

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

Dynamic content updated: 2020-11-12 03:34:26.

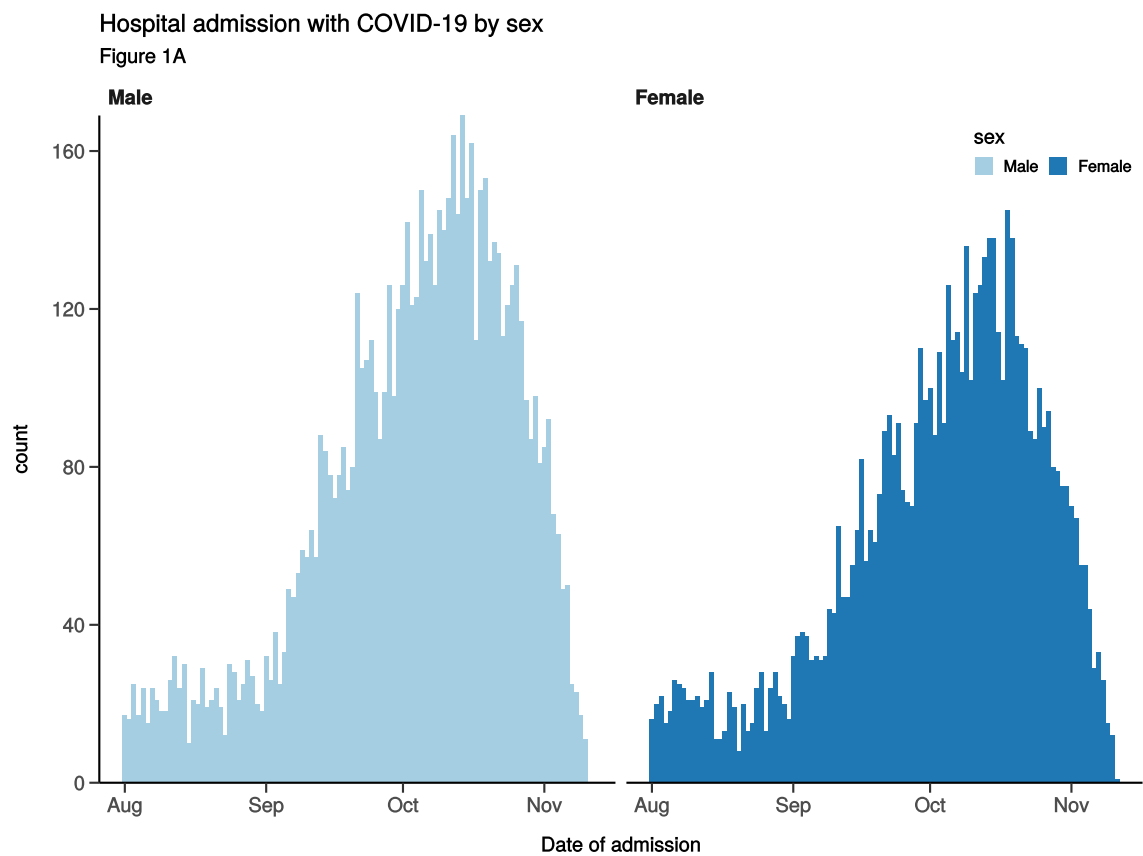
## Executive summary

### Includes patients admitted after 01 August 2020

There are 13724 patients included in CO-CIN. Of these, 1747 patient(s) have died and 1699 required ICU. 7058 have been discharged home.

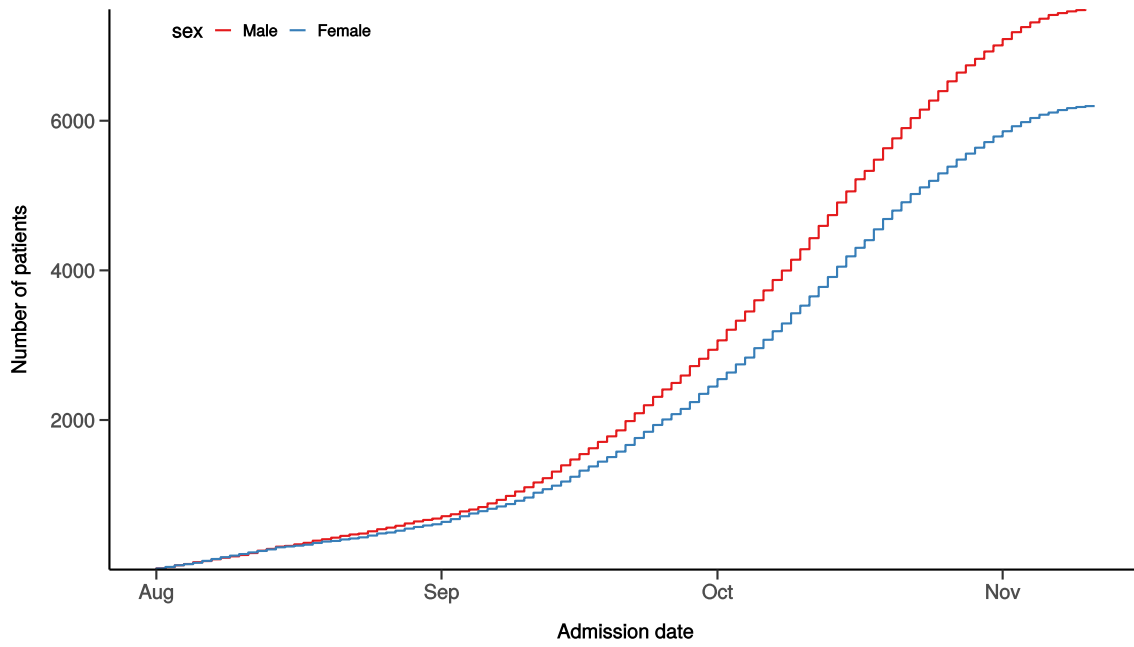
## Admission

Figure 1



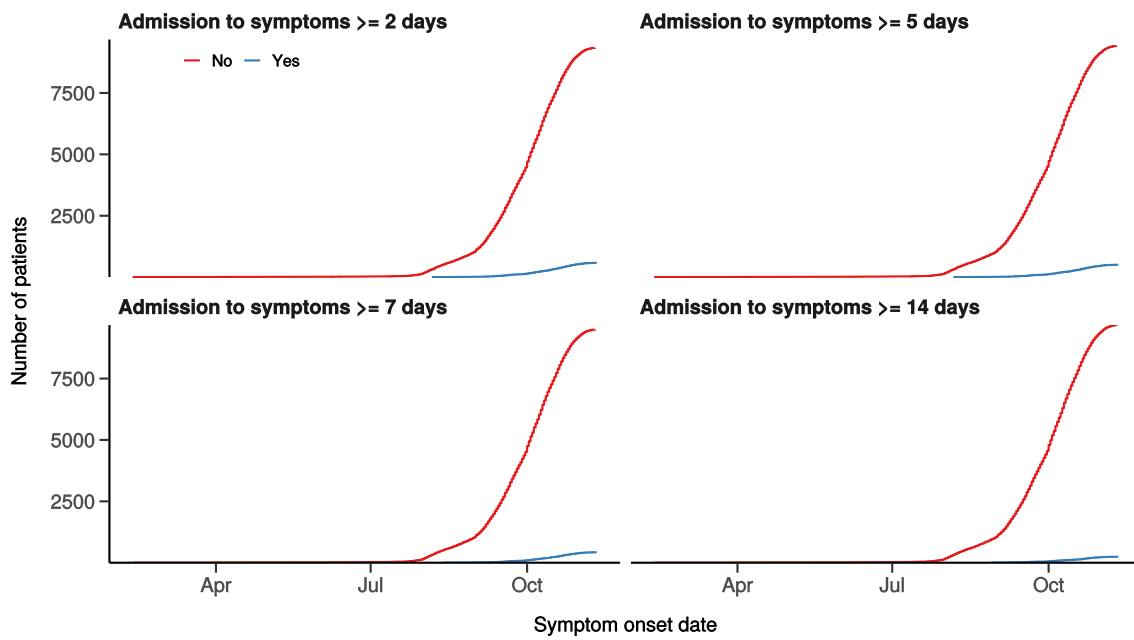
## Hospital admission with COVID-19 by sex

Figure 1B



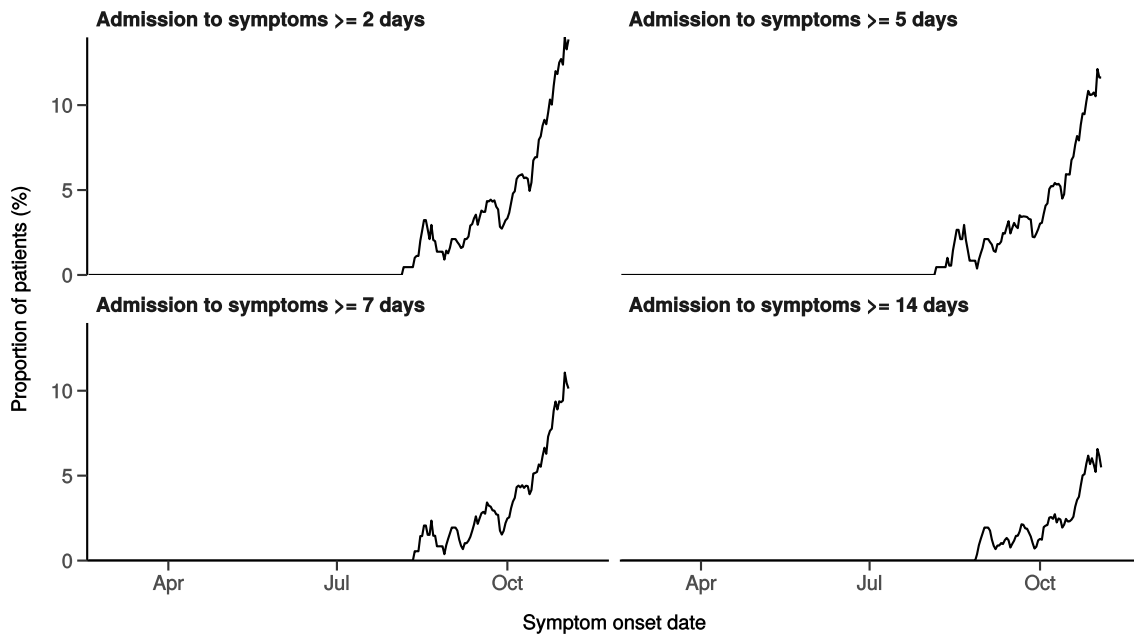
## Number with symptom onset occurring after admission to hospital

