

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

Dynamic content updated: 2020-10-28 03:31:34.

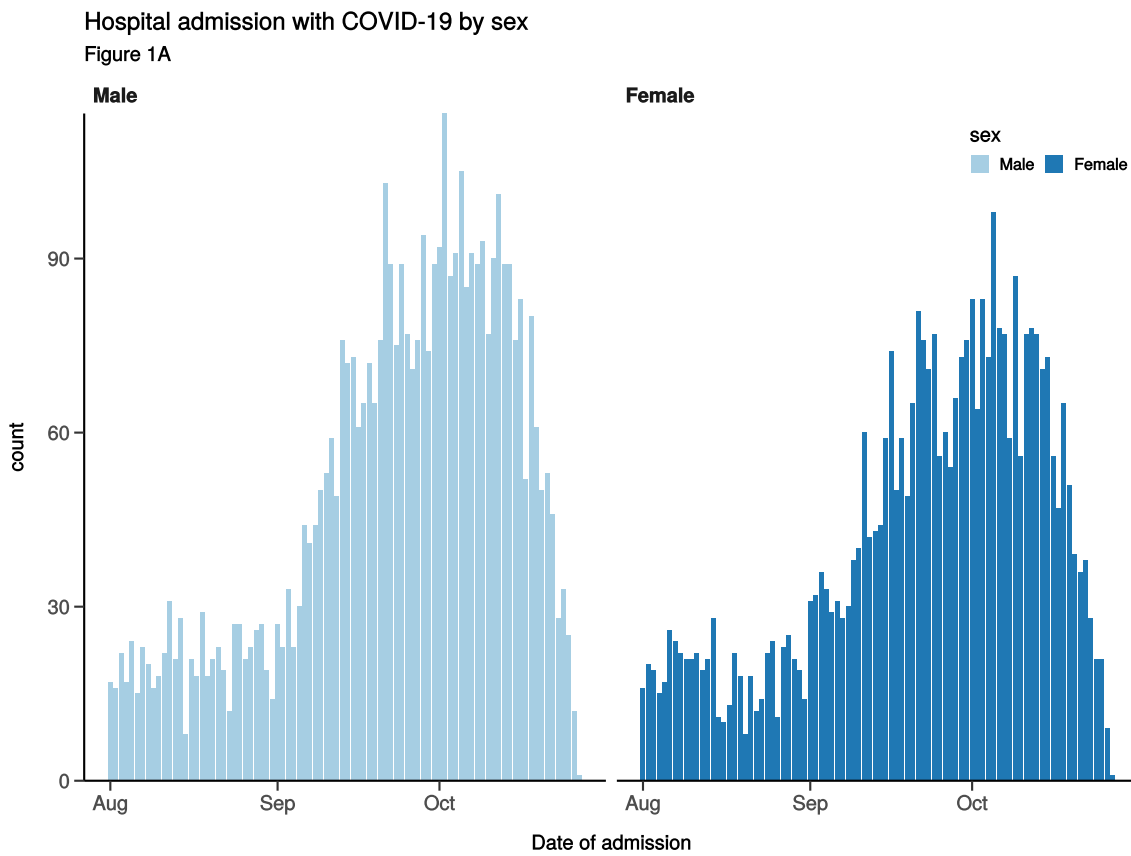
## Executive summary

### Includes patients admitted after 01 August 2020

There are 8126 patients included in CO-CIN. Of these, 910 patient(s) have died and 910 required ICU. 4118 have been discharged home.

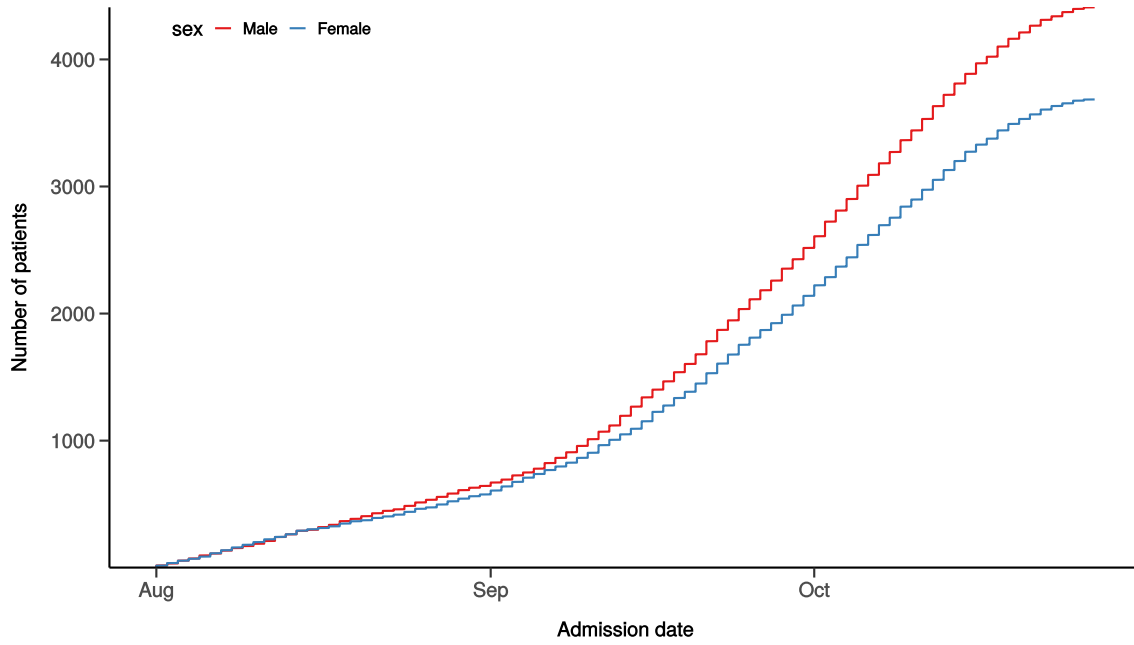
## Admission

Figure 1



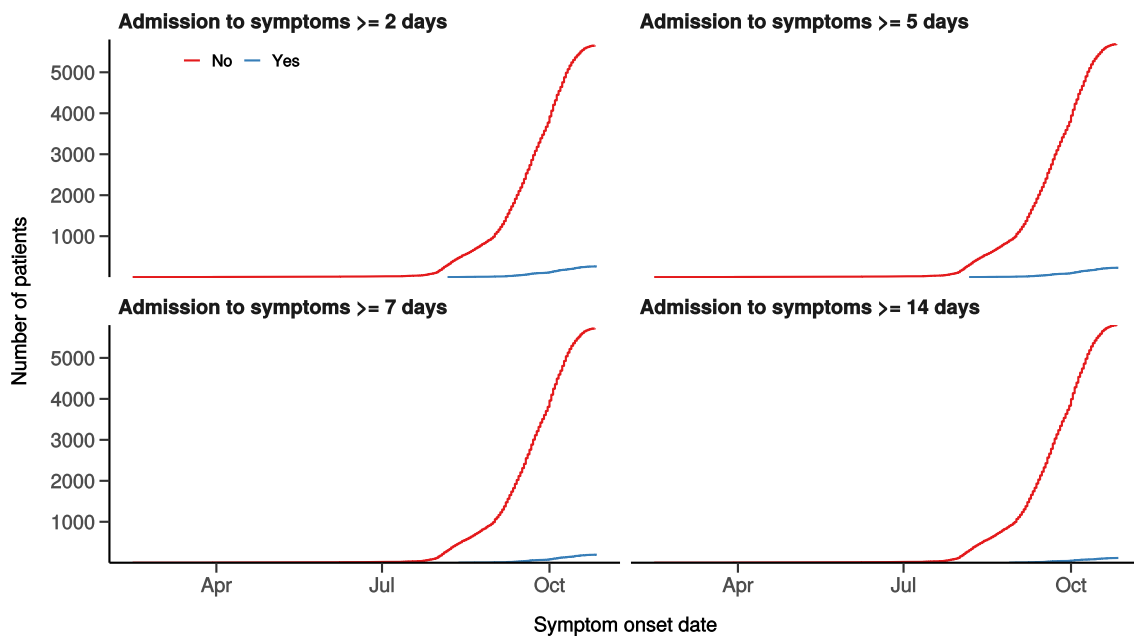
### Hospital admission with COVID-19 by sex

Figure 1B



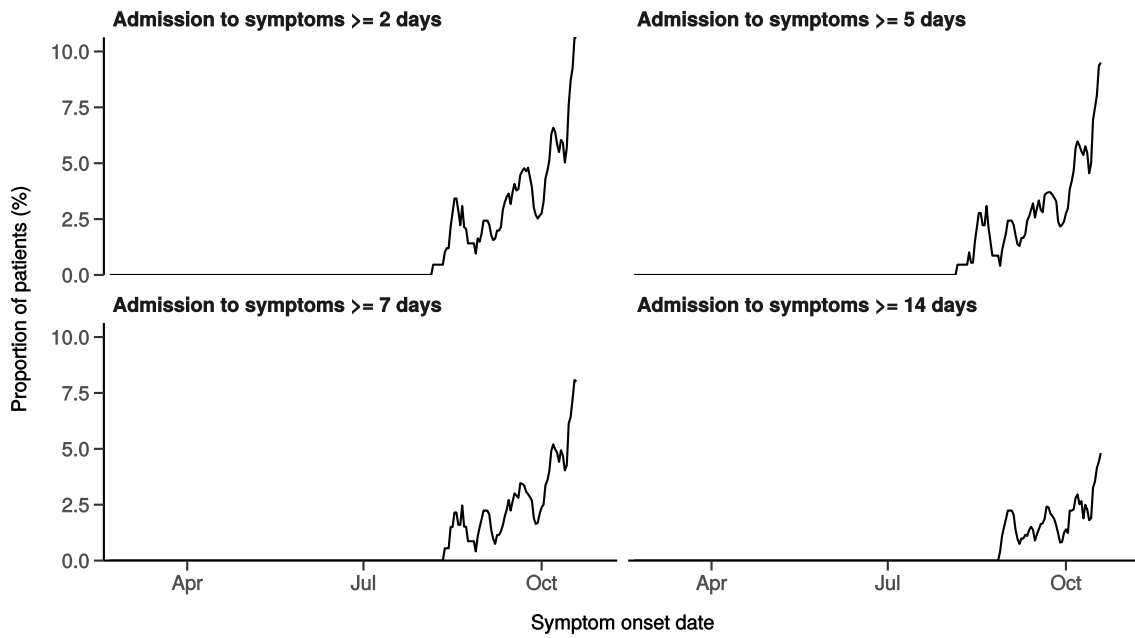
### Number with symptom onset occurring after admission to hospital

