

WEEK 3 WHAT RESEARCH HAS AND IS BEING DONE TO ADDRESS COVID-19?
STEP 3.8 HOW CAN VACCINES HELP?

Frequently asked questions

Question	Answer
What is the predicted vaccine development timeline?	It takes a considerable amount of time to develop an effective vaccine, often several years, but people are also working to expedite the "usual" timelines to around 12 months. The process not only involves identifying a candidate vaccine but also trialing this in humans, following rigorous safety protocols to ensure that the benefits of the vaccine outweigh the risks when used at a population level. Given the urgent need for treatment and prevention of COVID-19, there are many teams of people working to identify effective vaccines around the world. You might be interested to read more about these examples here: https://wellcome.ac.uk/news/new-way-developing-vaccines-covid-19-could-help-world-prepare-future-outbreaks and http://www.ox.ac.uk/news/2020-03-27-oxford-covid-19-vaccine-programme-opens-clinical-trial-recruitment
What stage are we currently at with vaccine development and what types of vaccine are being developed?	There are currently over 100 candidate vaccines and many different techniques being used to develop them. See https://www.who.int/who-documents-detail/draft-landscape-of-covid-19-candidate-vaccines . Some are in clinical evaluation and some candidate vaccines are in pre-clinical evaluation. More information on vaccines can be accessed here: https://www.who.int/teams/blueprint/covid-19
Which groups would receive a vaccine for COVID-19 when it is ready; what level of protection would it offer; would it be compulsory; would it be given annually; and	The answers to these questions are unknown at this stage. The target groups for vaccination may depend on which vaccine(s) are developed. However, there are some suggestions on vaccinating at-risk groups including frontline healthcare workers, individuals over the age of 60, and those with underlying and debilitating chronic conditions here: https://doi.org/10.1007/s40475-020-00201-6

<p>would previously infected people receive it?</p>	
<p>What is known about the mutation rate of SARS-CoV-2 and its implications for vaccine development?</p>	<p>The SARS-CoV-2 virus has now been whole genome sequenced more than 3,500 times from sites all over the world; allowing us to develop a good idea of the mutation rate, which seems to be a very steady and typical for other RNA viruses. There are no particular hotspots for mutations, suggesting that the virus is well adapted to humans, with no particular selection pressures (such as immune escape). This is not unexpected for Coronaviruses, which do not alter in the same way as Influenza viruses do. Indeed SARS-CoV-2 cross reacts extensively with SARS (which infected humans in 2003) and most likely a SARS survivor would be at least partially protected against COVID-19.</p> <p>Thus, there is hope that a vaccine made against current isolates of SARS-CoV-2, would be protective for next year's strains. However, protective immunity to natural infection with Coronaviruses is not always long lasting, probably due to an imbalance in the immune response, which might mean people becoming more vulnerable to re-infection with the same strain over time. If a vaccine re-created this problem, we could probably overcome this with vaccine boosters. One other effect to consider though, is that in the wonderful situation where most people were vaccine protected, this could create an immune race with the virus in the following years, creating a selection pressure on the virus to evolve away from the vaccine induced protective immunity.</p>
<p>What is the association between population level BCG vaccination and COVID-19 prevalence?</p>	<p>There have been epidemiological studies (not yet peer reviewed) looking into the associations between population level BCG vaccination and prevalence (or mortality from) COVID-19. While interesting, it isn't yet possible to draw any definite conclusions from these. There are a very large number of known and unknown factors influencing COVID-19 transmission and severity and many of these factors could also be contributing to the differences we see between countries (factors relating not only to individual vaccination history but also for example to prevalence of other medical conditions, population behaviours during a pandemic and healthcare resources). You might be interested to read more about a randomized controlled trial which will investigate the effect of BCG vaccination on risk of COVID-19 among healthcare workers in Australia – https://www.mcri.edu.au/BRACE</p>