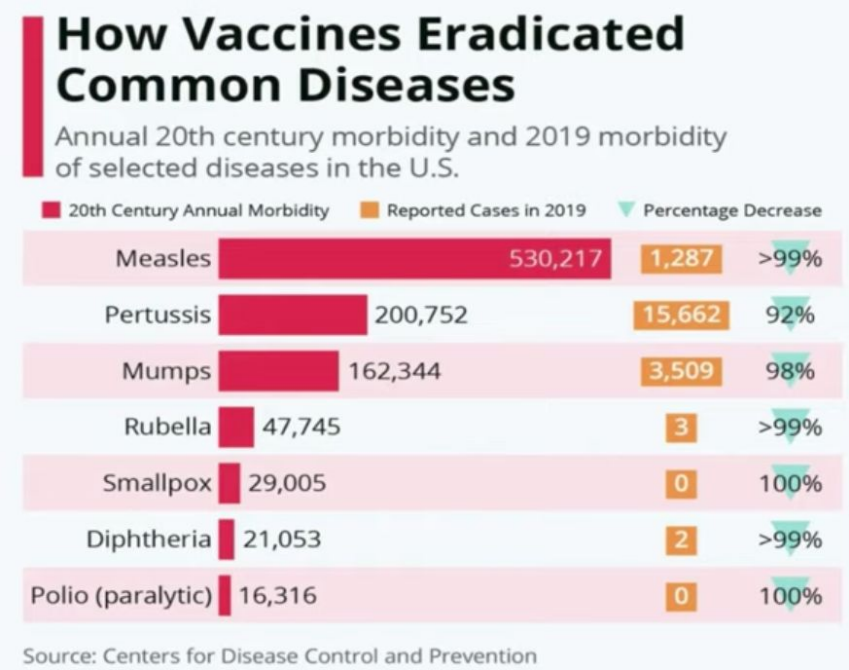
Frequently Asked Vaccine Questions

**Q:** What have Vaccines done for human beings?

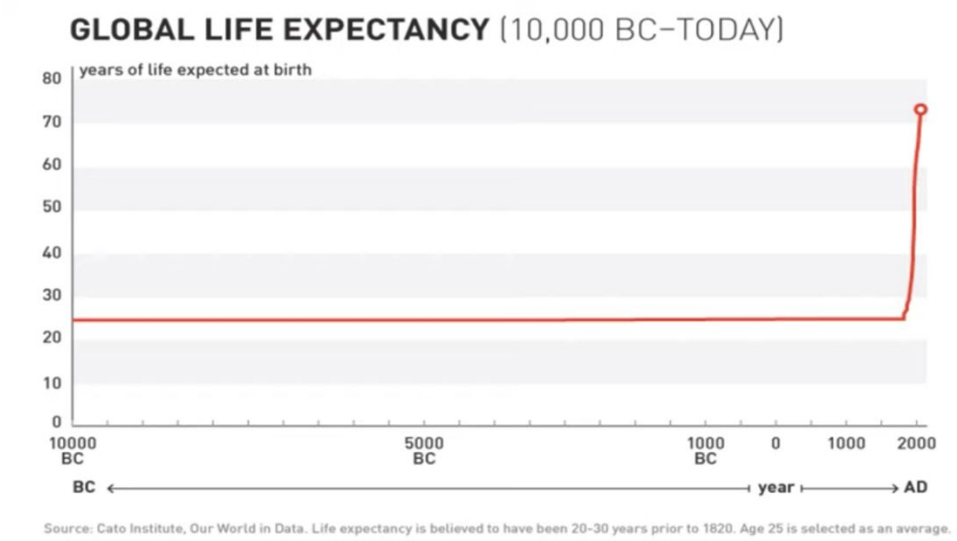
**A:** Vaccines have eradicated or nearly eradicated the following common diseases

- Measles, Pertussis, Mumps, Rubella, Smallpox, Diptheria, Polio (paralytic)
    - **o** E.g. In America polio affected >45,000 children annually in 1950s but it dropped to 900 cases/annually after vaccine was introduced. Now polio has been eradicated from much of the world.