Figure 1C



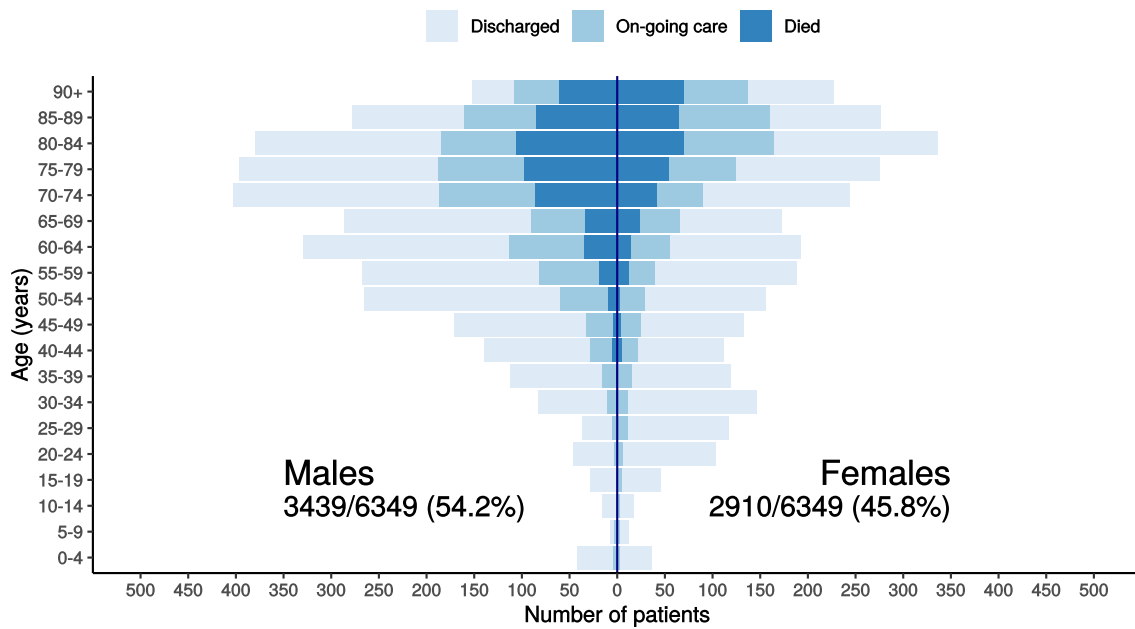
Proportion with symptom onset occurring after hospital admission

Figure 1D - 7-day rolling percentage. n = 5917



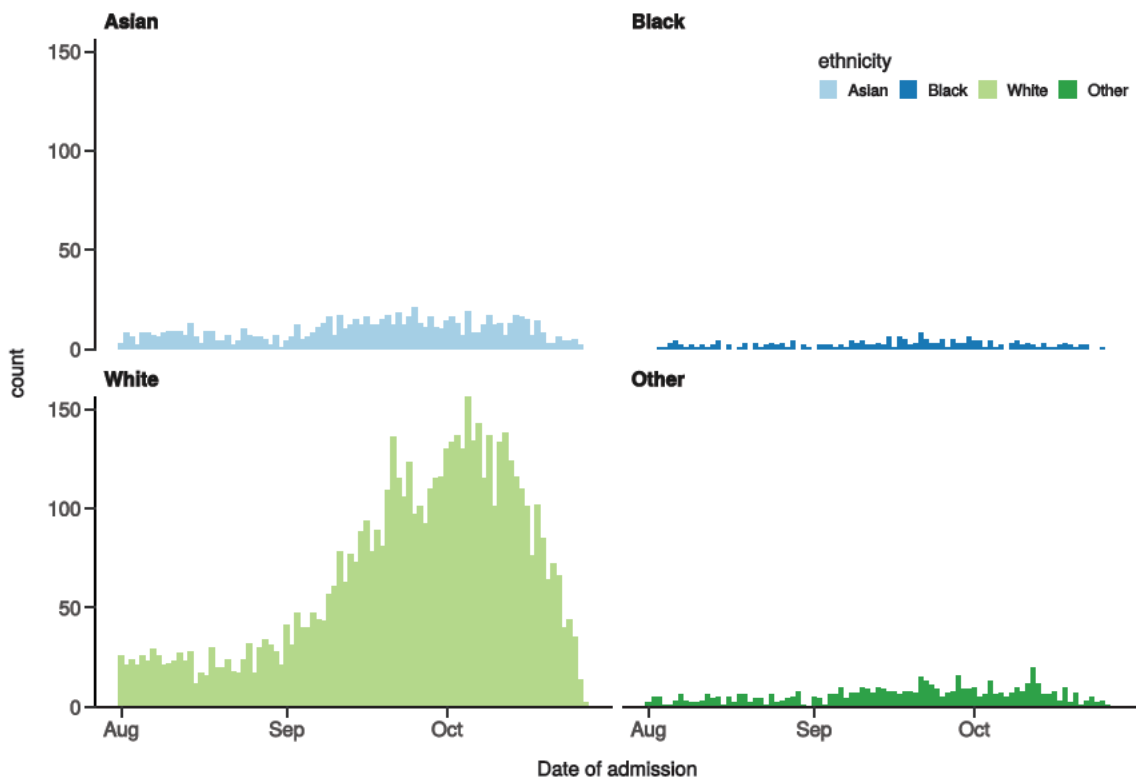
Patients with outcome stratified by age, and sex

