

BUILDING CONFIDENCE:

A COVID-19 Vaccine Discussion Guide

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Contents

- 3** “What’s in COVID-19 vaccines?”
- 9** “I’ve heard the vaccines can cause potentially lethal blood clots. Is that true?”
- 13** “I’ve heard that COVID-19-vaccinated individuals can still get breakthrough infections. Is that true? What happens to my protection against the virus then?”
- 16** “Can I get a COVID-19 vaccine after a natural infection? Is it safe? Is it necessary?”



“What’s in COVID-19 vaccines?”



Two of the vaccines that have been authorized in the United States — specifically, the [Pfizer-BioNTech](#) and [Moderna](#) vaccines — use something called messenger RNA, or mRNA.

mRNA instructs cells in the human body to make a type of protein found on the surface of the virus that causes COVID-19. This teaches the immune system to recognize and produce antibodies against the virus. Both mRNA vaccines also include inactive ingredients, like lipids, salts and other components that keep the vaccine stable.

The third vaccine authorized in the U.S. is the Janssen vaccine, also known as the [Johnson & Johnson](#) vaccine, which uses a harmless version of a different virus to deliver instructions to cells to trigger an immune response. The adenovirus used in the vaccine cannot

Active ingredients in FDA-authorized COVID-19 vaccines:

Pfizer-BioNTech

Moderna

messenger RNA

Johnson & Johnson

Adenovirus type 26

cause illness. The Johnson & Johnson vaccine contains lipids, salts and certain stabilizing agents.

None of the three vaccines contain the live virus that causes COVID-19, and none of them contain eggs, gelatin, latex or preservatives. Below, you will find a detailed explanation of the ingredients in all three vaccines. There is also a [table](#) containing the ingredients for quick access.

PFIZER-BIONTECH mRNA VACCINE

The Pfizer-BioNTech mRNA vaccine is authorized for those aged 5 years and older. The FDA is also considering authorizing the vaccine for children under the age of 5 years.



ACTIVE INGREDIENT:

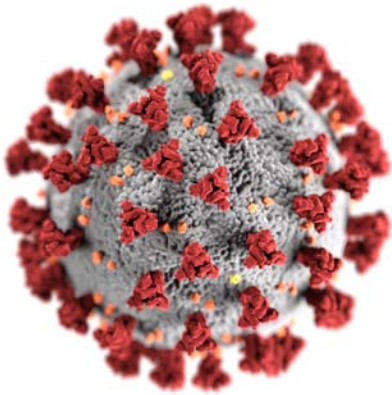
- Messenger ribonucleic acid, or mRNA.

INACTIVE INGREDIENTS:

- **Lipids** are fats and oils that are also found naturally in the human body and in the food we eat. The lipids in this vaccine are used to protect the mRNA while it's delivered to cells in the body.
 - (4-hydroxybutyl)azanediyl)bis(hexane-6,1-diyl)bis(2-hexyldecanoate)
 - 2[(polyethylene glycol)-2000]- N,N-ditetradecylacetamide
 - 1,2-distearoyl-sn-glycero-3-phosphocholine
 - cholesterol
- There are some ingredients in the Pfizer-BioNTech vaccine that fall into the “**other**” category. These include tromethamine, which is used to keep the vaccine stable for longer periods at

refrigerated temperatures and to balance the vaccine's pH, or acidity, as well as sugar (sucrose), another stabilizing agent.

- tromethamine
- tromethamine hydrochloride
- sucrose



COVID-19 vaccines work by instructing human cells to produce a type of protein found on the surface of the virus, shown in this image, which in turn helps the immune system to recognize it and produce antibodies.

Source: CDC

MODERNA mRNA VACCINE

The Moderna mRNA vaccine is authorized for those aged 18 years and older.



ACTIVE INGREDIENT:

- Like the Pfizer-BioNTech vaccine, the active ingredient in the Moderna vaccine is mRNA.

