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## Letter to the Editor

**Changing patterns of clinical presentation of COVID-19 in hospital admissions: With, or because of, COVID?***Dear editor,*

The UK Health Security Agency reports hospital admissions that have a positive SARS-CoV-2 PCR in the fourteen days leading up to admission. However, it is unclear how many of these admissions are due to COVID related disease and how many are incidental infections, the proportion of which are likely to change with background immunity and emerging viral variants.

In this journal, Barnacle et al commented on the importance of differentiating between incidental COVID-19 infections and acute COVID-19 requiring hospital level care and how this might impact on disease modeling and hospital planning.<sup>1</sup> Here we present updated data tracking consecutive admissions who tested positive for SARS-CoV-2 on admission across a large London NHS trust, classifying them on clinical presentation and prior vaccination status. This more granular data is likely to be informative in planning hospital services as the burden of COVID disease changes over time.

Patients were included if admitted to Imperial College London NHS Trust between 1st January 2021 and 30th January 2022 and positive for SARS-CoV-2 viral testing (usually PCR based either in central laboratory and/or point of care testing). Duplicate patients were removed from the database unless they had a repeat admission. As part of screening for clinical trials, date of admission, age, vaccination status and whether COVID was the reason for admission were recorded for each patient.

2995 patients were included in the study. Overall, 1136 patients had an incidental finding of SARS-CoV-2 PCR positivity (38.3%), compared to 1825 patients in whom COVID was the primary diagnosis (61.6%). 60.3% of patients were unvaccinated, and 9.1% triple vaccinated. The median age was 62 years. Of those patients admitted with a primary diagnosis of COVID, 68.5% were unvaccinated (1250/1825) compared to 31.5% who had had at least one vaccine (575/1825). Of those admitted with an incidental COVID diagnosis, 47.2% were unvaccinated (536/1136) compared to 52.4% who had at least one vaccine (595/1136).

Comparing the peak of admission in January 2021 (at time when delta variant was dominant), to that in January 2022 (when omicron had begun to dominate), 23.0% had incidental COVID (121/527) compared to 66.3% in January 2022 (338/510), see Fig. 1. In January 2021 6.3% had received at least one vaccine (33/527), compared to 66.6% in January 2022 (405/608). Of those with incidental COVID, 5.0% had at least one vaccine in January 2021 (6/121) compared to 70.4% in January 2022 (236/335). In January 2021 6.7% of patients admitted with COVID-19 as a primary diagnosis had at least one vaccine (27/406) compared to 61.6% in January 2022 (106/172).

These clear trends reflect potential differences in the biological behavior of variants (with the omicron variant thought to cause milder disease compared to delta) and the changing immune status of the population (driven largely by vaccination status, but also natural infection). Establishing the relative importance of each can be challenging. There have been two large studies examining trends of COVID-19 severity in the UK: Zoe and COG-UK consortium. The COG-UK consortium found a reduced hazard ratio for hospital attendance, and hospital admission for patients with the omicron compared to the delta variant.<sup>2</sup> The Zoe study also found patients reporting a positive SARS-CoV-2 test between December 2021 and January 2022 were less likely to be admitted to hospital compared to patients from the delta wave and reported fewer lower respiratory tract symptoms.<sup>3</sup> The reduced severity and reduced risk of admission in both these studies correlates with our study findings, however neither comment on incidental infections in hospitalised patients. Other studies have found that the vaccine status of the patients determines disease severity rather than the virus variant, with one study finding no significant difference in ITU admission or mechanical ventilation between the omicron and delta variants when stratified by vaccination status.<sup>4</sup>

There have been no UK specific studies comparing the proportion of hospital admissions with incidental COVID between variants. Existing studies from USA, France and South Africa have focused on patient outcomes in hospital, showing reduced ITU admission and shorter duration of stay for the January 2022 wave compared to previous waves.<sup>5-7</sup> However, most have not commented on incidental infections, excepting a South African study which found 63% of COVID admissions were incidental during the omicron wave (November to December 2021), similar to the proportion found in this study.<sup>7</sup> However, vaccine uptake in South African was much lower at this time compared to our UK population.

