The BMJ

Cite this as: *BMJ* 2021;373:n1127
http://dx.doi.org/10.1136/bmj.n1127
Published: 30 April 2021

Covid-19: Most people admitted to hospital after vaccination were infected before immunity could develop, research shows

Elisabeth Mahase

The majority of vaccinated people who were admitted to hospital for covid-19 were probably infected shortly before or around the time of their vaccination, highlighting the importance of maintaining social distancing and understanding that immunity develops over time, researchers have said.[1]

The International Severe Acute Respiratory Infection Consortium Clinical Characterisation Protocol (ISARIC4C), which is funded by UK Research and Innovation and the National Institute for Health Research, analysed UK hospital admissions after the start of the covid-19 vaccination rollout. As of 10 April 2021, 3842 of the 99 445 inpatients enrolled in the study had been vaccinated.

Looking at symptomatic patients (1823), the researchers found that 40% (729) developed covid-19 symptoms 0-7 days post-vaccination. A further 19% (352) developed symptoms 8-14 days post-vaccination. The median incubation period for SARS-CoV-2 is around five days, meaning it is likely that many of these patients were infected before immunity developed.

High risk groups

The report said it was possible that "elderly and vulnerable people who had been shielding may have inadvertently been exposed and infected either through the end-to-end process of vaccination, or shortly after vaccination through behavioural changes where they wrongly assume they are immune."

However, 12% (211) showed symptoms 15-21 days after vaccination and 29% (526) more than 21 days after vaccination. These cases could be due to vaccination failure, meaning that the vaccine failed to provide the person with immunity. The team emphasised that this was not an unexpected finding, as the vaccines were not 100% effective, and that the absolute numbers of vaccinated people being admitted to hospital 21 days after their first dose were "tiny."

The researchers reported that, among the people who developed symptoms more than 21 days post-vaccination, 113 (of 400) died with covid-19 (28%). Of these, 82 were in the "frail elderly" group. The report said, "Mortality appears to remain high for people in high risk vaccination tiers who are admitted to hospital with SARS-CoV-2 infection despite vaccination 21 day or more previously."

Deborah Dunn-Walters, chair of the covid-19 taskforce at the British Society for Immunology and professor of immunology at the University of Surrey, said, "According to this paper, the majority of hospitalisations for covid-19 post-vaccination take place in this 1-14 day window when protection from the vaccine is not yet fully active. This shows the importance of maintaining social distancing, even after vaccination, to minimise the risk of contracting SARS-CoV-2 before your immune protection is active.

"A very small number of people were hospitalised 21 days post-vaccination, and it's these people that we need to examine in more detail to understand why the vaccine did not afford them full protection."

Researchers noted a number of limitations to the report, including that not all admitted patients were enrolled in the study and that vaccinated patients may be over-represented owing to the recruitment strategy. Additionally, the absolute numbers are very low, and analysis accounting for characteristics such as sex and ethnicity have not yet been performed.

Correction: We amended the second and third paragraphs on 4 May 2021 to remove an incorrect percentage (7.3%) after the figure "3842" and to include the number of symptomatic patients studied (1823).

1 Egan C, Knight S, Baillie K, Harrison E, Docherty A, Semple C. ISARIC4C and CO-CIN: Hospitalised vaccinated patients during the second wave—update April 2021, 22 April 2021. 30 Apr 2021. https://www.gov.uk/government/publications/isaric4c-and-co-cin-hospitalised-vaccinated-patients-during-the-second-wave-update-april-2021-22-april-2021.