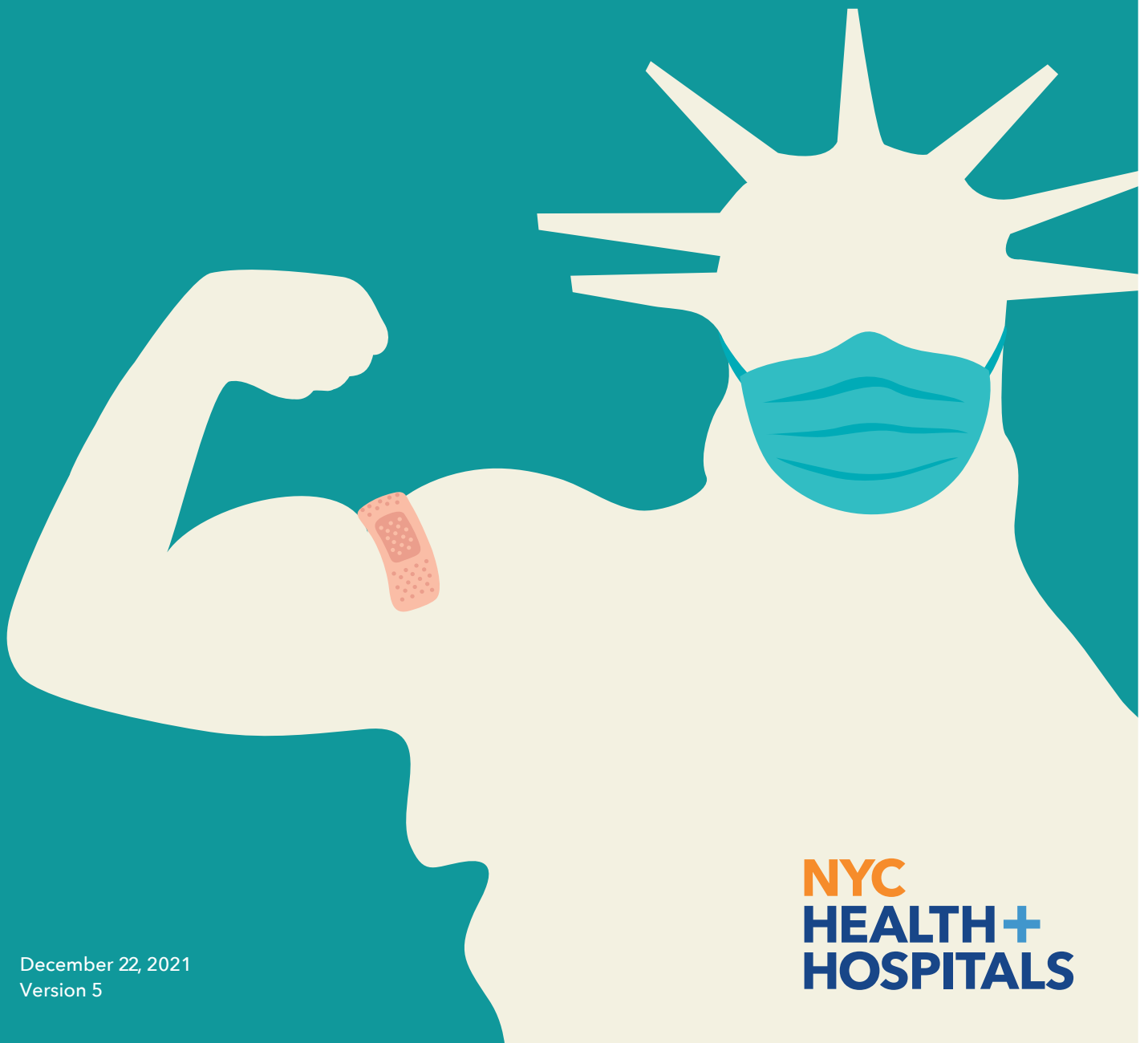


# Understanding COVID-19 Vaccines

A guide to learning about COVID-19 vaccines



December 22, 2021  
Version 5

**NYC**  
**HEALTH+**  
**HOSPITALS**

# About This Guide

This guide shares information about vaccination and COVID-19 vaccines, to help answer your questions and address your concerns. You will find information to help keep you, your family and community safe. You will be able to use what you learn and be empowered to make decisions that work for **YOU**. You have a voice and can also share this knowledge with your loved ones, on social media, or in your community.

