

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

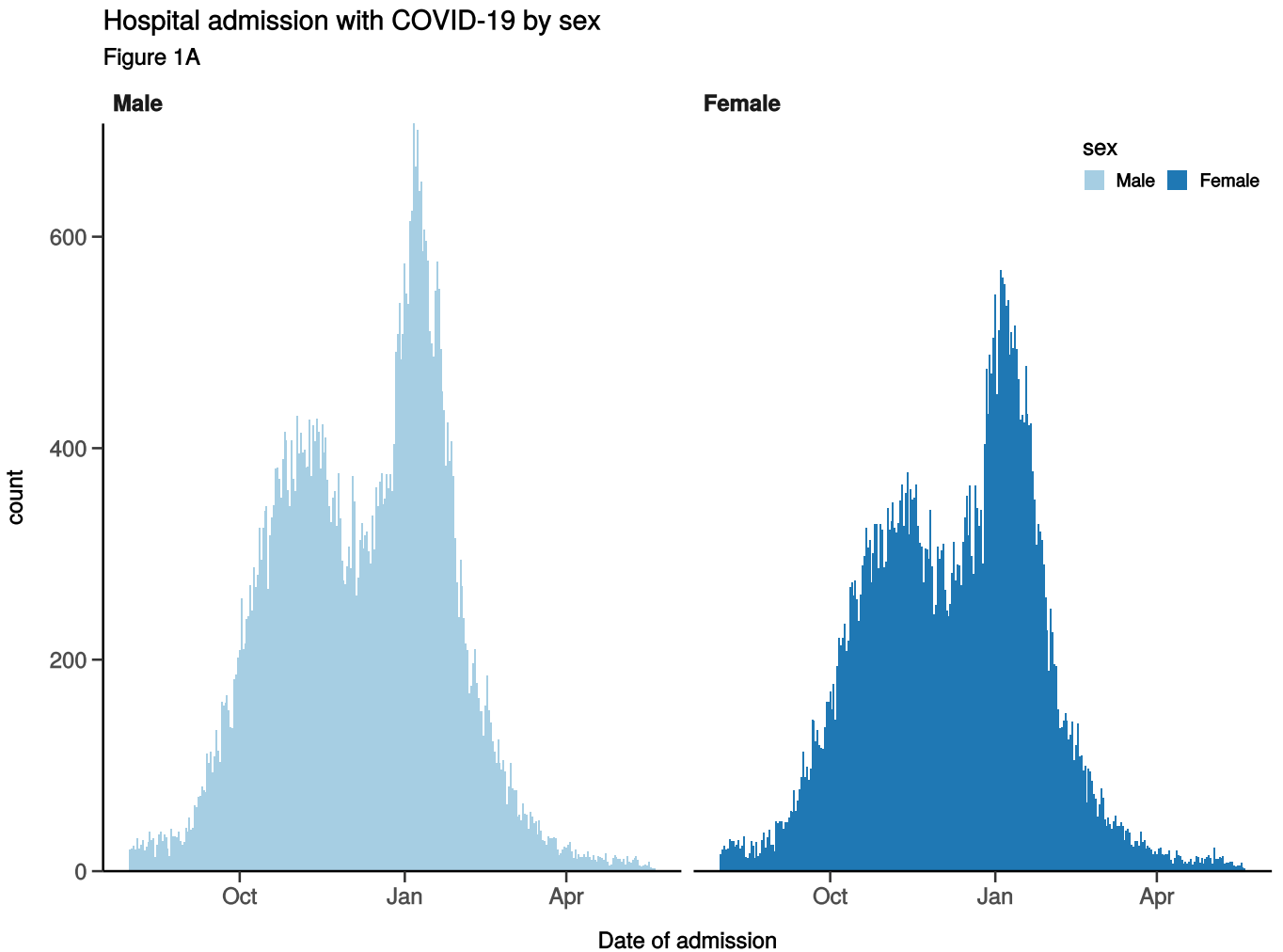
Executive summary

Includes patients admitted after 01 August 2020

There are 108523 patients included in CO-CIN. Of these, 22111 patient(s) have died and 18769 required ICU. 65682 have been discharged home.

