

# Dynamic CO-CIN report to SAGE and NERVTAG (Recent cases)

Dynamic content updated: 2021-01-20 04:13:24.

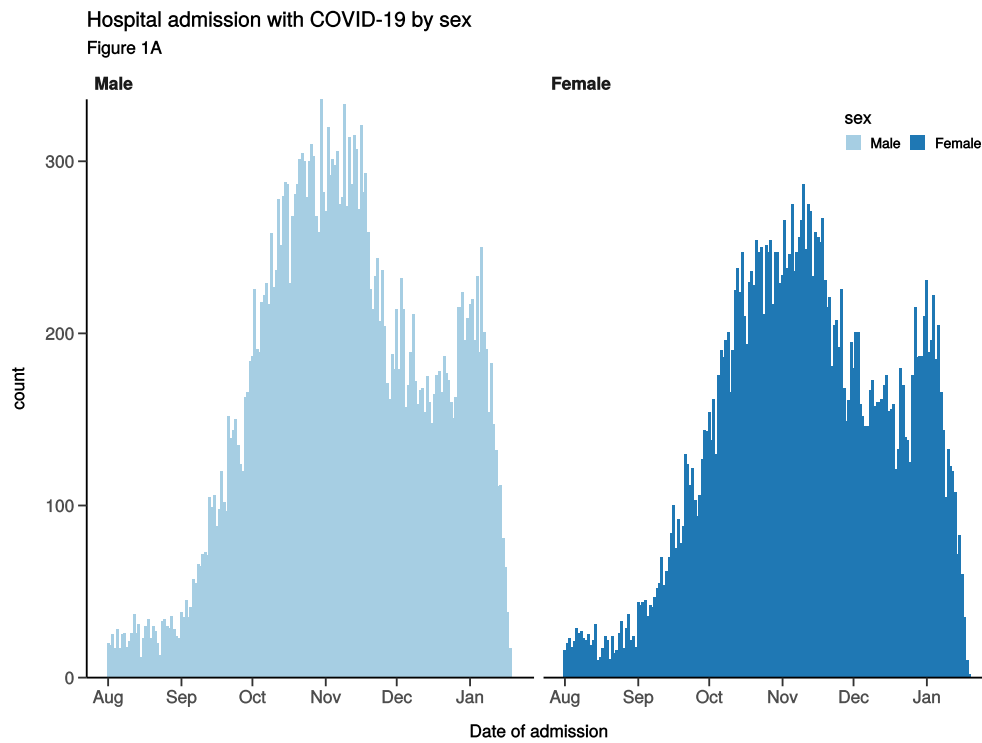
## Executive summary

### Includes patients admitted after 01 August 2020

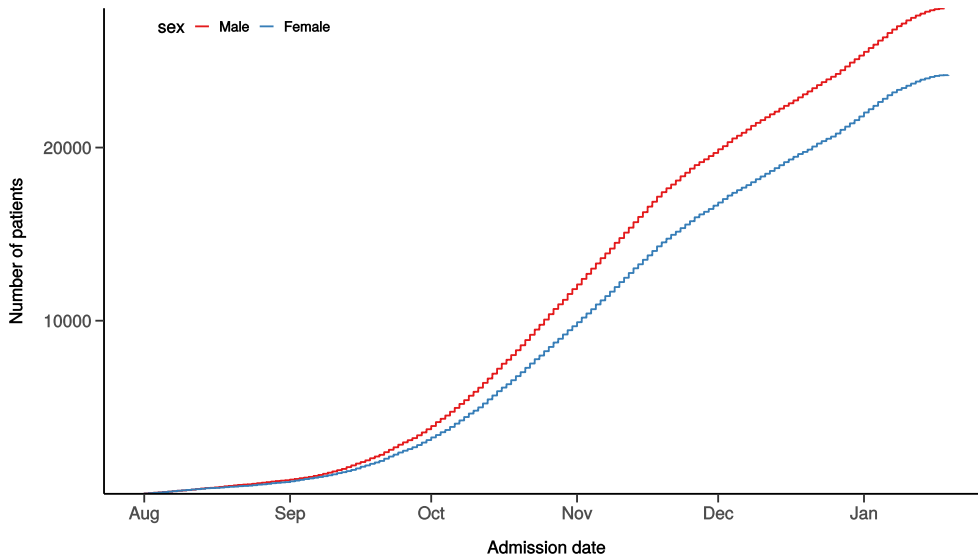
There are 52435 patients included in CO-CIN. Of these, 8579 patient(s) have died and 9048 required ICU. 27794 have been discharged home.

## Admission

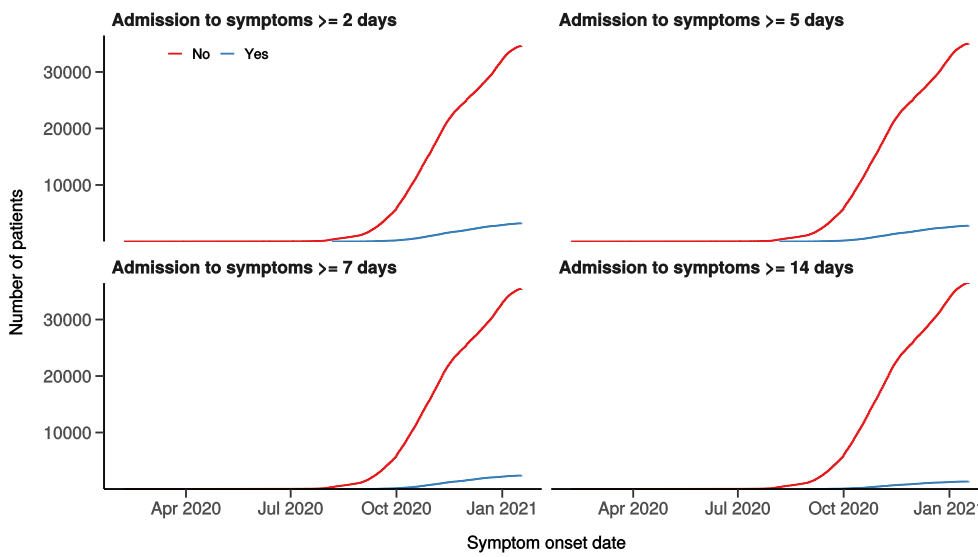
Figure 1



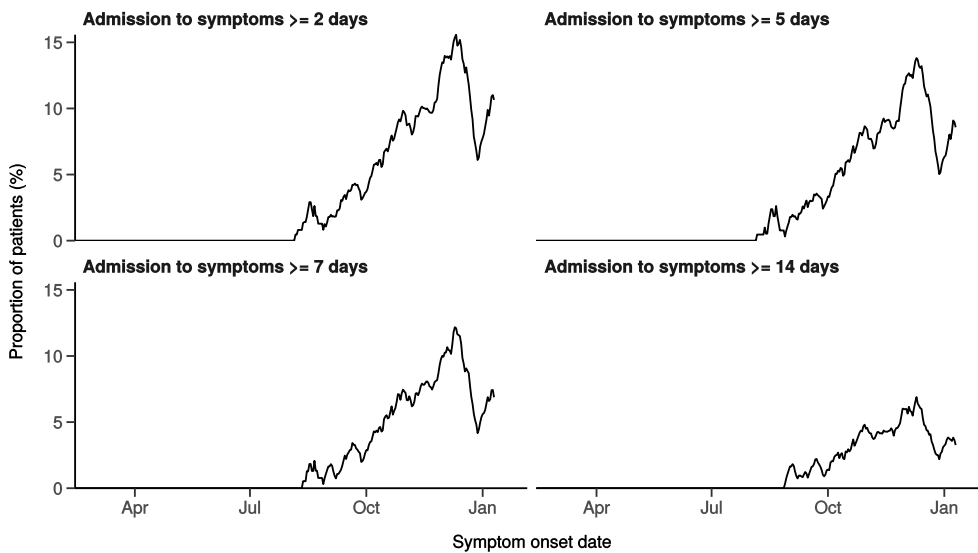
Hospital admission with COVID-19 by sex  
Figure 1B



Number with symptom onset occurring after admission to hospital  
Figure 1C

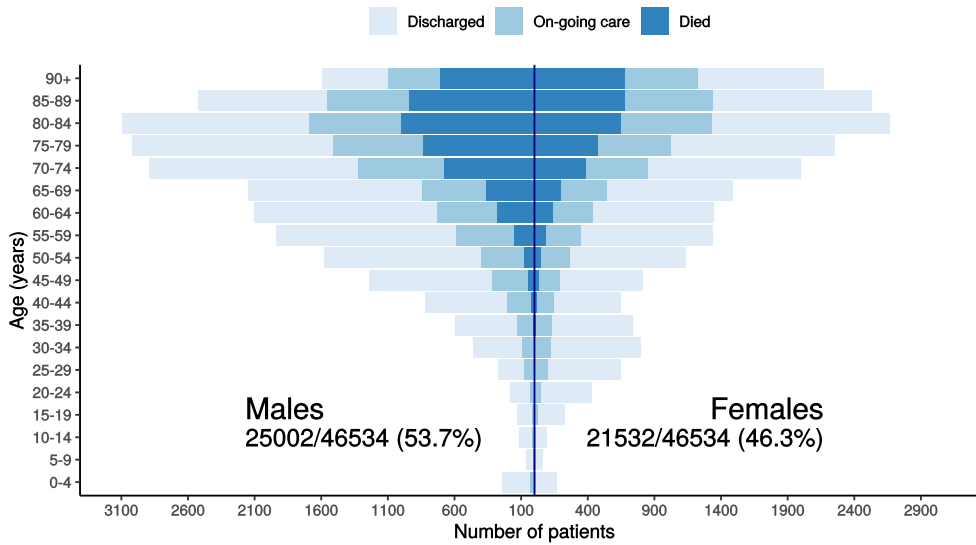


Proportion with symptom onset occurring after hospital admission  
Figure 1D - 7-day rolling percentage. n = 37780



