

Hospital case fatality and emergence of variant of concern B.1.1.7, rapid CO-CIN report to NERVTAG and SAGE, January 19th 2021

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In a multinomial multivariable model that adjusts for period of admission, age, sex, deprivations and ethnicity we do not observe any increase in hospital case fatality rates (hCFR) in the period during which VOC2020-01 (Lineage B.1.1.7) emerged in England (figures 1 and 2). Rather we continue to observe reduced hCFR in all subsequent months compared to March 2020 at peak of wave 1 and stable hCFR in September through December.

As previously observed increasing age continues to be the strongest determinant of hCFR in terms of magnitude of hazard, followed by male sex. There remains increased hazard associated with Asian (both S & E) and "Other" ethnicity and with multiple deprivations.

In one region, despite being busy, the R&D team covering two large hospitals at one trust have maintained CO-CIN submissions during the period when VOC emerged and became dominant (figure 2 and 4). This allows a natural observational experiment in a controlled setting with granular analysis of impact of emergence of VOV. In this controlled setting we do not observe statistically significant change in hCFR associated with proven infection with VOC compared with non-VOC.

Limitations: Following reprioritisation of all observational UPH studies from start of November, data return from CO-CIN is reduced and not evenly distributed. We are missing outcomes for about half of cases admitted in late December. It is likely that the busiest trusts are underrepresented in CO-CIN. COG sampling in NHS admissions (pillar one) is sparse, but none-the-less has been linked to 21882 cases in ISARIC CCP-UK / CO-CIN data. 21596 cases of non-VOC and 286 of VOC has been identified. However, as the majority of cases of VOC were admitted in December, we only have outcome for 143 VOC cases. This report was written at pace based on COG data extracted on 09JAN2021 and linked to CO-CIN data on 16JAN2021. There is no source verification. An independent analysis of the same data is being done by the University of Liverpool analysts.

Conclusion: We do not see a strong early sign of increased hCFR in patients admitted to hospital in the period that VOC2020-01 (Lineage B.1.1.7) emerged.

Mortality in patients admitted to hospital with covid-19

Cox proportional hazards model adjusted for age, sex, deprivation, and ethnicity. n = 120944.

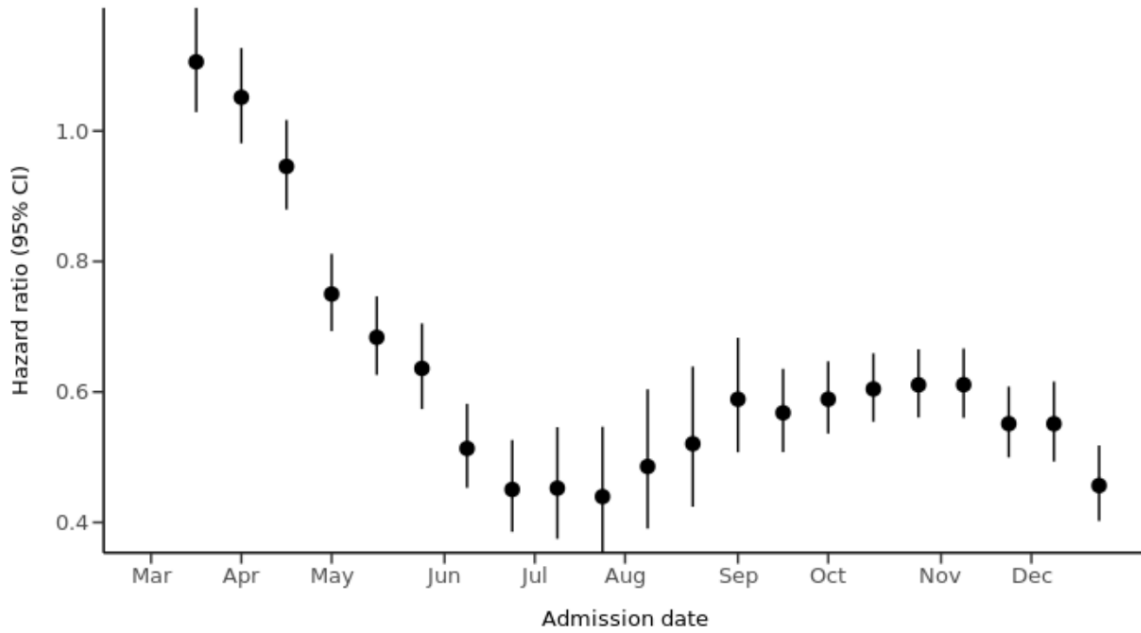


Figure 1. Whole CO-CIN Cohort. Standard survival analysis. No adjustment for informative censoring.

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[[1]]
Dependent: Surv(time, status)
wave
  March to April 61363 (49.8)
  May to June 15508 (12.6)
  July to August 3143 (2.6)
  September to October 19556 (15.9)
  November to December 23554 (19.1)
Age on admission (years)
  <50 19613 (15.6)
  50-69 34336 (27.4)
  70-79 27952 (22.3)
  80+ 43639 (34.8)
Sex at Birth
  Male 69560 (55.1)
  Female 56473 (44.7)
imd Quintile
  Not specified 189 (0.1)
  1 34099 (27.0)
  2 29033 (22.9)
  3 22919 (18.1)
  4 20997 (16.6)
  5 19461 (15.4)
Ethnicity
  White 91819 (82.3)
  South Asian 7310 (6.6)
  East Asian 730 (0.7)
  Black 3870 (3.5)
  Other Ethnic Minority 7799 (7.0)

