PANDEMIC & QUARANTINE

What exactly is… a coronavirus?

The whole family of coronaviruses are given the name "**corona**" because of the way the virus looks under the microscope (covered with points that resemble a crown).

"Corona" means "crown"

What exactly is… a coronavirus?

Some of them cause common colds among humans, symptoms ranging from small aggravating cold indicators to other respiratory infections.

Other types of coronavirus only affect other animals. In some rare instances, we see these animal coronaviruses "jump" from the animal to human population.

What exactly is… a coronavirus?

The 2019 novel coronavirus that is creating a worldwide pandemic is a new virus that we suspect did this very thing… "jump" from an animal species to the human species.

This has happened before:

- 1918 Influenza pandemic (virus) – avian (bird) origin
- H1N1 (virus) – North American and Eurasian pig herds
- HIV (virus) – African chimpanzee
- Ebola (virus) – fruit bats

Other diseases that have spread from animal to human:

- Lyme Disease (bacteria) – spread through black-legged tick
- Bubonic plague (bacteria) – rodents & cats, infected fleas transmit to humans
- Malaria (parasite) – infected mosquitos transmit to humans

Okay...but what about Covid 19?

- The novel coronavirus that causes the disease COVID-19 was first identified at the end of December 2019 in Wuhan, China.
- Officials suspect the source was somehow linked to a seafood market there.
- In COVID-19, 'CO' stands for 'corona,' 'VI' for 'virus,' and 'D' for disease. The “19” stands for 2019, the year in which it was identified.

And what do we know so far?

- As of now, researchers know that the new coronavirus is spread through droplets released into the air when an infected person coughs or sneezes.
- The droplets generally do not travel more than a few feet, and they fall to the ground (or onto surfaces) in a few seconds

This is why social and physical distancing is effective in preventing the spread!

This is a respiratory illness, plus you could expect the following:

cough	*muscle aches*	*fever*
shortness of breath	*sore throat*	*diarrhea*
headache	*unexplained loss of taste or smell*	

- Diagnosis may be difficult with only a physical exam because mild cases of COVID-19 may appear like the flu or a bad cold.
- Extreme cases may result in severe respiratory illness, kidney or liver failure and possible death.
- People who have pre-existing health conditions are more prone to this virus.

And what can we do?

According the World Health Organization:
To help prevent the spread of COVID-19, everyone should:

- Clean your hands often, either with soap and water for 20 seconds or a hand sanitizer that contains at least 60% alcohol.
- Avoid close contact with people who are sick.
- Put distance between yourself and other people (at least 6 feet).
- Cover your mouth and nose with a cloth face cover when around others.
- Cover your cough or sneeze with a tissue, then throw the tissue in the trash.
- Clean and disinfect frequently touched objects and surfaces daily.

Who's hoarding all the sanitizer?

The CDC recommends washing hands with soap and water.

- Handwashing reduces the amounts of all types of germs and chemicals on your hands.
- But if soap and water are not available, using a hand sanitizer with at least 60% alcohol can help you avoid getting sick and spreading germs to others.
- Sanitizers do ***not*** eliminate all types of germs.

- **Why?** Soap and water are more effective than hand sanitizers at removing certain kinds of bacteria and other microbes.
- Although alcohol-based hand sanitizers can inactivate many types of microbes very effectively, people may not use a large enough volume of the sanitizers or may wipe it off before it has dried.

Hand sanitizers may not be as effective when hands are visibly dirty or greasy.

- **Why?** Many studies show that hand sanitizers work well in clinical settings like hospitals, where hands come into contact with germs but generally are not heavily soiled or greasy.
- However, hands may become very greasy or soiled in community settings, such as after people handle food, play sports, work in the garden, or go camping or fishing. When hands are heavily soiled or greasy, hand sanitizers have shown to not work as well.
- Hand sanitizers may not remove harmful chemicals, like pesticides and heavy metals, from hands.

What happens when a pathogen hijacks our cells?

Let's review for a minute…

1.That sneaky little virus is welcomed into our cells by first attaching to a receptor on the outside of the cell membrane.

