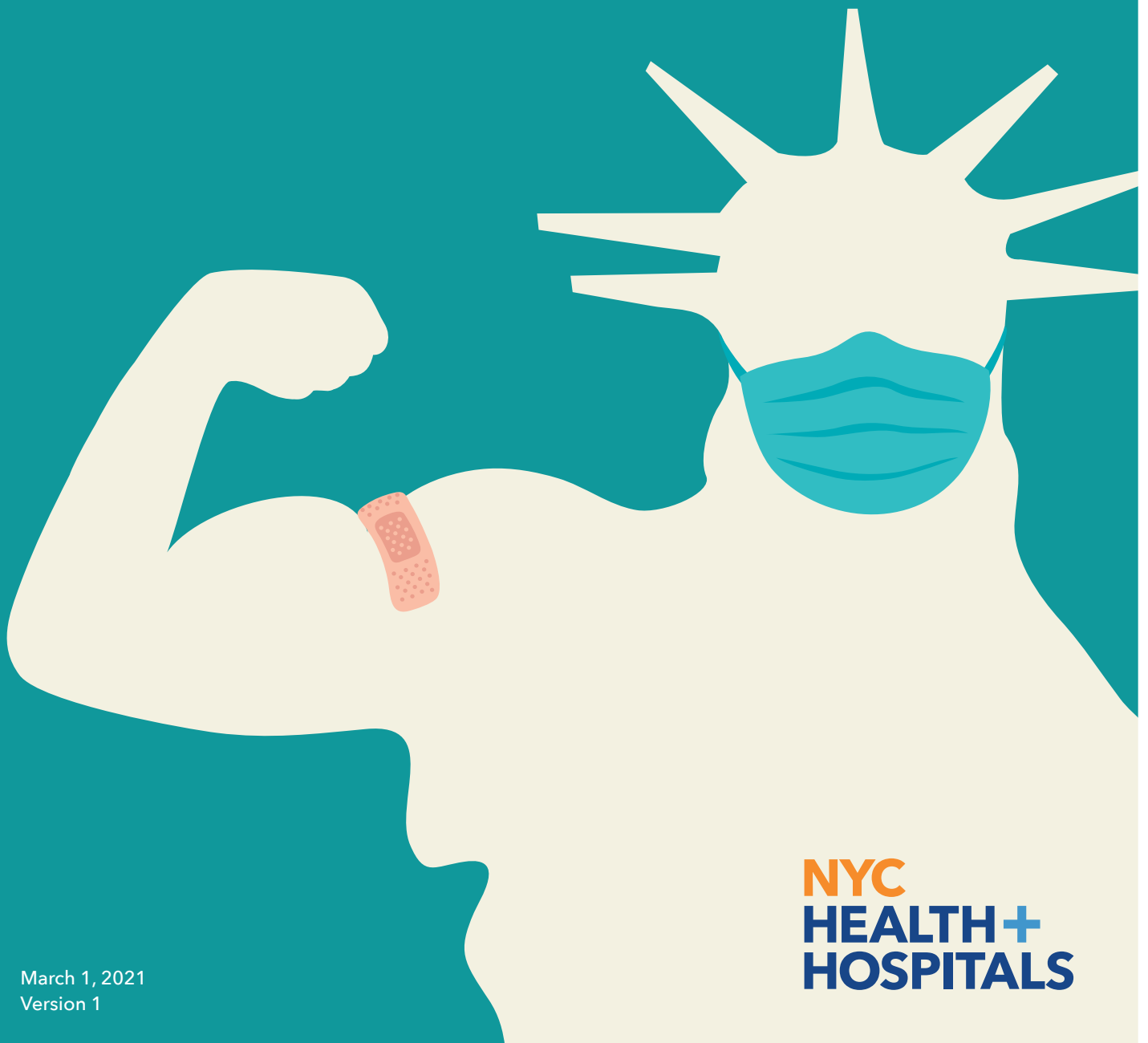# Understanding COVID-19 Vaccines

A guide to learning about COVID-19 vaccines

March 1, 2021
Version 1

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.

