Guardian® pharmacy Orlando

Understanding Covid-19 Vaccinations

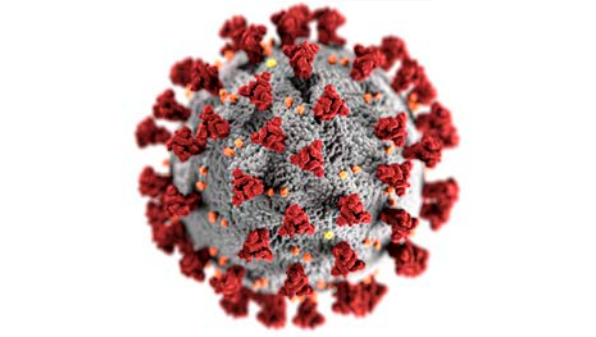
Alan Obringer, RPH, CPH, CGP

Michael Samarkos PharmD, CPH

Objectives

1. Discuss a brief overview of COVID-19
2. Explain how a vaccine works
3. Highlight 4 COVID-19 Vaccine Options
4. Describe how COVID-19 vaccines work
5. List and compare the 2 FDA approved vaccine's ingredients, side effects, dosing regimen, and efficacy
6. **Identify the new COVID-19 variants**
7. Answer common questions and misconceptions about COVID-19 vaccines

Brief Overview of COVID-19

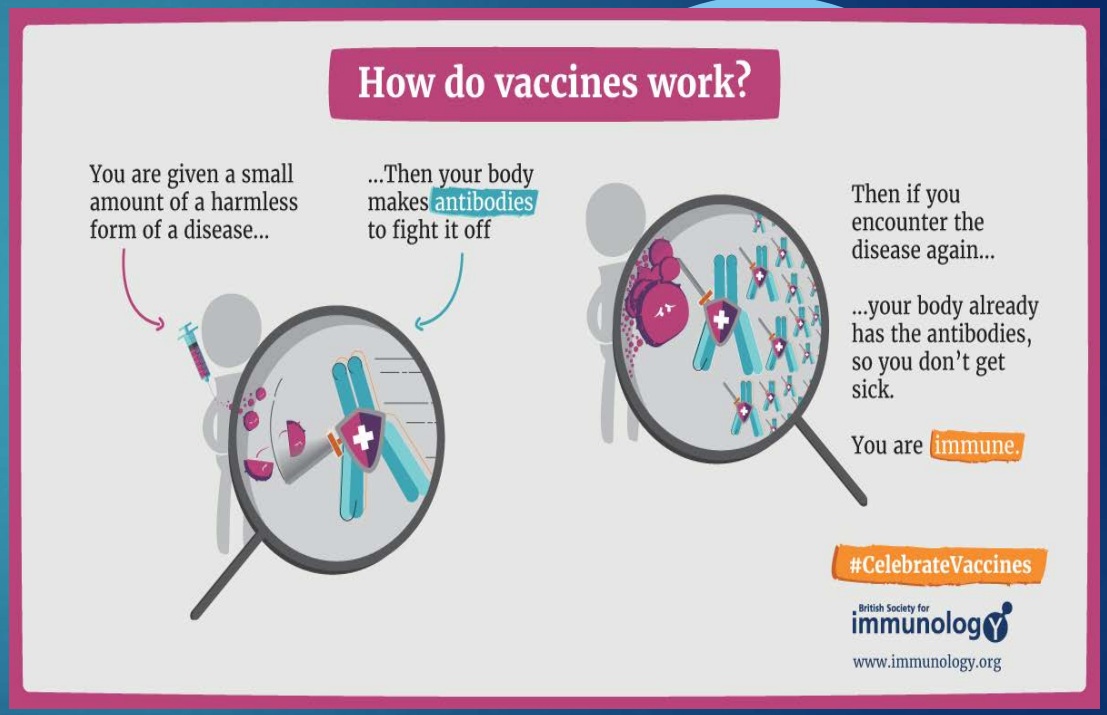


- Viral respiratory illness
  - Spreads mainly through the air by droplets either from sneezing, coughing, or talking to an infected person
- The virus uses spikes to bind to a cell and fuse with the cell's membrane. When fused, the virus releases its contents inside the cell to replicate and create more viruses. Once new viruses are formed, they will break out of the cell to bind to a new cell and damage the old cell in the process.
  - COVID-19 vaccines create antibodies to block the virus spikes from attaching to cells
- Common Symptoms:
  - Cough, fever, headache, loss of smell or taste, chest pain, and shortness of breath
- Symptoms are usually present 4-5 days after being infected but can take up to 14 days to be present

Source: Coronavirus(who.int)

How do vaccines work?

