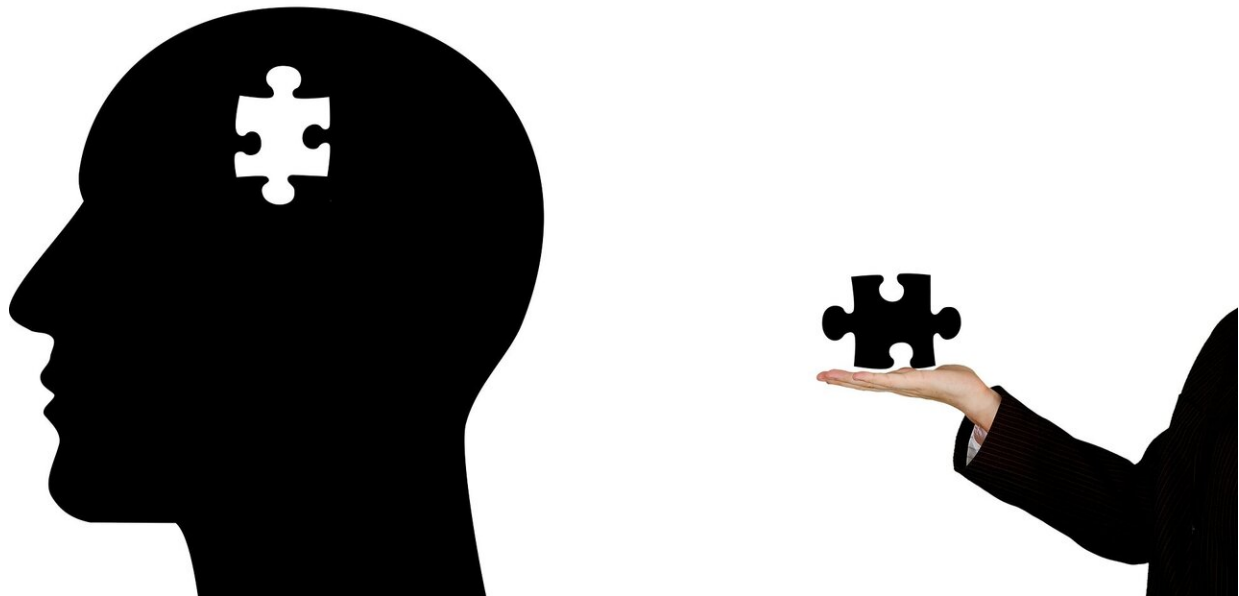


# Largest study to date suggests link between COVID-19 infection and subsequent mental health and neurological conditions

April 7 2021

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One in three COVID-19 survivors received a neurological or psychiatric diagnosis within six months of infection with the SARS-CoV-2 virus, an observational study of more than 230,000 patient health records published in *The Lancet Psychiatry* journal estimates. The study looked

at 14 neurological and mental health disorders.

Professor Paul Harrison, lead author of the study, from the University of Oxford, UK, said: "These are real-world data from a large number of patients. They confirm the high rates of psychiatric diagnoses after COVID-19, and show that serious [disorders](#) affecting the [nervous system](#) (such as stroke and dementia) occur too. While the latter are much rarer, they are significant, especially in those who had severe COVID-19."

"Although the individual risks for most disorders are small, the effect across the whole population may be substantial for health and [social care systems](#) due to the scale of the pandemic and that many of these conditions are chronic. As a result, health care systems need to be resourced to deal with the anticipated need, both within primary and secondary care services."

Since the COVID-19 pandemic began, there has been growing concern that survivors might be at increased risk of neurological disorders. A previous [observational study](#) by the same research group reported that COVID-19 survivors are at increased risk of mood and anxiety disorders in the first three months after infection. However, until now, there have been no large-scale data examining the risks of neurological as well as psychiatric diagnoses in the six months after COVID-19 infection.

This latest study analysed data from the electronic health records of 236,379 COVID-19 patients from the US-based TriNetX network, which includes more than 81 million people. Patients who were older than 10 years and who became infected with the SARS-CoV-2 virus after 20 January 2020, and were still alive on 13 December 2020, were included in the analysis. This group was compared with 105,579 patients diagnosed with influenza and 236,038 patients diagnosed with any [respiratory tract infection](#) (including influenza).

