

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

Dynamic content updated: 2020-11-05 03:33:44.

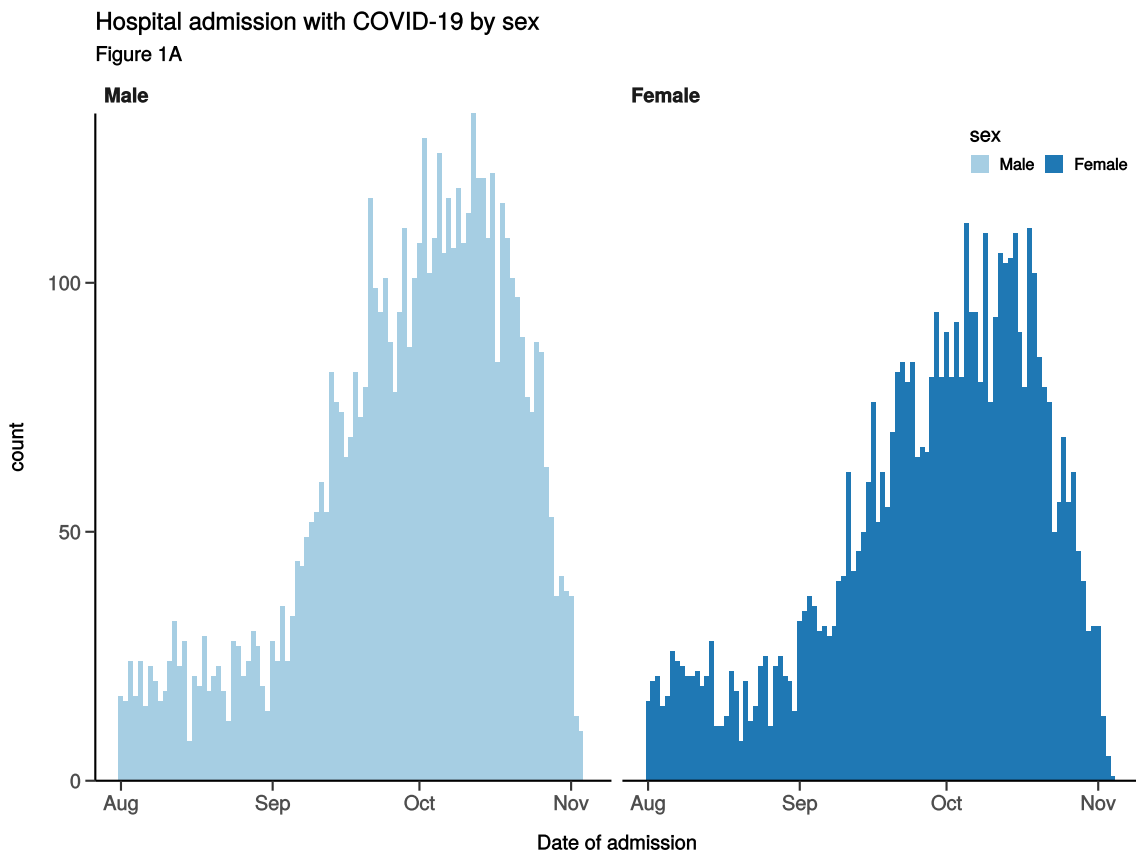
## Executive summary

### Includes patients admitted after 01 August 2020

There are 10654 patients included in CO-CIN. Of these, 1289 patient(s) have died and 1188 required ICU. 5481 have been discharged home.

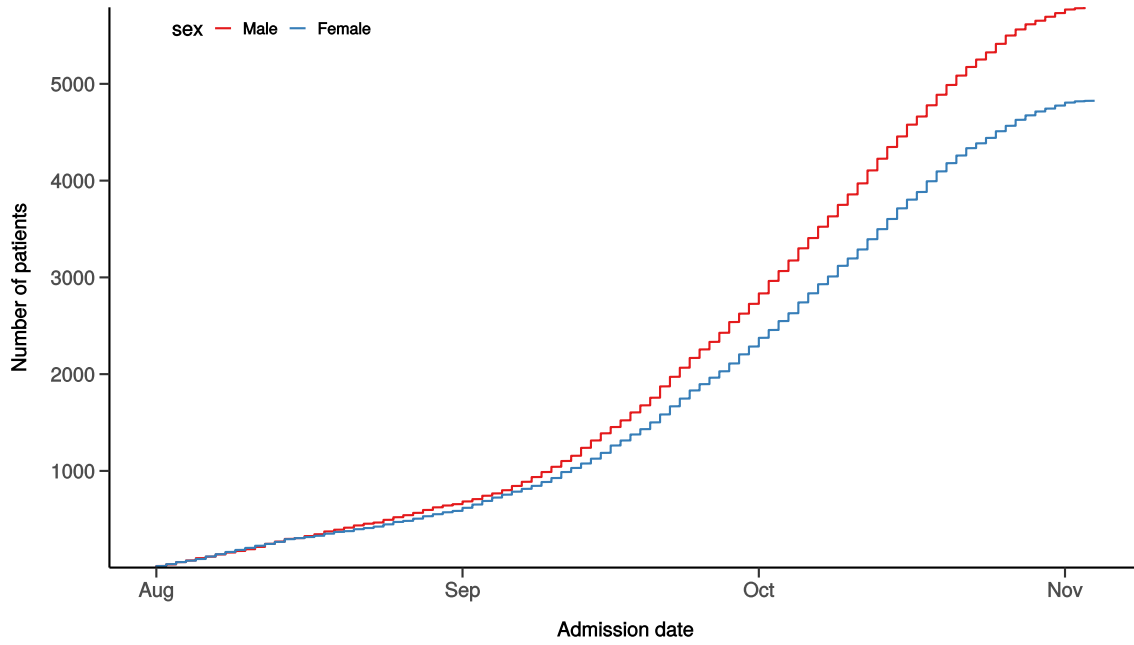
## Admission

Figure 1



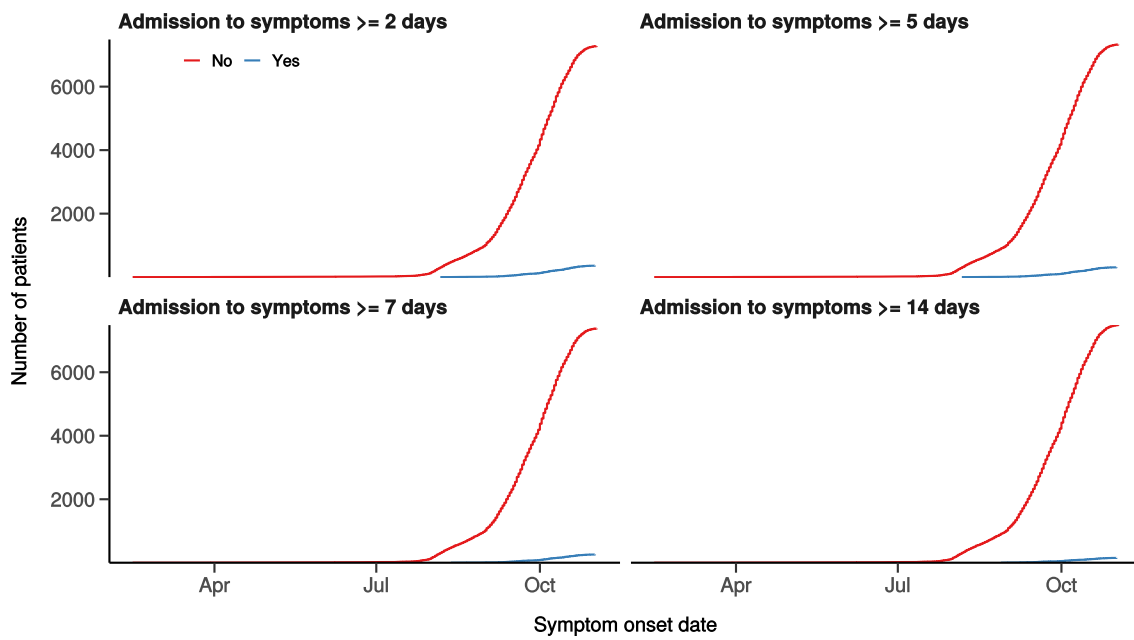
### Hospital admission with COVID-19 by sex

Figure 1B



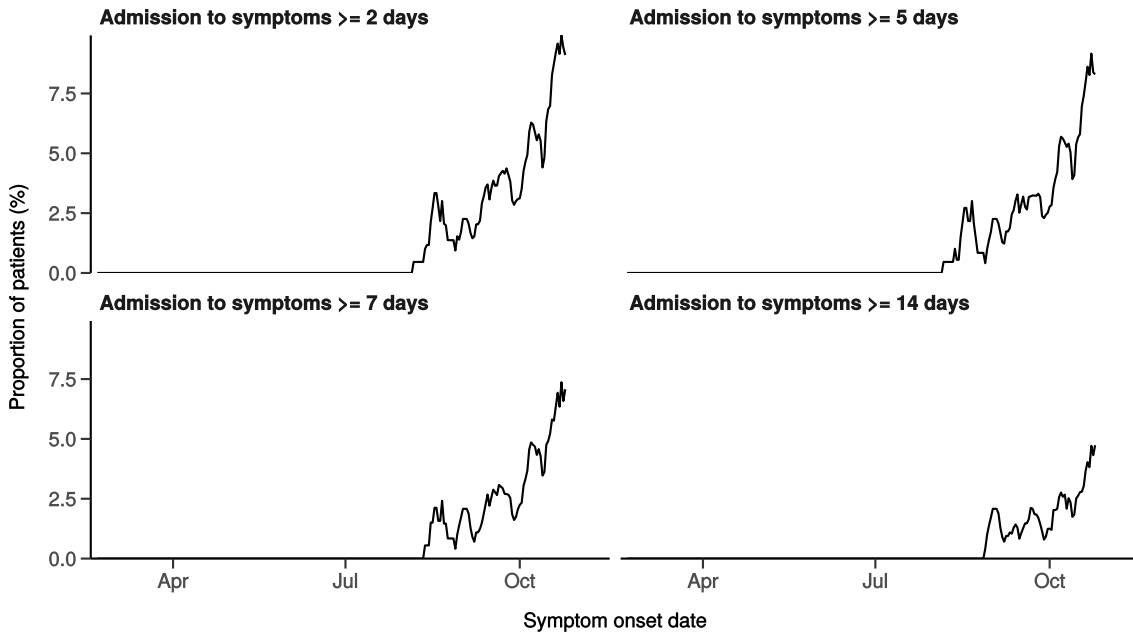
### Number with symptom onset occurring after admission to hospital