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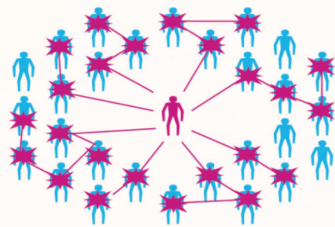
# **Section 1**

## **Understanding Vaccination and Immunity**

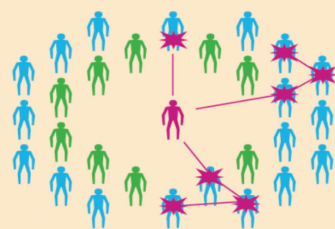
# The Importance of Vaccination

- + COVID-19 vaccination is a safe way to help the immune system build protection against COVID-19.
- + **Getting vaccinated reduces the risk of severe disease, hospitalization and death.**
- + Getting vaccinated in addition to practicing public health precautions is a great way to provide protection against the virus.
- + Vaccination helps with community immunity, or herd immunity, which will reduce the spread of disease.
- + **The more people who get vaccinated, the sooner we can end the pandemic.**

## How Herd Immunity Works



When no one has immunity, contagion has many opportunities to spread quickly.



The more immunity we have in the system, the less often contagion\* comes into contact with the susceptible.



Spread of contagious disease is contained.

[www.ucdavis.edu/sites/default/files/2020/herd\\_immunity\\_3.png](http://www.ucdavis.edu/sites/default/files/2020/herd_immunity_3.png)

\*Contagion is another way of referring to a virus.

## How Do Vaccines Work?

- ✚ When germs, such as the virus that causes COVID-19, invade our bodies, they attack and multiply. This causes infection and illness.
- ✚ Our immune system uses several tools to fight infection, such as antibodies and specific immune cells called B and T lymphocytes.
- ✚ Vaccines are used to help the immune system create immune cells and antibodies in order to prevent illness.
- ✚ After vaccination, the body is left with a supply of “memory” cells and **antibodies that will recognize and remember how to fight specific germs in the future.**
- ✚ Like many other vaccines, some of the COVID-19 vaccines require multiple doses to build protection.

## Infection Induced Immunity vs. Vaccine Induced Immunity

The immunity someone gains from having an infection, called infection induced immunity, varies from person to person. We are still learning about how long someone can be protected after recovering from COVID-19.

Vaccination is important even if you already had COVID-19 infection, because:

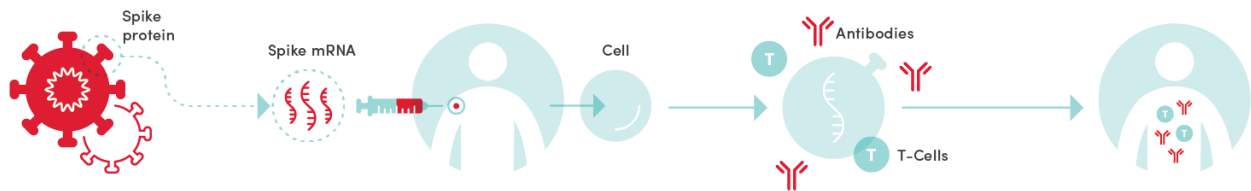
- ✚ Re-infection with COVID-19 is possible.
- ✚ Research is ongoing to find out how long immunity lasts.
- ✚ Vaccination provides strong immunity.



## What are mRNA Vaccines?

- + Pfizer BioNTech and Moderna COVID-19 vaccines are messenger RNA (mRNA) vaccines.
- + mRNA vaccines teach cells how to make a **harmless piece of the spike protein**, which is found on the surface of the COVID-19 virus.
- + This protein then triggers an immune response to make antibodies that protect against COVID-19.
- + **After our cells make copies of the protein, they destroy the mRNA from the vaccine.**
- + **mRNA does not enter the nucleus of your cells where DNA is stored and does NOT affect your DNA.**

### HOW MRNA COVID-19 VACCINES WORK

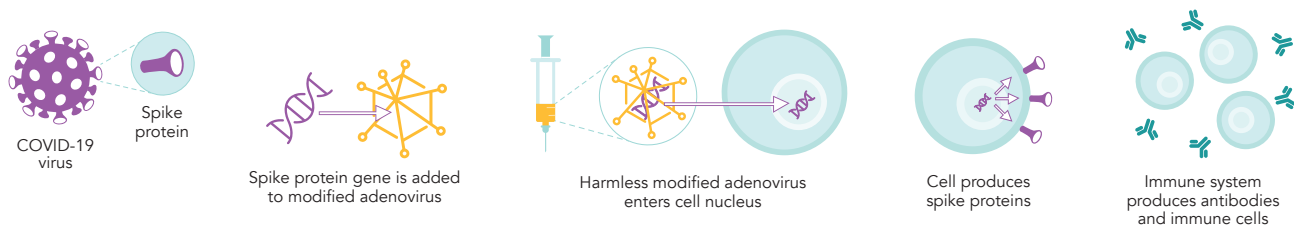


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## What are Adenovirus Vector Vaccines?

