

THE ALCIVAX

Alcimed analyzes newly released COVID vaccine data, what it means, what it doesn't, and what is still left to do to end the crisis.

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Taking a peek

When crafting a fine sauce, you often must keep the lid of the pot on trapping the steam in so as to not lose too much water. But you'll also need to lift the lid from time to time to take a sample and adjust the flavors. This is similar to what happens with a clinical trial interim report. Especially in a public health crisis where the only way out may be an effective vaccine. Pfizer and BioNTech released data from their first Phase 3 interim report suggesting that their COVID vaccine was 90% effective at preventing symptomatic COVID-19. Let us take the time to examine what this means in terms of the vaccine race and conquering the global pandemic.



The Pfizer/BioNTech Vaccine

The Pfizer/BioNTech along with two other major vaccine players, Moderna and Sanofi Pasteur/Translate Bio, have mRNA COVID vaccines in development. While no mRNA vaccine has been approved to date for any use, the technology is considered extremely promising.

What we know currently is that more than 43,000 people have been enrolled in the Pfizer Phase 3 trial. Some participants have been unblinded now that 94 cases of COVID have been reported among the trial population. Based on the ratio of COVID cases between the placebo and vaccine arms of the trials, the Pfizer vaccine is more than 90% effective at preventing COVID. The trial however will continue until 164 COVID cases are reported among the trial population.

02

Doses are required

Second dose taken 3 weeks after the first dose



What we do not yet know

- Undoubtedly, this is amazing news for the fight against COVID-19, but we don't know what the final efficacy will be in the larger population as the trial moves forward toward completion.
- How long does the protection last? We'll have to wait and see.
- Will it work in the elderly? The trial did enroll participants over the age of 65, but the data has not been released.
- Will it protect children? The current trial only includes participants as young as 16. A new trial for children as young as 12 was launched last month.
- To date only mild to moderate side effects, such as fever and muscle soreness, have been identified but a two year follow up period will be required to assess what the more rare side effects may be.
- Manufacturing capacity is currently estimated at 30 to 40 million doses by the end of 2020, but which advanced purchase agreements will be filled first is unclear.
- When will it be available? If all goes well, it could be available to high risk populations by the end of the year.
- What does this mean for the other vaccines in trial? Potentially good news: As many of the vaccines currently in trial target the same spike protein through different delivery methods, the current Pfizer results indicated that productive immune responses are mounted against the spike protein found on the outside of SARS-CoV-2.

Countries with Pfizer Pre-orders:   

Do we need more than one?

Phase 1	Phase 2	Phase 3	Approved
38 vaccines	16 vaccines	12 vaccines	6 vaccines

There are more than 71 other vaccines in development along side the Pfizer/BioNTech vaccine. How many of them do we really need? Would the Pfizer vaccine be sufficient?

The short answer is no. There are still four main challenges to overcome even if the Pfizer vaccine gets approved and on the market quickly.



Dosage

A one dose vaccine would be preferable to Pfizer's two doses

Manufacturing

1.3B dose manufacturing capacity per year is not enough.



Logistics

Pfizer's vaccine needs to be shipped at -94 degrees F.

Agreements

1st 230 million doses are already promised to only three countries



A one dose vaccine prevents loss of vaccine efficacy due to people not receiving the second dose, simplifies vaccine distribution schemes, and significantly reduces the number of doses needed to protect the population.

At projected manufacturing capacity, it would take 12 years for Pfizer to produce enough vaccine to cover the world's population.

Shipping frozen vaccine can not be achieved uniformly across the developing world, which would prevent global access.

Global Vaccine Distribution

Preparation is already underway to distribute COVID vaccine worldwide. UNICEF is largely spearheading the efforts to prepare developing countries with the necessary equipment with plans to place 65,000 solar powered freezers by the end of the year. UNICEF is also supplying cold packs with temperature sensors for last mile transport for by motorcycle, bike, horse, or boat. Of the major players in Phase 3, are some more ready for distribution in the developing world than others? That remains to be seen.

 <p>moderna</p> <ul style="list-style-type: none"> • 2 doses, 4 weeks apart • Ships at -4 degrees F • Manufactured in US & Switzerland 	 <p>Johnson & Johnson</p> <ul style="list-style-type: none"> • 1 dose • Ships refrigerated • Manufactured in US & Norway
 <p>康希诺生物 CanSinoBIO</p> <ul style="list-style-type: none"> • 1 dose • Ships refrigerated • Manufactured in China 	 <p>AstraZeneca</p> <ul style="list-style-type: none"> • 2 doses, 4 weeks apart • Ships refrigerated • Manufactured in US, UK, India, China, Argentina, etc.
 <p>МИНИСТЕРСТВО ЗДРАВООХРАНЕНИЯ РОССИЙСКОЙ ФЕДЕРАЦИИ</p> <ul style="list-style-type: none"> • 1 dose • Ships refrigerated • Manufactured in Russia 	 <p>NOVAVAX</p> <ul style="list-style-type: none"> • 2 doses, 4 weeks apart • Ships refrigerated • Manufactured in US, UK, India, Japan, and the Czech Republic
 <p>Pfizer BIONTECH</p> <ul style="list-style-type: none"> • 2 doses, 3 weeks apart • Ships at -94 degrees F • Manufactured in US & Belgium 	

