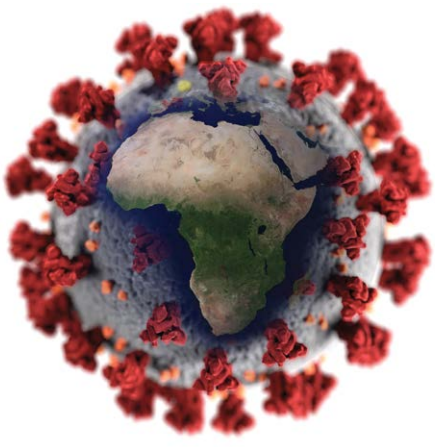
Government Communications Service

COVID-19 VACCINES

Edina Amponsah-Dacosta answers some frequently asked questions

'Coronavirus Disease 2019', or COVID-19, which is caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), has become a major threat to public health since the initial outbreak in China in December 2019. By 20 February 2021, more than 110 million infections and 2.45 million deaths associated with COVID-19 had been reported worldwide, with more than 1.5 million infections and 48 940 deaths having occurred in South Africa.

To reduce the spread of SARS-CoV-2 and help end the pandemic, experts around the world have been working intently to develop safe and effective vaccines against COVID-19. Vaccines help our bodies to develop protection – known as immunity – by teaching the cells in our body to recognise and fight against viruses and other germs, in this way preventing us from becoming sick or from spreading diseases to others.



CDC & NASA

Do we have a vaccine against COVID-19?

By mid-February, a number of vaccines had been licensed and approved for prevention of COVID-19 – including the Pfizer-BioNTech, Moderna and Oxford/AstraZeneca COVID-19 vaccines – and other candidates were undergoing testing in clinical trials. In South Africa, one million doses of the Oxford/AstraZeneca COVID-19 vaccine (also known as COVISHIELD) were secured from the manufacturers based at the Serum Institute of India. However, shortly before the vaccination programme was due to begin, it was suspended because the vaccine was found to have limited effectiveness against mild to moderate COVID-19 caused by the SARS-CoV-2 variant identified in South Africa. Instead, the South African government began roll-out of Johnson & Johnson's single-dose Janssen vaccine to healthcare workers on 17 February. Although the clinical trial results had been released in early February, showing the vaccine was safe and effective, the licensing process was still under way. The South African Health Products Regulatory Authority (SAHPRA) approved the use of the vaccine for healthcare workers within an implementation study that would allow additional data to be collected, pending the full licensing.

Are there different types of vaccines against COVID-19?

There are four main types or categories of COVID-19 vaccines, some of which are in use now, while others are in clinical trials. These vaccine types are nucleic acid, protein

 **Nucleic acid vaccines**	 **Protein subunit vaccines**	 **Whole virus vaccines**	 **Vector vaccines**
These vaccines contain a portion of the genetic material – specifically the mRNA – of SARS-CoV-2. Within this mRNA is the 'recipe' for making a harmless protein (spike protein) that is unique to SARS-CoV-2. The COVID-19 mRNA vaccine is the first-ever approved vaccine to use this approach! Because mRNA is highly labile (unstable), these vaccines have to be stored at −80°C.	This type of COVID-19 vaccine contains purified pieces of the spike protein that is unique to SARS-CoV-2.	There are two approaches for whole virus vaccines. (1) Live attenuated vaccines make use of a weakened form of the SARS-CoV-2. (2) Inactivated vaccines make use of a killed form of SARS-CoV-2, where the genetic material has been destroyed using chemicals, heat or radiation.	A vector vaccine uses a harmless virus as a vehicle to deliver the viral genetic material – in this case the viral DNA – which contains the 'recipe' for the SARS-CoV-2 spike protein. DNA is not as fragile as RNA, so these vaccines are easier to store at 2–8°C.
Once introduced into our body, the mRNA in the vaccine is carried to our cells, where it instructs them on how to make the harmless spike protein. This protein triggers our cells to produce large quantities of antibodies against it. Our cells then develop immune memory, which makes them recognise and destroy the spike protein anytime it appears in our bodies.	Once vaccinated, the protein in the vaccine directly triggers our cells to produce large quantities of antibodies, and to recognise and destroy this spike protein the next time we are exposed to SARS-CoV-2.	Both live attenuated and inactivated COVID-19 vaccines can directly trigger our cells to produce antibodies. This response also triggers our immune memory cells to recognise and destroy the spike protein every time we are exposed to SARS-CoV-2, giving us immunity to COVID-19.	Scientists take the viral DNA and insert it into a harmless virus known as the adenovirus. This adenovirus vector is modified in a way that prevents it from causing any disease once inside our cells.
This means the next time we are exposed to SARS-CoV-2, which carries the spike protein on its surface, our triggered cells recognise the protein and destroy it, protecting us from developing COVID-19.	Vaccines developed using this approach have been around for a very long time, and include the hepatitis B and pertussis (whooping cough) vaccines.	Because the virus used in this type of vaccine has been weakened or killed, it cannot cause COVID-19 in healthy individuals. Examples of live attenuated vaccines are the measles, mumps, rubella, and chickenpox vaccines. Inactivated vaccines include the flu and polio vaccines.	When we receive the vaccine, the DNA is delivered to our cells where it is transcribed to mRNA. The mRNA is then translated into spike proteins which trigger our cells to produce large quantities of antibodies. Our immune cells are also triggered to recognise the spike protein and destroy it next time we encounter it.
Both the Pfizer-BioNTech and the Moderna COVID-19 vaccines are mRNA vaccines.	The Novavax candidate COVID-19 vaccine is an example of a protein subunit vaccine.	Examples of live attenuated and inactivated COVID-19 vaccines are the Sinopharm, Sinovac and Bharat Biotech COVID-19 vaccines.	The Oxford/AstraZeneca and Johnson & Johnson Janssen COVID-19 vaccines are types of viral vector vaccines.

