

# SARS, MERS research paved way for rapid development of Covid-19 vaccines

Research on vaccines for the severe acute respiratory syndrome (SARS) and Middle East Respiratory Syndrome (MERS) viruses paved the way for more rapid development of a SARS-CoV-2 (Covid-19) vaccine allowing candidate vaccines to reach clinical trial stages in record time. Global collaboration and diversion of funding have contributed towards the speed of vaccine development.



Professor Felicity Burt

Pfizer and Moderna last month reported preliminary results from late-stage trials, showing that their vaccine candidates were almost 95% effective against the virus. Oxford University and AstraZeneca also said that its Covid-19 vaccine could be up to 90% effective in preventing the disease.



Why the Oxford AstraZeneca vaccine is now a global game changer

Michael Head 24 Nov 2020



## Development and testing vaccines has been accelerated

This is good news as previously experts had warned that it could take up 12 to 18 months for a vaccine to be available. “The process of development and testing of vaccines against COVID-19 has been accelerated with unprecedented speed. Vaccine development has previously been considered to take at least 10 years, from discovery research and pre-clinical stages followed by phase 1 to 3 clinical trials and finally regulatory review and approval.

“Historically, despite the investigation of many candidate vaccines against infectious diseases, and especially novel emerging viruses, very few reach clinical trial stages. This is frequently due to lack of adequate funding and a large enough market to incentivise manufacture allowing the vaccines to be economically viable,” says Professor Felicity Burt, an expert in arbovirology in the Division of Virology from the University of the Free State (UFS).

According to her, the development of a vaccine against Ebola virus is a classic example of vaccine development being shelved after the discovery and pre-clinical trials, until the 2014 outbreak. Ebola virus was first identified in 1976 as a cause

of severe haemorrhagic fever with fatality rates exceeding 80% during some outbreaks.

## The impact on developing vaccines for other viruses

Burt, who currently holds a NRF-DST South African Research Chair in vector-borne and zoonotic diseases, says several vaccines currently under development for Covid-19 are based on new technologies that have previously been used in the discovery phase of vaccines. The diversity of platforms under investigation should provide us with a diverse range of vaccine formulations. This could be beneficial as some may be more suited for selected populations such as the elderly. In addition, the ability to scale up manufacture and the stability of the end product will be important for global distribution.

“The use of next-generation technology allows flexibility in terms of being able to manipulate or modify the antigen used for inducing protective immunity and will allow the vaccines to be modified to accommodate any change in antigenicity if required.

“The knowledge acquired on safety and efficacy of the various vaccine platforms emulating from the Covid-19 trials can only enhance future vaccine development against other infectious pathogens, paving the way for use of diverse platforms with a ‘plug and play’ approach, platforms in which antigens can be readily replaced to tackle novel emerging pathogens,” says Burt.

## Availability of vaccine in SA

National regulators still need to approve any vaccines before they can be widely distributed and this is to ensure the safety of the vaccines. Large-scale development will be required to produce billions of doses for global distribution.

Burt says the availability and distribution of any of these vaccines for different countries is going to be a complex issue. However, the world especially wealthy countries, need to remember that their safety is dependent on global safety.



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“It would be pure speculation to give a time period of when the vaccine will be available for South Africans and we need to remember that the population at higher risk of severe disease and the healthcare workers should be prioritised when the vaccine does become available.”

She has no doubt that vaccines have made a significant contribution towards improving public health and saving millions of lives. “Smallpox, a virus with a 30% fatality rate, has been completely eradicated worldwide by use of vaccination. As a result of this eradication, many people today are totally unfamiliar with the fear caused by outbreaks of smallpox and the

scarring of survivors.

“Vaccines against the polio virus, measles, mumps, diphtheria, tetanus, to name a few, have contributed towards preventing deaths and permanent disability in children globally. Influenza vaccines save lives annually especially among the elderly at risk of more severe disease. The rapid acceleration of vaccine development and knowledge obtained from global research will hopefully provide enormous stepping stones for management of the next outbreak or disease.”

**Source:** University of the Free State

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