

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

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

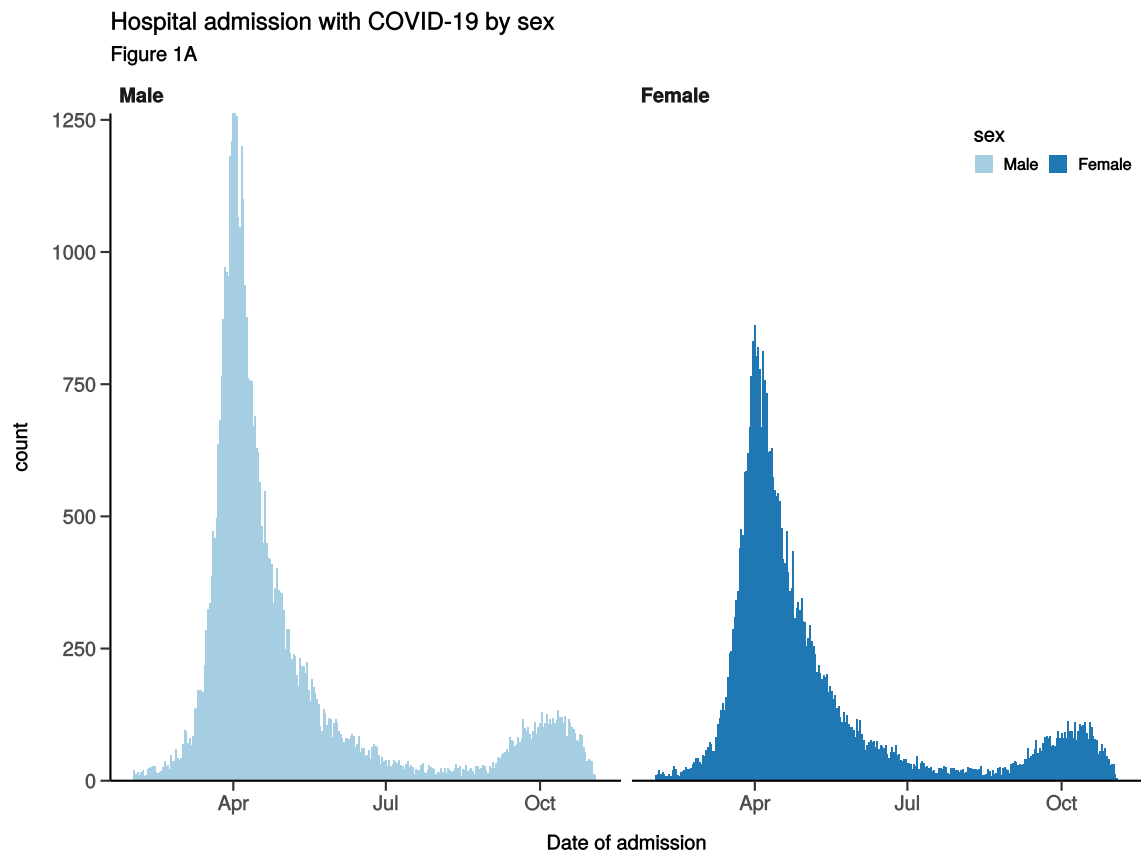
## Executive summary

### Includes all patients

There are 95381 patients included in CO-CIN. Of these, 25274 patient(s) have died and 11949 required ICU. 51768 have been discharged home.

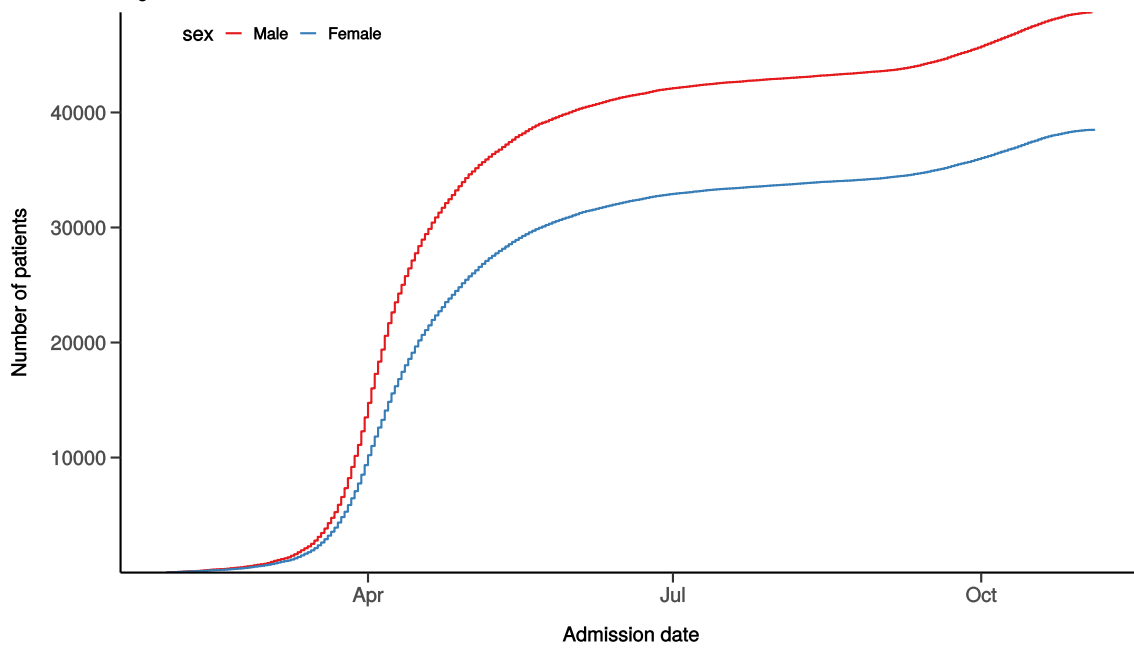
## Admission

Figure 1



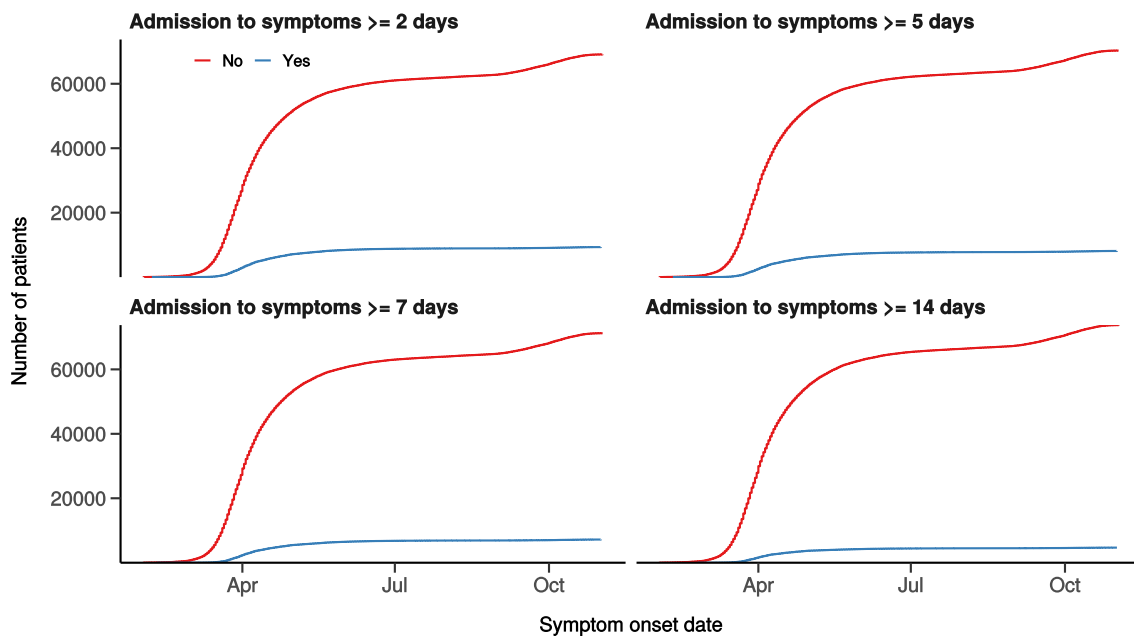
## Hospital admission with COVID-19 by sex

Figure 1B



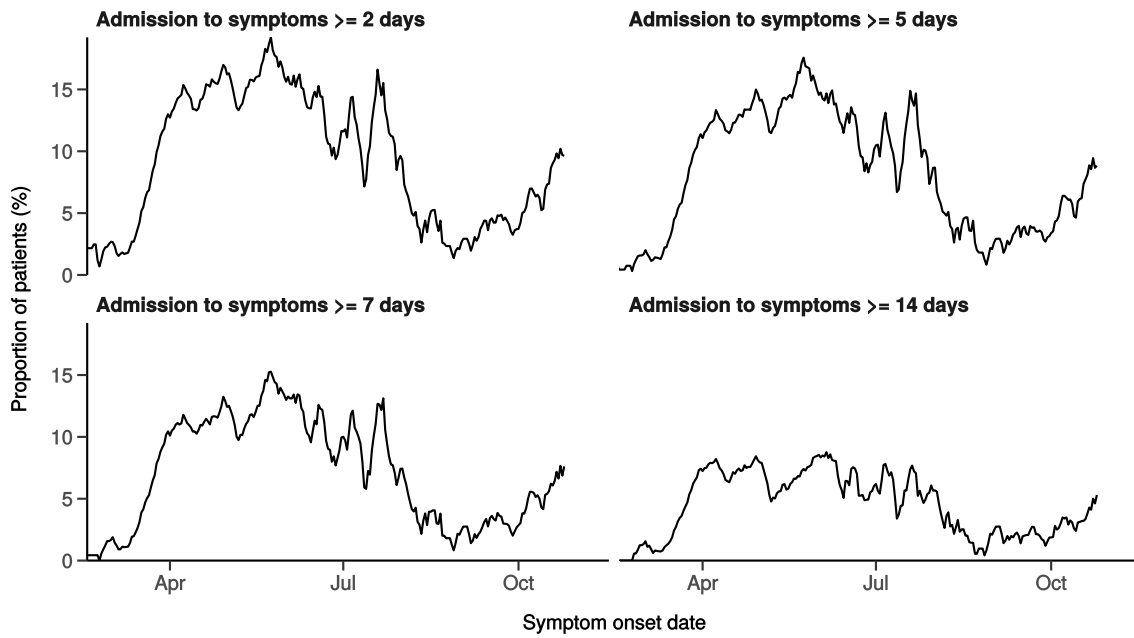
## Number with symptom onset occurring after admission to hospital

