

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

Executive summary

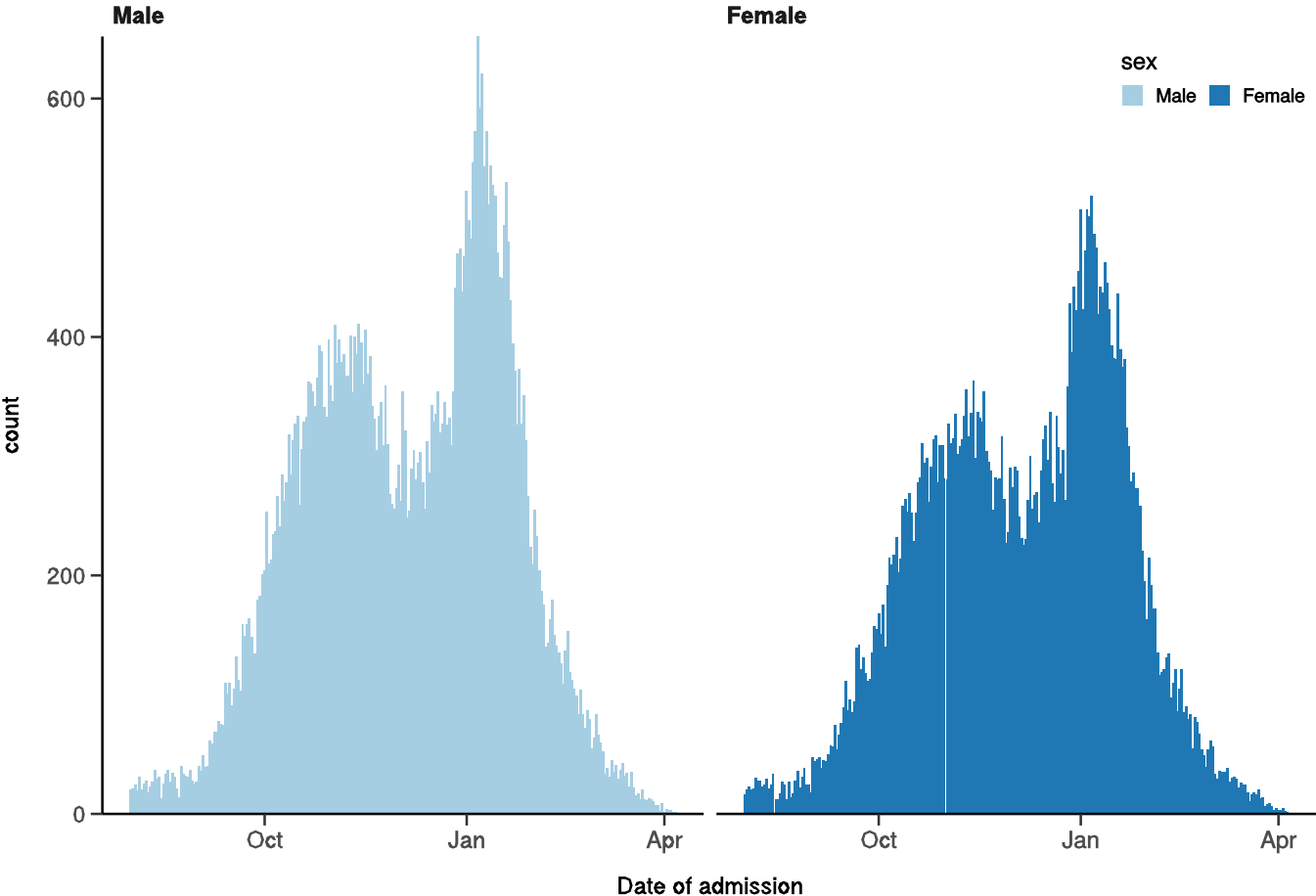
Includes patients admitted after 01 August 2020

There are 98606 patients included in CO-CIN. Of these, 19527 patient(s) have died and 16936 required ICU. 57970 have been discharged home.