- + Adenoviruses are common viruses that typically cause colds or flu-like symptoms.
- + The Janssen COVID-19 vaccine is a modified harmless adenovirus. It contains the gene for the coronavirus spike protein that enters the cell, but can't make copies or cause illness. It only produces the coronavirus spike protein.
- + The immune system will then respond to the spike protein, which allows it to recognize and fight off a future infection by the virus.

### HOW ADENOVIRUS VECTOR VACCINES WORK



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## Facts on Adolescents & Children and COVID-19 Vaccination

- + Adolescents and children are at risk for COVID-19 infection, severe illness, hospitalization, and death, and represent an increasing proportion of recent COVID-19 cases.
- + Adolescents and children who get infected with COVID-19 may also indirectly impact others' health, including older vulnerable populations, and contribute to transmission in households and communities.
- + The two dose Pfizer BioNTech COVID-19 vaccine series for adolescents (aged 12-15) and children (aged 5-11) is safe and has gone through the same stringent and rigorous process for authorization.
- + Vaccinated adolescents and children generate a robust antibody response and side effects from the vaccine are well tolerated.

## Facts on Pregnancy and COVID-19 Vaccination

- + Pregnancy causes changes in the body that could increase the risk for developing severe COVID-19 illness, hospitalization, and poor pregnancy outcomes.
- + COVID-19 vaccination during pregnancy reduces the risk of infection and hospitalization. Antibodies made after a pregnant person is vaccinated may also help protect newborns against COVID-19.
- + There is currently no evidence that the COVID-19 vaccines cause fertility problems.
- + The American College of Obstetricians and Gynecologists, the Society for Maternal Fetal Medicine and the CDC recommend vaccination for people who are pregnant, breastfeeding, or might become pregnant in the future.



Read more here:

[cdc.gov/coronavirus/2019-ncov/need-extra-precautions/pregnant-people.html#anchor\\_1614967211600](https://cdc.gov/coronavirus/2019-ncov/need-extra-precautions/pregnant-people.html#anchor_1614967211600)



## COVID-19 Variants

- + Viruses can change through mutations. These mutated forms of a virus are called variants.
- + Multiple variants of the virus that causes COVID-19 are circulating globally. Sometimes new variants emerge and disappear. Other times, new variants persist.
- + If you think about a virus like a tree growing and branching out, each branch on the tree is slightly different than the others. By comparing the branches, scientists can classify them according to the differences.
- + Variants can be classified as variants of interest, variants of concern, or variants of high consequence based on how quickly it spreads, severity of symptoms, and treatment options.
- + By studying and understanding these differences, scientists can monitor and track COVID-19 variants, and often predict whether a variant is more dangerous than others.
- + **Current COVID-19 vaccines from Moderna, Pfizer BioNTech, and Janssen offer protection against variants, including prevention from severe illness and hospitalization.**
- + **Getting vaccinated prevents continued community spread and the introduction of new variants.**

Read more here: <https://www.cdc.gov/coronavirus/2019-ncov/variants/variant-info.html>



## Additional Vaccine Dose

There are two distinct potential uses for an additional vaccine dose:

✚ **Additional dose after an initial primary vaccine series when the initial immune response is likely to be insufficient.**

