

Patient Education

COVID-19 Vaccines

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The Basics

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What is COVID-19?

COVID-19 stands for "coronavirus disease 2019." It is caused by a virus called SARS-CoV-2. The virus first appeared in late 2019 and quickly spread around the world.

More information about COVID-19 is available in a separate article. (See "Patient education: COVID-19 overview (The Basics)".)

What are vaccines?

Vaccines are a way to prevent certain serious or deadly infections. When a person gets a vaccine, this is called "vaccination" or "immunization."

To understand how vaccines work, it helps to understand what happens when you get an infection. Infections are caused by germs, such as bacteria or viruses. When a germ gets into your body, it multiplies (makes copies of itself) and attacks, which can make you sick. Your "immune system," or infection-fighting system, recognizes that the germ should not be there. In response, it starts to make proteins called "antibodies" to fight the germ.

There are different types of vaccines. They all work by causing your body to make antibodies, like it would if you had an infection. This prepares your immune system to fight off germs if you come into contact with them in the future. Most vaccines are given as shots, although some come in other forms. Some require more than 1 dose in order to fully protect you from infection.

Thanks to vaccines, the number of people who die from infections has gone way down. Experts believe that vaccines are the best way to control the COVID-19 pandemic.

How does the COVID-19 vaccine work?

There are multiple COVID-19 vaccines being developed. They work in slightly different ways.

In the United States, there are a few COVID-19 vaccines available. All of these have been found to work very well in preventing serious illness and death from COVID-19. They include:

- **mRNA vaccines** – The first 2 vaccines became available in late 2020. Both are a type of vaccine called an "mRNA vaccine." mRNA refers to genetic material from the virus that causes COVID-19. This genetic material is used in the vaccine. It gives the body instructions to make a specific piece of protein that is normally found on the virus. In response, the immune system then makes antibodies that can recognize and attack the virus in the future.

The mRNA vaccines for COVID-19 are made by the Pfizer and Moderna companies. They both require 2 doses given a few weeks apart. It's important to get both doses for the vaccine to be most effective. When to get the second dose depends on which vaccine you get.

- **Vector vaccine** – In early 2021, another type of vaccine became available. This is called a "vector vaccine." It contains a weakened version of a different virus, called an adenovirus. This virus does not make you sick, but it acts as a "vector," or a way to deliver instructions to all the cells in your body. These instructions tell your body to make the protein normally found on the virus that causes COVID-19. Then, your immune system makes antibodies that can recognize and attack the virus in the future.

The vector vaccine for COVID-19 is made by the Johnson and Johnson company. It only requires 1 dose.

It's important to know that these COVID-19 vaccines do **not** contain infectious SARS-CoV-2 virus. So they cannot give you COVID-19. They also do not affect your DNA.

Different COVID-19 vaccines are available in other countries.

Why should I get the COVID-19 vaccine?

Getting vaccinated greatly lowers your chances of getting infected. And while it's uncommon to get COVID-19 after being vaccinated, if you do get infected, you will be much less likely to get severely ill.

In addition to protecting yourself, getting the vaccine will also help protect other people, including those who are at higher risk of getting very sick or dying. It also protects people who can't yet get a vaccine, like young children. Even if you are not worried about getting very sick yourself, you could still spread the virus to others, even without realizing it.

The COVID-19 pandemic will be controlled when there is "herd immunity." This is when enough people are immune to a disease that it can no longer spread easily. The best way to do this is to vaccinate as many people as possible. If too few people get vaccinated, the virus will keep spreading, and it will take longer for the pandemic to end.

Do vaccines work against the different virus variants?

Viruses constantly change or "mutate." When this happens, a new strain or "variant" can form. Most of the time, new variants do not change the way a virus works. But when a variant has changes in important parts of the virus, it can act differently.

Experts have discovered several new variants of the virus that causes COVID-19. They are studying them to better understand if and how they act differently. They are also studying how well the available vaccines work to protect against them. From what they know so far, it seems like the available vaccines

provide at least some protection from the different variants. And the vaccines still work very well to prevent severe infection with the different variants.

If enough people get vaccinated, the virus will have a harder time spreading. When the virus cannot spread easily, new variants are less likely to form.

Can people who have been vaccinated still spread the virus?

Vaccines work very well to prevent serious illness and death, but they do not prevent 100 percent of infections. So it is still possible for a person who has been vaccinated to get COVID-19. Then, that person might be able to spread the virus to others. However, these "breakthrough infections" seem to be uncommon. Even though it might seem like lots of breakthrough infections have been reported, these are really a small fraction of COVID-19 cases. Most cases are happening in unvaccinated people.