Figure 1C



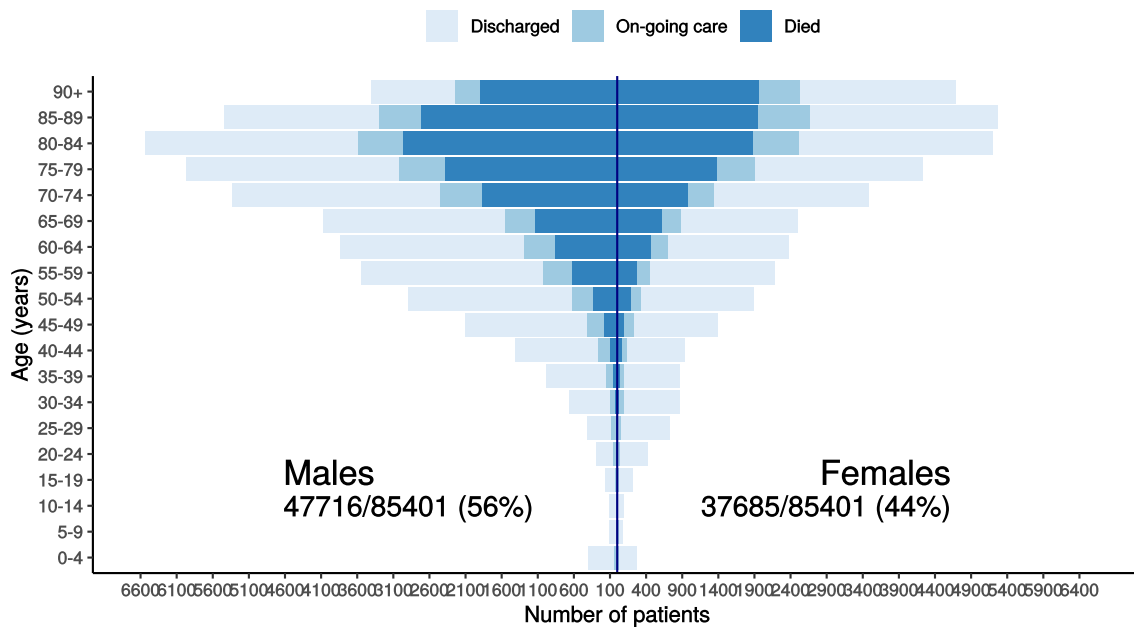
# Proportion with symptom onset occurring after hospital admission

Figure 1D - 7-day rolling percentage. n = 78426



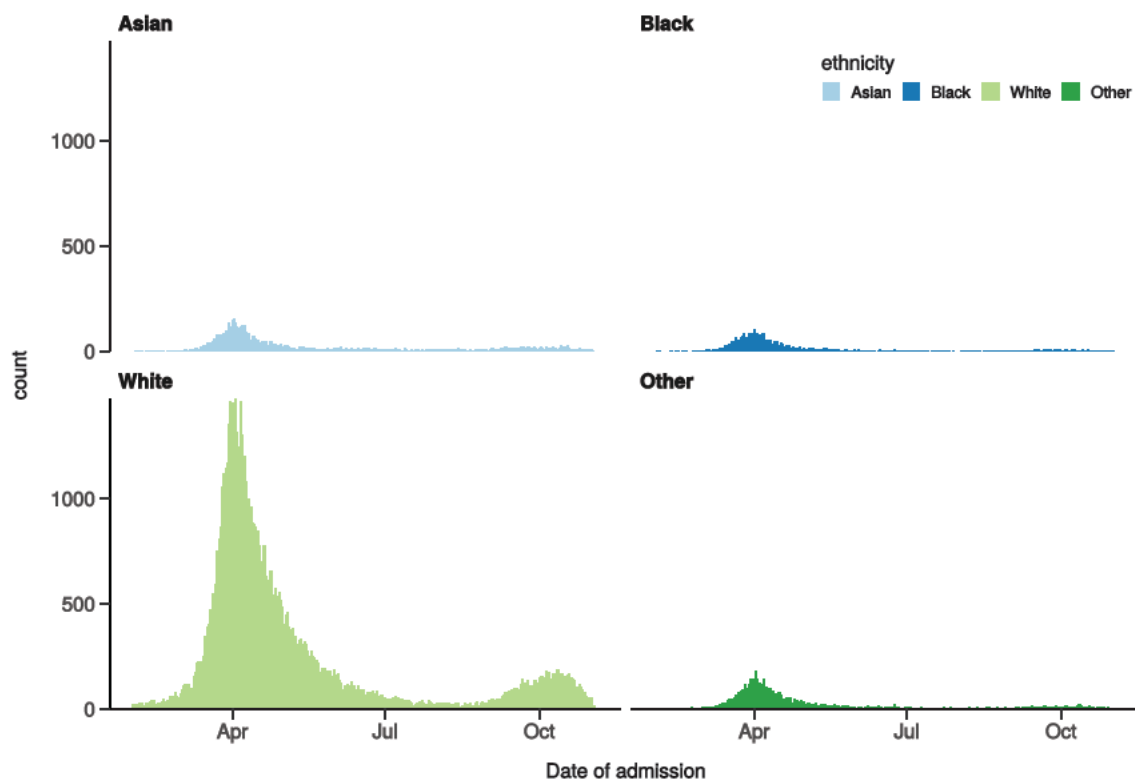
## Patients with outcome stratified by age, and sex

