

Title: Readmissions among those discharged following a COVID-19 hospitalisation

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Study type: Descriptive

Aim: To describe the rate of readmissions after a first COVID-19 hospitalisation, and reasons for re-admission. To aid interpretation, comparisons with those who have not been hospitalised with COVID-19 will also be made.

Setting: OpenSAFELY data based on TPP primary care, with linkage to SUS hospitalisations data and ONS mortality data.

Study population:

People with a first hospitalisation for COVID-19 (defined as code U071 or U072 as the primary reason for hospitalisation - in a secondary analysis one of these codes anywhere in the hospitalisation will be counted).

Comparison group:

People in the main study cohort will be matched to people in the general population who have not had a COVID-19 hospitalisation, for comparison. Each COVID-19 hospitalised patient will be matched to up to 10 people who were under follow-up in TPP and not hospitalised on the 1st day of the month of hospitalisation of the index case (the 1st day of the month rather than exact day is chosen due to computational limitations). Matching will be on age (nearest age, with a maximum window of 3 years), sex, and STP (NHS administrative region).

Outcome

The outcome is hospital (re)admission.

Analysis plan:

The demographic characteristics and comorbidity profile of patients hospitalised for COVID-19 and their matched controls will be described.

A time-to-event analysis will be done, with follow-up starting on date of initial discharge (and 1st of the same month, for controls). Cumulative incidence of COVID-19 (re)admission, non-COVID hospitalisation and death will be calculated and displayed, allowing for competing risks.

ICD-10 codes denoting the reason for (re)admission will be categorised into broad groups (following Bhaskaran et al [doi.org/10.1016/S2213-8587\(18\)30288-2](https://doi.org/10.1016/S2213-8587(18)30288-2)) and described.

Subdistribution hazard ratios for reason-specific hospitalisation comparing COVID-19 discharged patients with controls will be estimated using Fine and Gray models, initially accounting for matching factors only, and then for with adjustment for comorbidities.

Multiple imputation will be used to handle missing ethnicity. Missing BMI will be assumed healthy, and missing smoking status will be assumed to mean non-smoker, since these variables are unlikely to be missing at random.