Figure 1C



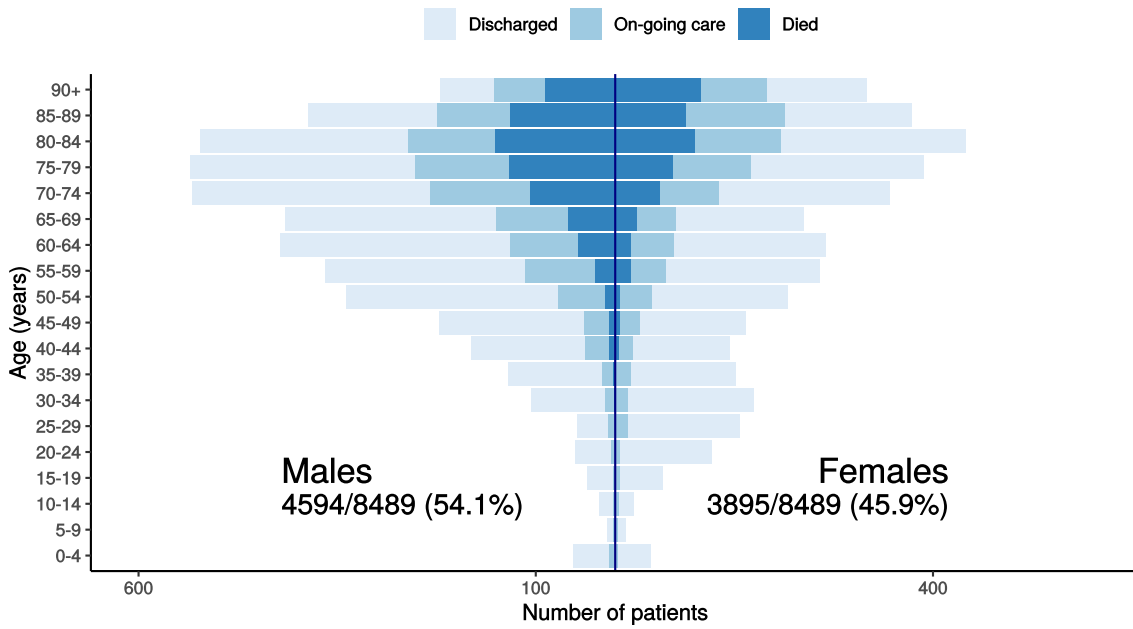
Proportion with symptom onset occurring after hospital admission

Figure 1D - 7-day rolling percentage. n = 7637

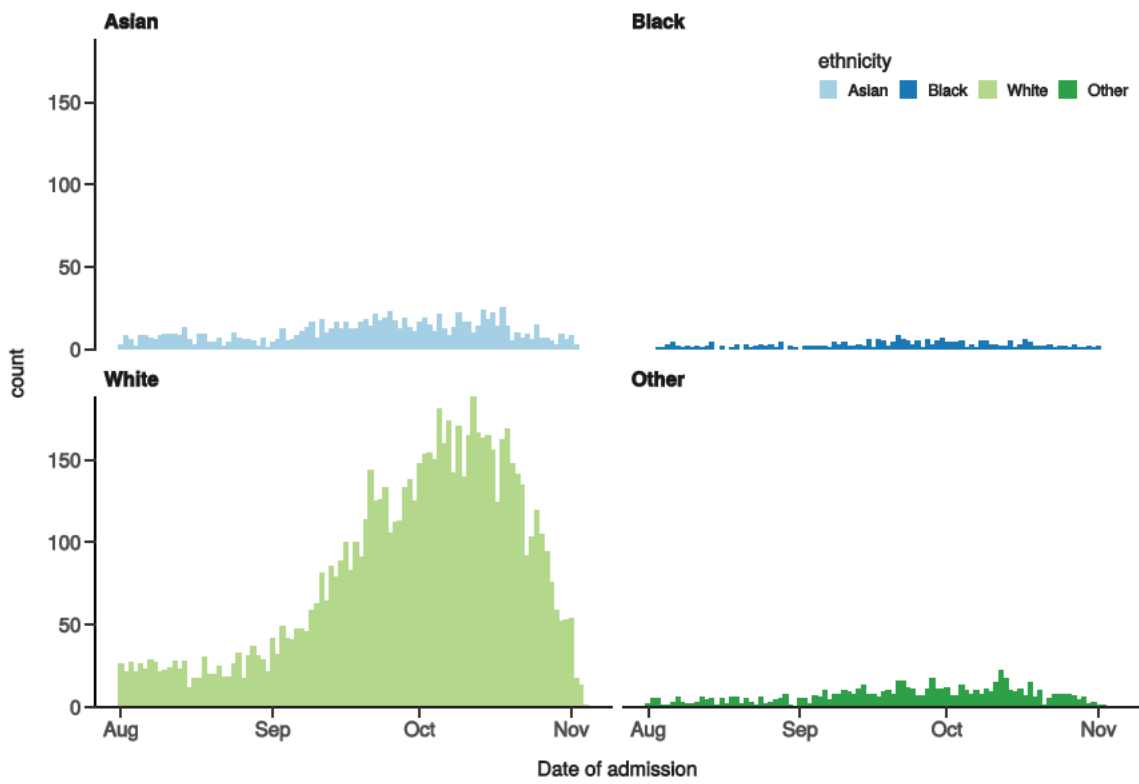


Patients with outcome stratified by age, and sex

Figure 1E



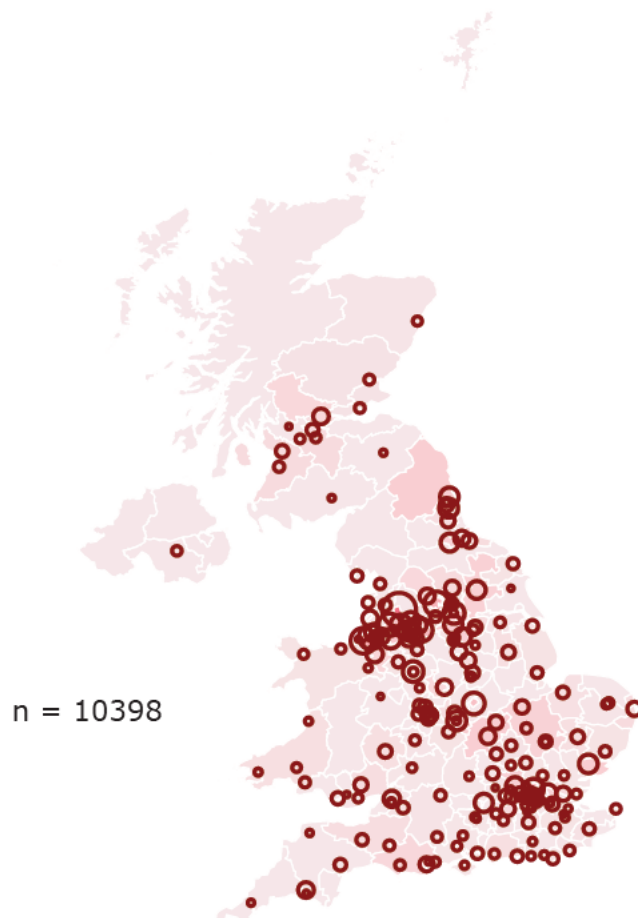
Hospital admission with COVID-19 by ethnicity  
Figure 1F