Figure 1E



## Hospital admission with COVID-19 by ethnicity

Figure 1F

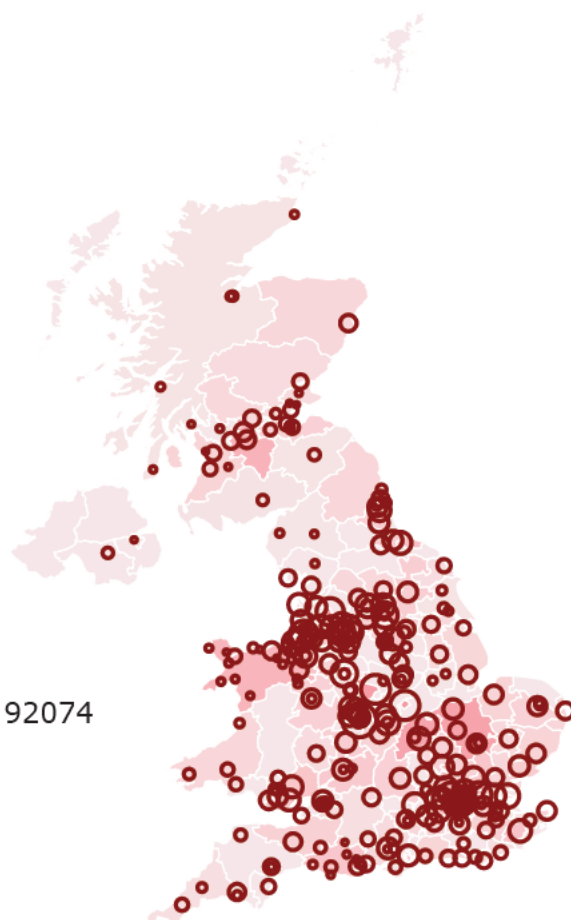


## Location by CCG / Healthboard

Figure 2

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

n = 92074



# Symptoms and comorbidity

Figure 3A

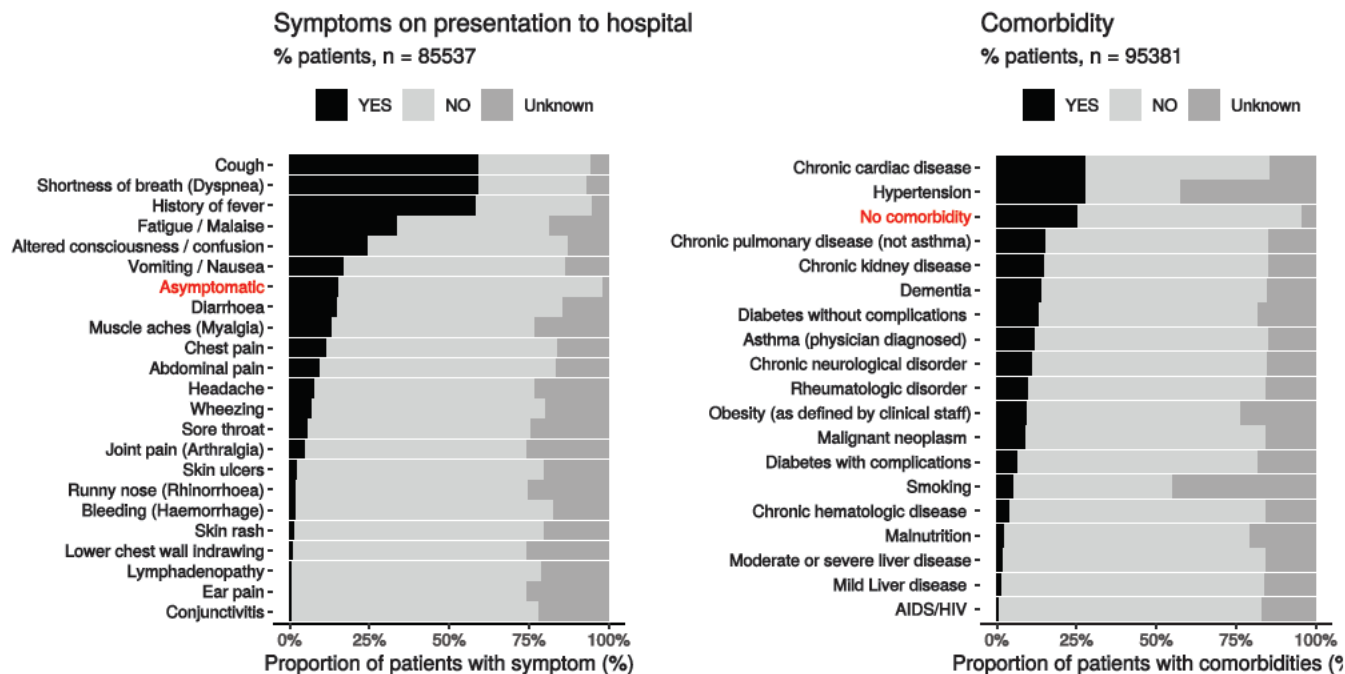


Figure 3B - Symptoms by Age

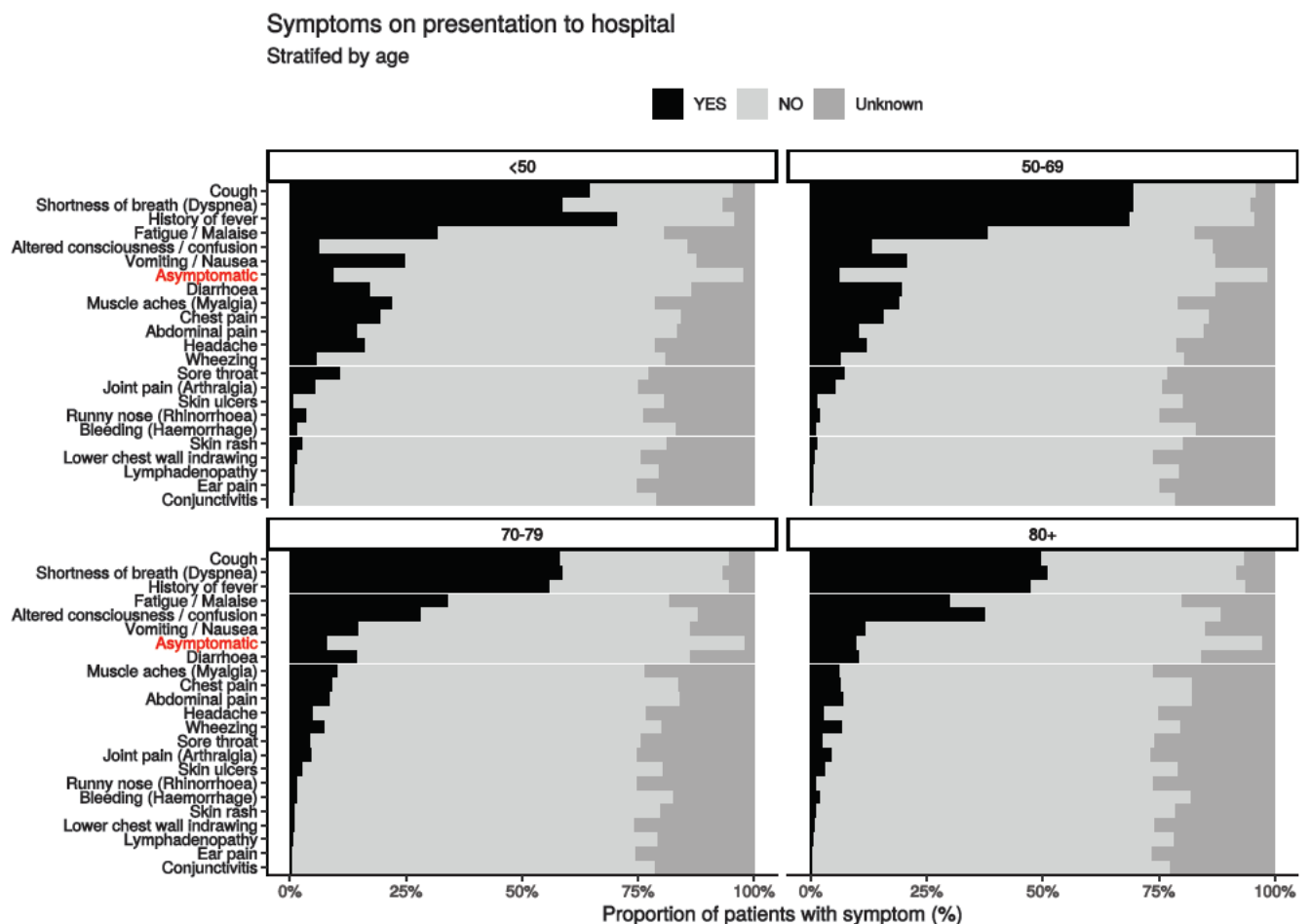
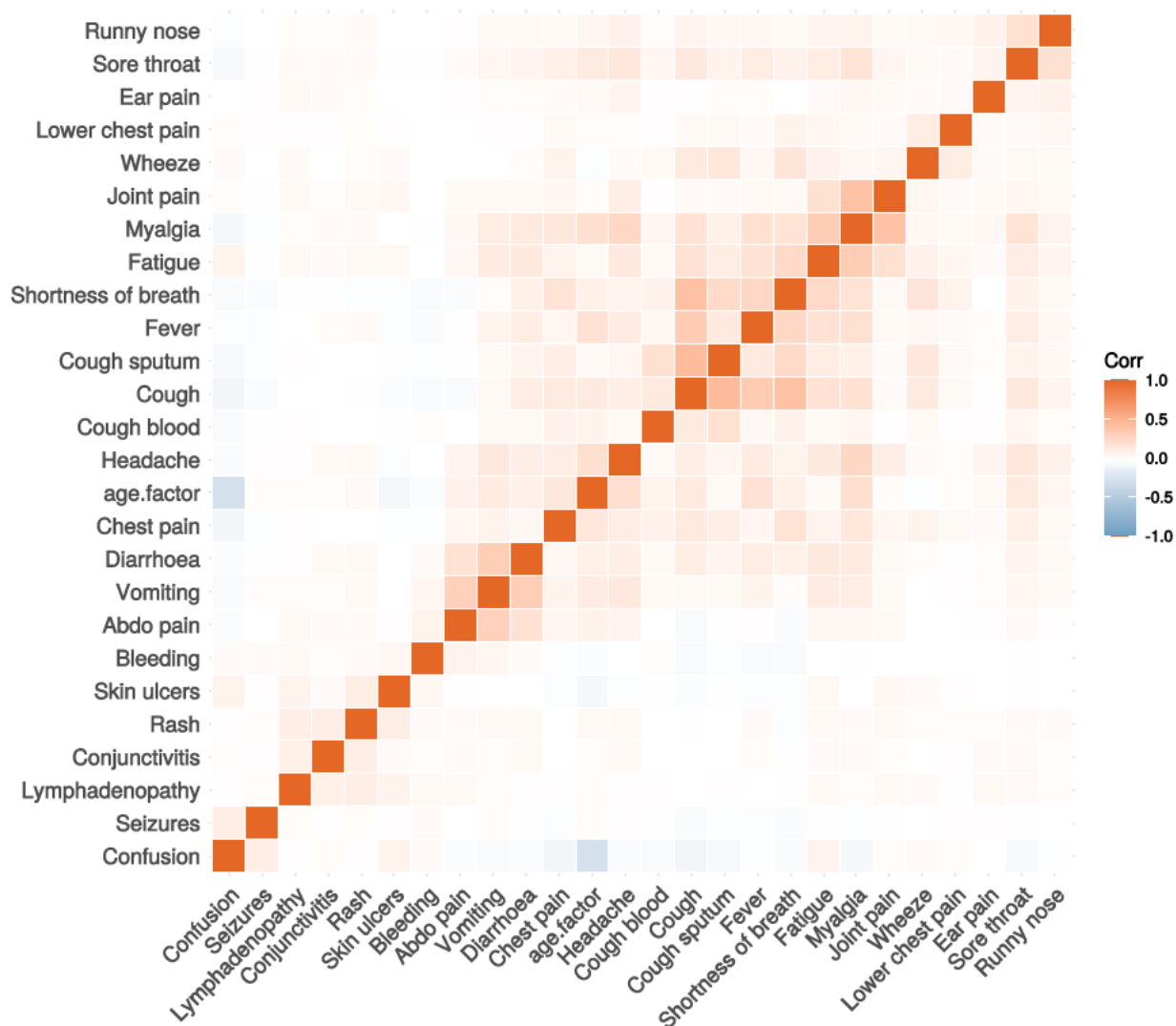


Figure 3C

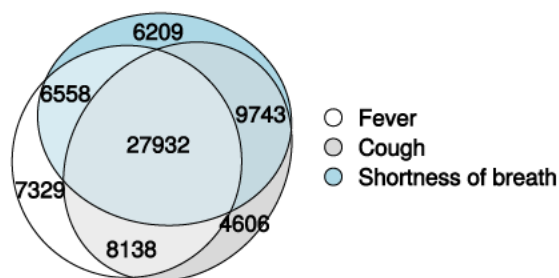
Correlation of symptoms in all pages. Note clusters, top right to bottom left, flu-like, coryzal, abdominal, respiratory, neurocutaneous.



