



# Overview of COVID-19 Vaccines

Updated Aug. 24, 2022

## What You Need to Know

- Different COVID-19 vaccines, which include boosters, are available in the United States. COVID-19 vaccines are approved for people of different ages, and on different schedules.
- People who are moderately or severely immunocompromised have specific recommendations for COVID-19 vaccines, including boosters. Learn more about [COVID-19 vaccine recommendations for people who are moderately or severely immunocompromised](#).
- [Severe allergic reactions](#) after getting a COVID-19 vaccine are **rare**. If you are allergic to polyethylene glycol (PEG), you should **not** get Pfizer-BioNTech or Moderna COVID-19 vaccine. If you are allergic to polysorbate, you should **not** get Novavax or J&J/Janssen COVID-19 vaccine. Talk to your doctor about your options.

## Types of COVID-19 Vaccines Available

There are four approved or authorized vaccines in the United States used to prevent COVID-19. Pfizer-BioNTech and Moderna are COVID-19 mRNA vaccines. You can also get the Novavax COVID-19 protein subunit vaccine. Otherwise, you may get Johnson & Johnson's Janssen (J&J/Janssen) COVID-19 viral vector vaccine in some situations.

These vaccines are given as a shot in the muscle of the upper arm or in the thigh. None of them affect or interact with our DNA in any way. COVID-19 vaccine ingredients are considered safe for most people. Nearly all of the ingredients in COVID-19 vaccines are ingredients found in many foods—fats, sugar, and salts. They all have:



- **No preservatives** like thimerosal or mercury or any other preservatives.
- **No antibiotics** like sulfonamide or any other antibiotics.
- **No medicines or therapeutics** like ivermectin or any other medications.
- **No tissues** like aborted fetal cells, gelatin, or any materials from any animal.
- **No food proteins** like eggs or egg products, gluten, peanuts, tree nuts, nut products, or any nut byproducts (COVID-19 vaccines are not manufactured in facilities that produce food products).
- **No metals** like iron, nickel, cobalt, titanium, rare earth alloys, or any manufactured products like microelectronics, electrodes, carbon nanotubes or other nanostructures, or nanowire semiconductors.
- **No latex**. The vial stoppers used to hold the vaccine also do not contain latex.

After the body produces an immune response, it discards all of the vaccine ingredients, just as it would discard any substance that cells no longer need. This process is a part of normal body functioning.

**Dosage:** [COVID-19 vaccine dose amounts](#) [236 KB, 4 pages] can vary depending on the type of vaccine being given and the age group for which it's intended.



COVID-19 vaccine and booster schedules are different for people who are moderately or severely immunocompromised.

[Vaccines for Immunocompromised](#)

## Pfizer–BioNTech and Moderna mRNA COVID–19 vaccines

[mRNA vaccines](#) use mRNA created in a laboratory to teach our cells how to make a protein—or even just a piece of a protein—that triggers an immune response inside our bodies. The mRNA from the vaccines is broken down within a few days after vaccination and doesn't last long in the body.

Pfizer-BioNTech

### Vaccine Schedule

Learn about the recommended timing between Pfizer-BioNTech COVID-19 vaccines and boosters for people:

6 Months–17 Years

18 Years and Older

### COMIRNATY Name Change

After receiving FDA approval on August 23, 2021, the Pfizer-BioNTech COVID-19 vaccine for people ages 16 years and older began to be marketed under the COMIRNATY brand name. The vaccine was also approved for pre-teens and teens ages 12–15 on July 8, 2022. **No change was made to the vaccine's formula** with the name change.

The Pfizer-BioNTech vaccine label remains for people ages 6 months–11 years since the vaccine is authorized but not yet approved for these age groups.

### Ingredients in Vaccine Formula for Children

The Pfizer-BioNTech COVID-19 vaccine for children ages 6 months–11 years contains only the following ingredients:

Type of Ingredient	Ingredient	Purpose
Messenger ribonucleic acid (mRNA)	<ul style="list-style-type: none"><li>Nucleoside-modified mRNA encoding the viral spike (S) glycoprotein of SARS-CoV-2</li></ul>	Provides instructions the body uses to build a harmless piece of a protein from the virus that causes COVID-19. This protein causes an immune response that helps protect the body from getting sick with COVID-19 in the future.
Lipids (fats)	<ul style="list-style-type: none"><li>2[(polyethylene glycol (PEG))-2000]-N,N-ditetradecylacetamide</li><li>1,2-distearoyl-sn-glycero-3-phosphocholine</li><li>Cholesterol (plant derived)</li></ul>	Work together to help the mRNA enter cells.