## 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

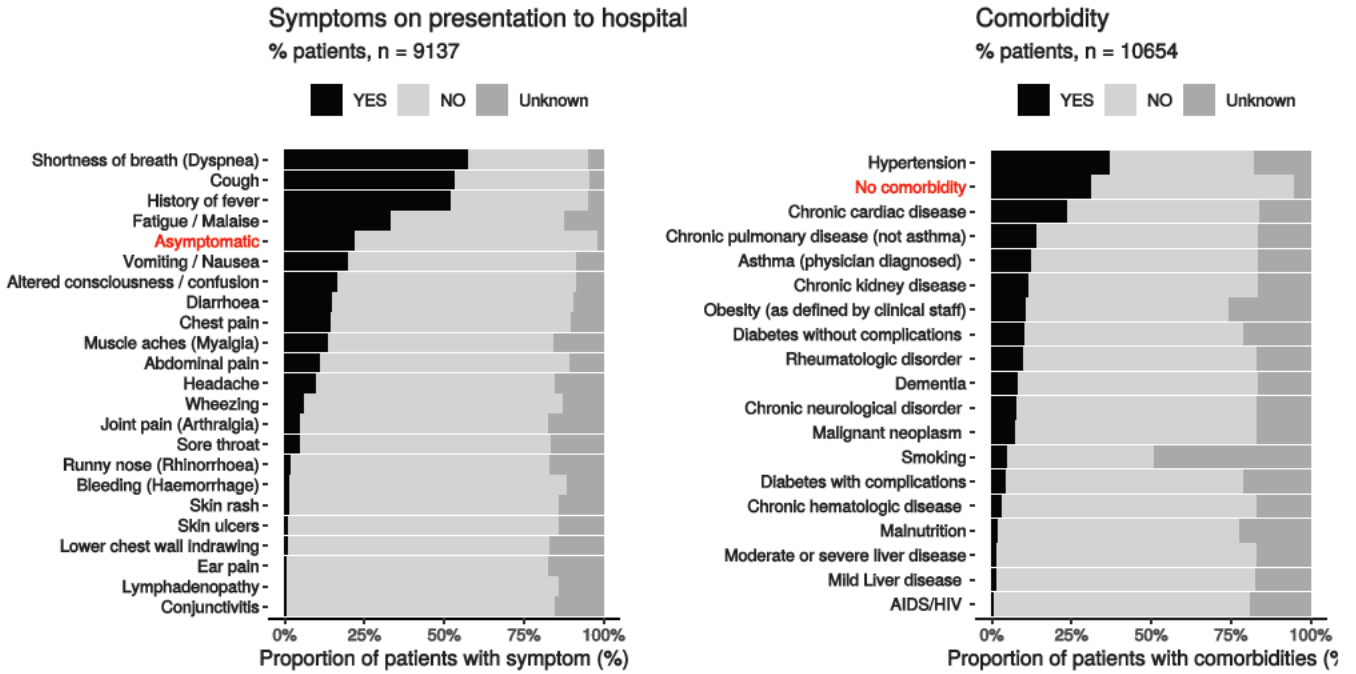


Figure 3B - Symptoms by Age

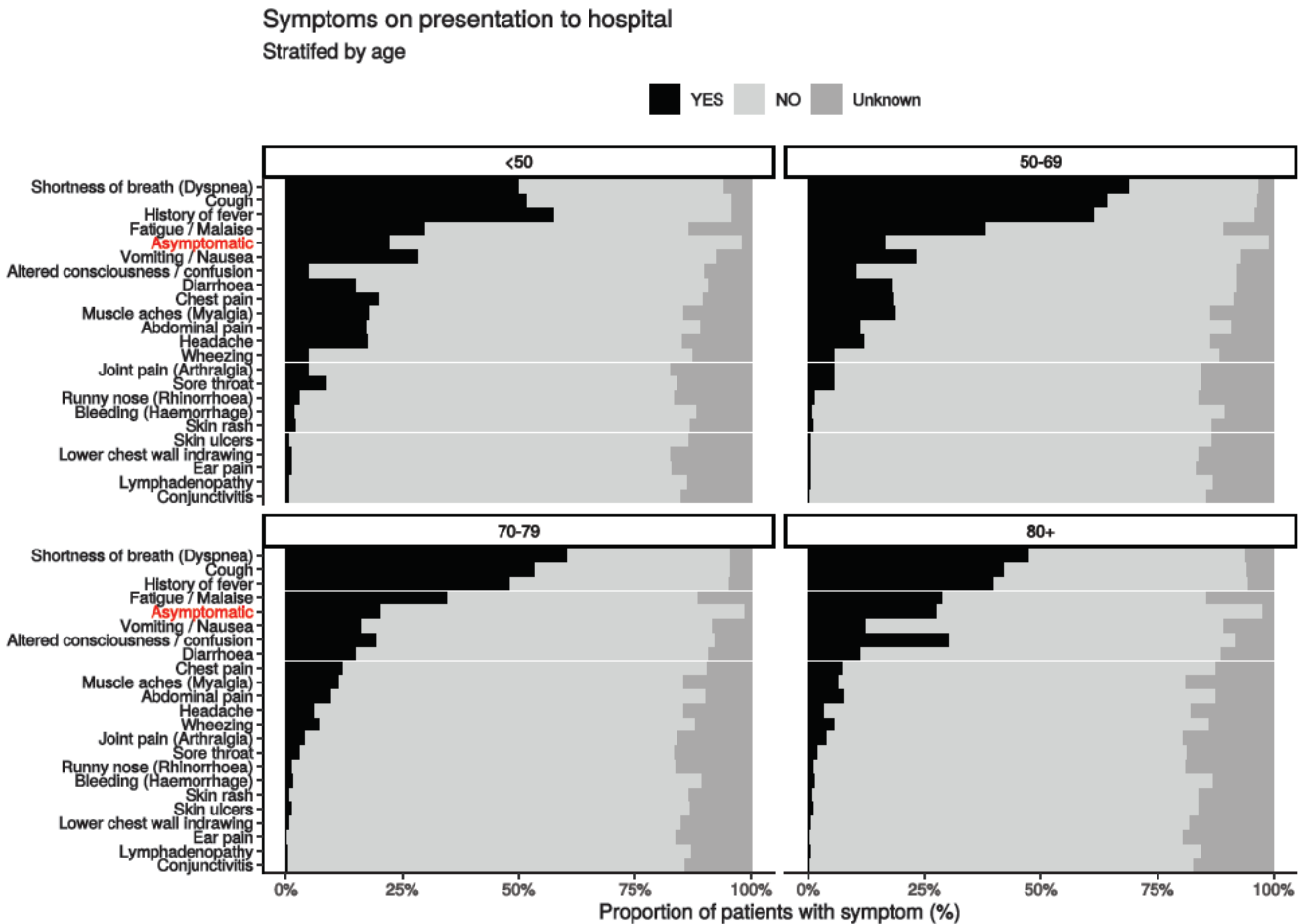
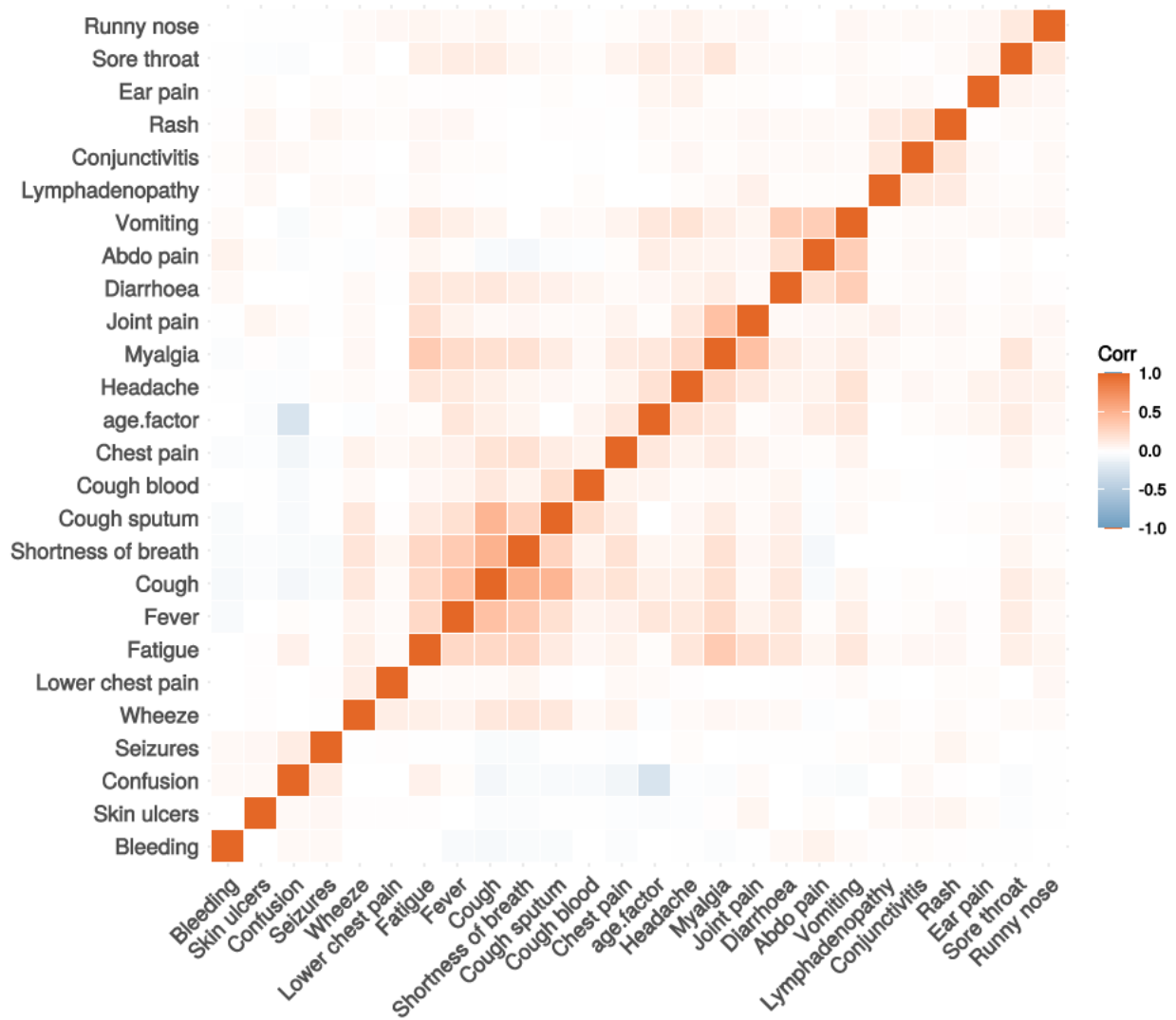


Figure 3C

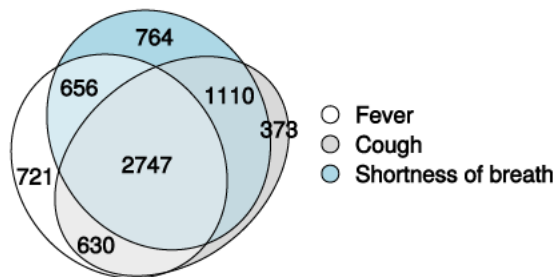
Correlation of symptoms in all pages. Note clusters, top right to bottom left, flu-like, coryzal, abdominal, respiratory, neurocutaneous.