- Increase in vaccine usage has correlated with increase in global human life expectancy (40 years old to over 82 years old)

Majlis Khuddamul Ahmadiyya USA
15000 Good Hope Road
Silver Spring, MD 20905 Fax +1.240.366.1260
Majlis Khuddamul Ahmadiyya
mkausa.org




**Q:** What are the current COVID-19 Vaccines?

**A:** The Pfizer Vaccine and Moderna Vaccine have both received EUA from the FDA. There are a dozen more vaccines in the pipeline

**Q:** How do these Vaccines work? What is an mRNA Vaccine?

**A:** Both Pfizer an Moderna are mRNA vaccines. These vaccines contain a message to make 1 out of 29 coronavirus proteins in the body. Our body then generates an immune response against the virus.

- **There is NO LIVE virus in these vaccines**
- mRNA Vaccine analogy – If I want to send a 10,000 documents to someone, I can either:
  1. Print 10,000 copies of the document and deliver to the person
  2. Or email the person a Microsoft Word Document and have them print 10,000 copies
- Vaccine acts like the second part of analogy and provides body with mRNA (Microsoft Word Document) and the body then produces the virus's spike protein (Print documents) that the body will then provide an immune response to

**Q:** How are these vaccines administered?

**A:** Pfizer – 2 Doses, 3 Weeks apart - Moderna – 2 Doses, 4 weeks apart

| Manufacturer | Product | Doses |
|---|---|---|
| **Pfizer** | mRNA<br>-70°C | 2 doses<br>3-weeks apart |
| **Moderna** | mRNA<br>-20°C | 2 doses<br>4-weeks apart |

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Majlis Khuddamul Ahmadiyya
mkausa.org

**Q**: Will the mRNA alter my DNA?

**A:** No it does not alter DNA. mRNA never enters the nucleus of the cell where the DNA is located. mRNA enters the cell membrane and then the proteins are produced. Like a landscaper who mows the lawn, never enters the house and then leaves

**Q:** Will the vaccine give me COVID?

**A:** No, that's a scientific impossibility. There is no live or dead virus in the vaccine. The vaccine has a "message" to produce only the virus's spike protein. Research has shown that if you have immunity against the spike protein the virus cannot survive. The "message" only creates the spike protein so that the body can make antibodies against it.

**Q:** Is the vaccine made in eggs? Or human fetal cells?

**A:** It's not made in eggs. If you are allergic to eggs you **can** take it, there is no cross reactivity. This vaccine also does not use human fetal cells.

**Q**: Will my COVID PCR test be positive after the vaccine?

**A:** No, the goal of the vaccine is to create antibodies to the virus and it will not produce a positive COVID PCR Test. However, you may test positive for the COVID-19 antibodies.

**Q:** Will the efficacy be lower than projected (95%) in real life?

**A:** It is possible that efficacy may be lower than projected due because real life is not as scripted as a clinical trial – e.g. people may skip the second dose, social distancing decreases. HOWEVER, even if the efficacy was ~70%, the vaccine would be still good enough to stop the pandemic.

**Q:** What was the outcome measured? COVID or antibody testing?

**A:** The outcome measured was COVID cases i.e. How many people actually developed the disease, in particular severe manifestation of the disease and/or requiring hospitalization.

**Q**: Was the vaccine rushed?

**A:** No, because the process and timeline of producing a vaccine for COVID-19 was unique. Typical timeline is a 10-15 year process broken down as such:

Years 1-2: Pre-clinical stage

Years 2-4: Manufacturing

Years 5-13: Enrolling patients in multiple phases of clinical trials

(Phase I – 10+ patients, Phase II - 100+ patients, Phase III - 1000+ patients)

Years 14-15: Regulatory Review and approval

However, the Pre-clinical stage for the COVID-19 vaccine took only 5 days. This is not because the vaccine was rushed. There has been a lot of experience with SARS and MERS over the past ten years which allowed for the COVID vaccine targets to be quickly identified.

Analogy to help clarify what this means: If you typed a full-page document and I simply cut and paste the same text. Did I rush? If every time, you go through the tedious typing of every word and I just cut and paste the text, am I rushing? The answer is no, I am using technology to achieve the same goal, just faster.

In the case of the COVID-19 vaccine, researchers didn't grow cells in cell lines, they utilized mRNA and within five days knew how to position the mRNA in order for it to be the most immunogenic i.e. able to fight the virus.

Manufacturers received guarantees and grants from the government and were simultaneously able to factory build and capacity build. Otherwise, typically you would wait for a vaccine, then think about building capacity for the vaccine three years later. Therefore, the timeline was sped up from this standpoint as well

Enrolling patients in vaccine trials can take years if there aren't many cases of the disease that you are trying to cure e.g. Salmonella or Lyme disease. The pandemic gave vaccine companies millions of patients and allowed them to go global and enroll patients in vaccine trials (Phase I, Phase II, Phase III) at an unprecedented rate.