- ((4-hydroxybutyl)azanediyl)bis(hexane-6,1-diyl)bis(2-hexyldecanoate)

Sugar and acid stabilizers

- Sucrose (table sugar)
- Tromethamine
- Tromethamine hydrochloride

Work together to help keep the vaccine molecules stable while the vaccine is manufactured, frozen, shipped, and stored until it is ready to be given to a vaccine recipient.

## Ingredients in Vaccine Formula for Teens and Adults

The Pfizer-BioNTech COVID-19 vaccine for teens and adults ages 12 years and older contains only the following ingredients:

Type of Ingredient	Ingredient	Purpose
Messenger ribonucleic acid (mRNA)	<ul style="list-style-type: none"> <li>• Nucleoside-modified mRNA encoding the viral spike (S) glycoprotein of SARS-CoV-2</li> </ul>	Provides instructions the body uses to build a harmless piece of a protein from the virus that causes COVID-19. This protein causes an immune response that helps protect the body from getting sick with COVID-19 in the future.
Lipids (fats)	<ul style="list-style-type: none"> <li>• 2[(polyethylene glycol (PEG))-2000]-N,N-ditetradecylacetamide</li> <li>• 1,2-distearoyl-sn-glycero-3-phosphocholine</li> <li>• Cholesterol (plant derived)</li> <li>• ((4-hydroxybutyl)azanediyl)bis(hexane-6,1-diyl)bis(2-hexyldecanoate)</li> </ul>	Work together to help the mRNA enter cells.
Sugar and acid stabilizers	<ul style="list-style-type: none"> <li>• Sucrose (table sugar)</li> <li>• Tromethamine</li> <li>• Tromethamine hydrochloride</li> </ul>	Work together to help keep the vaccine molecules stable while the vaccine is manufactured, frozen, shipped, and stored until it is ready to be given to a vaccine recipient.

## Resources

Fact sheets for recipients and caregivers-Ingredients, how vaccine is administered, and other details from the FDA:

- [Pfizer Recipient FS 6m-4y Maroon 06282022 \(fda.gov\)](#) 
- [Pfizer-BioNTech COVID-19 Vaccine for People 5–11 Years of Age \[646 KB, 8 pages\]](#) 
- [Pfizer-BioNTech COVID-19 Vaccine for People 12 Years of Age and Older \[669 KB, 9 pages\]](#) 

Other clinical information:

- [Pfizer COVID-19 Vaccine Product Information](#)

[Moderna](#)



## Vaccine Schedule

Learn about the recommended timing between Moderna COVID-19 vaccines and boosters for people:

6 Months–17 Years

18 Years and Older

## Spikevax Name Change

After receiving FDA approval on January 31, 2022, the Moderna COVID-19 vaccine for people ages 18 years and older began to be marketed under the Spikevax brand name. **No change was made to the vaccine's formula** with the name change.

The Moderna vaccine name remains for people ages 6 months–17 years since the vaccine is authorized but not yet approved for these age groups.

## Ingredients

The Moderna COVID-19 vaccine for everyone ages 6 months and older contains only the following ingredients:

Type of Ingredient	Ingredient	Purpose
Messenger ribonucleic acid (mRNA)	<ul style="list-style-type: none"><li>Nucleoside-modified mRNA encoding the viral spike (S) glycoprotein of SARS-CoV-2</li></ul>	Provides instructions the body uses to build a harmless piece of a protein from the virus that causes COVID-19. This protein causes an immune response that helps protect the body from getting sick with COVID-19 in the future.
Lipids (fats)	<ul style="list-style-type: none"><li>PEG2000-DMG: 1,2-dimyristoyl-rac-glycerol, methoxypolyethylene glycol</li><li>1,2-distearoyl-sn-glycero-3-phosphocholine</li><li>BotaniChol® (non-animal origin cholesterol)</li><li>SM-102: heptadecane-9-yl 8-((2-hydroxyethyl) (6-oxo-6-(undecyloxy) hexyl) amino) octanoate</li></ul>	Work together to help the mRNA enter cells.
Salt, sugar, acid stabilizers, and acid	<ul style="list-style-type: none"><li>Sodium acetate</li><li>Sucrose (basic table sugar)</li><li>Tromethamine</li><li>Tromethamine hydrochloride</li><li>Acetic acid (the main ingredient in white household vinegar)</li></ul>	Work together to help keep the vaccine molecules stable while the vaccine is manufactured, frozen, shipped, and stored until it is ready to be given to a vaccine recipient.