### Symptoms (diagnostic criteria)

Figure 4A

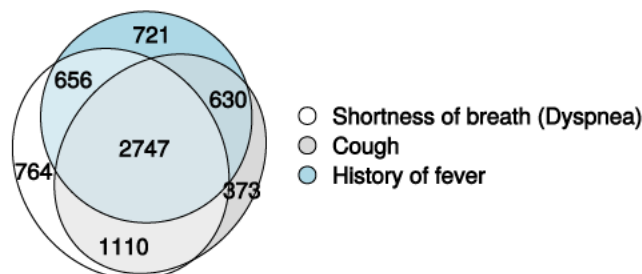
n = 9137



### Symptoms (most common)

Figure 4B

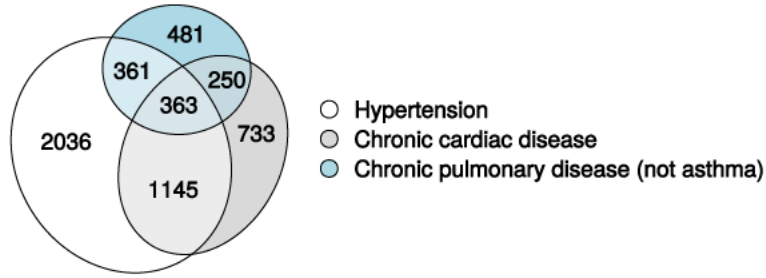
n = 9137



### Comorbidity (most common)

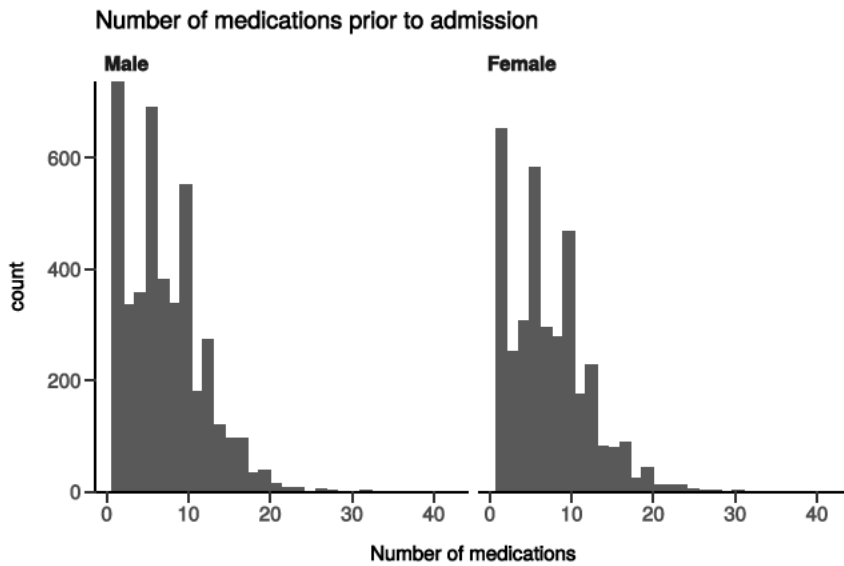
Figure 4C

n = 10654



## Medication prior to illness

Figure 5

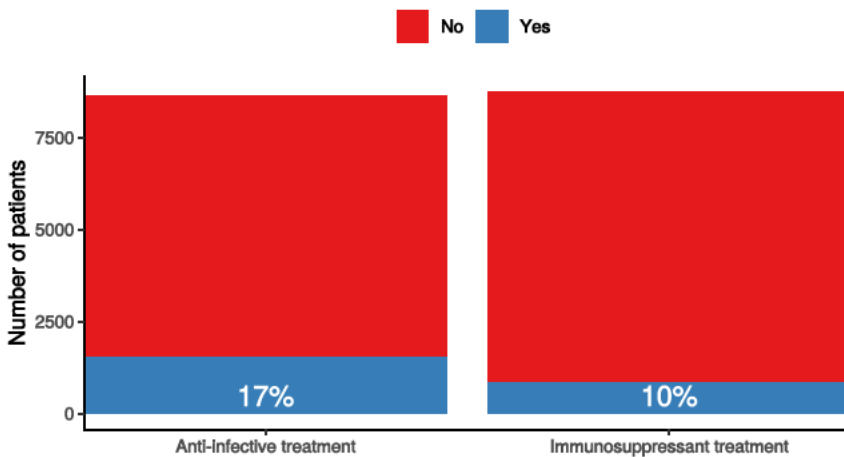


## Preadmission treatment

Figure 6

Pre-admission treatment

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



## Patient flow

Figure 7A - All patients

N = 9443

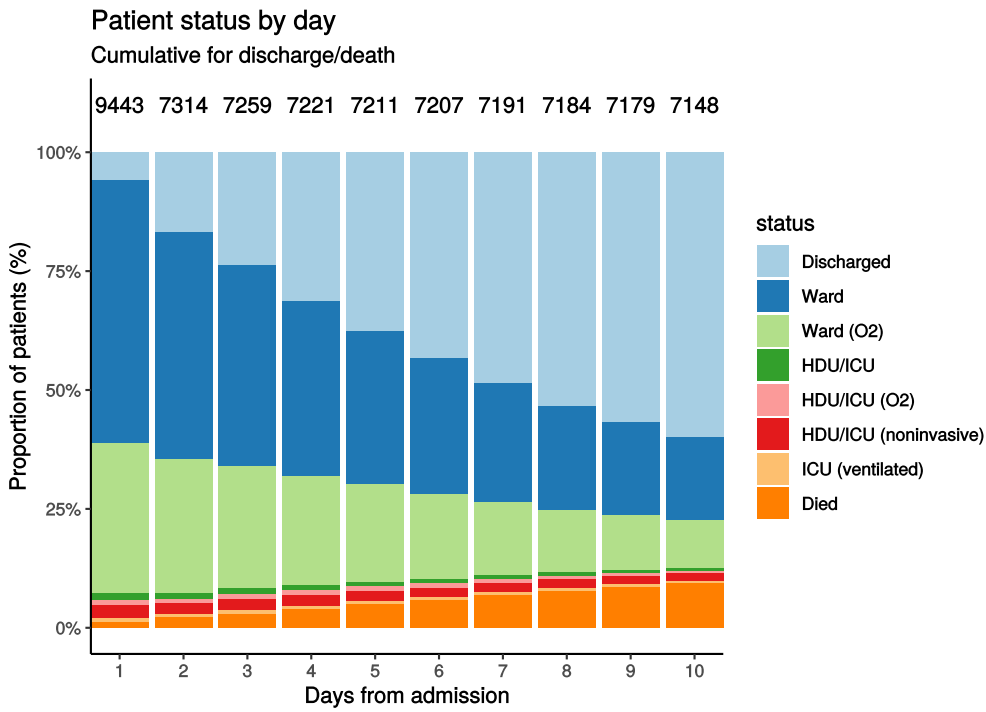
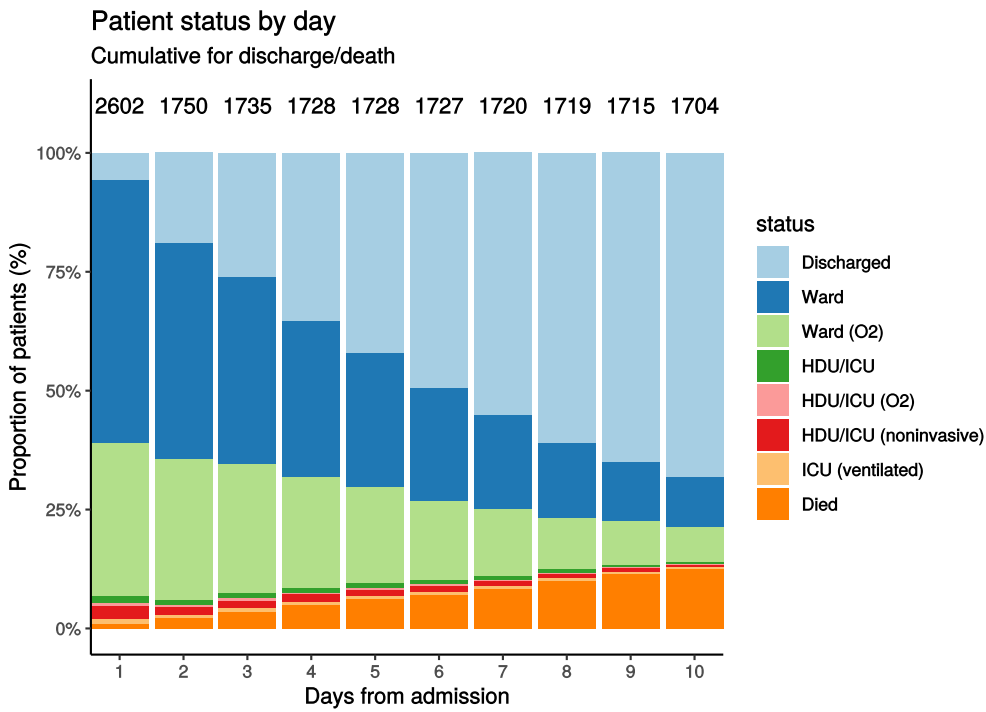


Figure 7B - Patients admitted  $\geq 14$  days and  $\leq 28$  days ago

N = 2602



## Oxygen requirement

Figure 8A - All patients

N = 9002



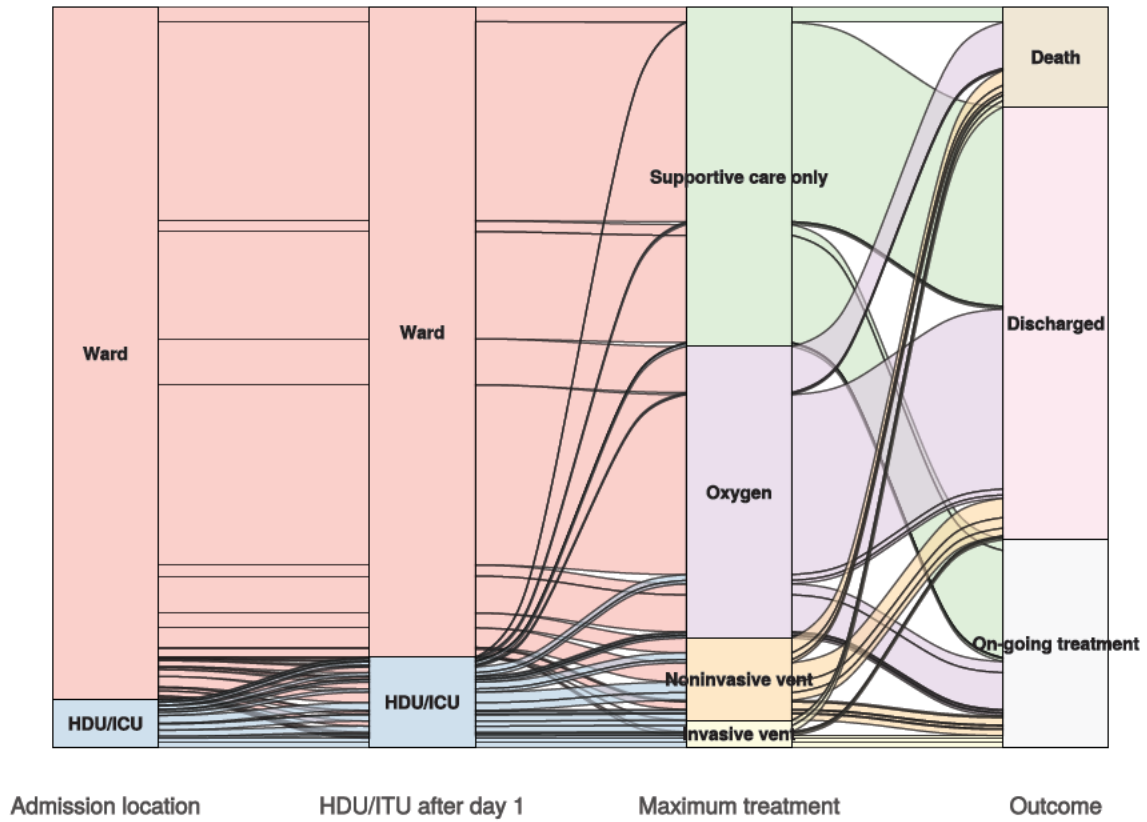


Figure 8B - Patients admitted  $\geq 14$  days and  $\leq 28$  days ago

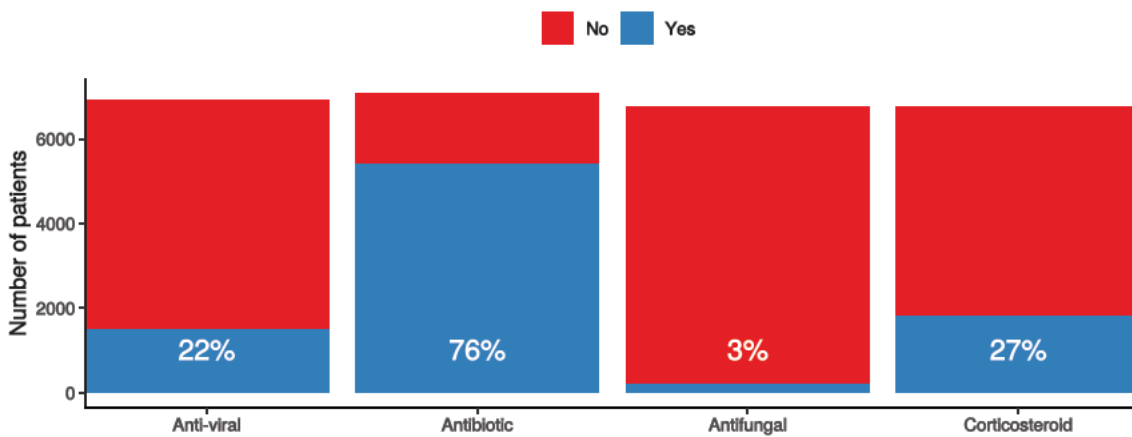
N = 2510

## In-hospital medical treatment

Figure 9

### In-hospital treatment

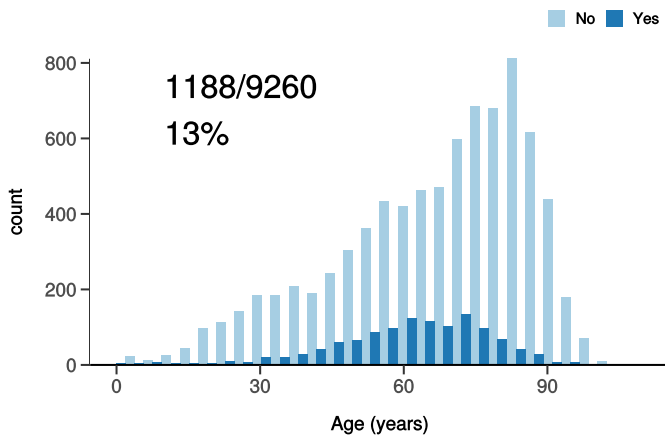
Anti-virals, antibiotics, corticosteroids, and anti-fungals for patients who have completed journey.