The Shipping Toll

Being able to distribute the Pfizer/BioNTech vaccine requires significant cold chain logistics to be organized. In the US, Pfizer has pre-sold 100M doses to Operation Warp Speed. In order to distribute the vaccine, the Pfizer will utilize FEDEX's cold chain capacity.

FEDEX has been updating its cold chain capabilities in anticipation of vaccine approval. FEDEX has 90 cold chain facilities globally, but were previously only capable of -14 degrees F storage, geared toward food and common vaccines. All facilities have been updated with deep freezers to accommodate COVID vaccine distribution which will bring billions to the global shipping industry. 9 other companies already have deals in place with FEDEX for vaccine shipment.

But that doesn't get the vaccine the last mile in a lot of places around the globe. Additionally, deep freeze storage significantly increases the environmental impact of shipping doses world wide. Recent estimates put the health care sector at 5% and cold chains at 3.5% of green house gas emissions in developed nations.

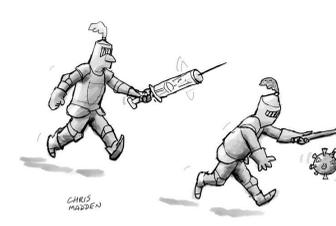


Image Credit: [Chris Madden](#)

In developing countries, many freezers are run off of diesel generators, due to lack of reliable electricity. To overcome the cold chain limitation, Pfizer is looking into a powered form of the vaccine for 2021.

Knowing How it Spreads Indoors

While cases numbers soar upwards again in both Europe and the US, it has been important to understand what kinds of indoor social gatherings facilitate spread as the world gears up for winter. A model of spread put together by the University of Colorado Boulder and visualized by the Spanish newspaper El Pais depicts three common indoor interactions and their impact.

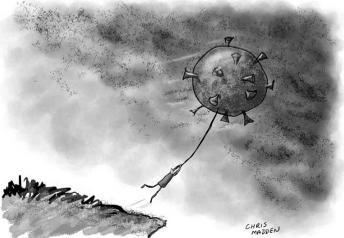
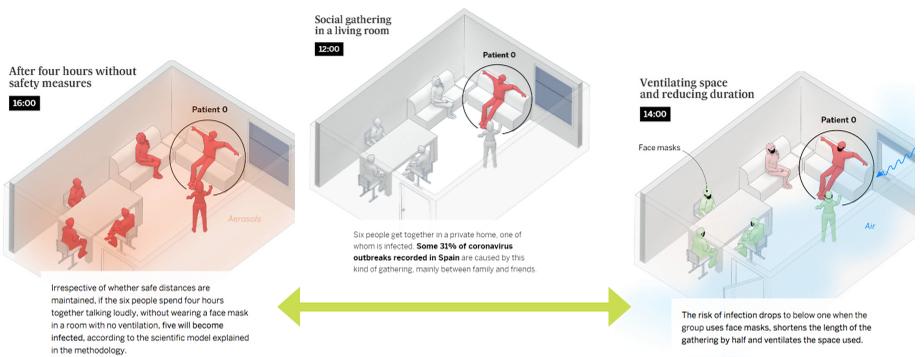


Image Credit: [Chris Madden](#)

- Always ensure good air flow indoors.
- Keep social visits to shorter periods of time.
- Masks drastically reduce the number persons infected.
- Masks will not prevent infection after prolonged indoor exposure.
- Virus can remain in the air in microdroplets for up to 4 hours.
- Small indoor gatherings may account for up to 31% of the spread of COVID-19 in Spain.

All joking aside

With all this positive vaccine news you might be tempted to do a little dancing! Thankfully, a Dutch neuroscientist has published a list of the 10 happiest songs, ever. What are the key details to make a song really happy? They need to be upbeat (140-150 beats per minute), in a major key, and either about an uplifting subjects or complete nonsense! Click here for the list and start filling your winter playlist.

If you have developed a bit of cabin fever you might consider planning your next dream vacation to one of the 15 countries left in the world that are still COVID free. As you can imagine these place are primarily rather remote and tend to be islands, like Micronesia, Samoa, and Tuvalu. But we might want to take the claim that North Korea is among them with a grain of salt.

If you're looking for more video games to play, CEPI Ndemc Creations & CEPI can let you cure the next pandemic.



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