Admission

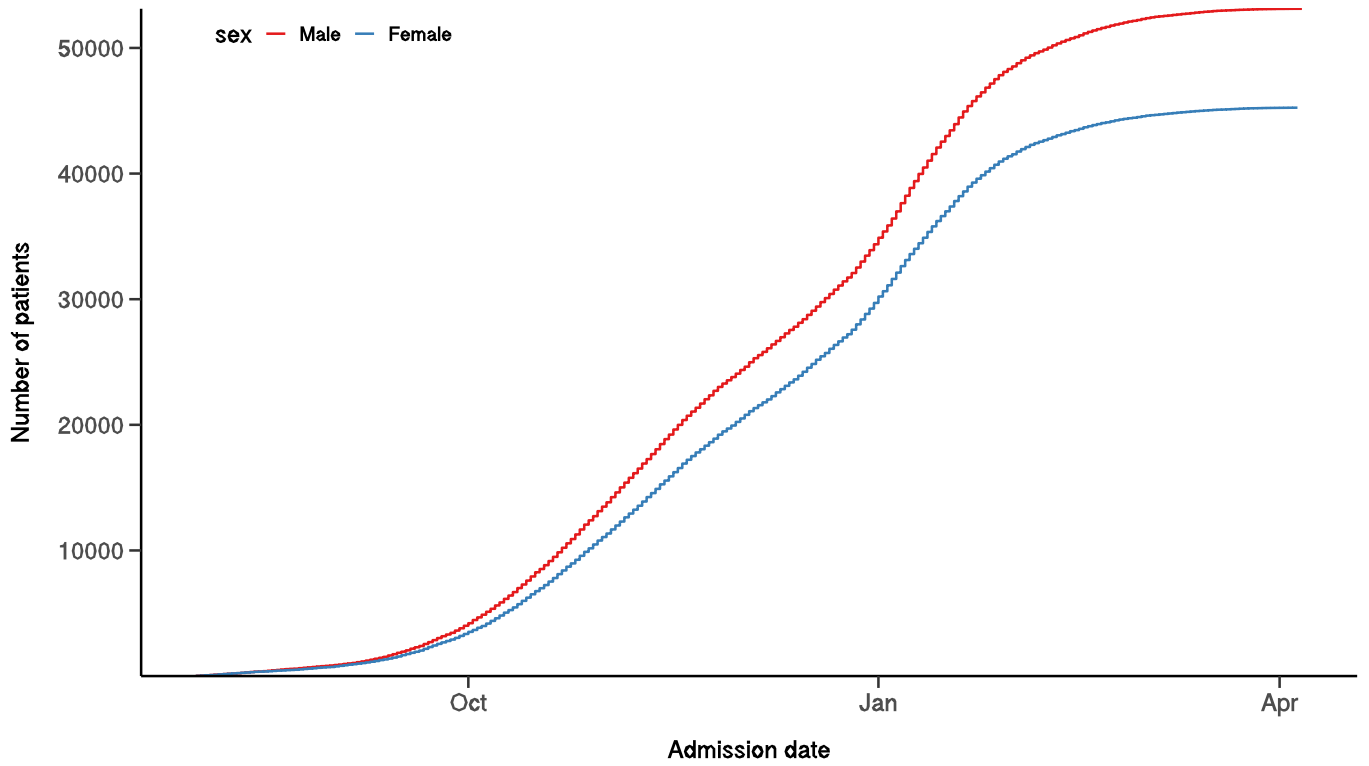
Figure 1

Hospital admission with COVID-19 by sex
Figure 1A



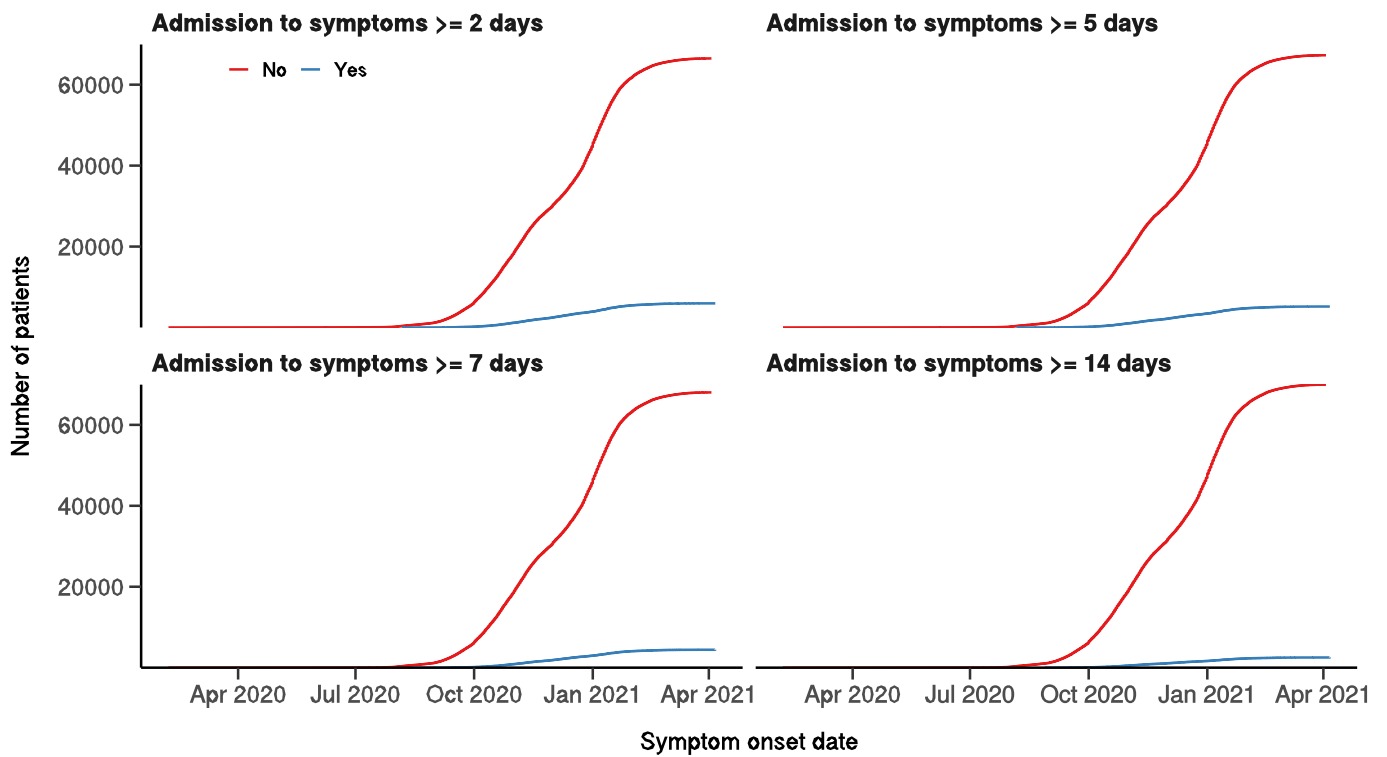
Hospital admission with COVID-19 by sex

Figure 1B



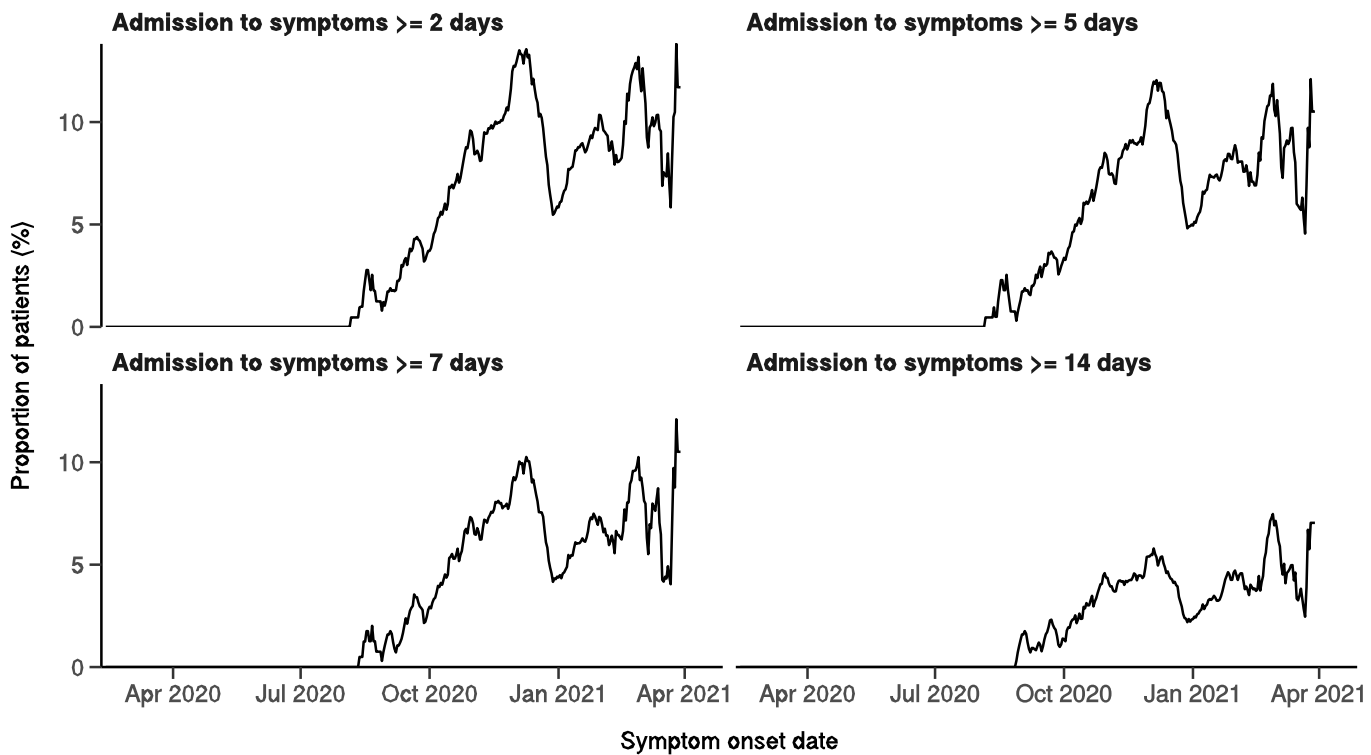
Number with symptom onset occurring after admission to hospital

Figure 1C



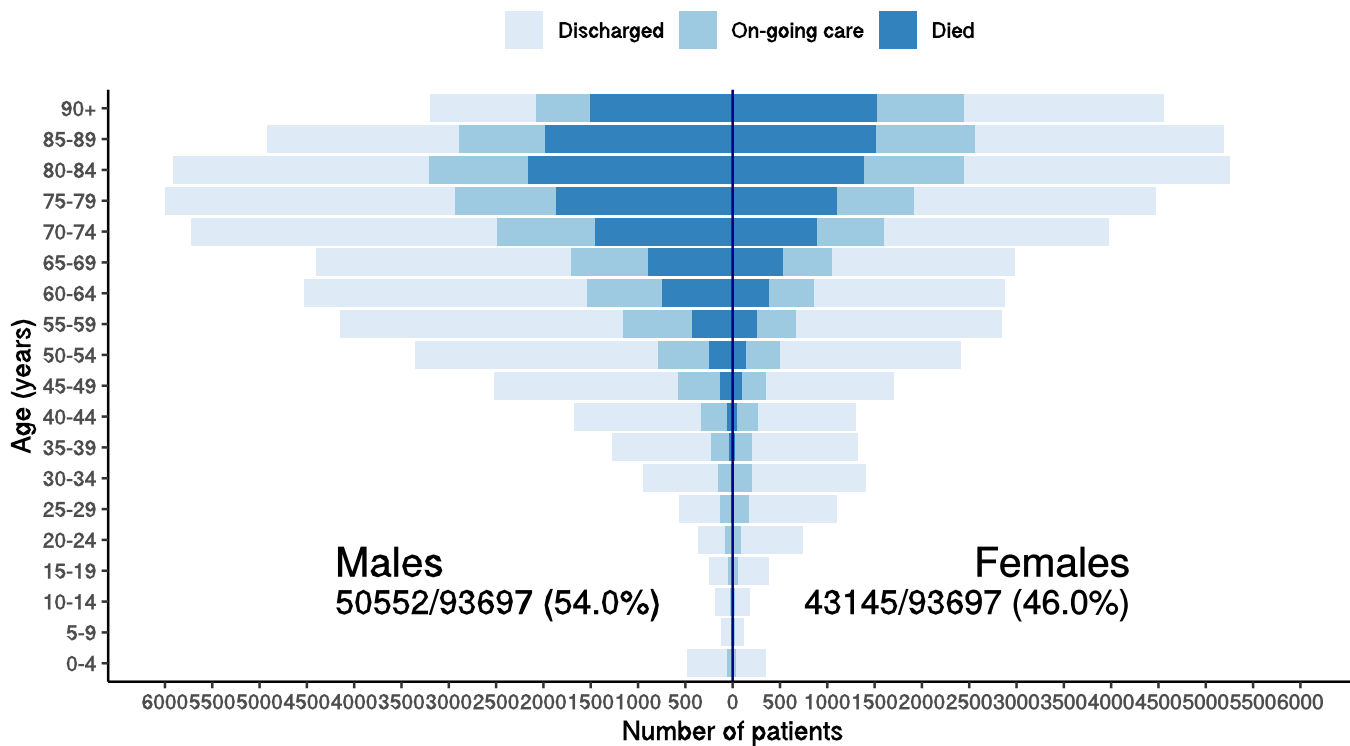
Proportion with symptom onset occurring after hospital admission

Figure 1D - 7-day rolling percentage. n = 72448



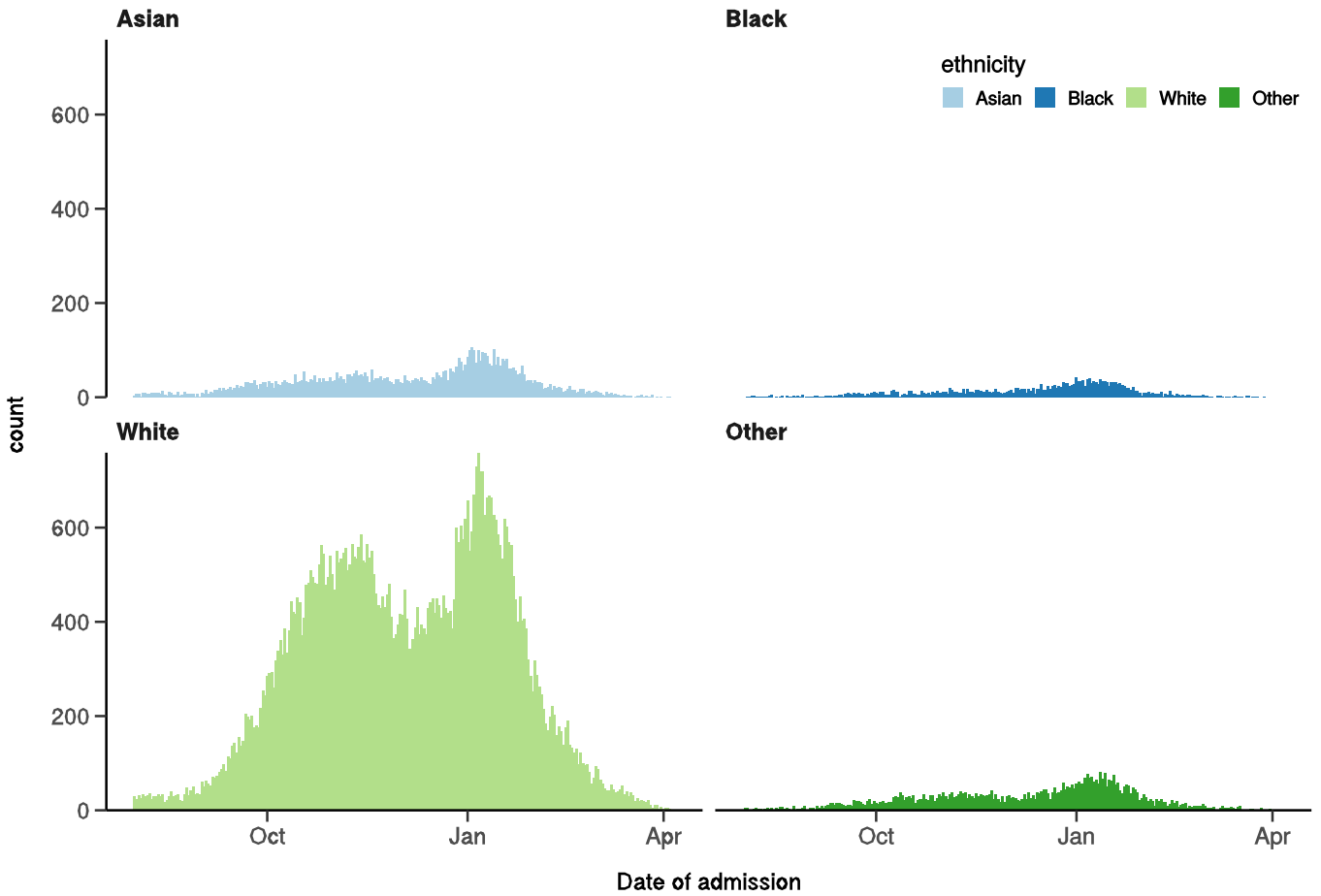
Patients with outcome stratified by age, and sex