Figure 1E



## Hospital admission with COVID-19 by ethnicity

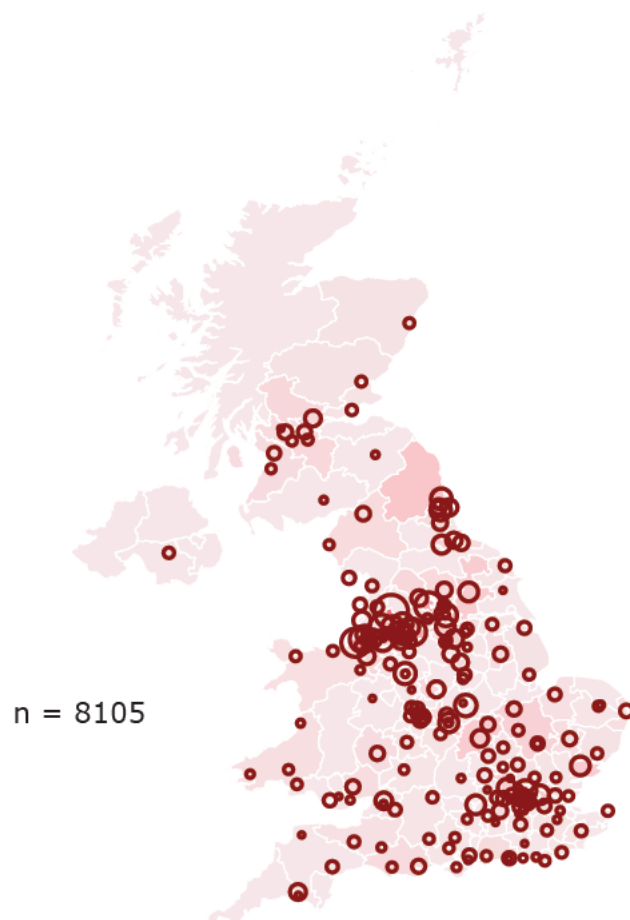
Figure 1F



## 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

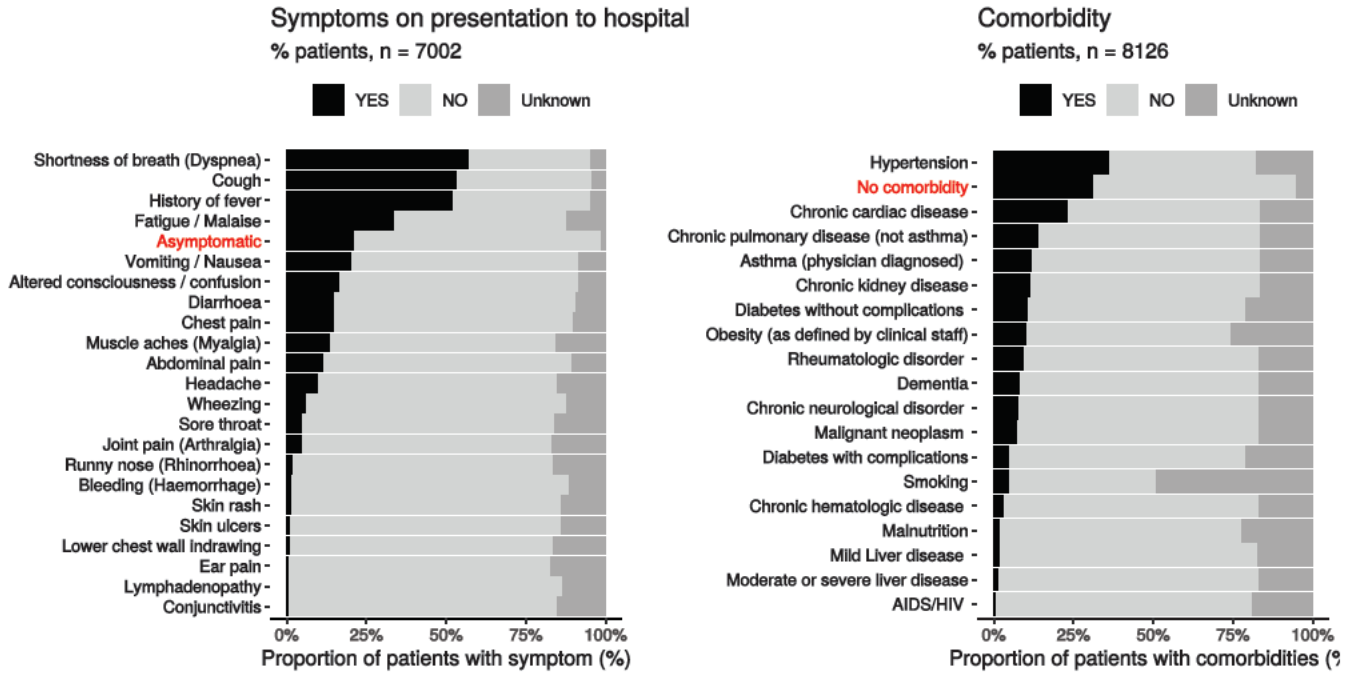


Figure 3B - Symptoms by Age

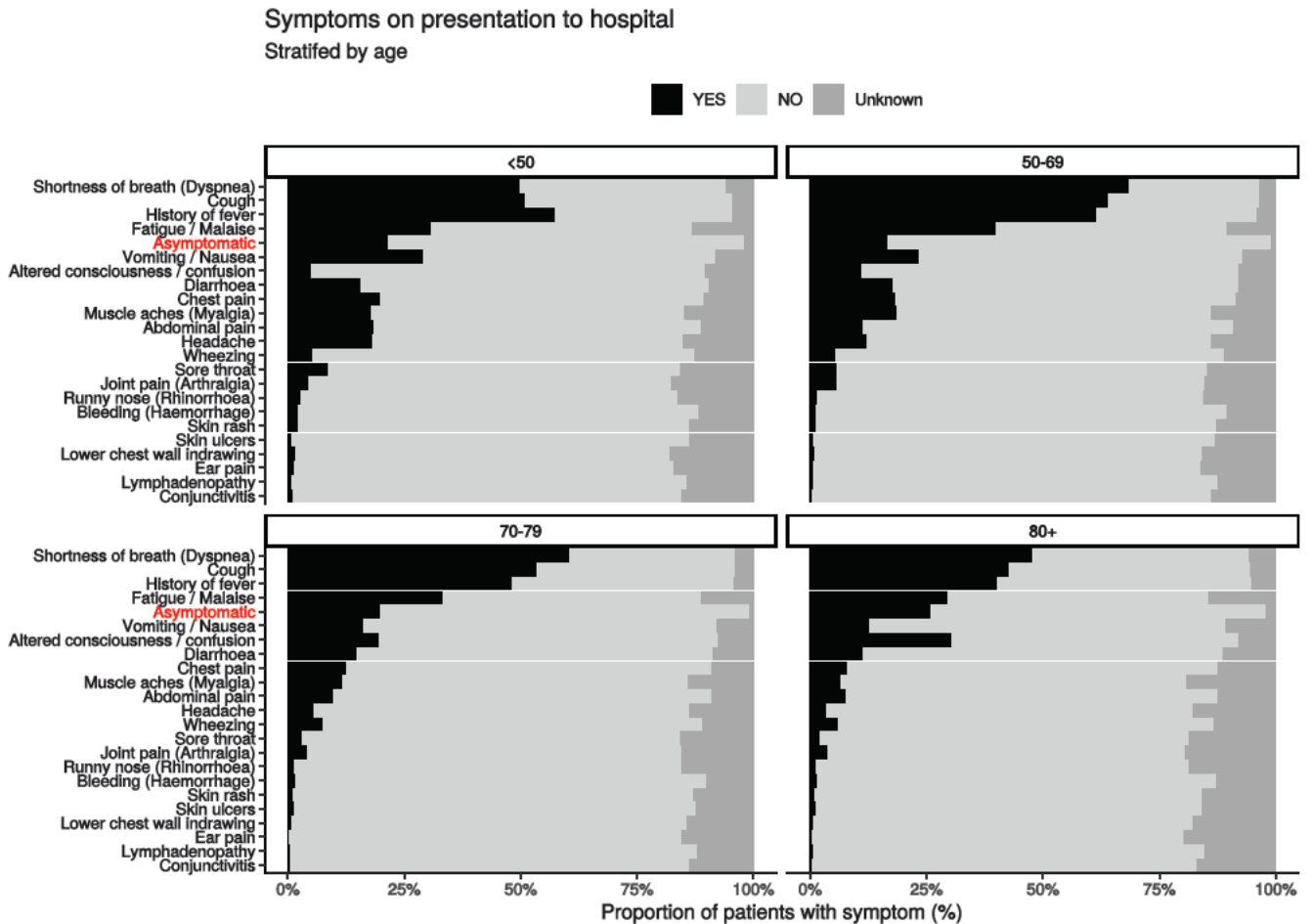
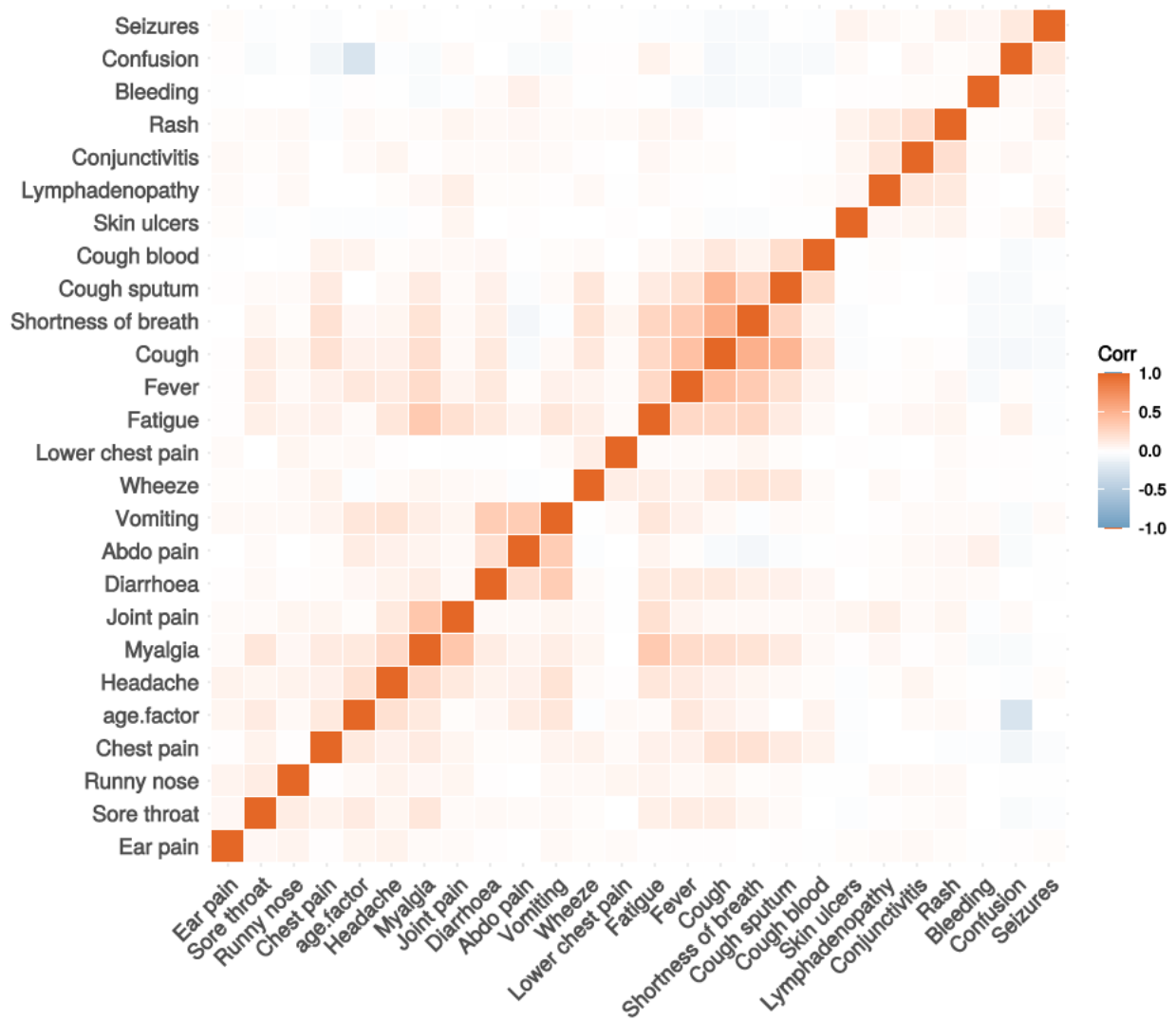


Figure 3C

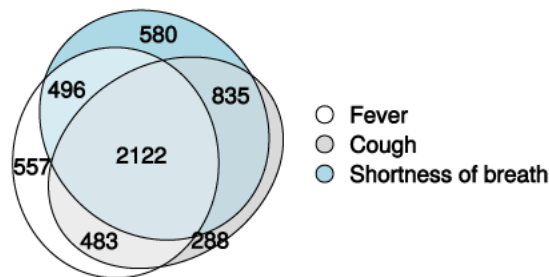
Correlation of symptoms in all pages. Note clusters, top right to bottom left, flu-like, coryzal, abdominal, respiratory, neurocutaneous.



