

COVID-19 vaccine may not need to be fully effective to benefit public health

25 September 2020, by Dr Sabine L. Van Elsland, Stephen Johns



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Even an imperfect, partially effective vaccine against COVID-19 could have a substantial public health benefit if rolled out in 2021, a report says.

Researchers from Imperial's COVID-19 Response Team also found that the optimal approach to allocating vaccine doses within a country will require a detailed understanding of the local setting—including relevant risk groups and the stage and spread of the epidemic.

With limited supply, this might involve targeting elderly and other high-risk groups. With larger supply available to a country, a more efficient strategy would be to vaccinate the working-age population.

The researchers found that as supply increases, vaccines that reduce or block infection—and thus transmission—in addition to preventing disease have a substantial greater impact than those that prevent disease alone, due to the indirect protection provided to high-risk groups.

Global allocation

Even under optimistic scenarios for manufacture and delivery, the doses available in 2021 are likely to be limited. In this report, researchers explore the impact of vaccine allocation within countries and between countries to maximise health and avert deaths under constraints on dose supply.

Allocating the limited doses likely to be available in 2021 to countries according to their [population size](#) is almost as efficient as more nuanced strategies. Such a strategy also aligns with the [ethical principles](#) agreed in pandemic preparedness planning. Defining the "optimal" strategy ahead of time is challenging because it is sensitive to vaccine characteristics that will not be fully known at the time of roll-out.

Global public health value of the vaccine can be maximised by ensuring equitable access: acting collectively in this way during the early stages of vaccine deployment remains the ethical approach to take, even if this is not the most beneficial short-term strategy from a national perspective, according to this report.

Research and development of a SARS-CoV-2 vaccine has taken place at unprecedented speed such that it is likely that efficacy and safety data will be available for one or more of the leading vaccine candidates within one year of the pandemic being declared.

The work is presented in [Report 33](#) from WHO Collaborating Centre for Infectious Disease Modelling within the MRC Centre for Global Infectious Disease Analysis, Jameel Institute (J-IDEA), Imperial College London.

'Cautious optimism'

Professor Azra Ghani of Imperial's School of Public Health, said: "Given the large number of candidate vaccines now in trial globally, it is conceivable that an efficacious vaccine against SARS-CoV-2 could

be available as early as 2021. Even an imperfect, partially effective vaccine could have a substantial public health benefit if rolled out.

"Given that doses are likely to be constrained, we find that the equitable approach of allocating available doses to countries in proportion to their population size is an efficient strategy to reduce future deaths from the virus. Prioritization of these doses within countries should take into account the vaccine characteristics, the relevant at-risk populations and the epidemic stage in different regions."

Dr. Alexandra Hogan from the School of Public Health, said: "While a range of vaccines against SARS-CoV-2 are now in various stages of the clinical trials pipeline, it is likely that the initial dose supply of the first authorised vaccine products will be limited. In our study we find that, even if the availability of vaccine doses allows for only a proportion of the population to be vaccinated initially, a [vaccine](#) could have a substantial impact on reducing global deaths from SARS-CoV-2, particularly if countries are able to access [vaccine doses](#) equitably."

Dr. Peter Winskil, from the School of Public Health, said: "The ongoing development of vaccines against SARS-CoV-2 is a cause for cautious optimism. However, with unprecedented global demand, dose supply is likely to be constrained initially. Modelling this scenario we find that a global allocation of doses to countries in proportion to their population size is close to optimal in averting deaths."

[Report 33 can be read on Imperial's COVID-19 Response Team website.](#)

Provided by Imperial College London

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