Figure 1E



Hospital admission with COVID-19 by ethnicity

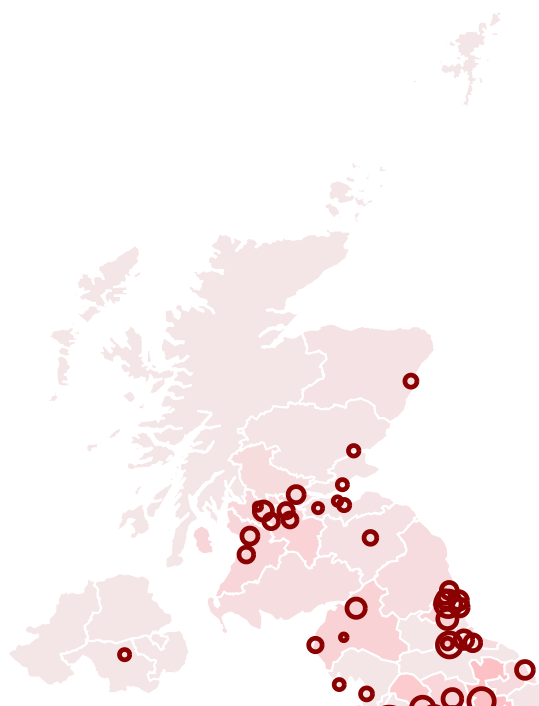
Figure 1F



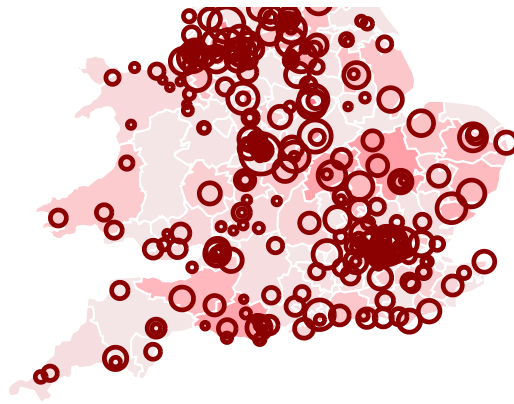
Location by CCG / Healthboard

Figure 2

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



n = 97932



Symptoms and comorbidity

Figure 3A

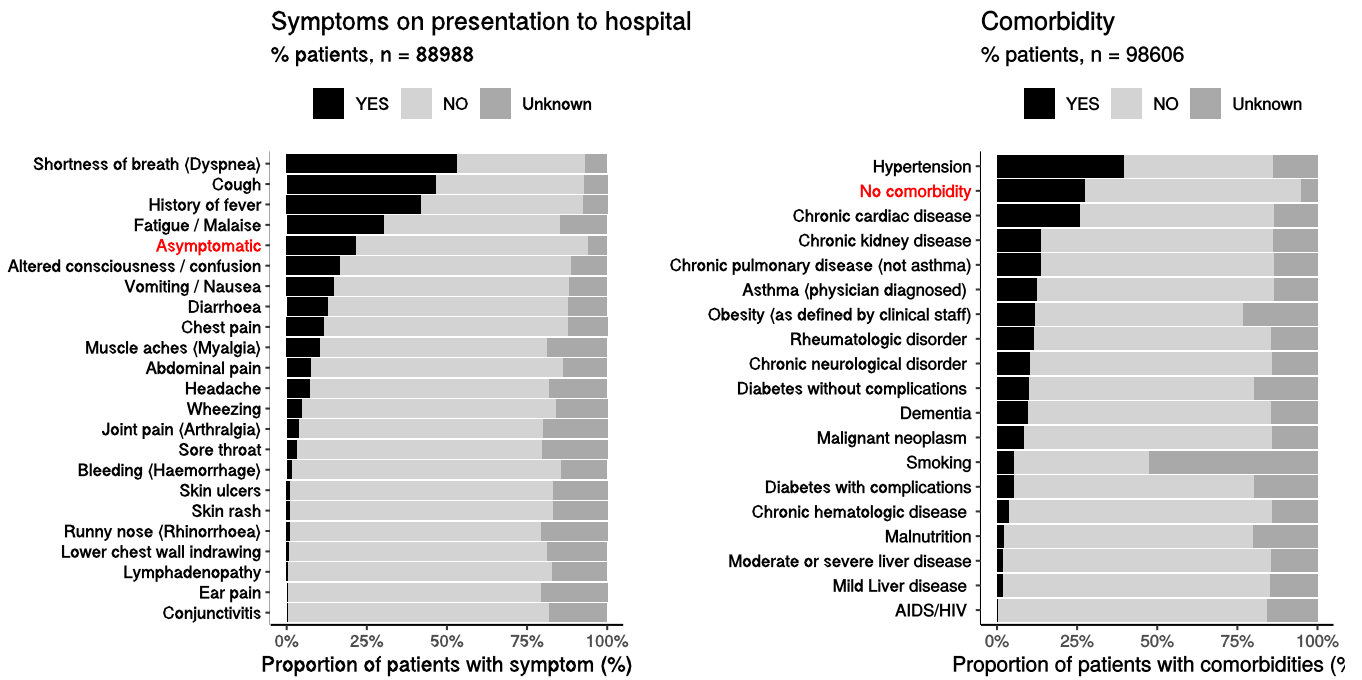


Figure 3B - Symptoms by Age

Symptoms on presentation to hospital
Stratified by age

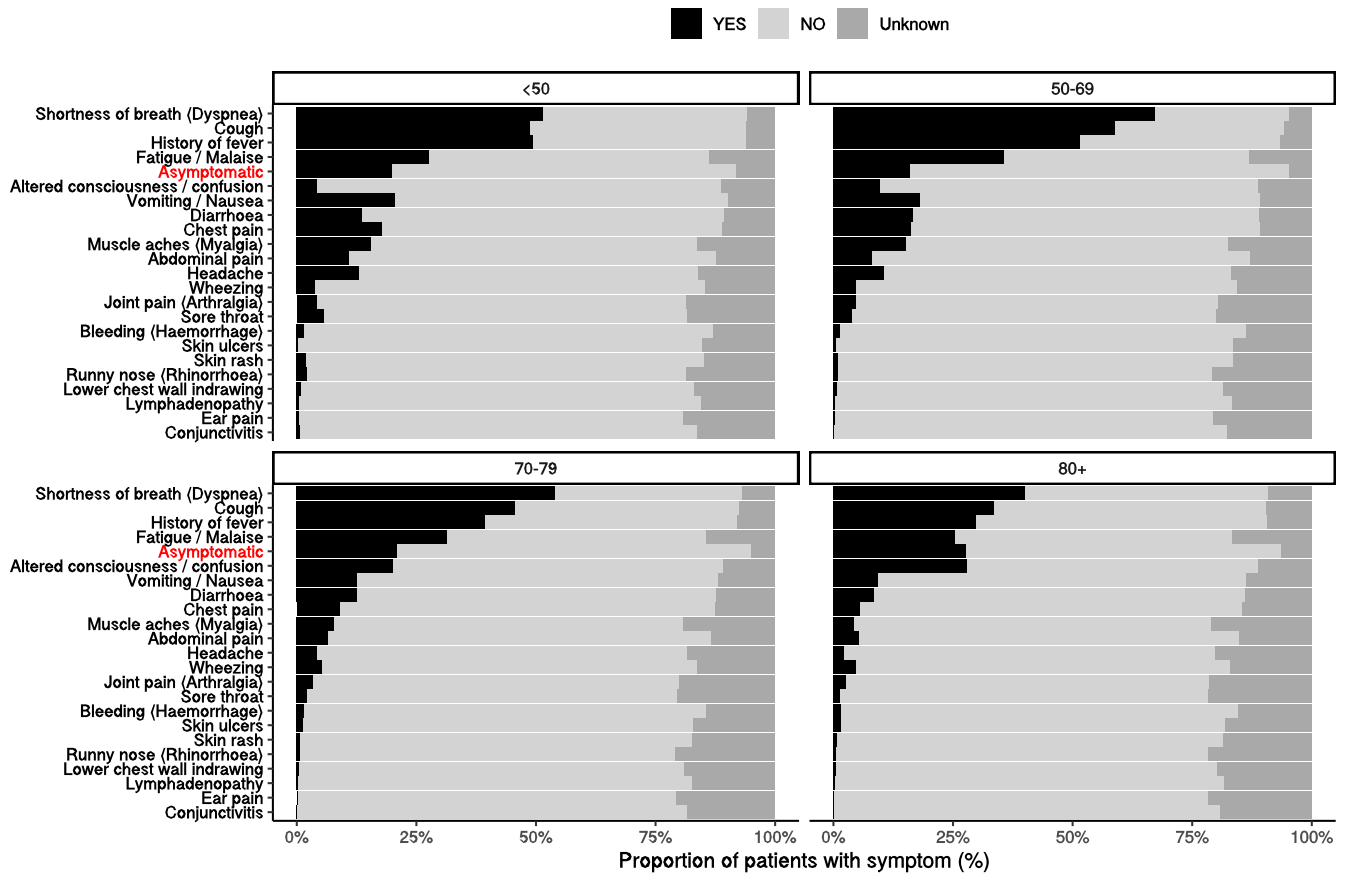


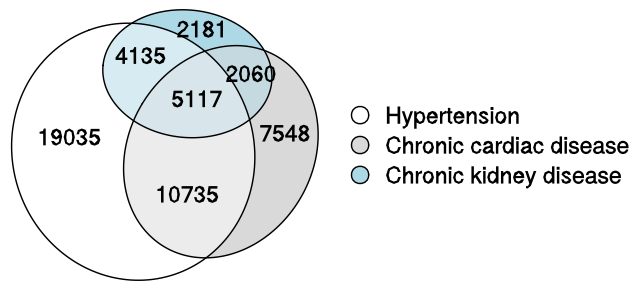
Figure 3C

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

Comorbidity (most common)