INACTIVE INGREDIENTS:

■ Lipids

- SM-102
- cholesterol
- polyethylene glycol (PEG) 2000 dimyristoyl glycerol (DMG)
- 1,2-distearoyl-sn-glycero-3-phosphocholine (DSPC)

■ Salt, like lipids, stabilizes the vaccine:

- sodium acetate

- The Moderna and Pfizer–BioNTech vaccines share some of the same ingredients that fall into the “**other**” category. However, the Moderna vaccine also contains acetic acid, which also works to stabilize the shot.
 - tromethamine
 - tromethamine hydrochloride
 - acetic acid
 - sucrose

JOHNSON & JOHNSON VACCINE

The Johnson & Johnson vaccine is authorized for those aged 18 years and older.



ACTIVE INGREDIENT:

- The Johnson & Johnson vaccine uses a harmless virus as a “vehicle” to deliver instructions to cells to produce an immune response against the virus that causes COVID-19.

INACTIVE INGREDIENTS:

- Salts
 - sodium chloride
 - trisodium citrate dihydrate
 - citric acid monohydrate
- The Johnson & Johnson vaccine also includes ingredients that don’t fall neatly into a category like lipids or salts. These “**other**” ingredients are used to stabilize or emulsify the vaccine or, like ethanol, help to dissolve the other ingredients in the vaccine.
 - polysorbate-80
 - 2-hydroxypropyl- β -cyclodextrin
 - ethanol

At a glance: Ingredients included in COVID-19 vaccines

	Pfizer-BioNTech vaccine for people ages ≥5 years	Moderna vaccine for people ages ≥18 years	Johnson & Johnson vaccine for people ages ≥18 years
Active ingredient	Messenger RNA	Messenger RNA	Adenovirus type 26
Inactive ingredients	2[(polyethylene glycol (PEG))-2000]-N,N-ditetradecylacetamide	PEG2000-DMG:1,2-dimyristoyl-rac-glycerol, methoxypolyethylene glycol	Polysorbate-80
	1,2-distearoyl-sn-glycero-3-phosphocholine	1,2-distearoyl-sn-glycero-3-phosphocholine	2-hydroxypropyl-β-cyclodextrin
	Cholesterol	Cholesterol	Citric acid monohydrate
	(4-hydroxybutyl)azanediyl) bis(hexane-6,1-diyl)bis(2-hexyldecanoate)	SM-102:heptadecan-9-yl 8-((2-hydroxyethyl) (6-oxo-6-(undecyloxy) hexyl) amino) octanoate	Trisodium citrate dihydrate
	Tromethamine	Tromethamine	Sodium chloride
	Tromethamine hydrochloride	Tromethamine hydrochloride	Ethanol
	Sucrose	Acetic acid	
		Sodium acetate	
		Sucrose	

Data source: CDC

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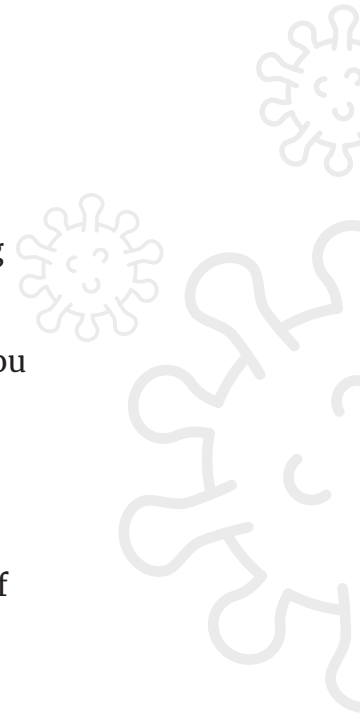
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VIEW TABLE OF CONTENTS

“I’ve heard the vaccines can cause potentially lethal blood clots. Is that true?”




The Johnson & Johnson vaccine has resulted in very rare cases of blood clots with a low platelet count, called thrombosis with thrombocytopenia, or TTS. These blood clots have not been seen with the Pfizer-BioNTech or Moderna [mRNA vaccines](#). The occurrence of TTS, although rare, can result in severe illness requiring ICU care and sometimes even result in death. Women are likely to be at higher risk for TTS. Because the United States has enough supply of mRNA vaccines, the CDC recommends using them over the Johnson & Johnson vaccine. However, having any vaccine is better than having no vaccine, and the Johnson & Johnson vaccine can still be used if there is another reason why you should not get the Pfizer-BioNTech or Moderna vaccines. Please consult your doctor for further advice. The benefits of COVID-19 vaccination far exceed any potential harm associated with their use, and it is strongly encouraged for your own benefit and that of your family and community.