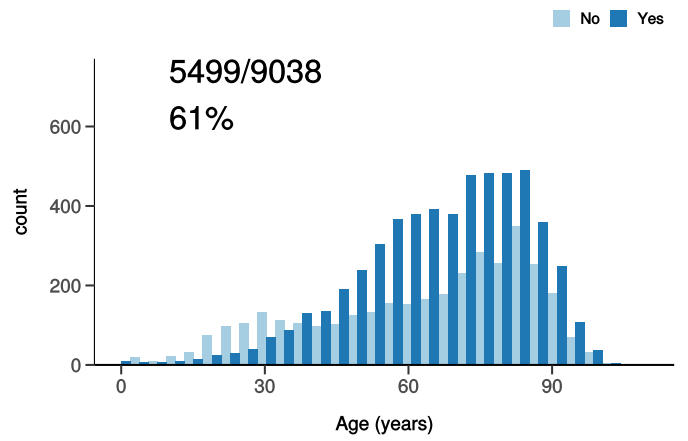
## Treatment

Figure 10

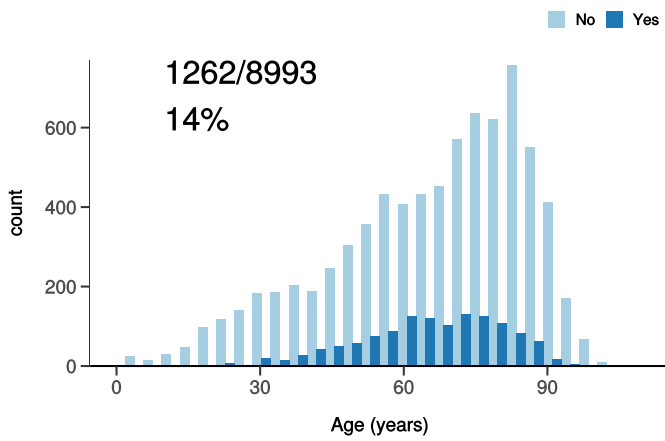
ICU/HDU admission  
Figure 10A



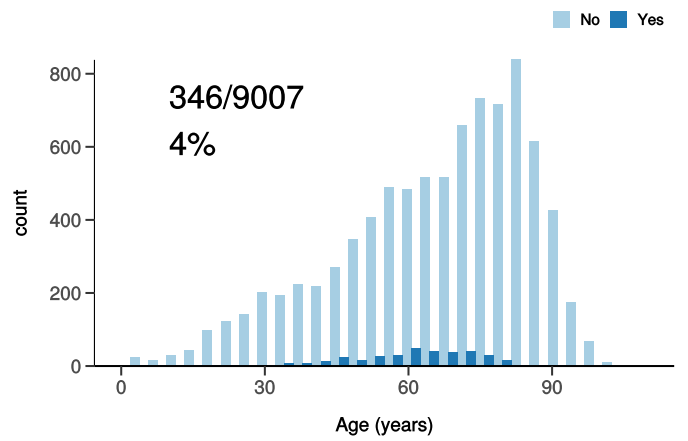
High flow oxygen  
Figure 10B



Noninvasive ventilation  
Figure 10C



Invasive ventilation  
Figure 10D

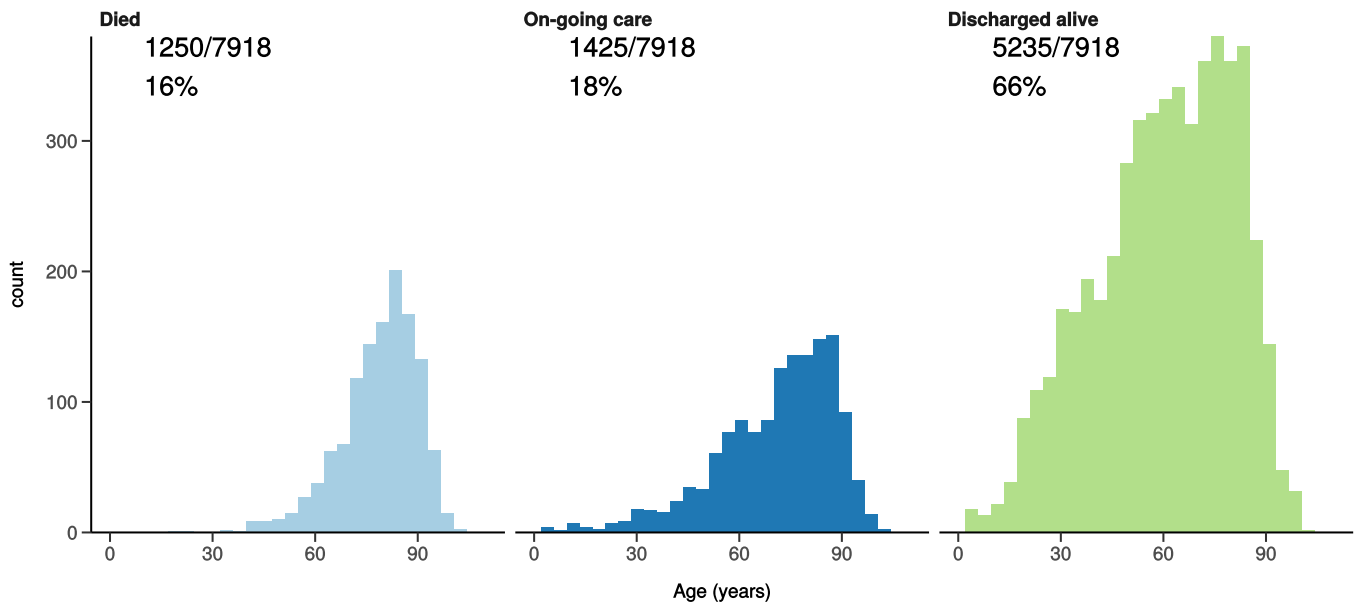


## Status in patients admitted $\geq 14$ days from today

Figure 11

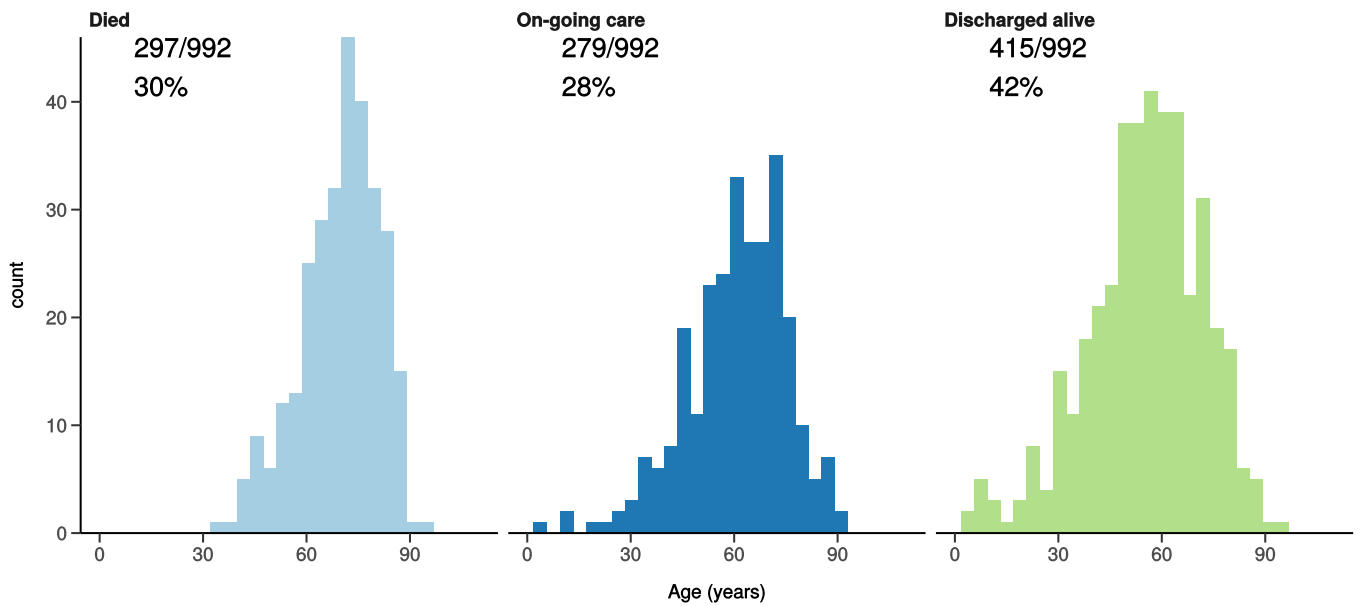
All: status in patients admitted  $\geq 14$  days ago

Figure 11A



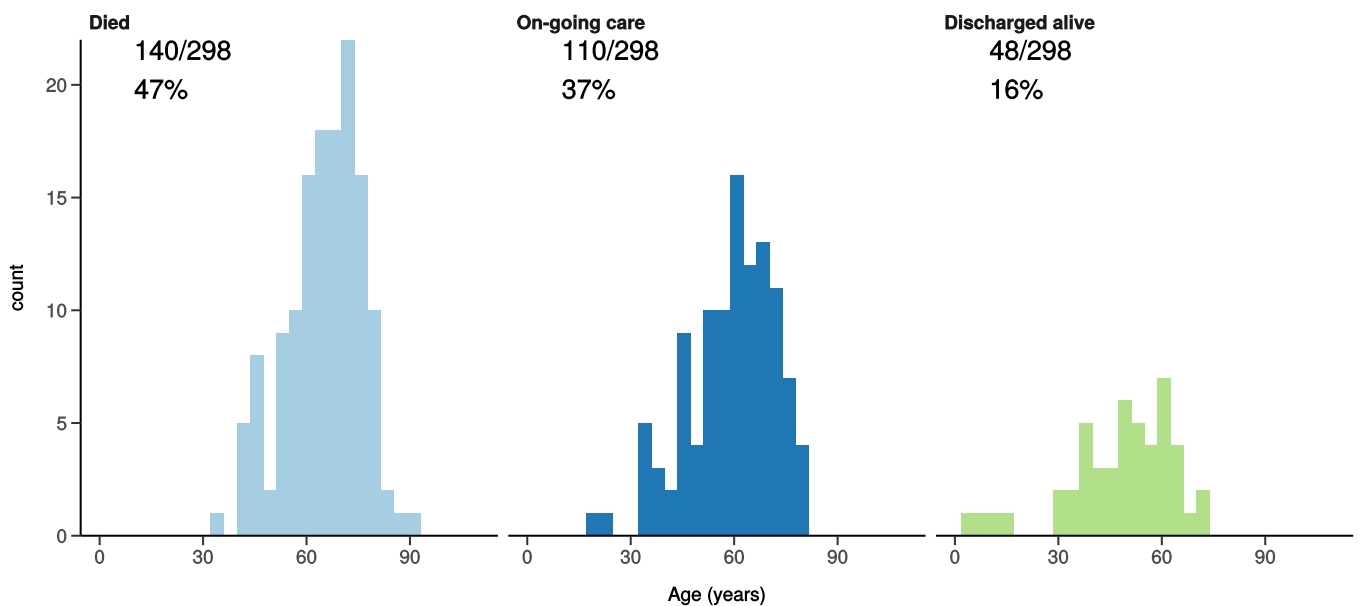
ICU/HDU admissions: status in patients admitted  $\geq 14$  days ago