## Symptoms (diagnostic criteria)

Figure 4A

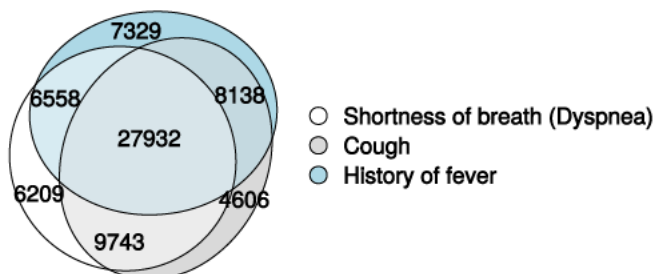
n = 85537



## Symptoms (most common)

Figure 4B

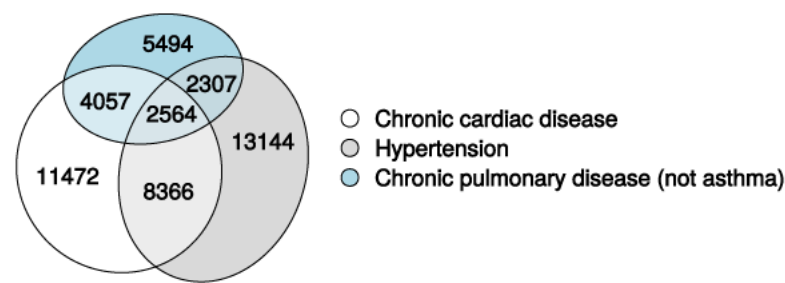
n = 85537



## Comorbidity (most common)

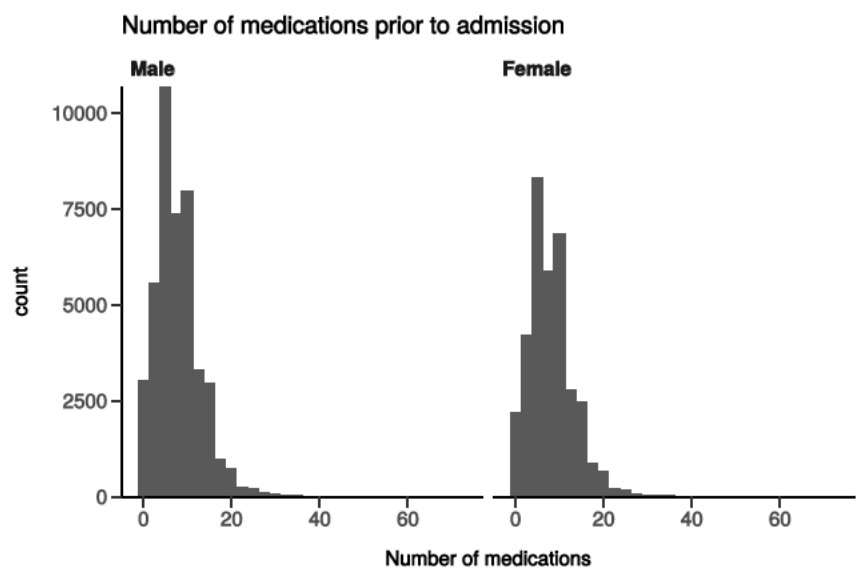
Figure 4C

n = 95381



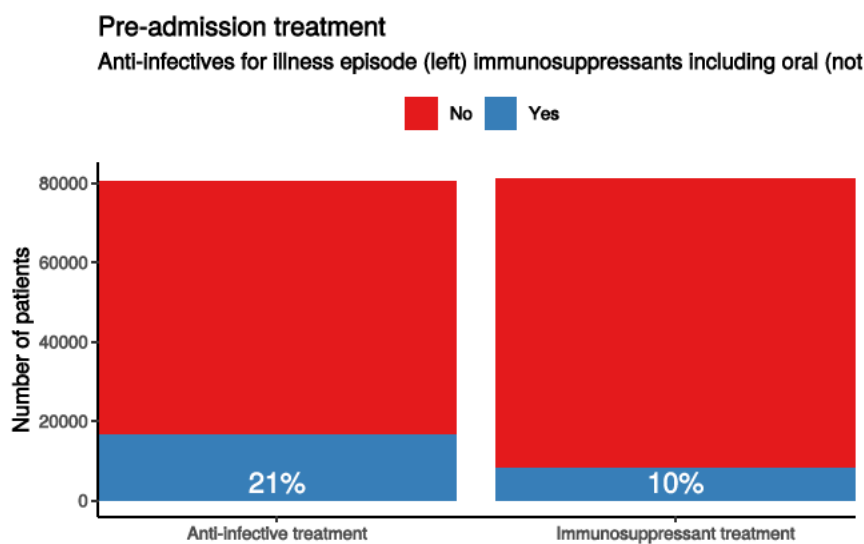
## Medication prior to illness

Figure 5



## Preadmission treatment

Figure 6



## Patient flow

Figure 7A - All patients

N = 87645

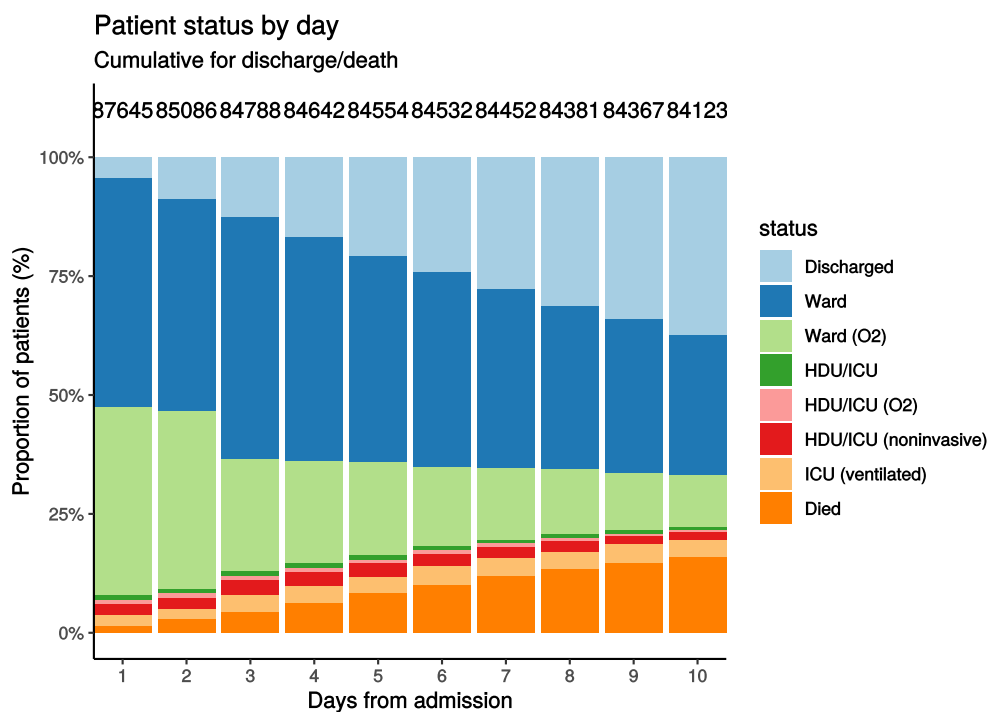
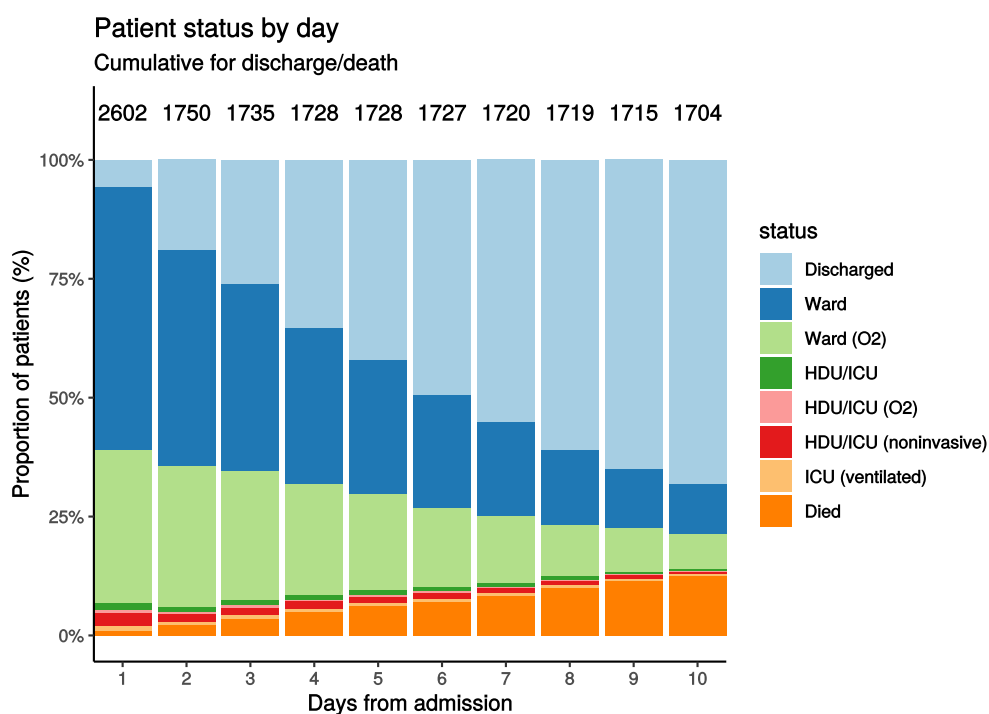


Figure 7B - Patients admitted  $\geq 14$  days and  $\leq 28$  days ago

N = 2602



## Oxygen requirement

Figure 8A - All patients

N = 82993



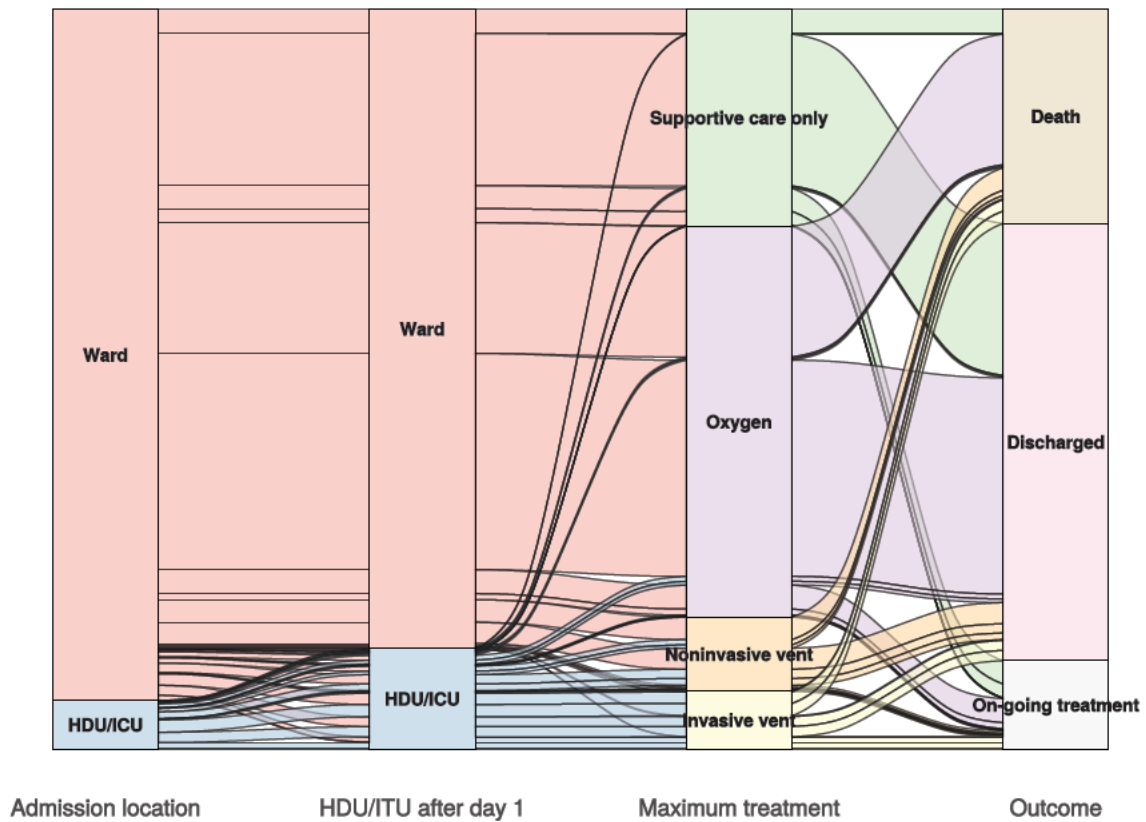


Figure 8B - Patients admitted  $\geq 14$  days and  $\leq 28$  days ago

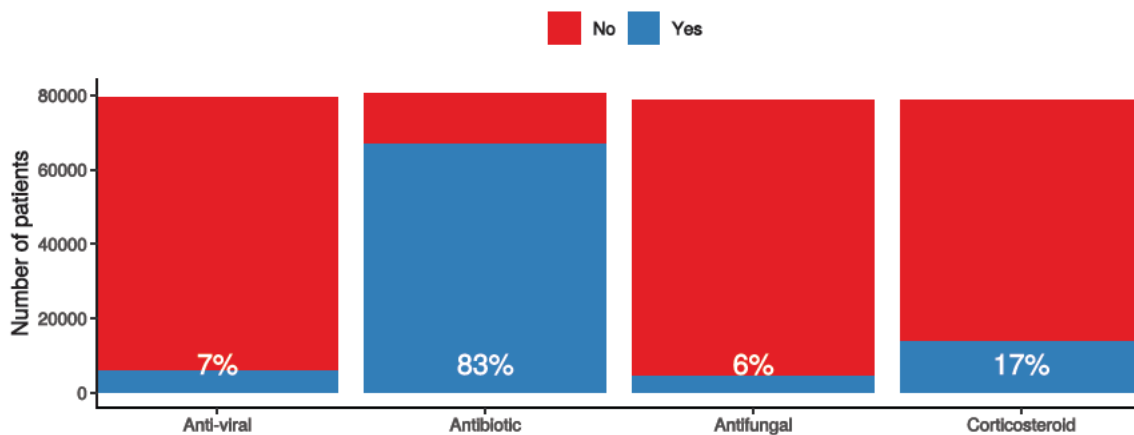
N = 2510

## In-hospital medical treatment

Figure 9

### In-hospital treatment

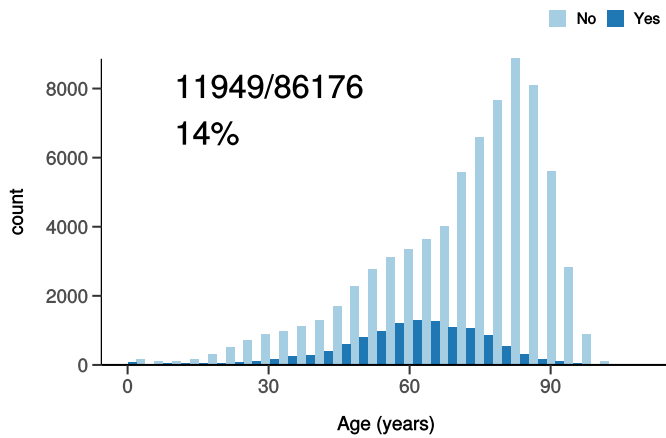
Anti-virals, antibiotics, corticosteroids, and anti-fungals for patients who have completed journey.



