

Researchers look at several scenarios to influence vaccine policy in Australia

20 January 2021 | News

Using mathematics to obtain herd immunity



The level of vaccination uptake will be the most important factor in controlling the COVID-19 pandemic, according to a new position paper by an international consortium of scientists which compared COVID-19 vaccination strategies.

The [position paper](#) – authored by scientists and health experts from the University of Sydney’s Centre for Complex Systems and the Faculty of Medicine and Health in collaboration with scientists and epidemiologists from India and Europe – emphasises that, given the limited availability of vaccines at the initial stage of the COVID-19 vaccination rollout, effective prioritisation and optimal use of vaccination resources will be crucial to contain the pandemic in the near future.

The researchers argue that vaccines which target transmissibility should be given to ‘superspreaders’ first – people who are more likely to transmit the virus to many people – while vaccines that reduce symptoms and severity of the disease should be given to more vulnerable groups.

The paper also proposes that game theory coupled with simulation modelling should be used to model different vaccination uptake scenarios. In turn, these models can be used to guide policymaking in relation to the vaccine rollout.

Game theory refers to the use of mathematics to model rational decision-making by individuals or groups with competing interests.

Dr [Michael Walsh](#), infectious disease epidemiologist and senior lecturer at the University of Sydney’s School of Public Health said: "vaccination efficacy is important, but high efficacy will not remove the need for high uptake. Indeed, some forms of suboptimal delivery and uptake, such as reducing the dosing schedule for some vaccines, could reduce a vaccine’s efficacy. The effective distribution of vaccines and the percentage of people who take those vaccines will essentially determine our success against COVID-19."