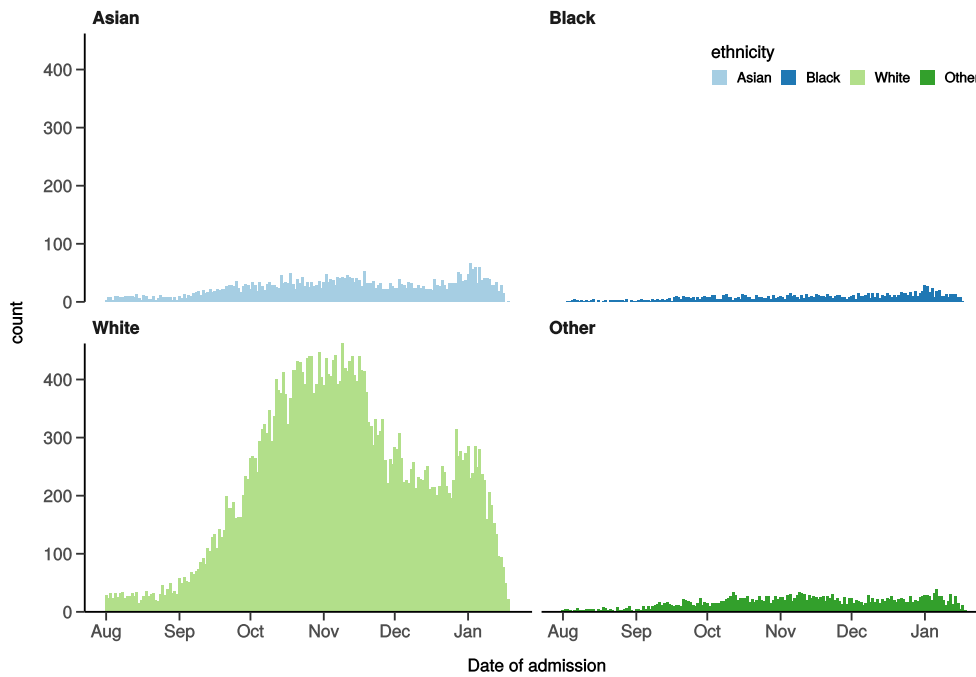
### Patients with outcome stratified by age, and sex

Figure 1E



### Hospital admission with COVID-19 by ethnicity

Figure 1F

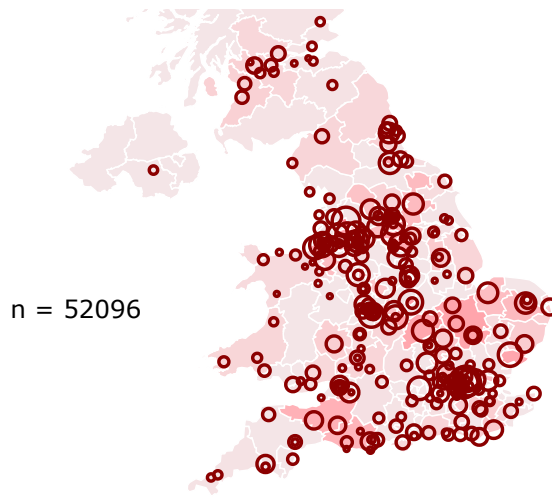


### Location by CCG / Healthboard

Figure 2

Click and drag on map to zoom into area. Reset via toolbar at top of map.