### Symptoms (diagnostic criteria)

Figure 4A

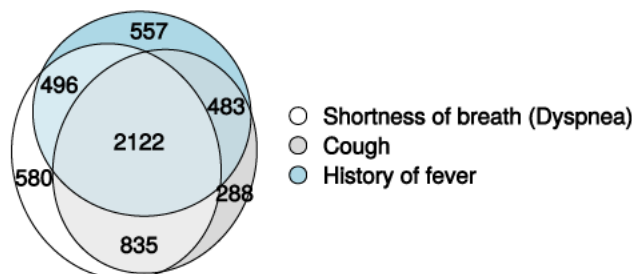
n = 7002



### Symptoms (most common)

Figure 4B

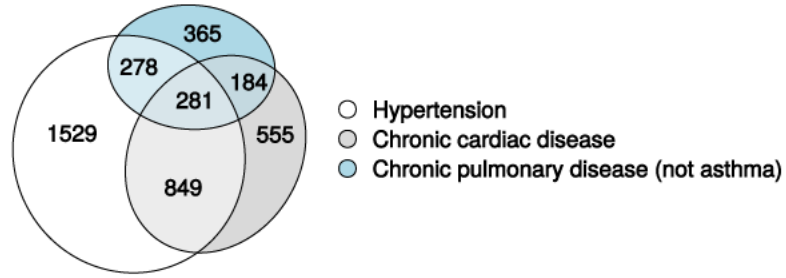
n = 7002



### Comorbidity (most common)

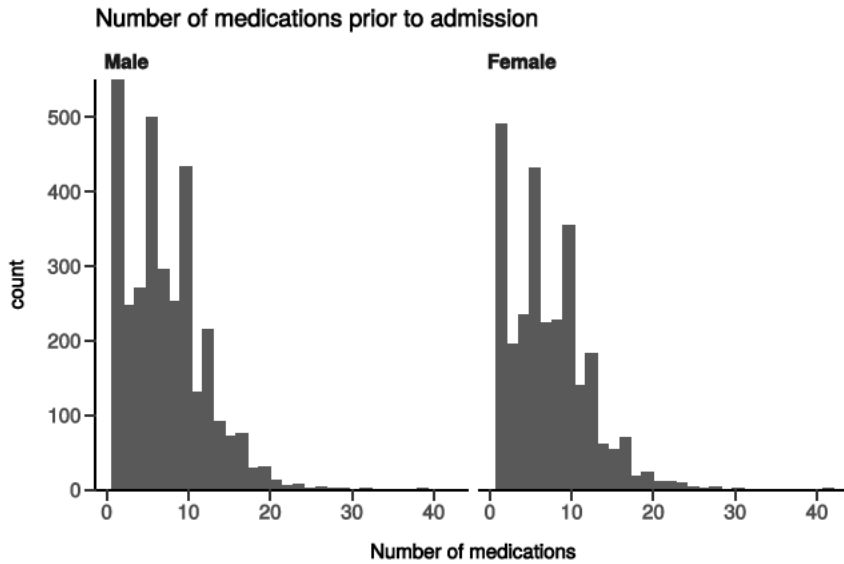
Figure 4C

n = 8126



## Medication prior to illness

Figure 5

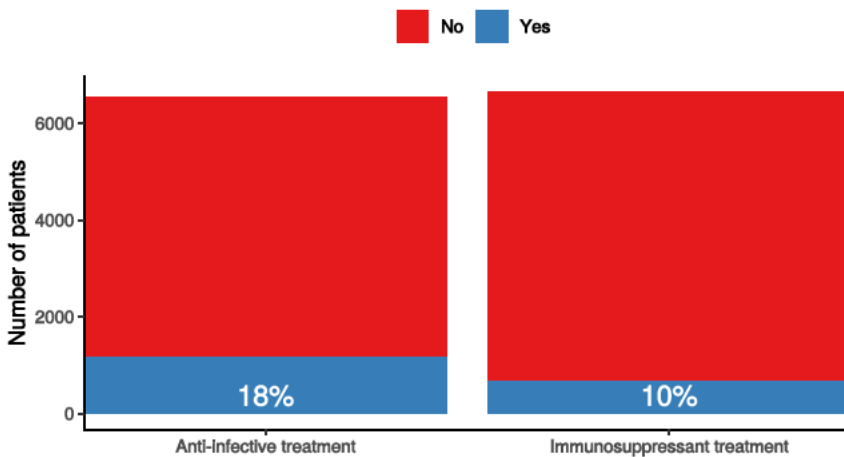


## Preadmission treatment

Figure 6

Pre-admission treatment

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



## Patient flow

Figure 7A - All patients

N = 7206

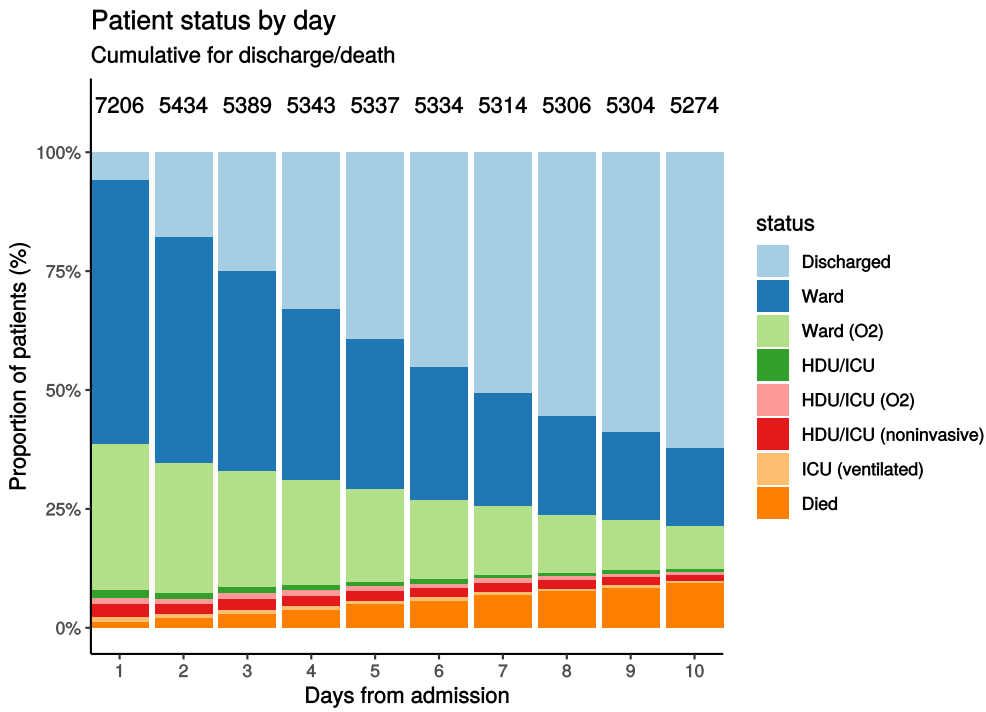
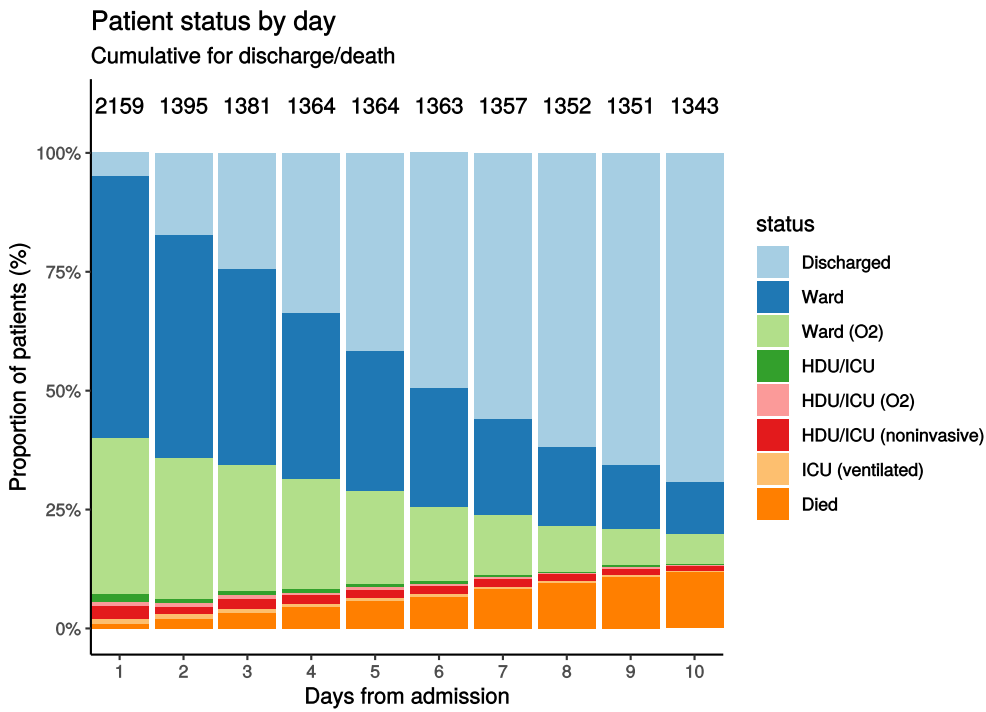


Figure 7B - Patients admitted  $\geq 14$  days and  $\leq 28$  days ago

N = 2159



## Oxygen requirement

Figure 8A - All patients

N = 6880



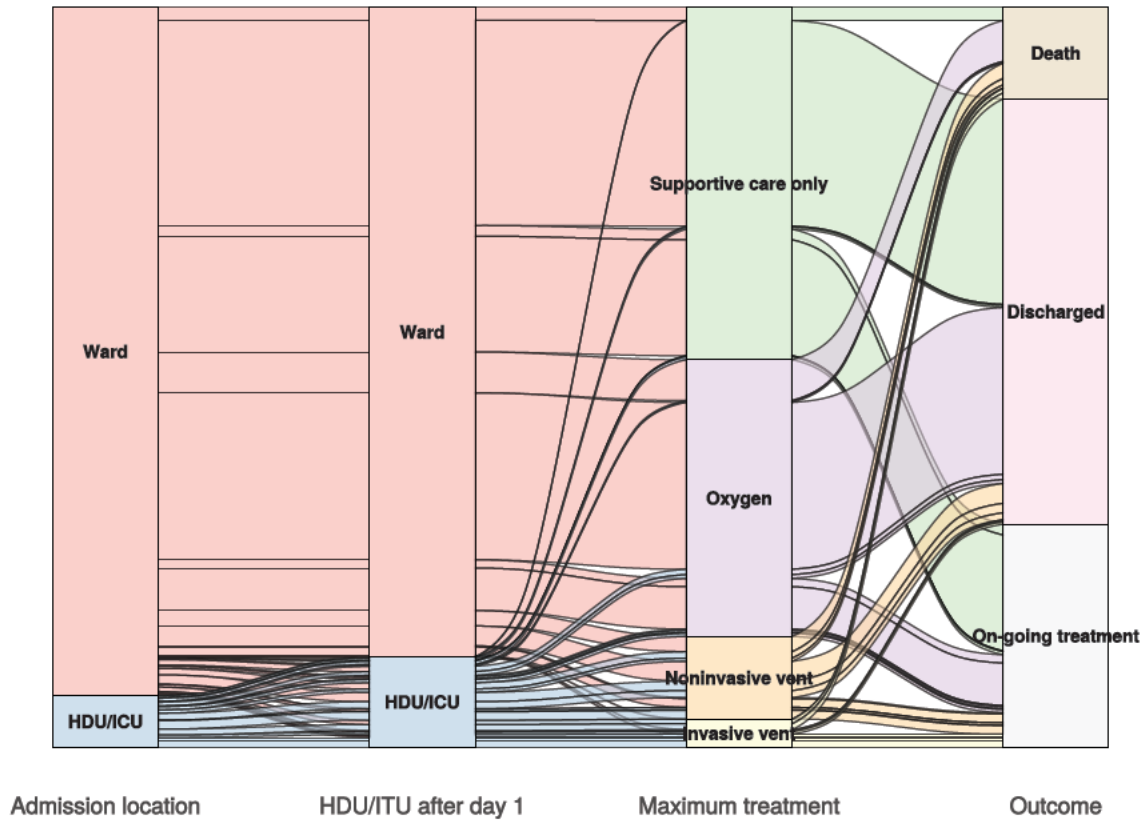


Figure 8B - Patients admitted  $\geq 14$  days and  $\leq 28$  days ago

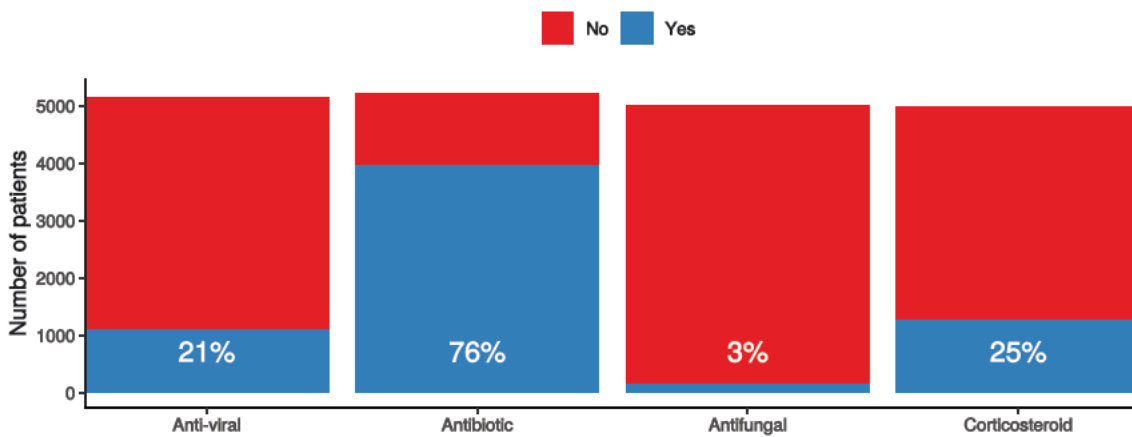
N = 2090

## In-hospital medical treatment

Figure 9

### In-hospital treatment

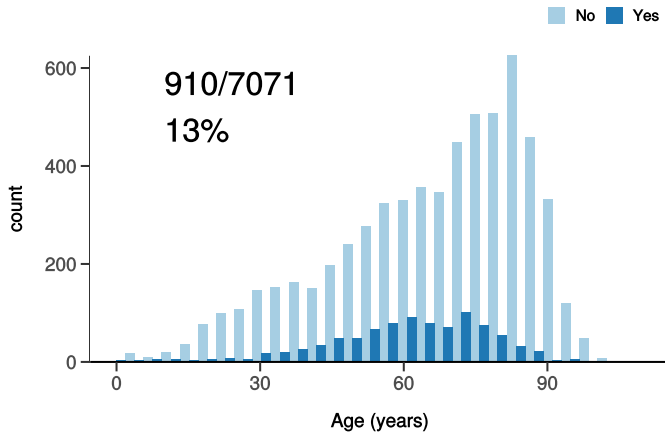
Anti-virals, antibiotics, corticosteroids, and anti-fungals for patients who have completed journey.



