

COVID-19 Fact Sheet

Understanding how the different COVID-19 vaccines work

A COVID-19 vaccination can help people develop immunity to SARS-CoV-2, the virus that causes COVID-19, without getting ill. Three vaccines have been authorized for emergency use in the United States and are available for eligible Ohioans. How exactly do the different types of COVID-19 vaccines work? How are they similar? How are they different? Are they all [safe and effective](#)? Here is what to know about the vaccines.

COVID-19 Vaccines: Fast facts

	Pfizer-BioNTech	Moderna	Johnson & Johnson (Janssen)
Date authorized	Dec. 11, 2020	Dec. 18, 2020	Feb. 27, 2021
Vaccine type	Messenger RNA (mRNA)	Messenger RNA (mRNA)	Viral vector
Dosage	Two doses, 21 days apart	Two doses, 28 days apart	Single dose
Ages	16 and older	18 and older	18 and older
Clinical trials efficacy Data	95% effective at preventing laboratory-confirmed COVID-19 illness in people who received two doses.	94% effective at preventing laboratory-confirmed COVID-19 illness in people who received two doses.	Full protection against hospitalization and death, 85% effective in preventing severe COVID-19, 72% effective in the U.S. (66% overall) at preventing moderate to severe COVID-19.
Side effects	Injection site pain, fatigue, headache, muscle pain, joint pain, fever. Side effects more common after second dose. Severe allergic reactions (anaphylaxis) are rare.	Injection site pain, fatigue, headache, muscle pain, joint pain, fever. Side effects more common after second dose. Severe allergic reactions (anaphylaxis) are rare.	Injection site pain, headache, fatigue, and muscle pain. Nausea and fever were less common. The vaccine has not been associated with anaphylactic reactions.
Fact sheets	Pfizer-BioNTech EUA fact sheet	Moderna EUA fact sheet	Janssen EUA fact sheet

How will the vaccines be distributed in Ohio?

While vaccine supply continues to be scarce, individuals receiving the COVID-19 vaccines are unlikely to be offered a choice of which vaccine they want to receive.

The vaccine that is available at a particular vaccination site or clinic is the vaccine an individual will receive. Getting vaccinated with the first vaccine available to you can help protect you from COVID-19.

All three COVID-19 vaccines have been proven safe and effective at preventing serious illness, hospitalization, and death from COVID-19 disease.

Different types of vaccines

Vaccines are our best defense against preventing serious illness from COVID-19. Vaccines create an immune response so your body remembers how to fight a virus in the future.

The U.S. COVID-19 vaccines work differently, but all involve using a harmless surface protein of the SARS-CoV-2 virus, which causes COVID-19, to build immunity.

The surface proteins (or spike proteins) latch the virus onto a cell, which allows the virus to gain entry into those cells. The spike protein itself is harmless, and using it in the vaccine simply teaches your body how to recognize that protein, and how to fight it in the future.

Messenger RNA (mRNA) vaccines

[Messenger RNA \(mRNA\) vaccines](#) use strands of genetic material called [mRNA](#) to deliver a genetic code to cells to make the surface or spike protein on the SARS-CoV-2 virus. The proteins made with the mRNA instructions activate the immune system, teaching it to see the spike protein as an invader, and to develop antibodies to fight it. The body learns how to protect against future infection.

This vaccine technology is used in both the [Pfizer-BioNTech](#) and [Moderna](#) vaccines. Although mRNA vaccines are new, researchers have been studying and working with mRNA vaccines for decades. They have been studied before for flu, Zika, and rabies, for example. Beyond vaccines, cancer research has used mRNA to trigger the immune system to target specific cancer cells.

Viral vector vaccines

A [viral vector vaccine](#) uses a modified version of a different virus to deliver instructions to cells to make copies of the surface spike protein. A harmless inactive virus, such as one that causes the common cold, is used as a vector (or transportation device) to deliver instructions for making the spike protein. The immune system then recognizes that this protein doesn't belong there, and begins to fight it. The body learns how to protect against future infection.

This technology is used in the [Johnson & Johnson \(Janssen\) vaccine](#). Scientists began creating viral vectors in the 1970s. Besides being used in vaccines, such as flu and RSV, viral vectors have also been studied for gene therapy, to treat cancer, and for molecular biology research. Vaccines using this technology were used during the Ebola outbreak.

How are vaccines determined to be safe and effective?

The safety of the COVID-19 vaccines is being closely monitored by the Centers for Disease Control and Prevention (CDC) and the U.S. Food and Drug Administration (FDA).

The FDA can grant an [emergency use authorization](#) (EUA) to make medical products available quickly during public health emergencies such as the COVID-19 pandemic. The FDA uses rigorous standards and insights from independent medical professionals to evaluate all available data to ensure that a vaccine is safe and effective, and the benefits of use outweigh any potential risks. After an FDA decision, the CDC also reviews available data before making final recommendations for vaccine use. Vaccine [safety monitoring systems](#) are ongoing once a vaccine is in use.

Resources:

- [Pfizer-BioNTech COVID-19 Vaccine EUA](#)
- [Moderna COVID-19 Vaccine EUA](#)
- [Johnson & Johnson \(Janssen\) Vaccine EUA](#)

Understanding vaccine efficacy in clinical trials

You have likely heard about the efficacy rates of the COVID-19 vaccines. But what do these numbers actually mean? [Vaccine efficacy](#) is the percentage reduction in a disease in a group of people who received a vaccination in a clinical trial compared with the control group participants who did not receive a vaccination. For example, an efficacy rate of 85% means that vaccinated people had an 85% lower risk of developing serious COVID-19 disease compared with the control group participants.

Comparing efficacy rates in the three COVID-19 vaccines is challenging because of differences in the designs and the timing of the Phase 3 clinical tests. The trials were testing for different outcomes, the vaccines were not tested against one another, and all did not test against the [new variants](#). The comparisons are not apples to apples.

- The [Pfizer](#) and [Moderna](#) trials both tested to determine if the vaccine prevented any symptomatic COVID-19 infection.
- [Janssen trials](#) tested to determine whether the vaccine protected against moderate to severe COVID-19 illness, defined as a combination of a positive test and at least one symptom.
- Pfizer and Moderna's vaccines were tested at about the same time before the [emergence of new variants](#) in Britain, South Africa, and Brazil. It's still uncertain how well they will work against these mutated viruses, although early research shows the vaccines still offer protection. The J&J vaccine was tested at a later time when the variants were emerging, and overall incidence rates were higher.

The bottom line is all three of these vaccines protect you against severe illness, including hospitalization and death.

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For additional information, visit coronavirus.ohio.gov. For answers to your COVID-19 questions, call 1-833-4-ASK-ODH (1-833-427-5634) or email COVIDVACCINE@odh.ohio.gov.

Your mental health is just as important as your physical health. If you or a loved one are experiencing anxiety related to the coronavirus pandemic, help is available 24 hours a day, seven days a week. Call the COVID-19 CareLine at 1-800-720-9616.