Figure 1C



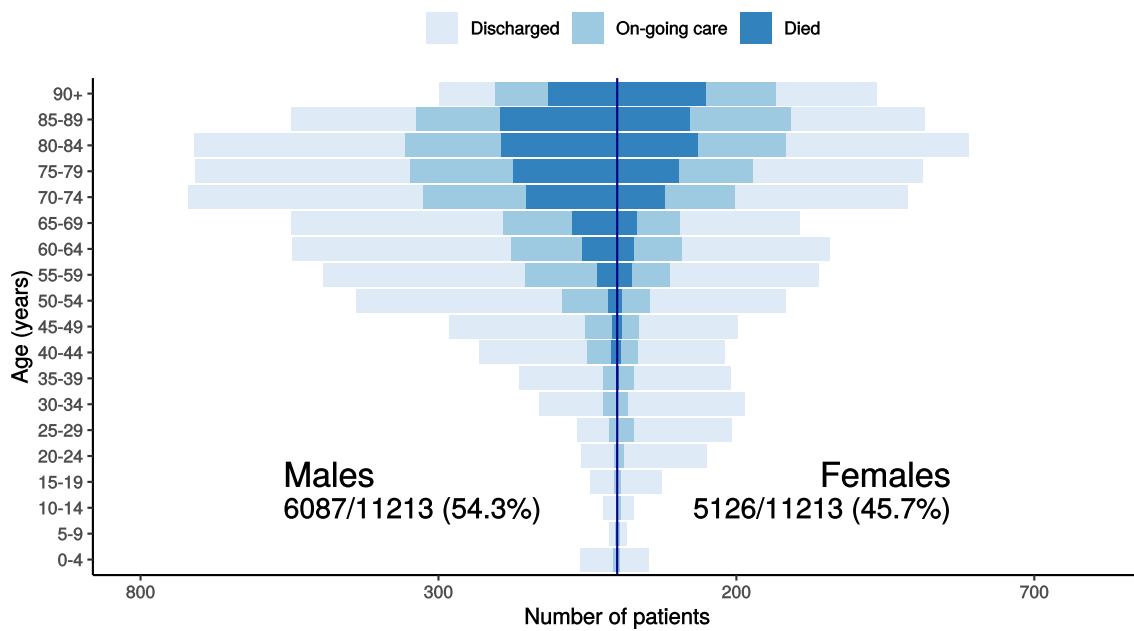
# Proportion with symptom onset occurring after hospital admission

Figure 1D - 7-day rolling percentage. n = 9920



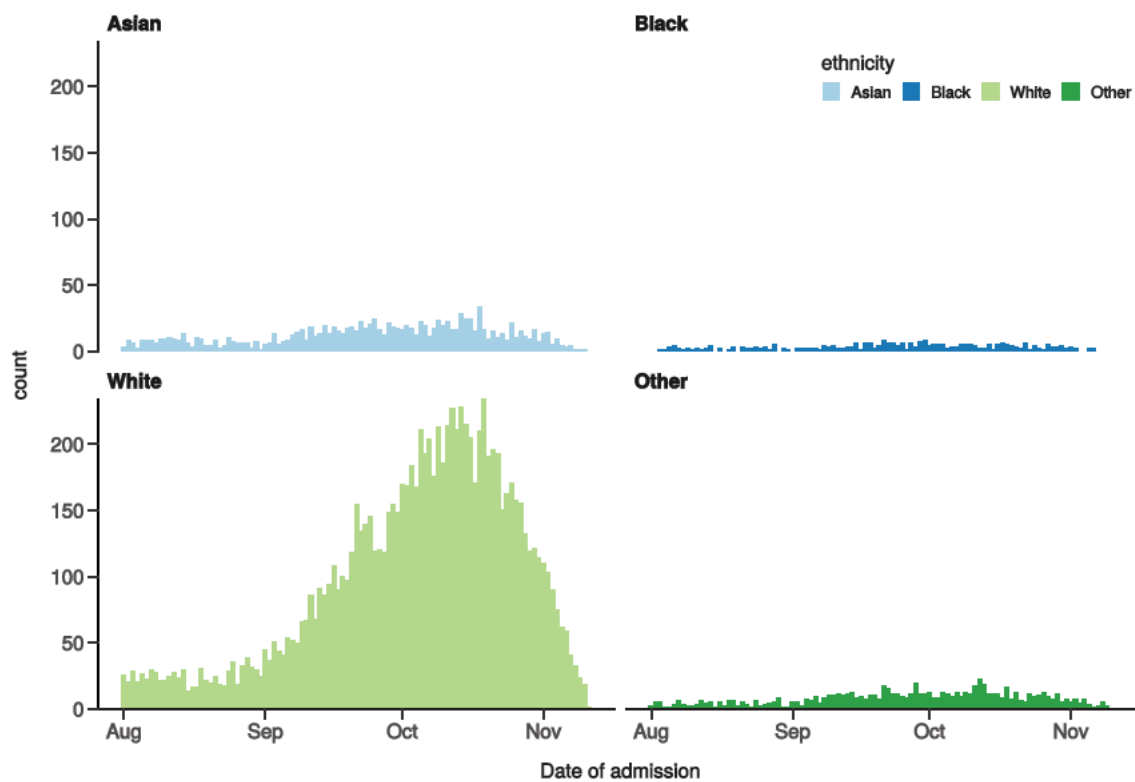
## Patients with outcome stratified by age, and sex