Therefore, the process that typically took 10-15 years was shortened to a few months.

**Q:** How effective is the COVID-19 vaccine?

**A:** Flu vaccine efficacy in the last 5 years is roughly 34%. Infectious disease experts and the Center for Disease Control (CDC) still recommend you to get a flu shot. Comparatively, the efficacy of the COVID-19 vaccine is roughly 95% at this time.

**Q:** Who will likely be the first to get the vaccine?

**A:** Healthcare workers, Nursing homes and elderly, Frontline essential non-medical workers (teachers, bus drivers, etc.), immunocompromised individuals

**Q:** I am immunocompromised. Should I get the vaccine?

**A:** Yes, absolutely. The vaccine does NOT give you the live virus, it helps you build antibodies. As an immunocompromised individual, you are at risk for contracting the virus and should get the vaccine. Your body may not generate a robust immune response to the vaccine though.

**Q:** Can I choose between the Pfizer and Moderna vaccine?

**A:** Not likely, the vaccines will be allocated across the country and you will most likely have to receive whatever vaccine your healthcare provider gets.

**Q:** Can you mix and match two vaccines for the first and second dose?

**A:** No, they may both be mRNA vaccines but their storage is different, their ideal temperature is different, and they are different products. Mixing the vaccines has not been tested and is not recommended.

**Q:** Should I take off work after receiving the vaccine?

**A:** Not necessarily, greater than 90% of people will have minimal side effects similar to any other vaccine inoculation.

**Q:** What should I expect as far as side effects are concerned?

**A:** Reactogenicity of the COVID-19 vaccine might be higher than the Flu shot. When you get a flu shot you may have the following side effects:

- Arm pain from where the flu vaccine was administered
- May develop a fever
- Headache

COVID-19 vaccine may have more acute side effects:

- Pfizer/Biotech: Fatigue (3.8%) and headache (2%)

- Moderna: Fatigue (9.7%), Muscle pain (8.9%), Joint pain (5.2%), headache (4.5%)

Compared to normal vaccines, these are higher numbers and you should expect to feel a little sick the day after receiving the vaccine. However, these side effects do NOT represent any long-term damage to your body.

**Q:** Are there any long-term side effects?

**A:** Most side-effects manifest themselves in the first month only. Extremely rare for vaccines to cause serious side effects after 1-month. Over 35,000 people spanning multiple countries (many of which are in the U.S) have received the vaccine and are doing well after a two-month follow up. Another 1.2 million people have received the Pfizer vaccine as of December 18, 2020.

There is always a chance of a rare side effect. However, the chance of this happening is one in a million

**Q:** Aren't we getting enough natural immunity (herd immunity)? Do we even need a vaccine?

**A:** According to CDC data, as of September 2020, 10% of the U.S. population was exposed to the COVID-19 virus. The world health organization projected similar numbers globally. Even if you make the argument that the actual number is 20%, **the lowest threshold for herd immunity is 50%**. Waiting for herd immunity will mean living three to four more years with the same amount of infection and death that we experienced during 2020. Countries that are able to vaccinate 60% or more of their population during 2021 may get back to normal by the end of that year.

## The Unknowns

**Q:** Can pregnant women and children take it?

**A:** As of now, the risks are unknown and both groups were not studied in the vaccine clinical trials. The recommendation would be no at this point. Pfizer has begun to include children as young as 12 and will gradually enroll children of younger ages.

**Q:** Antibody-dependent enhancement? Yes/no?
*i.e. If you already have antibodies in your system generated by a vaccine and then you get the infection, will you get a more severe version of the disease?*

**A:** Experts are still unclear. However, in the scientific journal *Nature Microbiology*, an article entitled "Antibody-dependent enhancement and SARS-CoV-2 vaccines and therapies" states that Antibody-Dependent Enhancement (ADE) is extremely unlikely for the COVID-19 vaccine.

**Q:** Will a vaccinated person need to wear a mask?

**A:** Yes, they should. But you should think about this not from an individual risk standpoint but a public health standpoint. Moreover, vaccines are 95% effective which means that even in a best case scenario 1 in 20 vaccinated people can still get the infection.

**Q:** Will one of the future vaccines be better than this current vaccine?

**A:** Possibly!

**Q:** Which immunity lasts longer? Natural infection or vaccine?

**A:** Experts are not sure! There is no conclusive evidence at this time. But we believe vaccine may provide a more robust and durable immune response.