Does the COVID-19 vaccine cause side effects?

It can. Temporary side effects are common, and can include:

- Pain where you got the shot (upper arm)
- Fever
- Feeling very tired
- Headache

If you get a vaccine that comes in 2 doses, side effects are more common after the second dose. While side effects can be annoying, they should not last longer than a day or 2. Some people do not have bothersome side effects at all. If you do have side effects, this does not mean you are sick, just that your immune system is responding to the vaccine.

Vaccines also sometimes cause more serious side effects, such as severe allergic reactions. But this is rare. If you have had a reaction to the vaccine or its ingredients in the past, you might need to talk to an allergy expert. They can help you figure out if you should get the COVID-19 vaccine. People who do get the vaccine might be monitored for 15 to 30 minutes to make sure they do not have an allergic reaction.

Other serious side effects are rare, but have happened:

- There have been a very small number of reports of people getting blood clots after they had the single-dose (Johnson and Johnson) vaccine. Experts have confirmed that the risk of blood clots is extremely rare, and much smaller than the risk of getting very sick with COVID-19.
- A very small number of people have developed inflammation of the heart muscle after receiving an mRNA (Pfizer or Moderna) vaccine. This is called "myocarditis." Most cases have been in teen or young adult males. This side effect is extremely rare, and is usually mild and treatable if it does happen.
- A very small number of people have had a problem called Guillain-Barre syndrome after getting the Johnson and Johnson vaccine. When this happens, it causes severe muscle weakness. Experts are studying this to better understand whether it is directly related to the vaccine.

For most people, the benefits of getting vaccinated against COVID-19 are **much greater** than the risks. If you had a COVID-19 vaccine **within the last 3 weeks**, let your doctor or nurse know right away if you have any concerning symptoms. These include severe and persistent headache, blurry vision, weakness on 1 or both sides of the body, back pain, trouble thinking clearly, severe belly pain, trouble breathing, leg swelling, tiny red spots on the skin, bruising easily, or chest pain.

Can I get COVID-19 from the vaccine?

No. You **cannot** get COVID-19 from the vaccine.

Some people worry that the vaccine actually contains the virus that causes COVID-19. The vector vaccine that is available in the United States does contain virus, but it is a different virus. It is also created in a lab in a weakened form so it will not make a healthy person sick. mRNA vaccines do not contain virus at all.

How do I know the vaccine is safe?

COVID-19 vaccines have been developed very quickly. Because of this, some people wonder if they are safe. The answer is **yes**, the new vaccines had to go through the same process as other vaccines to test them for safety. This involved running "clinical trials" with lots of people who volunteered to try the vaccine. The volunteers included people of all ages and ethnicities. During these trials, researchers studied how well the vaccines work and how many people had side effects. The results were reviewed by doctors and other experts who do not work for the drug companies that made the vaccines. These experts agreed that the vaccines are safe and effective enough to be given to the public.

It's true that clinical trials for the new COVID-19 vaccines have happened much more quickly than usual. That's because experts knew that an effective vaccine would be one of the best ways to control the pandemic. Drug companies were also able to make progress quickly because they had already learned a lot from many years of working on other vaccines. This includes studying other vaccines that work similarly to the ones made for COVID-19.

Which vaccine should I get?

All of the available vaccines work very well to protect against the virus that causes COVID-19. Depending on where you live, you might not have a choice about which one to get.

If you do have a choice between vaccines, your decision might be based on timing or convenience. People who might be at higher risk for certain rare side effects might choose a particular vaccine for this reason. If you have a choice of vaccine and are not sure which one to get, your doctor or nurse can help you make this decision.

Do I still need the vaccine if I have had COVID-19?

Yes. Experts recommend getting vaccinated even if you had COVID-19 in the past. People who get COVID-19 do develop antibodies that likely provide some protection against getting infected again. But it is not known exactly how long antibodies last after a person recovers. Also, the antibodies you get from a vaccine might give you stronger protection against new virus variants.

People who have had COVID-19 in the past might be more likely to have side effects after they get the vaccine. Keep in mind that any side effects are temporary, and it's still important to get vaccinated.

What are "boosters" and will I need one?

A booster is a dose given some time after a person first gets vaccinated. This is because the protection you get from a vaccine can decrease over time. Experts recommend boosters for some vaccines, such as tetanus, to "remind" the immune system how to protect against a specific infection. Some countries, including the United States, have announced plans to give people COVID-19 vaccine boosters. In the United States, this would start with people who got their first vaccines the earliest, when they first became available.