Figure 1E



## Hospital admission with COVID-19 by ethnicity

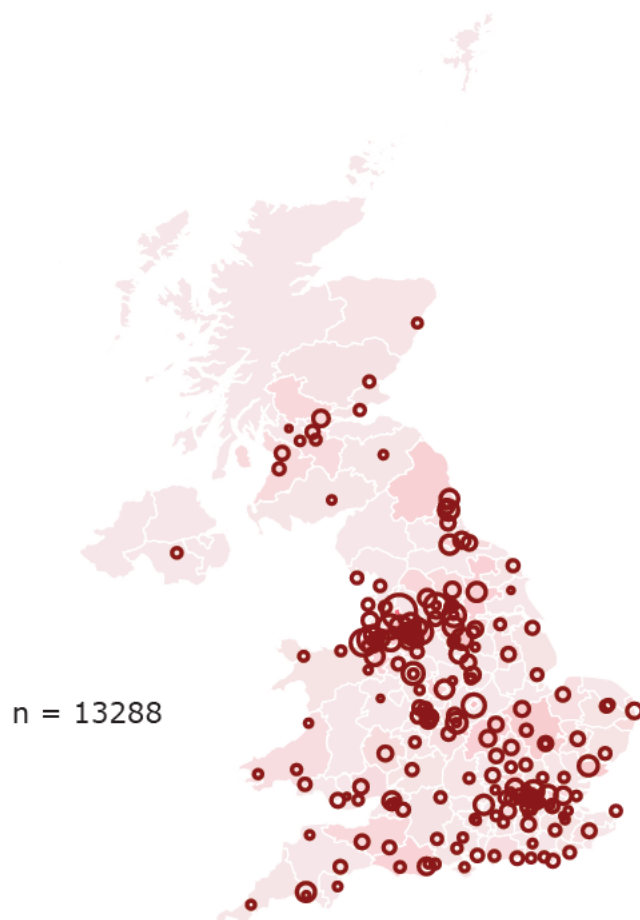
Figure 1F



## 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

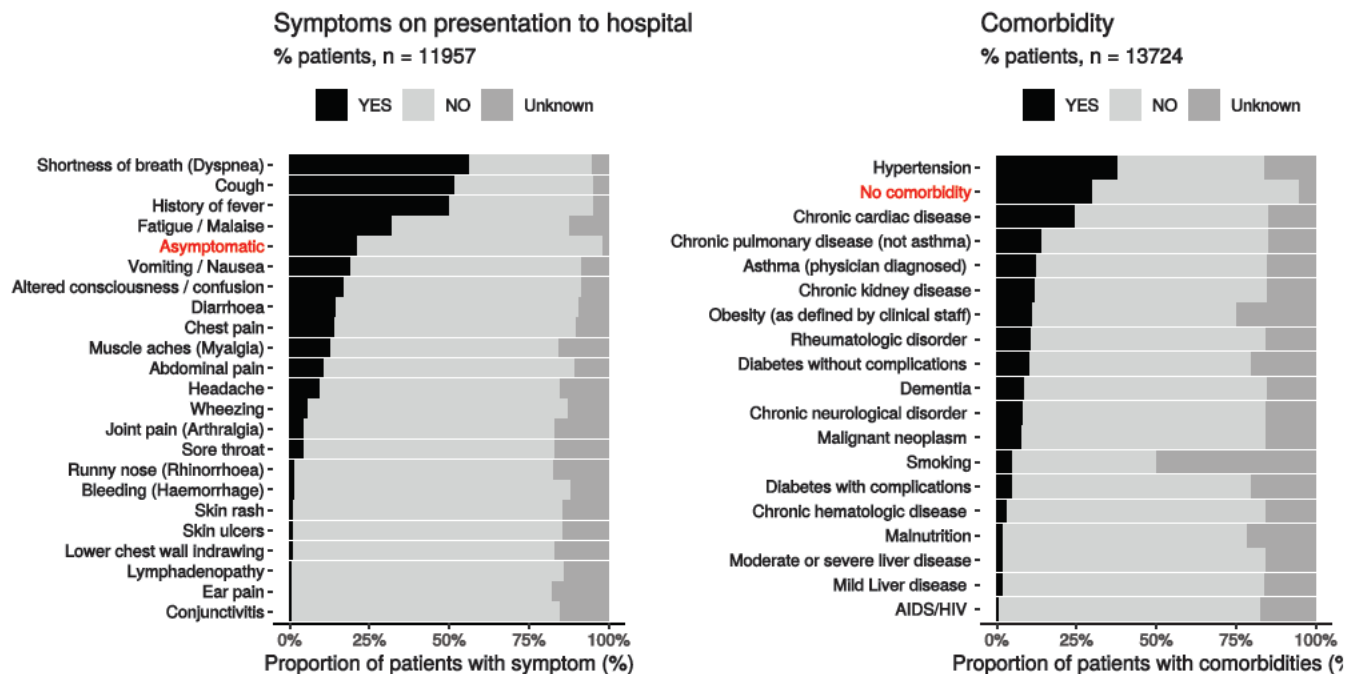


Figure 3B - Symptoms by Age

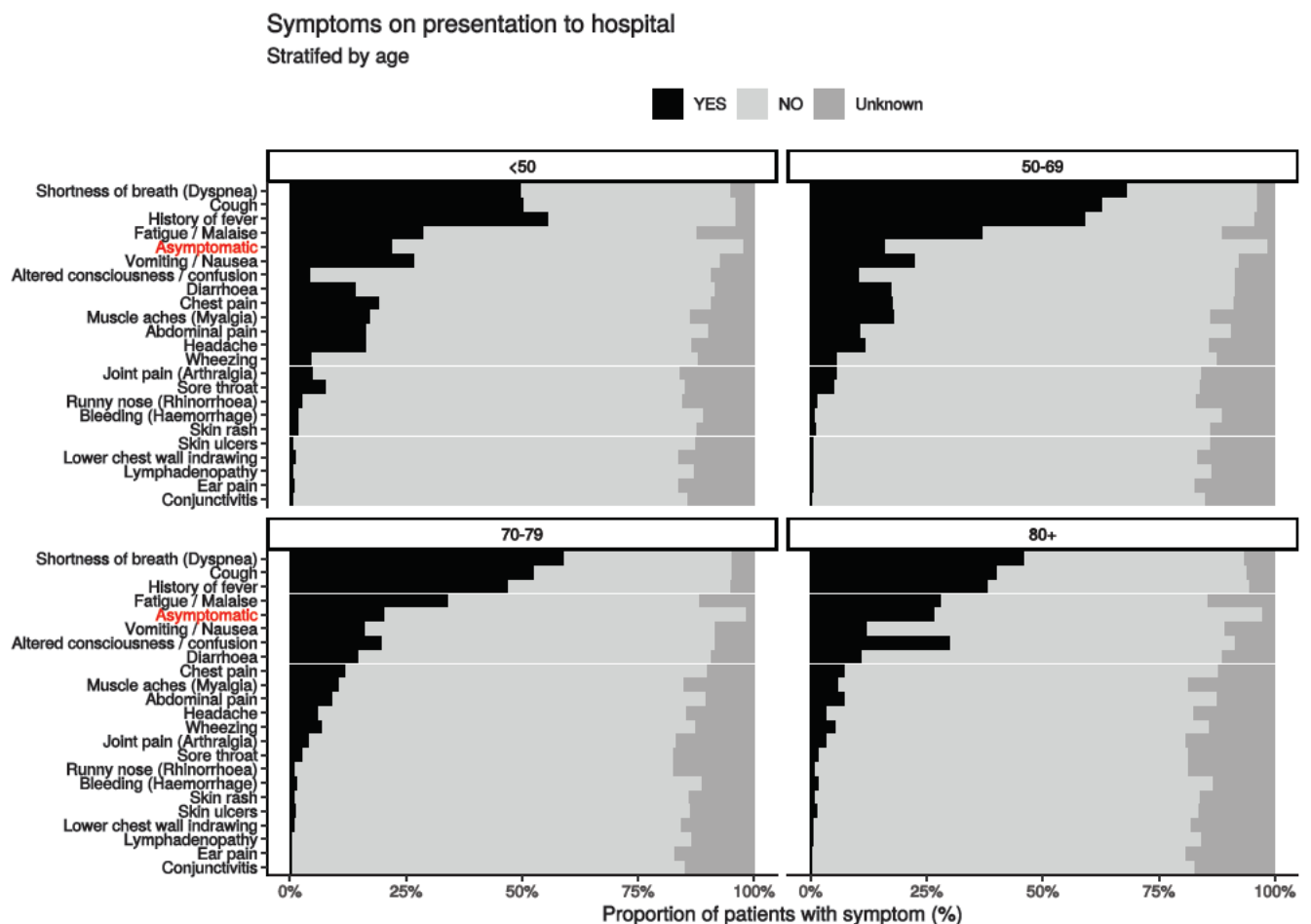
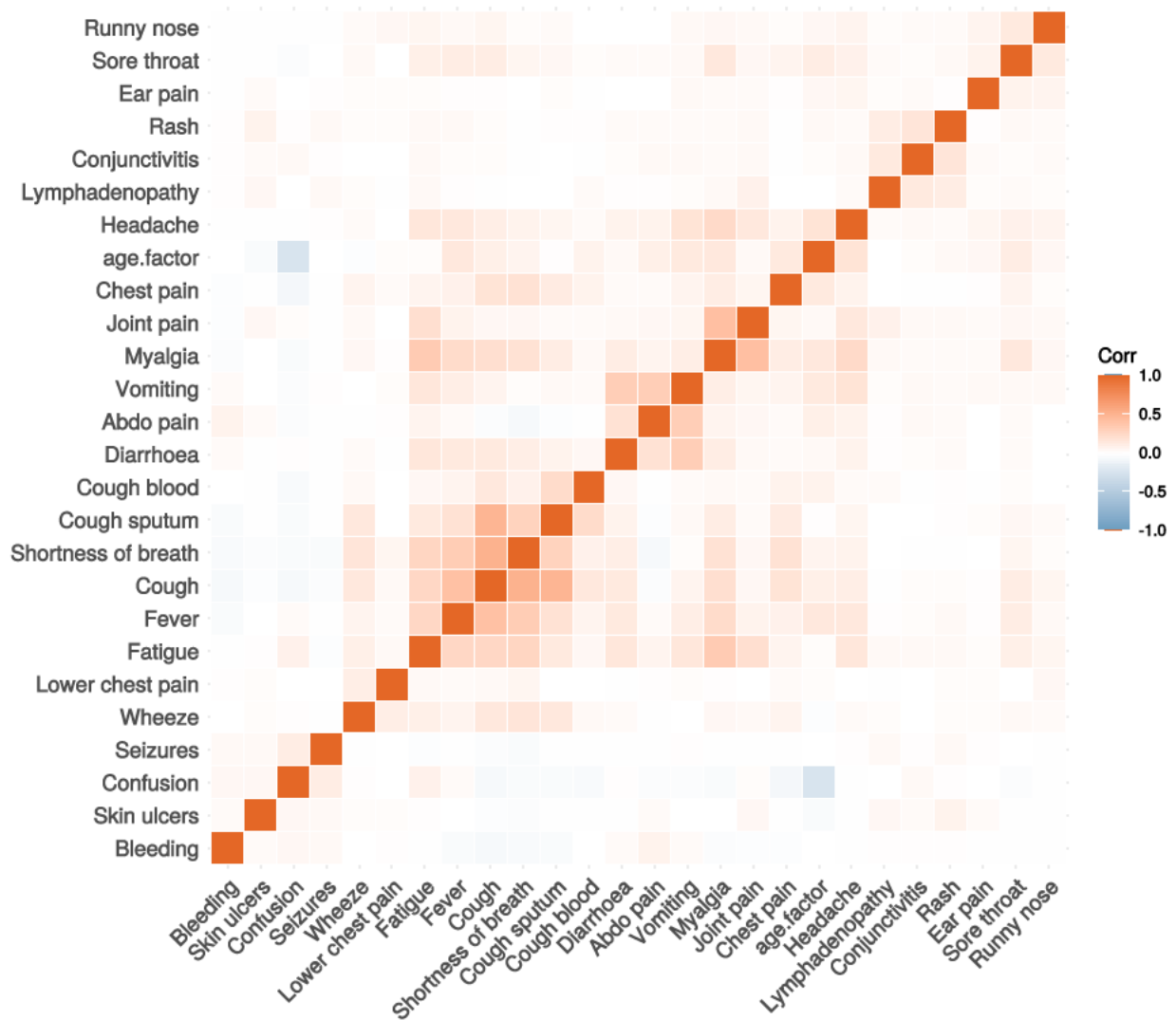


Figure 3C

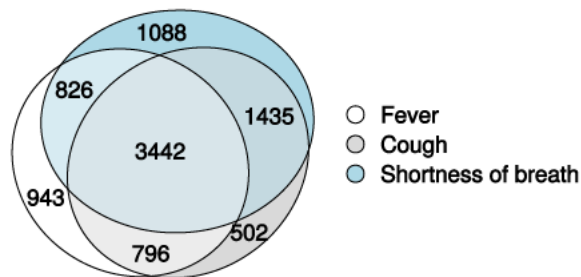
Correlation of symptoms in all pages. Note clusters, top right to bottom left, flu-like, coryzal, abdominal, respiratory, neurocutaneous.