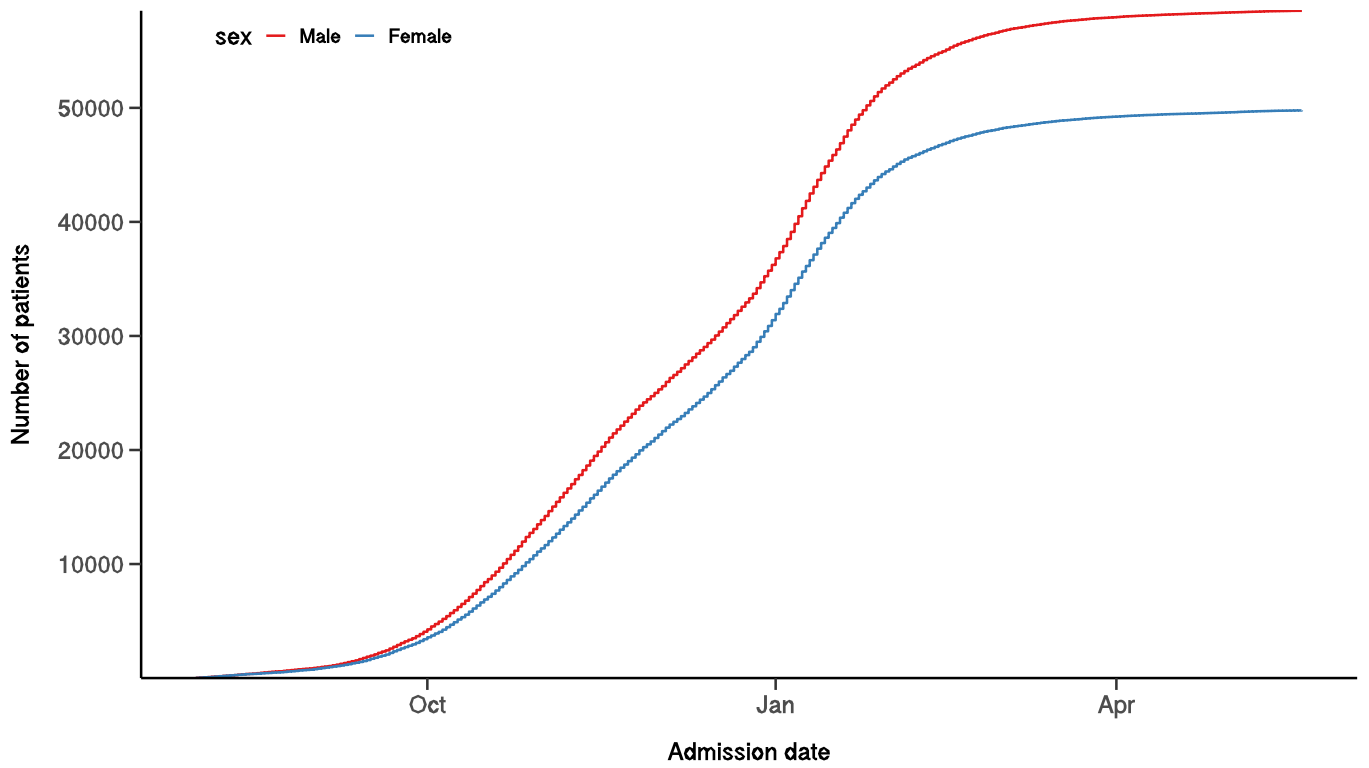
Admission

Figure 1



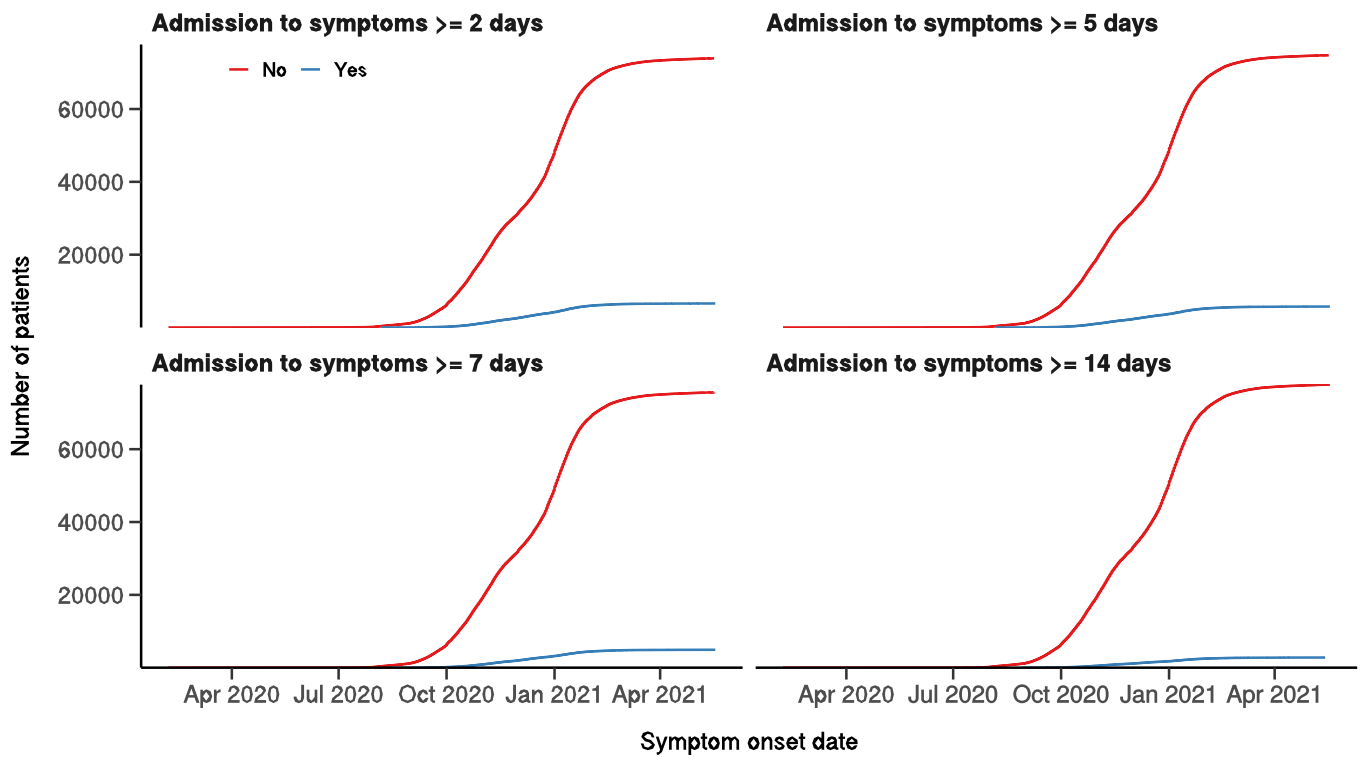
Hospital admission with COVID-19 by sex

Figure 1B



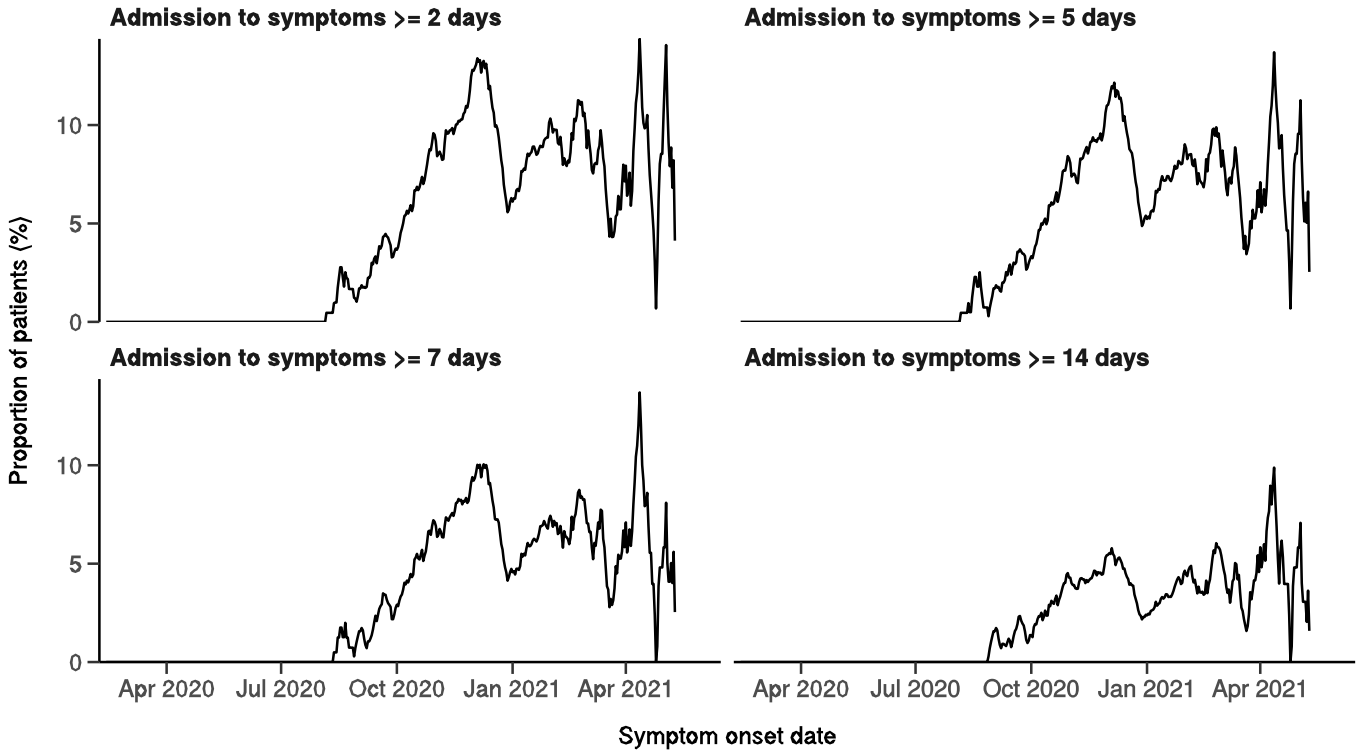
Number with symptom onset occurring after admission to hospital