Figure 11B



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

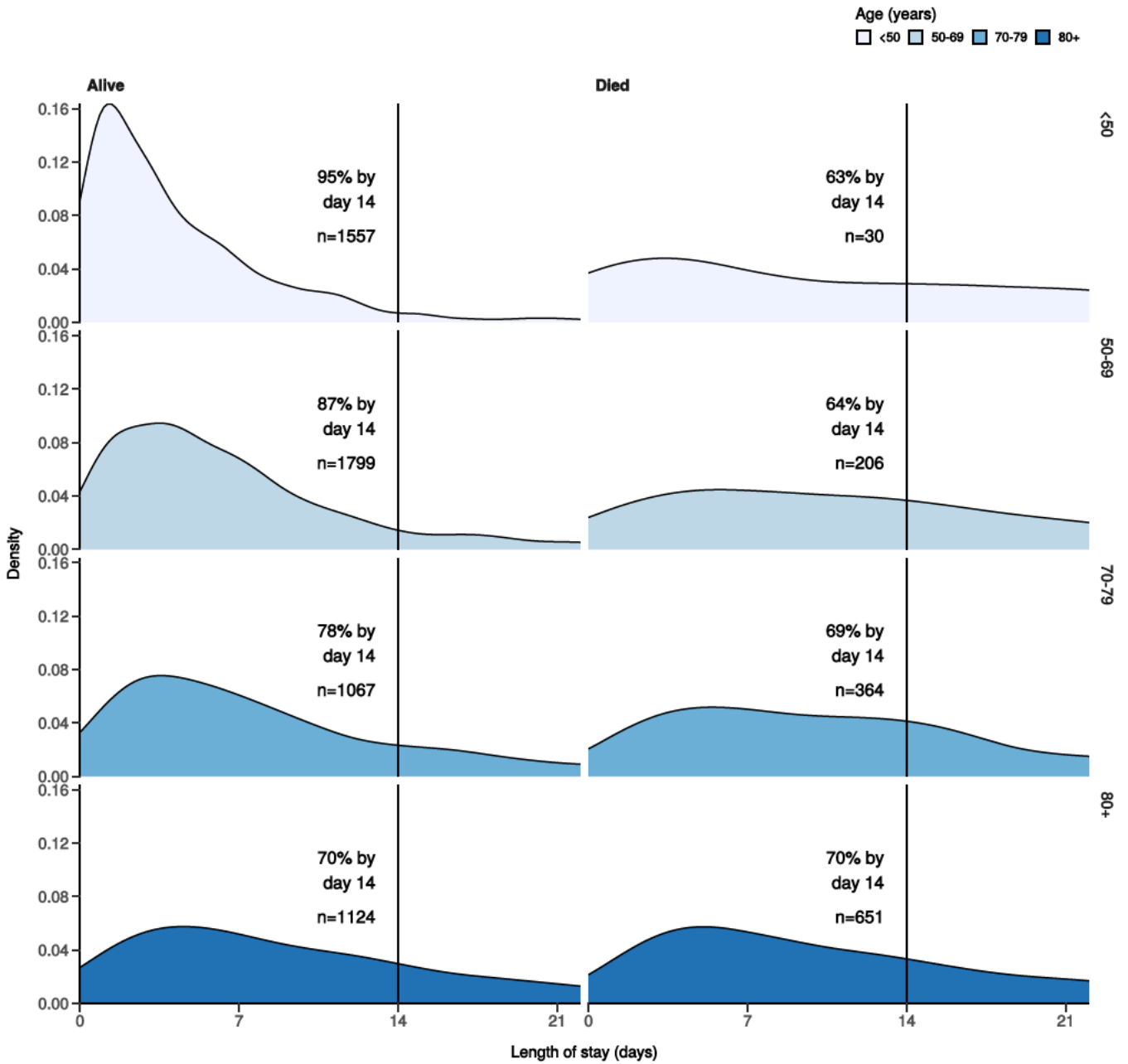
Figure 11c



# 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	1629 (98.2)	30 (1.8)	•	•
	50-69	1799 (89.8)	205 (10.2)	6.19 (4.26-9.31, p<0.001)	5.09 (3.35-8.08, p<0.001)
	70-79	1064 (74.6)	362 (25.4)	18.47 (12.85-27.57, p<0.001)	12.80 (8.45-20.28, p<0.001)
	80+	1130 (63.6)	647 (36.4)	31.09 (21.79-46.14, p<0.001)	20.67 (13.65-32.73, p<0.001)

Dependent: death		No	Yes	OR (univariable)	OR (multivariable)
Sex at Birth	Male	2963 (79.8)	751 (20.2)	•	•
	Female	2661 (84.4)	493 (15.6)	0.73 (0.64-0.83, p<0.001)	0.73 (0.62-0.85, p<0.001)
	Not specified	0 (NaN)	0 (NaN)	•	•
Chronic cardiac disease	NO	4070 (86.9)	612 (13.1)	•	•
	YES	1189 (68.4)	550 (31.6)	3.08 (2.70-3.51, p<0.001)	1.46 (1.24-1.72, p<0.001)
Chronic pulmonary disease (not asthma)	NO	4545 (84.4)	841 (15.6)	•	•
	YES	695 (68.3)	323 (31.7)	2.51 (2.16-2.92, p<0.001)	1.45 (1.21-1.75, p<0.001)
Chronic neurological disorder	NO	4807 (82.8)	996 (17.2)	•	•
	YES	419 (73.3)	153 (26.7)	1.76 (1.44-2.14, p<0.001)	1.27 (0.99-1.61, p=0.053)
Chronic hematologic disease	NO	5056 (82.4)	1080 (17.6)	•	•
	YES	166 (70.3)	70 (29.7)	1.97 (1.47-2.62, p<0.001)	1.36 (0.94-1.95, p=0.099)
Chronic kidney disease	NO	4700 (84.4)	867 (15.6)	•	•
	YES	540 (65.3)	287 (34.7)	2.88 (2.45-3.38, p<0.001)	1.40 (1.14-1.71, p=0.001)
Dementia	NO	4899 (83.9)	939 (16.1)	•	•
	YES	340 (61.9)	209 (38.1)	3.21 (2.66-3.86, p<0.001)	1.52 (1.20-1.92, p<0.001)
Obesity (as defined by clinical staff)	NO	3986 (81.9)	880 (18.1)	•	•
	YES	665 (84.7)	120 (15.3)	0.82 (0.66-1.00, p=0.057)	1.21 (0.95-1.54, p=0.117)
Malignant neoplasm	NO	4879 (83.5)	962 (16.5)	•	•
	YES	342 (63.7)	195 (36.3)	2.89 (2.39-3.49, p<0.001)	1.98 (1.56-2.49, p<0.001)

Number in dataframe = 9509, Number in model = 5446, Missing = 4063, AIC = 4161.9, C-statistic = 0.794, H&L = Chi-sq(8) 11.96 (p=0.153)

**Figure 13 - Adjusted odds ratio plot**

## Death

Age on admission (years)	<50	-
	50-69	5.09 (3.35-8.08, p<0.001)
	70-79	12.80 (8.45-20.28, p<0.001)
	80+	20.67 (13.65-32.73, p<0.001)
Sex at Birth	Male	-
	Female	0.73 (0.62-0.85, p<0.001)
	Not specified	-
Chronic cardiac disease	YES	1.46 (1.24-1.72, p<0.001)
Chronic pulmonary disease (not asthma)	YES	1.45 (1.21-1.75, p<0.001)
Chronic neurological disorder	YES	1.27 (0.99-1.61, p=0.053)
Chronic hematologic disease	YES	1.36 (0.94-1.95, p=0.099)
Chronic kidney disease	YES	1.40 (1.14-1.71, p=0.001)
Dementia	YES	1.52 (1.20-1.92, p<0.001)
Obesity (as defined by clinical staff)	YES	1.21 (0.95-1.54, p=0.117)
Malignant neoplasm	YES	1.98 (1.56-2.49, p<0.001)

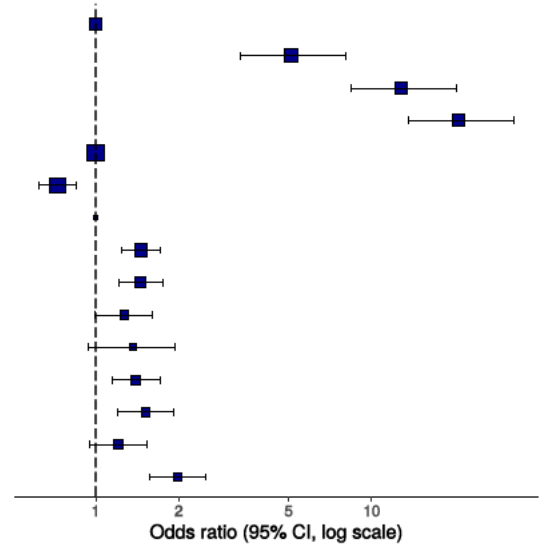
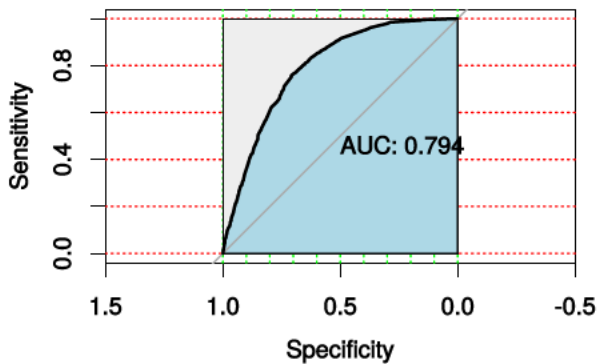


Figure 14 - ROC

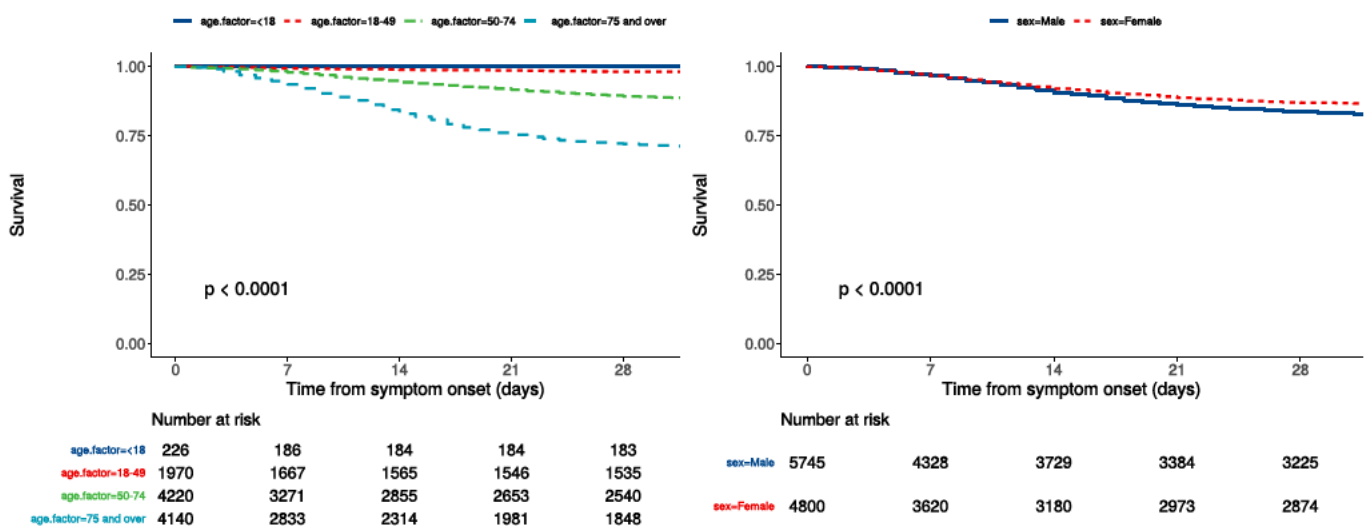


## Survival models

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.