US Secretary of Defence

South Africa has placed a large order for the Pfizer-BioNTech vaccine. Although originally required to be stored at ultra-low temperatures of −80°C to −60°C, the manufacturers showed in February that the vaccine is stable at −25°C to −15°C, allowing it to be stored in standard pharmaceutical freezers.

subunit, whole virus, and vector vaccines. The different vaccine types differ in whether they use the SARS-CoV-2 nucleic acid (or genetic material), the whole virus or just parts of the virus. All four of them are being developed with the same goal in mind: to give us immunity against COVID-19.

How do we know the COVID-19 vaccine will work?

The COVID-19 vaccines have been highly researched by experts through clinical trials around the world, and South Africa has participated in those for the Pfizer-BioNTech, Oxford/AstraZeneca, Novavax and the Johnson & Johnson COVID-19 vaccines. In these trials, some of the approved COVID-19 vaccines showed 94–95% efficacy in preventing symptomatic COVID-19 after the second doses. In the case of the Pfizer-BioNTech vaccine trial, for example, there were eight cases of COVID-19 among the more than 22 000 people who received the vaccine versus 162 cases among the other 22 000 people who received the placebo (8/162=5%). This implies that for every hundred people with COVID-19, only five would have got ill if they had received the vaccine. All vaccines are continuously evaluated and monitored, even after approval.

How do we know if it is safe?

It is important to note that none of these vaccines can give a person COVID-19 because they do not contain the actual infectious SARS-CoV-2 virus, but only harmless versions or parts of the virus. For a vaccine to be declared safe, it has to undergo and pass strict quality and standards tests set by internationally accredited regulatory bodies before final approval and licensure.

Who can receive the vaccine?

The approved COVID-19 vaccines have been licensed for use in individuals 16–18 years of age and older. As of mid-February, clinical trials to evaluate the safety and effectiveness of these vaccines in children with permission from their parents were still being conducted. The recommended dosage of most of the vaccines is two shots (scheduled up to 28 days apart) in the muscle of the upper arm. The first shot starts building immunity. After a few weeks, the second shot is needed to maximise the level of protection from the vaccine. Because there are limited doses of COVID-19 vaccines around the world, certain groups of people such as healthcare workers and the elderly, who are at higher risk of being infected and developing severe COVID-19, have been prioritised to receive the vaccine. With time, there should be enough vaccine doses available for everyone who wants to be vaccinated.

How many people should be vaccinated?

The South African government is aiming to vaccinate 67% (40 million people) of the population against COVID-19. It is anticipated that this strategy will help to achieve 'herd immunity', which is when most of the population is immune, thereby indirectly protecting the remainder of the population who are not immune for various reasons. The more people are vaccinated, the higher the chances of reducing the spread of the virus within our communities.

While the COVID-19 vaccine programme is rolled out, we must all continue to adhere to the recommended risk-reduction measures such as wearing cloth masks over our nose and mouth, practising physical distancing, and frequently washing and sanitising our hands. These measures have been proven to reduce the risk of contracting and spreading SARS-CoV-2, and together with vaccination will help control the devastating burden of COVID-19.

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Njengoba uhlelo liokugomela Igciwane le COVID-19 seluqalile, kumele sonke siqhubeke nokulandela imigomo ebekiwe yokwehlisa ukutheleleka ngegciwane, efana nokufaka izimfonyo, sivale ikhala nomlomo,siqhelelane kanye nokugeza izandla ngokwevamile.

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