

## Vaccine of SARS-CoV-2: Is It Authorized Early?

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SARS-CoV-2 infection and the resulting coronavirus disease 2019 (Covid-19) have afflicted ten million of people in a worldwide pandemic with more than two million death. The pandemic is having a catastrophic impact on every sector of world economy and life. Present repurposive treatment and standard precaution could not stop the transmission of virus even after year rather emergence of new strain is intensifying the pandemic. As there is no specific treatment of COVID-19, researchers are working to orchestrate an unprecedented global effort to find safe and effective vaccine against SARS-CoV-2 in record time. Researchers are currently testing 68 vaccines in clinical trials on humans, 20 in final stages of testing and 90 preclinical vaccines are under active investigation in animals. Vaccines of SARS-CoV-2 are coming to market at a record pace, shaving years off the typical development time like more or less ten years. A total of seven vaccines are now available for public use, in limited quantities. The biggest vaccination campaign in history has begun. More than 44 million doses in 51 countries have been administered and average 2.27million doses in a day. Scientists are concerned that this kind of early deployment could compromise the ongoing clinical trials that seek to show conclusively how well the vaccines work.

The Pfizer-BioNTech and Moderna vaccine has now been approved for use across North America, Europe and the Middle East. Both these vaccines found to be 95% effective. A vaccine by Oxford- AstraZeneca also got its authorization. Other countries got a head start on vaccinations. China and Russia authorized their own shots in July and August, before they'd been fully tested. Nations have poured billions of dollars into developing new vaccine technologies, testing them in thousands of volunteers, scaling up manufacturing, and then bringing them to market in

record time. None of these shots, on its own, is enough to inoculate a global population of some 7.8 billion people to produce herd immunity. But together they represent humanity's best chance of ending a scourge that has claimed more than 2 million lives and triggered global economic calamity. Such competition between a clinical trial for a vaccine and emergency use of it is new for vaccine development.

All vaccines are designed to generate an immune response - albeit in different ways - to prepare memory T cell and memory B cell to fight the virus. The Pfizer-BioNTech and Moderna vaccine is based on mRNA technology, which is completely new in a human vaccine. The oxford vaccine is based on DNA technology using viral vector (adenovirus). Vaccines need to generate an immune response to work, and side effects are a by-product of our bodies mounting an immune response. Usually most of the people will experience no side effects from a vaccine, but the inflammation can manifest in different ways in different people and between different vaccines. It could be a reaction at the site of the injection or fatigue or feeling unwell. Beside this previously described adverse effects many more unwanted side effects are being reported from different countries where vaccination has started. In the recent history of vaccines, we haven't seen any trends showing deaths in elderly people following vaccination. The deaths in Norway were reportedly associated with fever, nausea and diarrhoea, which, while at the severe end of the spectrum of vaccine side effects, would be tolerable for the vast majority of people. Some other countries also reported about allergic reactions and death. How different people will respond to the mRNA is what we're starting to understand now. It's possible this vaccine will have more serious effects in older, vulnerable people where the initial inflammatory

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response could be overwhelming. But it's still too early to draw any conclusions as these vaccines got early emergency authorization. Ideally, the vaccine should be considered on a case-by-case basis for this group, carefully weighing up the risks and benefits in each situation, based on the best available data. Reported adverse reactions are creating myth and discouraging people for vaccination.

As the COVID-19 vaccine rolls out, some issues loom. Can vaccinated person still spread the disease? Scientists don't have the data yet to say that with confidence. That's why people who have been vaccinated are still supposed to wear a mask and take other precautions – until that gets sorted out. Will the vaccine remain effective as the virus mutates? or Whether person will express symptoms of COVID 19 if infected immediately after vaccination? or Whether the vaccine prevents reinfection? T cells of lungs and nasal passages are primed to react immediately to bridge the gap between the time one gets infected and the time that immune system can mount a full response with antibodies. But whether they perform as well in COVID-19, we don't really know enough yet. How long will the vaccine's protection last? Whether the vaccine could prevent new strain? What would be the long-term side effect of vaccine? Answers to these questions lie in our immune systems and the answers aren't straightforward because our immune systems are both remarkably adept and remarkably challenging to predict. Age of this pandemic and its vaccine is not enough to curate sufficient evidence to answer the above question. The

fatal side effects that have been reported at present probably not meticulously evaluated during clinical trial due to the urgency of emergency authorization. With the span of time scientist will be able to elicit this fatal side effects and accordingly upgrade the technologies for safer, efficient vaccines and will generate data to answer the unsolved question.

It's been very interesting to watch this unfold in real time because we're learning so much about SARS-CoV-2, its vaccine and the immune response to it in a way that we've never done previously.

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