Figure 1C



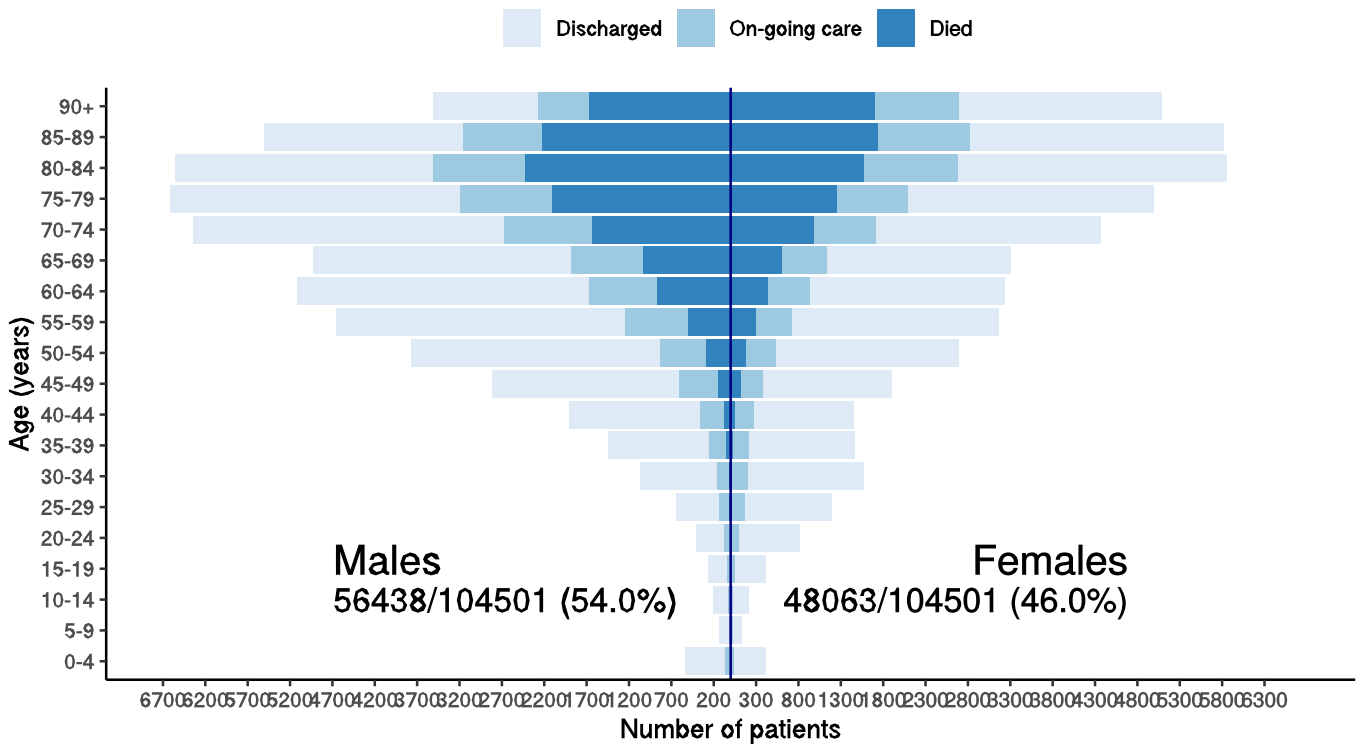
Proportion with symptom onset occurring after hospital admission

Figure 1D - 7-day rolling percentage. n = 80506



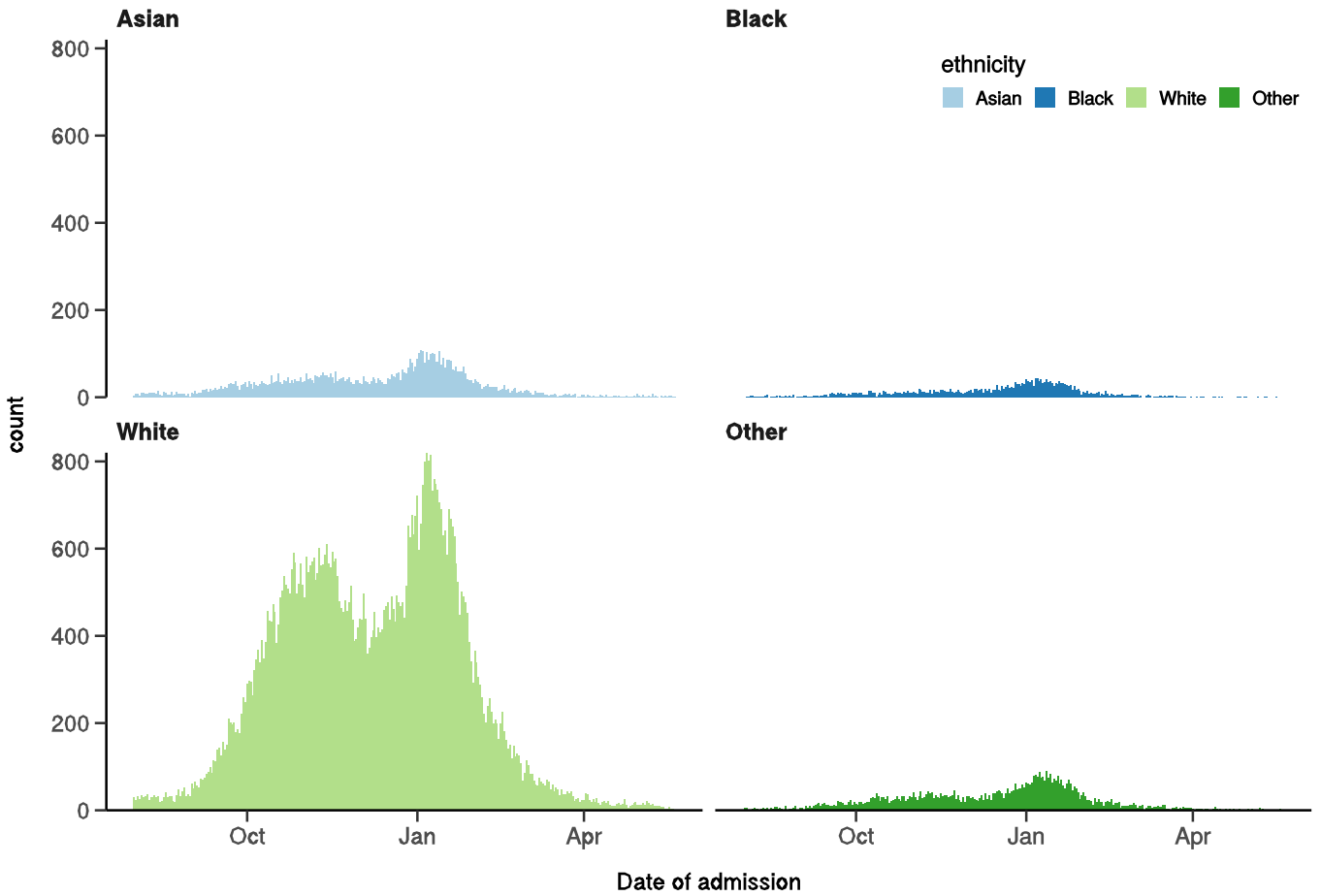
Patients with outcome stratified by age, and sex

