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COVID-19 Vaccines:

Addressing two challenges
to ensure a smooth
and successful
inoculation program





In December 2020, Saudi Arabia began inoculating people in the Kingdom with COVID-19 vaccines. It's another step in the government's effective response to addressing the global pandemic. Getting everyone vaccinated is critical in the fight against this global pandemic, especially as cases increase around the world. The vaccinations protect against severe COVID-19 illness about seven to 14 days after the second dose. The government has made them free for everyone and is using an app-based registration process to ensure a smooth and efficient rollout of the public health initiative.

Three vaccines have been approved for use to date: The Oxford-AstraZeneca vaccine, the Moderna vaccine, and the Pfizer-BioNTech vaccine. The Oxford-AstraZeneca vaccine is an adenovirus vector vaccine, which uses a modified virus to deliver the genetic instructions for fighting the COVID-19 infection into human cells. Early trials have shown this vaccine is 62% effective at preventing infection. Both the Moderna and Pfizer-BioNTech vaccine trials showed 95% effectiveness and use an innovative mRNA technique to provide protection.

As vaccinations continue across the Kingdom, there are two challenges that may slow down the effort. The first challenge has to do with logistics. Both the Moderna and Pfizer-BioNTech vaccines must be kept cold during storage and transportation to avoid damaging them. The second challenge is addressing vaccine hesitancy in individuals that are skeptical about how quickly both vaccines were developed and clinically tested.

Why two of the COVID-19 vaccines must be kept cold

Both the Moderna and Pfizer BioNTech vaccines use a snippet of messenger RNA (mRNA) with the same information as a molecule in SARS-CoV-2, the virus that causes COVID-19.

This snippet is a blueprint that our cells follow to create proteins the virus uses to infect us.

Once those proteins are created, our immune system learns to recognize them and mount an immune response to fight off future infections.

This innovative new approach to vaccine development comes with one downside: the mRNA is extremely fragile.

Molecules in our environment trigger chemical reactions that rapidly destroy the mRNA reducing their potency and effectiveness.

To curb potential damage, the mRNA is suspended in a lipid molecule and the vaccines must be transported and stored at freezing temperatures to slow down the destructive chemical reactions.

Moderna says its vaccine can be stored for up to six months and shipped at -20°C without degrading the mRNA.

After thawing it remains stable for up to 30 days if held at 2°C to 7°C — the temperature of standard medical refrigerators.

The vaccine can be administered for up to 12 hours after the vial has been punctured, and can be stored at room temperature for 24 hours¹. This means healthcare workers who are vaccinating the public won't need to put the doses back into the refrigerator each time it is administered.

The Pfizer-BioNTech vaccine needs to be stored at -80°C , which is colder than an Antarctic winter². Pfizer has developed a specially designed, temperature-controlled thermal box that uses dry ice to maintain the -80°C requirement for up to 15 days when the dry ice is refreshed every five days. Once it's thawed, the vaccine can be refrigerated for five days. Some countries, like the EU, are allowing the Moderna vaccine to be stored at -15°C for up to two weeks³.

This means the pharma logistics cold chain — which is a temperature-controlled supply chain — must provide an uninterrupted series of refrigerated production, storage and distribution activities to protect the vaccines.

How cold chain logistics protect the vaccines



Prior to the pandemic, the World Health Organization stated that approximately half of the vaccines distributed around the world go to waste often because of a failure to adequately control storage temperatures⁴. This risk is real for the COVID-19 vaccines. Keeping the doses within a narrow, specific temperature range creates a significant logistical hurdle in delivering them from the production facilities outside of Saudi Arabia into the arms of individuals here in the country.

Maintaining such cold temperatures throughout the cold chain requires special equipment, including temperature-controlled storage facilities and refrigerated trucks that ship doses to hospitals and healthcare facilities⁵. To increase protection for the vaccines, supply chains would benefit from end-to-end temperature logging, real-time monitoring and reporting of temperature, shock and moisture, and automated system alerts to maintain warehouse and transportation integrity⁶. These measures allow time for remedial action to ensure compromised goods in transit never reach the destination.

One innovative way to maintain the integrity of vaccines and other bio tech products is to fully digitize a pharma cold chain, which Salehiya has invested in prior to the global pandemic. Digitization allows for full traceability and control of critical metrics – temperature, location, product integrity, shipping dates, employee activity – from the moment products arrive at the airport in cold storage to right through to the last mile of delivery. Products in Salehiya’s pharma cold chain are digitally tracked across the Kingdom at a serial number level through a centrally-controlled warehouse management system. To further enhance data tracking, Salehiya is adding radio frequency identification (RFID) tracking to its pharma cold chain. RFID tags add even greater specificity for tracking products, monitoring temperature and pinpointing areas in the supply chain that require adjustments to avoid issues.