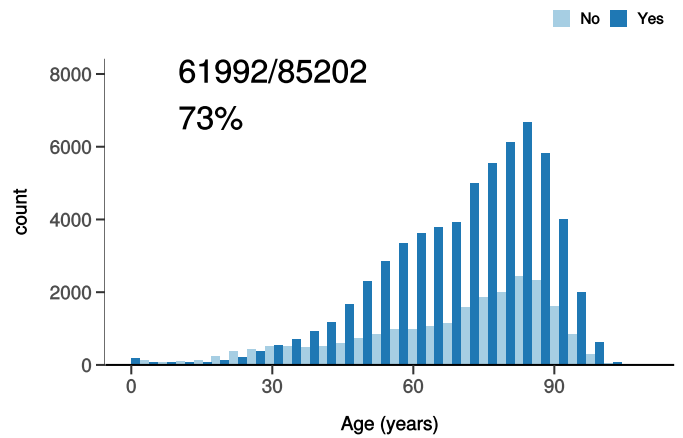
## Treatment

Figure 10

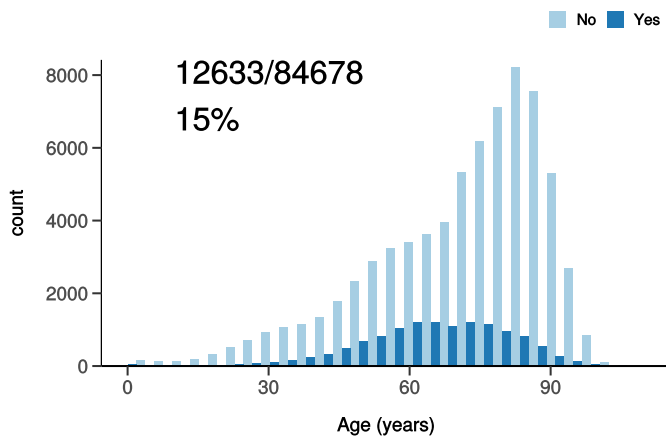
ICU/HDU admission  
Figure 10A



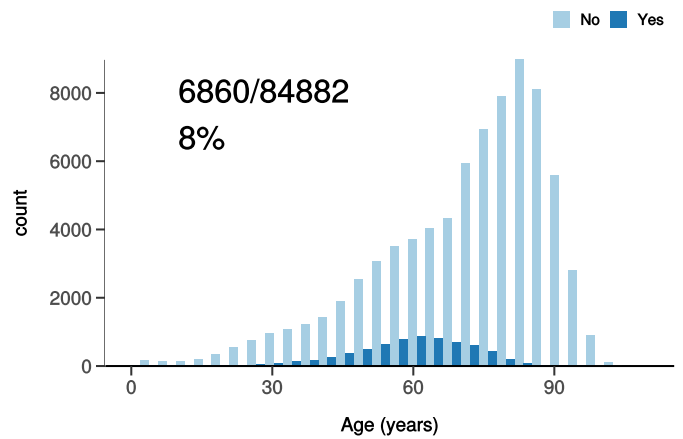
High flow oxygen  
Figure 10B



Noninvasive ventilation  
Figure 10C



Invasive ventilation  
Figure 10D

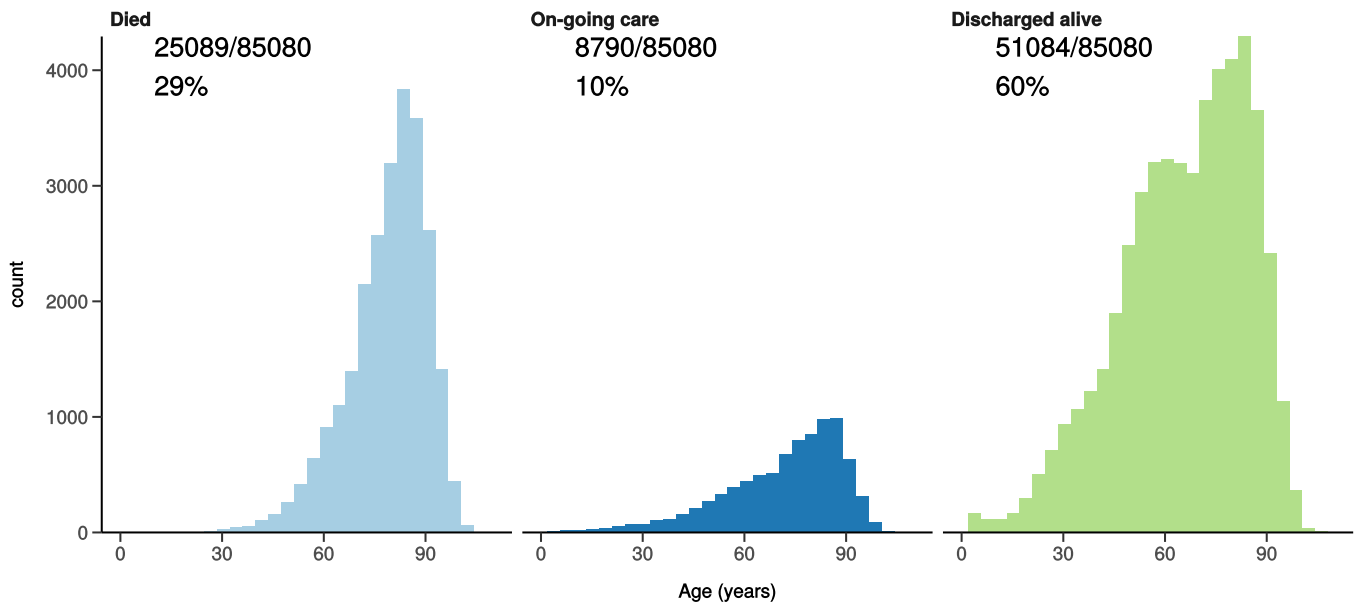


## Status in patients admitted $\geq 14$ days from today

Figure 11

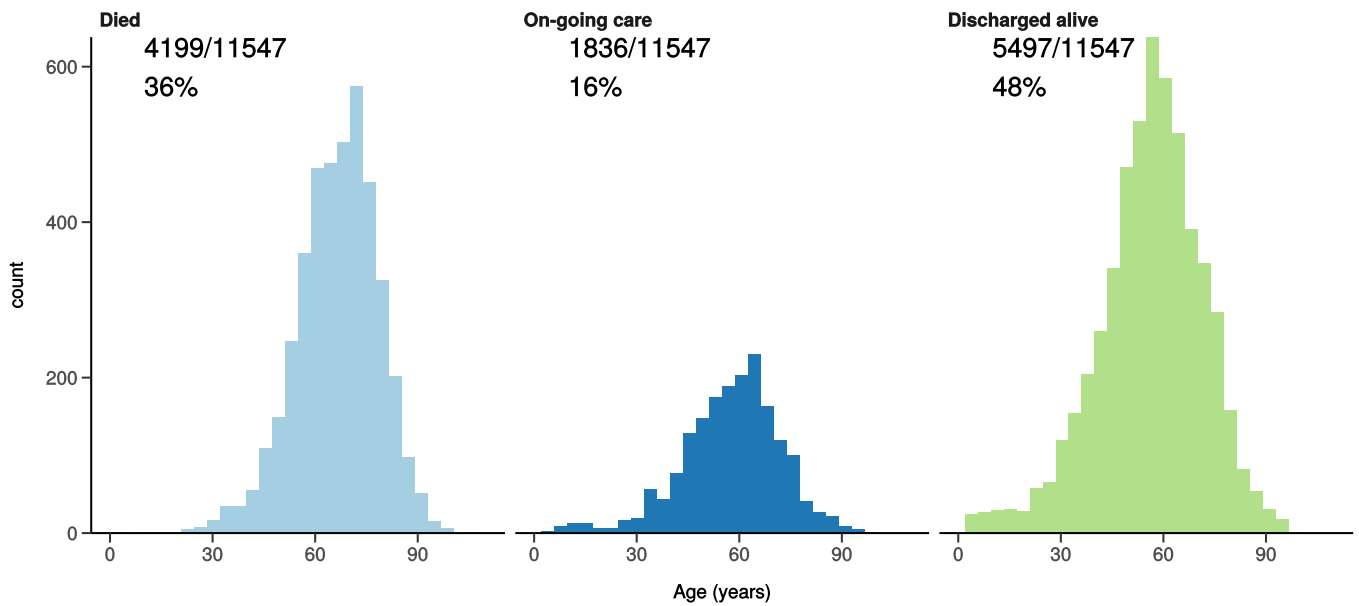
All: status in patients admitted  $\geq 14$  days ago

Figure 11A



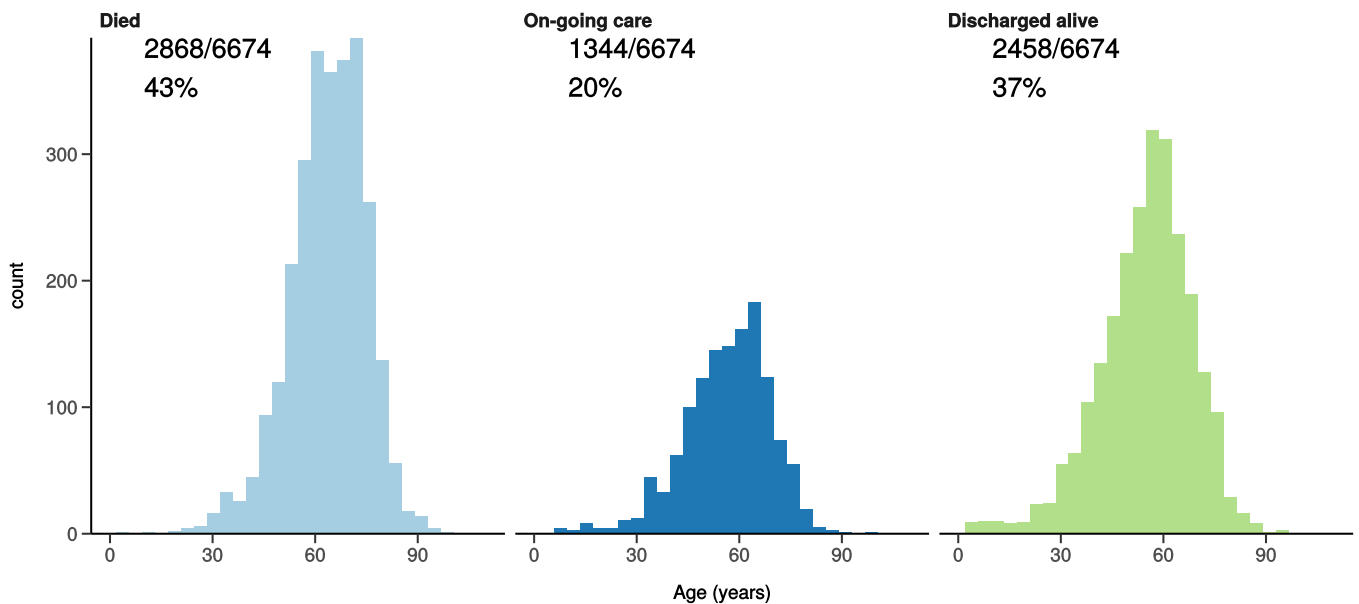
ICU/HDU admissions: status in patients admitted  $\geq 14$  days ago