Figure 1E



Hospital admission with COVID-19 by ethnicity

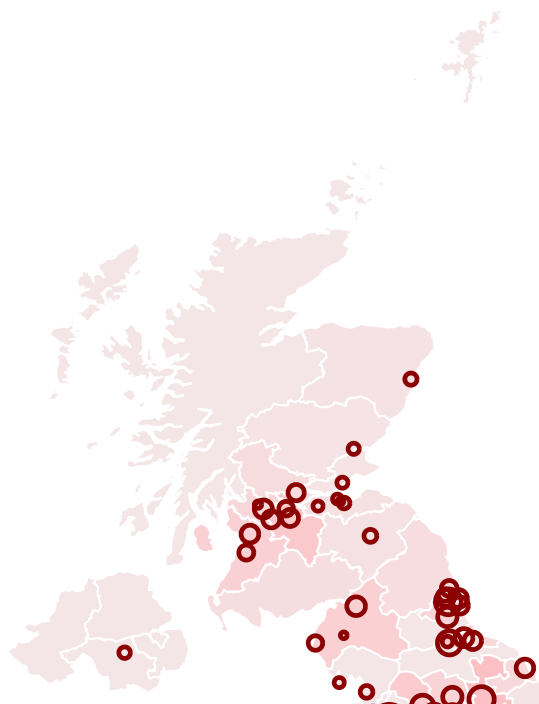
Figure 1F



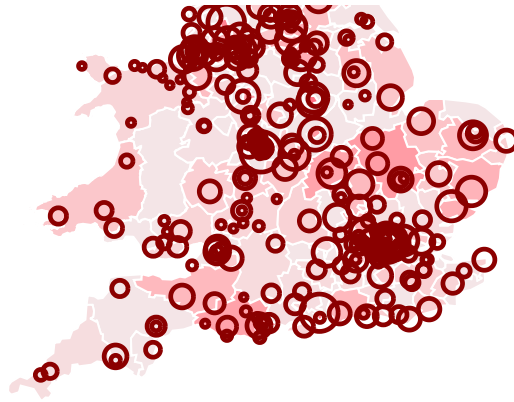
Location by CCG / Healthboard

Figure 2

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



n = 107820



Symptoms and comorbidity

Figure 3A

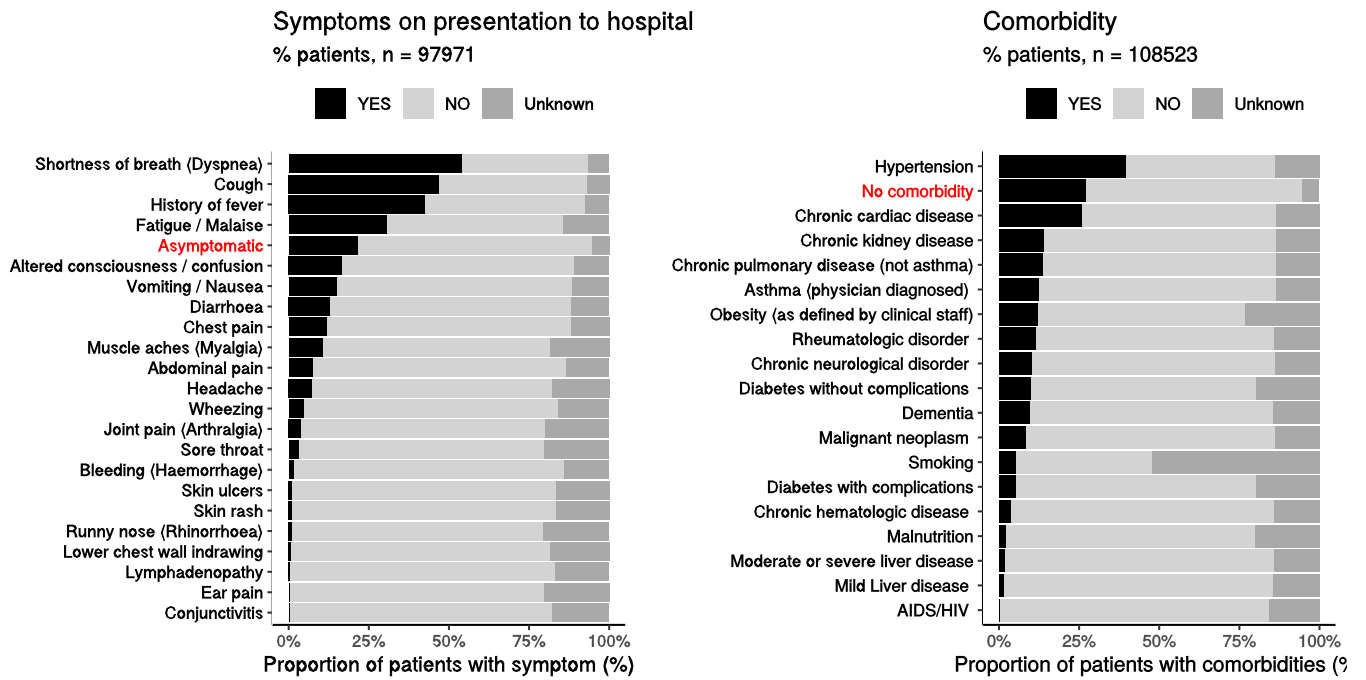


Figure 3B - Symptoms by Age

Symptoms on presentation to hospital
Stratified by age

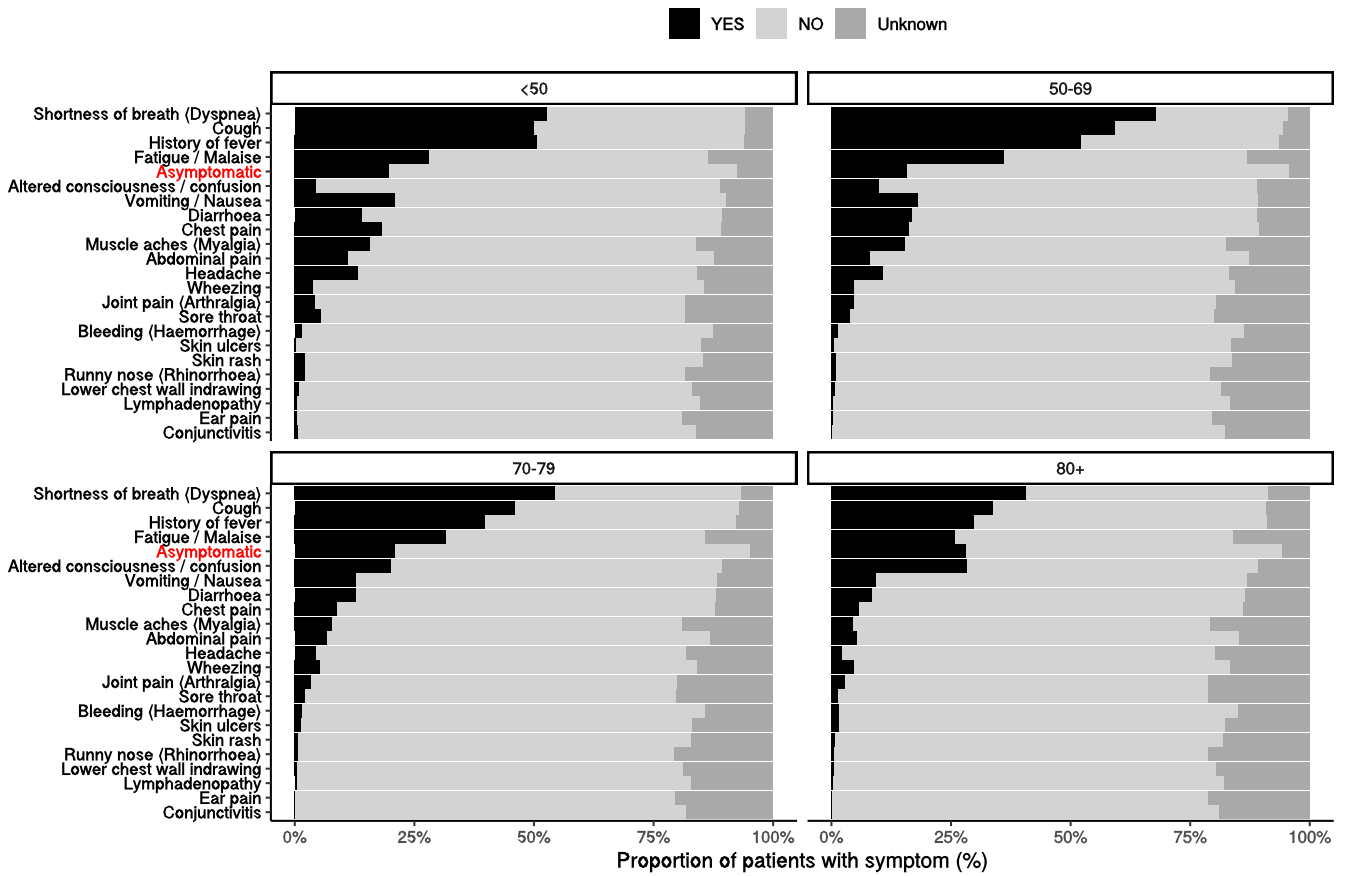
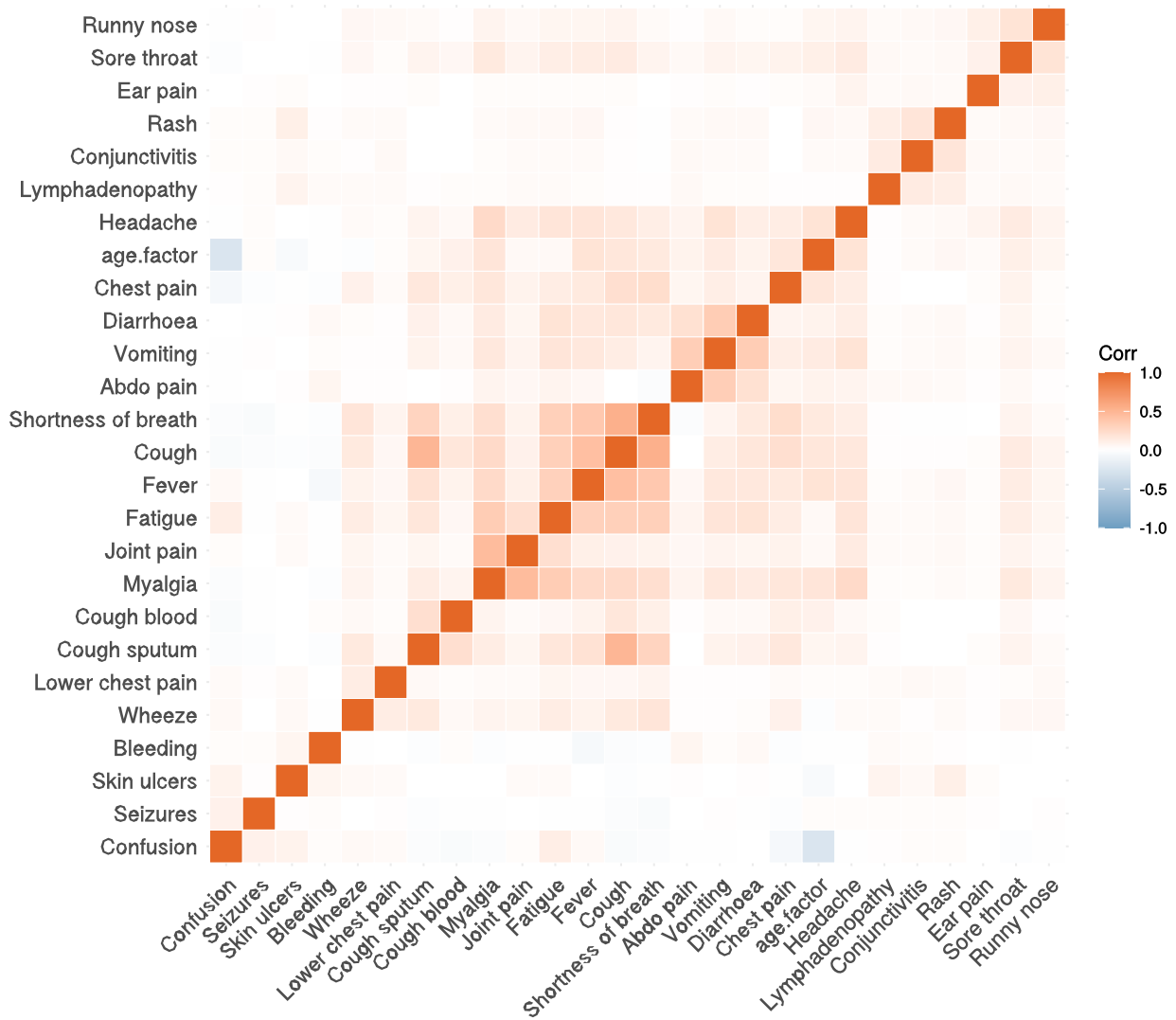


Figure 3C

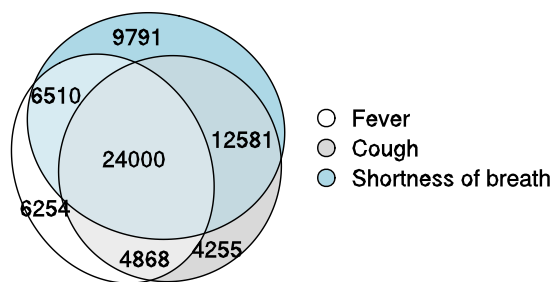
Correlation of symptoms in all pages. Note clusters, top right to bottom left, flu-like, coryzal, abdominal, respiratory, neurocutaneous.



Symptoms (diagnostic criteria)

Figure 4A

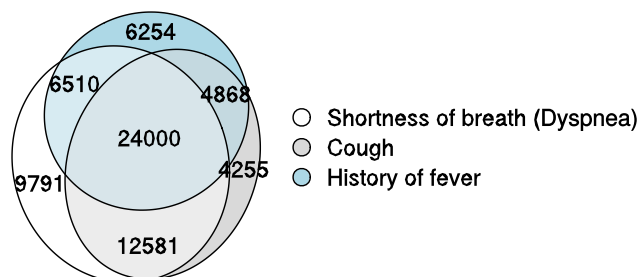
n = 97971



Symptoms (most common)

Figure 4B

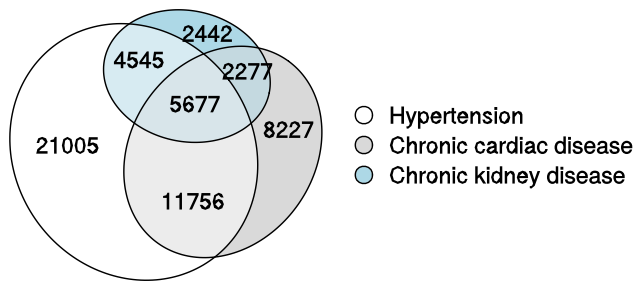
n = 97971



Comorbidity (most common)