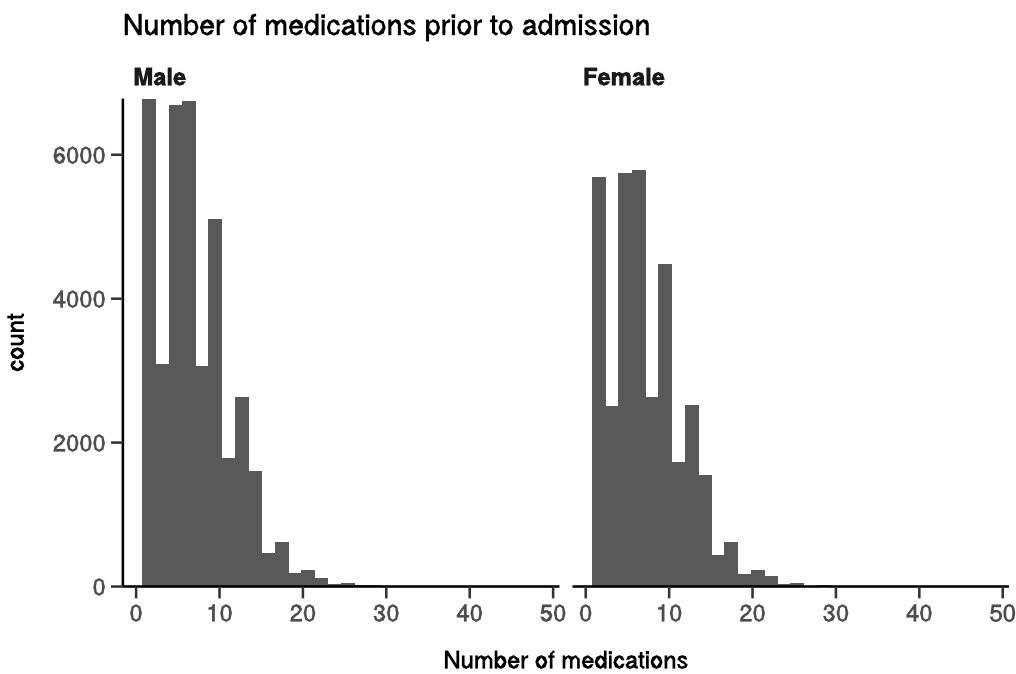
Figure 4C

n = 98606



Medication prior to illness

Figure 5

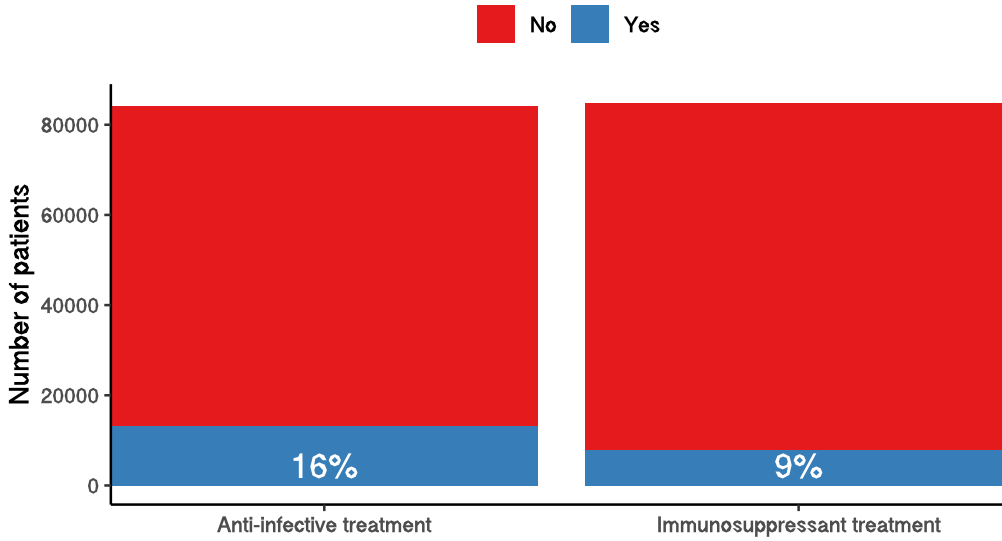


Preadmission treatment

Figure 6

Pre-admission treatment

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



Patient flow

Figure 7A - All patients

N = 94770

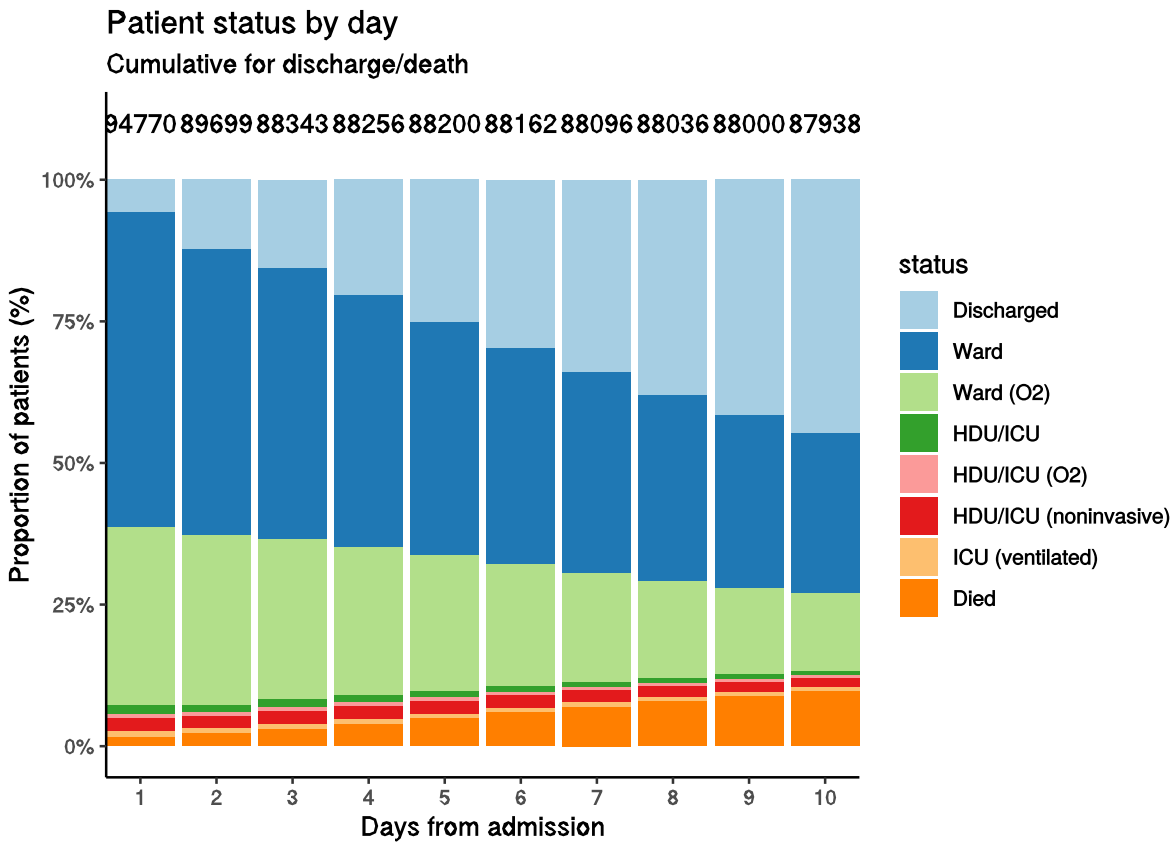
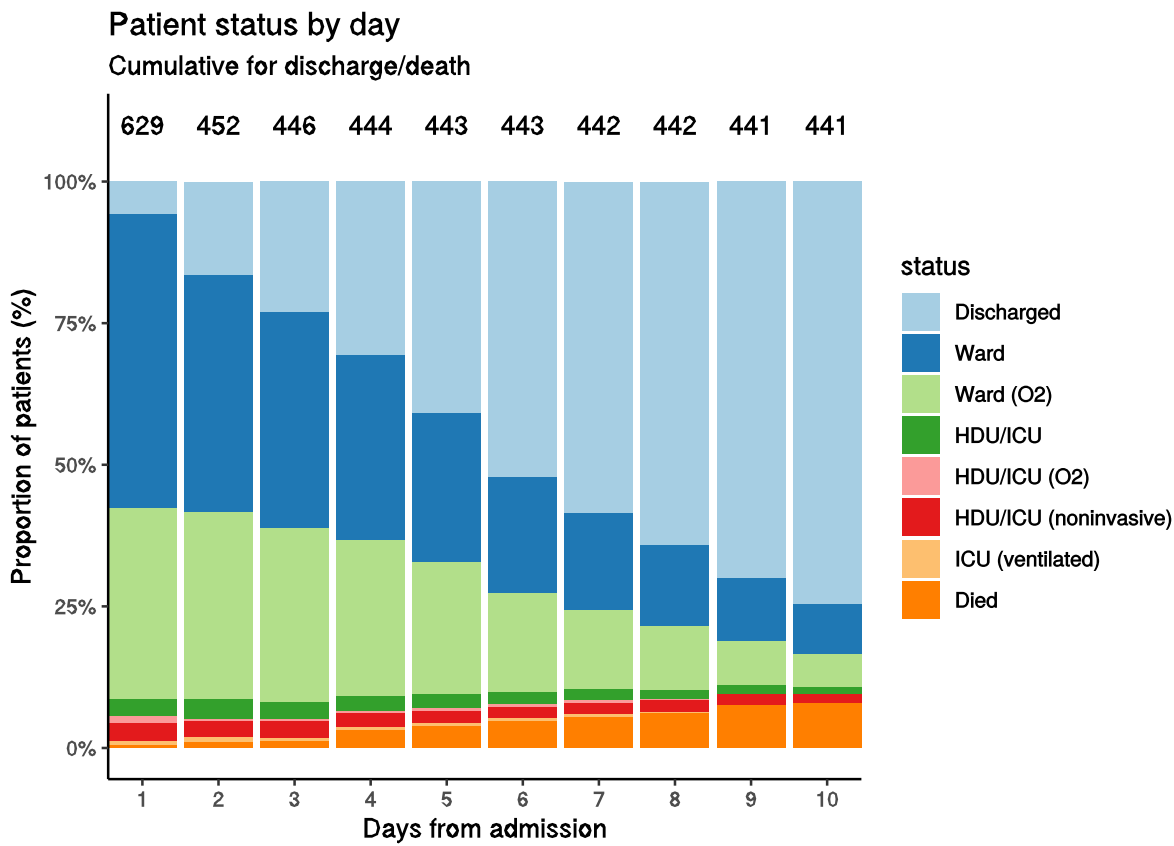


Figure 7B - Patients admitted ≥ 14 days and ≤ 28 days ago

N = 629



Oxygen requirement

Figure 8A - All patients

N = 89324

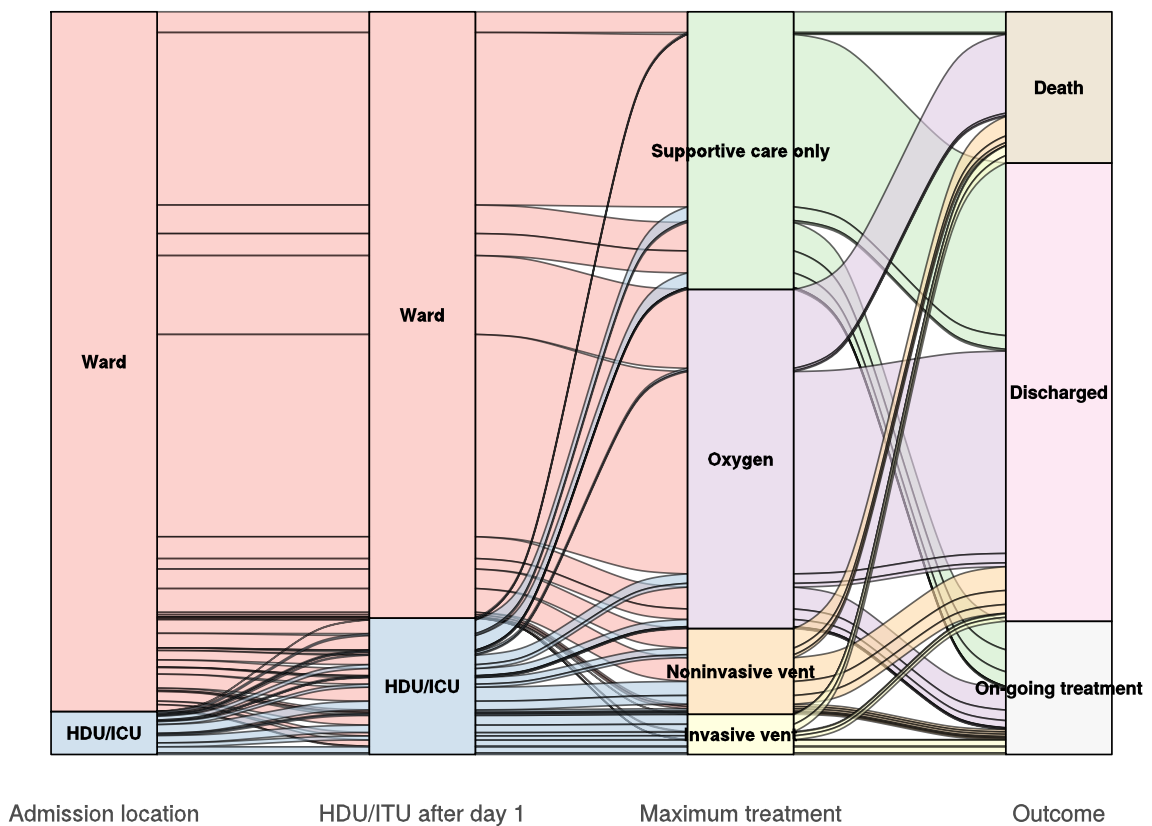


Figure 8B - Patients admitted ≥ 14 days and ≤ 28 days ago

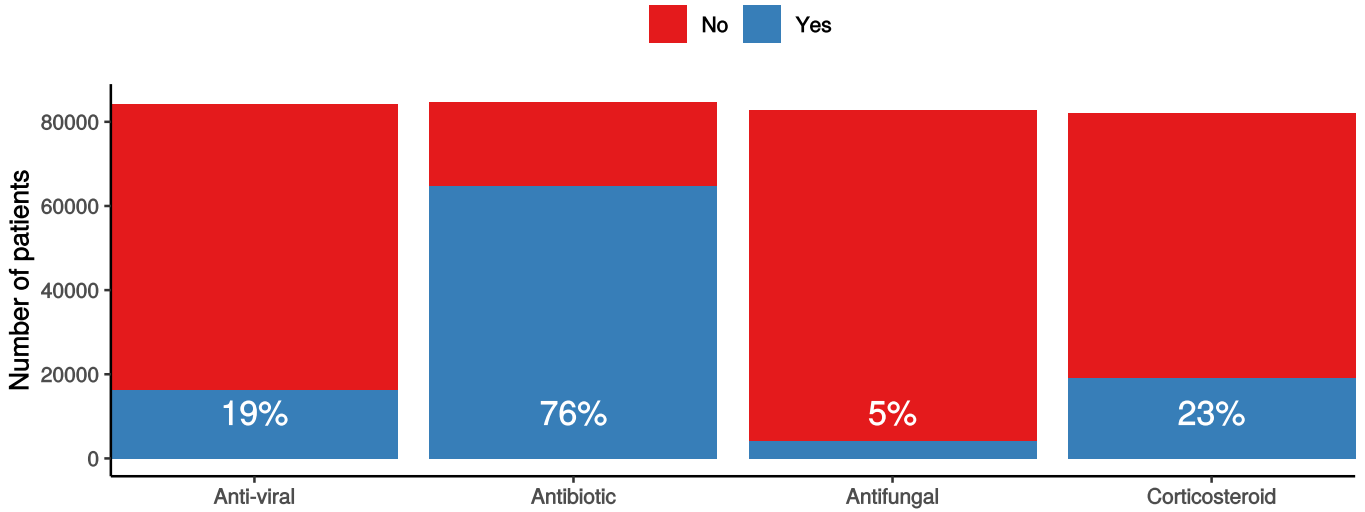
N = 606

In-hospital medical treatment

Figure 9

In-hospital treatment

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



Treatment

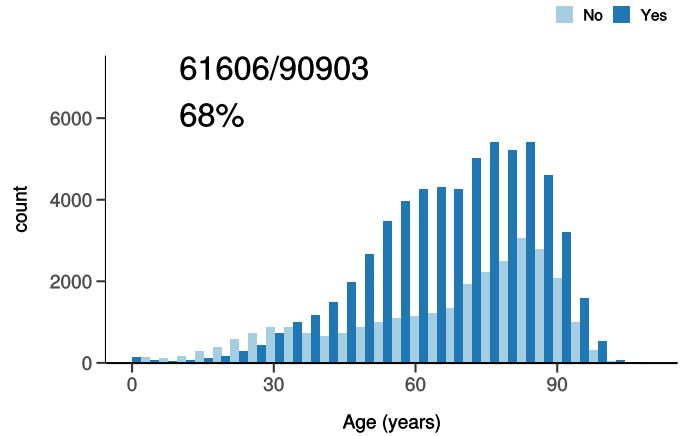
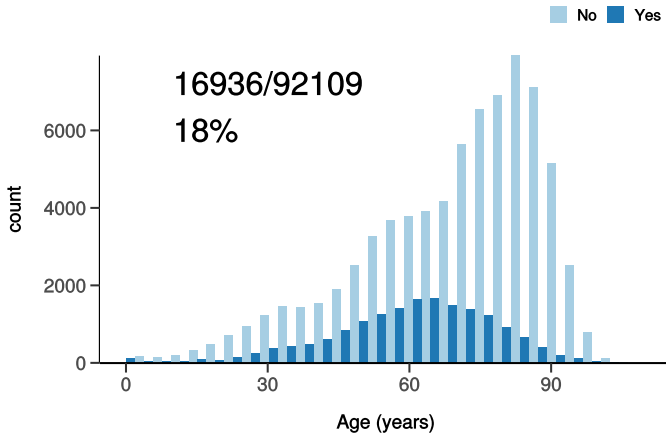
Figure 10