It is important to note that the risk of death from COVID-19 is 1%, whereas the risk of death from TTS is significantly lower.

FURTHER EXPLANATION

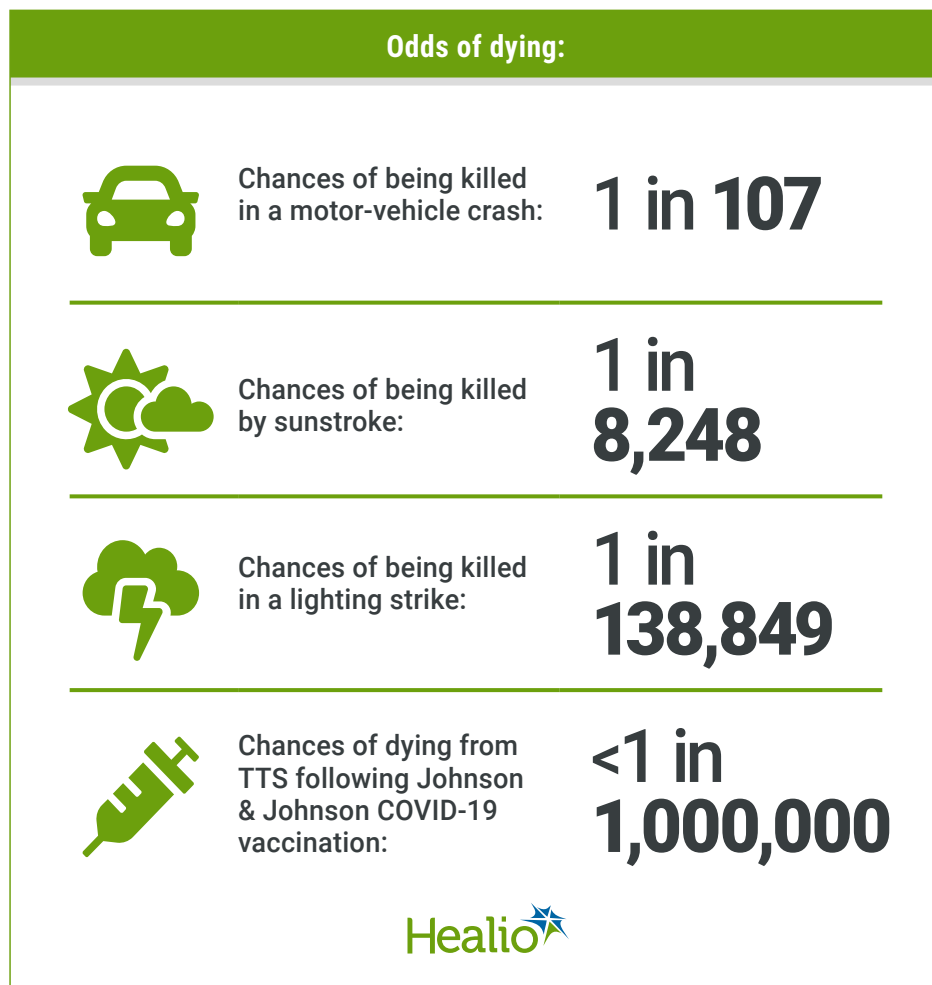


COVID-19 vaccines are widely believed to be the most effective solution against the pandemic. Vaccines have been available to the American public since December 2020. There are broadly two types of vaccines authorized for use in the U.S. The first type includes the novel messenger RNA vaccines — specifically the Pfizer-BioNTech and Moderna vaccines. The other type is a [conventional vector-based vaccine](#), known as the Johnson & Johnson vaccine. Health authorities pay very close attention to the safety of these vaccines.

A rare adverse reaction seen in people who received the Johnson & Johnson vaccine is called thrombosis with thrombocytopenia (TTS), a condition that presents as blood clots with a low platelet count. It is seen in people of all genders and ages but primarily affects women. According to the CDC, as of Dec. 8, 2021, there have been 57 cases and nine reported deaths after 16.9 million doses of the Johnson & Johnson vaccine had been administered. TTS is generally seen 1 to 4 weeks after vaccination. People with TTS can develop headache, leg swelling, chest pain, abdominal pain, bruising and bleeding, among other symptoms, and they may require a high level of care in the ICU. Approximately 15% to 20% percent of those who develop TTS may die.