## A Glance at What's Inside

# 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
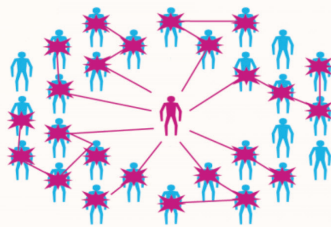


When no one has immunity, contagion has many opportunities to spread quickly.
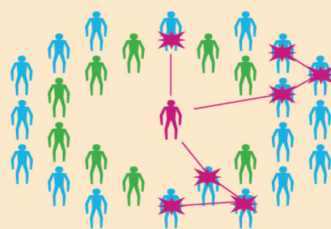
The more immunity we have in the system, the less often contagion* comes into contact with the susceptible.

Spread of contagious disease is contained.

www.ucdavis.edu/sites/default/files/2020/herd_immunity_3.png

*__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, the COVID-19 mRNA vaccines require two doses to build protection.

+ The Johnson & Johnson (Janssen) COVID-19 adenovirus vaccine requires one dose to build protection.

**The vaccine sparks your immune system to respond, by developing antibodies that remember the germ.**

**The antibodies fight off the germ if it invades again.**
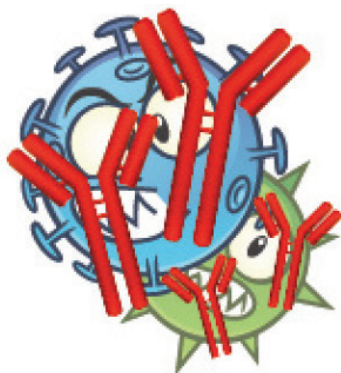
Adapted from: www.mayoclinichealthsystem.org/hometown-health/speaking-of-health/vaccine-safety-6-common-questions-answered

# 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
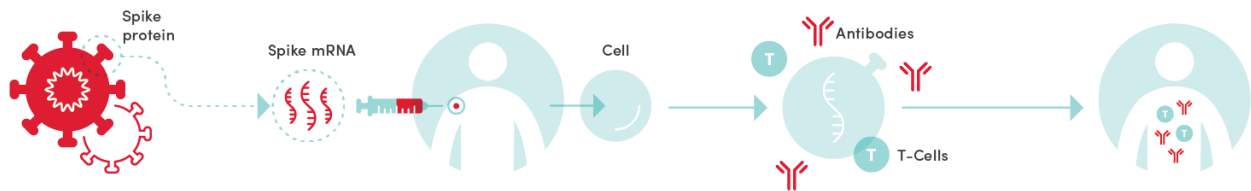
Spike protein | Spike mRNA | Cell | Antibodies | T-Cells

# 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



COVID-19 virus — Spike protein

Spike protein gene is added to modified adenovirus

Harmless modified adenovirus enters cell nucleus

Cell produces spike proteins

Immune system produces antibodies and immune cells
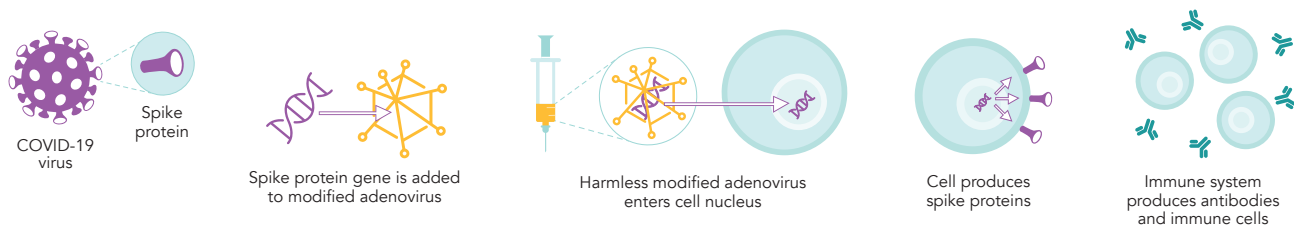
# Natural Immunity and Vaccine-Induced Immunity

The immunity someone gains from having an infection, called natural 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.