- Vaccines pre-expose your body to a small amount of a bacteria or virus to help develop immunity towards that infection
  - This exposure causes antibodies to be created which will destroy the vaccine and any future bacteria or viruses that the vaccine is used for
- Antibodies are part of your natural immune system to defend your body from an infection the next time you get exposed to that disease
  - Ex: COVID-19 antibodies means you have to the ability to fight against COVID-19 when exposed to it again



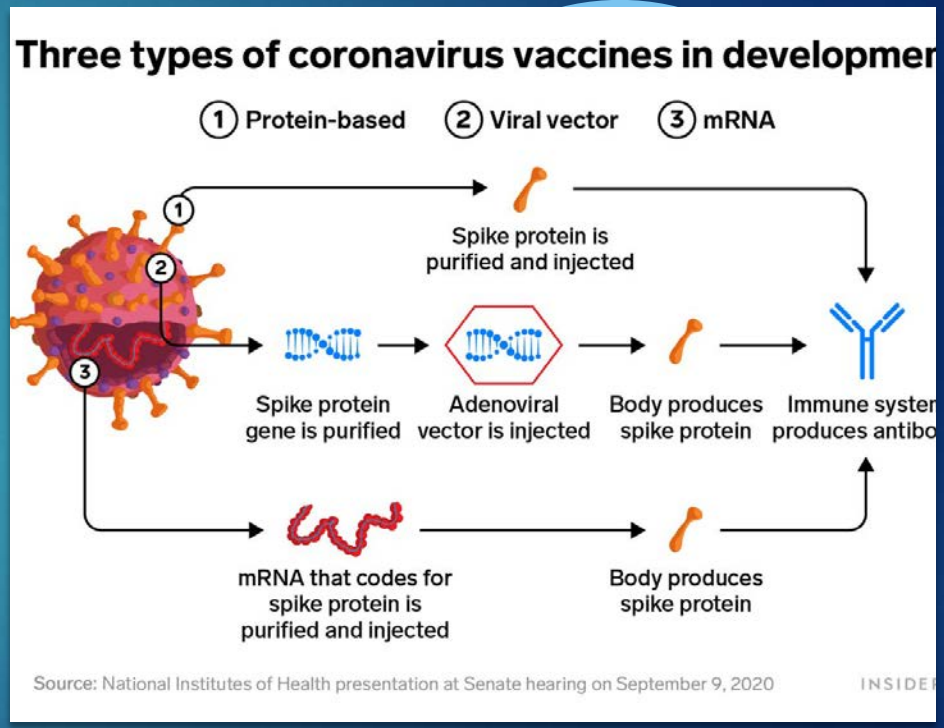
COVID-19 Vaccine Options:

- 2 have been released and are FDA approved:

- 2 upcoming releases in 2021:

How do the COVID vaccines work?

- Pfizer and Moderna vaccines are messenger RNA (mRNA) based
  - Each vaccine has COVID-19's mRNA in it to pre-expose you to the virus' genetic code in order to create antibodies
  - The antibodies formed will block the virus' spikes from attaching to your cells and protect you from an infection
- AstraZeneca and Johnson & Johnson are adenovirus based
  - Each vaccine will carry adenovirus along with a COVID-19 gene into your cells to produce the COVID-19 spike proteins which causes antibodies to be created
  - The antibodies formed will block the virus' spikes from attaching to your cells and protect you from an infection



Vaccine Ingredients:

Pfizer-BioNTech

- mRNA (30 mcg)
- Lipids (0.57 mg)
  - Includes polyethylene glycol (PEG) 2000
- Cholesterol (0.2 mg)
- Potassium chloride (0.01 mg)
- Monobasic Potassium Phosphate (0.01 mg)
- Sodium Chloride (0.36 mg)
- Dibasic Sodium Phosphate Dihydrate (0.07 mg)
- Sucrose (6 mg)