## Symptoms and comorbidity

Figure 3A

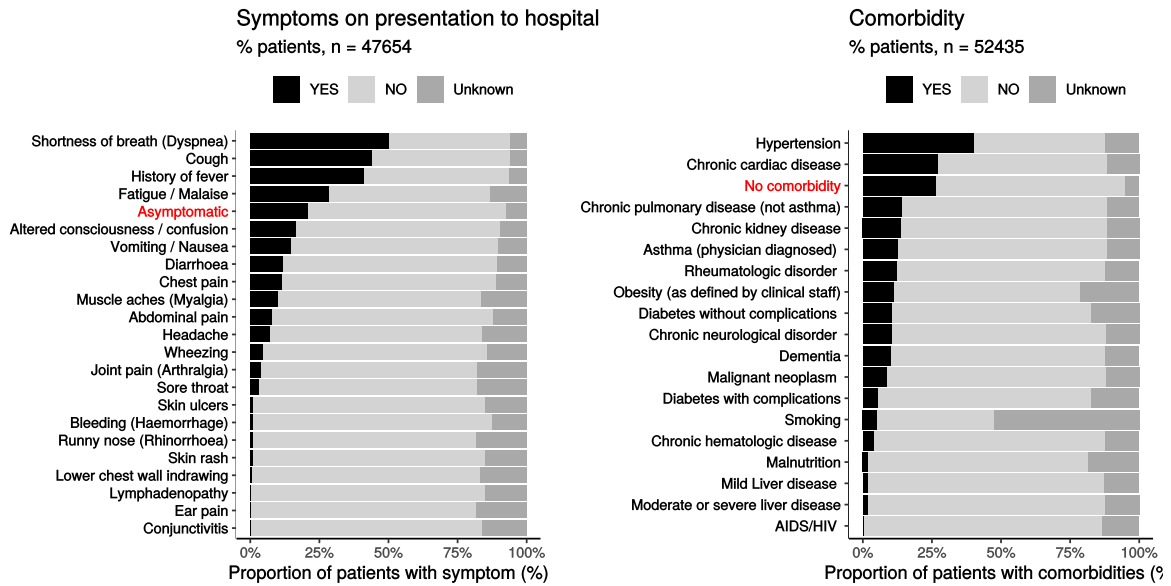


Figure 3B - Symptoms by Age

Symptoms on presentation to hospital  
Stratified by age

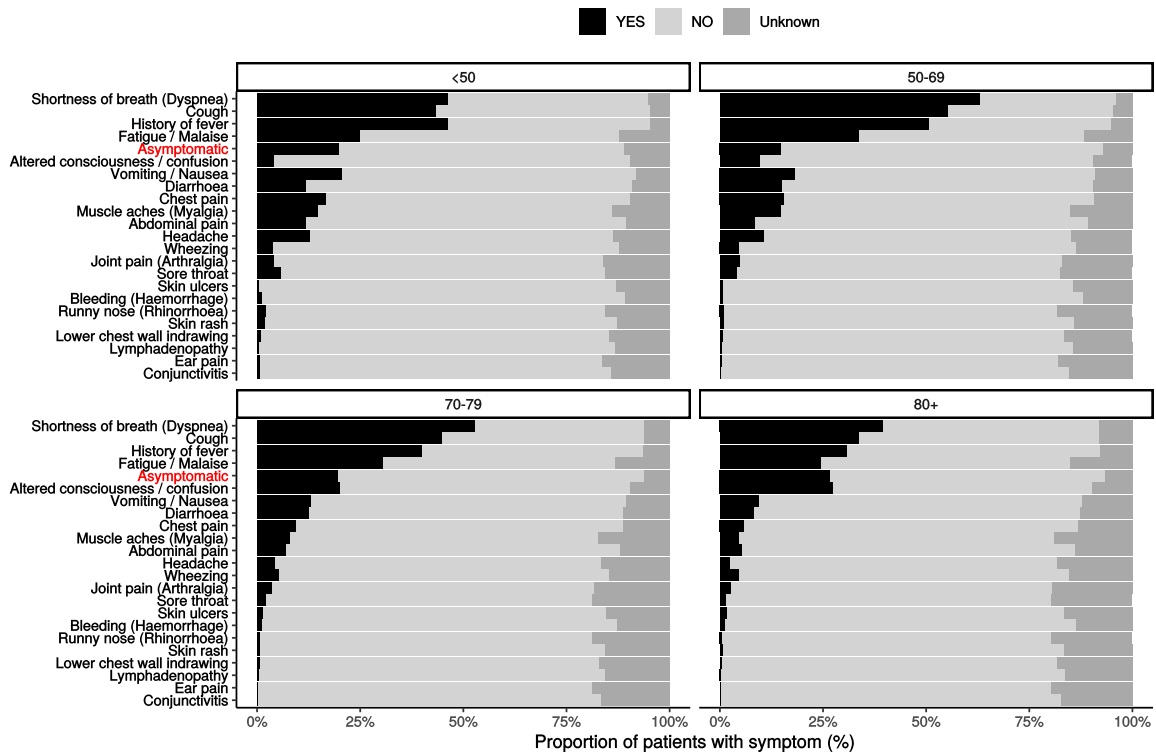
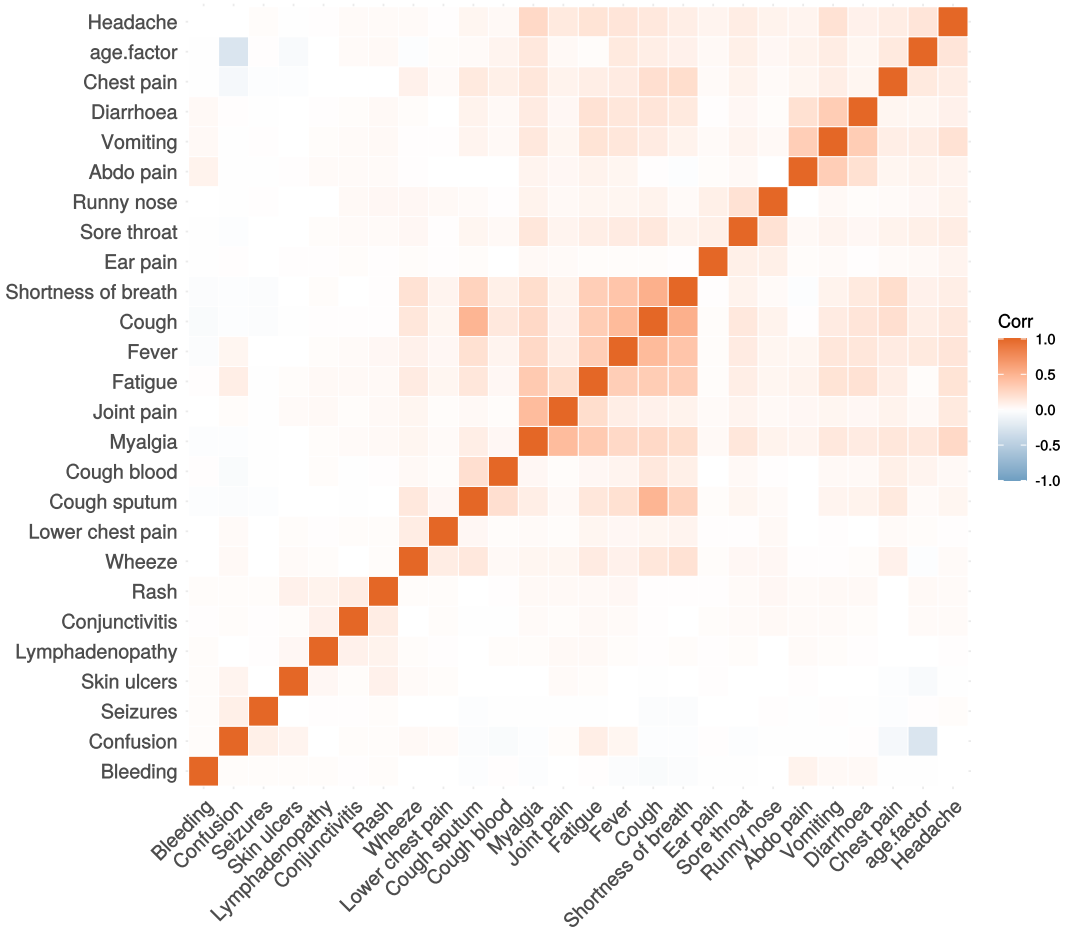


Figure 3C

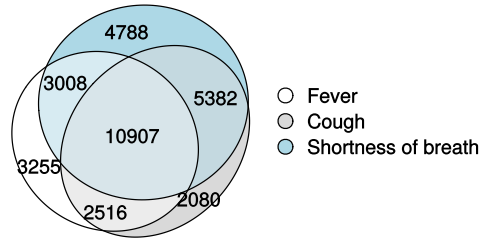
Correlation of symptoms in all pages. Note clusters, top right to bottom left, flu-like, coryzal, abdominal, respiratory, neurocutaneous.



Symptoms (diagnostic criteria)

Figure 4A

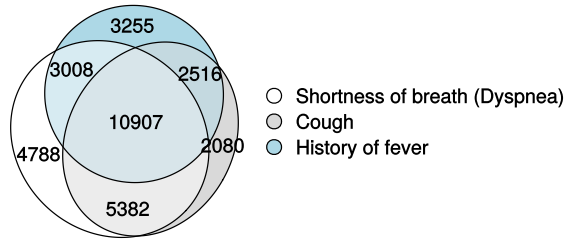
n = 47654



### Symptoms (most common)

Figure 4B

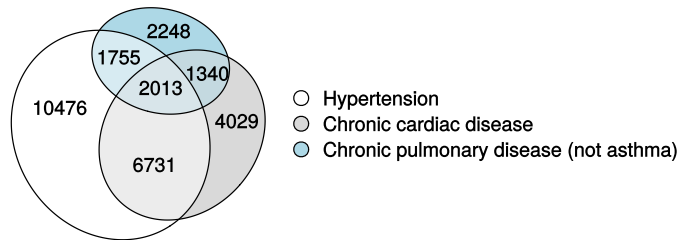
n = 47654



### Comorbidity (most common)

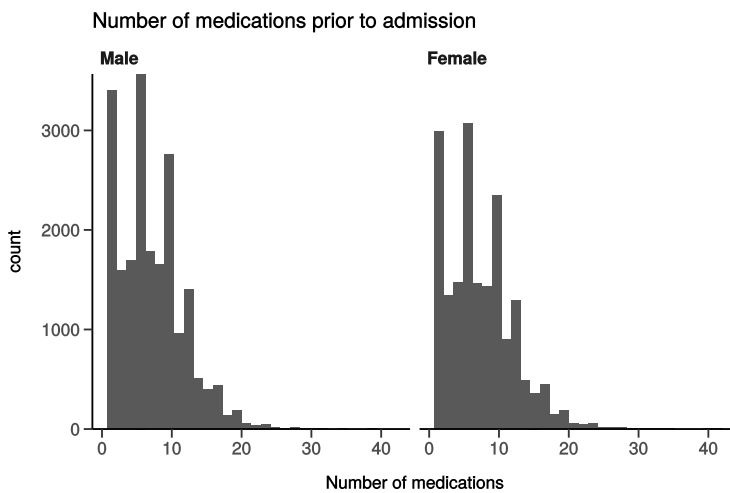
Figure 4C

n = 52435



### Medication prior to illness

Figure 5

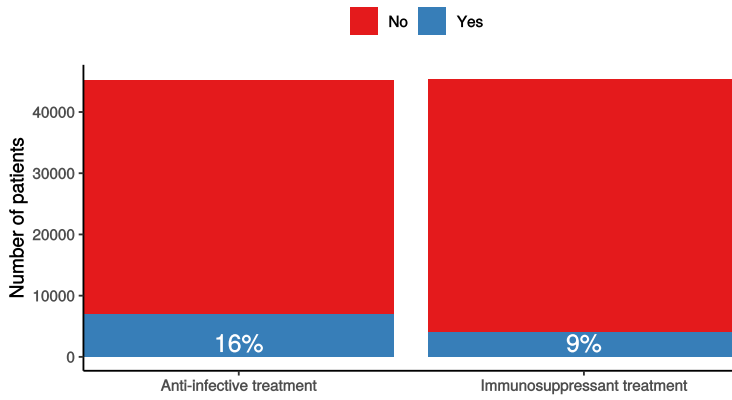


### Preadmission treatment

Figure 6

### Pre-admission treatment

Anti-infectives for illness episode (left) immunosuppressants including oral (not