**Q:** Will there be an annual booster like for a flu shot?

**A:** It is unsure at this time. Hopefully, the vaccine will crush the pandemic and we won't have to keep getting booster shots forever.

**Q:** Can I take this vaccine with a flu shot or pneumonia vaccine?

**A**: Would not recommend because of overlapping side effects and acute side effects. However, no definitive answer at this time. It's best to space out other vaccines by at least two weeks.

**Q:** What's the comparison between anti-viral medications and vaccines?

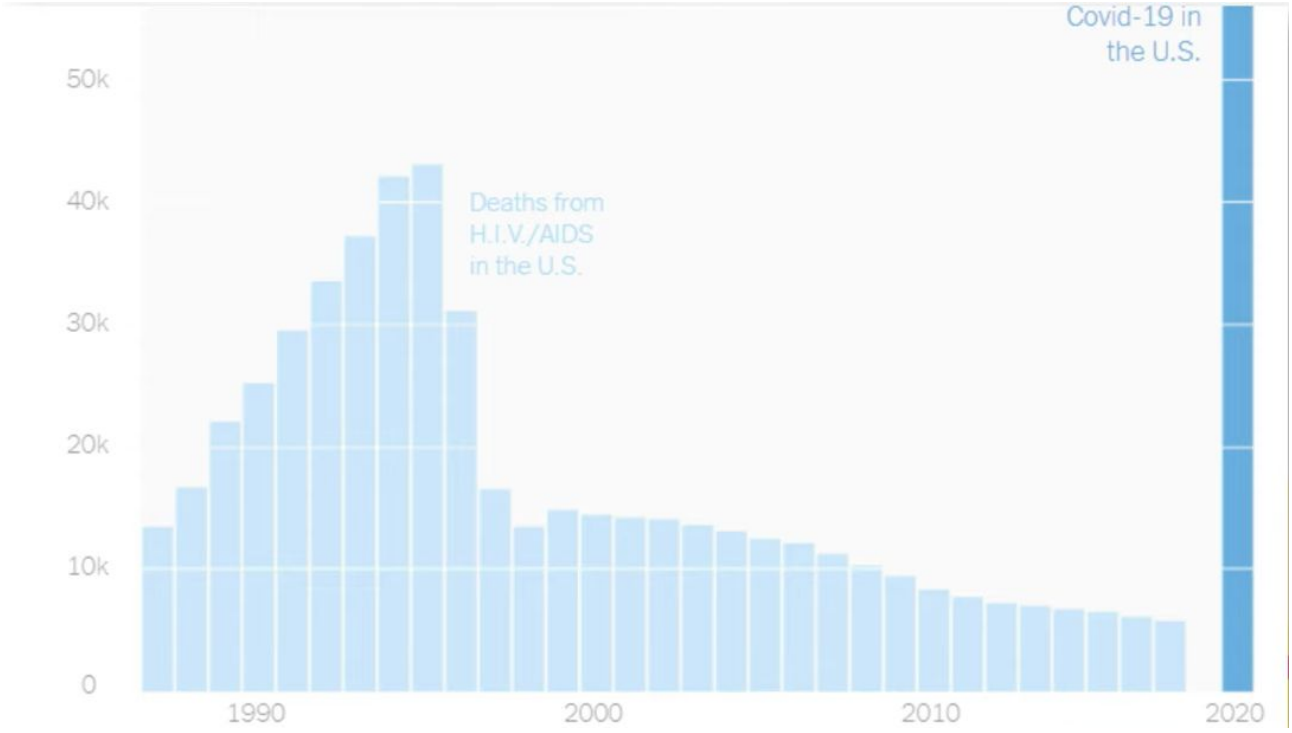
**A:** The strongest medications against COVID are weaker than the weakest vaccine. Treatments are still being evaluated and are not nearly as effective as physicians would like.

**Q:** What are the risks if the desired temperature cannot be maintained?

**A**: The vaccine will not become dangerous but will likely become ineffective as the mRNA may disintegrate. But remember that these vaccines are shipped with dry ice, GPS trackers, and a temperature probe in every box. Hospitals are equipped with special freezers to maintain the temperature. It's extremely unlikely, with the number of redundancies in the system, that such temperature failures will take place.