## Symptoms (diagnostic criteria)

Figure 4A

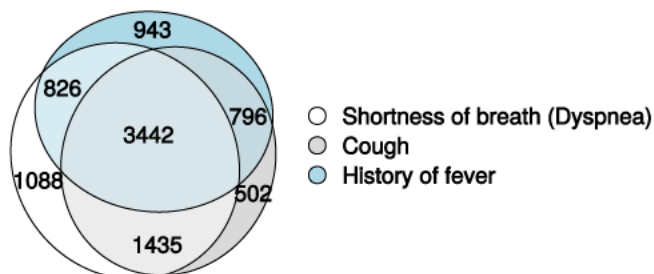
n = 11957



## Symptoms (most common)

Figure 4B

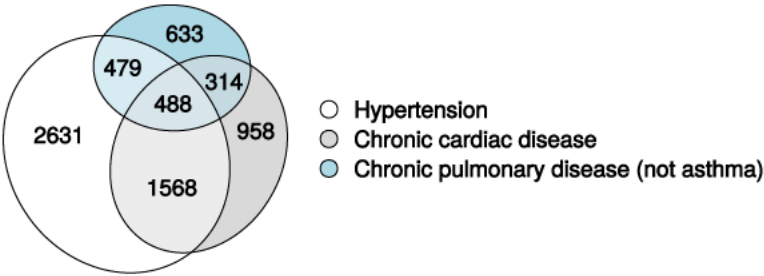
n = 11957



## Comorbidity (most common)

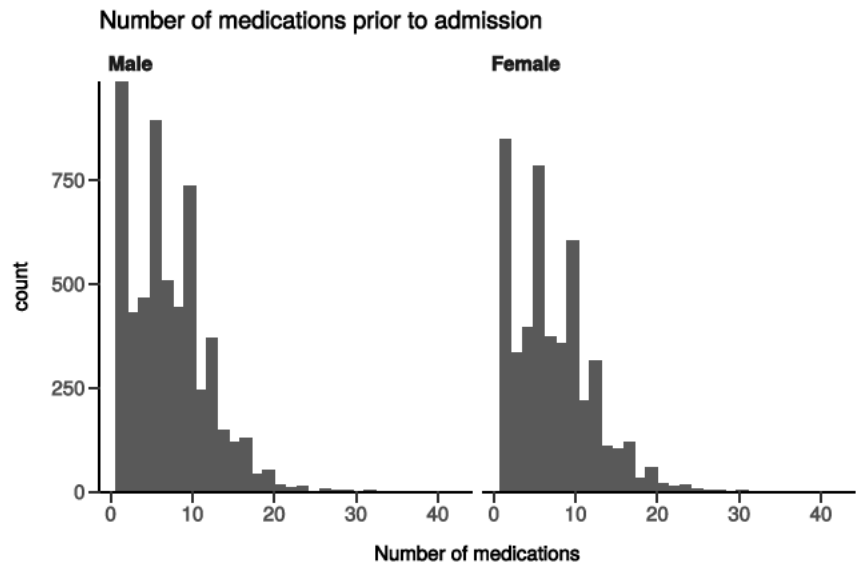
Figure 4C

n = 13724



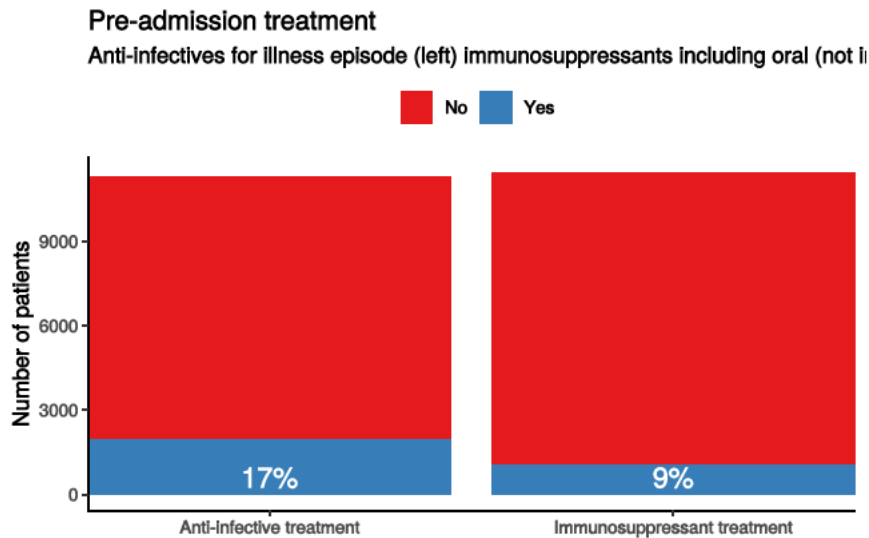
## Medication prior to illness

Figure 5



## Preadmission treatment

Figure 6



## Patient flow

Figure 7A - All patients

N = 12273

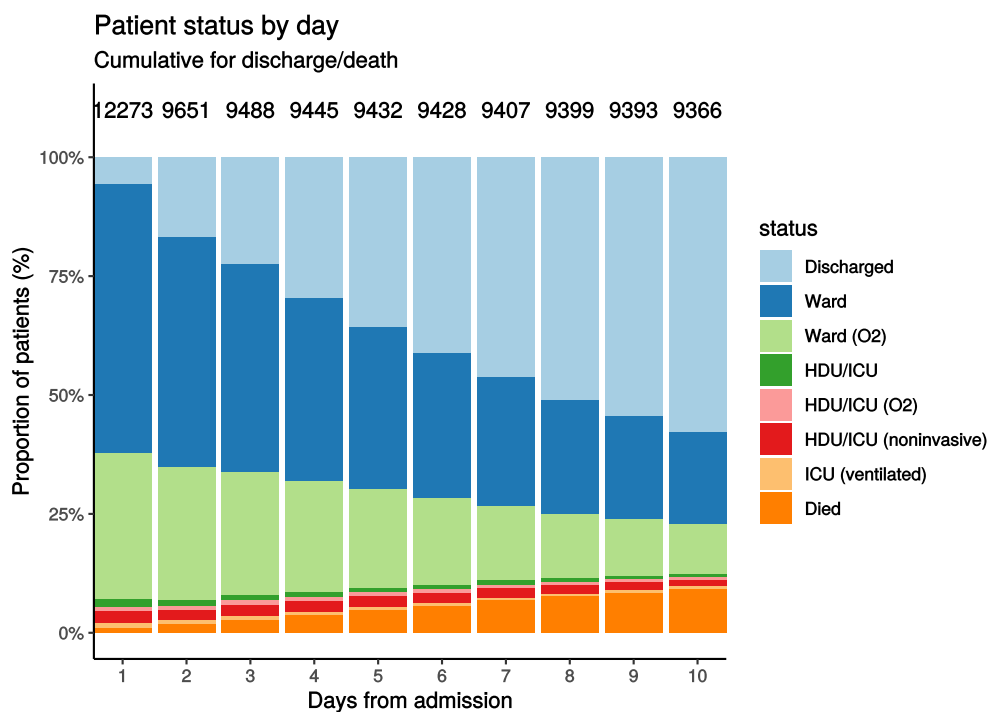
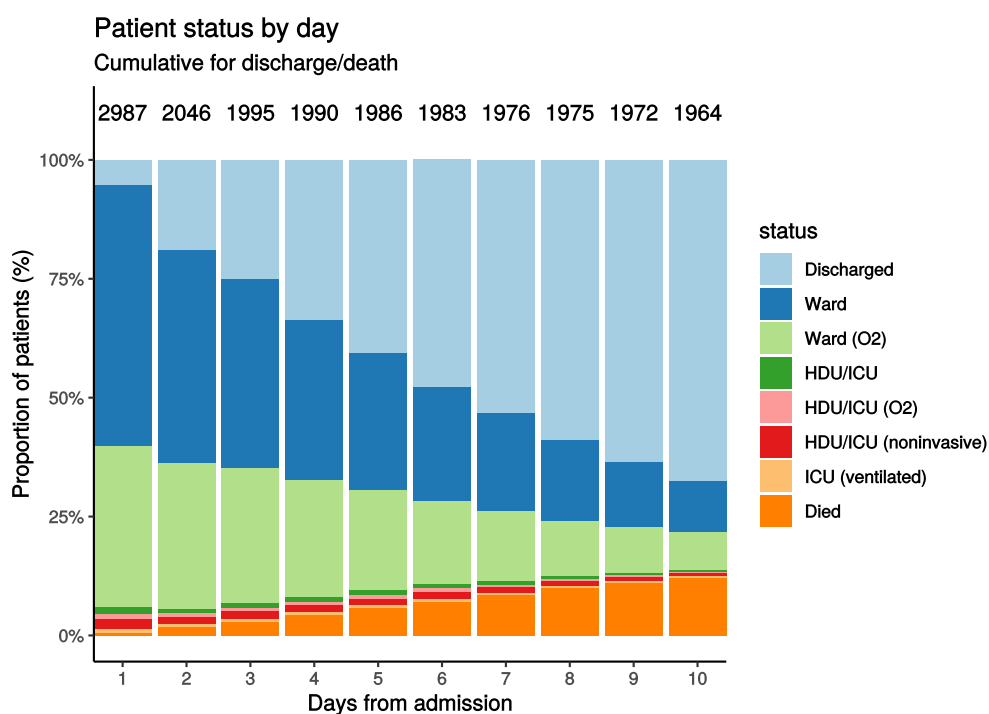


Figure 7B - Patients admitted  $\geq 14$  days and  $\leq 28$  days ago

N = 2987



## Oxygen requirement

Figure 8A - All patients

N = 11700



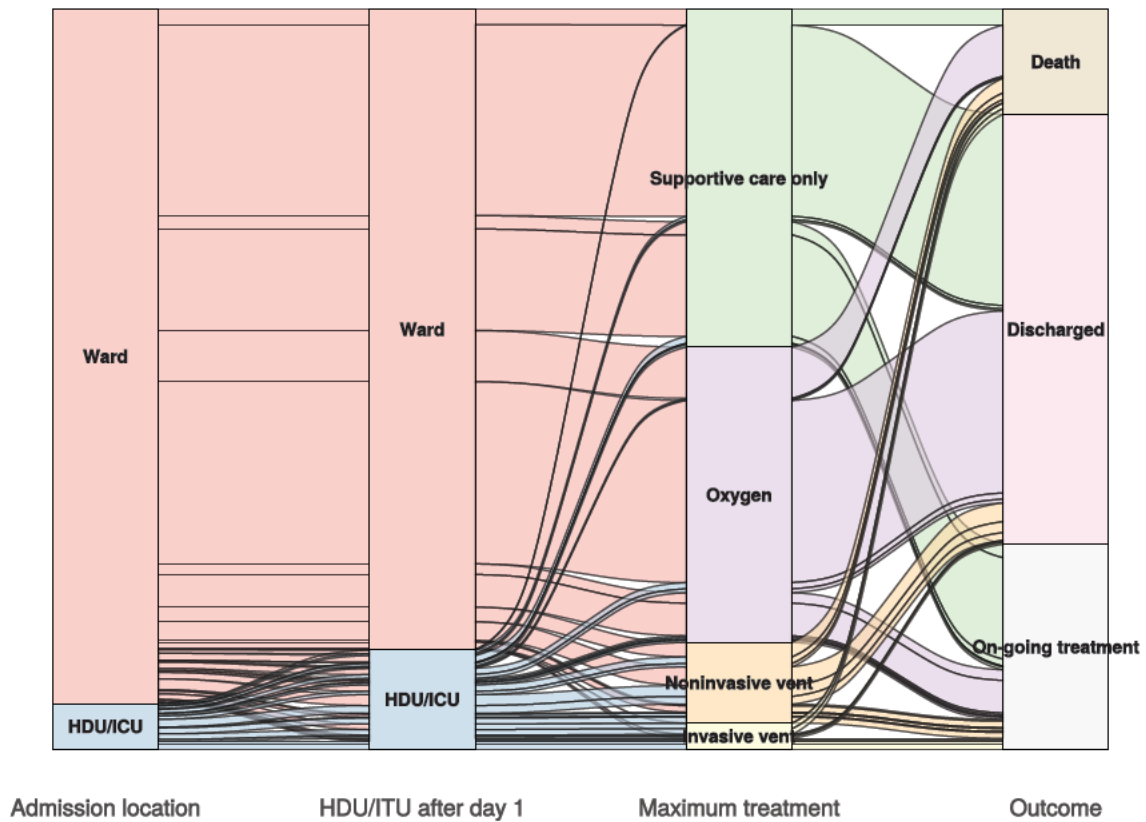


Figure 8B - Patients admitted  $\geq 14$  days and  $\leq 28$  days ago

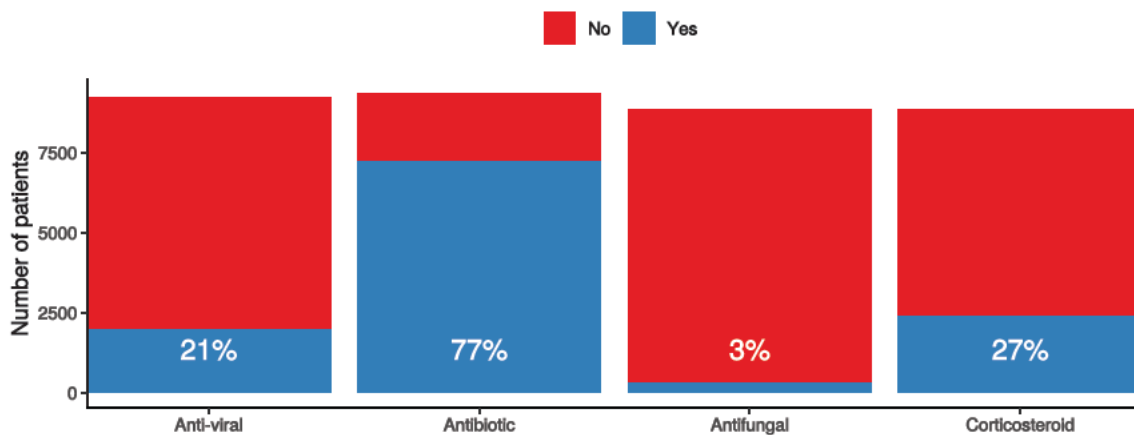
N = 2882

## In-hospital medical treatment

Figure 9

### In-hospital treatment

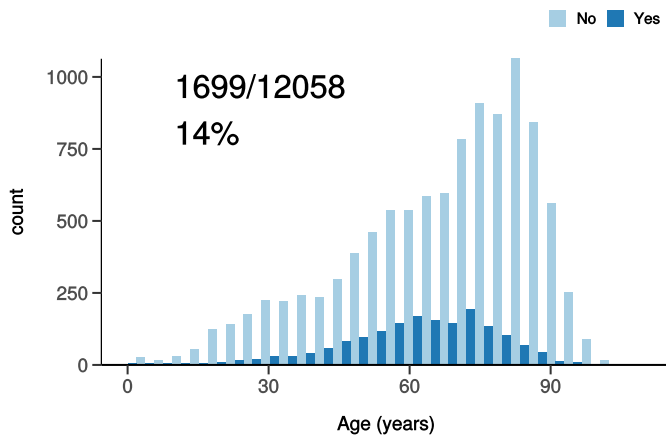
Anti-virals, antibiotics, corticosteroids, and anti-fungals for patients who have completed journey.