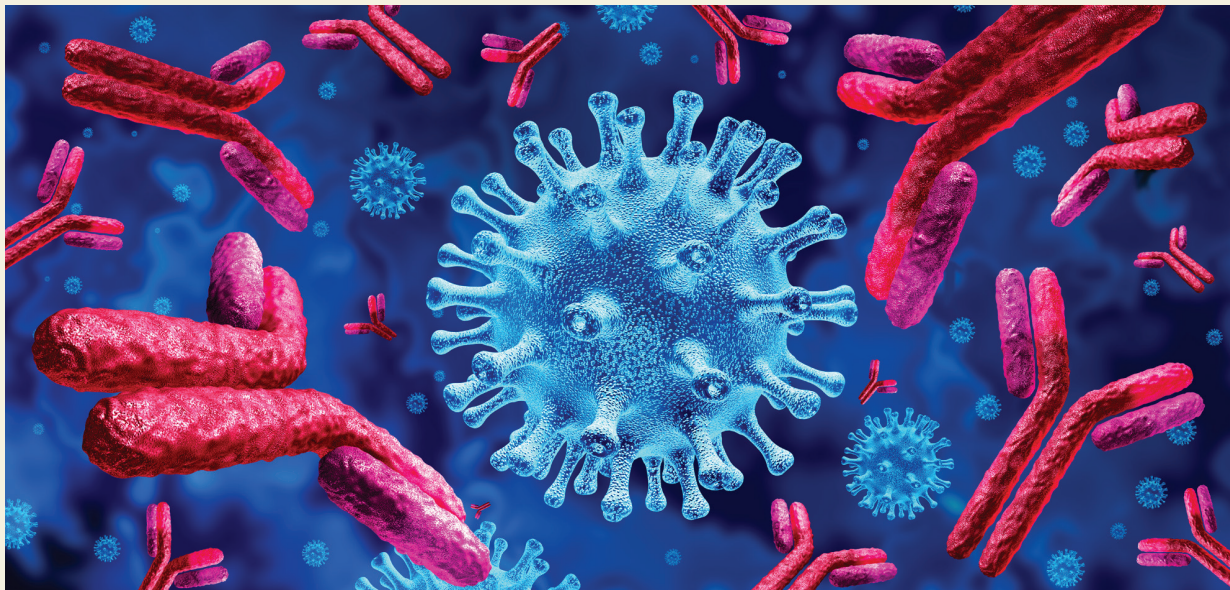
Some immunocompromised people don't always build the same level of immunity after vaccination as others do. Fully vaccinated immunocompromised people have accounted for a large proportion of hospitalized breakthrough cases and are more at risk for serious, prolonged illness.

People with moderately to severely compromised immune systems should receive an additional dose of mRNA COVID-19 vaccine after the initial 2 doses. This includes people who have:

- Been receiving cancer treatment (such as chemotherapy)
- Been receiving an organ transplant and are taking medicine to suppress the immune system
- Received a stem cell transplant within the last 2 years or are taking medicine to suppress the immune system
- Have another cause of moderate or severe immunodeficiency (genetic syndromes)
- Advanced or untreated HIV infection
- Active treatment drugs that may suppress the immune response

✚ **A booster dose when the initial sufficient immune response to a primary vaccine series is likely to have waned over time.**

Read more here: [cdc.gov/coronavirus/2019-ncov/vaccines/recommendations/specific-groups.html](https://cdc.gov/coronavirus/2019-ncov/vaccines/recommendations/specific-groups.html)



## **Section 2**

# **Vaccine Development, Safety, and Efficacy**

## Accelerated Vaccine Production

*It is normal to have questions about the quick development of COVID-19 vaccines, since vaccines usually take years to be developed. There were many factors that led to quicker vaccine production:*



### **A HEAD START**

Scientists learned from previous research on viruses similar to COVID-19 (like MERS and SARS). mRNA technology has been studied for over a decade, paving the way for efficient development of mRNA vaccines.

**Adenovirus-based vaccines have been studied for years. Recently, an adenovirus-based vaccine for Ebola was approved for general use.**



### **COUNTRIES WORKING TOGETHER FOR A COMMON GOAL**

Existing knowledge around vaccine technology and **continuous information sharing by researchers, around the world, allowed scientists to study and create effective vaccines.**