A booster is **not** the same as an extra dose given to some people when they get vaccinated. Experts do recommend that people with a weak immune system get 3 doses of an mRNA (Pfizer or Moderna) vaccine. This includes an extra dose in addition to the 2 most people get. Because the vaccine might not work as well in people with a weakened immune system, the extra dose can help give extra protection.

If you have a health condition or take certain medicines that might weaken your immune system, your doctor or nurse can talk to you about whether you should get a third dose of the vaccine.

Will I have to pay for my vaccine?

No. In the United States, COVID-19 vaccines are free. When you are eligible to get one based on your state's rules, you will not have to pay for it. This is true even if you do not have insurance. You might be asked for your insurance information, if you have it, but this does not mean there will be a cost to you.

How can I prepare for my vaccine?

Once you have an appointment to get the vaccine, make sure you have a plan for how to get there on time. Be sure you have anything you were told to bring, like your ID or any other information.

You don't need to do anything else specific to get ready. Doctors recommend **not** taking medicines like acetaminophen (sample brand name: Tylenol) or ibuprofen (sample brand names: Advil, Motrin) just before you get the vaccine. That's because they don't know if these medicines could make the vaccine work less well. You can take pain medicine after your vaccine if you need to.

Wear a face mask when you go to your appointment. There will be staff to tell you where to wait and what to do after you've gotten your shot. They will also make sure you know when to come back for your second dose.

Can children get the COVID-19 vaccine?

It depends on their age. One of the available vaccines in the United States can be given to people 12 years of age or older. The others can be given to people 18 or older.

Experts are also studying the safety of the vaccine in children younger than 12. Until a vaccine is available for this age group, the best way to protect younger children is for as many older people as possible to get vaccinated. Children under 12 can also protect themselves by continuing to wear masks and practice social distancing.

What if I am pregnant?

Experts have been studying the safety of the COVID-19 vaccine during pregnancy. Based on what they have learned, they recommend that pregnant people get the vaccine. Pregnant people might be more likely to get seriously ill if they get COVID-19, so getting vaccinated is especially important.

What can I do after I am vaccinated?

Once you are fully vaccinated, you are much less likely to get the virus. "Fully vaccinated" means you have had all doses of the vaccine **and** it has been at least 2 weeks since the last dose. (If you had a single-dose vaccine, you are fully vaccinated 2 weeks after you get the shot.)

In many places, COVID-19 is still spreading quickly, and cases are increasing. This is mostly due to variants that spread more easily. It is happening more in areas where fewer people are vaccinated. In the United States, you can check the level of spread where you live at this website: <https://covid.cdc.gov/covid-data-tracker/#county-view>.

Once you are fully vaccinated:

- If you live in an area where COVID-19 is **not** spreading quickly, it is generally safe to gather with other people without masks. You might also be able to go without a mask in some public places, but this depends on your local and state rules and the number of cases in your area.
- If you choose to travel within the United States, you do not need to get a COVID-19 test or self-quarantine.
- You do not need to self-quarantine if you come into contact with someone who has COVID-19, as long as you have no symptoms.

It's important to keep in mind that there are still situations where you **do** need to wear masks or socially distance:

- If you live in an area where COVID-19 **is** spreading quickly, experts recommend that you still wear a mask when you are indoors and around other people.
- No matter where you live, you should continue to wear a mask and social distance while traveling, on public transit, or in school buildings. Some businesses and other public spaces might also still require that everyone wear a mask. These include places like hospitals, medical offices, and nursing homes.
- If you have had the vaccine but it has not yet been 2 weeks since your last dose, you are not yet fully vaccinated. If this is the case, you should continue to avoid gathering with unvaccinated people from other households.
- If you have been around someone who tested positive for COVID-19, wear your mask and get tested as soon as possible. Even if you have been vaccinated, it's still possible to get the virus and spread it to others.

If you have a weaker than normal immune system (for example, if you have certain health conditions or take certain medicines), there might be different guidelines for what you can do once you are vaccinated. Your doctor or nurse can talk to you about the best way to keep yourself and your loved ones safe.

Some activities, like traveling to certain areas or attending certain events, might require vaccination. So getting the vaccine will make it easier to get back to doing the things you enjoyed before the pandemic. **The more people who get vaccinated, the sooner the pandemic will end.**

What if I have other questions?

It's normal to have a lot of questions or to be nervous about the idea of getting a new vaccine. Your doctor or nurse can help answer your questions or direct you to sources you can trust.

Be careful with information you find on the internet or social media. In some cases, it can be hard to tell what is true and what is false. This is especially dangerous if people share health information that is not based on science or evidence.

You can find more information about COVID-19 vaccines through the United States Centers for Disease Control and Prevention (CDC): www.cdc.gov/coronavirus/2019-ncov/vaccines/index.html.

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