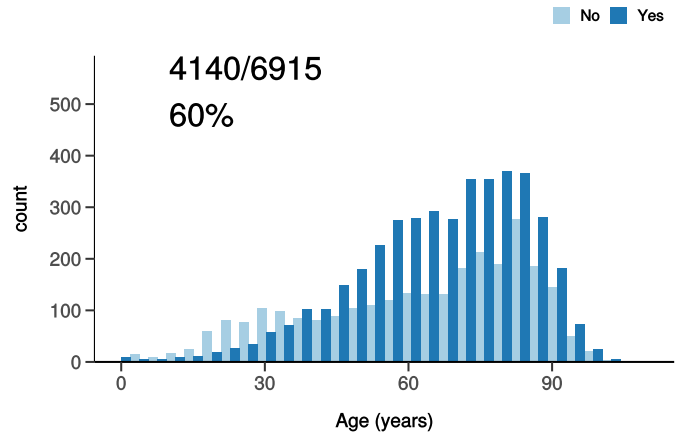
## Treatment

Figure 10

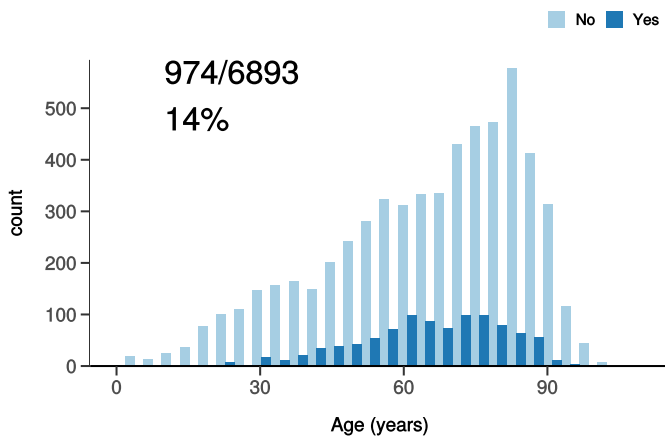
ICU/HDU admission  
Figure 10A



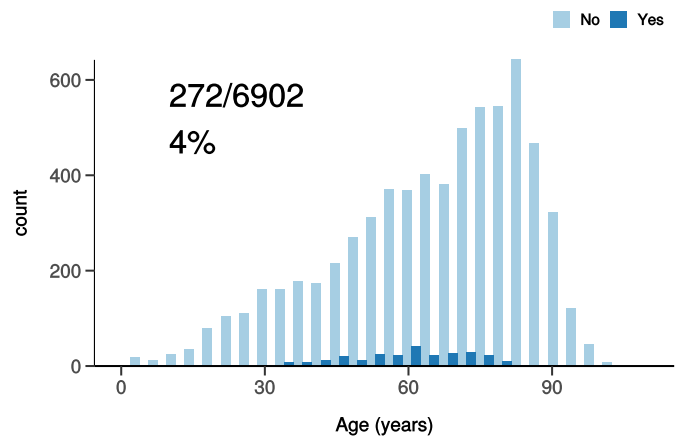
High flow oxygen  
Figure 10B



Noninvasive ventilation  
Figure 10C



Invasive ventilation  
Figure 10D

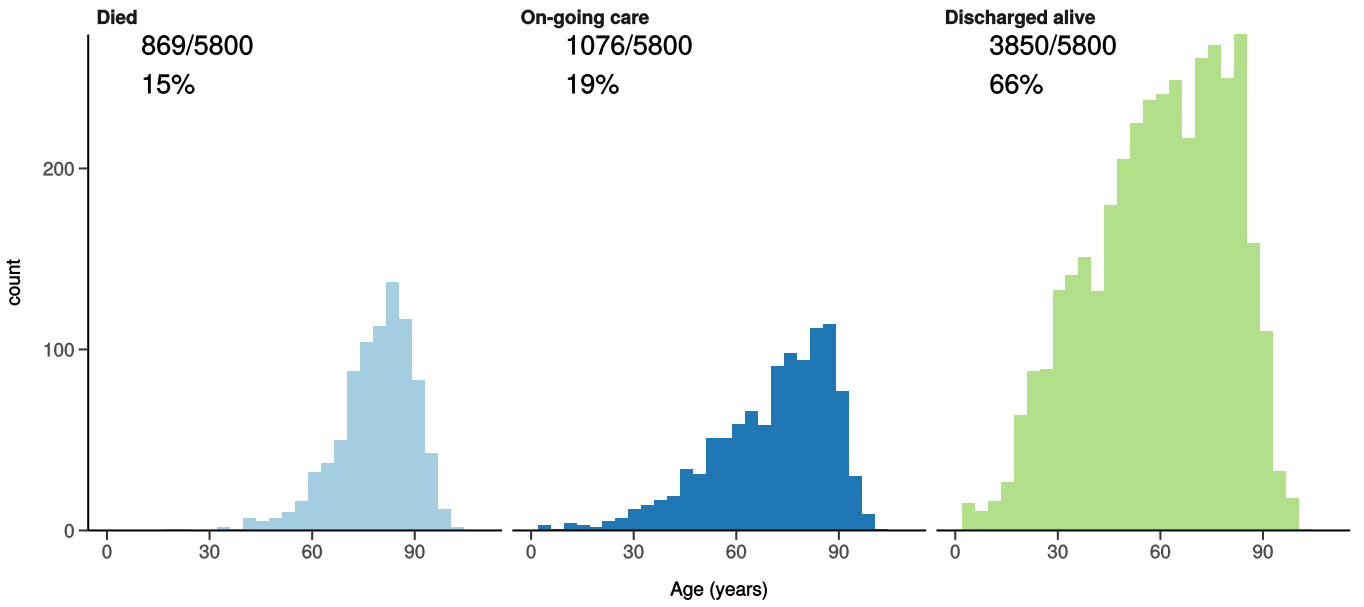


## Status in patients admitted $\geq 14$ days from today

Figure 11

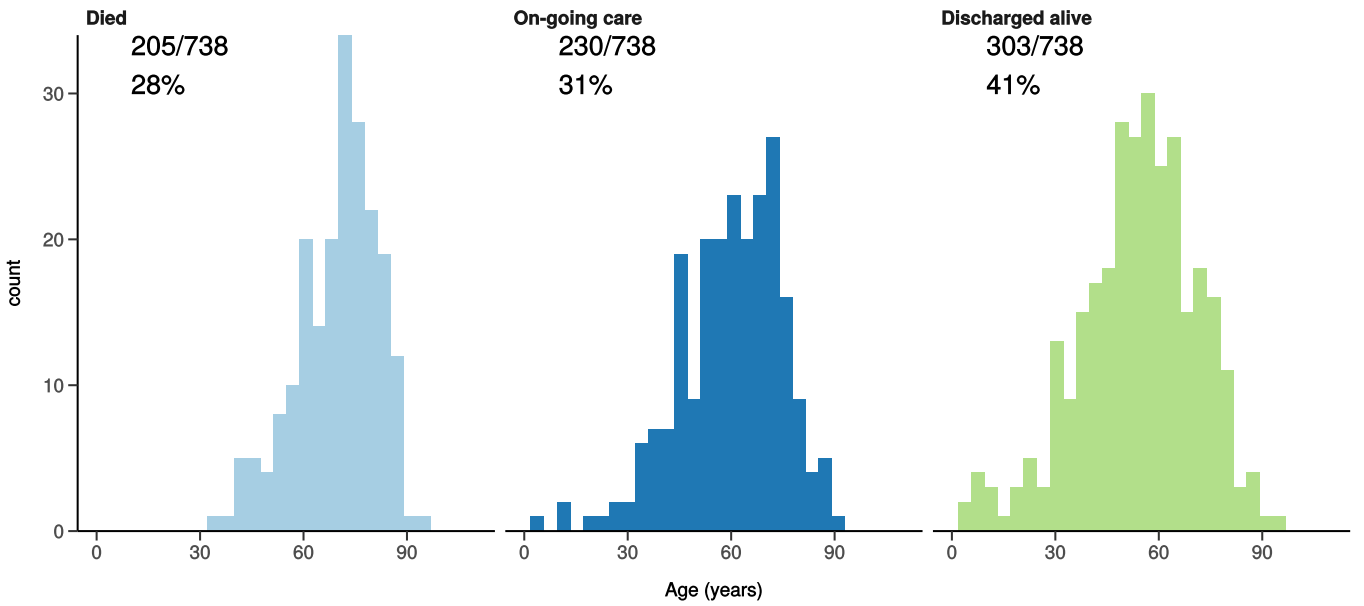
All: status in patients admitted  $\geq 14$  days ago

Figure 11A



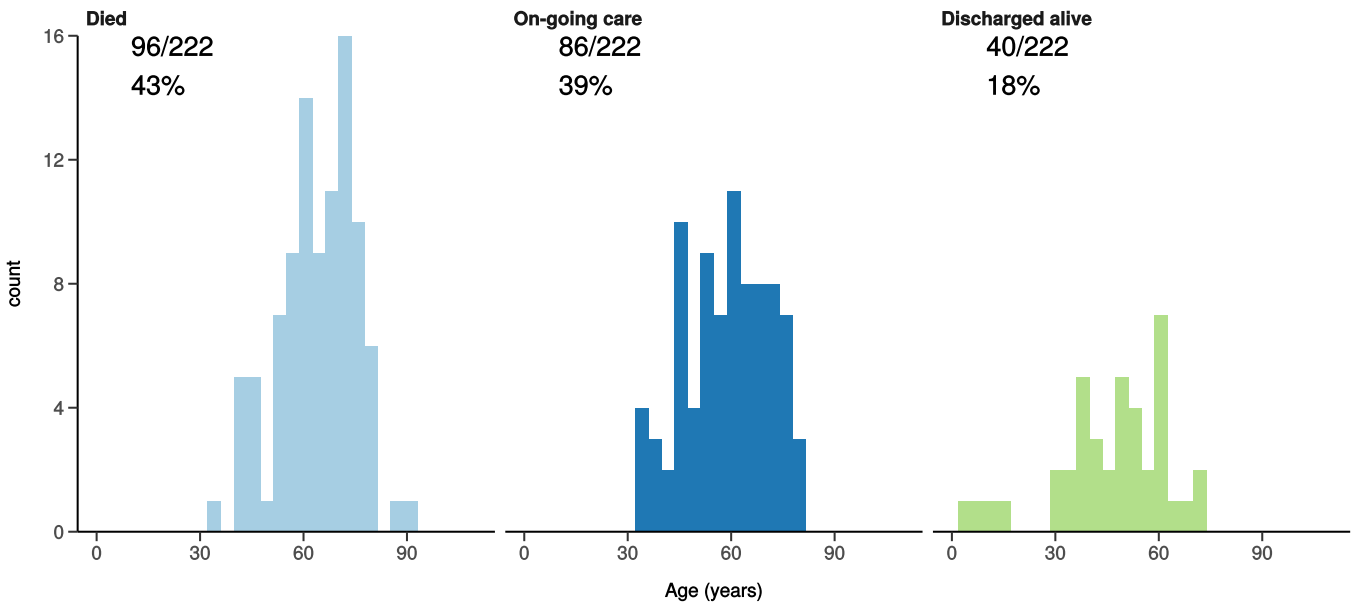
ICU/HDU admissions: status in patients admitted  $\geq 14$  days ago