2.Once inside the cell, the cell realizes its mistake and sends out signals to your immune system, to make antibodies

3. These antibodies are made through the process of transcription and translation

What happens when a pathogen hijacks our cells?

Let's review for a minute...

4. DNA, RNA and ribosomes make the new protein: the antibody.

The antibody is packaged by the golgi body

and sent to the cell's surface.

5. The golgi body creates a protective layer over the antibody and guides it to the cell membrane where it fuses with the edge of the cell. When the antibody is released from the cell, the protective layer is broken down by the lysosomes.

What is a Pandemic?

A Pandemic is a rapid outbreak of a disease.

Pandemics are usually classified as epidemics first.

Let's get the vocabulary down...

- **AN EPIDEMIC** is a disease that affects many people within a community, population, or region.
- **A PANDEMIC** is an epidemic that is spread over multiple countries or continents.

What is a Pandemic?

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Pandemics are usually classified as epidemics first.

Let's get the vocabulary down...

- **ENDEMIC** is something that belongs to a particular people or country.
- **AN OUTBREAK** is a greater-than-anticipated increase in the number of endemic cases. It can also be a single case in a new area. If it is not quickly controlled, an outbreak can become an epidemic.

What is a Pandemic?

Common Examples we hear about in the news…

- Zika: "outbreak" in Brazil 2014, became an "epidemic" as it spread to the Caribbean & South America.
- Ebola: "outbreak" in West Africa 2014-2016
- Opioid (heroin) "epidemic" declared by the US Department of Health and Human Services in 2017

What is a Pandemic?

The deadliest pandemic in history was the Spanish Flu of 1918. The virus infected an estimated one-third of the world's population and was responsible for causing between 20 million and 50 million deaths

A simple way to know the difference between an epidemic and a pandemic is to remember the "P" in pandemic, which means a pandemic has a passport. A pandemic is an epidemic that travels.

Visit this website & fill in Google Doc

GO TO WEBSITE

Visualizing the History of Pandemics

This website mentions that vaccination and "herd immunity" can be successful ways of treating a disease.