Figure 11B



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

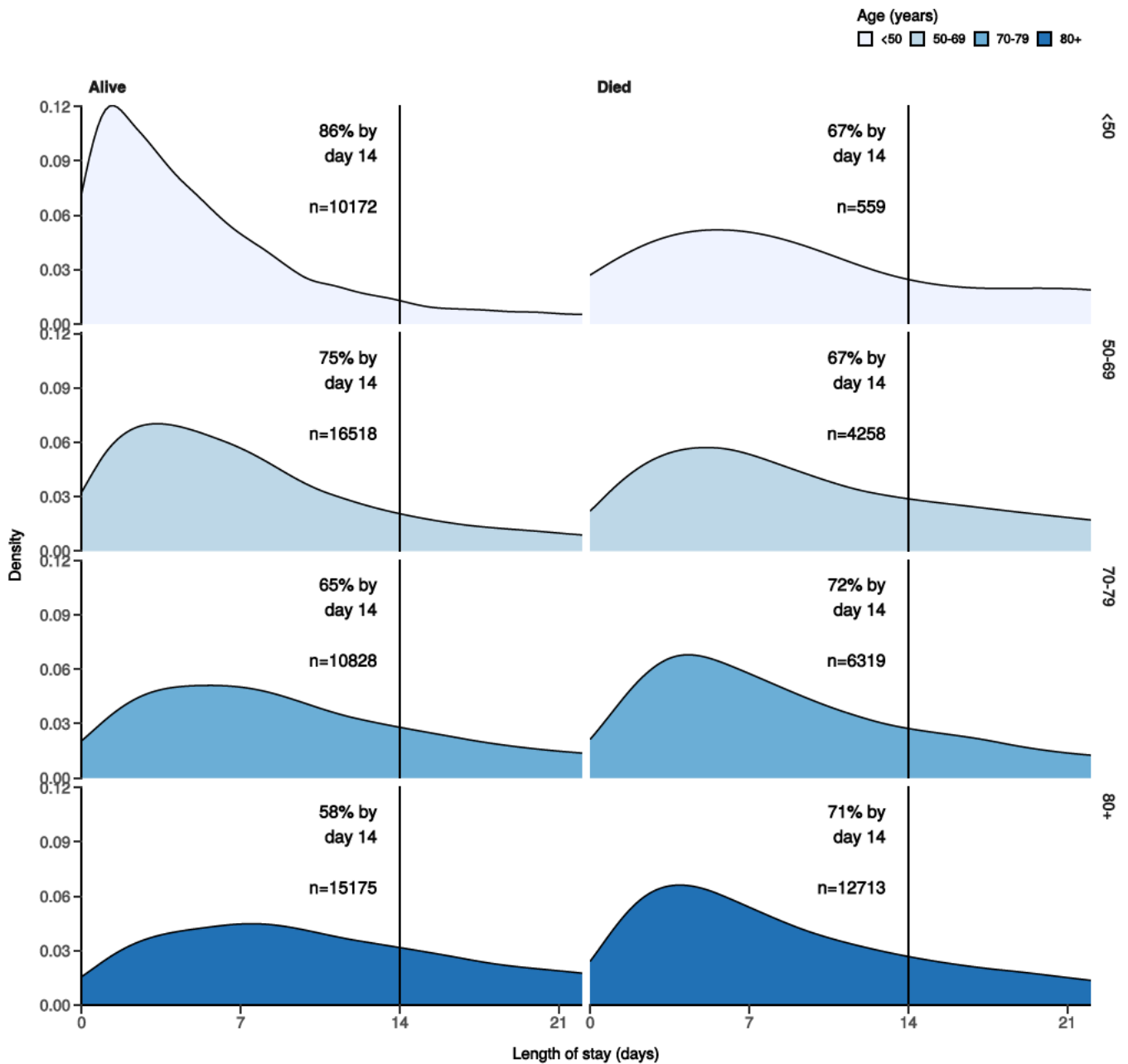
Figure 11c



# 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	11626 (95.1)	598 (4.9)	•	•
	50-69	18221 (80.3)	4464 (19.7)	4.76 (4.36-5.21, p<0.001)	4.42 (4.01-4.89, p<0.001)
	70-79	11925 (64.3)	6607 (35.7)	10.77 (9.88-11.77, p<0.001)	8.98 (8.13-9.93, p<0.001)
	80+	16589 (55.5)	13325 (44.5)	15.62 (14.35-17.02, p<0.001)	12.94 (11.73-14.31, p<0.001)

Dependent: death		No	Yes	OR (univariable)	OR (multivariable)
Sex at Birth	Male	31499 (67.5)	15136 (32.5)	•	•
	Female	26905 (73.1)	9876 (26.9)	0.76 (0.74-0.79, p<0.001)	0.70 (0.67-0.73, p<0.001)
	Not specified	0 (NaN)	0 (NaN)	•	•
Chronic cardiac disease	NO	39692 (74.9)	13275 (25.1)	•	•
	YES	15147 (59.7)	10242 (40.3)	2.02 (1.96-2.09, p<0.001)	1.16 (1.11-1.20, p<0.001)
Chronic pulmonary disease (not asthma)	NO	46391 (72.2)	17868 (27.8)	•	•
	YES	8318 (60.3)	5476 (39.7)	1.71 (1.65-1.78, p<0.001)	1.25 (1.20-1.31, p<0.001)
Chronic neurological disorder	NO	48139 (71.2)	19465 (28.8)	•	•
	YES	6216 (62.9)	3672 (37.1)	1.46 (1.40-1.53, p<0.001)	1.17 (1.11-1.23, p<0.001)
Chronic hematologic disease	NO	52126 (70.5)	21762 (29.5)	•	•
	YES	2080 (62.1)	1272 (37.9)	1.46 (1.36-1.57, p<0.001)	1.15 (1.06-1.26, p=0.001)
Chronic kidney disease	NO	46782 (72.7)	17532 (27.3)	•	•
	YES	7777 (57.5)	5745 (42.5)	1.97 (1.90-2.05, p<0.001)	1.29 (1.24-1.36, p<0.001)
Dementia	NO	47513 (73.2)	17399 (26.8)	•	•
	YES	6883 (54.2)	5825 (45.8)	2.31 (2.22-2.40, p<0.001)	1.38 (1.32-1.45, p<0.001)
Obesity (as defined by clinical staff)	NO	43074 (70.2)	18308 (29.8)	•	•
	YES	6200 (73.9)	2188 (26.1)	0.83 (0.79-0.87, p<0.001)	1.27 (1.20-1.35, p<0.001)
Malignant neoplasm	NO	49731 (71.7)	19646 (28.3)	•	•
	YES	4497 (56.7)	3430 (43.3)	1.93 (1.84-2.02, p<0.001)	1.48 (1.40-1.56, p<0.001)

Number in dataframe = 87143, Number in model = 66360, Missing = 20783, AIC = 71177.5, C-statistic = 0.719, H&L = Chi-sq(8) 121.93 (p<0.001)

**Figure 13 - Adjusted odds ratio plot**

## Death

Age on admission (years)	<50	-
	50-69	4.42 (4.01-4.89, p<0.001)
	70-79	8.98 (8.13-9.93, p<0.001)
	80+	12.94 (11.73-14.31, p<0.001)
Sex at Birth	Male	-
	Female	0.70 (0.67-0.73, p<0.001)
	Not specified	-
Chronic cardiac disease	YES	1.16 (1.11-1.20, p<0.001)
Chronic pulmonary disease (not asthma)	YES	1.25 (1.20-1.31, p<0.001)
Chronic neurological disorder	YES	1.17 (1.11-1.23, p<0.001)
Chronic hematologic disease	YES	1.15 (1.06-1.26, p=0.001)
Chronic kidney disease	YES	1.29 (1.24-1.36, p<0.001)
Dementia	YES	1.38 (1.32-1.45, p<0.001)
Obesity (as defined by clinical staff)	YES	1.27 (1.20-1.35, p<0.001)
Malignant neoplasm	YES	1.48 (1.40-1.56, p<0.001)

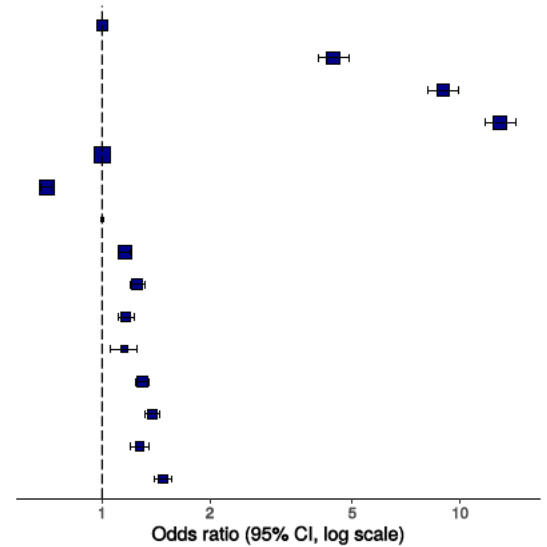
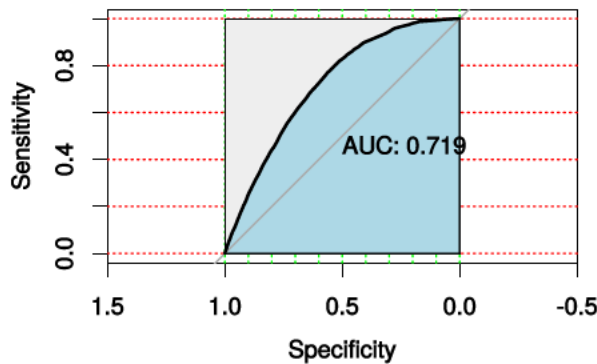