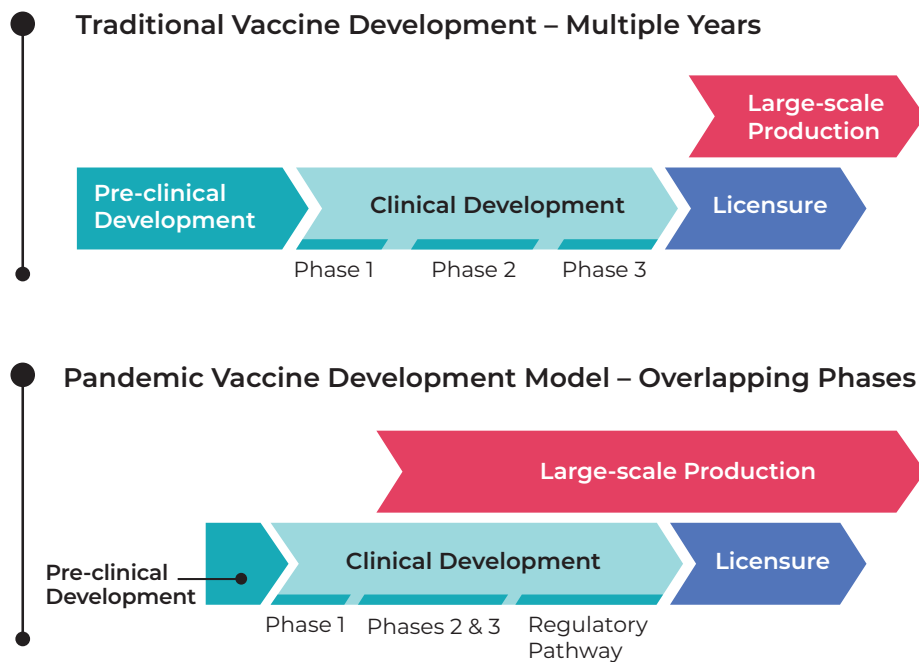
### **INVESTMENTS**

Developing a vaccine usually requires years of fundraising, but due to the high demand for a COVID-19 vaccine, **the US Congress gave over \$12 billion to fund vaccine research and development.**



## OVERLAPPING PHASES OF VACCINE DEVELOPMENT

Vaccine development is typically done in a step by step process. **To speed up the process, many steps were done simultaneously in an efficient and coordinated manner.**



## EFFICIENT CLINICAL TRIALS

COVID-19 vaccines have gone through the same **rigorous safety assessments** and clinical trial phases as other vaccines.

No steps were skipped during these processes.

## Diversity in Clinical Trials

- + Current authorized vaccines were tested in diverse populations, including communities of color.
- + Clinical trials showed high levels of safety and efficacy among tens of thousands of people across all age groups, genders, races, and ethnicities including:
  - Hispanic/Latino
  - American Indian or Alaska Native
  - Black
  - White
  - Native Hawaiian or other Pacific Islander
  - Asian