Watch the video on the next slide and answer the one thought question…

WATCH THE VIDEO

THIS BRINGS US TO…

1. Individual is inoculated (given the vaccine)

2. The vaccine contains a weakened/dead form of the pathogen

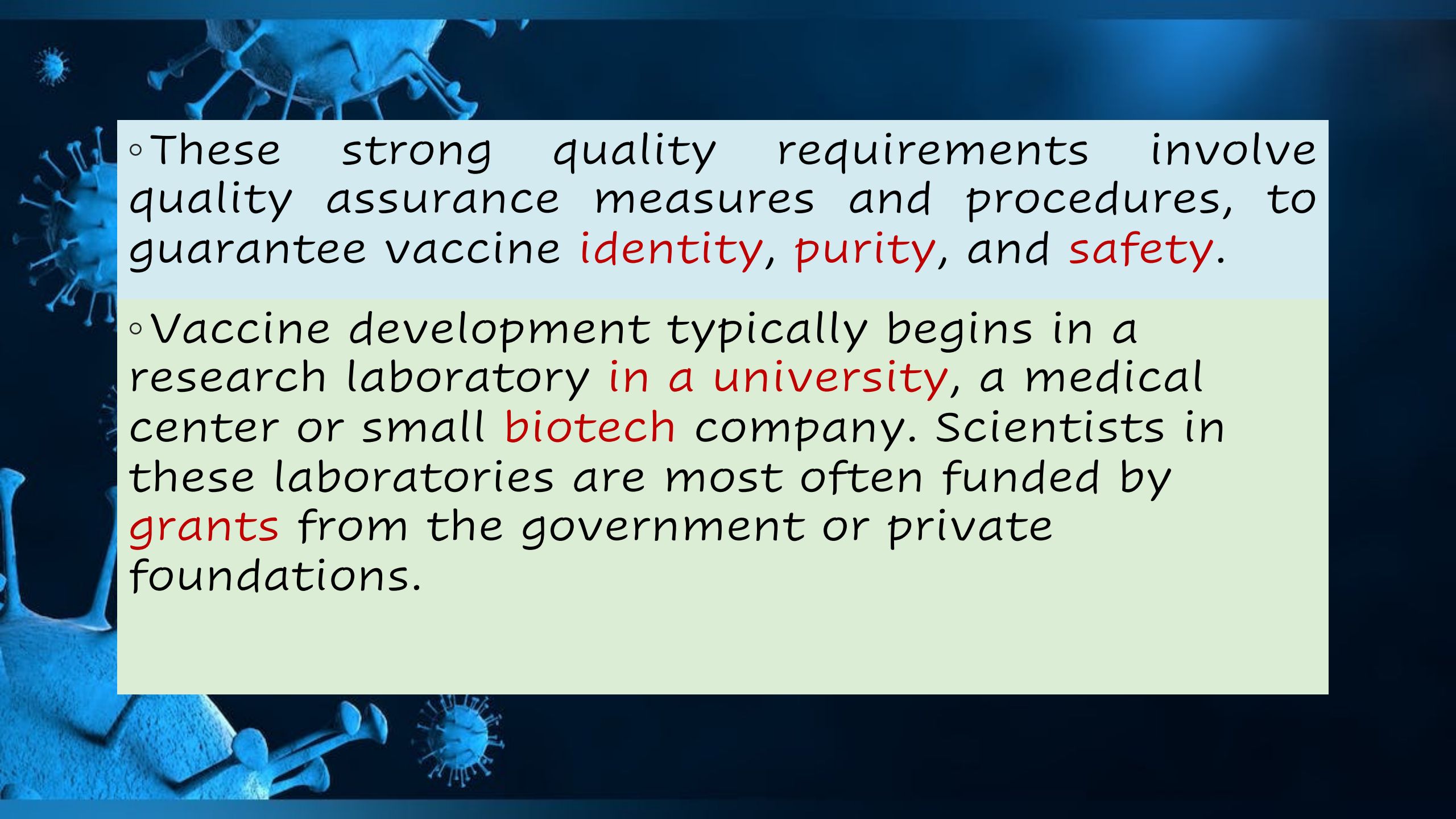
3. The pathogen has a foreign antigen that triggers your immune system

4. Antibodies are created that recognize the antigens in the future

5. The individual now has immunity to the disease

How are vaccines made?

- On average, it takes between 12-36 months to manufacture a vaccine before it is ready for distribution!
- Successful manufacturing of high-quality vaccines requires international standardization of materials, production, and quality control testing.



- These strong quality requirements involve quality assurance measures and procedures, to guarantee vaccine identity, purity, and safety.
- Vaccine development typically begins in a research laboratory in a university, a medical center or small biotech company. Scientists in these laboratories are most often funded by grants from the government or private foundations.

So what are the details?

There are several steps to creating a vaccine

- **STEP 1**: The genetic sequence of the virus must be identified.
- **STEP 2**: Develop the vaccine using one of these strategies:
  - Inactivate the virus so that, while keeping its major components, it will not cause infection.
  - Heavily weaken a strain of the vaccine so that it will not cause infection. Technically, it will still be alive, but it will not be strong enough to cause harm. This is called an **attenuated vaccine**, and it is how both the measles and some flu vaccines have been created.

So what are the details?

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- Pull out specific components of the virus (i.e., parts of its genetic sequence, instead of the full genetic code) and use that as a vaccine, so that your body will recognize it and build up antibodies without getting an infection. (This is a new way of creating a vaccine, and it is one method that is being explored with COVID-19)

STEP 3: Start the first clinical trials using healthy, normal volunteers. These first clinical trials measure the antibodies in the blood and ensure there are not any dangers associated with the vaccine.

So what are the details?

There are several steps to creating a vaccine

STEP 4: Begin the second round of clinical trials in larger populations of people who are at risk for infection. (for example, healthcare workers) Any adverse side effects are recorded. This stage is conducted in thousands of people, and it takes time.

STEP 5: Approve vaccine for widespread use. When scientists are confident that a vaccine works, it gets massed produced for large populations

Although these steps may seem straight forward, each phase takes plenty of time and coordination from researchers and doctors to ensure safety and precision.