Source: Pfizer-BioNTech COVID-19 Vaccine EUA Fact Sheet for Recipients and Caregivers (fda.gov)

Moderna

- mRNA (100 mcg)
- Lipids
  - Includes polyethylene glycol (PEG) 2000
- Cholesterol
- Tromethamine (0.31 mg)
- Tromethamine hydrochloride (1.18 mg)
- Acetic Acid (0.043 mg)
- Sodium Acetate (0.12 mg)
- Sucrose (43.5 mg)

Source: Vaccines and Related Biological Products Advisory Committee December 17, 2020 Meeting Briefing Document - FDA

**** Be mindful of any allergies especially to PEG 2000 that could cause anaphylactic shock****

List of Vaccine Side Effects:

Pfizer-BioNTech

- Injection site pain, swelling, and/or redness
- Tiredness
- Headache
- Muscle pain
- Chills
- Joint pain
- Fever
- Nausea
- Feeling unwell
- Swollen lymph nodes (lymphadenopathy)

Source: Pfizer-BioNTech COVID-19 Vaccine EUA Fact Sheet for Recipients and Caregivers (fda.gov)

Moderna

- Injection site pain, swelling, and/or redness
- Tiredness
- Headache
- Muscle pain
- Chills
- Joint pain
- Fever
- Nausea/Vomiting
- Feeling unwell
- Swollen lymph nodes (lymphadenopathy)

Source: Vaccines and Related Biological Products Advisory Committee December 17, 2020 Meeting Briefing Document - FDA

Comparison of Vaccine Side Effects:

- *All side effects are from within 7 days of vaccination (2nd dose for Shingrix, Pfizer, and Moderna)

- **Includes diarrhea and abdominal pain

	Shingrix* (≥50 years old)	Pfizer* (>55 years old)	Moderna* (≥65 years old)	Flucelvax Quadrivalent* (≥65 years old)
Localized Pain	78%	**66.1%**	**83.4%**	21.6%
Redness	38.1%	**7.2%**	**7.4%**	11.9%
Swelling	25.9%	**7.5%**	**10.8%**	8.7%
Headache	37.7%	**39%**	**46.4%**	9.3%
Fever	20.5%	**10.9%**	**10.2%**	0.3%
Chills	26.8%	**22.7%**	**30.6%**	4.4%
Fatigue	44.5%	**50.5%**	**58.4%**	9.1%
Myalgia (muscle pain)	44.7%	**28.7%**	**46.9%**	8.2%
Arthralgia (join pain)	--	**18.9%**	**34.9%**	5.5%
Nausea/Vomiting	17.3%**	**0.7% (Vomiting specific)**	**11.8%**	3.8% (Nausea) 0.9% (Vomiting)

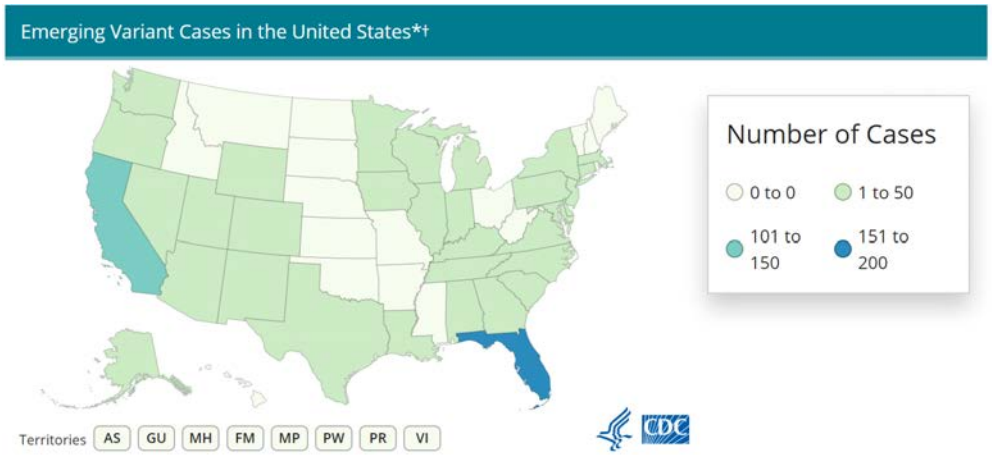
Comparison of COVID Vaccines:

Company Vaccine	Pfizer	Moderna	AstraZeneca	Johnson & Johnson
mRNA based	Yes	Yes	--	--
Adenovirus based	--	--	Yes	Yes
Cost per dose	$20	$33	$4	--
Effectiveness after 1st dose	52%	80.2%	--	**72% in USA 66% Overall**
Effectiveness after 2nd dose	95%	94.1%	70%	--
# of Doses	2	2	2	**1**
Days between shots	21	28	--	**0**

New COVID-19 Variants:

- 3 major new variants:
  - Variant B.1.1.7
    - 1st identified in the United Kingdom (UK)
  - Variant B.1.351
    - 1st identified in South Africa
  - Variant P.1
    - 1st identified in Brazil

- UK and South African variants spread at a higher rate
- No studies have proven these variants are more deadly



List of Common Questions:

- Who should or shouldn't get the vaccine?
- Who should wait to get the vaccination?
- Why should I get the vaccine?
- What is herd immunity?
- Will the vaccine make me sick?
- Do I still need the vaccine if I previously had COVID-19?
- Can I get COVID-19 from the vaccine?
- Do I still have to wear a mask, personal protective equipment, and social distance after taking the vaccine?
- Will the mRNA vaccine impact my DNA?
- How was the vaccine made so quickly, and can I trust it?
- Will the current vaccines protect me from the new variants?

Who should get the COVID-19 vaccine?

- Anyone ≥16 years old
- Anyone who previously had COVID-19
- High risk individuals:
  - Pregnant/Lactating mothers
  - People with poor immune systems
  - People with autoimmune or rheumatologic disorders
- If unsure, always feel free to ask your doctor for their opinion

Who should NOT get the COVID-19 vaccine?

- 2 patient populations;
  - People <16 years old
  - History of anaphylaxis or serious allergic reaction to vaccine ingredients

Who should wait to take the COVID-19 vaccines?

- Wait to take the vaccine if you:
  - Received a monoclonal antibody infusion in the past 90 days
    - Wait 90 days after infusion to take the COVID-19 vaccine
  - Received another vaccination such as the flu vaccine within 14 days
    - Wait 14 days before taking the COVID-19 vaccine

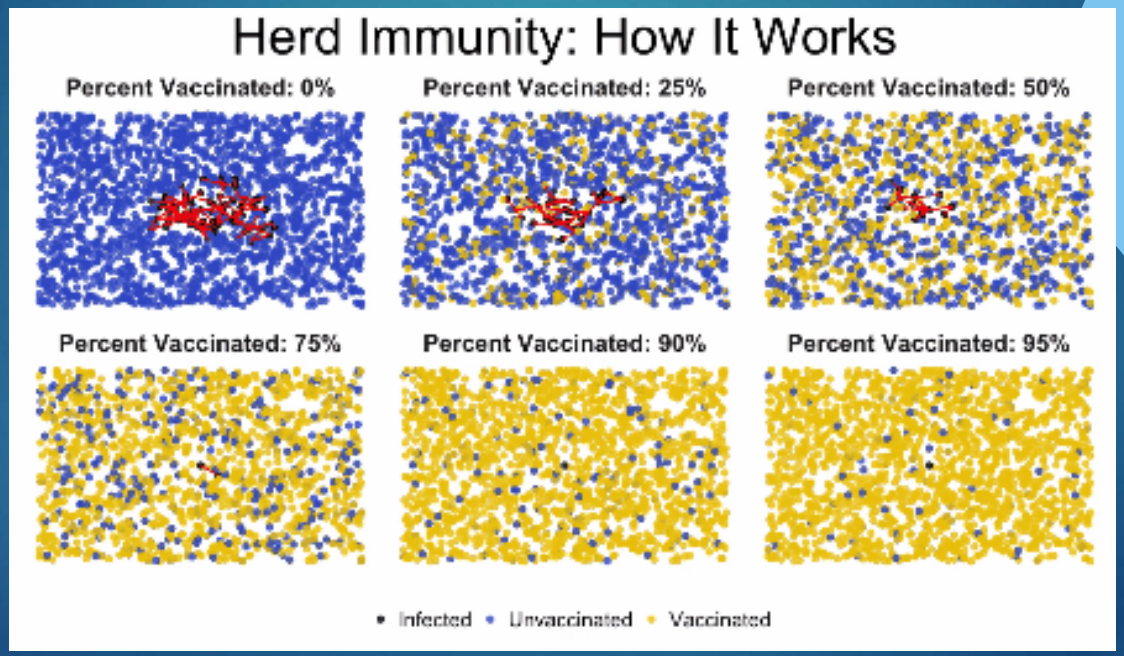
Source: Health Disparities Persist with Flu Vaccines | Managed Healthcare Executive

Why should I consider getting the COVID-19 vaccine?