# 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 as well, and are currently being studied for HIV and Zika virus. 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.**
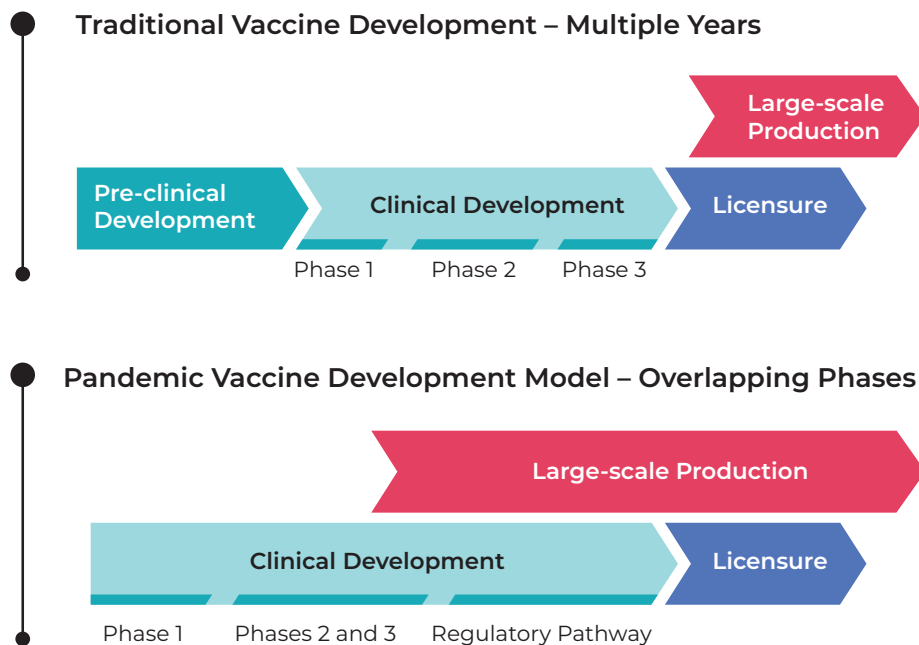
## INVESTMENTS

Developing a vaccine usually can take years to raise money, 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.**

**Traditional Vaccine Development – Multiple Years**

Large-scale Production

| Pre-clinical Development | Clinical Development | Licensure |
| --- | --- | --- |
| | Phase 1    Phase 2    Phase 3 | |

**Pandemic Vaccine Development Model – Overlapping Phases**

Large-scale Production

| Clinical Development | Licensure |
| --- | --- |
| Phase 1    Phases 2 and 3    Regulatory Pathway | |