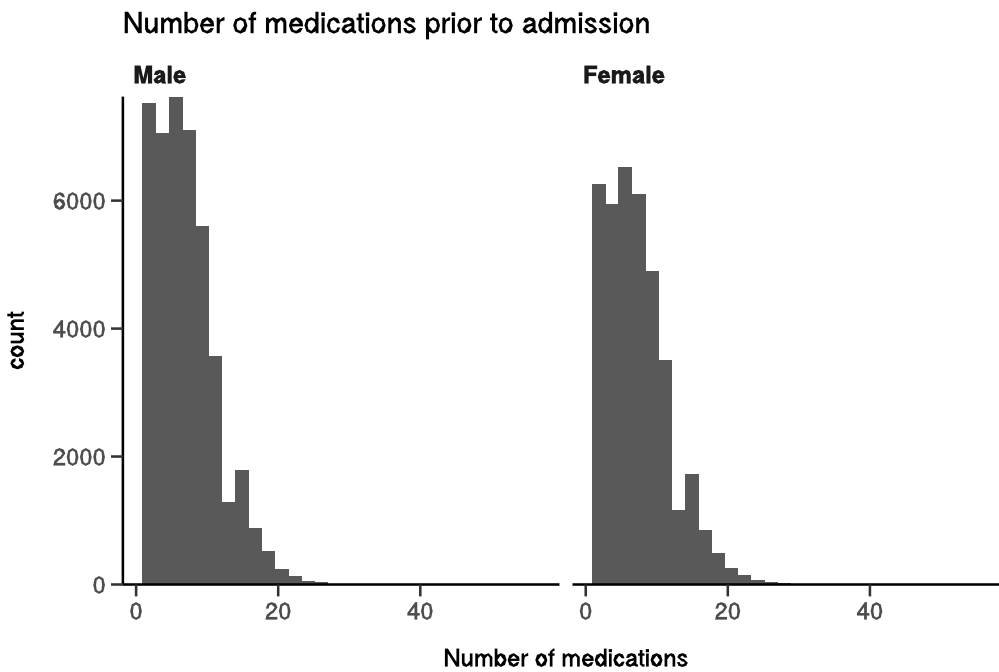
Figure 4C

n = 108523



Medication prior to illness

Figure 5

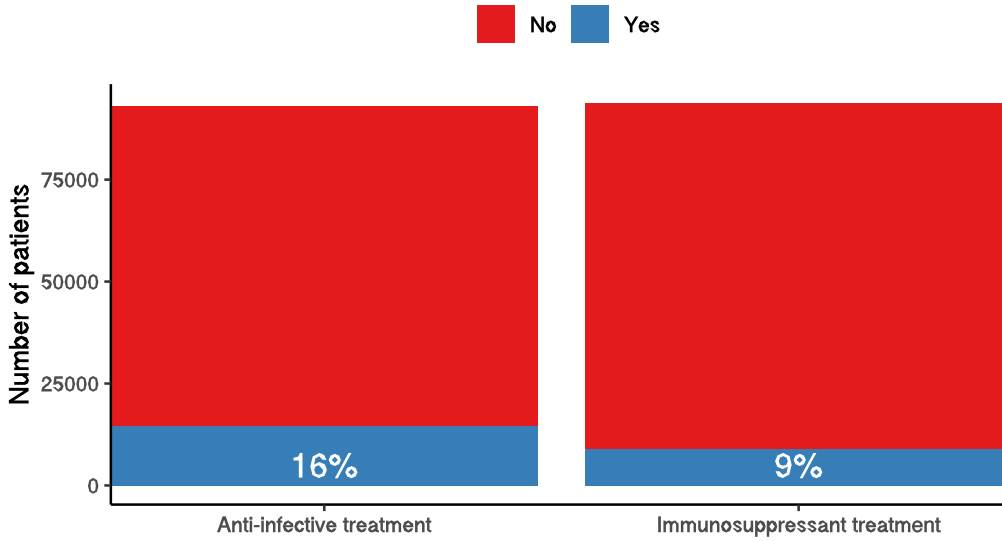


Preadmission treatment

Figure 6

Pre-admission treatment

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



Patient flow

Figure 7A - All patients

N = 105467

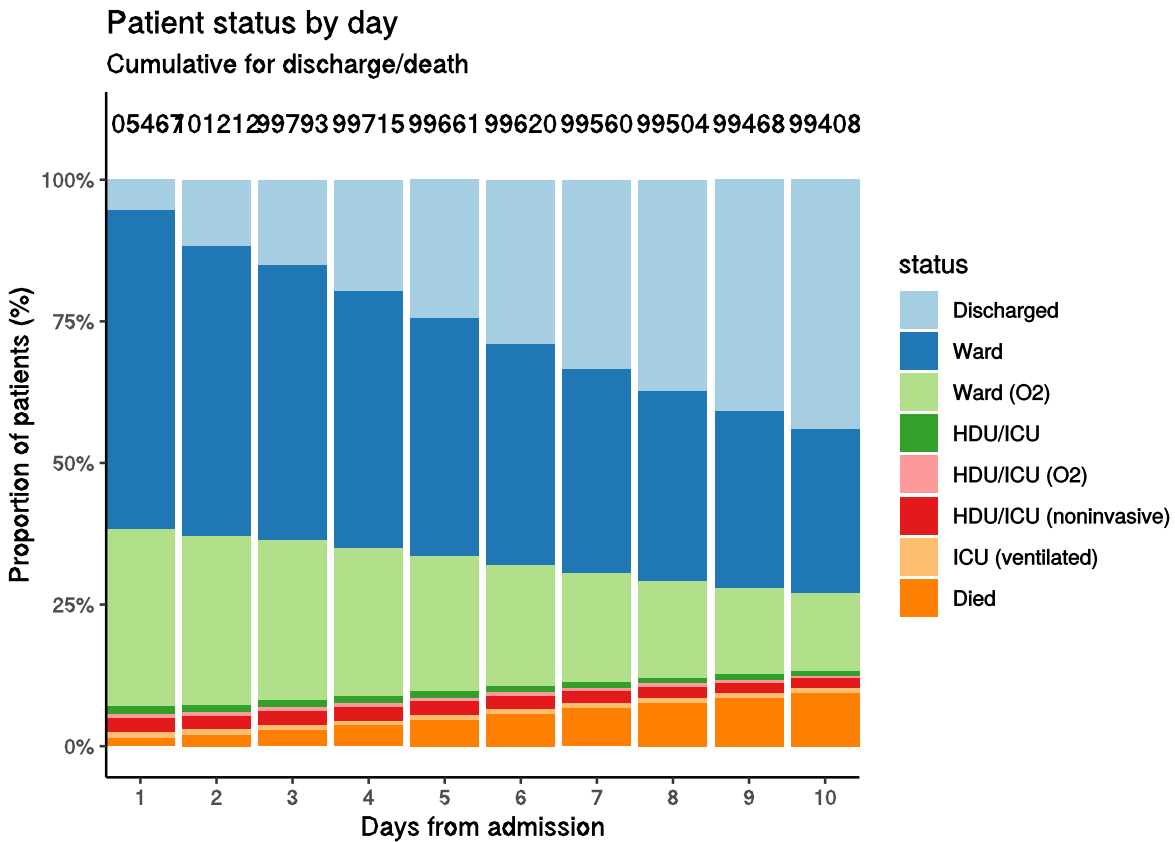
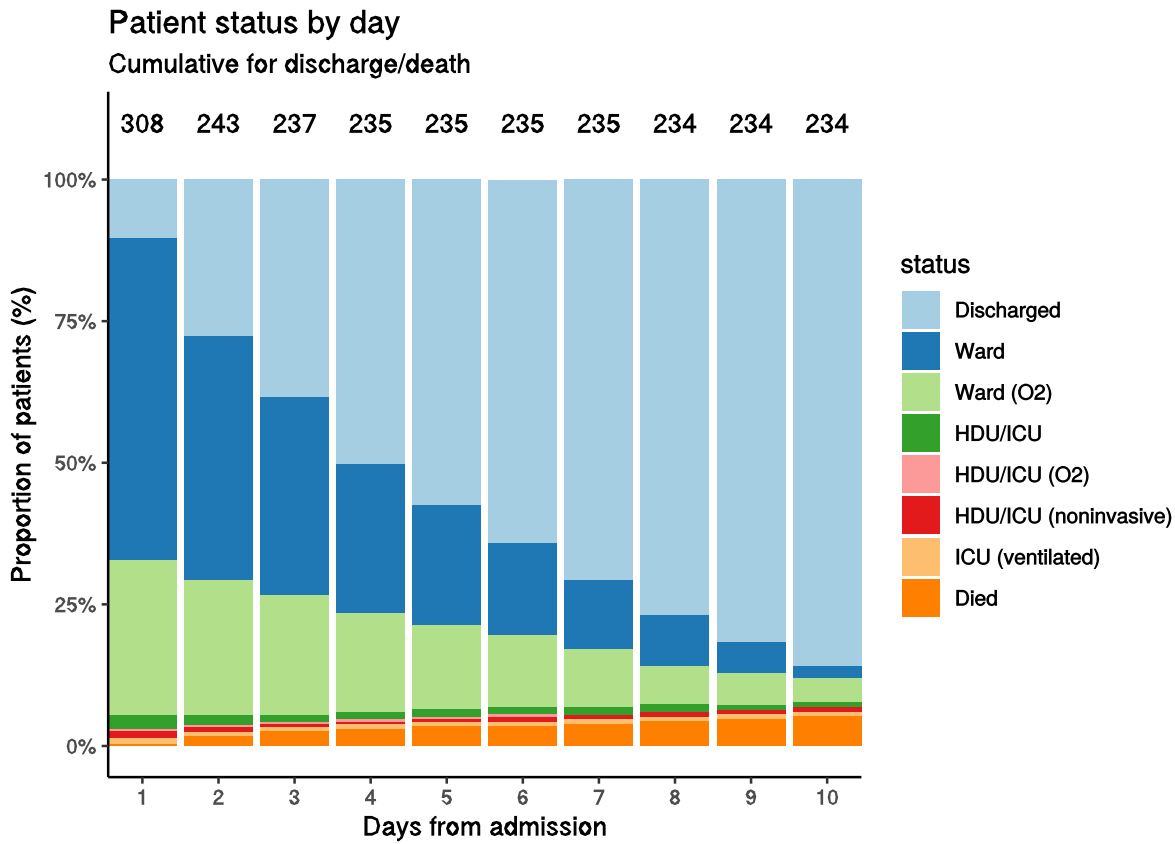