HR (univariable)
-
0.72 (0.69-0.74, p<0.001)
0.44 (0.40-0.48, p<0.001)
0.58 (0.56-0.60, p<0.001)
0.53 (0.51-0.55, p<0.001)
-
4.62 (4.28-4.99, p<0.001)
9.72 (9.01-10.48, p<0.001)
13.52 (12.55-14.56, p<0.001)
-
0.79 (0.77-0.81, p<0.001)
1.16 (0.90-1.50, p=0.264)
-
0.96 (0.93-0.99, p=0.009)
1.09 (1.06-1.13, p<0.001)
1.13 (1.09-1.16, p<0.001)
1.10 (1.07-1.14, p<0.001)
-
0.62 (0.59-0.65, p<0.001)
0.75 (0.64-0.87, p<0.001)
0.63 (0.58-0.67, p<0.001)
0.69 (0.66-0.73, p<0.001)

HR (multivariable)
-
0.66 (0.63-0.68, p<0.001)
0.46 (0.42-0.51, p<0.001)
0.59 (0.57-0.62, p<0.001)
0.57 (0.55-0.59, p<0.001)
-
4.46 (4.10-4.85, p<0.001)
9.50 (8.75-10.32, p<0.001)
13.69 (12.62-14.85, p<0.001)
-
0.75 (0.73-0.77, p<0.001)
1.12 (0.84-1.48, p=0.450)
-
0.95 (0.92-0.98, p=0.003)
0.94 (0.91-0.98, p=0.001)
0.94 (0.91-0.97, p=0.001)
0.89 (0.86-0.92, p<0.001)
-
1.15 (1.09-1.22, p<0.001)
1.11 (0.95-1.30, p=0.192)
0.97 (0.90-1.05, p=0.426)
1.03 (0.98-1.09, p=0.220)
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[[2]]
Number in dataframe = 126509, Number in model = 108816, Missing = 17693, Number of events = 28224, Concordance = 0.696 (SE = 0.001), R-squared = 0.121 (Max possible = 0.997), Likelihood ratio test = 14058.817 (df = 17, p = 0.000)
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Figure 2. Whole CO-CIN cohort. Standard survival analysis. No adjustment for informative censoring.

death: OR (95% CI, p-value)

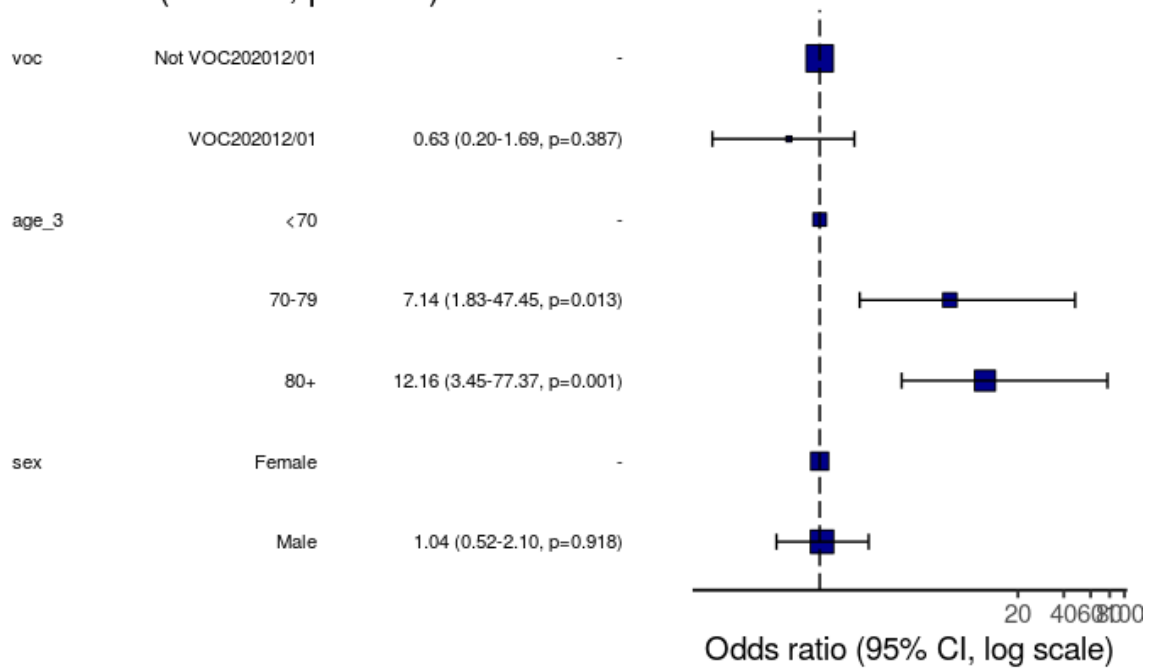


Figure 3. Single NHS Trust (two hospitals). OR of death by VOC, age and sex patients admitted between 1st October and 14th December.

		No	Yes	OR (univariable)	OR (multivariable)
voc	Not VOC202012/01	136 (74.7)	46 (25.3)	-	-
	VOC202012/01	27 (84.4)	5 (15.6)	0.55 (0.18-1.40, p=0.243)	0.63 (0.20-1.69, p=0.387)
age_3	<70	49 (96.1)	2 (3.9)	-	-
	70-79	43 (76.8)	13 (23.2)	7.41 (1.91-49.09, p=0.011)	7.14 (1.83-47.45, p=0.013)
	80+	71 (66.4)	36 (33.6)	12.42 (3.56-78.66, p=0.001)	12.16 (3.45-77.37, p=0.001)
sex	Female	60 (74.1)	21 (25.9)	-	-
	Male	103 (77.4)	30 (22.6)	0.83 (0.44-1.60, p=0.575)	1.04 (0.52-2.10, p=0.918)

Figure 4. Single NHS Trust (two hospitals). OR of death by VOC, age and sex patients admitted between 1st October and 14th December.