## Patient flow

Figure 7A - All patients

N = 48957

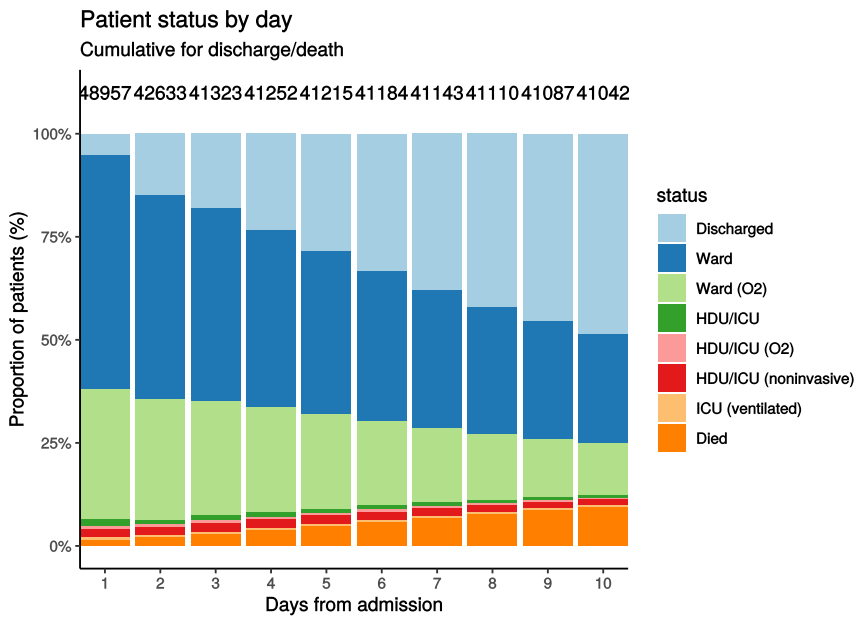
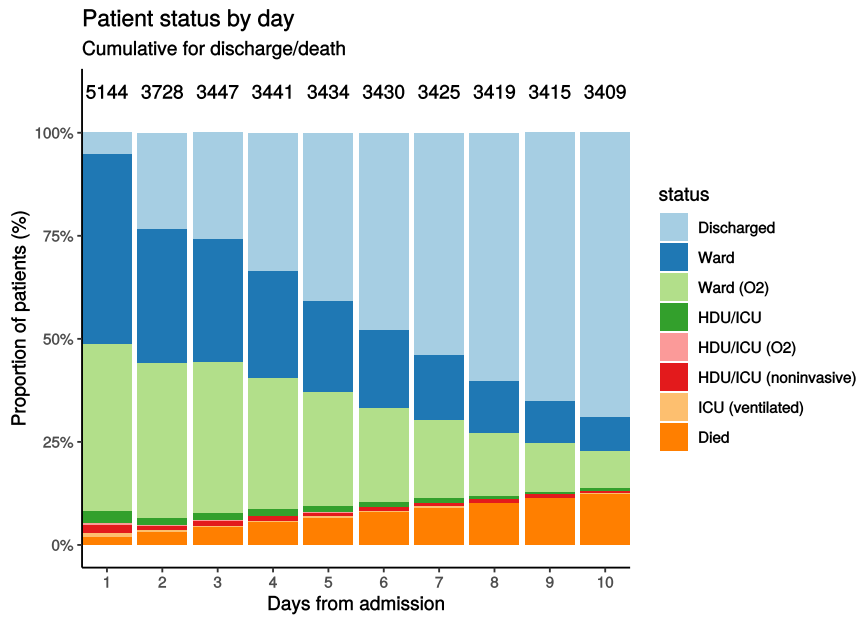


Figure 7B - Patients admitted  $\geq 14$  days and  $\leq 28$  days ago

N = 5144



## Oxygen requirement

Figure 8A - All patients

N = 46540

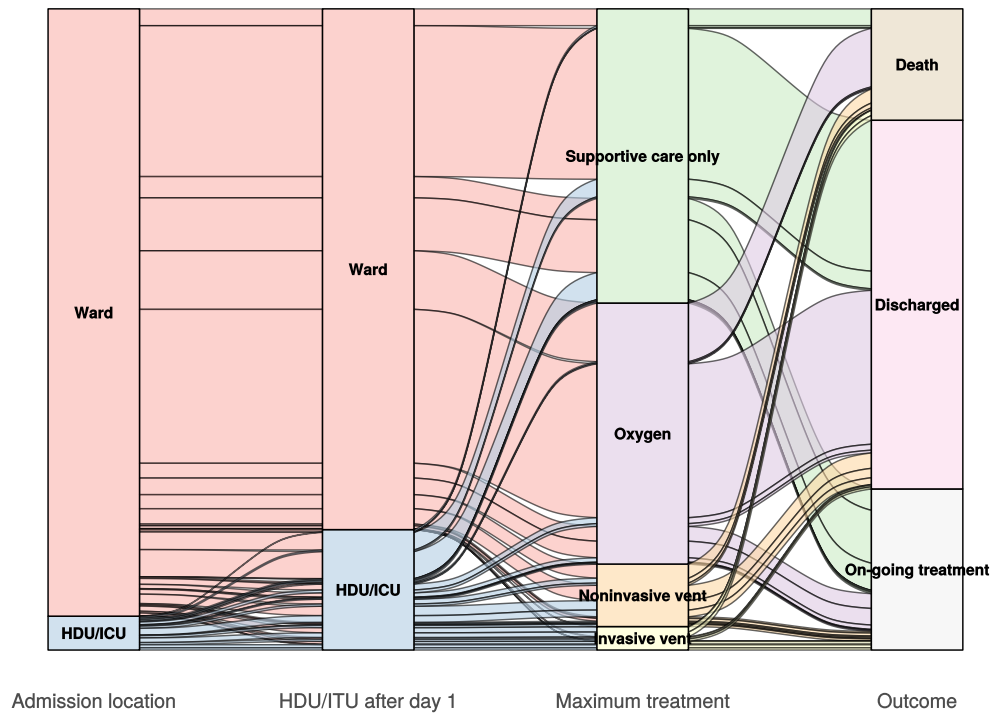


Figure 8B - Patients admitted  $\geq 14$  days and  $\leq 28$  days ago

N = 4835

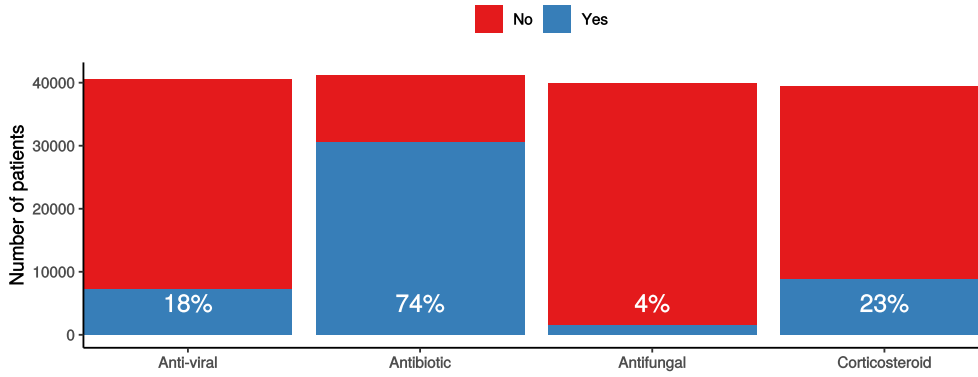
## In-hospital medical treatment

Figure 9



### In-hospital treatment

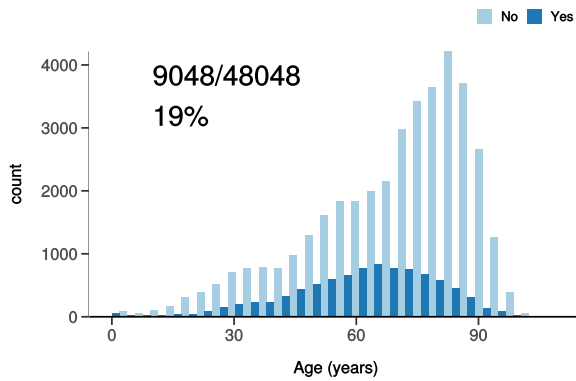
Anti-virals, antibiotics, corticosteroids, and anti-fungals for patients who have completed journey.



