

Hospitalised patients stratified by vaccination tier in second wave

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Summary

This brief report describes first analysis of early data on the impact of vaccination on hospitalised patients with SARS-CoV-2 infection during the latter part of the second wave in the CO-CIN / ISARIC4C cohort.

- The proportion of admissions of people in vaccination tiers 2 and 3 has decreased [moderate confidence].
- There has been a small gradual reduction of in-hospital mortality in vaccination tiers 2, 3 and 4 [moderate confidence].

Admission trends

The growth and decay characteristics of the second wave beginning ~ 1st September 2020 are mostly influenced by virus transmission dynamics, where virulence increased with emergence of a new variant, and behavioural change in response to public health regulations. Vaccination began on December 8th 2020 in a phased programme starting with care home residents (vaccination tier 1). While we are not able to identify care home residents in our data, most patients can be assigned to other vaccination tiers based on their age and pre-existing comorbidities when known.

The impact of vaccination during the latter half of the second wave can then be explored by seeking evidence of change in hospital admissions and hospital deaths over time in patients stratified by vaccination tier.

The multi-coloured graphs illustrate change in absolute numbers (Figure 1) and proportions (Figure 2) of hospital admissions and hospital deaths since December 2020 stratified by vaccination tier.

Enrolment to CO-CIN is prospective and so is dependent on local capacity to conduct research. At many sites, surge conditions at peak of wave two led to a reduction in enrolment to 1:10 of eligible cases. Despite this limitation the general shape of Figures 1A and 1B represent the epidemic curve of wave two described in other sources of community surveillance and NHS admission data.

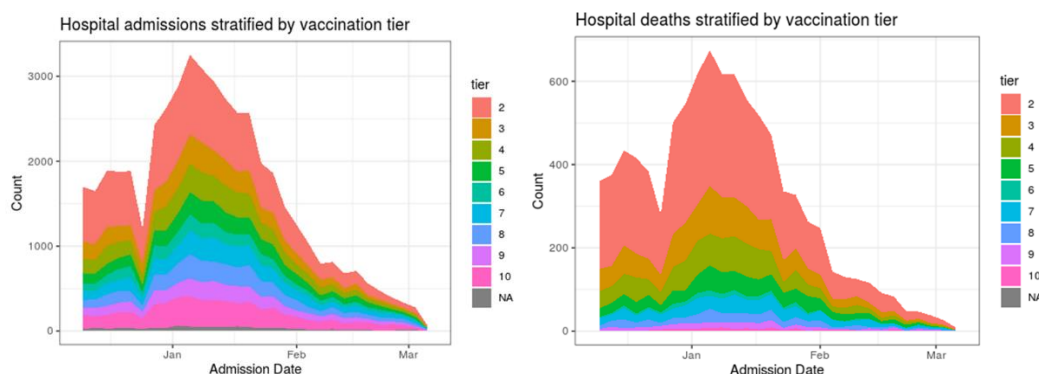


Figure 1: From 8th December 2020 (start of vaccination programme), absolute counts of **A**: all hospital admissions and **B**: all hospital deaths stratified by vaccination tier. NA=allocation to vaccination tier missing.

By visual inspection, the proportion of people admitted to hospital in vaccination tiers 2 and 3 has reduced towards the latter period of observation (Figure 2A) albeit with moderate confidence. The proportion of deaths in vaccination tier 2 as a fraction of all deaths also appears to reduce (Figure 2B), but as the likelihood of death varies greatly with age, and vaccination tiers are mostly defined by age, this is not the best illustration for impact. In any case death can be better explored as an outcome within vaccination tiers.