Figure 11B



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

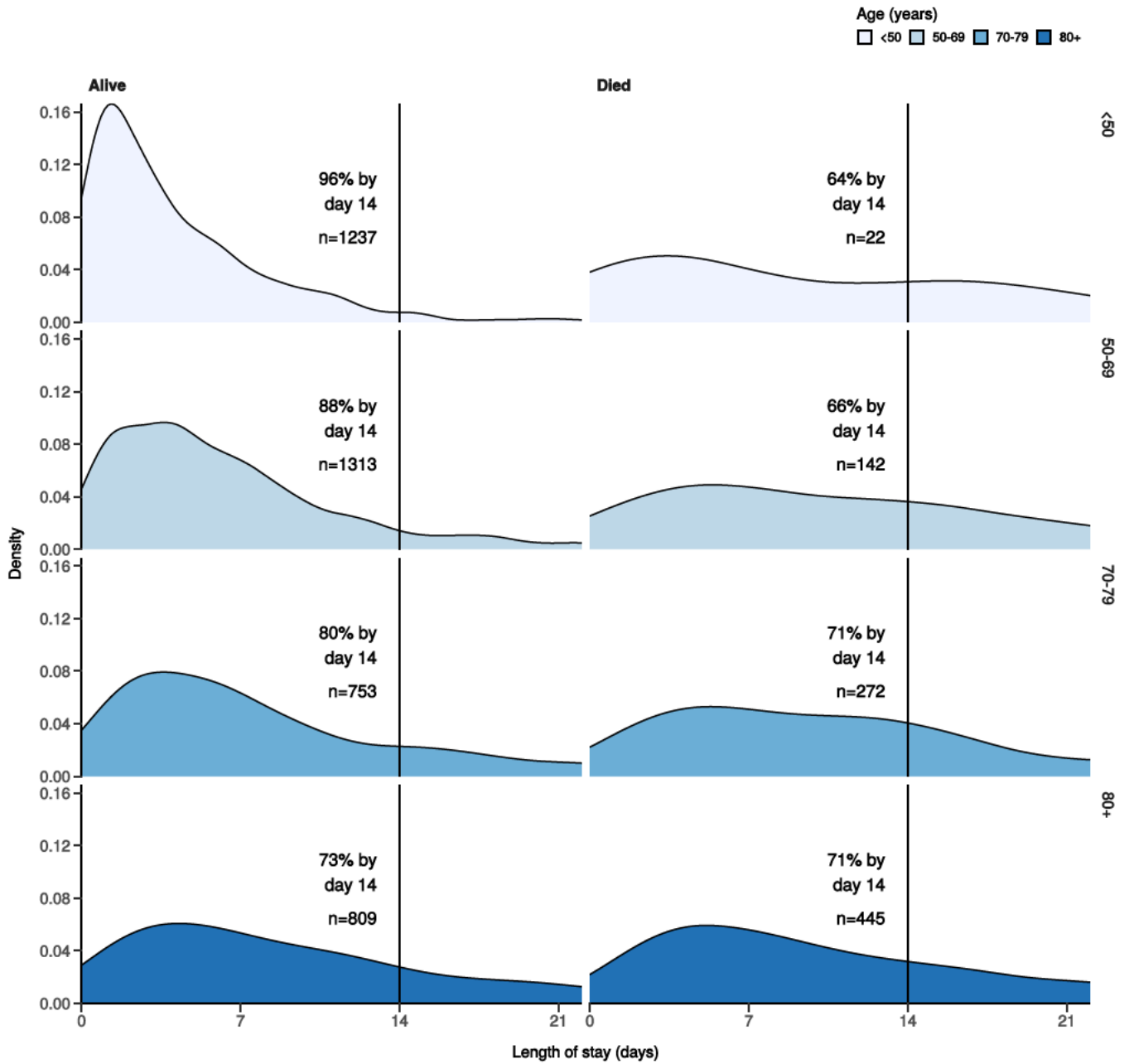
Figure 11c



# 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	1261 (98.3)	22 (1.7)	•	•
	50-69	1296 (90.3)	140 (9.7)	6.19 (4.01-10.03, p<0.001)	4.93 (3.03-8.47, p<0.001)
	70-79	738 (73.3)	269 (26.7)	20.89 (13.72-33.49, p<0.001)	14.63 (9.07-25.02, p<0.001)
	80+	807 (65.0)	434 (35.0)	30.83 (20.40-49.13, p<0.001)	20.14 (12.48-34.51, p<0.001)

Dependent: death		No	Yes	OR (univariable)	OR (multivariable)
Sex at Birth	Male	2164 (80.9)	512 (19.1)	•	•
	Female	1939 (84.6)	353 (15.4)	0.77 (0.66-0.89, p=0.001)	0.82 (0.68-0.99, p=0.040)
	Not specified	0 (NaN)	0 (NaN)	•	•
Chronic cardiac disease	NO	2974 (87.5)	425 (12.5)	•	•
	YES	840 (68.5)	387 (31.5)	3.22 (2.75-3.77, p<0.001)	1.47 (1.21-1.78, p<0.001)
Chronic pulmonary disease (not asthma)	NO	3314 (85.1)	579 (14.9)	•	•
	YES	487 (68.0)	229 (32.0)	2.69 (2.25-3.22, p<0.001)	1.49 (1.20-1.85, p<0.001)
Chronic neurological disorder	NO	3491 (83.5)	691 (16.5)	•	•
	YES	302 (73.5)	109 (26.5)	1.82 (1.44-2.30, p<0.001)	1.34 (1.00-1.77, p=0.045)
Chronic hematologic disease	NO	3665 (83.0)	753 (17.0)	•	•
	YES	123 (71.9)	48 (28.1)	1.90 (1.34-2.66, p<0.001)	1.24 (0.80-1.91, p=0.326)
Chronic kidney disease	NO	3416 (85.1)	600 (14.9)	•	•
	YES	389 (65.5)	205 (34.5)	3.00 (2.48-3.63, p<0.001)	1.49 (1.17-1.88, p=0.001)
Dementia	NO	3552 (84.3)	664 (15.7)	•	•
	YES	256 (65.1)	137 (34.9)	2.86 (2.29-3.57, p<0.001)	1.40 (1.06-1.85, p=0.019)
Obesity (as defined by clinical staff)	NO	2893 (82.4)	619 (17.6)	•	•
	YES	480 (85.0)	85 (15.0)	0.83 (0.64-1.05, p=0.132)	1.20 (0.89-1.60, p=0.216)
Malignant neoplasm	NO	3548 (84.1)	673 (15.9)	•	•
	YES	240 (65.2)	128 (34.8)	2.81 (2.23-3.53, p<0.001)	1.94 (1.46-2.56, p<0.001)

Number in dataframe = 7010, Number in model = 3923, Missing = 3087, AIC = 2949.1, C-statistic = 0.798, H&L = Chi-sq(8) 11.02 (p=0.200)

**Figure 13 - Adjusted odds ratio plot**

## Death

Age on admission (years)	<50	-
	50-69	4.93 (3.03-8.47, p<0.001)
	70-79	14.63 (9.07-25.02, p<0.001)
	80+	20.14 (12.48-34.51, p<0.001)
Sex at Birth	Male	-
	Female	0.82 (0.68-0.99, p=0.040)
	Not specified	-
Chronic cardiac disease	YES	1.47 (1.21-1.78, p<0.001)
Chronic pulmonary disease (not asthma)	YES	1.49 (1.20-1.85, p<0.001)
Chronic neurological disorder	YES	1.34 (1.00-1.77, p=0.045)
Chronic hematologic disease	YES	1.24 (0.80-1.91, p=0.326)
Chronic kidney disease	YES	1.49 (1.17-1.88, p=0.001)
Dementia	YES	1.40 (1.06-1.85, p=0.019)
Obesity (as defined by clinical staff)	YES	1.20 (0.89-1.60, p=0.216)
Malignant neoplasm	YES	1.94 (1.46-2.56, p<0.001)

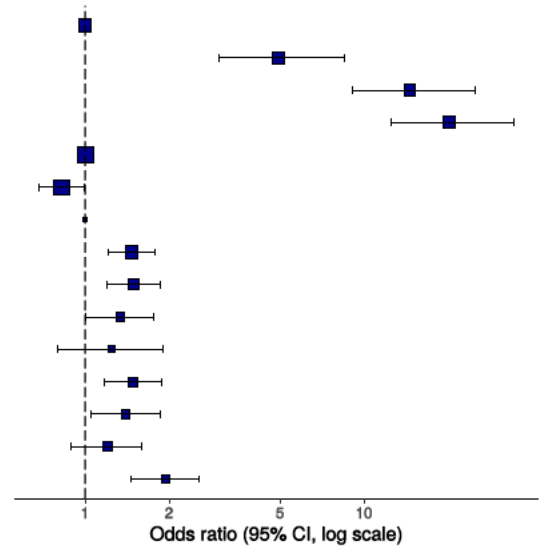
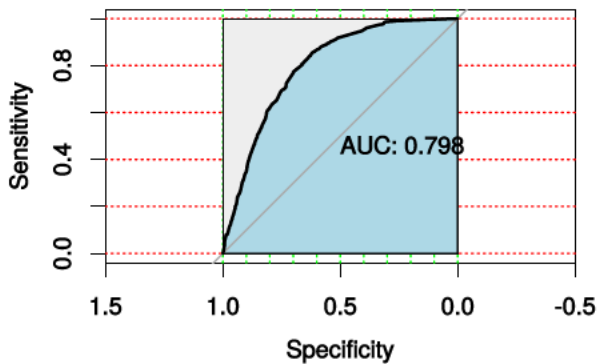


Figure 14 - ROC

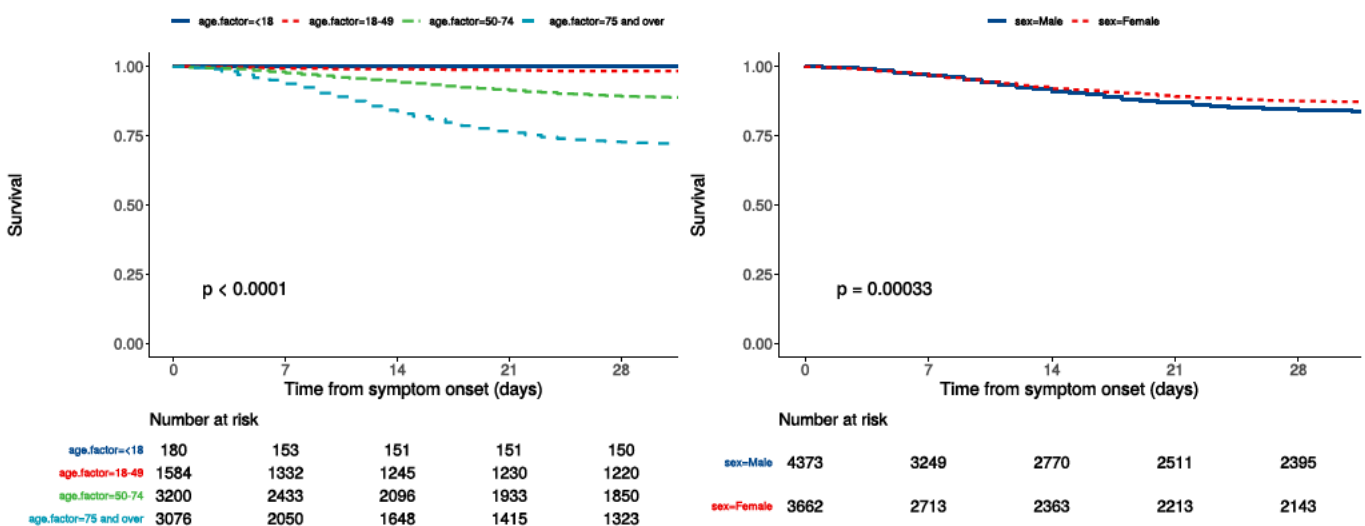


## Survival models

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.

