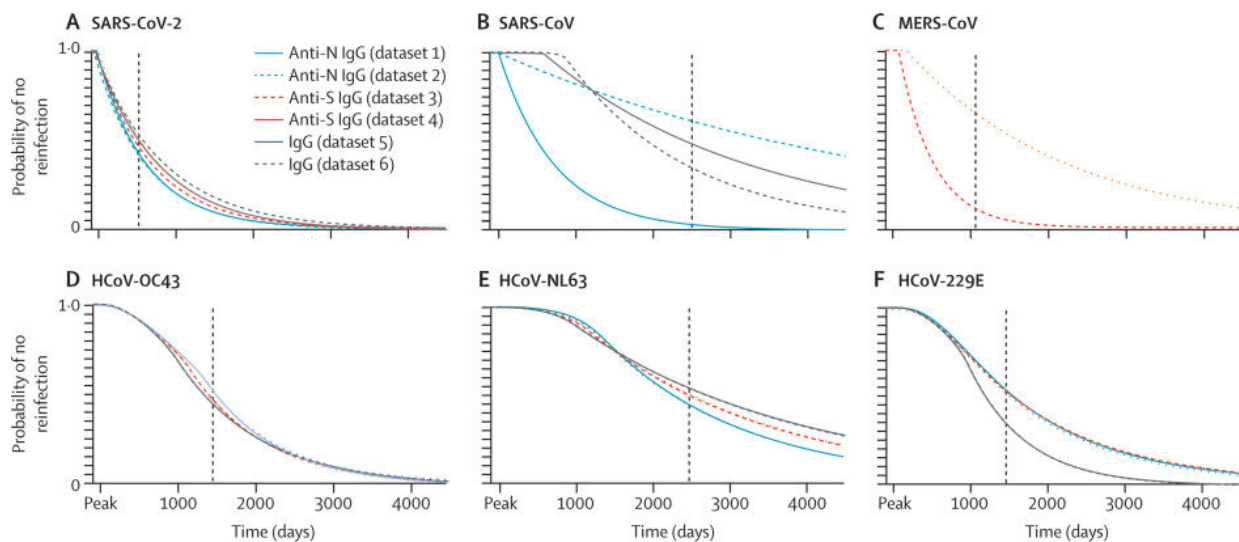


# Study: For unvaccinated, reinfection by SARS-CoV-2 is likely

October 4 2021, by Michael Greenwood



Probability of remaining free of reinfection over time and median times to reinfection for human-infecting coronaviruses SARS-CoV-2, SARS-CoV, MERS-CoV, HCoV-OC43, HCoV-NL63, and HCoV-229E. Credit: DOI: 10.1016/S2666-5247(21)00219-6

Throughout the COVID-19 pandemic, there has been much uncertainty about how long immunity lasts after an unvaccinated person is infected with SARS-CoV-2.

Now a team of scientists led by faculty at Yale School of Public Health and the University of North Carolina at Charlotte have an answer: Strong

protection following natural infection is short-lived.

"Reinfection can reasonably happen in three months or less," said Jeffrey Townsend, the Elihu Professor of Biostatistics at the Yale School of Public Health and the study's lead author. "Therefore, those who have been naturally infected should get vaccinated. Previous infection alone can offer very little long-term protection against subsequent infections."

The study, published in the journal *The Lancet Microbe*, is the first to determine the likelihood of reinfection following natural infection and without vaccination.

Townsend and his team analyzed known reinfection and immunological data from the close viral relatives of SARS-CoV-2 that cause "common colds," along with immunological data from SARS-CoV-1 and Middle East Respiratory Syndrome. Leveraging evolutionary principles, the team was able to model the risk of COVID-19 reinfection over time.

Reinfections can, and have, happened even shortly after recovery, the researchers said. And they will become increasingly common as immunity wanes and new SARS-CoV-2 variants arise.

"We tend to think about immunity as being immune or not immune. Our study cautions that we instead should be more focused on the risk of reinfection through time," said Alex Dornburg, assistant professor of bioinformatics and genomics at the University of North Carolina at Charlotte, who co-led the study. "As new variants arise, previous immune responses become less effective at combating the virus. Those who were naturally infected early in the pandemic are increasingly likely to become reinfected in the near future."

The team's data-driven model reveals striking similarities to the reinfection risks over time between SARS-CoV-2 and endemic

coronaviruses.

"Just like common colds, from one year to the next you may get reinfected with the same virus," Townsend said. "The difference is that, during its emergence in this pandemic, COVID-19 has proven to be much more deadly."

A hallmark of the modern world is going to be the evolution of new threats to human health, Townsend added. Evolutionary biology—which provided the theoretical foundations for these analyses—is traditionally considered a historical discipline.

"However, our findings underscore its important role in informing decision-making, and provide a crucial steppingstone toward robust knowledge of our prospects of resistance to SARS-CoV-2 [reinfection](#)," he said.

**More information:** Jeffrey P Townsend et al, The durability of immunity against reinfection by SARS-CoV-2: a comparative evolutionary study, *The Lancet Microbe* (2021). [DOI: 10.1016/S2666-5247\(21\)00219-6](#)

Provided by Yale University

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