ICU/HDU admission

Figure 10A

High flow oxygen

Figure 10B

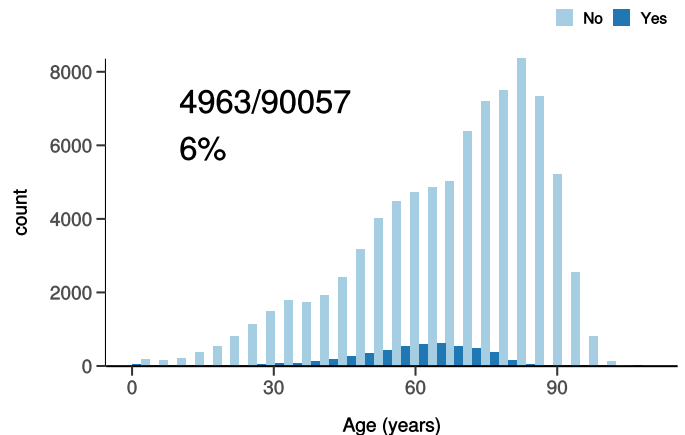
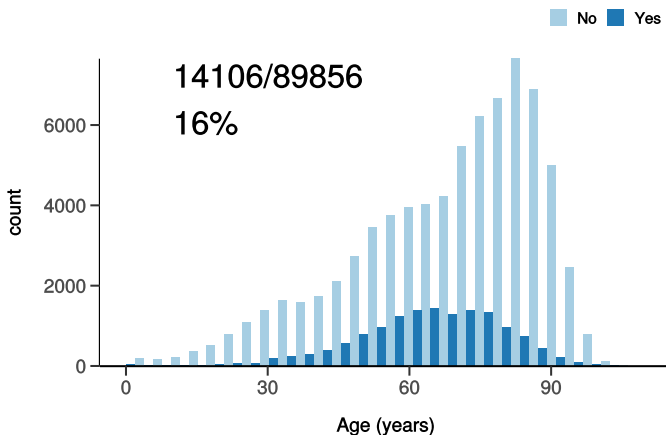


Noninvasive ventilation

Figure 10C

Invasive ventilation

Figure 10D

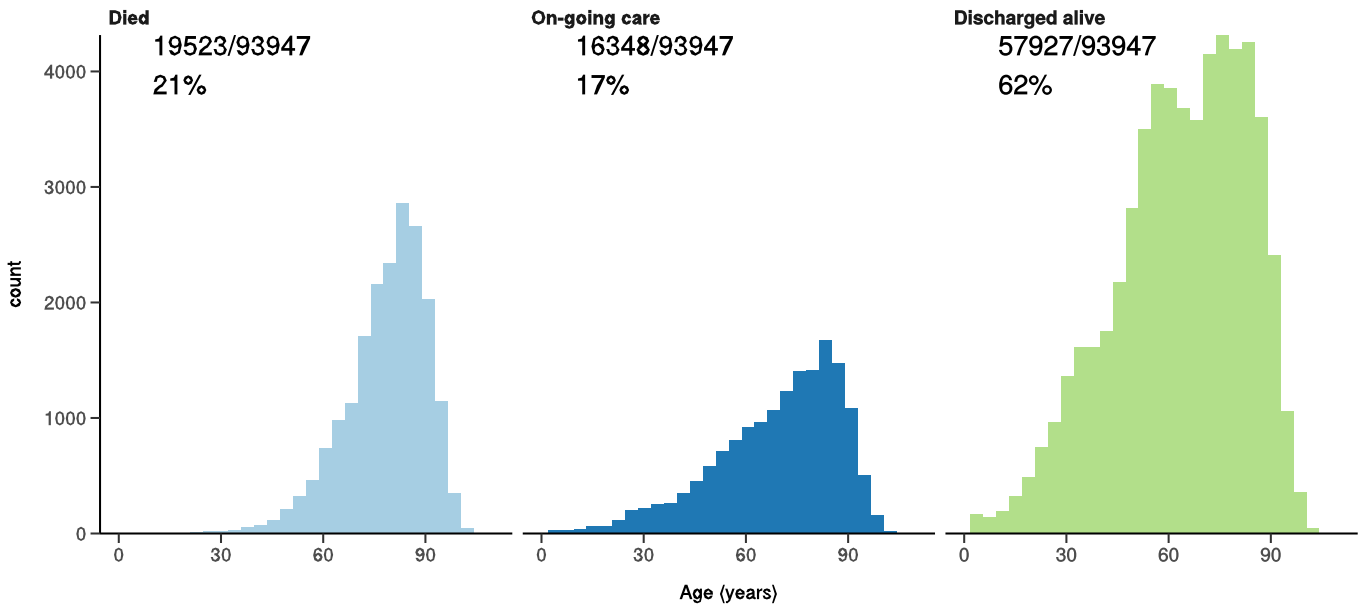


Status in patients admitted ≥ 14 days from today

Figure 11

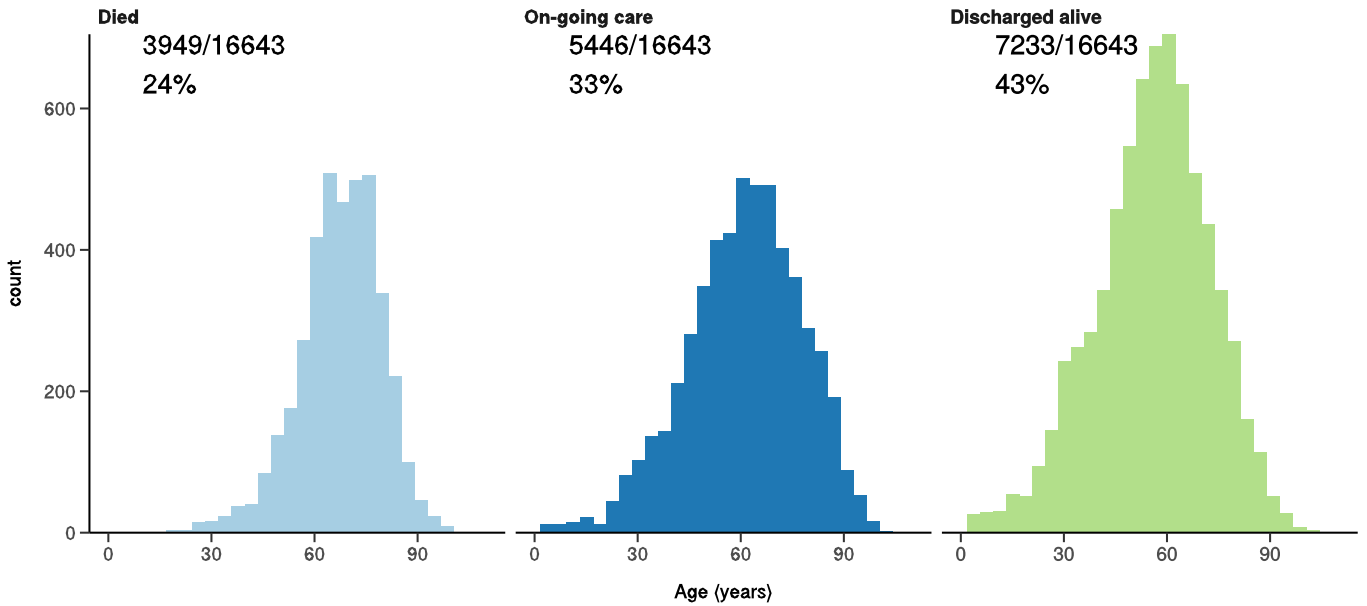
All: status in patients admitted ≥ 14 days ago

Figure 11A



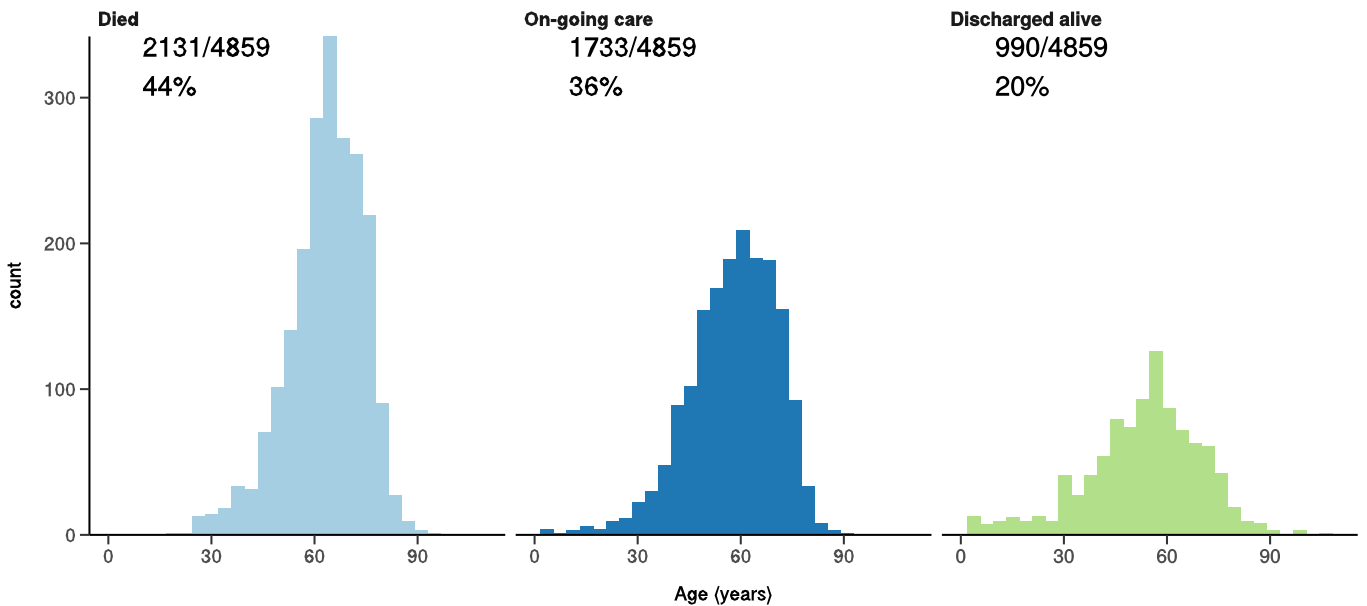
ICU/HDU admissions: status in patients admitted ≥ 14 days ago