1- <https://www.barrons.com/articles/moderna-covid-19-vaccine-fda-eases-restrictions-51617371005>

2- <https://www.npr.org/sections/health-shots/2020935563377/17/11//why-does-pfizers-covid-19-vaccine-need-to-be-kept-colder-than-antarctica>

3- <https://www.massdevice.com/eu-allows-pfizer-biontech-covid-19-vaccine-to-be-stored-at-higher-temperatures/>

4- https://apps.who.int/iris/bitstream/handle/1066568463/WHO_VB_03.18.Rev.1_eng.pdf

5- <https://www.scientificamerican.com/article/the-covid-cold-chain-how-a-vaccine-will-get-to-you/#>

6- <https://assets.kpmg/content/dam/kpmg/xx/pdf/202012/five-ways-to-optimize-the-covid-19-vaccine-supply-chain.pdf>

Vaccine hesitancy: What it is and how to address it

The second challenge to a smooth vaccination program is vaccine hesitancy. This is when individuals delay or outright refuse to get a vaccination despite the availability of it. In 2019, the WHO named vaccine hesitancy one of the top ten threats to global health. At the time, measles had a 30% increase globally after vaccination rates for measles, mumps and rubella (known as MMR) had slipped down to 85% — well below the required 95% to prevent community transmission.



The reasons for vaccine hesitancy are complex. For COVID-19, the rapid development and clinical testing of the vaccine has contributed to a lack of trust in the science behind the innovation. Digital media channels, like social media, contribute to spreading uncertainty and misinformation about vaccines. In fact, research has found that misleading information spreads faster than truths online often because incorrect information can feel more novel⁷.

Here in Saudi Arabia, research from the Department of Public Health, College of Health Sciences at Saudi Electronic University found that 64.7% of a 1,000-person survey would be willing to accept the COVID-19 vaccine when it is available⁸. That leaves 35% of the respondents either hesitant or not going to take the vaccine. If left unaddressed, misinformation could put public health at risk and unnecessarily extend this pandemic.

How can health care professionals address vaccine hesitancy?

First, public figures and government officials are encouraged to get the vaccine and share that they did. For example, Crown Prince Mohammed bin Salman was photographed getting his first dose of the vaccine shortly after the Ministry of Health's national inoculation plan got underway.

Second, targeted health education campaigns could be used to address concerns at different socio-demographic segments and increase the likelihood of getting the COVID-19 vaccine. These strategies should provide accurate information to people in creative, effective, and ethical ways. Virtual healthcare could be also increased and used as an education tool while assessing vaccine eligibility⁹.

Lastly, health care professionals are encouraged not to dismiss vaccine fears raised by patients. Instead, show compassion for their concerns and find out what each person is concerned about, then educate them about the concern with facts and data^{10, 11}. For example, an individual might believe the vaccine contains dormant SARS-CoV-2 when it does not. Ultimately, the choice to not get a vaccine is not risk-free. It is a choice to take a different — and more serious — risk.

How vaccines are critical tools to ending the pandemic

Vaccines represent the beginning of the end of the pandemic. Daily life will only return to normal when enough people are vaccinated to provide protection against coronavirus.

Despite the current success of the vaccination rollout to date, the program will take time. The safety, efficacy, and durability of each vaccine beyond what was learned in clinical studies will become better known over time, including whether or not those vaccinated can spread the virus and whether single doses provide some protection. Other non-vaccine-related factors of the pandemic will be discovered as well, such as how the virus evolves and how many people choose to refuse vaccinations.

For the foreseeable future, everyone must continue to social distance, wear a mask, and avoid crowds — even if they are vaccinated. Efforts to test and trace and reduce the severity of the disease with therapeutics will also remain a priority. While this pandemic is not yet over, there are many reasons to feel positive about the future.

7- <https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019>

8- <https://news.mit.edu/2018/study-twitter-false-news-travels-faster-true-stories-0308>

9- <https://www.medrxiv.org/content/10.1101/2020.05.27.20114413/v2.full.pdf>

10- <https://www2.deloitte.com/us/en/blog/health-care-blog/2020/the-cost-and-value-of-covid-19-vaccines.html>

11- <https://www.pharmaceutical-technology.com/features/how-to-combat-vaccine-hesitancy-in-the-age-of-covid-19/>

12- <https://www.healio.com/news/primary-care/20201103/qa-how-to-address-covid19-vaccine-hesitancy-in-primary-care>

Additional sources

- 1- <https://www.vox.com/21552934/moderna-pfizer-covid-19-vaccine-biontech-coronavirus-cold-chain>
- 2- <https://www.businesswire.com/news/home/20201116005606/en/>
- 3- <https://www.nasdaq.com/articles/pfizers-vaccine-candidate-is-effective-but-it-has-issues-202028-11->
- 4- <https://www.bbc.com/news/technology-54889084>
- 5- <https://thearabweekly.com/arab-gulf-begins-covid-19-vaccinations-ahead-others-region>





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