Overall, the estimated incidence of being diagnosed with a neurological or mental health disorder following COVID-19 infection was 34%. For 13% of these people it was their first recorded neurological or [psychiatric diagnosis](#).

The most common diagnoses after COVID-19 were anxiety disorders (occurring in 17% of patients), mood disorders (14%), substance misuse disorders (7%), and insomnia (5%). The incidence of neurological outcomes was lower, including 0.6% for brain haemorrhage, 2.1% for ischaemic stroke, and 0.7% for dementia.

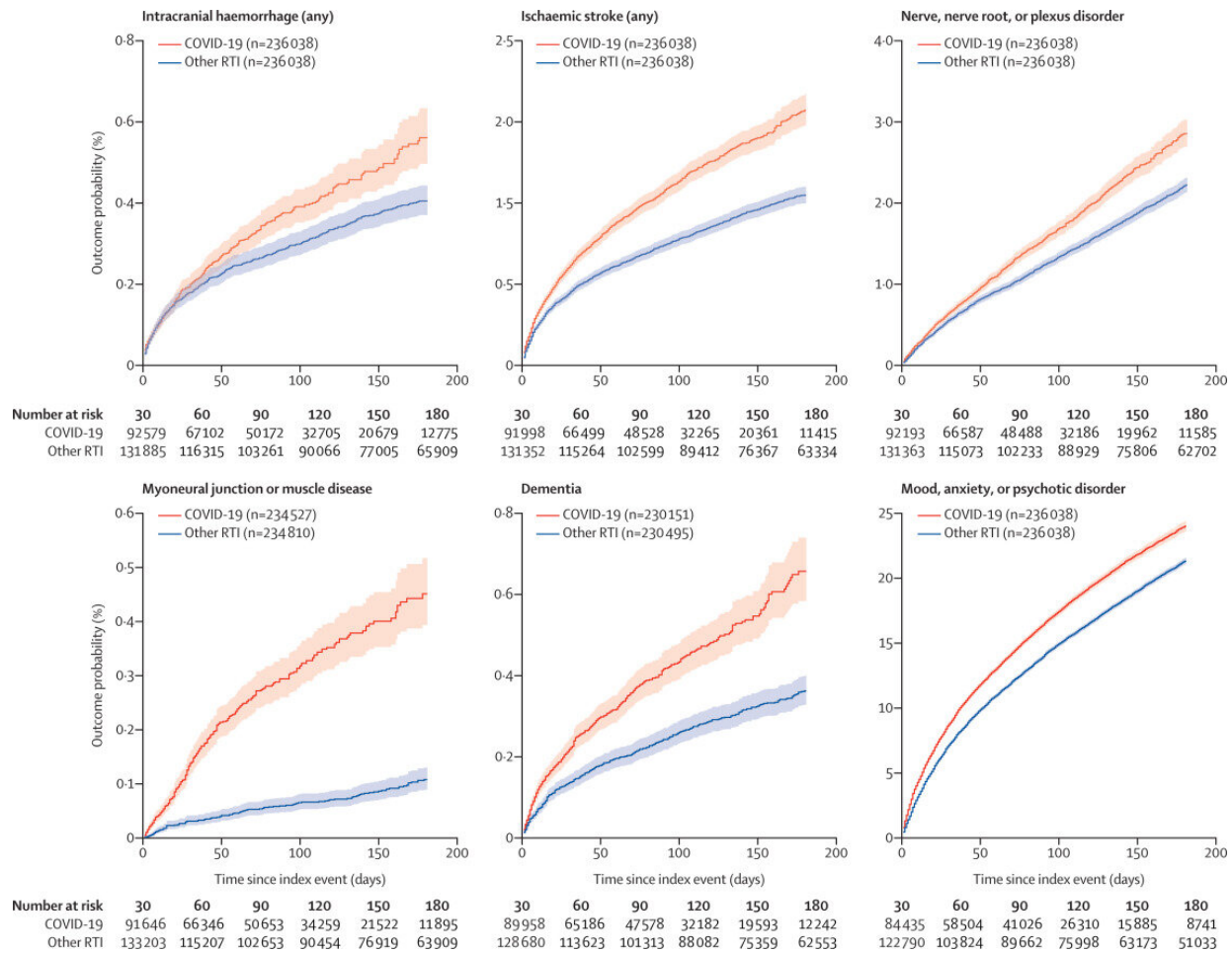


Figure 1 Kaplan-Meier estimates for the incidence of major outcomes after

COVID-19 compared with other RTIs Shaded areas are 95% CIs. For incidences of first diagnoses, the number in brackets corresponds to all patients who did not have the outcome before the follow-up period. For diagnostic subcategories, see appendix (pp 8–10). RTI=respiratory tract infection. Credit: *The Lancet Psychiatry* (2021). DOI: 10.1016/S2215-0366(21)00084-5

Risks of a neurological or psychiatric diagnosis were greatest in, but not limited to, patients who had severe COVID-19. Compared to the overall 34% incidence, a neurological or psychiatric diagnosis occurred in 38% of those who had been admitted to hospital, 46% of those in intensive care, and 62% in those who had delirium (encephalopathy) during their COVID-19 [infection](#). This gradient of risk applied to individual disorders too. For example, 2.7% of people needing intensive care and 3.6% of people with encephalopathy had a brain haemorrhage (compared to 0.3% in people without hospitalisation); 6.9% and 9.4% had ischaemic stroke (compared to 1.3% without hospitalisation); 1.7% and 4.7% developed dementia (0.4% without hospitalisation); and 2.8% and 7% were diagnosed with a psychotic disorder (0.9% without hospitalisation).

The authors also looked at people who experienced flu and other respiratory tract infections over the same time frame to help understand whether these neurological and mental health complications were linked specifically to COVID-19. After taking into account underlying health characteristics, such as age, sex, ethnicity, and existing health conditions, there was overall a 44% greater risk of neurological and mental health diagnoses after COVID-19 than after flu, and a 16% greater risk after COVID-19 than with respiratory tract infections. As a result, the authors say that COVID-19 does lead to a greater risk of neurological and psychiatric disorders than these other health conditions. However, this was not seen for all conditions; there was no clear evidence that