## 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 adult populations, including older adults and 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
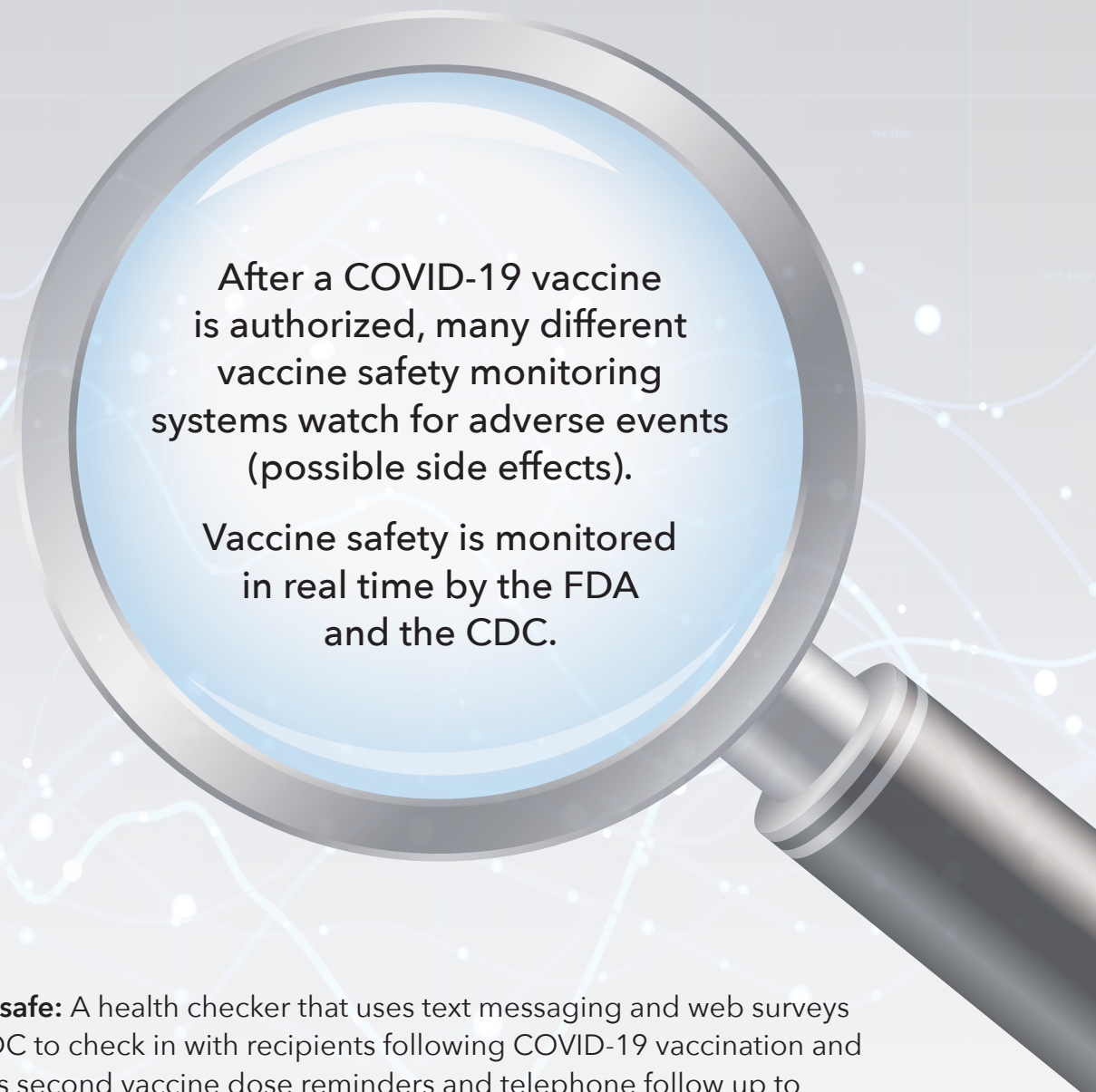
# Emergency Use Authorization of Vaccines

+ Emergency Use Authorization (EUA) allows new medicines or vaccines that treat or prevent serious or life-threatening diseases to be made available quickly to the public during an emergency, once the best available evidence from clinical trials has been carefully reviewed.

+ 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.

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 that uses text messaging and web surveys from CDC to check in with recipients following COVID-19 vaccination and provides second vaccine dose 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).**

# 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. The new variants may make the virus easier to spread, and may cause worse infections.

+ **The best way to prevent more variants from spreading is to get vaccinated and follow the recommended safe practices.** Preventing infections prevents the virus from being able to mutate and spread.