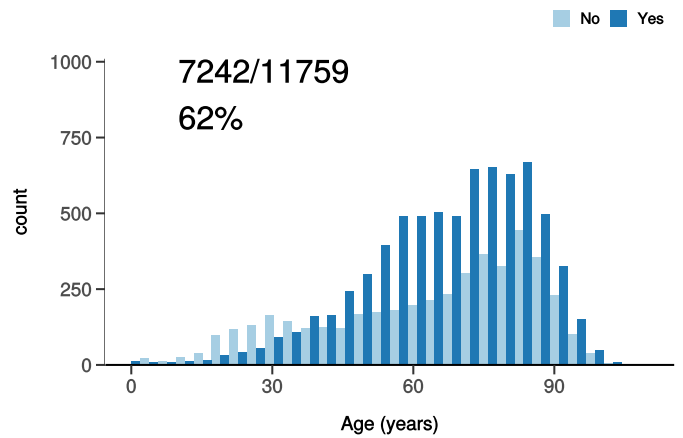
## Treatment

Figure 10

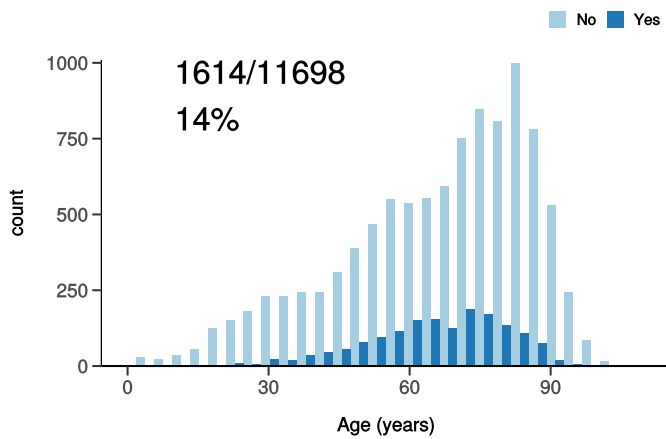
ICU/HDU admission  
Figure 10A



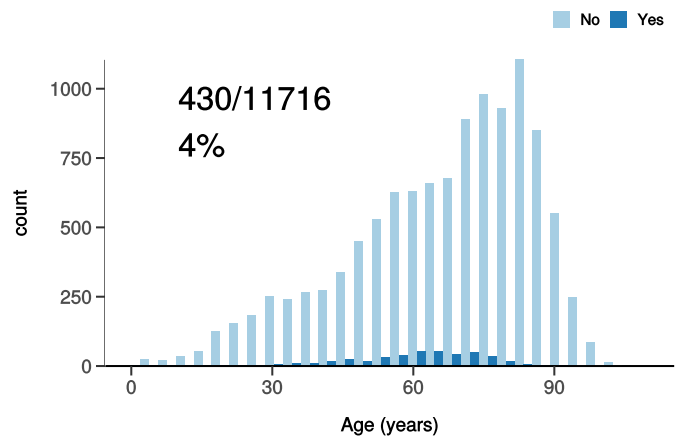
High flow oxygen  
Figure 10B



Noninvasive ventilation  
Figure 10C



Invasive ventilation  
Figure 10D

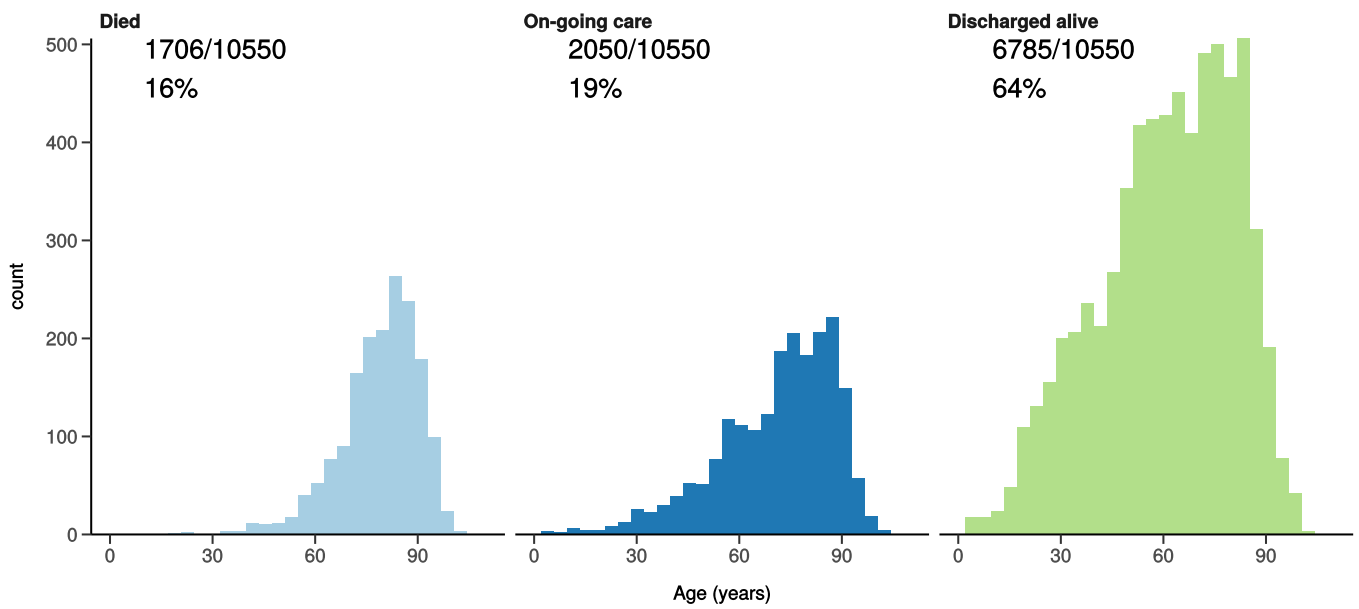


## Status in patients admitted $\geq 14$ days from today

Figure 11

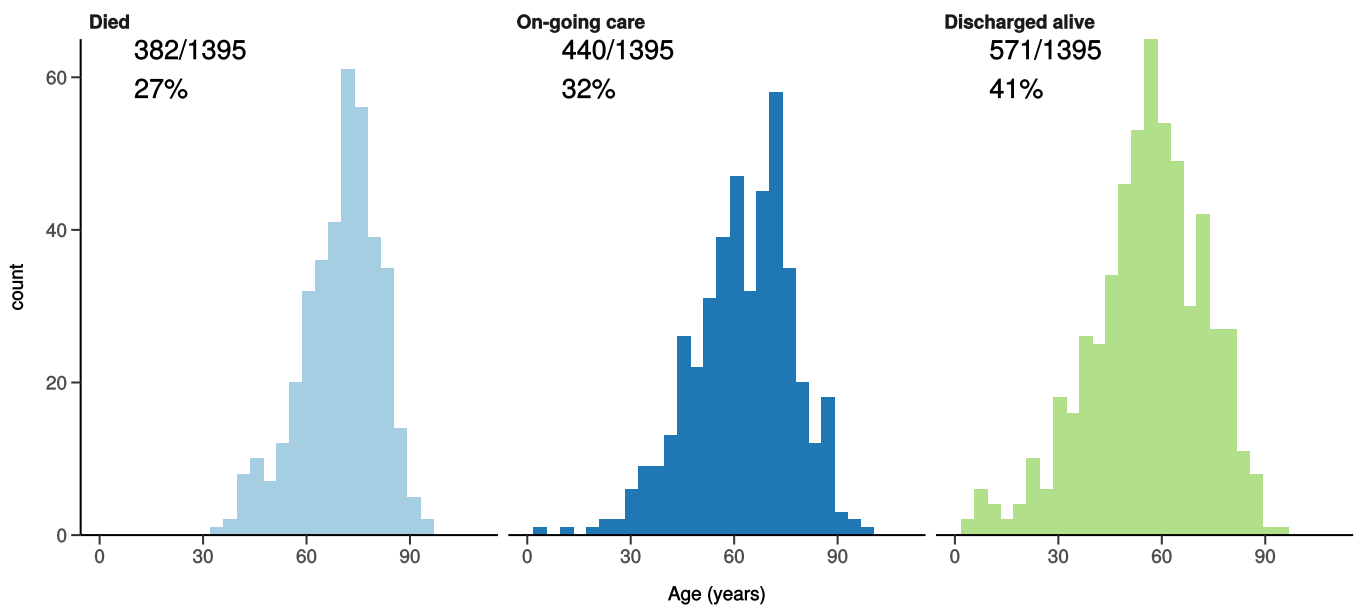
All: status in patients admitted  $\geq 14$  days ago

Figure 11A



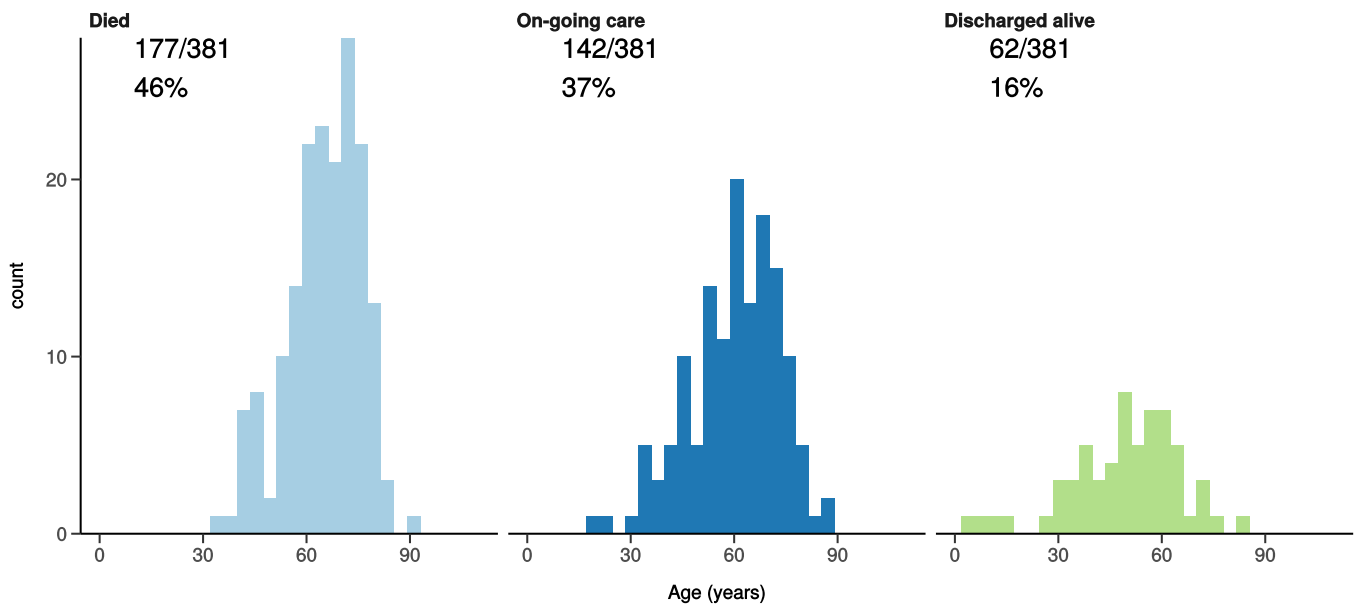
ICU/HDU admissions: status in patients admitted  $\geq 14$  days ago