Figure 14 - ROC

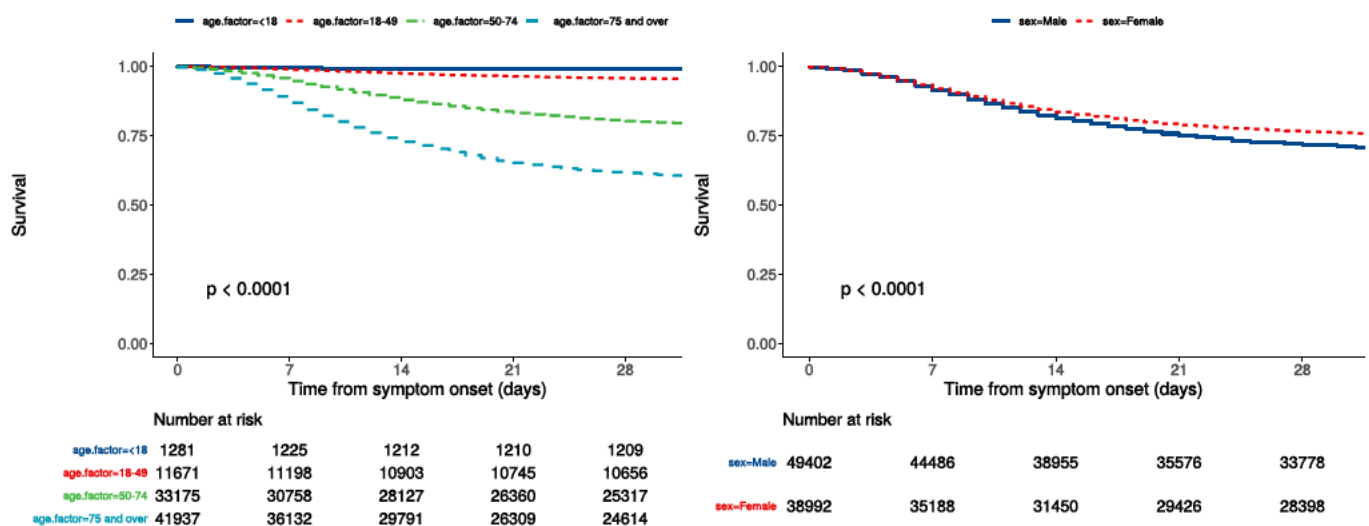


## Survival models

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	12952 (14.7)	•	•
	50-69	24070 (27.3)	4.34 (3.98-4.72, p<0.001)	4.15 (3.73-4.60, p<0.001)
	70-79	19630 (22.3)	8.83 (8.12-9.60, p<0.001)	8.16 (7.36-9.05, p<0.001)
	80+	31418 (35.7)	12.02 (11.07-13.06, p<0.001)	10.86 (9.80-12.04, p<0.001)
Sex at Birth	Male	49402 (55.9)	•	•
	Female	38992 (44.1)	0.81 (0.79-0.83, p<0.001)	0.79 (0.76-0.81, p<0.001)
qSOFA score on admission	0	32501 (43.4)	•	•
	1	33459 (44.7)	1.62 (1.57-1.67, p<0.001)	1.73 (1.67-1.79, p<0.001)
	2	8062 (10.8)	3.14 (3.02-3.27, p<0.001)	2.91 (2.79-3.04, p<0.001)
	3	878 (1.2)	5.13 (4.71-5.59, p<0.001)	4.61 (4.18-5.08, p<0.001)
Symptomatic at presentation	No symptoms	4830 (5.6)	•	•
	Symptoms	80740 (94.4)	1.60 (1.50-1.71, p<0.001)	•
Chronic cardiac disease	NO	55163 (67.7)	•	•
	YES	26350 (32.3)	1.81 (1.76-1.85, p<0.001)	1.14 (1.10-1.18, p<0.001)
Chronic kidney disease	NO	66961 (82.7)	•	•
	YES	14018 (17.3)	1.76 (1.71-1.82, p<0.001)	1.23 (1.19-1.28, p<0.001)
Moderate or severe liver disease	NO	78639 (98.0)	•	•
	YES	1575 (2.0)	1.30 (1.20-1.42, p<0.001)	1.43 (1.29-1.58, p<0.001)
Chronic neurological disorder	NO	70404 (87.4)	•	•
	YES	10193 (12.6)	1.39 (1.34-1.44, p<0.001)	•
Malignant neoplasm	NO	72227 (89.8)	•	•
	YES	8190 (10.2)	1.69 (1.63-1.75, p<0.001)	1.35 (1.29-1.41, p<0.001)
Chronic hematologic disease	NO	76897 (95.7)	•	•
	YES	3433 (4.3)	1.36 (1.29-1.44, p<0.001)	•
Obesity (as defined by clinical staff)	NO	63852 (87.9)	•	•
	YES	8750 (12.1)	0.85 (0.81-0.88, p<0.001)	1.17 (1.11-1.23, p<0.001)
Diabetes without complications	NO	65418 (84.0)	•	•
	YES	12504 (16.0)	1.26 (1.22-1.31, p<0.001)	•
Rheumatologic disorder	NO	70916 (88.5)	•	•
	YES	9221 (11.5)	1.20 (1.15-1.24, p<0.001)	•

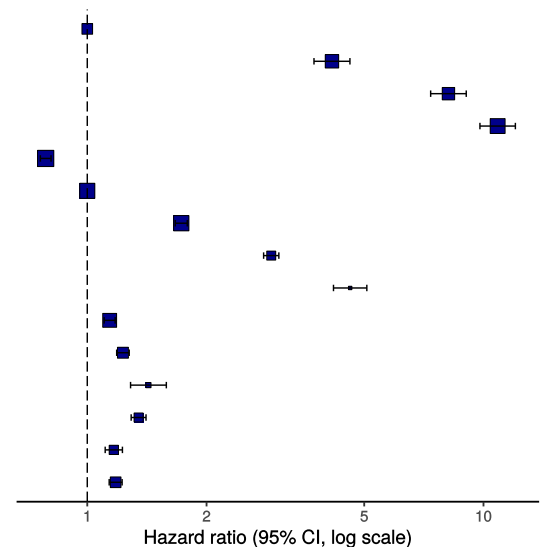
Dependent: Surv(time, status)		all	HR (univariable)	HR (multivariable)
Dementia	NO	67657 (83.8)	•	•
	YES	13090 (16.2)	2.04 (1.98-2.10, p<0.001)	1.18 (1.14-1.22, p<0.001)
Malnutrition	NO	73470 (97.3)	•	•
	YES	2068 (2.7)	1.46 (1.36-1.57, p<0.001)	•
smoking_mhyn_2levels	NO	47344 (57.2)	•	•
	YES	4604 (5.6)	0.86 (0.81-0.92, p<0.001)	•
	N/K	30878 (37.3)	1.23 (1.20-1.27, p<0.001)	•

Number in dataframe = 88772, Number in model = 61271, Missing = 27501, Number of events = 17202, Concordance = 0.722 (SE = 0.002), R-squared = 0.160( Max possible = 0.998), Likelihood ratio test = 10655.131 (df = 13, p = 0.000)

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

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

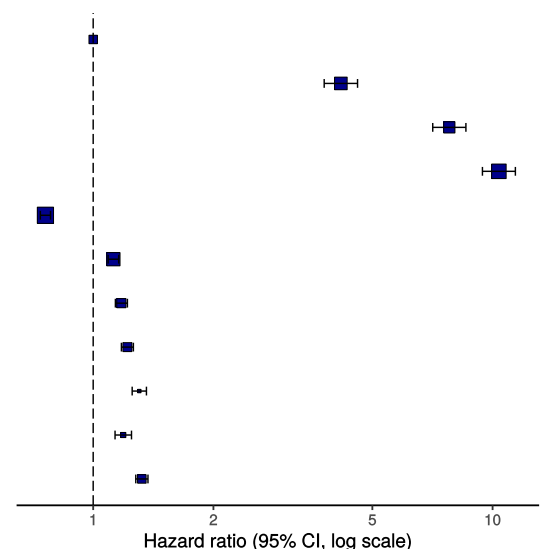
Age on admission (years)	<50	-
	50-69	4.15 (3.73-4.60, p<0.001)
	70-79	8.16 (7.36-9.05, p<0.001)
	80+	10.86 (9.80-12.04, p<0.001)
Sex at Birth	Female	0.79 (0.76-0.81, p<0.001)
qSOFA score on admission	0	-
	1	1.73 (1.67-1.79, p<0.001)
	2	2.91 (2.79-3.04, p<0.001)
	3	4.61 (4.18-5.08, p<0.001)
Chronic cardiac disease	YES	1.14 (1.10-1.18, p<0.001)
Chronic kidney disease	YES	1.23 (1.19-1.28, p<0.001)
Moderate or severe liver disease	YES	1.43 (1.29-1.58, p<0.001)
Malignant neoplasm	YES	1.35 (1.29-1.41, p<0.001)
Obesity (as defined by clinical staff)	YES	1.17 (1.11-1.23, p<0.001)
Dementia	YES	1.18 (1.14-1.22, 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	4.17 (3.79-4.59, p<0.001)
	70-79	7.79 (7.08-8.57, p<0.001)
	80+	10.37 (9.43-11.40, p<0.001)
Sex at Birth	Female	0.76 (0.74-0.78, p<0.001)
Chronic cardiac disease	YES	1.12 (1.09-1.16, p<0.001)
Chronic pulmonary disease (not asthma)	YES	1.18 (1.14-1.22, p<0.001)
Chronic kidney disease	YES	1.22 (1.18-1.26, p<0.001)
Malignant neoplasm	YES	1.30 (1.25-1.36, p<0.001)
Obesity (as defined by clinical staff)	YES	1.19 (1.13-1.25, p<0.001)
Dementia	YES	1.32 (1.28-1.37, p<0.001)



ROC = 0.721839

**Figure 17 - Predictions calibration plot**



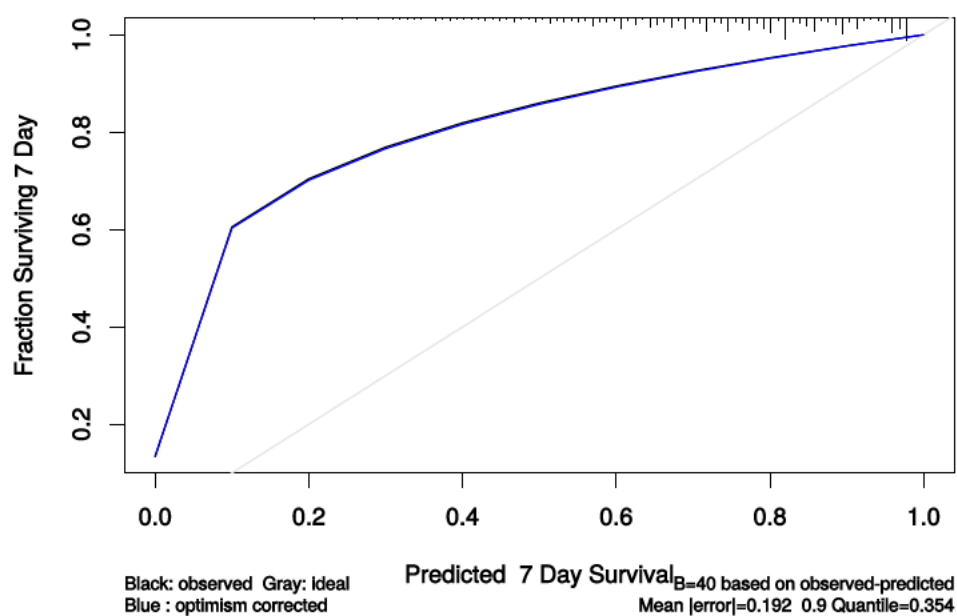


Figure 18 - Prognostic model predictions

Again, for demonstration of methods.