+ **Current COVID-19 vaccines from Moderna, Pfizer BioNTech, and Janssen still offer protection against variants.**

For more information refer to: www.cdc.gov/coronavirus/2019-ncov/more/science-and-research/scientific-brief-emerging-variants.html

# Section 3

# Safety Tips and Resources

# Common Short Term 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 does not mean you are infected with COVID-19 from the vaccine.*

✚ Speak with your doctor if you have a history of allergic reactions or have further questions about side effects.
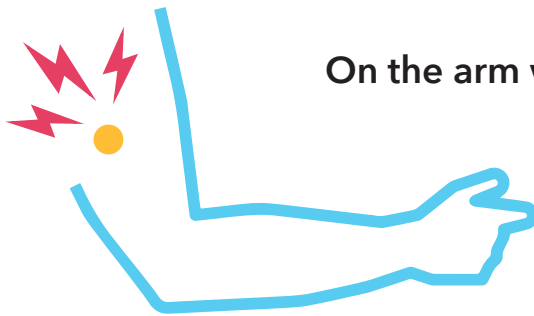
### On the arm where you got the vaccine

- Pain
- Swelling

### Throughout the rest of your body

- Fever
- Chills
- Tiredness
- Headache

✚ While COVID-19 vaccines are safe and effective across all age groups, races, and ethnicities, we still continue to learn more about how long protection lasts and how much the vaccine prevents the spread of the virus.

✚ Whether you have already been vaccinated or are still considering getting vaccinated, we all must continue to follow safety precautions.

✚ **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.

## *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<br><br>Avoid close contact with people who are sick | Select a high-quality mask with multi-layers, a good fit, and filtration<br><br>Wear a mask in indoor and outdoor settings when around other people<br><br>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.<br><br>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<br><br>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<br><br>If you get a call from a contact tracer or public health department, pick up the phone<br><br>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)<br><br>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<br><br>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 |

UPDATED JANUARY 2021

www.belfercenter.org/publication/keeping-safe-and-protecting-yourself-and-others-covid19

# 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
  ess.nychhc.org/vaccinationinformation.html

+ **NYC Department of Health and Mental Hygiene**
  nyc.gov/covidvaccine

+ **New York State Department of Health**
  covid19vaccine.health.ny.gov

+ **CDC**
  cdc.gov/covidvaccine

+ **FDA**
  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

"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*

"COVID-19 is disproportionately impacting Black Americans, and generational trauma has led to massive distrust of vaccines.

The [COVID Collaborative] national education campaign will be a critical step in providing Black communities with the information they need to rebuild trust and get vaccinated."

*– Derrick Johnson*
President of the NAACP

"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*

"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

"As a Pediatrician and Director of Equity, Quality & Safety at NYC H+H, I believe strongly that vaccines are safe, effective and are the most promising path forward to regaining our humanity and putting this devastating pandemic behind us forever. The medical evidence shows that the approved COVID vaccines are safe and work well in all people, something that can truly unite us in the fight against this virus. Therefore, we all have to do our part to get vaccinated to protect ourselves, our families, and our communities so we can all emerge on the other side of this stronger together!"

*— Louis H. Hart III, MD*
Director of Equity, Quality & Safety

"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 vaccine is one powerful tool that we have to protect ourselves and each other from COVID. The reality of vaccine acceptance among the community is complex. The responsibility of making the experience safe and trusting are responsibilities that we share as a community."

*Khoi Luong, MD*
Post-Acute Chief Medical Officer

حمي نفسك عائلتك
وأحبابك، تلقح ضد الكورونا، الوقاية خيرمن 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

کووِیڈ 19 ویکسین ہمارے جسم کو بیماری سے لڑنے میں مدد دیتی ہے
اور ہمیں کووِیڈ 19 وائرس سے محفوظ رکھتی ہے

*Syra Madad, DHSc, MSc*
Senior Director, System-wide Special Pathogens Program

"I can understand the concerns about a new vaccine, but when you look at what we know about COVID — how devastating an illness it is, the deaths and the long-term consequences that we are still learning about, and you compare that to the science of the vaccine and how well they work at preventing severe sickness and death from COVID, for me it was a clear choice. I am vaccinated, and I feel a bit more at ease knowing that many of my family members are also vaccinated."

*— Nichola Davis, MD, MS*
Vice President and Chief Population Health Officer, Office of Population Health

Live Your Healthiest Life.    **NYC** **HEALTH+** **HOSPITALS**