**But COVID-19 isn't as deadly...**

**HIV/AIDS, in twenty years, has not killed as many people in the U.S. as COVID-19 did this year**




**Balancing Risks: Skipping the vaccine is exchanging a smaller risk with a greater risk**

## Vaccine (hypothetical)

- Vaccine **MAY** trigger a long-term autoimmune disease

- Possibility of a 1 in a million severe side effect

## COVID-19 (Reality)

- Most viral infections can trigger autoimmune diseases
- 10,000 hospitalizations daily
- Up to 20% of COVID patients were not back to baseline (feeling normal) 3 months post-infection

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**Let me wait it out a few months…By waiting, you are exchanging one risk with another.**

**What's available now…**

Two Highly effective vaccines that have been tested in over 35,000 volunteers who are doing well after two months and have now been administered to over 1.2 million people globally

**What's my daily risk…**

- >250,000 cases daily
- >100,000 in hospitals daily (>10,000 entering hospitals daily)
- >3000 Americans dying daily (1 every 30 seconds)

## I'm young, healthy, and my risk of dying from COVID-19 is low

Majlis Khuddamul Ahmadiyya USA
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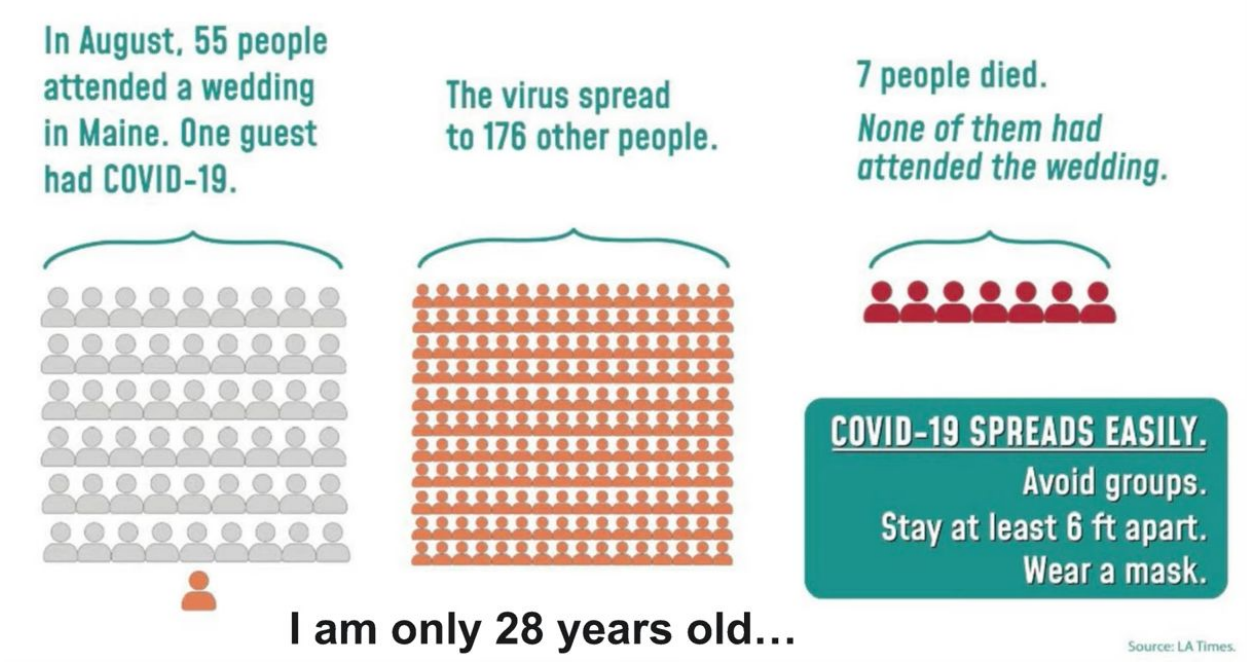
mkausa.org




It's not just about you. Let's talk about what happened in Maine. In August, 55 people attended a wedding. **ONLY one guest had COVID-19**. The virus spread to 176 other people and 7 people eventually died. None of the individuals who passed away had attended the wedding but all had been infected by one of the attendees of the wedding.

If you are not living in a bubble, the people around you (coworkers, uncles, grandparents, parents) are counting on YOUR responsible behavior.

This document represents the text of a lecture delivered by Dr. Faheem Younus to the thousands of frontline team members at the University of Maryland hospitals.

Transcribed by MKA USA National Sehat e Jismani team
Dr. Hashim Mumtaz
Dr. Harris Ahmed MPH
Dr. Yameen Khalil
Intesar Tariq