<b>Dependent: Surv(time, status)</b>		<b>all</b>	<b>HR (univariable)</b>	<b>HR (multivariable)</b>
Age on admission (years)	<50	2196 (20.8)	•	•
	50-69	3104 (29.4)	5.67 (3.89-8.26, p<0.001)	4.89 (3.09-7.74, p<0.001)
	70-79	2304 (21.8)	14.92 (10.34-21.52, p<0.001)	11.59 (7.39-18.18, p<0.001)
	80+	2954 (28.0)	23.88 (16.66-34.24, p<0.001)	18.16 (11.58-28.47, p<0.001)
Sex at Birth	Male	5745 (54.5)	•	•
	Female	4800 (45.5)	0.77 (0.69-0.86, p<0.001)	0.81 (0.70-0.93, p=0.002)
qSOFA score on admission	0	4084 (50.2)	•	•
	1	3479 (42.8)	1.99 (1.73-2.27, p<0.001)	2.13 (1.83-2.47, p<0.001)
	2	542 (6.7)	5.09 (4.25-6.09, p<0.001)	4.03 (3.27-4.97, p<0.001)
	3	31 (0.4)	8.91 (5.22-15.20, p<0.001)	8.44 (4.70-15.15, p<0.001)
Symptomatic at presentation	No symptoms	980 (10.6)	•	•
	Symptoms	8288 (89.4)	1.40 (1.14-1.72, p=0.002)	•
Chronic cardiac disease	NO	6422 (72.2)	•	•
	YES	2474 (27.8)	2.71 (2.42-3.04, p<0.001)	1.37 (1.19-1.58, p<0.001)
Chronic kidney disease	NO	7673 (86.5)	•	•
	YES	1197 (13.5)	2.58 (2.26-2.94, p<0.001)	1.43 (1.21-1.68, p<0.001)
Moderate or severe liver disease	NO	8653 (98.3)	•	•
	YES	152 (1.7)	2.14 (1.54-2.97, p<0.001)	1.98 (1.28-3.06, p=0.002)
Chronic neurological disorder	NO	8014 (90.8)	•	•
	YES	814 (9.2)	1.67 (1.41-1.98, p<0.001)	•
Malignant neoplasm	NO	8075 (91.4)	•	•
	YES	762 (8.6)	2.56 (2.20-2.98, p<0.001)	1.81 (1.51-2.17, p<0.001)
Chronic hematologic disease	NO	8508 (96.6)	•	•
	YES	304 (3.4)	1.80 (1.41-2.29, p<0.001)	•
Obesity (as defined by clinical staff)	NO	6789 (86.2)	•	•
	YES	1087 (13.8)	0.82 (0.68-0.99, p=0.040)	1.14 (0.92-1.41, p=0.240)
Diabetes without complications	NO	7281 (87.1)	•	•
	YES	1080 (12.9)	1.34 (1.14-1.57, p<0.001)	•
Rheumatologic disorder	NO	7793 (88.5)	•	•
	YES	1013 (11.5)	1.42 (1.22-1.67, p<0.001)	•

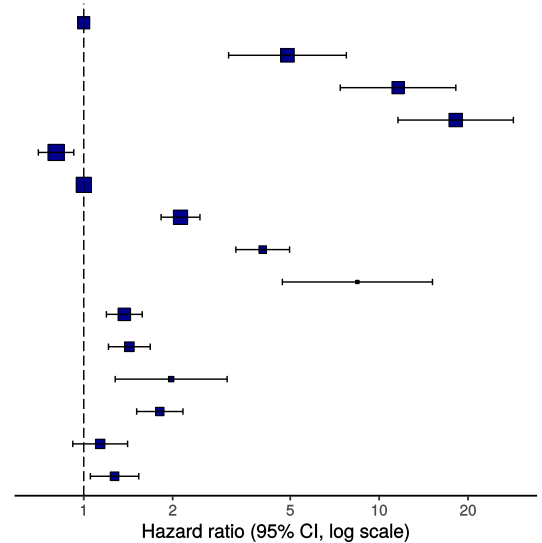
Dependent: Surv(time, status)		all	HR (univariable)	HR (multivariable)
Dementia	NO	8018 (90.6)	•	•
	YES	836 (9.4)	2.80 (2.41-3.24, p<0.001)	1.27 (1.05-1.54, p=0.013)
Malnutrition	NO	8058 (97.9)	•	•
	YES	172 (2.1)	1.94 (1.41-2.67, p<0.001)	•
smoking_mhyn_2levels	NO	4912 (53.7)	•	•
	YES	482 (5.3)	0.83 (0.62-1.11, p=0.218)	•
	N/K	3752 (41.0)	1.37 (1.22-1.53, p<0.001)	•

Number in dataframe = 10579, Number in model = 6691, Missing = 3888, Number of events = 874, Concordance = 0.794 (SE = 0.007), R-squared = 0.140 (Max possible = 0.892), Likelihood ratio test = 1010.122 (df = 13, p = 0.000)

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

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

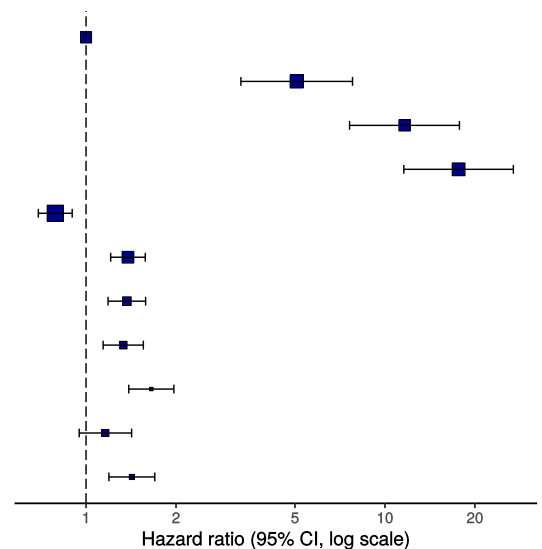
Age on admission (years)	<50	-
	50-69	4.89 (3.09-7.74, p<0.001)
	70-79	11.59 (7.39-18.18, p<0.001)
	80+	18.16 (11.58-28.47, p<0.001)
Sex at Birth	Female	0.81 (0.70-0.93, p=0.002)
qSOFA score on admission	0	-
	1	2.13 (1.83-2.47, p<0.001)
	2	4.03 (3.27-4.97, p<0.001)
	3	8.44 (4.70-15.15, p<0.001)
Chronic cardiac disease	YES	1.37 (1.19-1.58, p<0.001)
Chronic kidney disease	YES	1.43 (1.21-1.68, p<0.001)
Moderate or severe liver disease	YES	1.98 (1.28-3.06, p=0.002)
Malignant neoplasm	YES	1.81 (1.51-2.17, p<0.001)
Obesity (as defined by clinical staff)	YES	1.14 (0.92-1.41, p=0.240)
Dementia	YES	1.27 (1.05-1.54, p=0.013)



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

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

Age on admission (years)	<50	-
	50-69	5.07 (3.30-7.79, p<0.001)
	70-79	11.63 (7.61-17.75, p<0.001)
	80+	17.64 (11.57-26.89, p<0.001)
Sex at Birth	Female	0.79 (0.69-0.90, p<0.001)
Chronic cardiac disease	YES	1.38 (1.21-1.58, p<0.001)
Chronic pulmonary disease (not asthma)	YES	1.37 (1.18-1.58, p<0.001)
Chronic kidney disease	YES	1.33 (1.14-1.55, p<0.001)
Malignant neoplasm	YES	1.65 (1.39-1.97, p<0.001)
Obesity (as defined by clinical staff)	YES	1.16 (0.95-1.42, p=0.148)
Dementia	YES	1.42 (1.19-1.70, p<0.001)



ROC = 0.7965234

**Figure 17 - Predictions calibration plot**



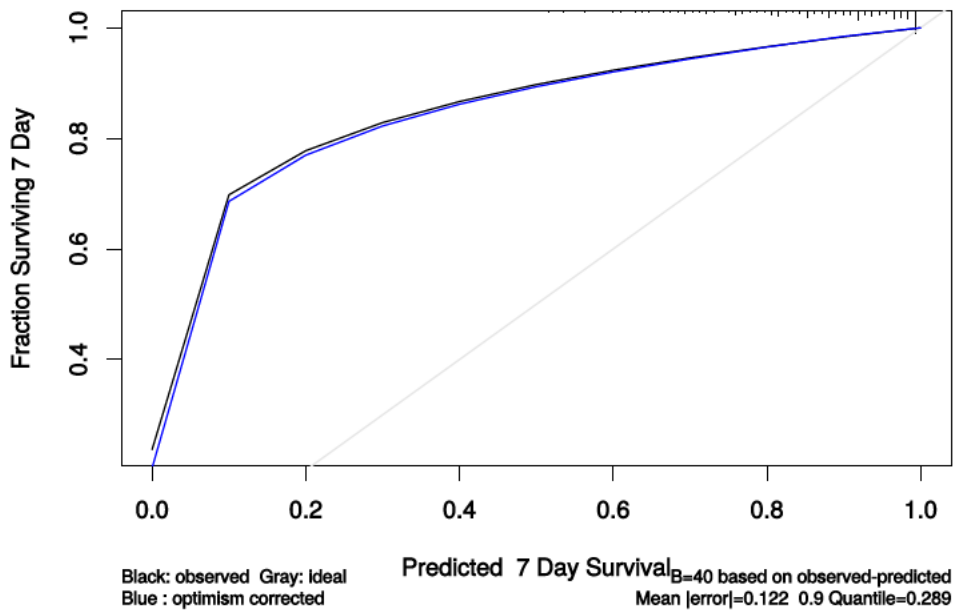


Figure 18 - Prognostic model predictions

Again, for demonstration of methods.