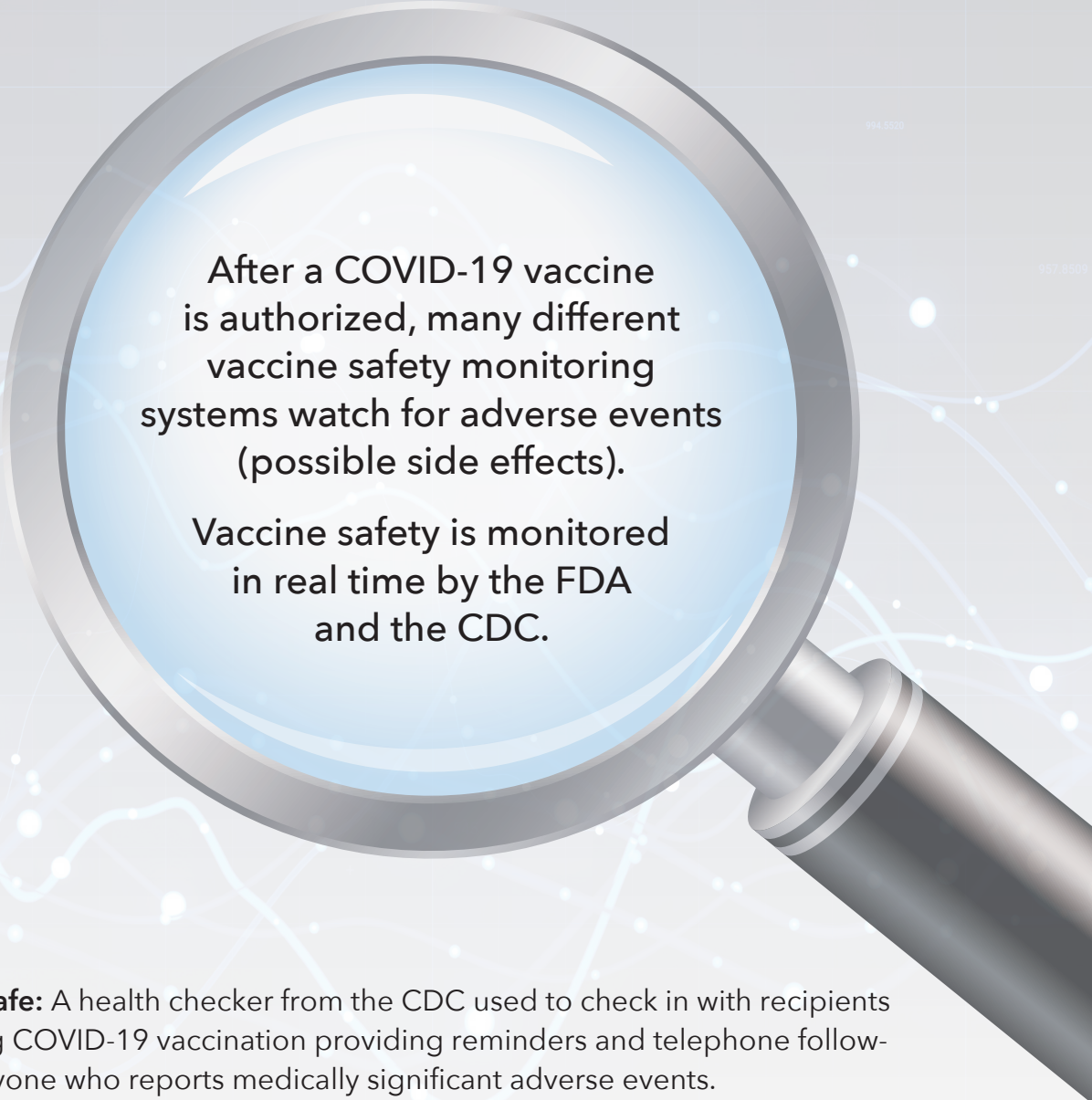


## Emergency Use Authorization of Vaccines and Approval of COVID-19 Vaccines

- + Once the best available evidence from clinical trials has been carefully reviewed, Emergency Use Authorization (EUA) allows new medicines or vaccines to be made available to the public during an emergency, to treat or prevent serious or life-threatening diseases.
- + Safety testing and clinical trials were not fast tracked. The Food and Drug Administration (FDA) and Centers for Disease Control (CDC) focused on review and authorization, making the vaccine their number one priority.
- + Approval means the FDA has thoroughly evaluated extensive data and information from the EUA, such as pre-clinical and clinical data, the manufacturing process, and vaccine testing results to ensure vaccine quality, safety, and effectiveness.



## Safety Monitoring



After a COVID-19 vaccine is authorized, many different vaccine safety monitoring systems watch for adverse events (possible side effects).

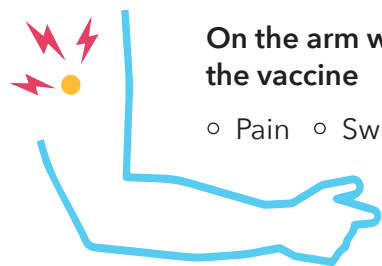
Vaccine safety is monitored in real time by the FDA and the CDC.

- + **CDC V-safe:** A health checker from the CDC used to check in with recipients following COVID-19 vaccination providing reminders and telephone follow-up to anyone who reports medically significant adverse events.
- + **CDC and FDA: Vaccine Adverse Event Reporting System (VAERS)** A national vaccine safety surveillance system that collects, monitors, and tracks reports from healthcare professionals, vaccine manufacturers, and the public on adverse events that happen after vaccination.
- + Other monitoring systems include the **National Healthcare Safety Network (NHSN)**, the **Food and Drug Administration (FDA)**, and **CDC Vaccine Safety Datalink (VSD)**.



## Side Effects

- + Common short term side effects are normal after vaccination and mean your body is in the process of building protection. So far, millions of people have been vaccinated and major side effects are extremely rare.
- + Experiencing side effects after you get vaccinated is common and does not mean that you're infected with COVID-19 from the vaccine. Some people experience short-term side effects, while others don't. Either way, your body is still working to build protection against COVID-19.
- + Speak with your doctor if you have a history of allergic reactions or have further questions about side effects.