Figure 11B



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

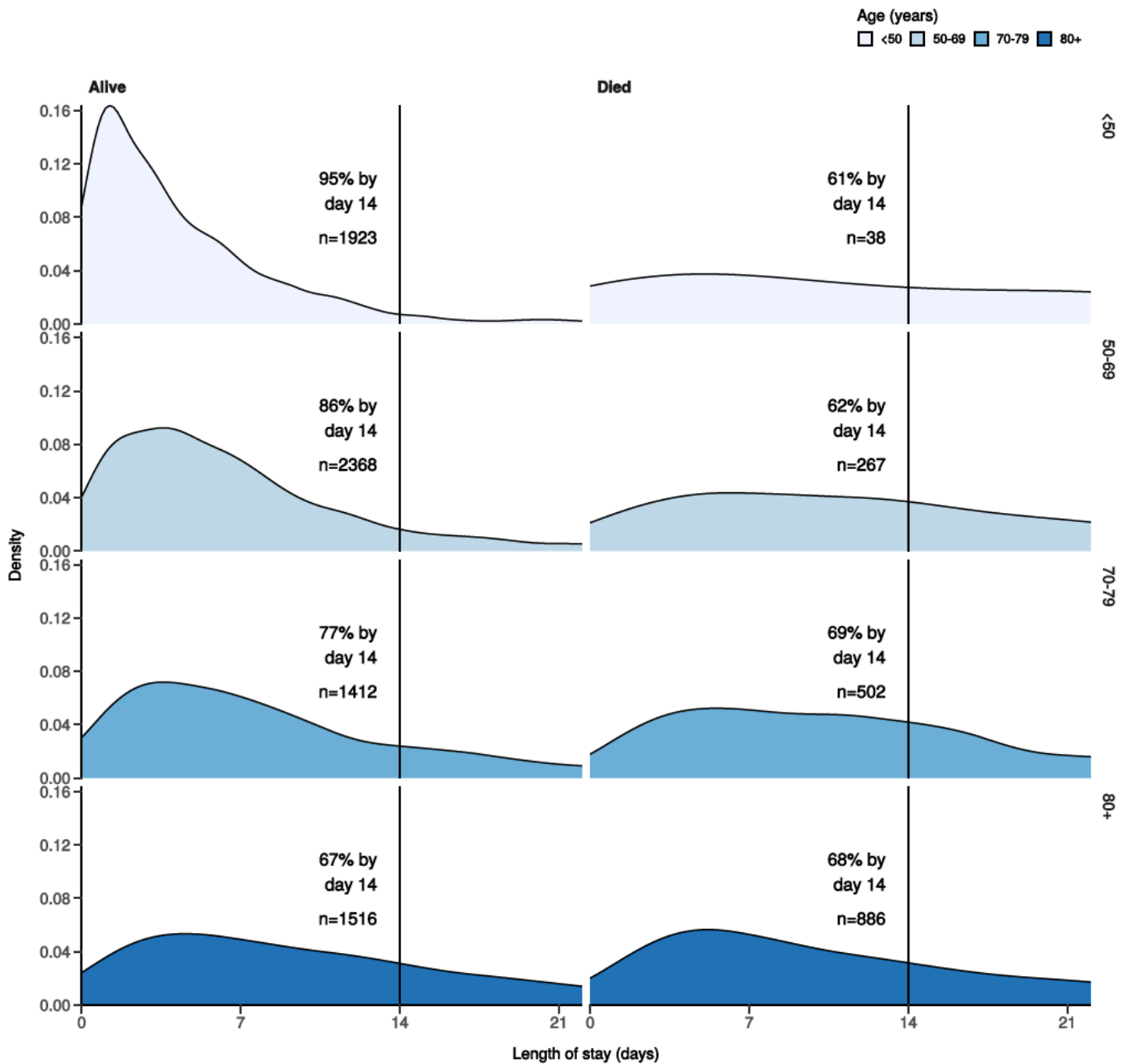
Figure 11c



# 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	2008 (98.0)	41 (2.0)	•	•
	50-69	2387 (89.8)	272 (10.2)	5.58 (4.05-7.90, p<0.001)	4.79 (3.32-7.13, p<0.001)
	70-79	1439 (74.3)	498 (25.7)	16.95 (12.40-23.82, p<0.001)	12.07 (8.41-17.93, p<0.001)
	80+	1564 (63.8)	889 (36.2)	27.84 (20.49-38.92, p<0.001)	19.04 (13.27-28.25, p<0.001)

Dependent: death		No	Yes	OR (univariable)	OR (multivariable)
Sex at Birth	Male	3909 (79.4)	1013 (20.6)	•	•
	Female	3491 (83.6)	687 (16.4)	0.76 (0.68-0.85, p<0.001)	0.71 (0.62-0.82, p<0.001)
	Not specified	0 (NaN)	0 (NaN)	•	•
Chronic cardiac disease	NO	5337 (86.5)	835 (13.5)	•	•
	YES	1618 (68.1)	757 (31.9)	2.99 (2.67-3.35, p<0.001)	1.38 (1.20-1.59, p<0.001)
Chronic pulmonary disease (not asthma)	NO	6026 (83.9)	1159 (16.1)	•	•
	YES	919 (67.8)	436 (32.2)	2.47 (2.16-2.81, p<0.001)	1.56 (1.33-1.82, p<0.001)
Chronic neurological disorder	NO	6361 (82.3)	1364 (17.7)	•	•
	YES	556 (72.5)	211 (27.5)	1.77 (1.49-2.09, p<0.001)	1.18 (0.95-1.45, p=0.130)
Chronic hematologic disease	NO	6691 (81.9)	1478 (18.1)	•	•
	YES	218 (69.6)	95 (30.4)	1.97 (1.53-2.52, p<0.001)	1.40 (1.02-1.90, p=0.033)
Chronic kidney disease	NO	6190 (84.1)	1167 (15.9)	•	•
	YES	752 (64.3)	417 (35.7)	2.94 (2.57-3.37, p<0.001)	1.56 (1.32-1.85, p<0.001)
Dementia	NO	6449 (83.5)	1275 (16.5)	•	•
	YES	486 (62.8)	288 (37.2)	3.00 (2.56-3.51, p<0.001)	1.42 (1.16-1.73, p=0.001)
Obesity (as defined by clinical staff)	NO	5232 (81.2)	1213 (18.8)	•	•
	YES	912 (84.4)	169 (15.6)	0.80 (0.67-0.95, p=0.012)	1.14 (0.92-1.40, p=0.214)
Malignant neoplasm	NO	6440 (83.0)	1323 (17.0)	•	•
	YES	477 (65.2)	255 (34.8)	2.60 (2.21-3.06, p<0.001)	1.68 (1.37-2.05, p<0.001)

Number in dataframe = 12466, Number in model = 7221, Missing = 5245, AIC = 5646.3, C-statistic = 0.786, H&L = Chi-sq(8) 22.31 (p=0.004)

**Figure 13 - Adjusted odds ratio plot**

## Death

Age on admission (years)	<50	-
	50-69	4.79 (3.32-7.13, $p<0.001$ )
	70-79	12.07 (8.41-17.93, $p<0.001$ )
	80+	19.04 (13.27-28.25, $p<0.001$ )
Sex at Birth	Male	-
	Female	0.71 (0.62-0.82, $p<0.001$ )
	Not specified	-
Chronic cardiac disease	YES	1.38 (1.20-1.59, $p<0.001$ )
Chronic pulmonary disease (not asthma)	YES	1.56 (1.33-1.82, $p<0.001$ )
Chronic neurological disorder	YES	1.18 (0.95-1.45, $p=0.130$ )
Chronic hematologic disease	YES	1.40 (1.02-1.90, $p=0.033$ )
Chronic kidney disease	YES	1.56 (1.32-1.85, $p<0.001$ )
Dementia	YES	1.42 (1.16-1.73, $p=0.001$ )
Obesity (as defined by clinical staff)	YES	1.14 (0.92-1.40, $p=0.214$ )
Malignant neoplasm	YES	1.68 (1.37-2.05, $p<0.001$ )

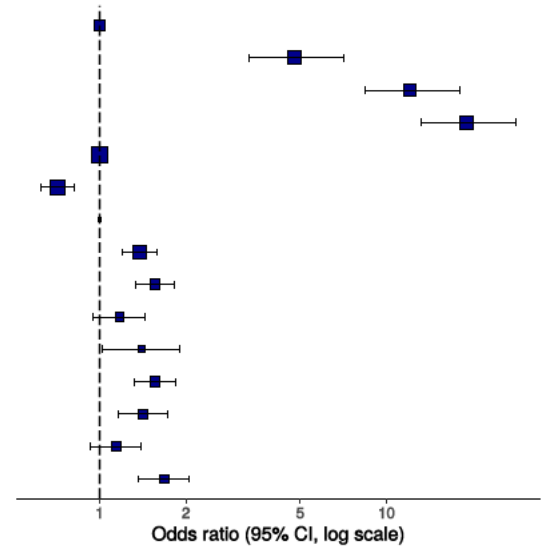
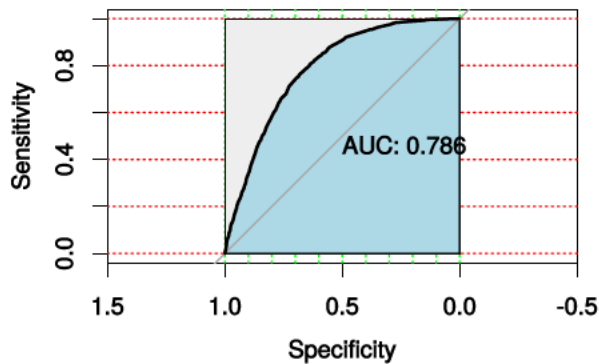


Figure 14 - ROC

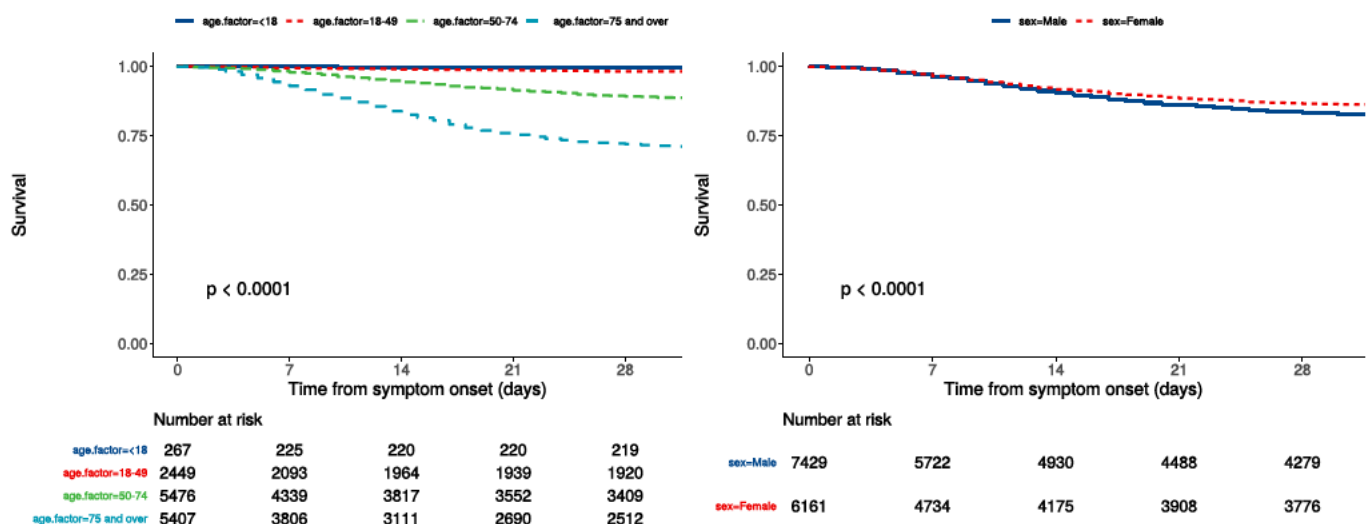


## Survival models

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.