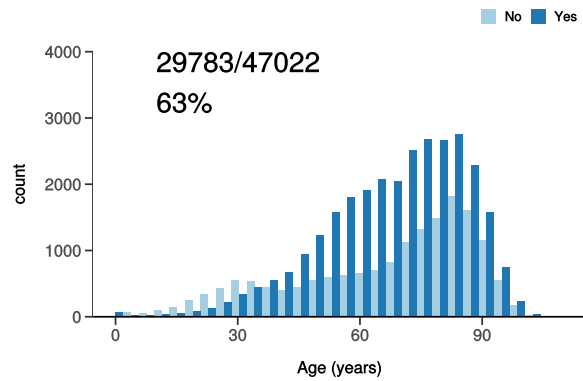
## Treatment

Figure 10

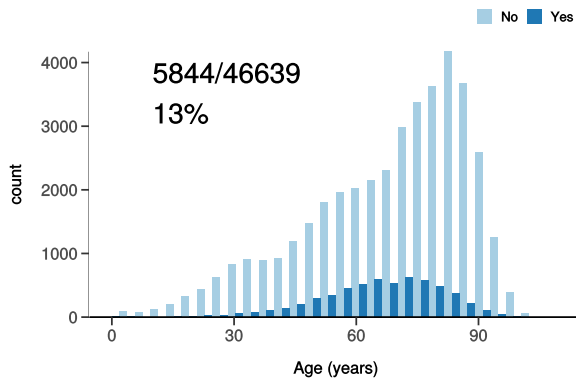
ICU/HDU admission  
Figure 10A



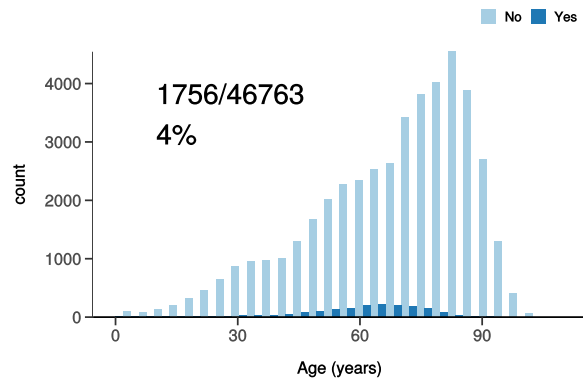
High flow oxygen  
Figure 10B



Noninvasive ventilation  
Figure 10C



Invasive ventilation  
Figure 10D

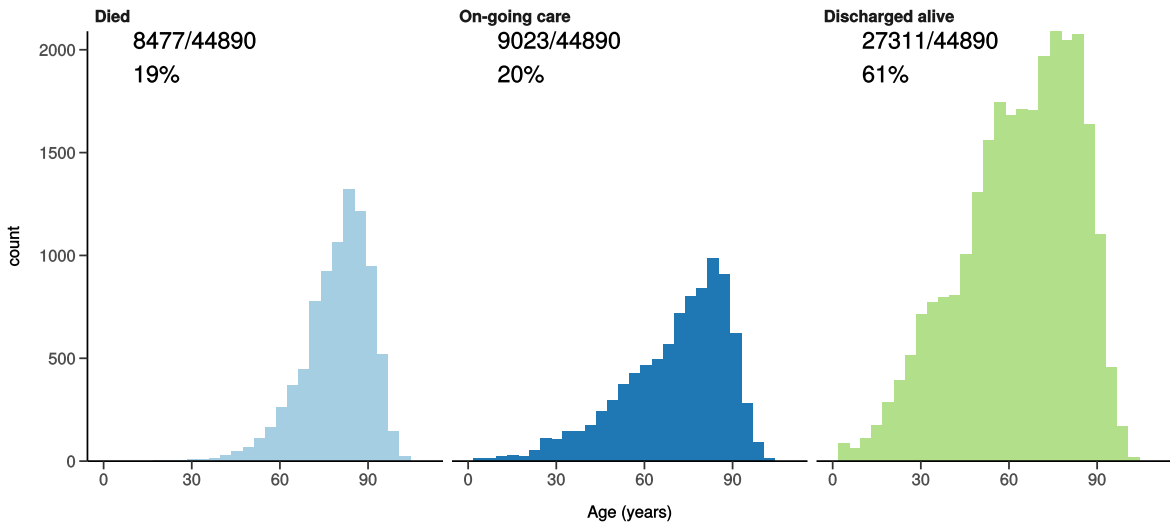


## Status in patients admitted $\geq 14$ days from today

Figure 11

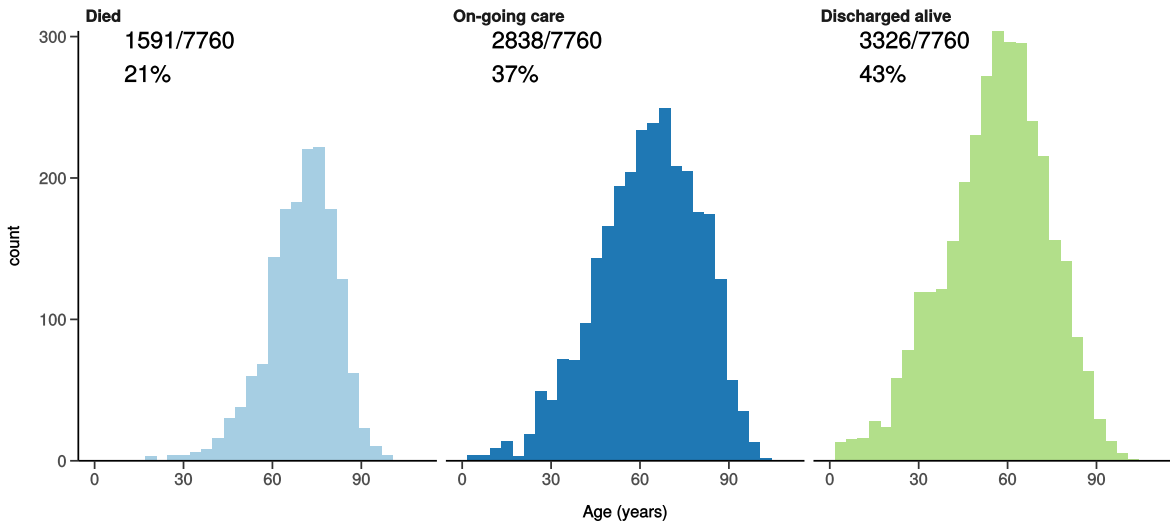
All: status in patients admitted  $\geq 14$  days ago

Figure 11A



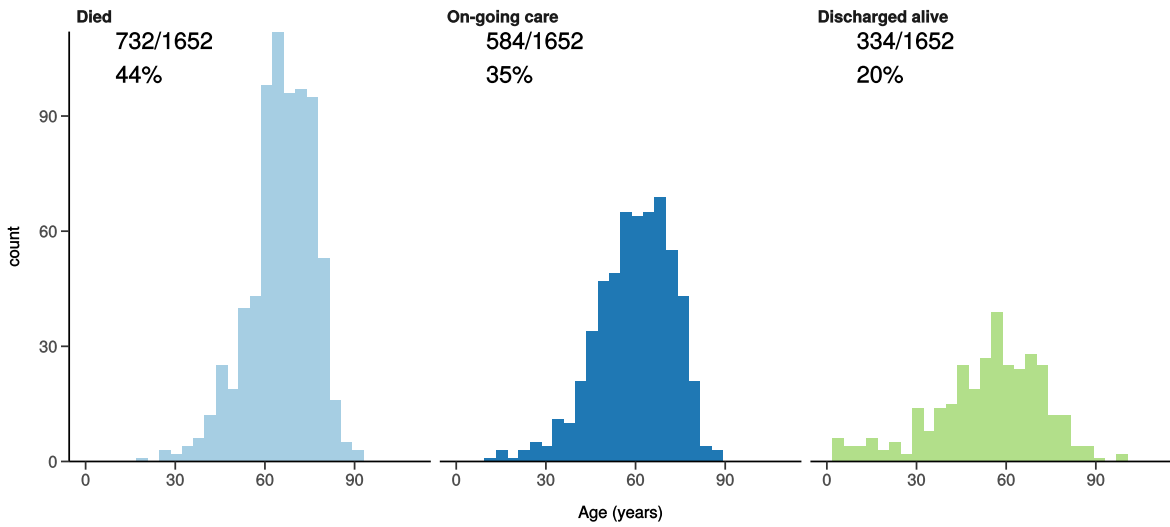
ICU/HDU admissions: status in patients admitted  $\geq 14$  days ago

Figure 11B



Invasive ventilation: status in patients admitted  $\geq 14$  days ago

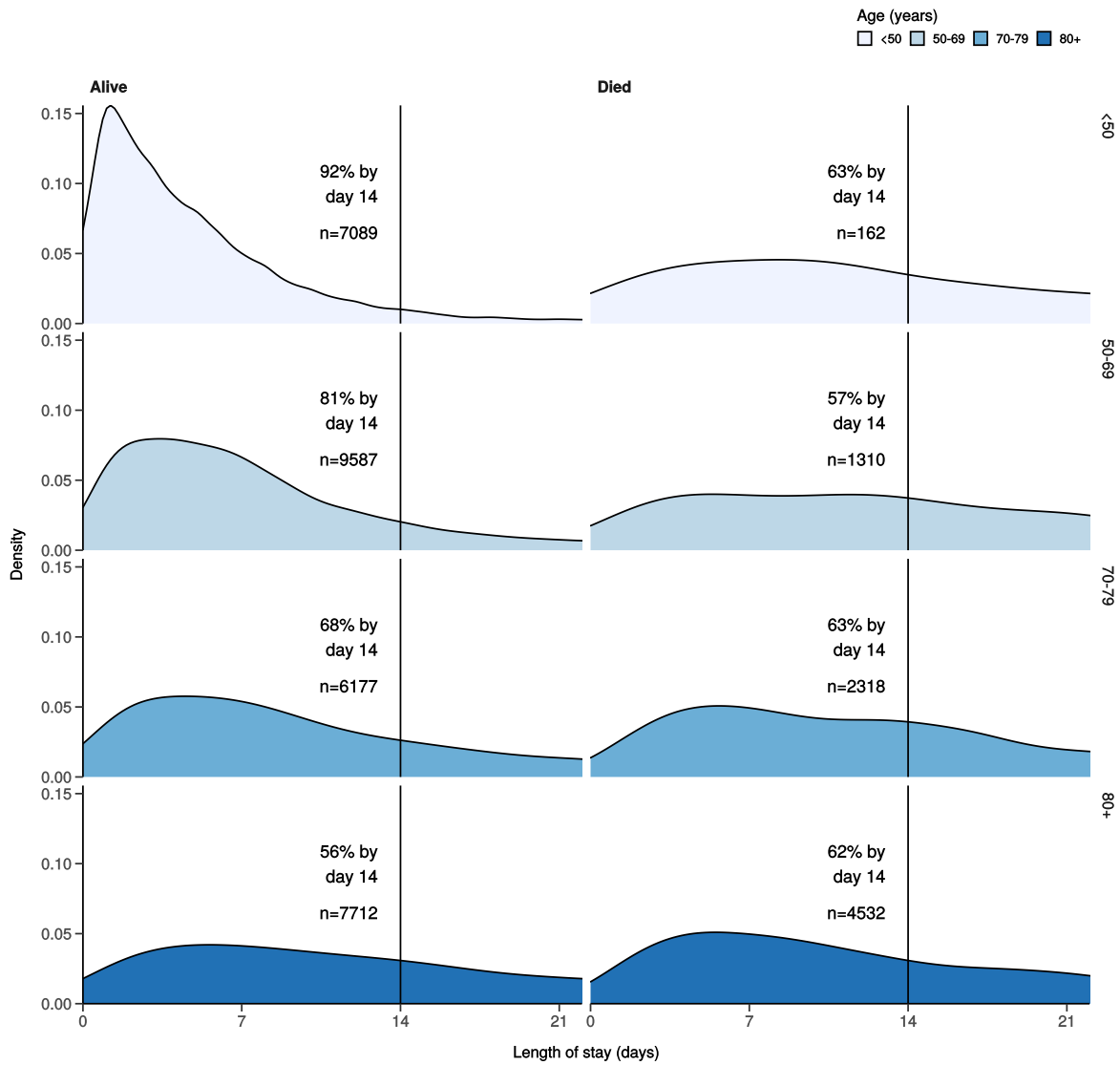
Figure 11c



## Length of stay stratified by age

Figure 12

Length of stay stratified by age and mortality  
Proportion who reach outcome by day 14 shown