**On the arm where you got the vaccine**

- Pain
- Swelling

**Throughout the rest of your body**

- Fever
- Tiredness
- Chills
- Headache



## Rare Adverse Events

**Janssen COVID-19 Vaccine:** There are rare but increased risks of **Guillain-Barré syndrome (GBS)** and **thrombosis with thrombocytopenia syndrome (TTS)** following the use of the Janssen vaccine. GBS is a rare disorder that causes muscle weakness and sometimes paralysis which may occur during the 42 days following vaccination. Most people fully recover. TTS is a rare condition which involves blood clots with low platelets. Women, especially those younger than 50 years old, should be aware of the rare but increased risk of TTS. It is recommended for individuals to receive an mRNA COVID-19 vaccine such as Moderna or Pfizer based on the latest evidence on vaccine effectiveness, vaccine safety, and rare adverse events. However, individuals who are unable to receive an mRNA COVID-19 vaccine can still be vaccinated with the Janssen COVID-19 vaccine.

**Moderna and Pfizer-BioNTech Vaccines:** There is a rare but increased risk of **myocarditis** (inflammation of the heart muscle) and **pericarditis** (inflammation of the outer lining of the heart), following the use of the Pfizer-BioNTech and Moderna mRNA vaccines, particularly in male adolescents and young adults above the age of 16 in the days immediately following the second dose of mRNA COVID-19 vaccines. These conditions are rare, given the hundreds of millions of vaccine doses already administered. Individuals can usually return to their normal daily activities after their symptoms improve.

**These adverse events are extremely rare and the CDC and FDA continue to monitor the safety of all vaccines. The significant benefits of vaccination, such as prevention of COVID-19 disease, severe illness, and hospitalization, outweigh the risks associated with these rare adverse events.**

## **Section 3**

# **Safety Tips and Resources**

## Staying Safe Before and After Vaccination

- + Your actions matter. Simple strategies like wearing a face covering, maintaining physical distance from others, keeping hands clean, and staying home if sick, will help slow the spread of COVID-19.
- + Fully vaccinated individuals should still continue to take precautions.
- + Getting vaccinated and practicing safety precautions can help increase community protection and reduce the spread of variants.

Read more here: [cdc.gov/coronavirus/2019-ncov/vaccines/fully-vaccinated-guidance.html](https://cdc.gov/coronavirus/2019-ncov/vaccines/fully-vaccinated-guidance.html)

## Keeping Safe and Protecting Yourself and Others from COVID19

### Layer each measure on!

The more you add to your **pile of prevention**, the lower your risk of COVID19 infection

Stay Home If You Can	Wear a Mask	Stay Distant	Avoid 3-Cs:	Open Windows	Clean Hands and High Touched Surfaces
Limit contact and activities with non-household contacts  Avoid close contact with people who are sick	Select a high-quality mask with multi-layers, a good fit, and filtration  Wear a mask in indoor and outdoor settings when around other people  Wear a mask correctly (over your nose and mouth) and consistently	Stay at least 6 feet from non-household contacts but the more distance the better.  Limit duration and time spent when around others	Avoid crowded places, close contact settings, confined, enclosed spaces	Increase ventilation and airflow by opening windows and doors if possible	Clean hands often and especially after touching any high touch surfaces, contaminated items, after being in a public space and before touching your face  Clean and disinfect high touch surfaces daily or more if contaminated

Stay Informed	Get Tested Periodically	Get Vaccinated When Eligible	Monitor Your Health	Practice Respiratory Etiquette
Stay up-to-date on local COVID19 news including rate of community transmission, and public health announcements  If you get a call from a contact tracer or public health department, pick up the phone  See your local health department website among other credible sources of information	If you engage in activity requiring in-person contact outside your home or live or work in a congregate setting, you should get tested at least once a month (regardless of exposure or symptoms)  There are several types of COVID19 tests, some more reliable than others. Talk to your health care provider about which type of test is best for you based on reason for testing	Get the COVID19 vaccine when eligible and if you meet the criteria for vaccination  Ensure you follow vaccination schedule (2 dose) depending on vaccine received for full protection	Be alert for symptoms of COVID19 or any new or concerning symptoms especially if you engage in activities or settings with other people	Always practice respiratory etiquette, cover your coughs and sneezes and wash or sanitizer your hands

## Trusted Sources for Information

Learning about COVID-19 vaccines can be overwhelming.

It is important to use scientific sources to check the facts about vaccines in order to avoid false or misleading information.