Figure 11B



Invasive ventilation: status in patients admitted ≥ 14 days ago

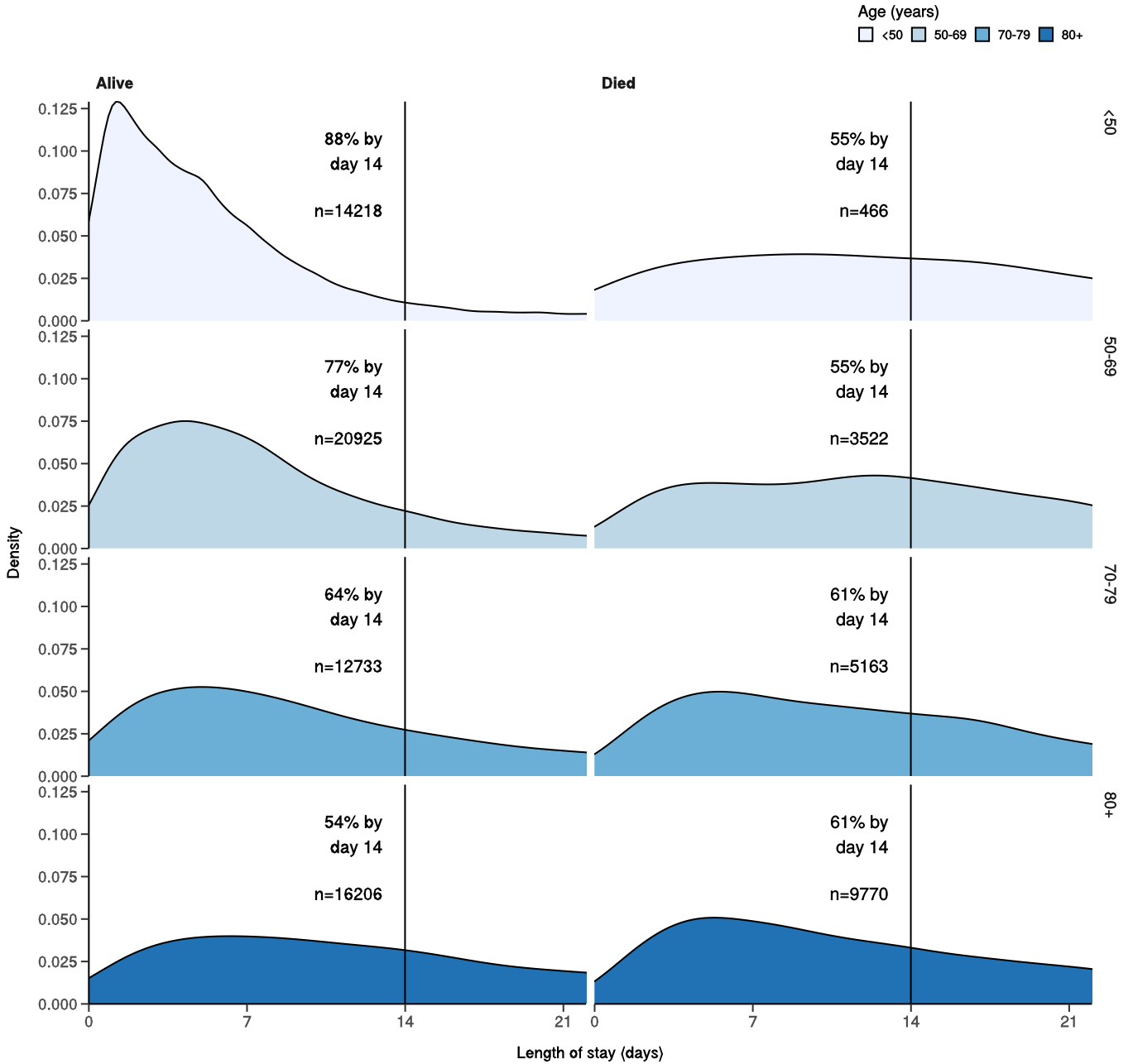
Figure 11c



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	15723 (97.0)	483 (3.0)	•	•
	50-69	22492 (86.1)	3625 (13.9)	5.25 (4.77-5.79, p<0.001)	4.34 (3.90-4.84, p<0.001)

Dependent: death		No	Yes	OR (univariable)	OR (multivariable)
	70-79	13795 (72.2)	5300 (27.8)	12.51 (11.38-13.78, p<0.001)	8.93 (8.02-9.97, p<0.001)
	80+	17507 (63.5)	10061 (36.5)	18.71 (17.05-20.57, p<0.001)	13.12 (11.79-14.64, p<0.001)
Sex at Birth	Male	36429 (75.9)	11559 (24.1)	•	•
	Female	33116 (80.7)	7921 (19.3)	0.75 (0.73-0.78, p<0.001)	0.70 (0.67-0.73, p<0.001)
	Not specified	0 (NaN)	0 (NaN)	•	•
Chronic cardiac disease	NO	46436 (83.0)	9524 (17.0)	•	•
	YES	16081 (67.4)	7767 (32.6)	2.35 (2.27-2.44, p<0.001)	1.21 (1.16-1.26, p<0.001)
Chronic pulmonary disease (not asthma)	NO	54442 (80.7)	13011 (19.3)	•	•
	YES	8104 (65.6)	4241 (34.4)	2.19 (2.10-2.28, p<0.001)	1.55 (1.48-1.63, p<0.001)
Chronic neurological disorder	NO	55416 (79.2)	14528 (20.8)	•	•
	YES	6802 (72.6)	2570 (27.4)	1.44 (1.37-1.51, p<0.001)	1.03 (0.97-1.09, p=0.343)
Chronic hematologic disease	NO	59799 (78.7)	16182 (21.3)	•	•
	YES	2361 (72.5)	896 (27.5)	1.40 (1.30-1.52, p<0.001)	0.92 (0.83-1.01, p=0.068)
Chronic kidney disease	NO	54215 (81.0)	12710 (19.0)	•	•
	YES	8184 (64.6)	4479 (35.4)	2.33 (2.24-2.43, p<0.001)	1.34 (1.28-1.41, p<0.001)
Dementia	NO	56507 (80.6)	13620 (19.4)	•	•
	YES	5543 (62.6)	3309 (37.4)	2.48 (2.36-2.60, p<0.001)	1.38 (1.30-1.46, p<0.001)
Obesity (as defined by clinical staff)	NO	47126 (78.5)	12935 (21.5)	•	•
	YES	8956 (81.7)	2009 (18.3)	0.82 (0.78-0.86, p<0.001)	1.17 (1.10-1.24, p<0.001)

Dependent: death		No	Yes	OR (univariable)	OR (multivariable)
Malignant neoplasm	NO	57310 (80.0)	14288 (20.0)	•	•
	YES	4876 (63.3)	2829 (36.7)	2.33 (2.21-2.45, p<0.001)	1.67 (1.57-1.77, p<0.001)

Number in dataframe = 98252, Number in model = 67985, Missing = 30267, AIC = 60740.6, C-statistic = 0.741, H&L = Chi-sq(8) 211.79 (p<0.001)

Figure 13 - Adjusted odds ratio plot

Death

Age on admission (years)	<50	-
	50-69	4.34 (3.90-4.84, p<0.001)
	70-79	8.93 (8.02-9.97, p<0.001)
	80+	13.12 (11.79-14.64, p<0.001)
Sex at Birth	Male	-
	Female	0.70 (0.67-0.73, p<0.001)
	Not specified	-
Chronic cardiac disease	YES	1.21 (1.16-1.26, p<0.001)
Chronic pulmonary disease (not asthma)	YES	1.55 (1.48-1.63, p<0.001)
Chronic neurological disorder	YES	1.03 (0.97-1.09, p=0.343)
Chronic hematologic disease	YES	0.92 (0.83-1.01, p=0.068)
Chronic kidney disease	YES	1.34 (1.28-1.41, p<0.001)
Dementia	YES	1.38 (1.30-1.46, p<0.001)
Obesity (as defined by clinical staff)	YES	1.17 (1.10-1.24, p<0.001)
Malignant neoplasm	YES	1.67 (1.57-1.77, p<0.001)

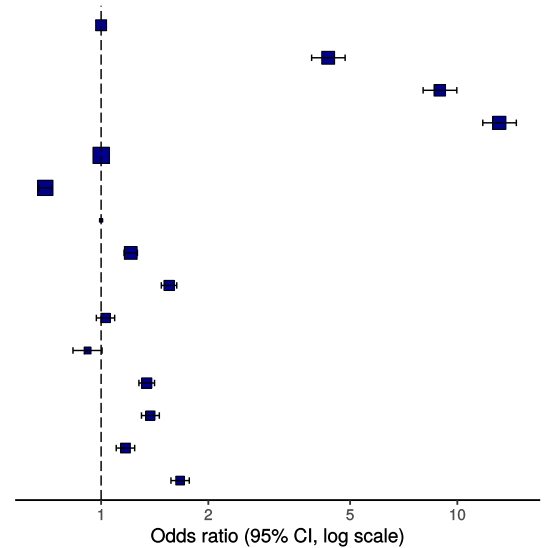
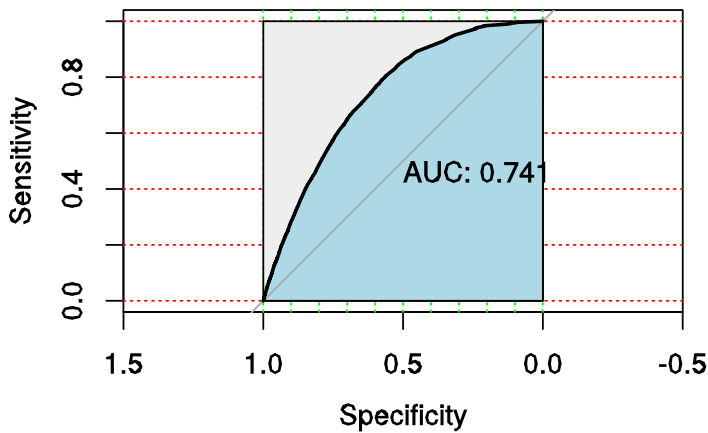


Figure 14 - ROC

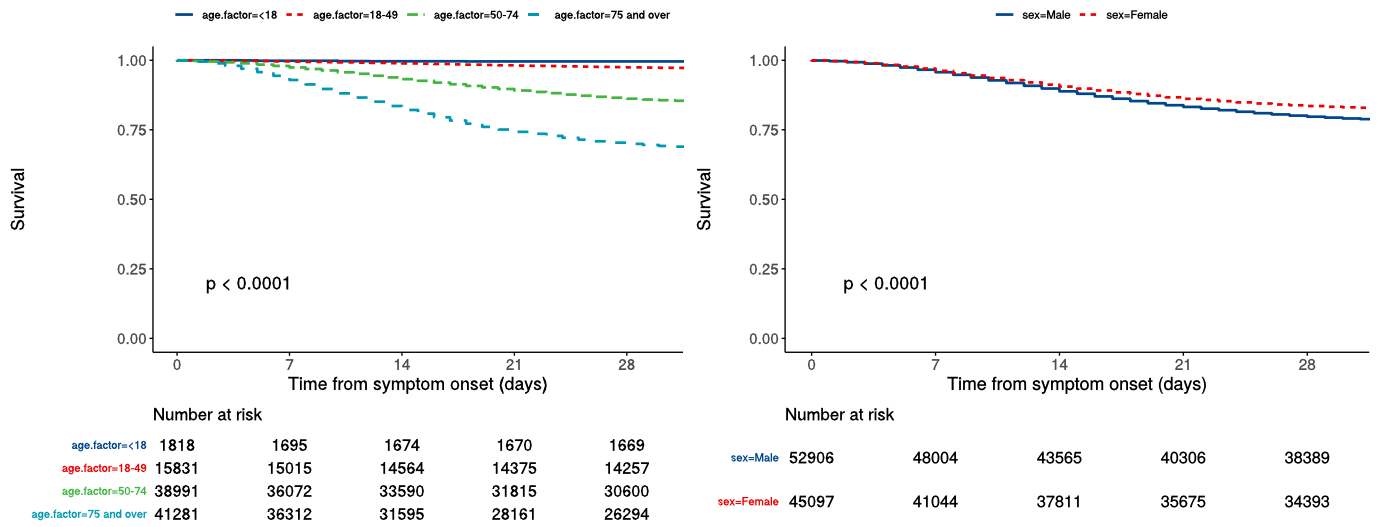


Survival models

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	17649 (18.0)	•	•
	50-69	28847 (29.5)	4.88 (4.44-5.37, p<0.001)	4.13 (3.69-4.62, p<0.001)
	70-79	21134 (21.6)	10.70 (9.74-11.74, p<0.001)	8.69 (7.78-9.72, p<0.001)
	80+	30312 (30.9)	15.13 (13.81-16.58, p<0.001)	12.22 (10.94-13.66, p<0.001)
Sex at Birth	Male	52906 (54.0)	•	•
	Female	45097 (46.0)	0.79 (0.76-0.81, p<0.001)	0.77 (0.74-0.79, p<0.001)
qSOFA score on admission	0	40073 (50.2)	•	•
	1	33905 (42.5)	1.58 (1.53-1.64, p<0.001)	1.77 (1.71-1.84, p<0.001)
	2	5386 (6.8)	3.08 (2.93-3.24, p<0.001)	3.00 (2.83-3.18, p<0.001)
	3	392 (0.5)	4.74 (4.12-5.45, p<0.001)	4.52 (3.86-5.28, p<0.001)
Symptomatic at presentation	No symptoms	14808 (16.6)	•	•
	Symptoms	74370 (83.4)	1.50 (1.43-1.56, p<0.001)	•