## Predictors of death: logistic regression multivariable model

Logistic regression model only includes patients admitted >14 days ago from today.

Dependent: death		No	Yes	OR (univariable)	OR (multivariable)
Age on admission (years)	<50	7582 (97.9)	166 (2.1)	•	•
	50-69	10087 (88.3)	1335 (11.7)	6.04 (5.15-7.15, p<0.001)	5.08 (4.25-6.12, p<0.001)
	70-79	6572 (73.7)	2347 (26.3)	16.31 (13.93-19.23, p<0.001)	11.95 (10.01-14.37, p<0.001)
	80+	8247 (64.2)	4606 (35.8)	25.51 (21.86-29.98, p<0.001)	18.28 (15.33-21.97, p<0.001)
Sex at Birth	Male	16869 (76.8)	5083 (23.2)	•	•
	Female	15636 (82.2)	3378 (17.8)	0.72 (0.68-0.75, p<0.001)	0.67 (0.63-0.71, p<0.001)
	Not specified	0 (NaN)	0 (NaN)	•	•
Chronic cardiac disease	NO	22554 (84.3)	4195 (15.7)	•	•

Dependent: death		No	Yes	OR (univariable)	OR (multivariable)
	YES	8087 (68.8)	3659 (31.2)	2.43 (2.31-2.56, p<0.001)	1.20 (1.13-1.28, p<0.001)
Chronic pulmonary disease (not asthma)	NO	26579 (81.9)	5866 (18.1)	•	•
	YES	4082 (67.0)	2007 (33.0)	2.23 (2.10-2.37, p<0.001)	1.54 (1.43-1.66, p<0.001)
Chronic neurological disorder	NO	27274 (80.5)	6609 (19.5)	•	•
	YES	3263 (73.2)	1193 (26.8)	1.51 (1.40-1.62, p<0.001)	1.03 (0.95-1.13, p=0.460)
Chronic hematologic disease	NO	29190 (80.0)	7314 (20.0)	•	•
	YES	1295 (73.2)	474 (26.8)	1.46 (1.31-1.63, p<0.001)	0.93 (0.82-1.06, p=0.290)
Chronic kidney disease	NO	26661 (82.2)	5785 (17.8)	•	•
	YES	3954 (65.8)	2057 (34.2)	2.40 (2.26-2.55, p<0.001)	1.35 (1.26-1.46, p<0.001)
Dementia	NO	27816 (81.8)	6179 (18.2)	•	•
	YES	2681 (63.4)	1551 (36.6)	2.60 (2.43-2.79, p<0.001)	1.40 (1.29-1.53, p<0.001)
Obesity (as defined by clinical staff)	NO	23371 (79.6)	6004 (20.4)	•	•
	YES	4140 (83.6)	815 (16.4)	0.77 (0.71-0.83, p<0.001)	1.05 (0.95-1.15, p=0.341)
Malignant neoplasm	NO	28105 (81.2)	6498 (18.8)	•	•
	YES	2418 (64.9)	1307 (35.1)	2.34 (2.17-2.51, p<0.001)	1.66 (1.52-1.81, p<0.001)

Number in dataframe = 49638, Number in model = 32949, Missing = 16689, AIC = 27929.1, C-statistic = 0.758, H&L = Chi-sq(8) 54.17 (p<0.001)

Figure 13 - Adjusted odds ratio plot

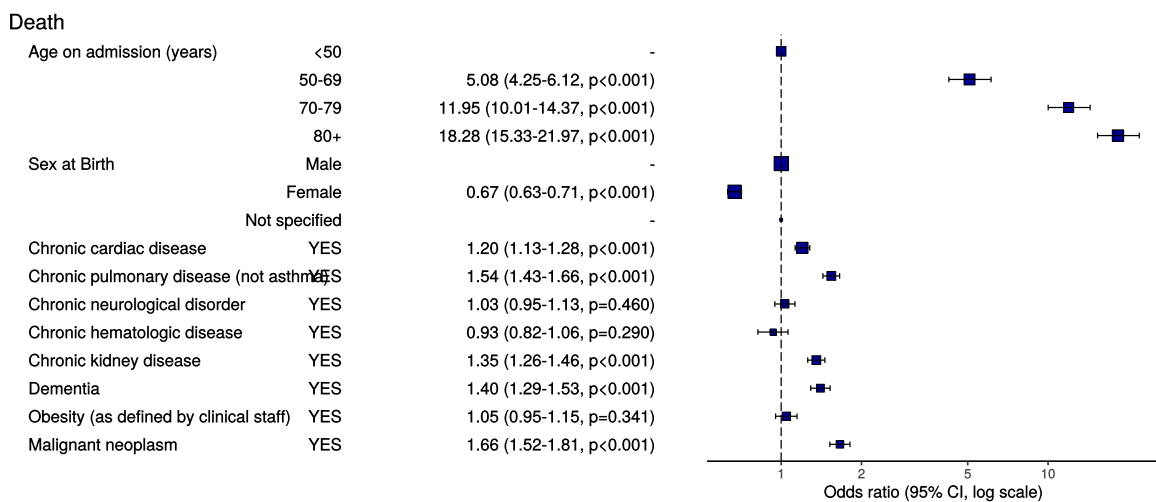
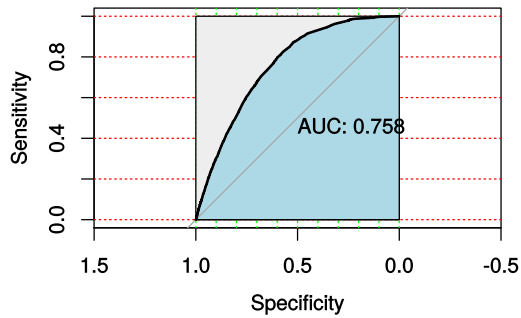


Figure 14 - ROC

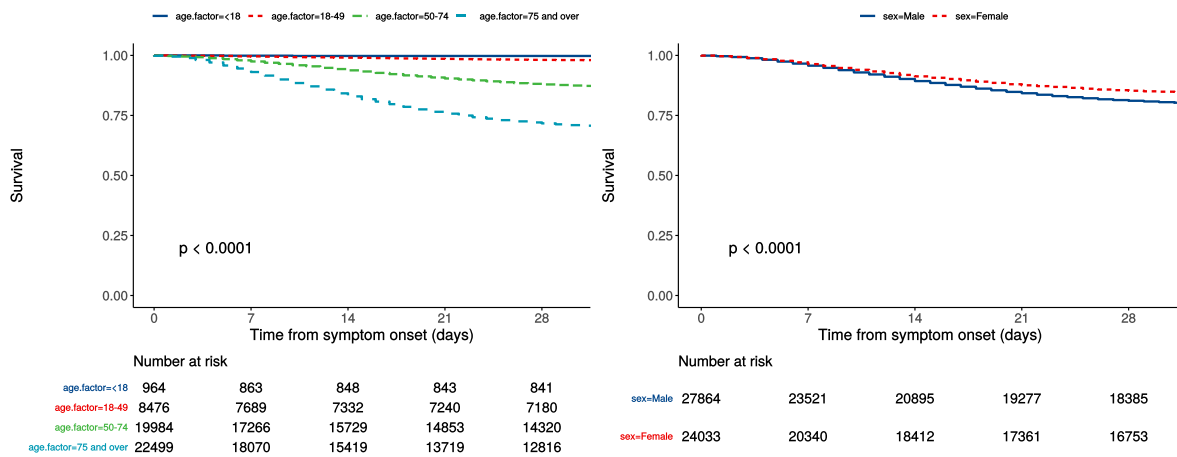


## Survival models

Kaplan-Meier plots for survival from symptom onset stratified by age (left) and sex (right)

Figure 15

P-value is log-rank test.



