

# How COVID-19 restrictions may be necessary for years to come

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COVID-19 could continue to cause recurrent waves and deaths despite frequent vaccinations according to a new study from the University of East Anglia.

Researchers studied how the vaccination program in England could impact COVID-19 transmission. They found that under optimistic scenarios, mass immunization using effective vaccines may enable society to safely return to normality. But plausible scenarios with low [vaccine](#) efficacy and short durability of immunity would see recurrent waves and more deaths—despite frequent vaccinations.

Due to the rapid-response nature of this research it has not yet been peer reviewed.

Lead researcher Prof Fujian Song, from UEA's Norwich Medical School, said: "We wanted to assess how effective mass vaccination against COVID-19 will be, and look at the possible impacts of vaccine-induced and naturally acquired immunity in years to come. So we used computer simulations to model the future dynamics of SARS-CoV-2 transmission from now until 2029."

The team investigated possible impacts of different types of immune response on future dynamics of SARS-CoV-2 transmission. Prof Song said: "People may have naturally acquired immunity if they have already had COVID-19 and vaccines will also reduce people's susceptibility to being infected. Although infection protection immunity is often short-lived, the effects of immunity on disease reduction and re-infectivity reduction are likely long lasting. We took this all into account in our scenarios."

The team found that if vaccine efficacy is more than 70 percent, vaccine-induced immunity lasts more than 182 days, and the infectiousness of re-infected cases is reduced by more than 40 percent, then mass vaccination programs can prevent further outbreaks. In this scenario, the researchers assumed that the vaccination program covers 80 percent of those aged over 16.

Under such optimistic scenarios, the team estimated that the cumulative number of COVID-19 deaths will be between 113,000 and 115,000 by the end of 2029 in England. However, under plausible scenarios with lower vaccine efficacy, shorter durability of immunity, and a smaller reduction in infectivity, repeated vaccination programs could not prevent further waves of outbreaks.

Prof Song said: "Under the most optimistic mass immunization scenarios, we found that society may be able to safely return to normality. However, it's still plausible that this may not happen. This is partly because we are still not certain about how long immunity lasts after vaccination, and how effective naturally and vaccine-induced immune responses are on the transmission of the virus. With plausible pessimistic scenarios, COVID-19 could continue to cause recurrent waves of severe morbidity and mortality despite frequent vaccinations. Non-pharmaceutical interventions to reduce the spread, such as social and [travel restrictions](#), closure of certain types of businesses and things like mask wearing could be here for the

long term. Although our study did not specifically analyze the effects of new variants, these are represented by scenarios with lower vaccine efficacy."

"It is crucial to monitor the vaccination effects in the [real world](#), and to better understand characteristics of naturally acquired and vaccine induced immunity against SARS-CoV-2," he added.

"Vaccination against COVID-19 and society's return to normality in England: a modeling study of impacts of different types of naturally acquired and vaccine induced immunity" is published on the medRxiv preprint server

**More information:** Fujian Song et al, Vaccination against COVID-19 and society return to normality in England: a modelling study of impacts of different types of naturally acquired and vaccine induced immunity, *medrxiv* (2021). [DOI: 10.1101/2021.05.18.21257314](#)

Provided by University of East Anglia

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