Dependent: Surv(time, status)		all	HR (univariable)	HR (multivariable)
Chronic cardiac disease	NO	59604 (70.1)	•	•
	YES	25363 (29.9)	2.14 (2.07-2.20, p<0.001)	1.21 (1.17-1.26, p<0.001)
Chronic kidney disease	NO	71297 (84.1)	•	•
	YES	13440 (15.9)	2.09 (2.02-2.16, p<0.001)	1.25 (1.20-1.31, p<0.001)
Moderate or severe liver disease	NO	82512 (98.1)	•	•
	YES	1594 (1.9)	1.58 (1.45-1.74, p<0.001)	1.64 (1.47-1.84, p<0.001)
Chronic neurological disorder	NO	74524 (88.3)	•	•
	YES	9897 (11.7)	1.39 (1.33-1.45, p<0.001)	•
Malignant neoplasm	NO	76221 (90.3)	•	•
	YES	8192 (9.7)	2.05 (1.97-2.14, p<0.001)	1.49 (1.42-1.56, p<0.001)
Chronic hematologic disease	NO	80896 (96.0)	•	•
	YES	3414 (4.0)	1.36 (1.27-1.46, p<0.001)	•
Obesity (as defined by clinical staff)	NO	63817 (84.6)	•	•
	YES	11609 (15.4)	0.84 (0.80-0.88, p<0.001)	1.09 (1.04-1.15, p=0.001)
Diabetes without complications	NO	69161 (87.7)	•	•
	YES	9681 (12.3)	1.17 (1.12-1.23, p<0.001)	•
Rheumatologic disorder	NO	72934 (86.7)	•	•
	YES	11213 (13.3)	1.24 (1.19-1.29, p<0.001)	•
Dementia	NO	74676 (88.8)	•	•
	YES	9421 (11.2)	2.21 (2.12-2.29, p<0.001)	1.20 (1.14-1.26, p<0.001)
Malnutrition	NO	76614 (97.6)	•	•

Dependent: Surv(time, status)		all	HR (univariable)	HR (multivariable)
	YES	1893 (2.4)	1.76 (1.62-1.91, p<0.001)	•
smoking_mhyn_2levels	NO	41605 (47.0)	•	•
	YES	5115 (5.8)	0.90 (0.84-0.97, p=0.004)	•
	N/K	41885 (47.3)	1.19 (1.15-1.22, p<0.001)	•

Number in dataframe = 98233, Number in model = 64805, Missing = 33428, Number of events = 12821, Concordance = 0.740 (SE = 0.002), R-squared = 0.134(Max possible = 0.987), Likelihood ratio test = 9348.706 (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	4.13 (3.69-4.62, p<0.001)
	70-79	8.69 (7.78-9.72, p<0.001)
	80+	12.22 (10.94-13.66, p<0.001)
Sex at Birth	Female	0.77 (0.74-0.79, p<0.001)
qSOFA score on admission	0	-
	1	1.77 (1.71-1.84, p<0.001)
	2	3.00 (2.83-3.18, p<0.001)
	3	4.52 (3.86-5.28, p<0.001)
Chronic cardiac disease	YES	1.21 (1.17-1.26, p<0.001)
Chronic kidney disease	YES	1.25 (1.20-1.31, p<0.001)
Moderate or severe liver disease	YES	1.64 (1.47-1.84, p<0.001)
Malignant neoplasm	YES	1.49 (1.42-1.56, p<0.001)
Obesity (as defined by clinical staff)	YES	1.09 (1.04-1.15, p=0.001)
Dementia	YES	1.20 (1.14-1.26, p<0.001)

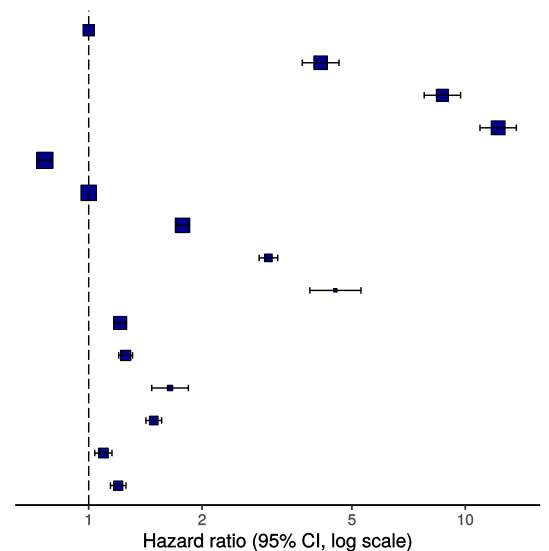
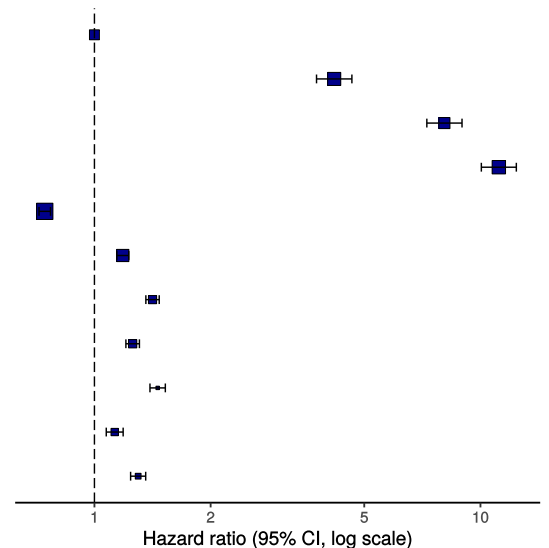


Figure 16b - Multivariable Cox proportional hazards model (age, sex, comorbidities only)

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

Age on admission (years)	<50	-
	50-69	4.18 (3.76-4.64, p<0.001)
	70-79	8.07 (7.26-8.96, p<0.001)
	80+	11.16 (10.05-12.39, p<0.001)
Sex at Birth	Female	0.74 (0.72-0.77, p<0.001)
Chronic cardiac disease	YES	1.18 (1.14-1.23, p<0.001)
Chronic pulmonary disease (not asthma)	YES	1.41 (1.36-1.47, p<0.001)
Chronic kidney disease	YES	1.26 (1.21-1.31, p<0.001)
Malignant neoplasm	YES	1.46 (1.39-1.53, p<0.001)
Obesity (as defined by clinical staff)	YES	1.13 (1.07-1.19, p<0.001)
Dementia	YES	1.30 (1.24-1.36, p<0.001)



ROC = 0.7410965

Figure 17 - Predictions calibration plot

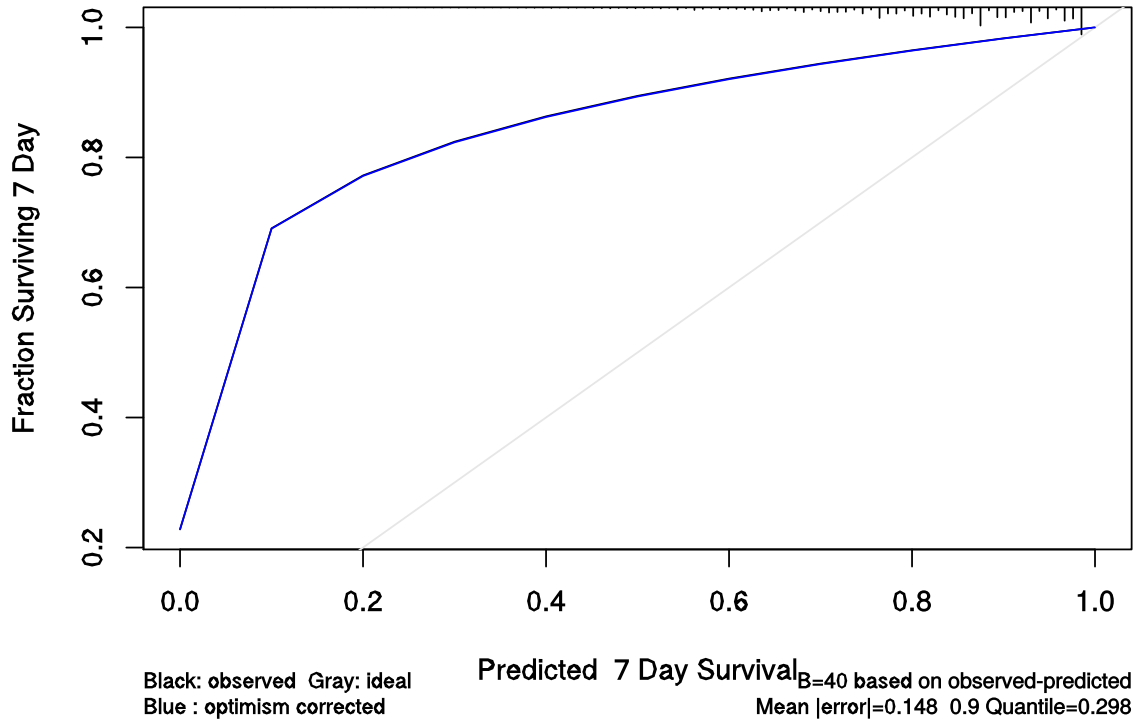


Figure 18 - Prognostic model predictions

Again, for demonstration of methods.