## Resources

Fact sheets for recipients and caregivers- Ingredients, how vaccine is administered, and other details from the FDA:

- [Moderna Recipients FS 6m-5y 06172022 \(fda.gov\)](#) 
- [Moderna Recipients FS 6-11y 06172022 \(fda.gov\)](#) 
- [Moderna Recipients FS 12+ 06172022 \(fda.gov\)](#) 

Other clinical information:

- [Moderna COVID-19 Vaccine Product Information](#)

# Novavax protein subunit COVID-19 vaccine

**Protein subunit vaccines** contain pieces (proteins) of the virus that causes COVID-19. These virus pieces are the spike protein. The Novavax COVID-19 vaccine contains another ingredient called an adjuvant that helps the immune system respond to that spike protein. After learning how to respond to the spike protein, the immune system will be able to respond quickly to the actual virus spike protein and protect you against COVID-19.

Novavax



## Vaccine Schedule

The Novavax COVID-19 vaccine is authorized as a 2-dose primary series only—and not as a booster dose—at this time.

Learn about the recommended timing between the Novavax COVID-19 vaccines for people:

12 Years and Older

## Ingredients

The Novavax COVID-19 vaccine contains only the following ingredients:

Type of Ingredient	Ingredient	Purpose
Protein	<ul style="list-style-type: none"><li>SARS-CoV-2 recombinant spike protein</li></ul>	Causes an immune response that helps protect the body from getting sick with COVID-19 in the future.
Lipids (fats)	<ul style="list-style-type: none"><li>Cholesterol</li><li>Phosphatidylcholine</li></ul>	Work together to help the recombinant spike protein enter cells.
Adjuvant	<ul style="list-style-type: none"><li>Fraction-A and Fraction-C of <i>Quillaja saponaria</i> Molina extract</li></ul>	Facilitates activation of the cells of the innate immune system.
Salts, sugar, and acid	<ul style="list-style-type: none"><li>Disodium hydrogen phosphate heptahydrate</li><li>Disodium hydrogen phosphate dihydrate</li><li>Polysorbate-80</li><li>Potassium chloride (common food salt)</li><li>Potassium dihydrogen phosphate (common food salt)</li><li>Sodium chloride (basic table salt)</li><li>Sodium dihydrogen phosphate monohydrate</li><li>Sodium hydroxide or hydrochloric acid</li><li>Water</li></ul>	<p>Work together to help keep the vaccine molecules stable while the vaccine is manufactured, shipped, and stored until it is ready to be given to a vaccine recipient.</p> <p>The vaccine may also contain very small amounts of ingredients from the manufacturing stage, which can be found in the EUA Fact Sheet.</p>

## Resources

Factsheet for recipients- Ingredients, how vaccine is administered, and other details from the FDA:

- [Novavax Patients Fact Sheet 07132022 \(fda.gov\)](#)

Other clinical information:

- [Novavax COVID-19 Vaccine Product Information](#)
- [Novavax COVID-19 Vaccine Fact Sheet for Healthcare Providers \[1 MB, 26 pages\]](#) 

## Johnson & Johnson's Janssen (J&J/Janssen) viral vector COVID-19 vaccine

[Viral vector vaccines](#) use a harmless, modified version of a different virus (a vector virus), and not the virus that causes COVID-19. The vector virus delivers important instructions to our cells on how to recognize and fight the virus that causes COVID-19.

J&J/Janssen 

### Vaccine Schedule

Learn about the recommended timing between the J&J/Janssen COVID-19 vaccine and boosters for people:

18 Years and Older

### When to Consider Getting J&J/Janssen COVID-19 Vaccine

In most situations, Pfizer-BioNTech or Moderna COVID-19 vaccines are preferred over the J&J/Janssen COVID-19 vaccine for primary and booster vaccination due to the [risk of serious adverse events](#). Vaccine recipients should talk to their healthcare provider. They must be informed of the risks and benefits of J&J/Janssen COVID-19 vaccination. The J&J/Janssen COVID-19 vaccine may be considered in some situations, including for persons who:

- Had a severe reaction after an mRNA vaccine dose or who have a severe allergy to an ingredient of Pfizer-BioNTech or Moderna (mRNA COVID-19 vaccines).
- Would otherwise remain unvaccinated for COVID-19 due to limited access to Pfizer-BioNTech or Moderna (mRNA COVID-19 vaccines).
- Wants to get the J&J/Janssen COVID-19 vaccine despite the safety concerns.