The CDC recommends that people receive mRNA vaccines instead of the Johnson & Johnson vaccine because of the risk for TTS, which although rare is quite significant in terms of the severity of illness, and because mRNA vaccines have proven more effective. However, the risk of dying from COVID-19 is about 1%, whereas the risk of dying from a blood clot after vaccination with the Johnson & Johnson vaccine is significantly lower. The risk of

developing TTS is rare: 3.8 cases per million doses given. The death rate from TTS is 0.57 per million doses (to date, nine people have died from TTS — seven women and two men). Therefore, any vaccine is better than having no vaccine. The Johnson & Johnson vaccine can still be used if mRNA vaccines are unavailable or contraindicated. Please consult your doctor for further advice. The benefits of COVID-19 vaccination far exceed any potential harm, and it is strongly encouraged for your own benefit and that of your family and community.



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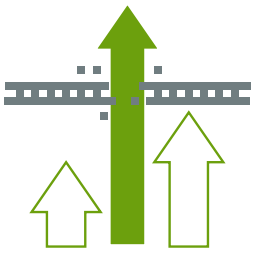
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VIEW TABLE OF CONTENTS

“I’ve heard that COVID-19-vaccinated individuals can still get breakthrough infections. Is that true? What happens to my protection against the virus then?”



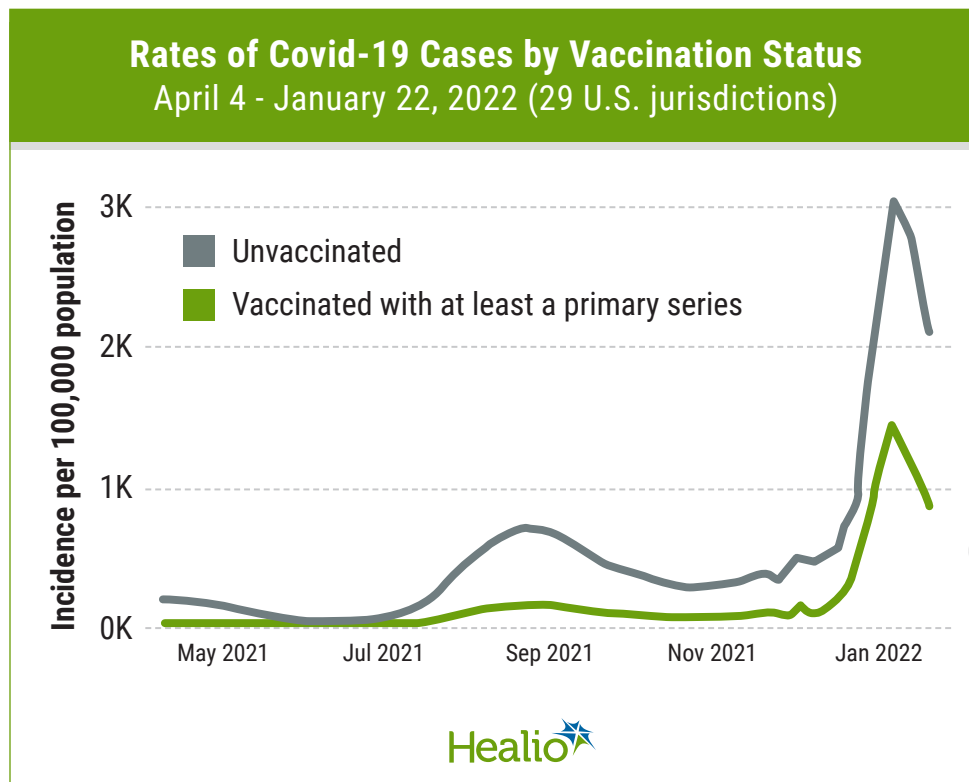
It is true that even fully vaccinated people can get COVID-19. This is what is called a “breakthrough infection.” No vaccine can give us 100% protection. While this may sound concerning, breakthrough infections in vaccinated people often cause asymptomatic or mild infections. Breakthrough infections are less likely to lead to serious illness and hospitalization. The goal of immunization is to protect against serious illness, hospitalization and death. A booster dose may help decrease the frequency and severity of breakthrough infections.