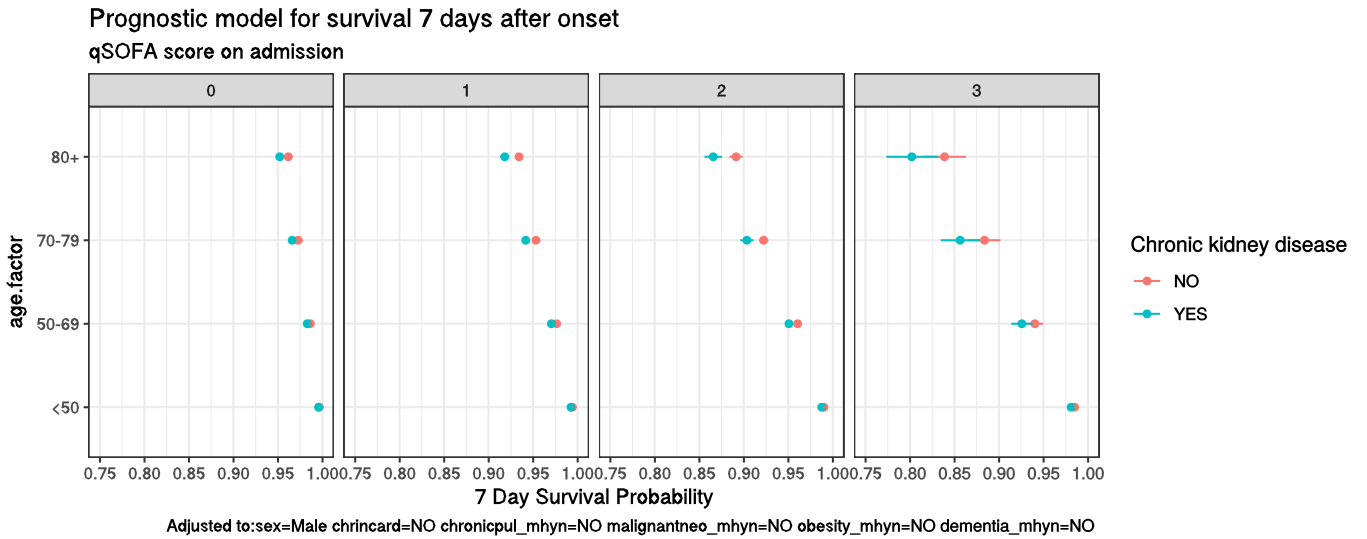


Figure 19 - Death by severity (NEWS) on admission

Number of deaths by NEWS score at admission

Alive Died

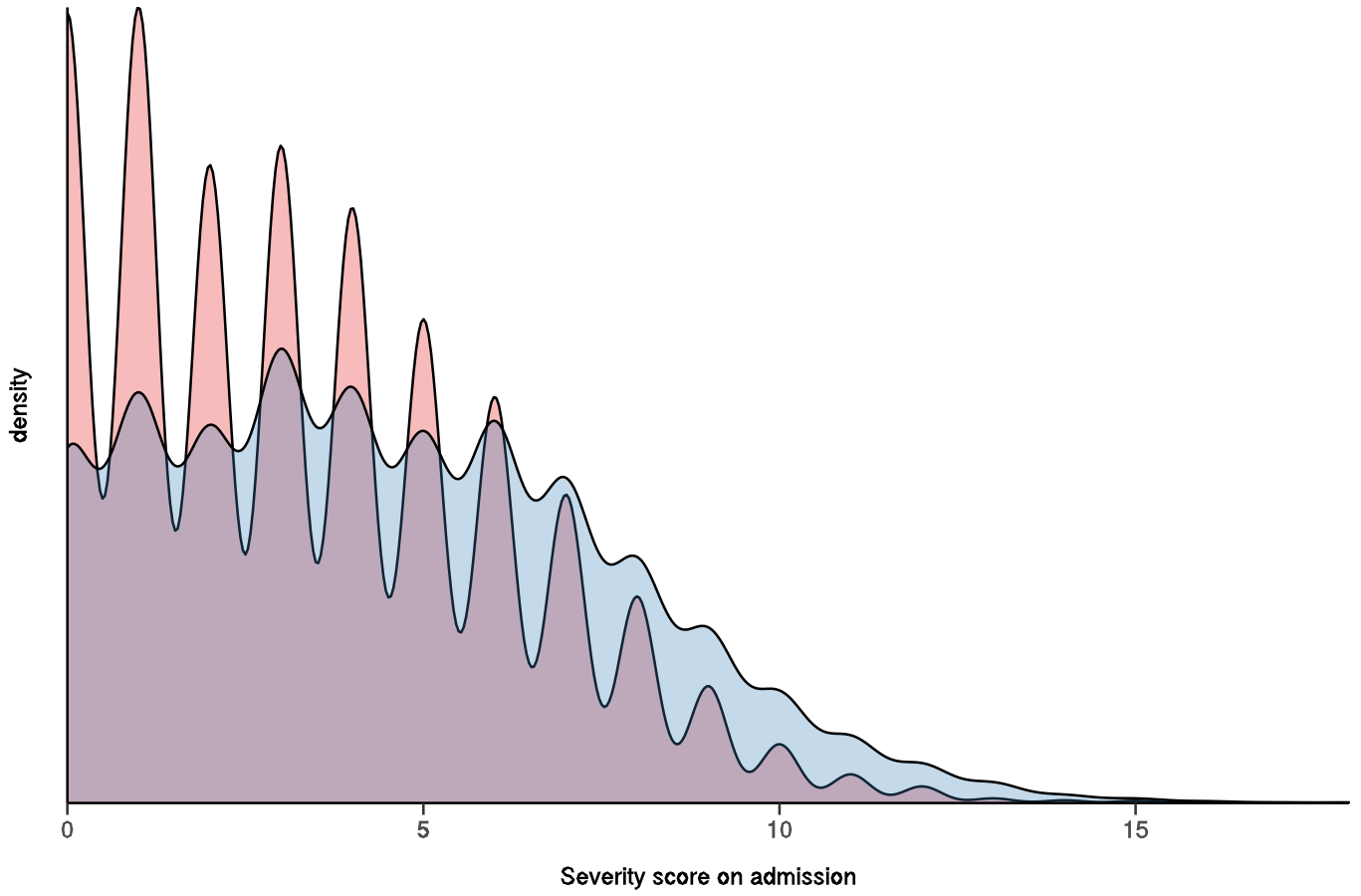


Figure 20 - Death by severity (NEWS) on admission stratified by age

Number of deaths by NEWS score at admission
Stratified by age

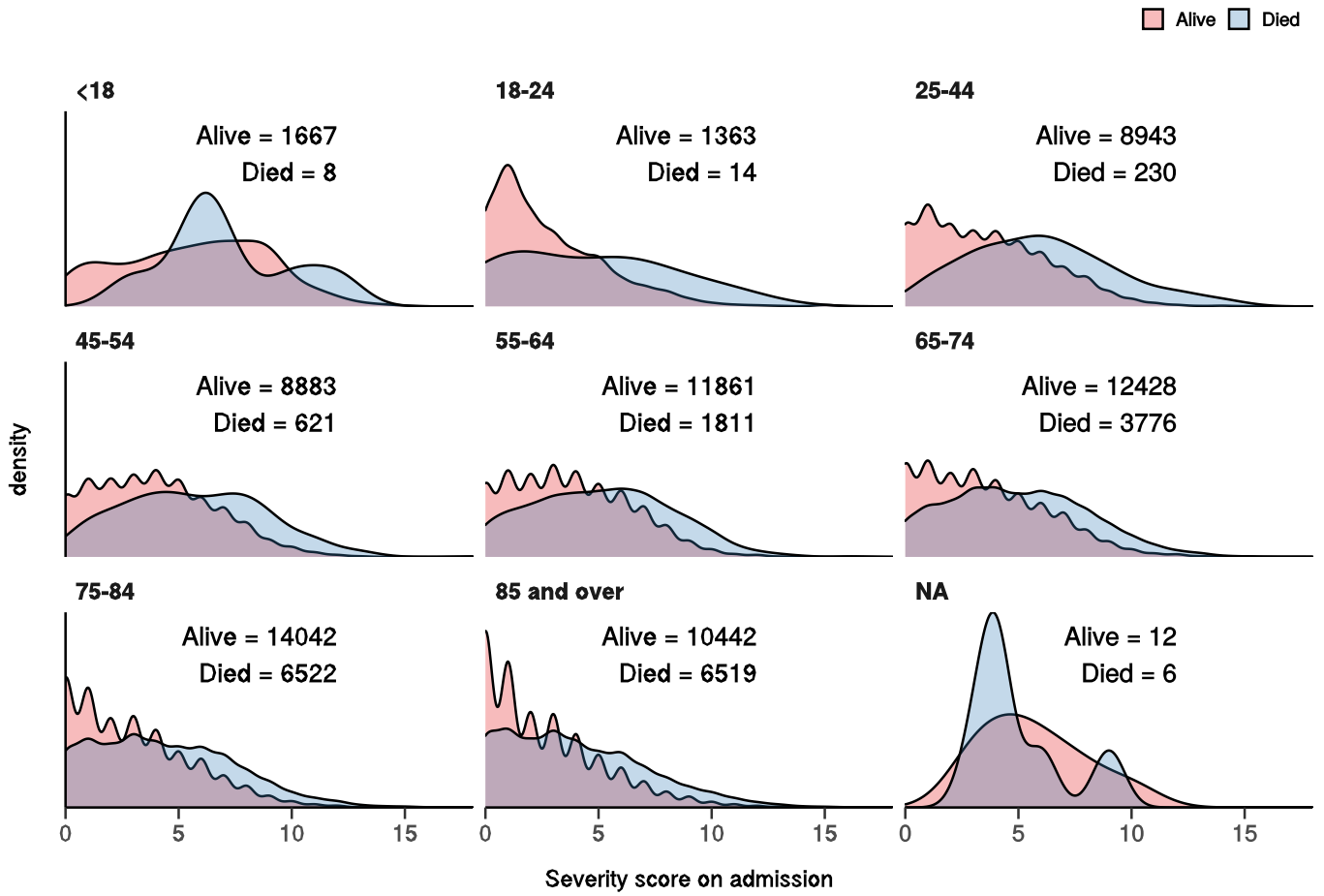
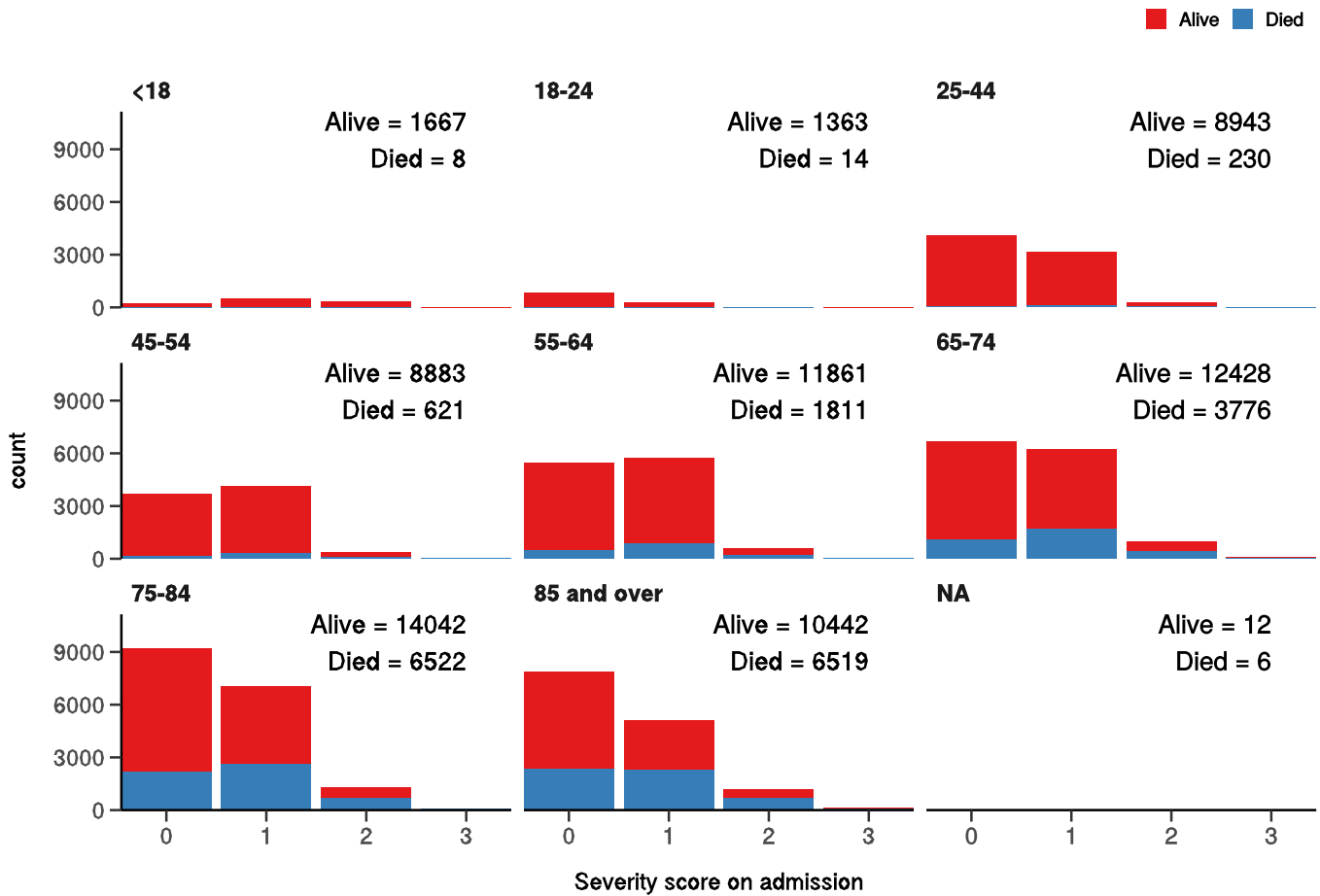


Figure 21 - Death by severity (qSOFA) on admission stratified by age

Number of deaths by qSOFA score at admission

Stratified by age



Healthcare workers

Employed as a healthcare worker?		NO	YES	p
Total N (%)		75057 (97.4)	1984 (2.6)	
NEWS score on admission	Median (IQR)	3.0 (4.0)	4.0 (4.0)	<0.001
Death	No	51777 (75.4)	1725 (93.1)	<0.001
	Yes	16931 (24.6)	127 (6.9)	