### Ingredients

The J&J/Janssen COVID-19 vaccine contains only the following ingredients:

Type of Ingredient	Ingredient	Purpose
A harmless version of a virus unrelated to the COVID-19 virus	<ul style="list-style-type: none"><li>• Recombinant, replication-incompetent Ad26 vector, encoding a stabilized variant of the SARS-CoV-2 Spike (S) protein</li></ul>	Provides instructions the body uses to build a harmless piece of a protein from the virus that causes COVID-19. This protein causes an immune response that helps protect the body from getting sick with COVID-19 in the future.
Sugars, salts, acid, and acid stabilizer	<ul style="list-style-type: none"><li>• Polysorbate-80</li><li>• 2-hydroxypropyl-<math>\beta</math>-cyclodextrin</li><li>• Trisodium citrate dihydrate</li><li>• Sodium chloride (basic table salt)</li><li>• Citric acid monohydrate (closely related to lemon juice)</li><li>• Ethanol (a type of alcohol)</li></ul>	Work together to help keep the vaccine molecules stable while the vaccine is manufactured, shipped, and stored until it is ready to be given to a vaccine recipient.

## Resources

Fact sheets for recipients and caregivers- Ingredients, how vaccine is administered, and other details from the FDA:

- [Janssen COVID-19 Vaccine EUA Fact Sheet for Recipients and Caregivers \(fda.gov\)](#) [↗](#)
- [Janssen COVID-19 Vaccine EUA Fact Sheet for Healthcare Providers \(fda.gov\)](#) [↗](#)

Other clinical information:

- [J&J/Janssen COVID-19 Vaccine Product Information](#)

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## How Well COVID-19 Vaccines Work

- Vaccines reduce the risk of COVID-19, including the risk of severe illness and death among people who are fully vaccinated.
- COVID-19 vaccines are effective, but studies have shown vaccine protection can decline over time—especially with the Omicron variant. As a result, booster shots have been recommended to enhance or restore protection against COVID-19.
- All FDA-approved or authorized COVID-19 vaccines provide substantial protection against COVID-19 hospitalization and death.
- CDC will continue to provide updates as we learn more.

## Safety of COVID-19 Vaccines

COVID-19 vaccines have undergone—and will continue to undergo—the most intensive safety monitoring in U.S. history. Evidence from the hundreds of millions of COVID-19 vaccines already administered in the United States, and the billions of vaccines administered globally, demonstrates that they are [safe](#) and [effective](#).

- [Side effects](#) that happen within 7 days of getting vaccinated are common but are mostly mild. Sometimes they may affect a person's ability to do daily activities.
- [Severe allergic reactions](#) to vaccines are rare but can happen.
- Side effects throughout the body (such as fever, chills, tiredness, and headache) are more common after the second dose of a Pfizer-BioNTech, Moderna, or Novavax COVID-19 vaccine.
- There is a rare risk of [myocarditis and pericarditis](#) associated with mRNA COVID-19 vaccination, mostly among males ages 12–39 years. The rare risk may be further reduced with a longer interval between the first and second dose.
- Cases of myocarditis and pericarditis have also been reported in people who received Novavax COVID-19 vaccine.
- There is a plausible causal relationship between J&J/Janssen COVID-19 vaccine and a rare and serious adverse event—blood clots with low platelets ([thrombosis with thrombocytopenia syndrome, or TTS](#)). It occurs at a rate of about 4 cases per million Janssen doses and has resulted in deaths.

Learn more about [vaccine safety monitoring](#) after a vaccine is authorized or approved for use.

## If You Are Allergic to an Ingredient in a COVID-19 Vaccine

- If in the past you have had a severe allergic reaction to an ingredient in an COVID-19 vaccine or if you have a diagnosed allergy to an ingredient in a COVID-19 vaccine, **you should not get that COVID-19 vaccine**. For example:
  - If you are allergic to polyethylene glycol (PEG), you should not get Pfizer-BioNTech or Moderna COVID-19 vaccine.
  - If you are allergic to polysorbate, you should not get Novavax or J&J/Janssen COVID-19 vaccine.
- If you aren't able to get one type of COVID-19 vaccine, talk to your doctor about your options for getting **a different type of COVID-19 vaccine**.



## Learn about Getting Your Vaccine

- Do you need to wait to get vaccinated after infection or getting treatment?
- How can you prepare?
- What can you expect during and after your vaccination?

[Getting Your COVID-19 Vaccine](#)

## Resources

### Related Pages

- › [Possible Side Effects](#)
- › [Safety of COVID-19 Vaccines](#)
- › [Benefits of Getting Vaccinated](#)



### For Healthcare Workers

[U.S. COVID-19 Vaccine Product Information](#)

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