Figure 7B - Patients admitted ≥ 14 days and ≤ 28 days ago

N = 308



Oxygen requirement

Figure 8A - All patients

N = 99908

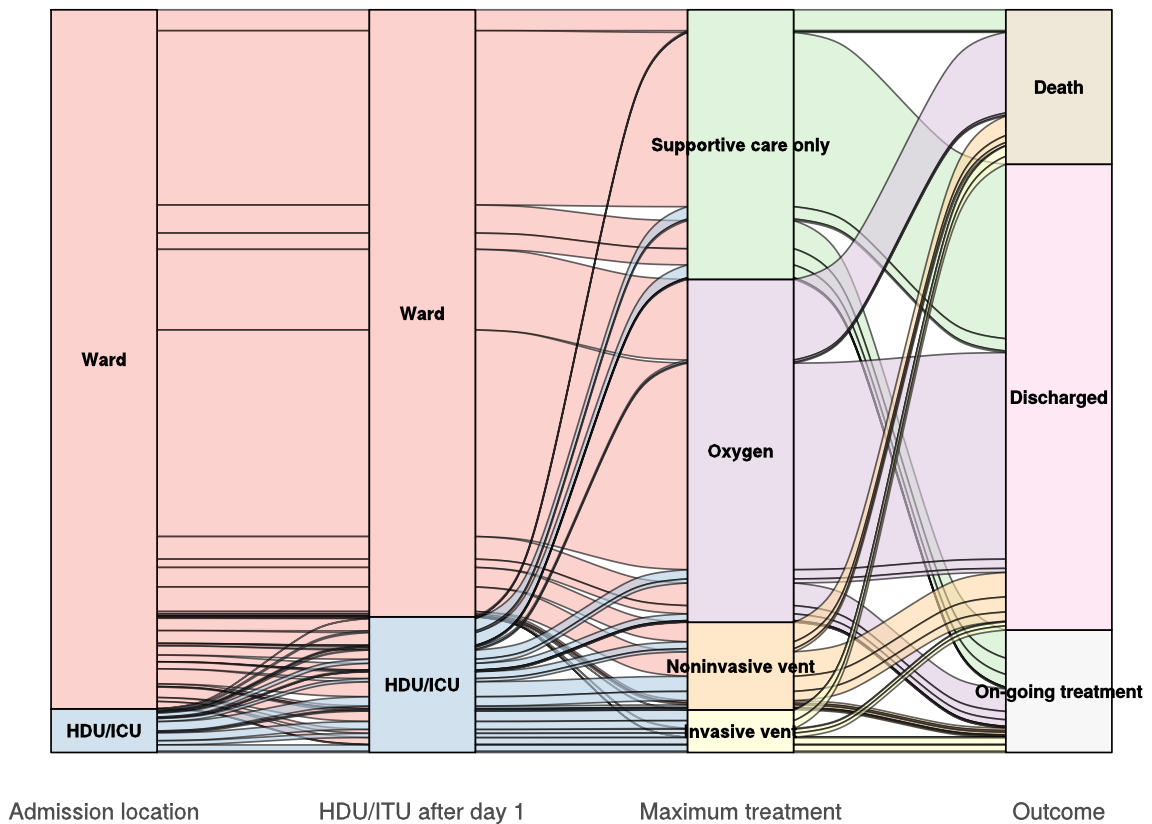


Figure 8B - Patients admitted ≥ 14 days and ≤ 28 days ago

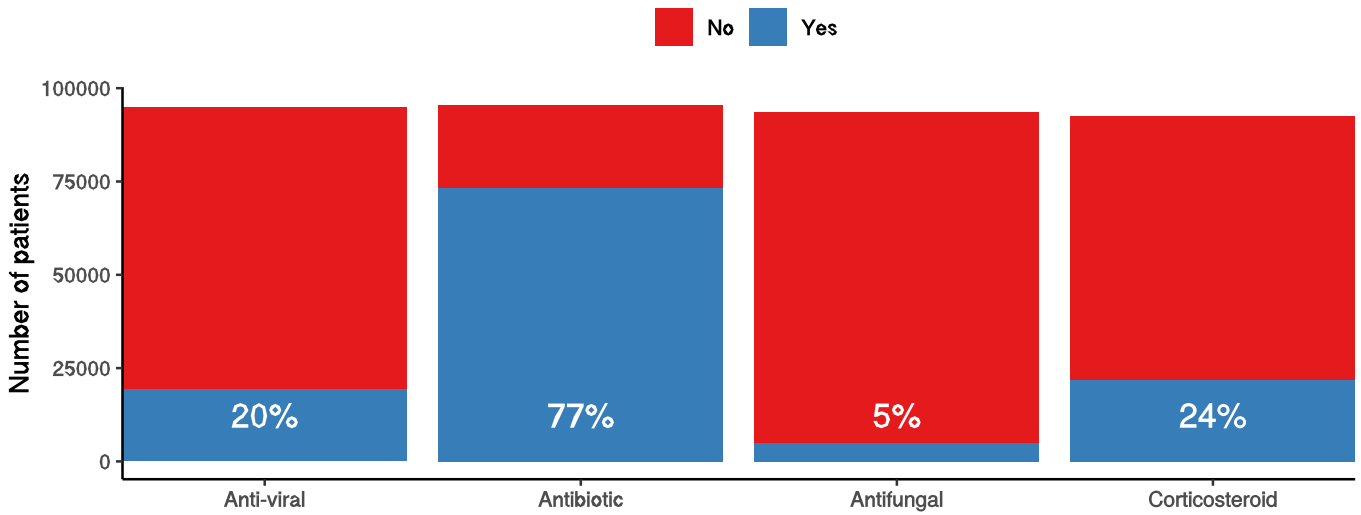
N = 292

In-hospital medical treatment

Figure 9

In-hospital treatment

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

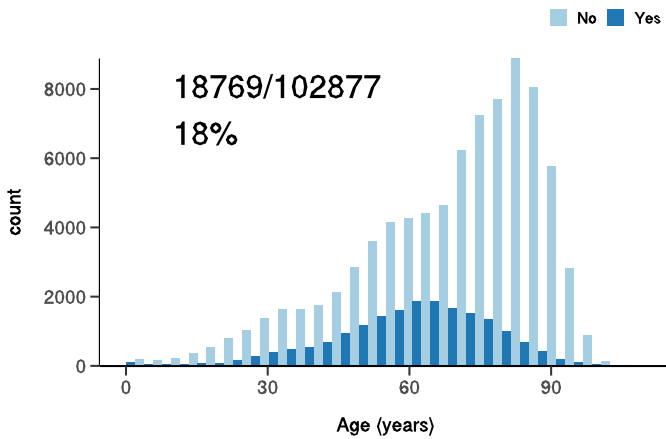


Treatment

Figure 10

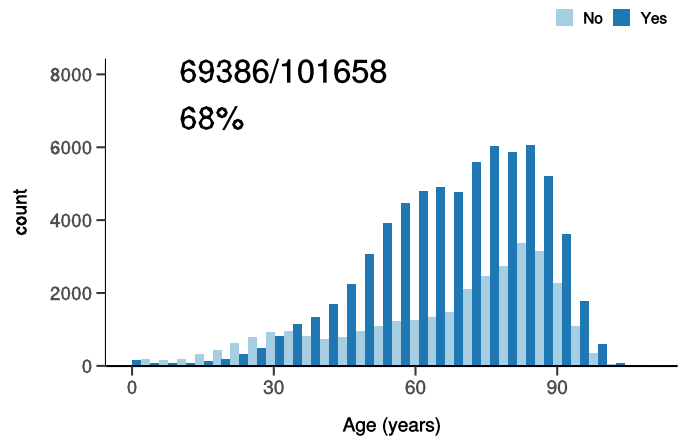
ICU/HDU admission

Figure 10A



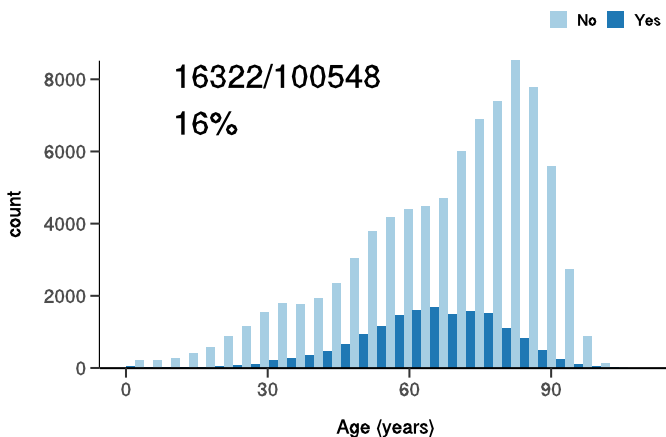
High flow oxygen

Figure 10B



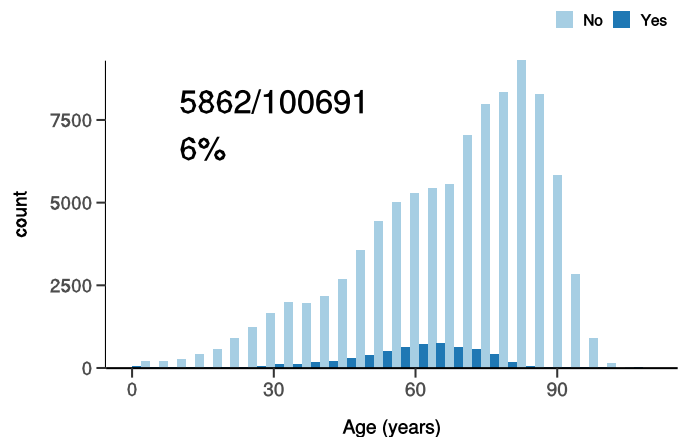
Noninvasive ventilation