<b>Dependent: Surv(time, status)</b>		<b>all</b>	<b>HR (univariable)</b>	<b>HR (multivariable)</b>
Age on admission (years)	<50	1764 (21.9)	•	•
	50-69	2360 (29.3)	5.97 (3.81-9.33, p<0.001)	5.46 (3.11-9.56, p<0.001)
	70-79	1723 (21.4)	17.53 (11.36-27.07, p<0.001)	15.03 (8.68-26.03, p<0.001)
	80+	2196 (27.3)	25.48 (16.61-39.09, p<0.001)	20.67 (11.93-35.82, p<0.001)
Sex at Birth	Male	4373 (54.4)	•	•
	Female	3662 (45.6)	0.78 (0.69-0.90, p<0.001)	0.89 (0.75-1.05, p=0.153)
qSOFA score on admission	0	3107 (49.8)	•	•
	1	2670 (42.8)	2.14 (1.82-2.52, p<0.001)	2.26 (1.88-2.71, p<0.001)
	2	431 (6.9)	5.39 (4.35-6.68, p<0.001)	4.42 (3.45-5.66, p<0.001)
	3	26 (0.4)	11.13 (6.49-19.10, p<0.001)	12.18 (6.70-22.14, p<0.001)
Symptomatic at presentation	No symptoms	745 (10.5)	•	•
	Symptoms	6376 (89.5)	1.50 (1.16-1.94, p=0.002)	•
Chronic cardiac disease	NO	4917 (72.6)	•	•
	YES	1860 (27.4)	2.87 (2.51-3.29, p<0.001)	1.41 (1.20-1.67, p<0.001)
Chronic kidney disease	NO	5860 (86.6)	•	•
	YES	903 (13.4)	2.63 (2.25-3.08, p<0.001)	1.41 (1.17-1.72, p<0.001)
Moderate or severe liver disease	NO	6607 (98.3)	•	•
	YES	115 (1.7)	2.62 (1.82-3.78, p<0.001)	2.36 (1.47-3.80, p<0.001)
Chronic neurological disorder	NO	6120 (90.9)	•	•
	YES	612 (9.1)	1.69 (1.38-2.06, p<0.001)	•
Malignant neoplasm	NO	6174 (91.6)	•	•
	YES	564 (8.4)	2.55 (2.12-3.07, p<0.001)	1.74 (1.40-2.17, p<0.001)
Chronic hematologic disease	NO	6495 (96.6)	•	•
	YES	231 (3.4)	1.73 (1.29-2.30, p<0.001)	•
Obesity (as defined by clinical staff)	NO	5195 (86.3)	•	•
	YES	826 (13.7)	0.84 (0.67-1.05, p=0.127)	1.10 (0.85-1.42, p=0.467)
Diabetes without complications	NO	5525 (86.6)	•	•
	YES	855 (13.4)	1.30 (1.07-1.57, p=0.007)	•
Rheumatologic disorder	NO	5963 (88.8)	•	•
	YES	753 (11.2)	1.48 (1.23-1.78, p<0.001)	•

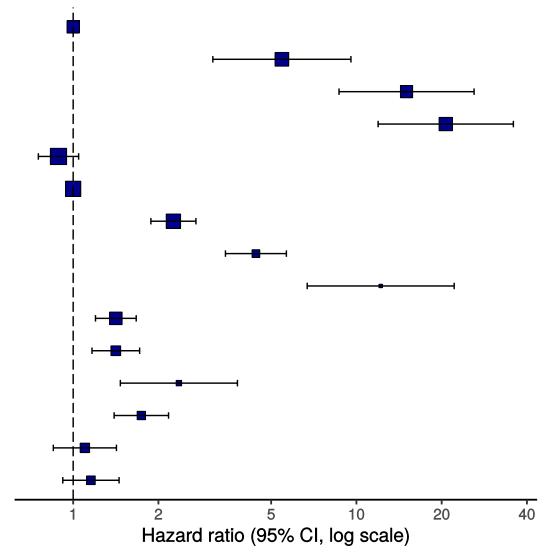
Dependent: Surv(time, status)		all	HR (univariable)	HR (multivariable)
Dementia	NO	6125 (90.7)	•	•
	YES	625 (9.3)	2.53 (2.11-3.03, p<0.001)	1.16 (0.92-1.45, p=0.216)
Malnutrition	NO	6168 (97.9)	•	•
	YES	134 (2.1)	1.89 (1.31-2.72, p=0.001)	•
smoking_mhyn_2levels	NO	3743 (53.6)	•	•
	YES	369 (5.3)	0.83 (0.59-1.17, p=0.277)	•
	N/K	2873 (41.1)	1.35 (1.18-1.55, p<0.001)	•

Number in dataframe = 8062, Number in model = 5116, Missing = 2946, Number of events = 623, Concordance = 0.804 (SE = 0.008), R-squared = 0.142 (Max possible = 0.865), Likelihood ratio test = 783.562 (df = 13, p = 0.000)

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

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

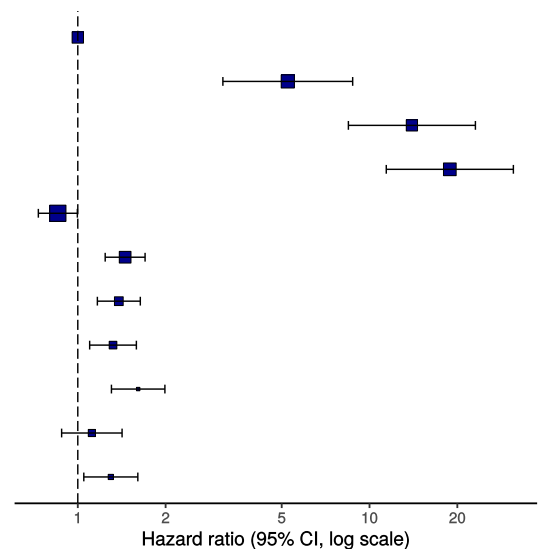
Age on admission (years)	<50	-
	50-69	5.46 (3.11-9.56, p<0.001)
	70-79	15.03 (8.68-26.03, p<0.001)
	80+	20.67 (11.93-35.82, p<0.001)
Sex at Birth	Female	0.89 (0.75-1.05, p=0.153)
qSOFA score on admission	0	-
	1	2.26 (1.88-2.71, p<0.001)
	2	4.42 (3.45-5.66, p<0.001)
	3	12.18 (6.70-22.14, p<0.001)
Chronic cardiac disease	YES	1.41 (1.20-1.67, p<0.001)
Chronic kidney disease	YES	1.41 (1.17-1.72, p<0.001)
Moderate or severe liver disease	YES	2.36 (1.47-3.80, p<0.001)
Malignant neoplasm	YES	1.74 (1.40-2.17, p<0.001)
Obesity (as defined by clinical staff)	YES	1.10 (0.85-1.42, p=0.467)
Dementia	YES	1.16 (0.92-1.45, p=0.216)



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

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

Age on admission (years)	<50	-
	50-69	5.25 (3.14-8.75, p<0.001)
	70-79	13.97 (8.46-23.07, p<0.001)
	80+	18.85 (11.41-31.13, p<0.001)
Sex at Birth	Female	0.85 (0.73-1.00, p=0.045)
Chronic cardiac disease	YES	1.45 (1.24-1.70, p<0.001)
Chronic pulmonary disease (not asthma)	YES	1.38 (1.17-1.64, p<0.001)
Chronic kidney disease	YES	1.32 (1.10-1.59, p=0.003)
Malignant neoplasm	YES	1.61 (1.30-1.99, p<0.001)
Obesity (as defined by clinical staff)	YES	1.12 (0.88-1.42, p=0.362)
Dementia	YES	1.30 (1.05-1.61, p=0.017)



ROC = 0.8061829

**Figure 17 - Predictions calibration plot**



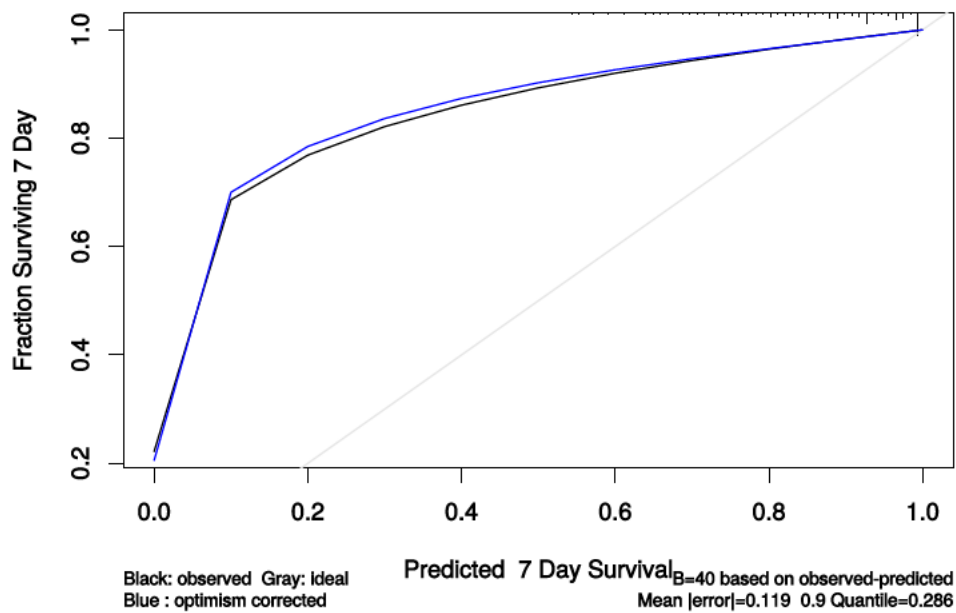


Figure 18 - Prognostic model predictions

Again, for demonstration of methods.

