

COVID-19 vaccine likely 12 to 18 months away, expert claims

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Development of a COVID-19 vaccine is at best 12 to 18 months away, according to University of Otago infectious disease specialist Professor David Murdoch.

Dean of the University of Otago, Christchurch, and an international expert in infectious disease, Professor Murdoch says it is important to

put into context that it will be some time before there is an effective [vaccine](#) to combat COVID-19.

"By the best estimates we're still 12 to 18 months away, even if everything went well.

"That may seem a long way in the future, but it's worth remembering past vaccines have taken 10 to 15 years to get to market."

Professor Murdoch has experience working in vaccine evaluation and deployment and understands that at least 35 vaccine candidates are entering various stages of development around the world.

"The fact clinical trials are starting is amazing when you think that four months ago we didn't even know this virus existed. So that is quite extraordinary."

Professor Murdoch outlines the six-phase process to develop a vaccine:

- **Exploratory:** This phase is where scientists come up with ideas of how to target the vaccine. In the case of COVID-19 information about the structure of the virus was released very quickly.
- **Pre-clinical:** Once you've got the ideas you want to know: Is it going to work? Is it going to be harmful? Live cells will be grown in the lab or perhaps some animal studies looking at whether it will produce an immune response.
- **Clinical development:** A lot of vaccines fail at the pre-clinical stage, but if a vaccine looks promising, it enters this phase. This stage is about determining: Is it safe, will it work and what doses should be used? It's a big phase which requires a lot of funding.

Usually it is broken into three sections:

Phase 1 is typically less than 100 healthy volunteers. The goal is to get an idea of the development of the immune response. If it passes that it will go to Phase 2 study, which is the order of hundreds of healthy participants. It's a similar process to Phase 1 looking at the immune response, but getting a better idea about dosage.

Phase 3 studies involve thousands or maybe tens of thousands of volunteers. A typical design would be a placebo-controlled trial, comparing the vaccine to a placebo. It's looking over time at who develops the infection. Once the study is finished you look at the proportion who get COVID-19 among those who got the vaccine and among those who didn't get the vaccine.

- Regulatory review and approval: It will then go through a series of checks with the various regulators making sure it meets all the requirements for an effective and safe vaccine.
- Manufacturing: The vaccine will then progress to manufacturing. This will almost always involve industry with the ability to mass produce. Thought needs to be given to that very early on. There is no point developing the vaccine if you cannot make enough.
- Quality control: This is about knowing that it's a vaccine that can be stored and delivered and is having the impact it should be having, so ongoing monitoring is critical.

Development of the vaccine is not the end of the process, Professor Murdoch explains.

"Each country or region will have its own challenges and work is required to determine the suitability of the vaccine for the population, along with funding and logistics considerations.

"Equity and inequity are issues. Once a vaccine is developed, will it be going to all countries and all areas that need it?"

Professor Murdoch says an international body, the Coalition for Epidemic Preparedness Innovations, established in 2015 to help fund vaccines and other innovations, will work to ensure the equity issue is covered for the vaccines it funds.

He is quietly optimistic about the prospect of a vaccine for COVID-19 being developed within 12 to 18 months.

"I'm constantly surprised by how quickly things have come along. Recent events, like the West African Ebola outbreak ,really pushed on the technology. Hopefully we'll see a fairly quick process.

"I'm optimistic. There are a lot of clever people working on this."

Provided by University of Otago

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