## Cox proportional hazards model

The methodology for this is now up and running, but models are still being explored. **What is presented here is not a final model, but to demonstrate methodology.** The results are correct, but important variables have not yet been included.

Time from symptom onset.

Dependent: Surv(time, status)		all	HR (univariable)	HR (multivariable)
Age on admission (years)	<50	9440 (18.2)	•	•
	50-69	14505 (27.9)	5.66 (4.82-6.64, p<0.001)	4.68 (3.87-5.65, p<0.001)
	70-79	11502 (22.1)	14.03 (12.00-16.40, p<0.001)	11.19 (9.29-13.47, p<0.001)
	80+	16483 (31.7)	20.73 (17.78-24.19, p<0.001)	16.51 (13.72-19.86, p<0.001)
Sex at Birth	Male	27864 (53.7)	•	•
	Female	24033 (46.3)	0.75 (0.72-0.78, p<0.001)	0.74 (0.70-0.78, p<0.001)
qSOFA score on admission	0	21694 (52.0)	•	•
	1	17216 (41.3)	1.67 (1.59-1.76, p<0.001)	1.86 (1.75-1.96, p<0.001)
	2	2655 (6.4)	3.48 (3.24-3.75, p<0.001)	3.21 (2.95-3.49, p<0.001)
	3	163 (0.4)	6.20 (4.99-7.70, p<0.001)	5.42 (4.26-6.89, p<0.001)
Symptomatic at presentation	No symptoms	9147 (19.1)	•	•

Dependent: Surv(time, status)		all	HR (univariable)	HR (multivariable)
	Symptoms	38765 (80.9)	1.69 (1.58-1.80, p<0.001)	•
Chronic cardiac disease	NO	32084 (69.6)	•	•
	YES	14033 (30.4)	2.21 (2.11-2.31, p<0.001)	1.19 (1.13-1.26, p<0.001)
Chronic kidney disease	NO	38872 (84.4)	•	•
	YES	7167 (15.6)	2.16 (2.05-2.27, p<0.001)	1.27 (1.20-1.35, p<0.001)
Moderate or severe liver disease	NO	44792 (98.0)	•	•
	YES	902 (2.0)	1.60 (1.41-1.82, p<0.001)	1.62 (1.38-1.90, p<0.001)
Chronic neurological disorder	NO	40489 (88.3)	•	•
	YES	5384 (11.7)	1.42 (1.34-1.52, p<0.001)	•
Malignant neoplasm	NO	41432 (90.3)	•	•
	YES	4433 (9.7)	2.07 (1.96-2.20, p<0.001)	1.51 (1.41-1.63, p<0.001)
Chronic hematologic disease	NO	43718 (95.5)	•	•
	YES	2043 (4.5)	1.39 (1.27-1.52, p<0.001)	•
Obesity (as defined by clinical staff)	NO	35243 (85.9)	•	•
	YES	5801 (14.1)	0.79 (0.74-0.85, p<0.001)	1.03 (0.95-1.12, p=0.440)
Diabetes without complications	NO	37619 (87.3)	•	•
	YES	5467 (12.7)	1.16 (1.09-1.24, p<0.001)	•
Rheumatologic disorder	NO	39416 (86.2)	•	•
	YES	6328 (13.8)	1.20 (1.13-1.27, p<0.001)	•
Dementia	NO	40629 (88.7)	•	•
	YES	5163 (11.3)	2.33 (2.20-2.46, p<0.001)	1.20 (1.12-1.29, p<0.001)
Malnutrition	NO	41573 (97.7)	•	•
	YES	973 (2.3)	1.80 (1.60-2.03, p<0.001)	•
smoking_mhyn_2levels	NO	21955 (46.0)	•	•
	YES	2637 (5.5)	0.92 (0.83-1.02, p=0.123)	•
	N/K	23158 (48.5)	1.17 (1.12-1.22, p<0.001)	•

Number in dataframe = 52090, Number in model = 34299, Missing = 17791, Number of events = 5854, Concordance = 0.758 (SE = 0.003), R-squared = 0.137 (Max possible = 0.970), Likelihood ratio test = 5042.207 (df = 13, p = 0.000)

**Figure 16a - Multivariable Cox proportional hazards model**

Survival: HR (95% CI, p-value)

Age on admission (years)	<50	-
	50-69	4.68 (3.87-5.65, p<0.001)
	70-79	11.19 (9.29-13.47, p<0.001)
	80+	16.51 (13.72-19.86, p<0.001)
Sex at Birth	Female	0.74 (0.70-0.78, p<0.001)
qSOFA score on admission	0	-
	1	1.86 (1.75-1.96, p<0.001)
	2	3.21 (2.95-3.49, p<0.001)
	3	5.42 (4.26-6.89, p<0.001)
Chronic cardiac disease	YES	1.19 (1.13-1.26, p<0.001)
Chronic kidney disease	YES	1.27 (1.20-1.35, p<0.001)
Moderate or severe liver disease	YES	1.62 (1.38-1.90, p<0.001)
Malignant neoplasm	YES	1.51 (1.41-1.63, p<0.001)
Obesity (as defined by clinical staff)	YES	1.03 (0.95-1.12, p=0.440)
Dementia	YES	1.20 (1.12-1.29, p<0.001)

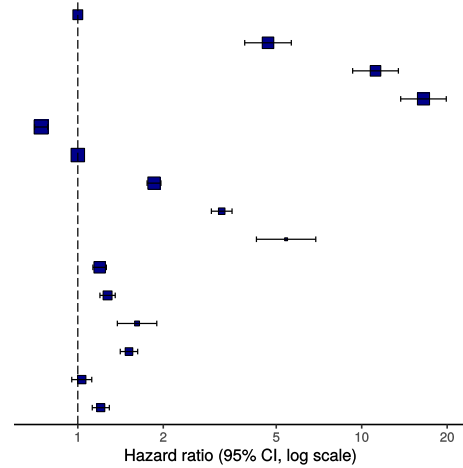
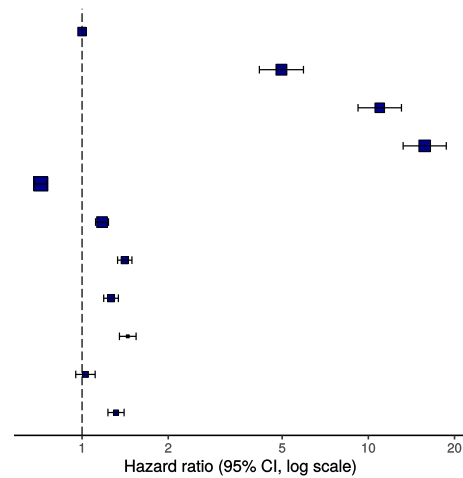


Figure 16b - Multivariable Cox proportional hazards model (age, sex, comorbidities only)

Survival: HR (95% CI, p-value)

Age on admission (years)	<50	-
	50-69	4.97 (4.16-5.93, p<0.001)
	70-79	10.96 (9.20-13.05, p<0.001)
	80+	15.73 (13.23-18.72, p<0.001)
Sex at Birth	Female	0.72 (0.68-0.76, p<0.001)
Chronic cardiac disease	YES	1.17 (1.11-1.24, p<0.001)
Chronic pulmonary disease (not asthma)	YES	1.41 (1.33-1.49, p<0.001)
Chronic kidney disease	YES	1.26 (1.19-1.34, p<0.001)
Malignant neoplasm	YES	1.44 (1.35-1.54, p<0.001)
Obesity (as defined by clinical staff)	YES	1.03 (0.95-1.11, p=0.493)
Dementia	YES	1.31 (1.23-1.40, p<0.001)



ROC = 0.7587206

Figure 17 - Predictions calibration plot

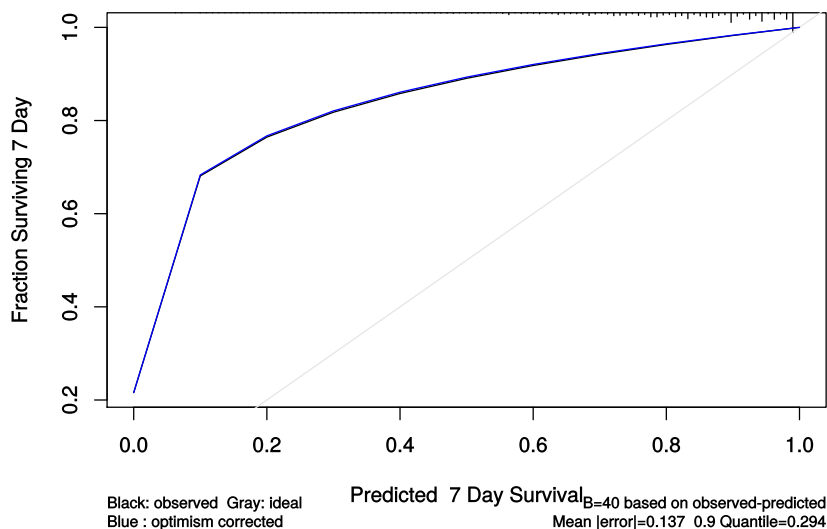


Figure 18 - Prognostic model predictions

Again, for demonstration of methods.

