Reduced incidence of Long COVID referrals to the Cambridge University Teaching Hospital Long COVID clinic

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Abstract

Long COVID (LC) constitutes a potential health emergency as millions of SARS-CoV-2 infections lead to chronic symptoms. We must understand whether vaccines reduce LC as this has major implications for health policy. We report a 79% reduction in LC referrals correlating with reinfections and vaccination in the UK.
Main text

Long COVID (also known as post-acute sequelae of SARS-CoV-2 infection (PASC)) poses a serious health burden for society. There is currently no consensus of the exact symptoms, duration or prevalence of Long COVID. It is however evident that some patients experience debilitating multi-systemic symptoms such as fatigue, myalgia, memory problems and shortness of breath, just to mention a few, more than 6 months post-acute COVID-19. Even more concerning is that there are a significant number of patients who have not fully recovered two years since the initial infection. This greatly diminishes Long COVID sufferers’ quality of life, as well as exerting a heavy burden on the healthcare system, families of those affected and having a negative impact on the economy.

Given the magnitude and impact of Long COVID, it is vital that we understand whether vaccination reduces the incidence or severity of Long COVID symptoms. Establishing whether vaccines reduce Long COVID risk would provide key information in understanding the mechanistic underpinnings of Long COVID. Additionally, if breakthrough infections are less likely to lead to Long COVID, this affects decisions on policies such as masking to reduce SARS-CoV-2 spread, “zero COVID” as a long-term strategy and the use of further booster vaccinations. Indeed, as antibodies wane after booster vaccines, we would expect to see more breakthrough infections and potentially higher rates of Long COVID cases. If that turns out to be the case, then yearly booster vaccines might be cost effective for reducing morbidity from Long COVID.

Two recent publications suggest that vaccination strongly reduced Long COVID symptoms at 1-3 months after infection but another study using a cohort of US Army Veterans suggests a more modest effect size at 6 months (15% reduction). We believe that these differences are likely due to different data collection methods as well as the populations studied. It is conceivable that vaccination may reduce the severity of Long COVID without full resolution of all symptoms. In this scenario, we would expect that vaccinated individuals would be less likely to seek medical treatment for Long COVID but may still report Long COVID symptoms if asked to complete a health questionnaire.

At the Cambridge University Teaching Hospital the initial long covid clinic was set up in May 2020. Patients are referred to the clinic based on a number of criteria, one of which is symptoms duration of at least 5 months. These patients tend to be those on the severe end of the symptom spectrum, having been referred following assessment by a community multi-disciplinary team which includes a general practitioner, mental health practitioners, physio and occupational therapists amongst other specialists.

We have noticed a 79% drop in the number of patients being referred to the clinic from August 2021 – June 2022, compared to August 2020 - July 2021 (Fig 1). This effect has so far been sustained until at least June 2022, despite 4 times more cases per month of acute COVID-19 in England across the same time periods. This change is notable as the decrease begins in August 2021, 5 months after the British population started receiving second doses of COVID-19.
vaccines in March 2021. Taken in context, this observation points towards vaccination in the UK playing a role in reducing the rates of the most severe Long COVID cases.

Although changes in variant could explain differences in Long COVID rates, we are not aware of any data which suggests a strong enough difference to explain our observations. Our observed reduction in Long COVID rates in August 2021 were from patients experiencing symptoms for 5 months which would suggest a change beginning in March 2021. This occurs too early for the delta wave which began in April 2021 but correlates well with the second doses of vaccination in the UK. Our recruitment criteria have not changed over this time period either, leading us to rule this out as a possible explanation. We cannot fully rule out prior infections providing immunity that protects against Long COVID from reinfections, however primary infections were more common than reinfections around March-April 2021.

We also observe no changes in symptoms between those referred for Long COVID before or after vaccination for any of the major symptoms such as fatigue (73% pre-vaccination, 76% post vaccination) and shortness of breath (18% pre-vaccination vs 23% post-vaccination).

In summary, we have observed a significant reduction in the most severe cases of Long COVID since the introduction of vaccines in the UK. Vaccination has not changed the symptoms of Long COVID but has likely reduced symptom severity. Our data point towards vaccination being an important tool to reduce the burden of Long COVID for society. They also suggest that immunity prior to infection reduces Long COVID risk, although the mechanisms behind this remain to be elucidated. One potential factor to consider is that vaccines reduce the severity of acute COVID-19 symptoms, leading to a reduction in post-COVID sequelae and subsequent reduction in Long COVID severity.

It is not yet clear if immunity from a prior infection protects against Long COVID, nor whether reinfections with SARS-CoV-2 hold the same risk of Long COVID as a primary infection. Given the possibility that Long COVID is caused by autoimmunity triggered by infection, or by persistent viral infections, it is plausible that each reinfection poses a cumulative risk of Long COVID.

We also do not yet know what level of immunity is required to protect against Long COVID. As immunity wanes over time, booster shots may be necessary to minimise Long COVID risk, and variant specific booster shots may be more efficacious. These questions are paramount to our understanding, treating and preventing Long COVID.
NOTES

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Ethics

The Long COVID study patients were recruited and consented under the Cambridge COVID-19 NIHR BioResource joint Consent Form (Research Ethics Committee (REC) no. T1gC1) study NBR87. Informed consent was obtained from all participants for the rest of the study.

Declaration Of Interests

All authors declare no competing interests
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**FIGURE LEGEND**

**Figure 1:** The number of patients referred to the Cambridge University Teaching Hospital Long COVID clinic has dropped since August 2021. Black circles: number of patients referred that month. Black crosses and dotted line: 6-month moving average.