COVID-19 led to an increased risk of parkinsonism or and Guillain-Barré syndrome.

Dr. Max Taquet, a co-author of the study, from the University of Oxford, UK, said: "Our results indicate that brain diseases and psychiatric disorders are more common after COVID-19 than after flu or other respiratory infections, even when patients are matched for other risk factors. We now need to see what happens beyond six months. The study cannot reveal the mechanisms involved, but does point to the need for urgent research to identify these, with a view to preventing or treating them."

The authors note several limitations to their study. Firstly, the completeness and accuracy of the electronic health records is not known. Secondly, many people with COVID-19 have mild or no symptoms and do not present for health care, therefore, the people studied here are likely to have been more severely affected than in the general population. Thirdly, the severity and course of the neurological and psychiatric disorders is not known.

Writing in a linked Comment article, Dr. Jonathan Rogers, who was not involved in the study, from University College London (UCL), UK, said: "[this] study points us towards the future, both in its methods and implications. Researchers need to be able to observe and anticipate the neurological and psychiatric outcomes of future emerging health threats by use of massive, international, real-world clinical data. Selection biases will remain an issue, not necessarily mitigated by sample size,<sup>10</sup> and thus the onus should be on countries with public health-care systems to enable truly comprehensive national data to be available for research. Sadly, many of the disorders identified in this study tend to be chronic or recurrent, so we can anticipate that the impact of COVID-19 could be with us for many years."

**More information:** Maxime Taquet et al. 6-month neurological and psychiatric outcomes in 236 379 survivors of COVID-19: a retrospective cohort study using electronic health records, *The Lancet Psychiatry* (2021). [DOI: 10.1016/S2215-0366\(21\)00084-5](https://doi.org/10.1016/S2215-0366(21)00084-5)

Provided by Lancet

Citation: Largest study to date suggests link between COVID-19 infection and subsequent mental health and neurological conditions (2021, April 7) retrieved 27 April 2024 from <https://medicalxpress.com/news/2021-04-largest-date-link-covid-infection.html>

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