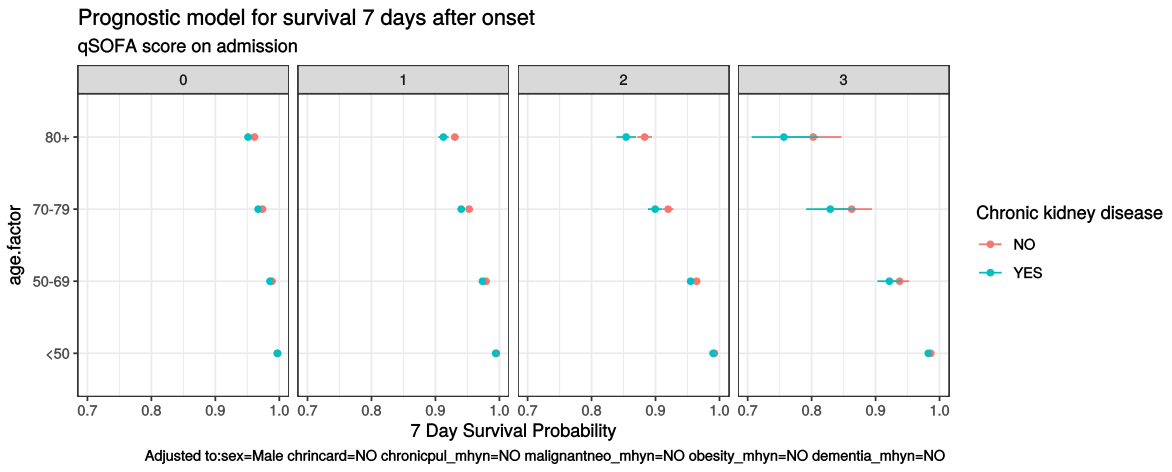


Figure 19 - Death by severity (NEWS) on admission

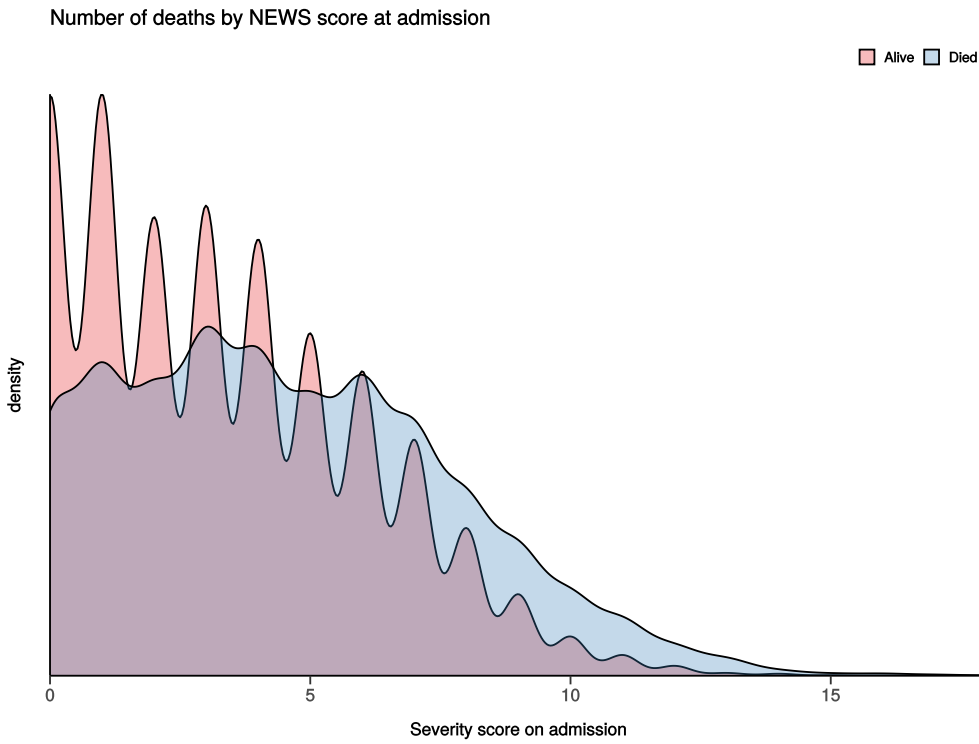


Figure 20 - Death by severity (NEWS) on admission stratified by age



Number of deaths by NEWS score at admission  
Stratified by age

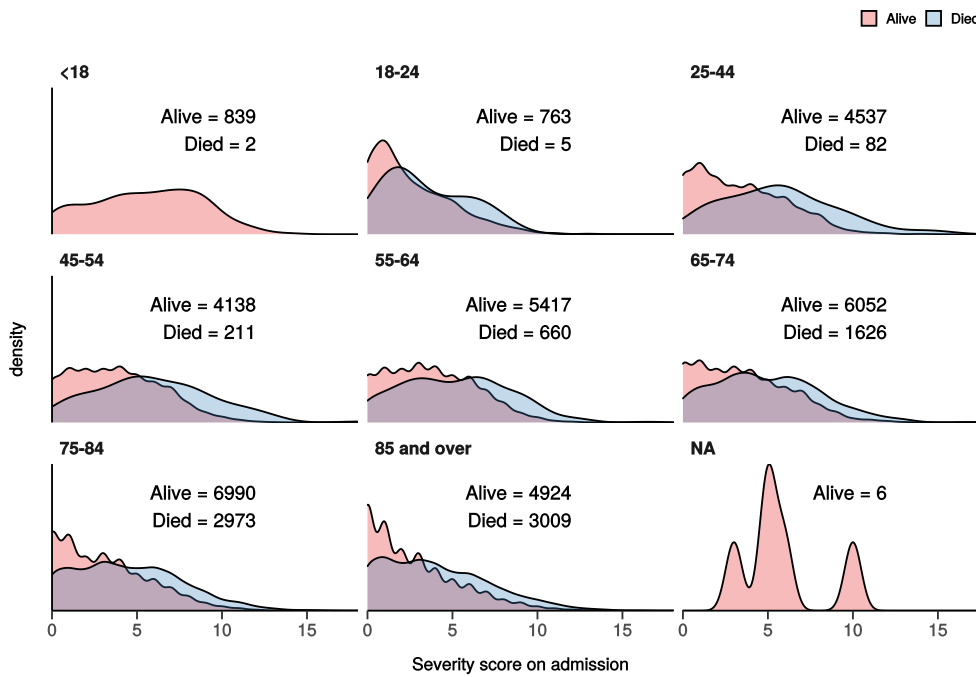
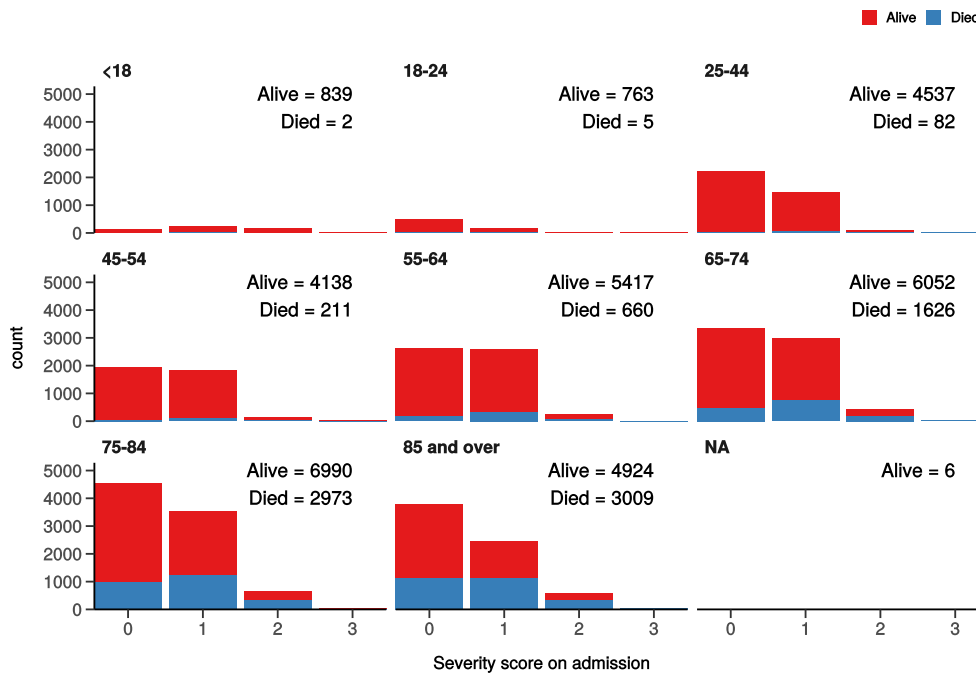


Figure 21 - Death by severity (qSOFA) on admission stratified by age

Number of deaths by qSOFA score at admission  
Stratified by age



## Healthcare workers

Employed as a healthcare worker?		NO	YES	p
Total N (%)		40237 (97.6)	990 (2.4)	
NEWS score on admission	Median (IQR)	3.0 (4.0)	3.0 (5.0)	0.001
Death	No	24827 (76.5)	809 (95.9)	<0.001
	Yes	7643 (23.5)	35 (4.1)	