Our findings are consistent with the few other studies comparing hospitalizations and vaccine coverage between peaks of admissions during the omicron wave and previous periods. As patients with incidental disease and those that are vaccinated are likely to have different healthcare requirements, these measures are likely to be more informative for the planning of healthcare services than admission with positive viral detection alone. We propose that the proportion of patients admitted with incidental SARS-CoV-2 PCR positivity should be routinely captured to improve our understanding of the impact of future variants on disease and subsequent demand for clinical services.

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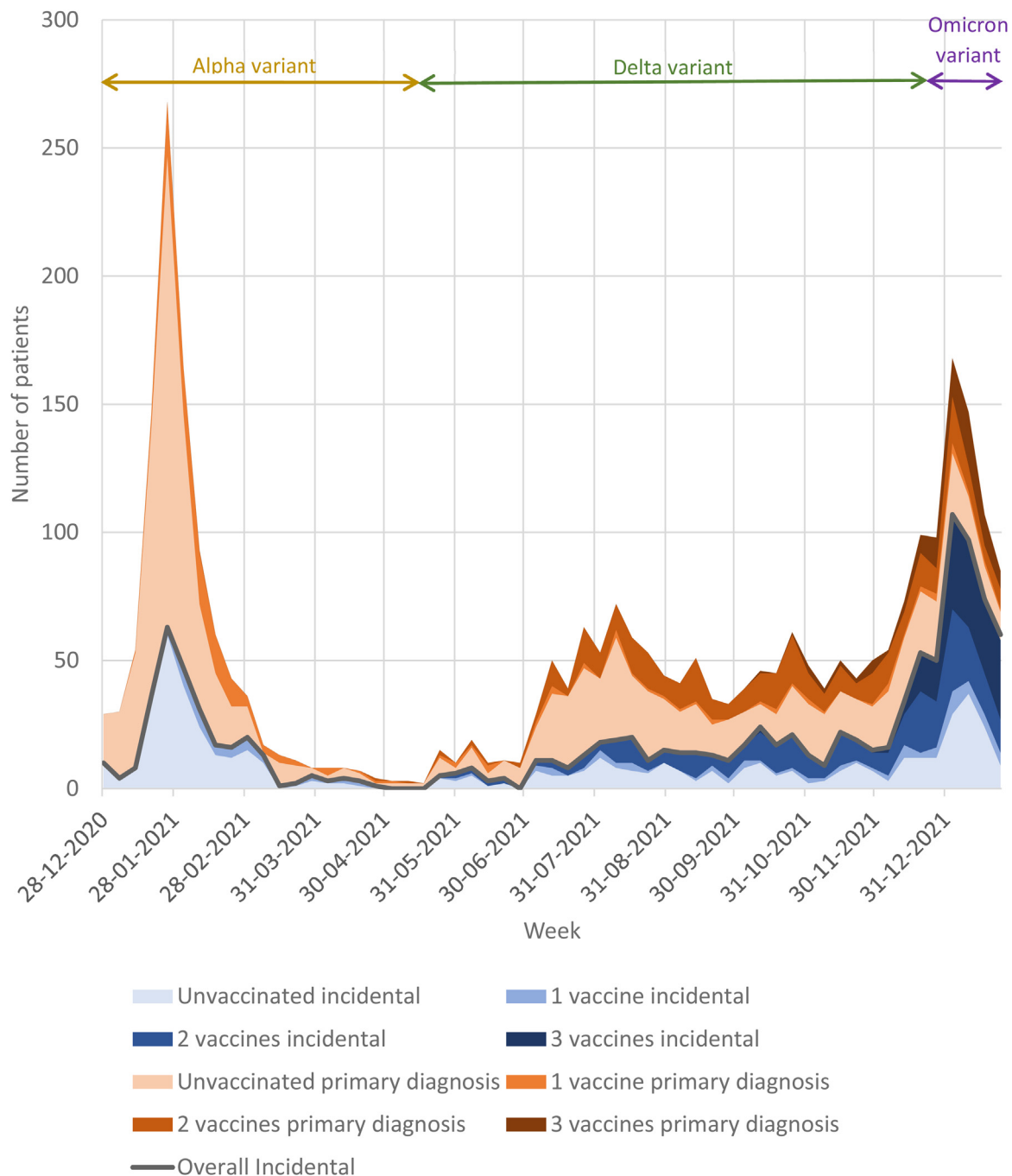


Fig. 1. Proportion of patients admitted with incidental COVID vs COVID as a primary diagnosis by Vaccination status each week.

**Conflict of interest**

The authors declare that they have no conflicts of interest.

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