Figure 10C



Invasive ventilation

Figure 10D

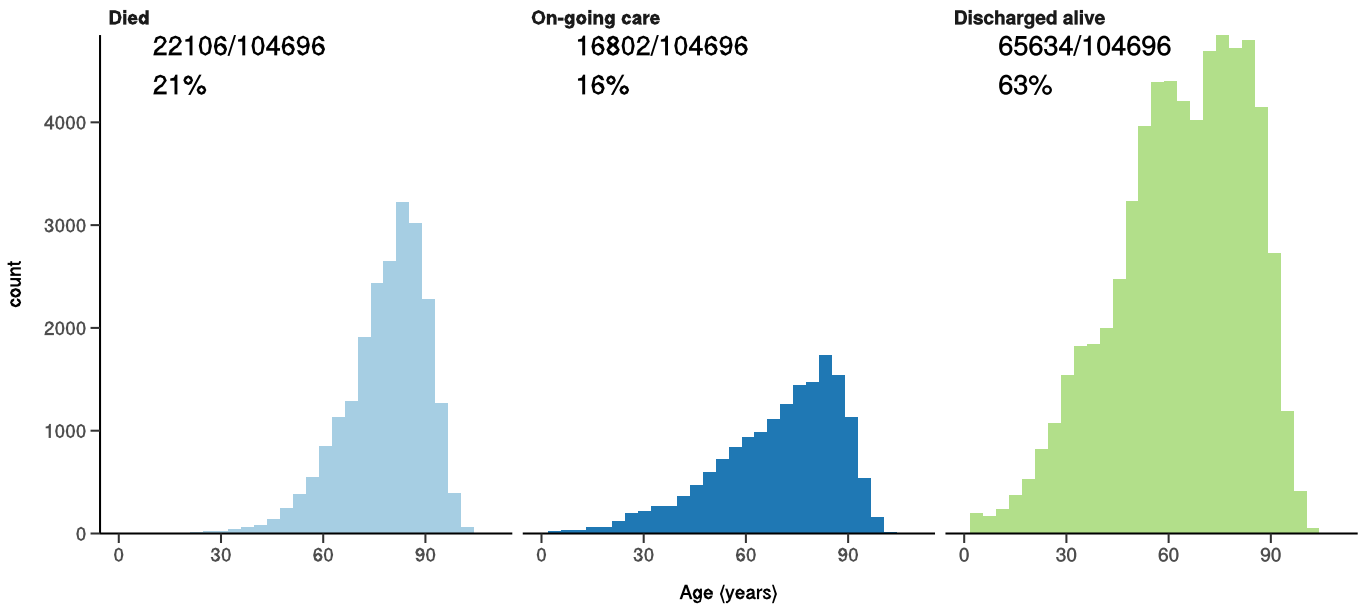


Status in patients admitted ≥ 14 days from today

Figure 11

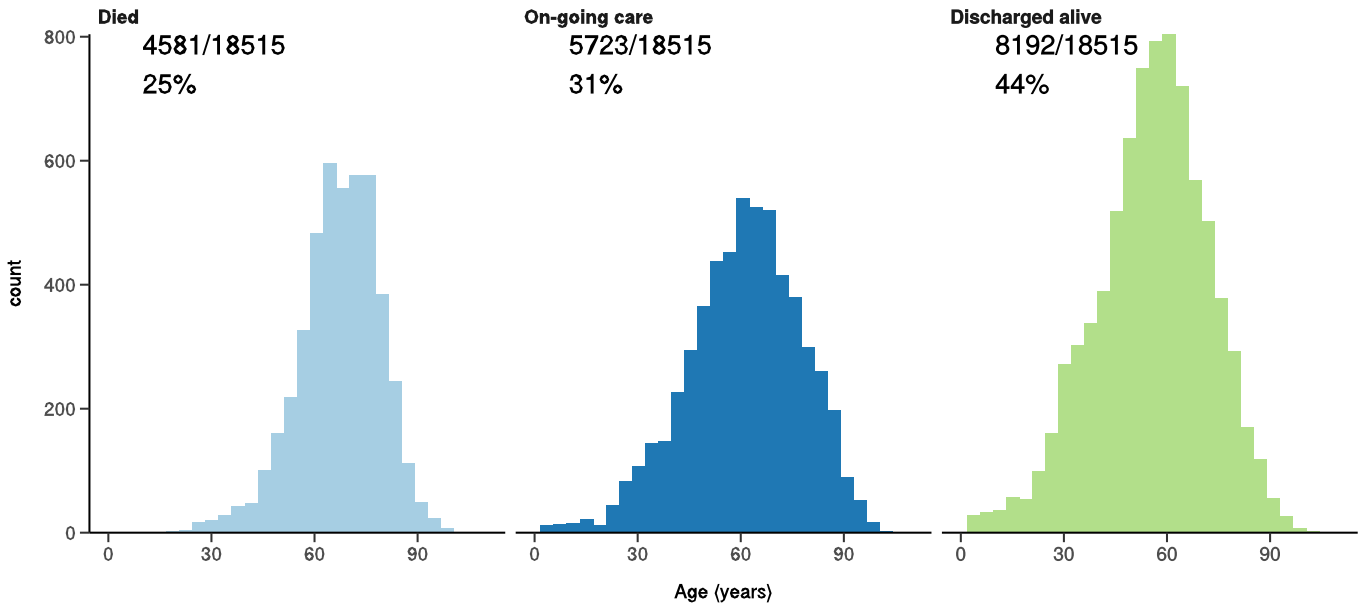
All: status in patients admitted ≥ 14 days ago

Figure 11A



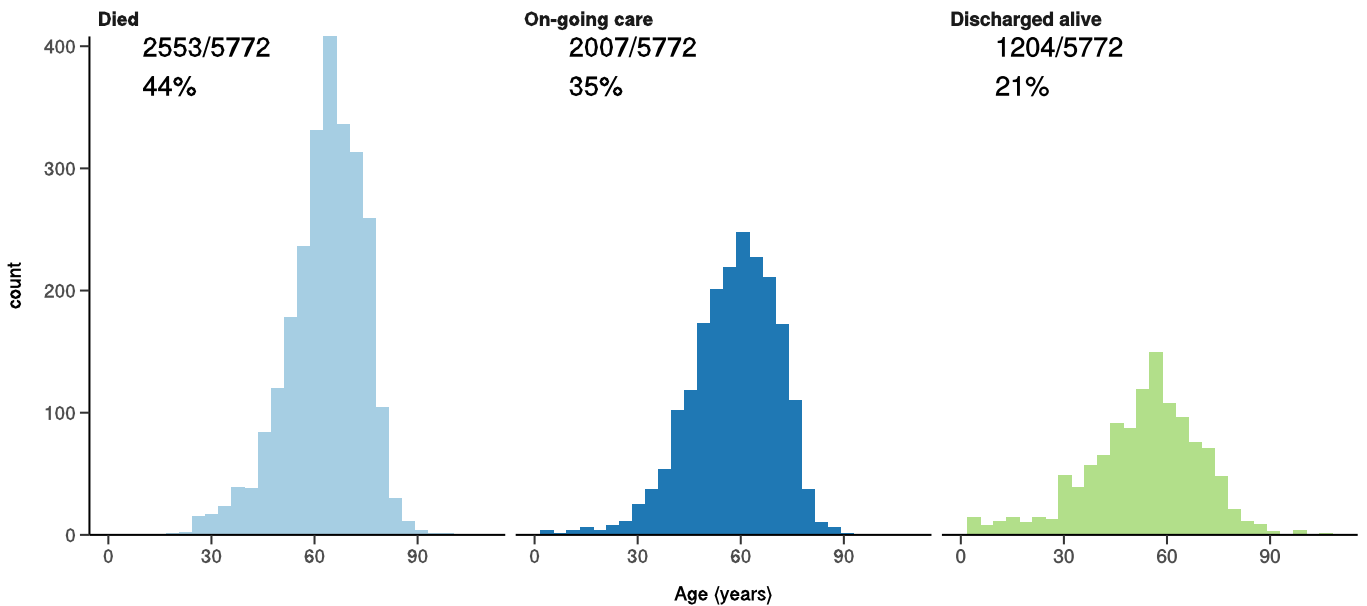
ICU/HDU admissions: status in patients admitted ≥ 14 days ago

Figure 11B



Invasive ventilation: status in patients admitted ≥ 14 days ago

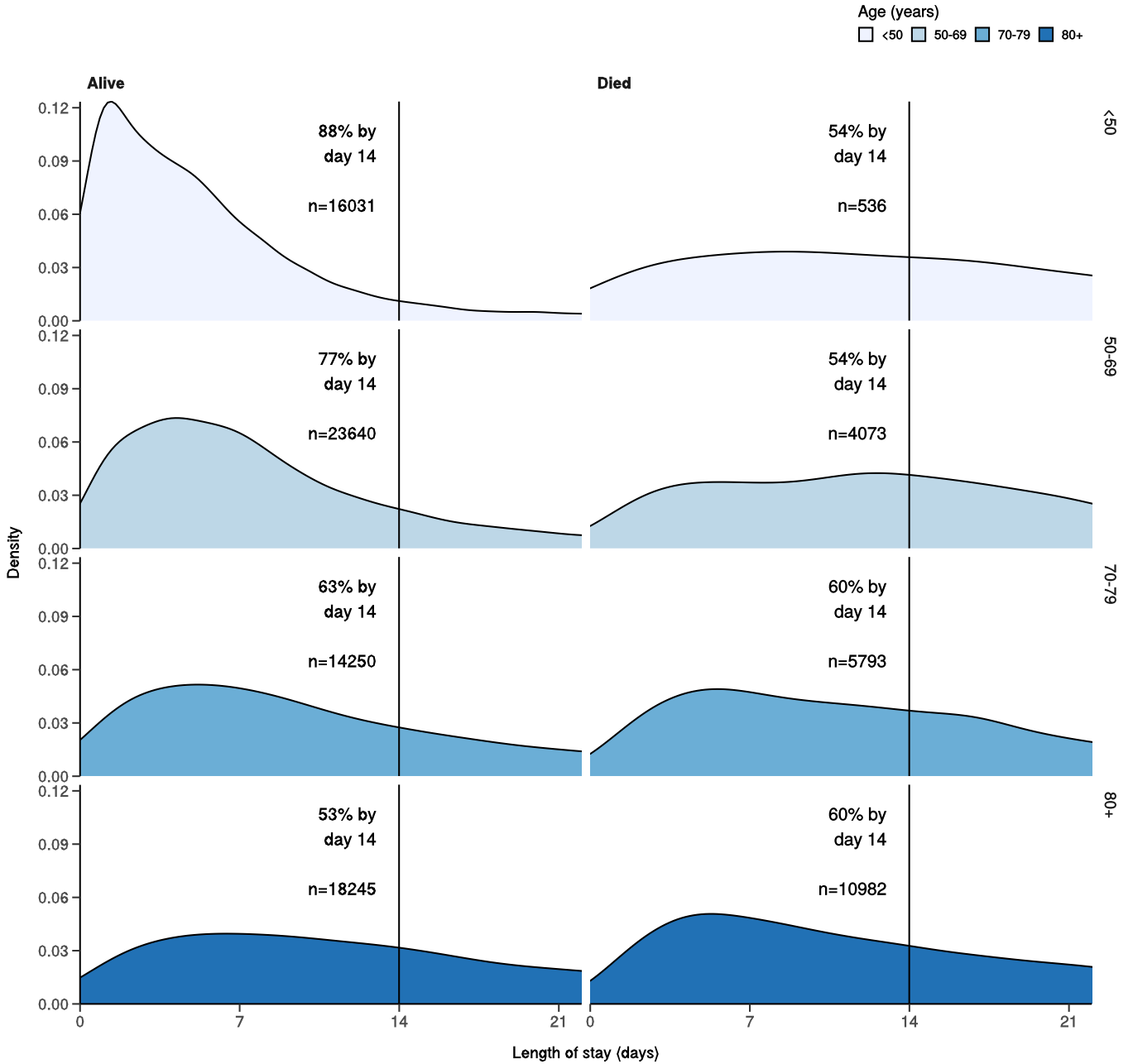
Figure 11c



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	17749 (97.0)	558 (3.0)	•	•
	50-69	25483 (85.9)	4199 (14.1)	5.24 (4.79-5.74, p<0.001)	4.38 (3.96-4.85, p<0.001)