FURTHER EXPLANATION

“Breakthrough infections” are infections that occur in fully immunized individuals. This is likely due to the body not mounting an adequate immune response to the virus or immunity waning over time following vaccination. No vaccine is absolutely effective in preventing infection.

However, fully immunized individuals are significantly less likely to become infected, and the illness is often asymptomatic or mild.

Immunized individuals are protected against serious illness, hospitalization and death, which is the goal of immunization. Breakthrough infections can be prevented or further reduced by the administration of a booster dose of vaccine. The chances of breakthrough infections in immunocompromised patients could be higher and their severity of illness may be greater. Therefore, immunocompromised individuals should continue to wear masks,



Data source: CDC

maintain social distancing and use other precautions until advised by their doctor. Immunocompromised individuals may also require additional doses of COVID-19 vaccines.

There is also emerging evidence that breakthrough infections in fully immunized individuals can generate a highly amplified robust immune response, which can be effective against emerging

variants as well. A “foundation” of full vaccination is the armored protection necessary to effectively fight against circulating and future emerging variants.

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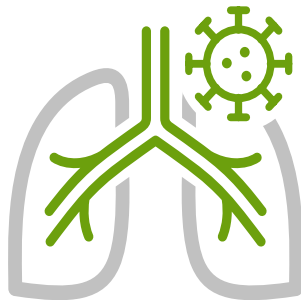
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VIEW TABLE OF CONTENTS

“Can I get a COVID-19 vaccine after a natural infection? Is it safe? Is it necessary?”

Yes, people can get a vaccine after becoming infected. COVID-19 vaccinations are highly effective and safe, according to the CDC. It is common for individuals to have a natural infection and then get a vaccine. The CDC says there is no change in the timing of vaccination when a person is naturally infected. In fact, the immunity gained through vaccination is much more robust, long lasting and highly protective compared with natural infection in someone who did not get vaccinated. A reinfection after a natural infection is much more likely to lead to hospitalization if an individual is not vaccinated against COVID-19.

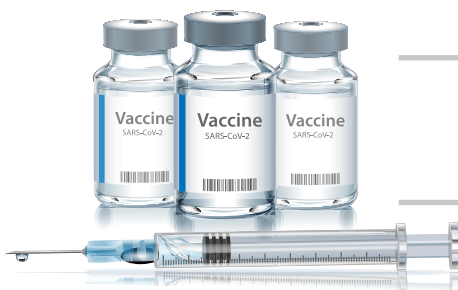
Benefits of COVID-19 vaccination following natural infection:



- Studies show that getting a COVID-19 vaccine after you recover from COVID-19 provides added protection to your immune system.
- Vaccines are a safe way to keep you from getting and spreading COVID-19 a second time. COVID-19 vaccination also helps protect you from serious illness if you get sick again.

FURTHER EXPLANATION

Vaccination after natural infection is encouraged by medical scientists and the CDC. People with COVID-19 can complete the quarantine period for the natural infection and subsequently can get immunized by any of the FDA-authorized vaccines (mRNA vaccines are favored by CDC) with no change in the vaccine schedule — meaning, they get the same number of vaccine doses that uninfected individuals get, and the timing of the doses does not differ. If a naturally infected individual was given convalescent plasma or any antibody infusion to treat COVID-19, they can be vaccinated at any time, according to the CDC.



Vaccination after natural infection provides long-lasting protection.

It has been shown that reinfection was much more likely — by about 5 times — in unvaccinated individuals with prior natural infection who did not get vaccinated compared with individuals who were infected and then vaccinated. Vaccination after natural infection helps stimulate high antibody levels that effectively neutralize the virus during a reinfection. That immunity is long lasting, likely effective against variants, associated with a lower risk for [breakthrough infection](#) or reinfection and results in a lower risk for hospitalization and subsequent complications. Prevention of reinfection also protects family members. Hence, vaccination is highly encouraged for people who were naturally infected.

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VIEW TABLE OF CONTENTS