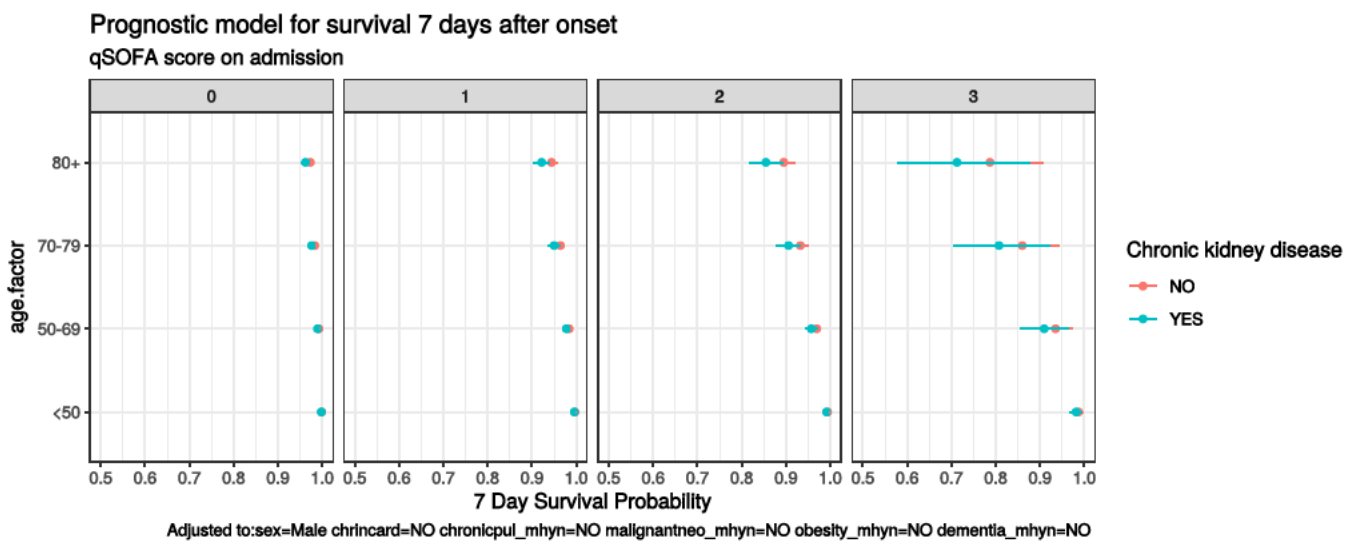


Figure 19 - Death by severity (NEWS) on admission

Number of deaths by NEWS score at admission

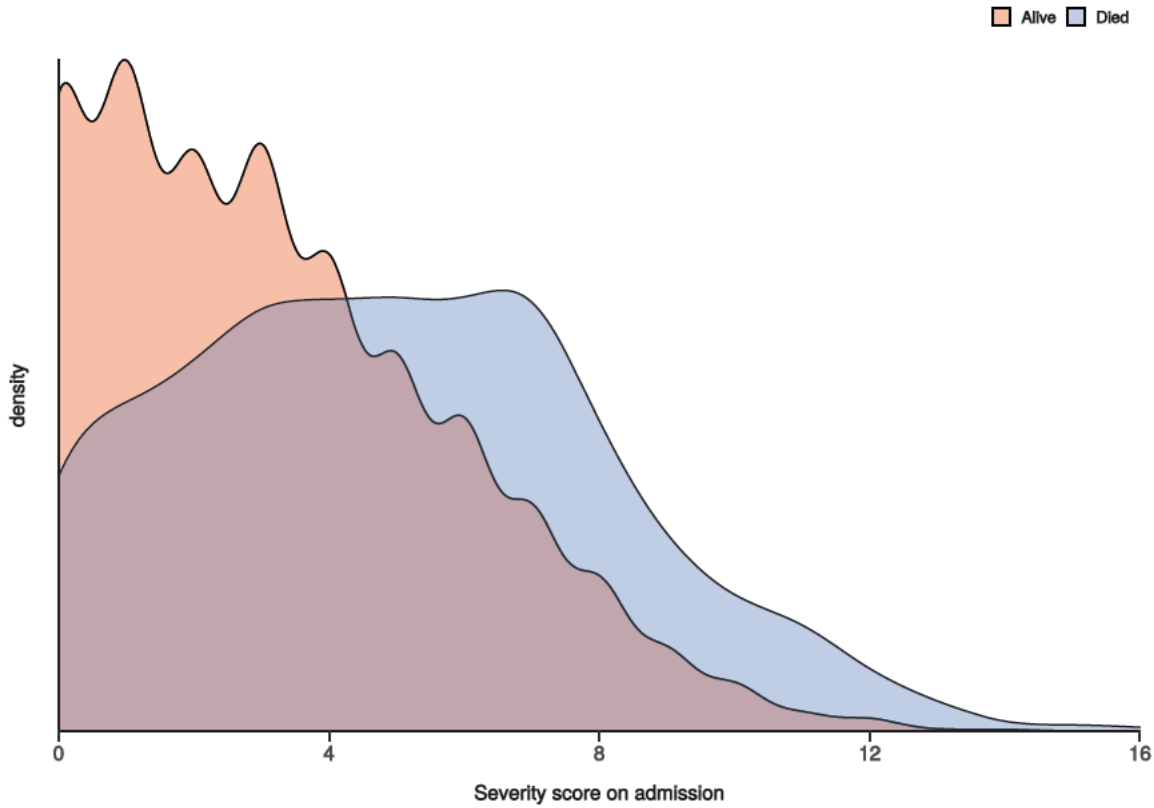


Figure 20 - Death by severity (NEWS) on admission stratified by age

Number of deaths by NEWS score at admission  
Stratified by age

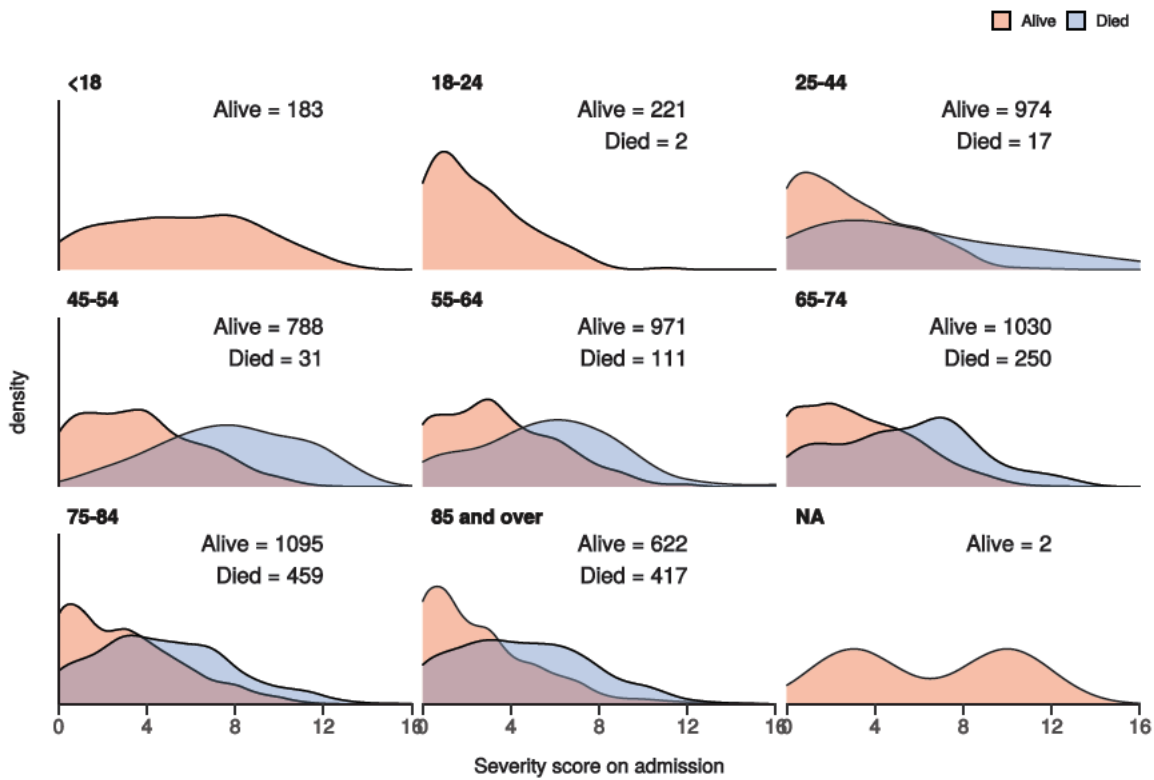
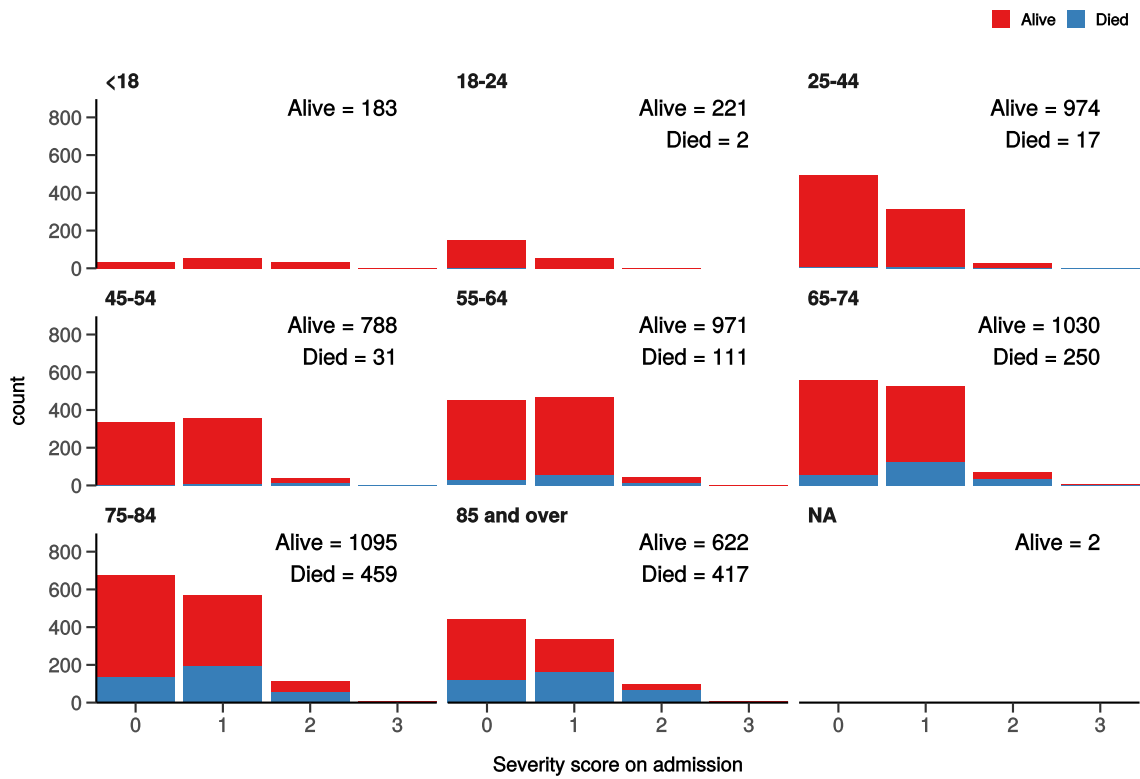


Figure 21 - Death by severity (qSOFA) on admission stratified by age

Number of deaths by qSOFA score at admission  
Stratified by age



## Healthcare workers

Employed as a healthcare worker?		NO	YES	p
Total N (%)		9019 (97.6)	218 (2.4)	
NEWS score on admission	Median (IQR)	3.0 (4.0)	4.0 (4.0)	0.171
Death	No	4990 (80.6)	161 (98.8)	<0.001
	Yes	1200 (19.4)	2 (1.2)	