Dependent: Surv(time, status)		all	HR (univariable)	HR (multivariable)
Age on admission (years)	<50	2716 (20.0)	•	•
	50-69	3986 (29.3)	5.31 (3.81-7.40, p<0.001)	4.62 (3.08-6.92, p<0.001)
	70-79	3026 (22.2)	14.84 (10.76-20.48, p<0.001)	11.67 (7.85-17.33, p<0.001)
	80+	3875 (28.5)	23.10 (16.83-31.71, p<0.001)	17.92 (12.06-26.62, p<0.001)
Sex at Birth	Male	7429 (54.7)	•	•
	Female	6161 (45.3)	0.79 (0.72-0.87, p<0.001)	0.78 (0.69-0.88, p<0.001)
qSOFA score on admission	0	5313 (51.0)	•	•
	1	4407 (42.3)	1.87 (1.67-2.09, p<0.001)	2.02 (1.78-2.29, p<0.001)
	2	671 (6.4)	4.59 (3.93-5.37, p<0.001)	3.75 (3.13-4.49, p<0.001)
	3	36 (0.3)	7.87 (4.78-12.95, p<0.001)	7.64 (4.38-13.33, p<0.001)
Symptomatic at presentation	No symptoms	1414 (11.7)	•	•
	Symptoms	10701 (88.3)	1.36 (1.15-1.61, p<0.001)	•
Chronic cardiac disease	NO	8331 (71.6)	•	•
	ES	3306 (28.4)	2.66 (2.41-2.93, p<0.001)	1.37 (1.21-1.54, p<0.001)
Chronic kidney disease	NO	9975 (86.0)	•	•
	ES	1619 (14.0)	2.62 (2.34-2.92, p<0.001)	1.51 (1.32-1.74, p<0.001)
Moderate or severe liver disease	NO	11303 (98.1)	•	•
	ES	215 (1.9)	1.86 (1.40-2.48, p<0.001)	1.62 (1.10-2.40, p=0.015)
Chronic neurological disorder	NO	10448 (90.5)	•	•
	ES	1100 (9.5)	1.62 (1.40-1.87, p<0.001)	•
Malignant neoplasm	NO	10536 (91.1)	•	•
	ES	1023 (8.9)	2.29 (2.00-2.61, p<0.001)	1.73 (1.48-2.03, p<0.001)
Chronic hematologic disease	NO	11125 (96.5)	•	•
	ES	407 (3.5)	1.76 (1.43-2.17, p<0.001)	•
Obesity (as defined by clinical staff)	NO	8815 (85.8)	•	•
	ES	1461 (14.2)	0.82 (0.70-0.96, p=0.015)	1.14 (0.95-1.37, p=0.149)
Diabetes without complications	NO	9555 (87.5)	•	•
	ES	1370 (12.5)	1.29 (1.12-1.48, p<0.001)	•
Rheumatologic disorder	NO	10116 (87.7)	•	•
	ES	1415 (12.3)	1.42 (1.24-1.62, p<0.001)	•

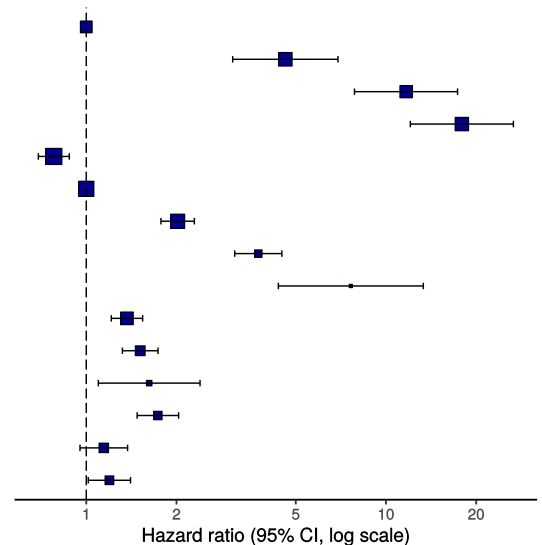
Dependent: Surv(time, status)		all	HR (univariable)	HR (multivariable)
Dementia	NO	10450 (90.2)	•	•
	ES	1132 (9.8)	2.59 (2.28-2.94, p<0.001)	1.19 (1.02-1.41, p=0.032)
Malnutrition	NO	10529 (98.0)	•	•
	ES	217 (2.0)	1.96 (1.49-2.57, p<0.001)	•
smoking_mhyn_2levels	NO	6198 (51.8)	•	•
	ES	630 (5.3)	0.94 (0.75-1.19, p=0.633)	•
	N/K	5141 (43.0)	1.32 (1.20-1.46, p<0.001)	•

Number in dataframe = 13624, Number in model = 8498, Missing = 5126, Number of events = 1179, Concordance = 0.789 (SE = 0.006), R-squared = 0.142( Max possible = 0.912), Likelihood ratio test = 1302.216 (df = 13, p = 0.000)

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

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

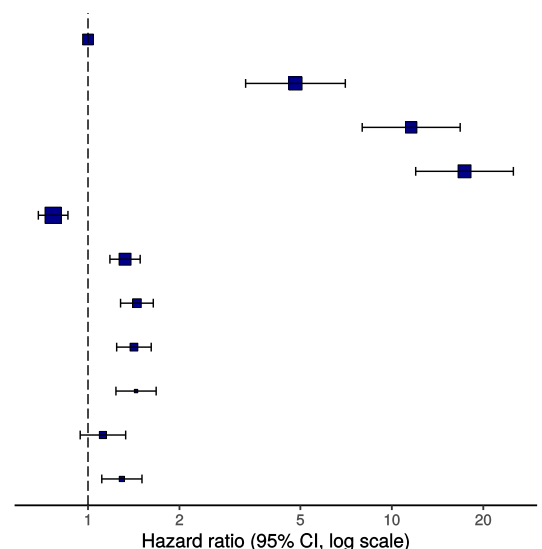
Age on admission (years)	<50	-
	50-69	4.62 (3.08-6.92, p<0.001)
	70-79	11.67 (7.85-17.33, p<0.001)
	80+	17.92 (12.06-26.62, p<0.001)
Sex at Birth	Female	0.78 (0.69-0.88, p<0.001)
qSOFA score on admission	0	-
	1	2.02 (1.78-2.29, p<0.001)
	2	3.75 (3.13-4.49, p<0.001)
	3	7.64 (4.38-13.33, p<0.001)
Chronic cardiac disease	YES	1.37 (1.21-1.54, p<0.001)
Chronic kidney disease	YES	1.51 (1.32-1.74, p<0.001)
Moderate or severe liver disease	YES	1.62 (1.10-2.40, p=0.015)
Malignant neoplasm	YES	1.73 (1.48-2.03, p<0.001)
Obesity (as defined by clinical staff)	YES	1.14 (0.95-1.37, p=0.149)
Dementia	YES	1.19 (1.02-1.41, p=0.032)



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

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

Age on admission (years)	<50	-
	50-69	4.82 (3.30-7.03, p<0.001)
	70-79	11.58 (7.99-16.79, p<0.001)
	80+	17.35 (11.98-25.12, p<0.001)
Sex at Birth	Female	0.77 (0.69-0.86, p<0.001)
Chronic cardiac disease	YES	1.32 (1.18-1.49, p<0.001)
Chronic pulmonary disease (not asthma)	YES	1.45 (1.28-1.64, p<0.001)
Chronic kidney disease	YES	1.42 (1.24-1.61, p<0.001)
Malignant neoplasm	YES	1.44 (1.24-1.68, p<0.001)
Obesity (as defined by clinical staff)	YES	1.12 (0.94-1.33, p=0.198)
Dementia	YES	1.29 (1.11-1.51, p=0.001)



ROC = 0.7909812

**Figure 17 - Predictions calibration plot**



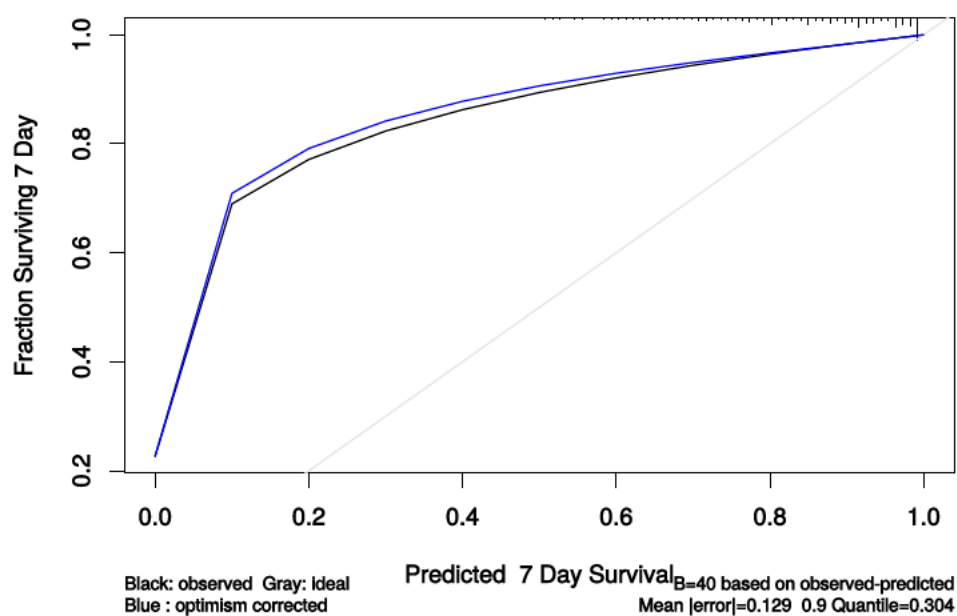


Figure 18 - Prognostic model predictions

Again, for demonstration of methods.