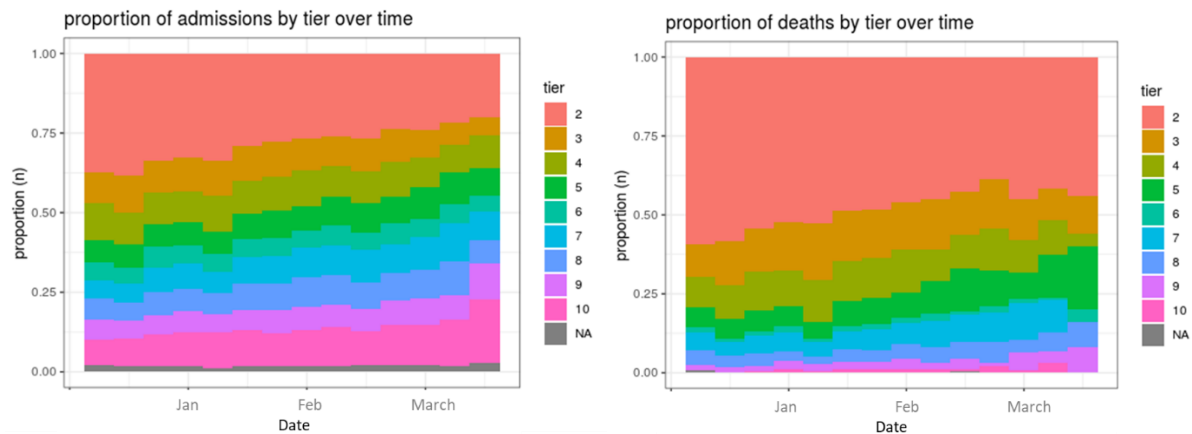


Figure 2: From 8th December 2020 Proportions of **A**: all hospital admissions and **B**: deaths stratified by vaccination tier. NA=allocation to vaccination tier missing.

We next explored in-hospital mortality within each vaccination tier by week of admission (Figure 3). Vaccination rollout across a tier of eligible people takes time, and not all people choose to be vaccinated. In those who do come forward for vaccination it appears to take three weeks between vaccination and immunisation for the majority of people.

Visual inspection appears to show small gradual sustained reduction of in-hospital mortality in vaccination tiers 2 (beginning late January) and in tiers 3 and 4 (beginning middle February), with moderate confidence.

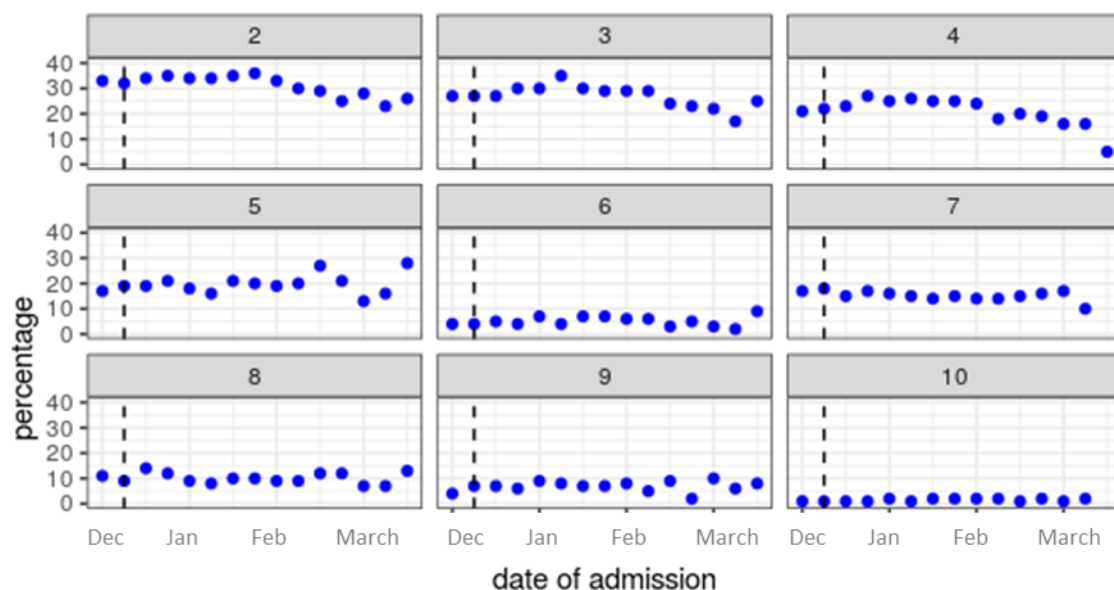


Figure 3: From December 2020. Percentage of in-hospital mortality per week of admission, stratified by vaccination tier. Vertical line = December 8th start of vaccination programme.