- The vaccine triggers your immune system to create antibodies to help you fight off any future COVID-19 infection. Your body will learn how to fight the virus and prevent serious complications and symptoms.
- Helps with herd immunity
  - Need about 75% of population to take vaccines to reach herd immunity
- Helps protect those who cannot get the vaccine due to allergies or age (too young or too old)
- There is no current cure so the best and safest way to eliminate the disease is by vaccines.

What is herd immunity?

- Herd immunity is when a large percentage of a population or herd becomes immune to a disease preventing the spread of the disease



Source: IFLScience

Will the vaccine make me sick?

- Yes, it is likely that you will experience some side effects like pain, redness, or swelling, but you shouldn't worry. Pain, fever, redness swelling, etc., indicates an immune response is occurring which is a good sign.
- You may experience side effects for a couple days after receiving the vaccine.

How do I know if symptoms are vaccine side effects or from COVID-19?

- If the signs and symptoms you experience are localized to the site where you got the vaccine, then it's most likely caused by the vaccine.
- Majority of the vaccine side effects are experienced within the first couple of days of taking it. Side effects such as: pain, swelling, redness, fever, muscles aches and feeling very tired.
  - If these symptoms lasts longer than a couple of days or starts after a couple of days from getting the vaccine, it could be due to COVID-19.
- The vaccine does not cause a cough, stuffy nose, or loss of taste or smell.
  - If you experience these symptoms, you should get tested for possibly having COVID-19.

If I've already had COVID-19, do I still need the vaccine?

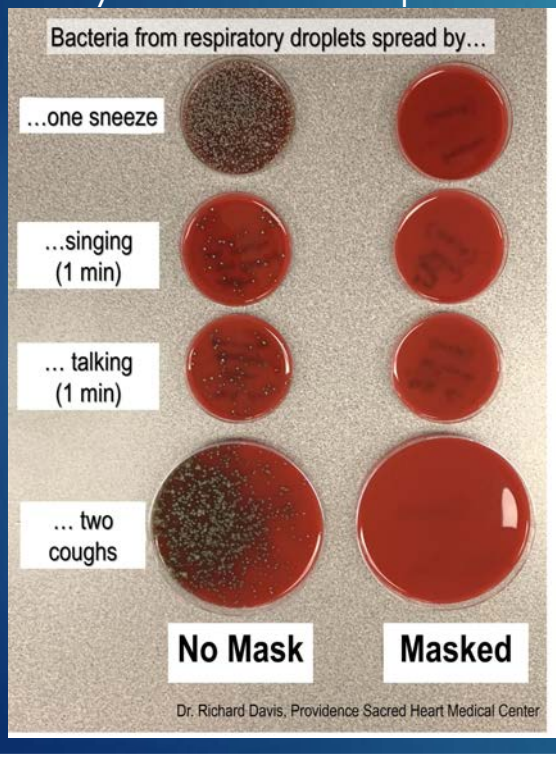
- Yes! Although, your body has made antibodies there is no telling how long that immunity will last and/or how effective it is.
- The vaccine could provide stronger and longer lasting protection from the virus.

Can I get COVID-19 from the vaccine?

- No, you cannot! But you can still get infected with COVID-19 but will not experience the severe symptoms.