Prognostic model for survival 7 days after onset  
qSOFA score on admission

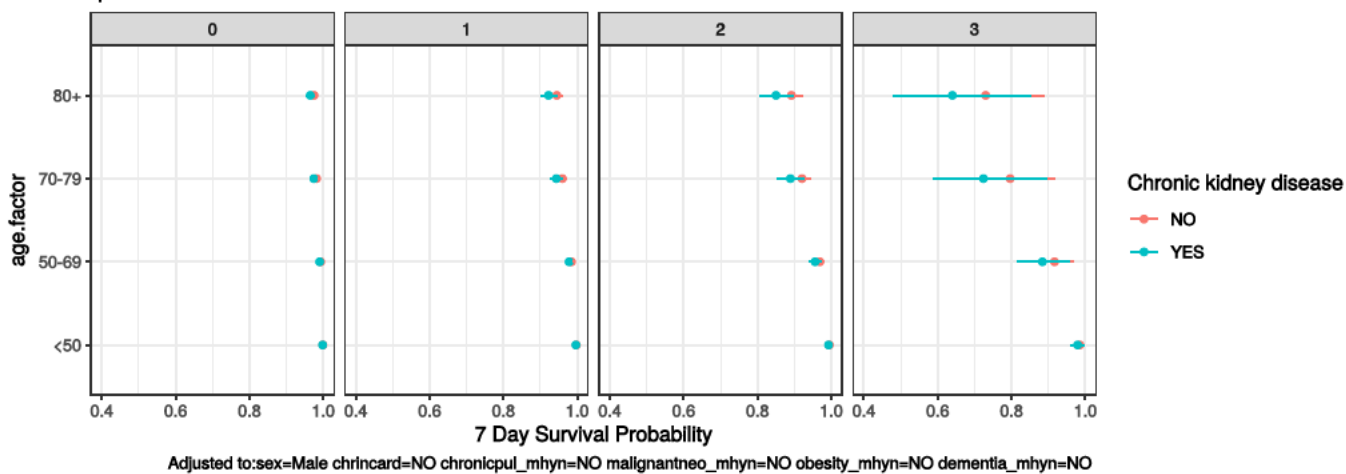


Figure 19 - Death by severity (NEWS) on admission

Number of deaths by NEWS score at admission

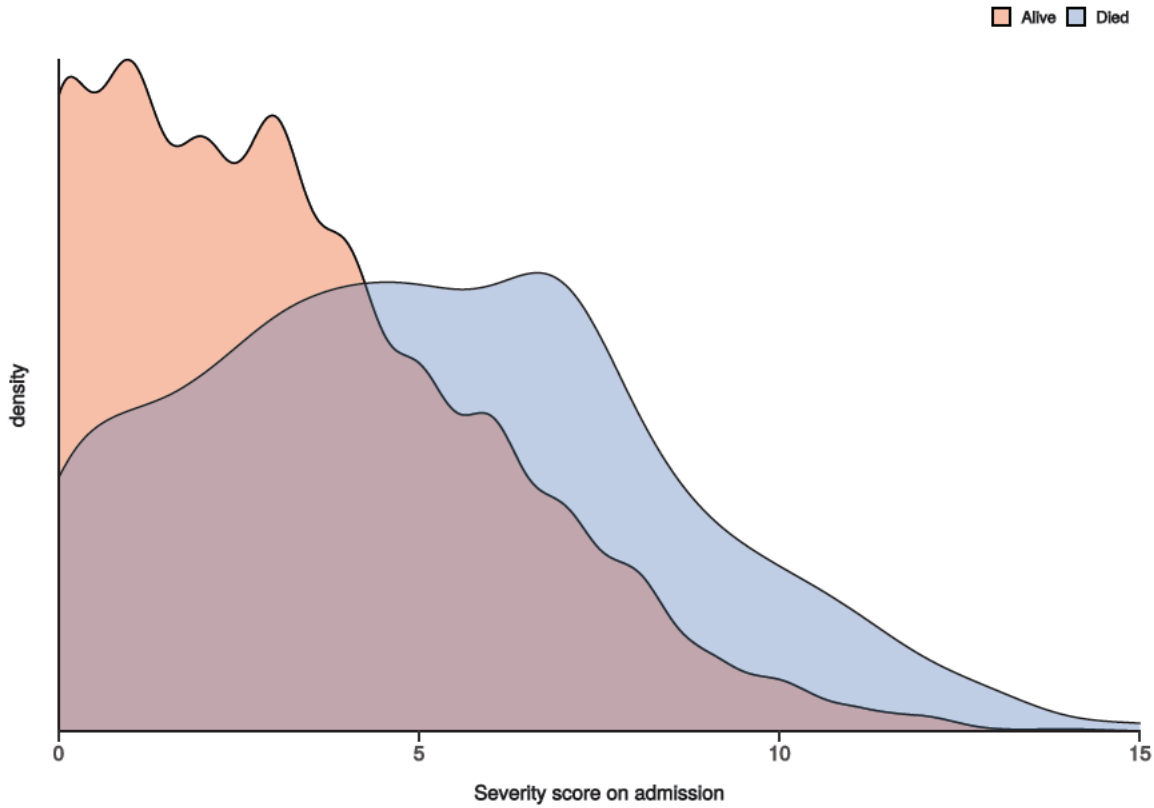


Figure 20 - Death by severity (NEWS) on admission stratified by age

Number of deaths by NEWS score at admission  
Stratified by age

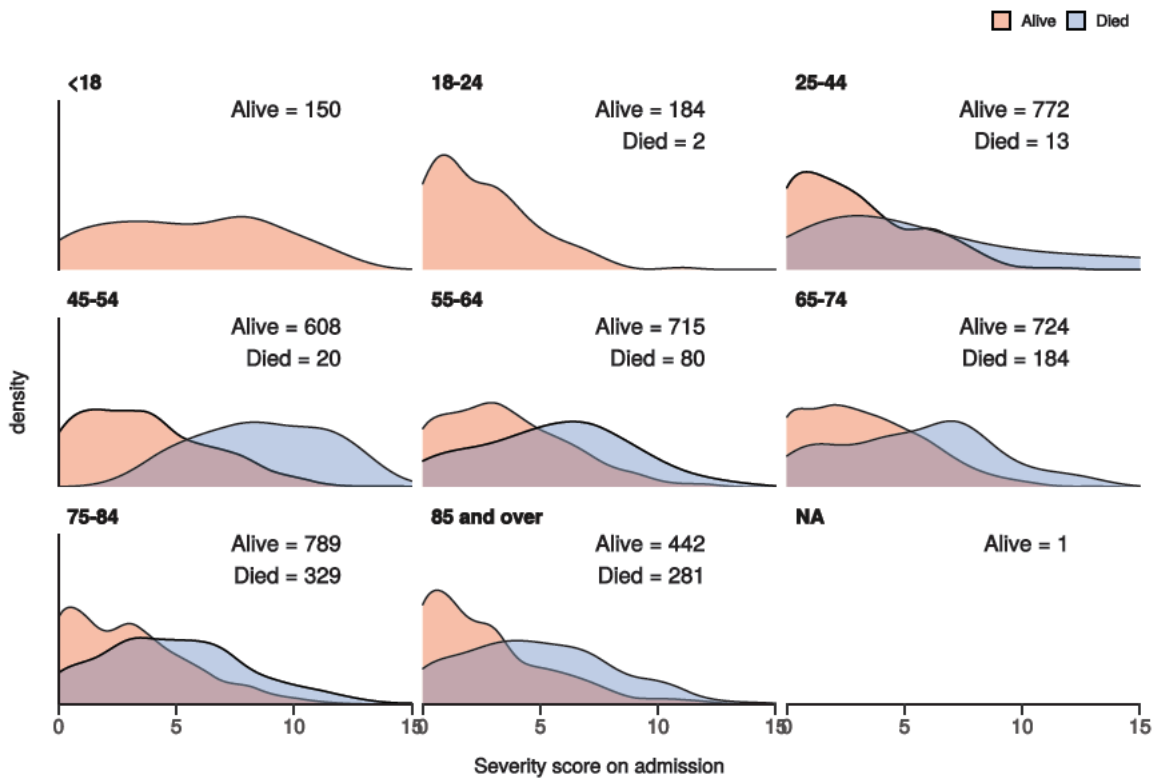
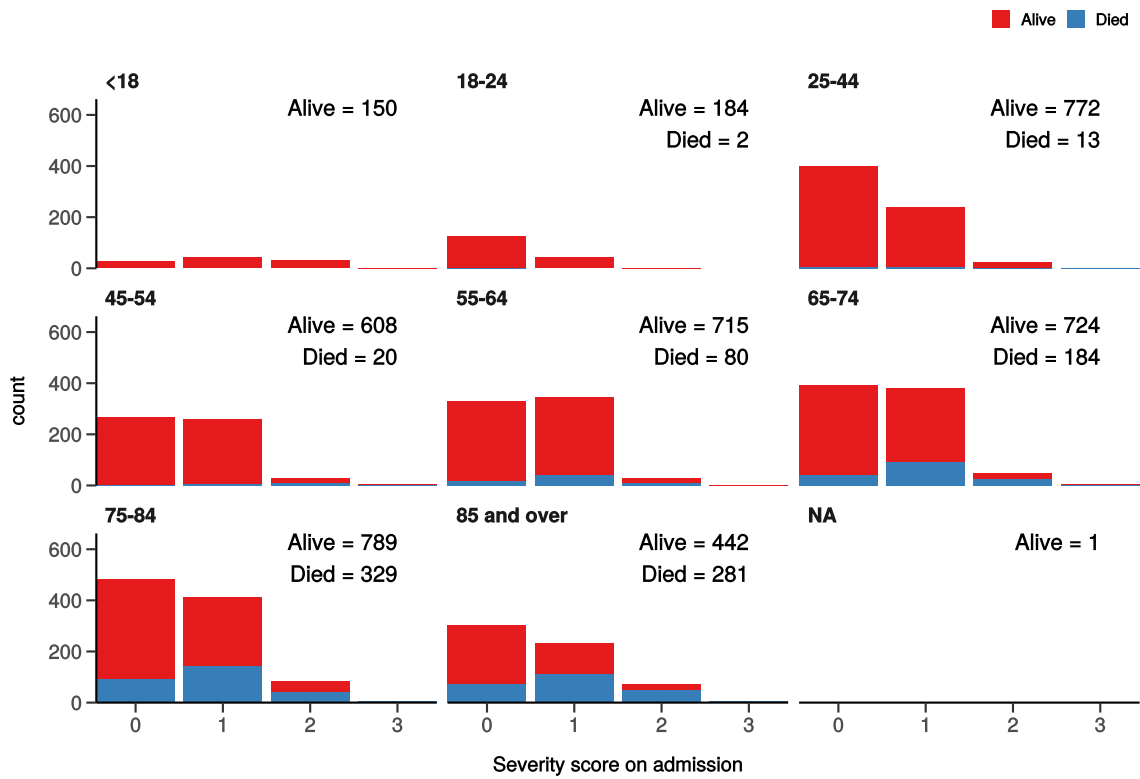


Figure 21 - Death by severity (qSOFA) on admission stratified by age

Number of deaths by qSOFA score at admission  
Stratified by age



## Healthcare workers

Employed as a healthcare worker?		NO	YES	p
Total N (%)		6896 (97.6)	168 (2.4)	
NEWS score on admission	Median (IQR)	3.0 (5.0)	4.0 (4.0)	0.242
Death	No	3697 (81.4)	127 (98.4)	<0.001
	Yes	845 (18.6)	2 (1.6)	