein that infects our cells. By making that protein, we prevent infection. You might have side effects like a headache or chills, but that’s because your body is creating an immune response, not because you have an infection.”
4. **Myth: I’ve already had COVID-19, so I don’t need to get vaccinated. This is FALSE.**The Center for Disease Control (CDC) recommends that those who have had COVID-19 get the vaccine. “There is preliminary evidence that the vaccine offers better protection than having had the virus,” “Plus, it’s sometimes hard to know whether you actually had [COVID-19](https://www.henryford.com/blog/2020/12/otc-remedies-for-to-covid-symptoms). People who had COVID-19 in the early days, before we had laboratory testing available, were being diagnosed based upon symptoms and not a test. Also, some of the tests aren’t always 100% accurate.”
5. **Myth: People with underlying conditions shouldn’t get vaccinated. This is FALSE.**  
   People who have underlying conditions—like [diabetes](https://www.henryford.com/blog/2020/12/covid-and-diabetes)and [heart disease](https://www.henryford.com/blog/2020/08/lasting-health-effects-of-covid19), for example—are at a high risk for getting complications from COVID-19, so it’s even more reason why they should get vaccinated, says Dr. Cunningham. Talk with your doctor who is helping you manage the condition if you have concerns.
6. **Myth: People with suppressed immune systems shouldn’t get vaccinated. This is FALSE.**  
   People with suppressed immune systems (like from [cancer](https://www.henryford.com/blog/2020/09/cancer-covid-flu)treatments or autoimmune diseases) should definitely get vaccinated. “The vaccine will not hurt you since it doesn’t contain a live virus,” says Dr. Cunningham. “Those with suppressed immune systems will still get protection from COVID-19, just not as much protection as those with healthy immune systems.” Again, talk with your doctor if you have specific concerns.
7. **Myth: The COVID-19 vaccines will alter your DNA. This is FALSE.**“The Pfizer and Moderna vaccines use messenger RNA (mRNA) to protect us from COVID-19, and I think that is where this rumor comes from,” says Dr. Cunningham. “mRNA basically gives our cells the blueprints for the factories that will build the protein to protect us from COVID-19. People get scared that mRNA will cause the virus to go into our DNA and mutate us, but it does not even go into the center part of the cell where we have our DNA.”
8. **Myth: If you get vaccinated, it could make you infertile. This is FALSE.**  
   “There is absolutely no data from the clinical trials or any theoretical reason as to why the vaccines could cause infertility,” says Dr. Cunningham. “In fact, we know that pregnant women with COVID-19 infections could have a miscarriage or go into premature labor, which is all the more reason to get the vaccine.”
9. **Myth: If I’m pregnant or breastfeeding, I definitely shouldn’t get vaccinated.  This is FALSE.**  
   “The CDC believes it is fine for pregnant women to get the vaccine,” says Dr. Cunningham. “If you’re pregnant and in a group that should be urgently vaccinated, like a healthcare worker, you should get vaccinated. If you’re concerned about the risks versus the benefits, talk to your doctor. But we know pregnant women who contract viruses can have complications or pass diseases to their babies, and the same goes for breastfeeding. Since the vaccine is not a live virus, you can’t pass anything to the baby.”
10. **Myth: Once I get vaccinated, I don’t have to wear masks or practice social distancing. This is FALSE.**“You absolutely still have to [wear masks](https://www.henryford.com/blog/2020/11/debunking-covid19-mask-myths) and social distance,” says Dr. Cunningham. “If you’re walking around in public, how do you know who is vaccinated? And no vaccine is 100% effective. These vaccines are 95% effective, which is an incredibly high percentage, but that means there will still be 5% of people who won’t be protected. Get a vaccine, wear your mask and then a few months later, when we know that everyone has been vaccinated, we can go back to life the way it was.”

Dr. Cunningham is optimistic that this virus will go away for good. “The COVID-19 vaccines are much more effective than [flu](https://www.henryford.com/blog/2020/11/why-is-covid-more-contagious-than-flu)vaccines," he says. "Every year the flu changes, which is why they don’t work as well as we’d like. The good news about COVID-19 is that it’s main protein that infects our cells is the same in every mutation of COVID-19. The protein doesn’t change, so whatever mutation of COVID-19 you have, the vaccine will work.”