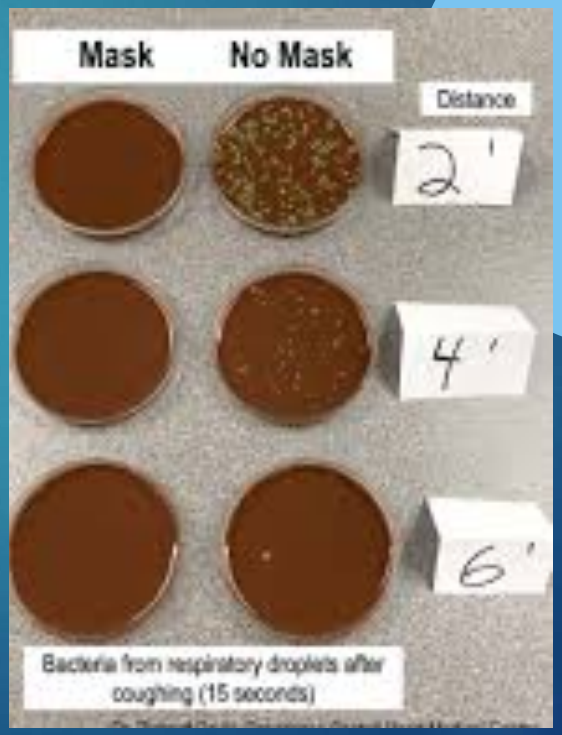
Do I still have to wear a mask and social distance after taking the vaccine?

- Yes! It is important to keep in mind that the vaccine prevents you from experiencing symptoms but not from getting the disease so you could still spread it to others who have not taken the vaccine.



Note: In this demonstration presence of bacteria (not viruses) on plates is only meant to be a proxy for microbes present in respiratory droplets.

Likely, smaller aerosolized droplets (that could carry viruses like SARS-CoV-2) are also produced by coughing, sneezing etc. and that these would travel further and stay in the air longer than larger respiratory droplets.



Source: Dr. Richard Davis, Providence Sacred Heart Medical Center

Does the vaccine impact my DNA?

- No, because the vaccine is made from mRNA
  - DNA is found in the nucleus or the center of your cell but mRNA functions outside of the nucleus and has no way of entering to interact with your DNA.

How was the vaccine made so quickly, and can I trust it?

- Scientists at Pfizer and Moderna have been studying different types of coronaviruses for years. COVID-19 is one of seven types of coronaviruses that exist. Therefore, those scientists used their research and knowledge from other coronaviruses and applied it to quickly create a vaccine.

- The FDA has a process to approve vaccines administered in the USA and these vaccines met the safety and efficacy standards needed for FDA approval.

Will the current vaccines protect me from the new variants?

- Yes, but the vaccines will protect you to an extent.
  - Pfizer-BioNTech
    - Strong protection against the UK variant
    - Has not been studied in the South African and Brazilian variant
  - Moderna vaccine
    - Strong protection against the UK and South African variant
    - Weaker protection against the Brazilian variant due to suspected mutations in the spike proteins

Take Home Points:

- Be sure to get both shots of the vaccine and get the same brand for each shots
  - Wait 21 days for Pfizer's 2nd shot and 28 days for Moderna's 2nd shot
- The vaccine prevents you from getting symptoms of the disease but not from spreading it
  - Continue wearing a mask and PPE and continue social distancing in order to prevent the spread of COVID-19
- Full protection is expected 7 days after 2nd shot
- If you have antibodies or previously had COVID-19, you should still get the vaccine
- You should still quarantine for 14 days if you've been exposed to someone who tested positive for COVID-19, even if you took the vaccine

Questions

References

- Pfizer-BioNTech COVID-19 Vaccine EUA Fact Sheet for Recipients and Caregivers (fda.gov)
- Vaccines and Related Biological Products Advisory Committee December 17, 2020 Meeting Briefing Document - FDA
- Local Reactions, Systemic Reactions, Adverse Events, and Serious Adverse Events: Pfizer-BioNTech COVID-19 Vaccine (cdc.gov)
- Here's How the AstraZeneca COVID-19 Vaccine Compares to Pfizer's and Moderna's (yahoo.com)
- Vaccine Science » COVID-19 Updates » UF Health » University of Florida
- (This statement was updated on October 4, 2020 to include additional information) Johnson & Johnson Posts Interim Results from Phase 1/2a Clinical Trial of its Janssen COVID-19 Vaccine Candidate | Johnson & Johnson (jnj.com)
- Johnson & Johnson COVID-19 Vaccine: What You Should Know (verywellhealth.com)
- SHINGRIX (Zoster Vaccine Recombinant, Adjuvanted), suspension for intramuscular injection (gsksource.com)
- Package Insert - FLUCELVAX QUADRIVALENT (fda.gov) How vaccines work | British Society for Immunology