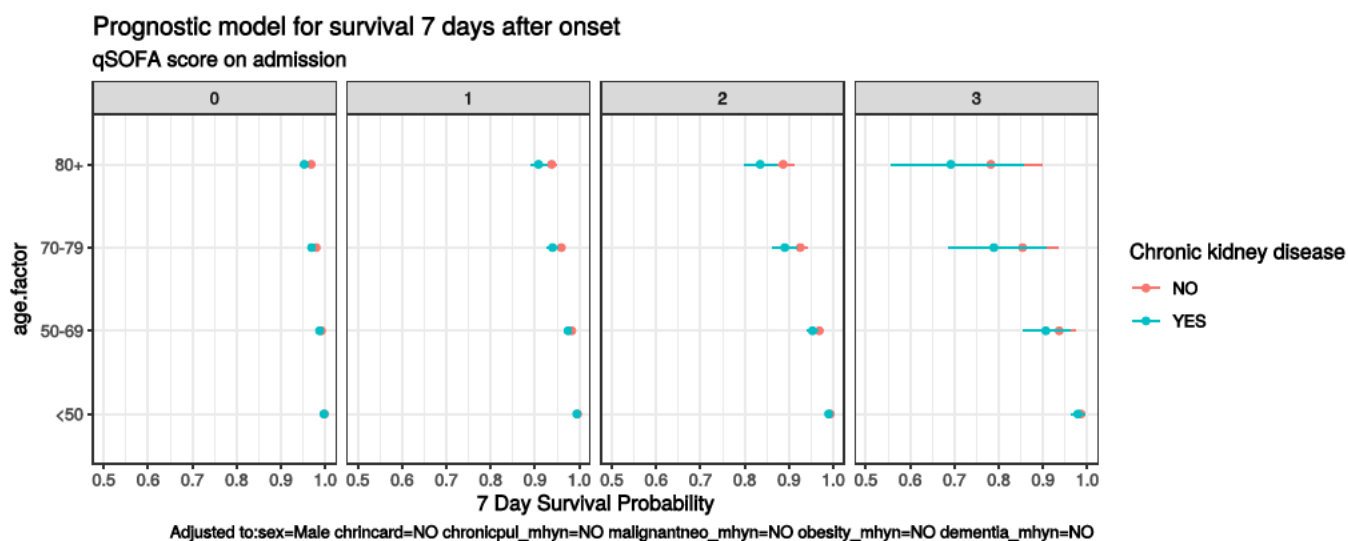


Figure 19 - Death by severity (NEWS) on admission

# Number of deaths by NEWS score at admission

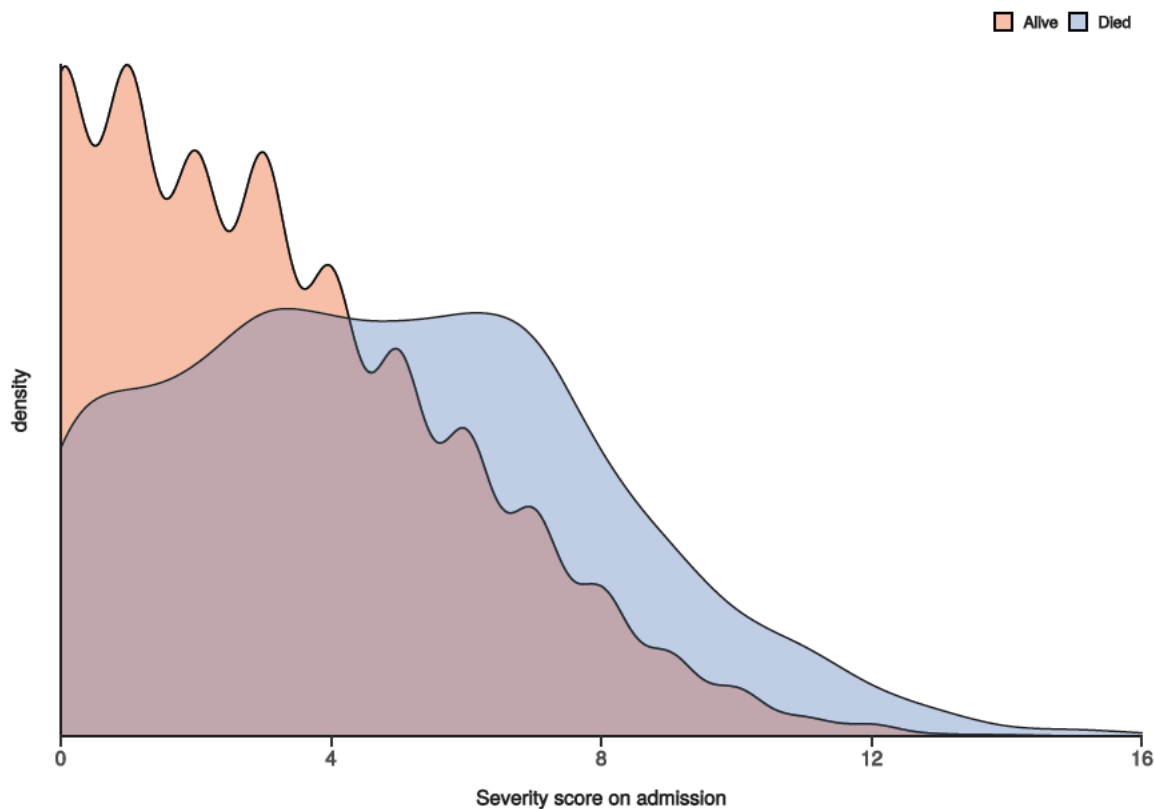


Figure 20 - Death by severity (NEWS) on admission stratified by age

## Number of deaths by NEWS score at admission Stratified by age

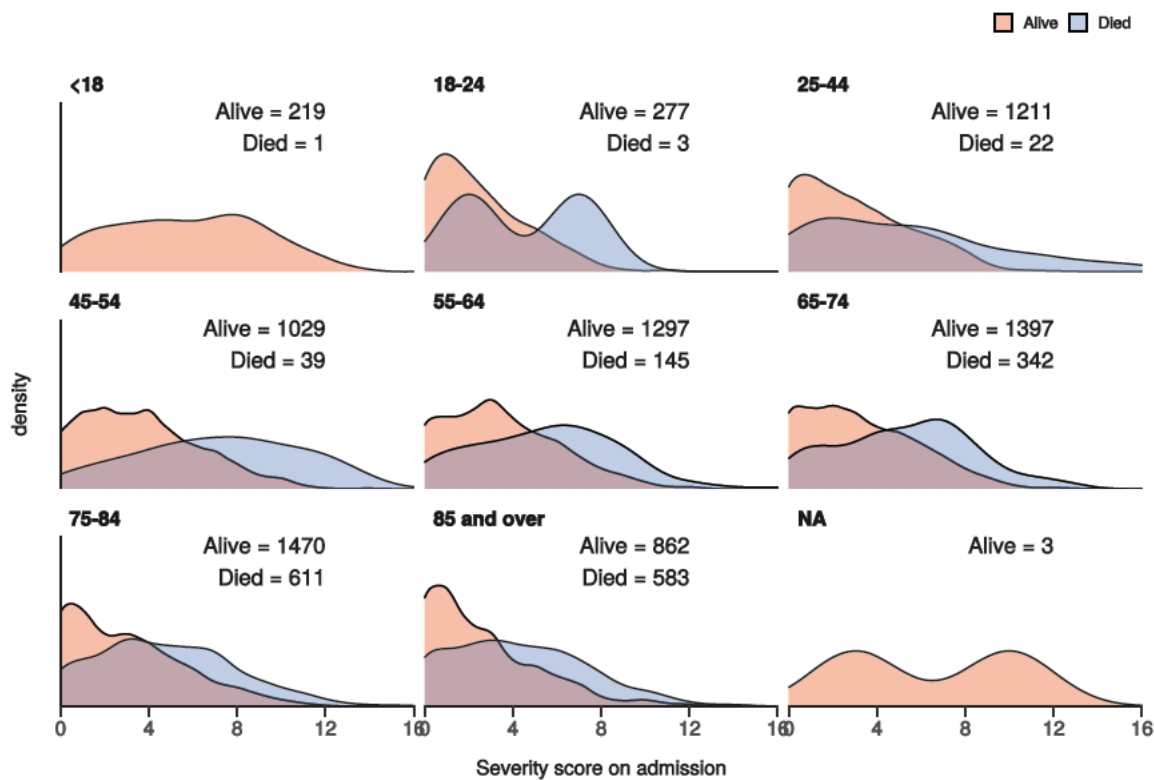
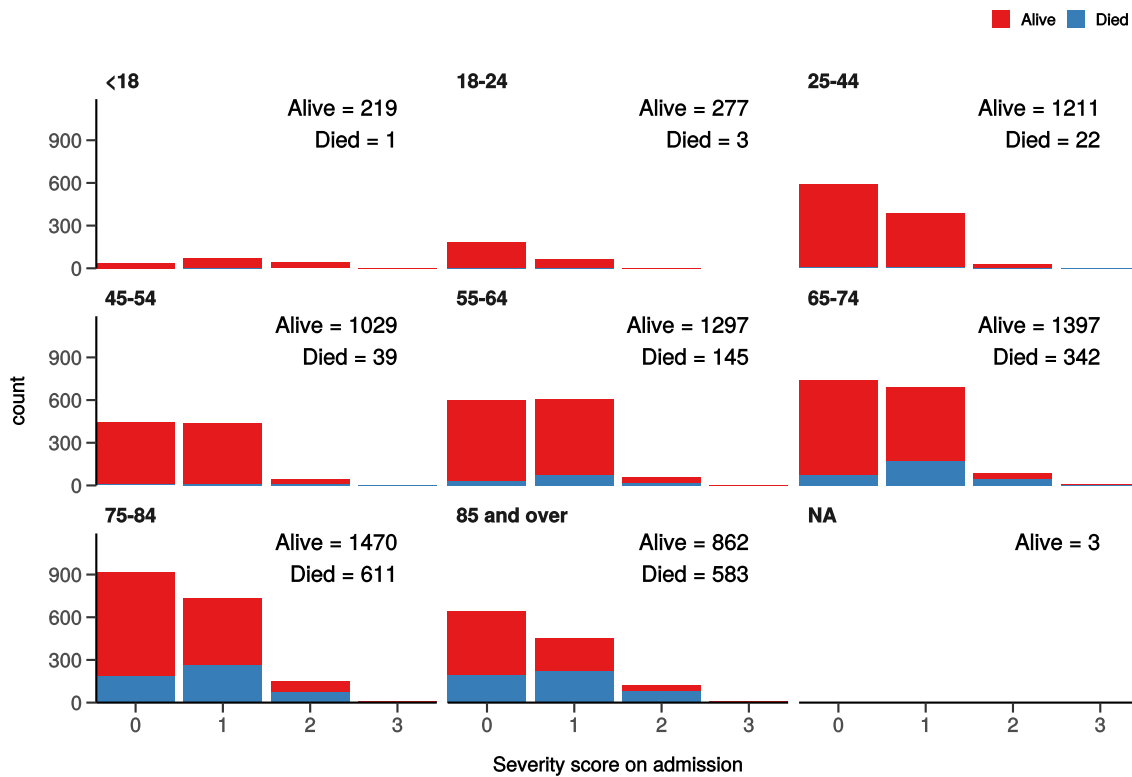


Figure 21 - Death by severity (qSOFA) on admission stratified by age

Number of deaths by qSOFA score at admission  
Stratified by age



## Healthcare workers

Employed as a healthcare worker?		NO	YES	p
Total N (%)		11405 (97.6)	280 (2.4)	
NEWS score on admission	Median (IQR)	3.0 (4.0)	3.0 (4.0)	0.675
Death	No	6411 (79.8)	204 (97.6)	<0.001
	Yes	1619 (20.2)	5 (2.4)	