A few trusted sources you can use are:

- + **NYC Health + Hospitals**  
[nychealthandhospitals.org/covidvaccine](https://nychealthandhospitals.org/covidvaccine)  
[ess.nychhc.org/vaccinationinformation.html](https://ess.nychhc.org/vaccinationinformation.html)
- + **NYC Department of Health and Mental Hygiene**  
[nyc.gov/covidvaccine](https://nyc.gov/covidvaccine)
- + **New York State Department of Health**  
[covid19vaccine.health.ny.gov](https://covid19vaccine.health.ny.gov)
- + **CDC**  
[cdc.gov/covidvaccine](https://cdc.gov/covidvaccine)
- + **FDA**  
[fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/covid-19-vaccines](https://fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/covid-19-vaccines)



## Messages From Trusted Voices

"Just like wearing a mask, I'd never advise you to do something that I wasn't willing to do myself. You should still get the vaccine even if you already got COVID before/ have COVID antibodies.

This is because we don't know how long natural immunity lasts (some studies suggest people may get it twice) and the vaccine can not only extend your immunity, but also make your immunity stronger."

– *Alexandria Ocasio-Cortez*  
US Representative - New York

"The COVID-19 vaccines save lives—and help us get back to the people and the experiences we most love. Vaccination is not just about safety and protection, it is also about joy."

– *Dave A. Chokshi, MD MSc,*  
Commissioner, NYC Department  
of Health and Mental Hygiene

"I understand you know historically—everything dating back all the way to the Tuskegee experiments and so forth — why the African American community, would have some skepticism. But the fact of the matter is, is that vaccines are why we don't have polio anymore. And they're the reason why we don't have a whole bunch of kids dying from measles and smallpox and diseases that used to decimate entire populations and communities.

If Anthony Fauci tells me this vaccine is safe, and can vaccinate, you know, immunize you from getting COVID, absolutely I'm going to take it."

– *Former President*  
*Barack Obama*

"We know that our collective role in helping to create a vaccine that works for black people — and that we trust—has an impact on our very survival."

– *America's Black doctors and nurses & the Black Coalition against COVID-19*

## NYC Health + Hospitals Voices

"I got the COVID vaccine to protect myself, my family, my patients, and my community. The sooner we can all get vaccinated, the sooner we can all together return to normal life!"

– Celine Gounder, MD

Former member of the Biden-Harris  
Transition COVID-19 Advisory Board

Getting the vaccine is the best way we can honor and remember those we lost before they had the same opportunity. I continue to be in awe of the medicine and science that we have today, especially the multiple life-saving vaccines to fight this horrible pandemic. I sleep better at night knowing my elderly parents and young daughters are protected by vaccines.

– Eric Wei, MD, MBA

Senior Vice President and Chief Quality Officer

"New York City has gotten through this pandemic by standing in solidarity with mask wearing, social distancing, and testing – getting your vaccine is the final step in keeping your family, community, and city safe."

– Theodore Long, MD, MHS

Senior Vice President,  
Ambulatory Care and Population Health

The COVID-19 vaccine is proven to be safe and effective. When children get vaccinated, it provides them with added protection to go back to school, spend time with friends, participate in sports, and so much more. Get vaccinated! Do it for yourself, your family, and your community.

– M. Pilar Gonzalez, MD, FAAP

Director of Pediatric Ambulatory Care

حمي نفسك عائلتك

وأحبائك، تلقح ضد الكورونا، الوقاية خير من العلاج

– Rabea Khedimi, MD

Infectious Disease Physician

"As nurses, we all understand the critical importance of preventative medicine, and today, we have one of the most important tools available to us to help prevent the continuing spread of COVID-19: a safe and effective vaccine. Getting the COVID-19 vaccine yourself, and encouraging others to get vaccinated, is the best way to protect yourself and the people around you. Stopping a pandemic requires using every available resource...so we are all able to connect face to face again."

– Natalia Cineas, DNP, RN

NEA-BC Chief Nurse Executive

我已经接受COVID疫苗的两次注射。我在此希望大家为了自己家人，身边亲朋好友及社区人群的健康，积极参与接种疫苗的活动。

– Christopher Ding, MD

Emergency Medicine Resident

"Me vacune para proteger a mi familia, amigos, y pacientes. La vacuna es segura, y nos ayudara volver a la normalidad."

– Leonel Lopez III, MD, MHS

Director, Equity and Evaluation,

Office of Ambulatory Care and Population Health

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– Syra Madad, DHSc, MSc

Senior Director,

System-wide Special Pathogens Program

With the continued dominance of variant of concern, now more than ever, it is critical for all adults over the age of 18 years get their COVID-19 vaccine booster, when eligible. The booster is safe and effective and will not only help protect you but also your loved ones and community. It's time to roll-up your sleeves again!

– Andrew Wallach, MD, FACP

Ambulatory Care Chief Medical Officer

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