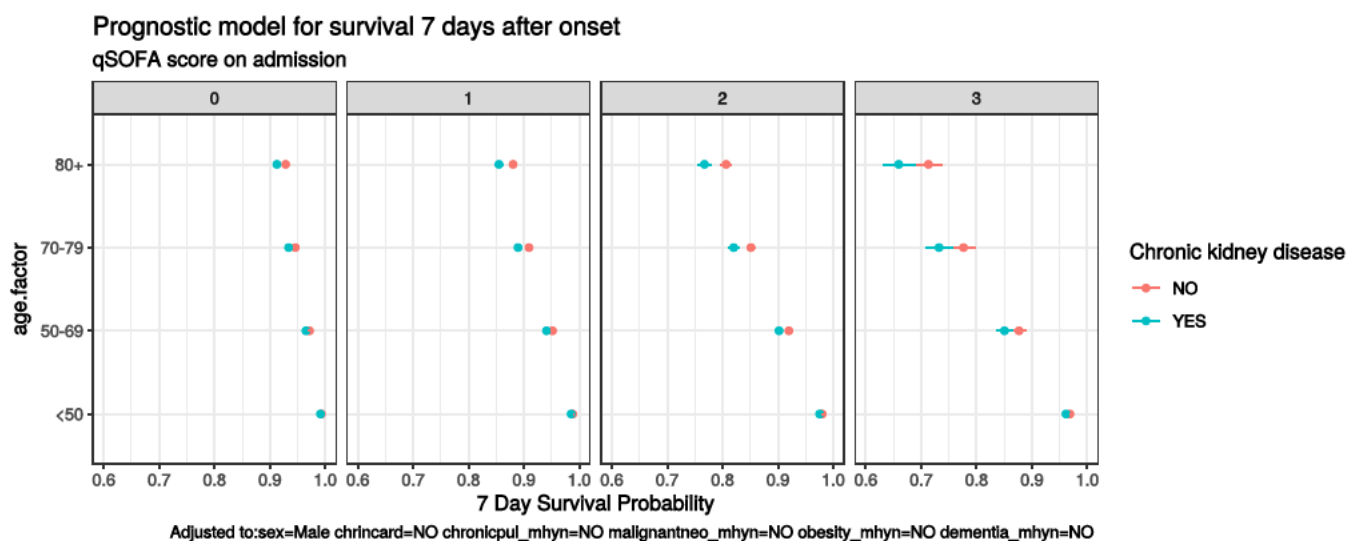


Figure 19 - Death by severity (NEWS) on admission

# Number of deaths by NEWS score at admission

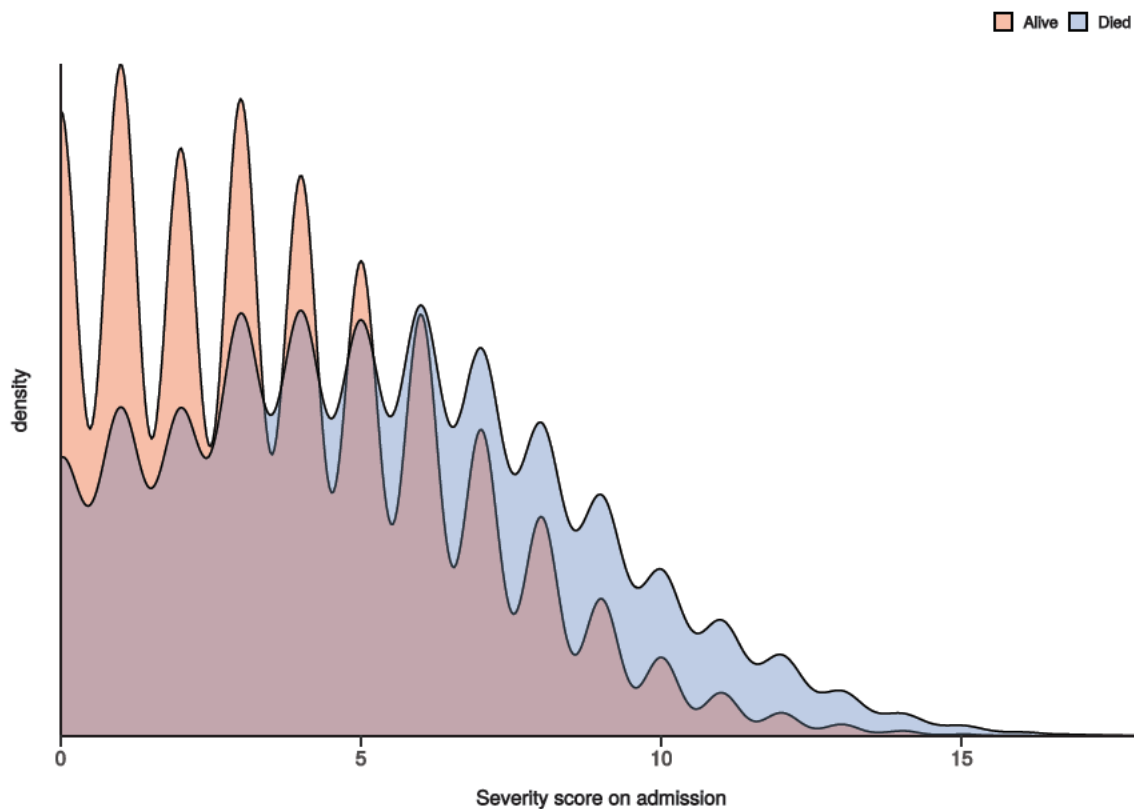


Figure 20 - Death by severity (NEWS) on admission stratified by age

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

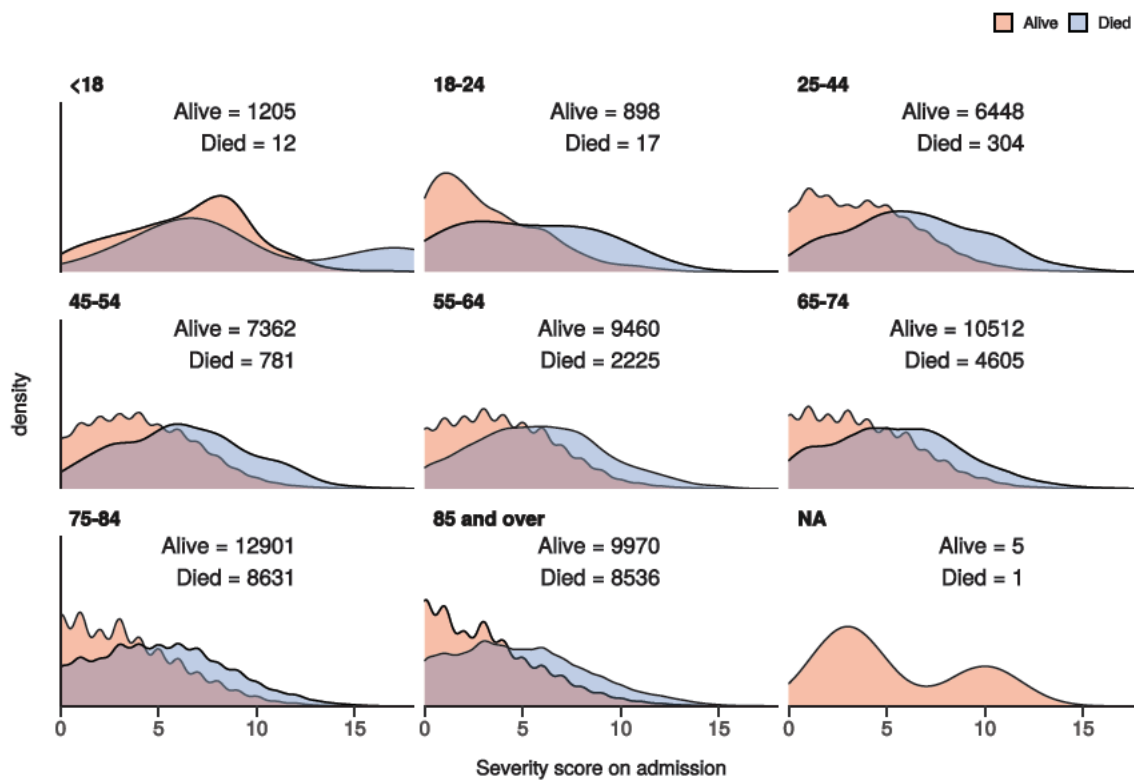
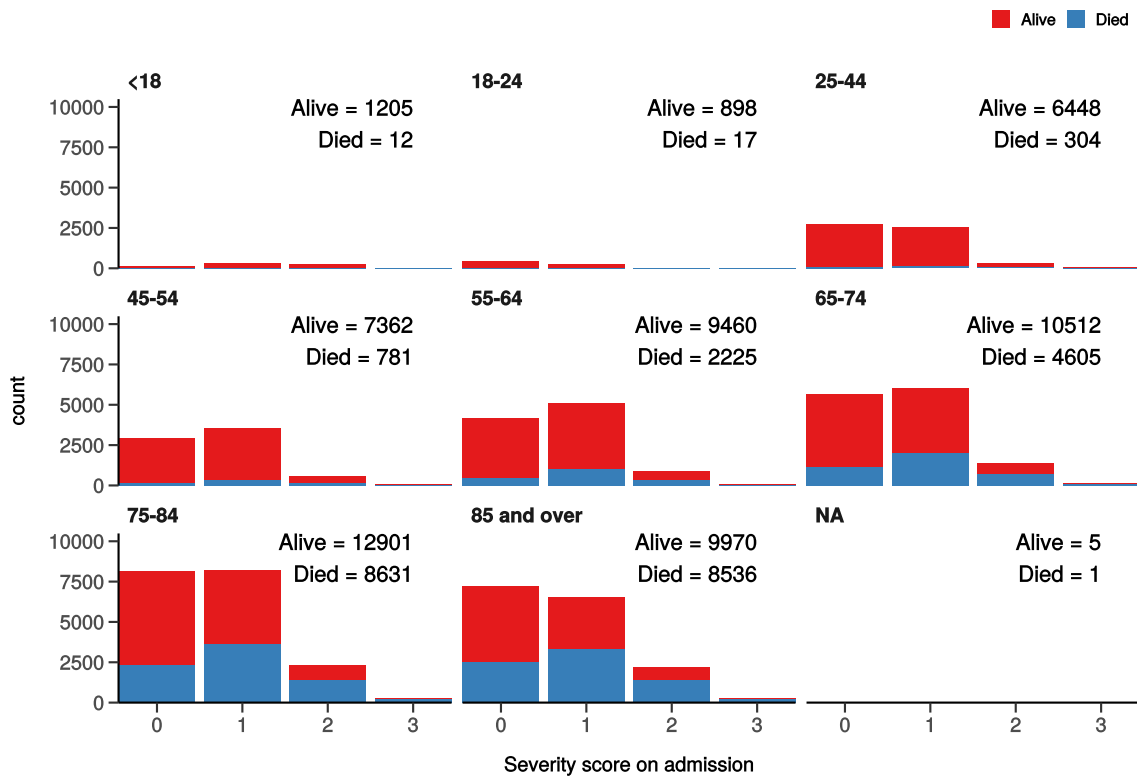


Figure 21 - Death by severity (qSOFA) on admission stratified by age

Number of deaths by qSOFA score at admission  
Stratified by age



## Healthcare workers

Employed as a healthcare worker?		NO	YES	p
Total N (%)		77006 (95.4)	3695 (4.6)	
NEWS score on admission	Median (IQR)	4.0 (4.0)	4.0 (4.0)	<0.001
Death	No	49196 (68.2)	3312 (92.8)	<0.001
	Yes	22924 (31.8)	258 (7.2)	