Dependent: death		No	Yes	OR (univariable)	OR (multivariable)
	70-79	15463 (72.2)	5963 (27.8)	12.27 (11.23-13.43, p<0.001)	8.97 (8.11-9.94, p<0.001)
	80+	19754 (63.5)	11334 (36.5)	18.25 (16.74-19.94, p<0.001)	13.03 (11.78-14.44, p<0.001)
Sex at Birth	Male	41191 (75.9)	13065 (24.1)	•	•
	Female	37286 (80.6)	8999 (19.4)	0.76 (0.74-0.78, p<0.001)	0.70 (0.68-0.73, p<0.001)
	Not specified	0 (NaN)	0 (NaN)	•	•
Chronic cardiac disease	NO	51917 (82.8)	10801 (17.2)	•	•
	YES	17885 (67.3)	8687 (32.7)	2.33 (2.26-2.41, p<0.001)	1.21 (1.16-1.26, p<0.001)
Chronic pulmonary disease (not asthma)	NO	60755 (80.5)	14724 (19.5)	•	•
	YES	9086 (65.6)	4756 (34.4)	2.16 (2.08-2.25, p<0.001)	1.53 (1.46-1.60, p<0.001)
Chronic neurological disorder	NO	61900 (79.0)	16450 (21.0)	•	•
	YES	7553 (72.6)	2849 (27.4)	1.42 (1.35-1.49, p<0.001)	1.03 (0.97-1.08, p=0.371)
Chronic hematologic disease	NO	66802 (78.5)	18288 (21.5)	•	•
	YES	2600 (72.3)	996 (27.7)	1.40 (1.30-1.51, p<0.001)	0.92 (0.84-1.01, p=0.070)
Chronic kidney disease	NO	60494 (80.8)	14377 (19.2)	•	•
	YES	9177 (64.6)	5022 (35.4)	2.30 (2.21-2.39, p<0.001)	1.33 (1.27-1.39, p<0.001)
Dementia	NO	63111 (80.3)	15439 (19.7)	•	•
	YES	6138 (62.6)	3673 (37.4)	2.45 (2.34-2.56, p<0.001)	1.36 (1.29-1.43, p<0.001)
Obesity (as defined by clinical staff)	NO	52508 (78.2)	14605 (21.8)	•	•
	YES	10098 (81.6)	2281 (18.4)	0.81 (0.77-0.85, p<0.001)	1.18 (1.11-1.24, p<0.001)

Dependent: death		No	Yes	OR (univariable)	OR (multivariable)
Malignant neoplasm	NO	64024 (79.8)	16171 (20.2)	•	•
	YES	5420 (63.2)	3157 (36.8)	2.31 (2.20-2.42, p<0.001)	1.65 (1.56-1.74, p<0.001)

Number in dataframe = 108179, Number in model = 76101, Missing = 32078, AIC = 68564.3, C-statistic = 0.739, H&L = Chi-sq(8) 137.92 (p<0.001)

Figure 13 - Adjusted odds ratio plot

Death

Age on admission (years)	<50	-
	50-69	4.38 (3.96-4.85, p<0.001)
	70-79	8.97 (8.11-9.94, p<0.001)
	80+	13.03 (11.78-14.44, p<0.001)
Sex at Birth	Male	-
	Female	0.70 (0.68-0.73, p<0.001)
	Not specified	-
Chronic cardiac disease	YES	1.21 (1.16-1.26, p<0.001)
Chronic pulmonary disease (not asthma)	YES	1.53 (1.46-1.60, p<0.001)
Chronic neurological disorder	YES	1.03 (0.97-1.08, p=0.371)
Chronic hematologic disease	YES	0.92 (0.84-1.01, p=0.070)
Chronic kidney disease	YES	1.33 (1.27-1.39, p<0.001)
Dementia	YES	1.36 (1.29-1.43, p<0.001)
Obesity (as defined by clinical staff)	YES	1.18 (1.11-1.24, p<0.001)
Malignant neoplasm	YES	1.65 (1.56-1.74, p<0.001)

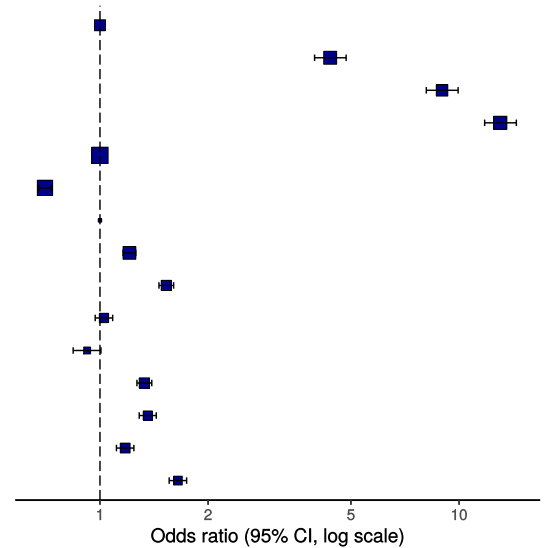
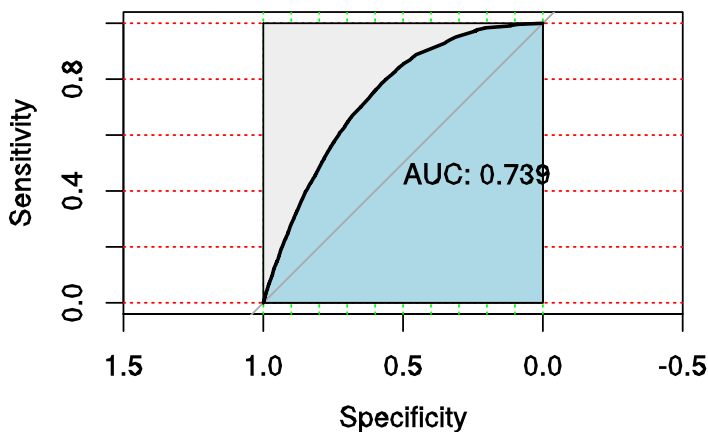


Figure 14 - ROC

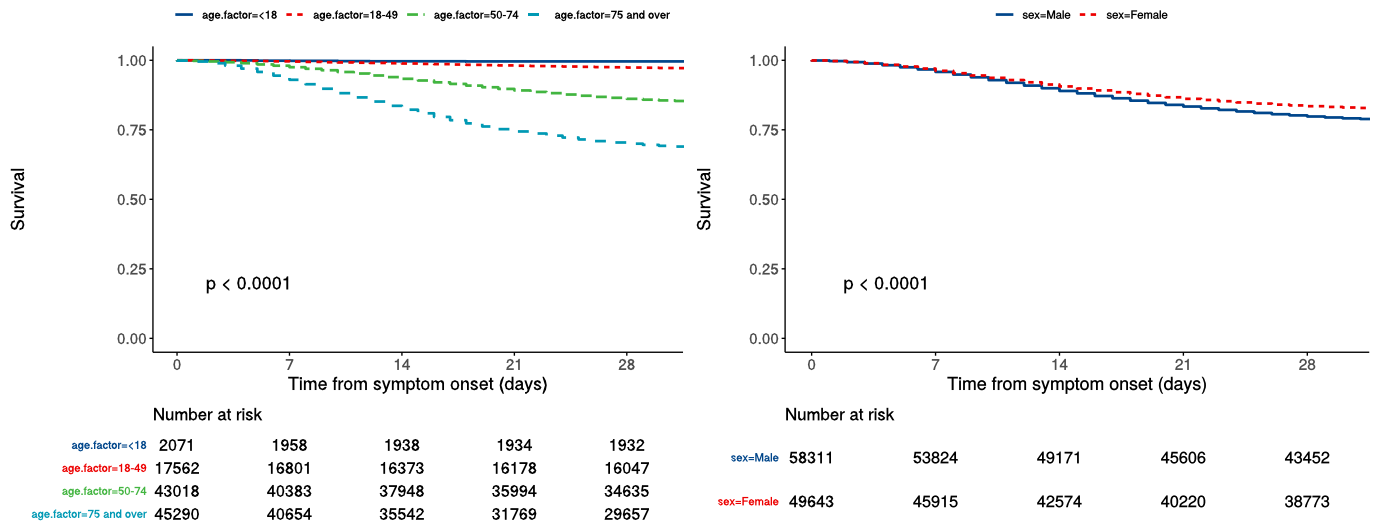


Survival models

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	19633 (18.2)	•	•
	50-69	31928 (29.6)	4.89 (4.47-5.34, p<0.001)	4.17 (3.75-4.63, p<0.001)
	70-79	23105 (21.4)	10.53 (9.65-11.48, p<0.001)	8.77 (7.91-9.73, p<0.001)
	80+	33294 (30.8)	14.82 (13.61-16.14, p<0.001)	12.16 (10.96-13.50, p<0.001)
Sex at Birth	Male	58311 (54.0)	•	•
	Female	49643 (46.0)	0.79 (0.77-0.81, p<0.001)	0.77 (0.74-0.80, p<0.001)
qSOFA score on admission	0	44276 (49.8)	•	•
	1	38151 (42.9)	1.56 (1.51-1.60, p<0.001)	1.75 (1.69-1.82, p<0.001)
	2	6051 (6.8)	3.02 (2.89-3.17, p<0.001)	2.96 (2.81-3.13, p<0.001)
	3	436 (0.5)	4.50 (3.93-5.14, p<0.001)	4.18 (3.60-4.85, p<0.001)
Symptomatic at presentation	No symptoms	15813 (16.1)	•	•
	Symptoms	82239 (83.9)	1.48 (1.42-1.54, p<0.001)	•

Dependent: Surv(time, status)		all	HR (univariable)	HR (multivariable)
Chronic cardiac disease	NO	65770 (70.3)	•	•
	YES	27835 (29.7)	2.12 (2.06-2.18, p<0.001)	1.21 (1.17-1.25, p<0.001)
Chronic kidney disease	NO	78501 (84.1)	•	•
	YES	14882 (15.9)	2.06 (2.00-2.13, p<0.001)	1.24 (1.19-1.29, p<0.001)
Moderate or severe liver disease	NO	90950 (98.1)	•	•
	YES	1760 (1.9)	1.58 (1.45-1.72, p<0.001)	1.65 (1.48-1.83, p<0.001)
Chronic neurological disorder	NO	82199 (88.4)	•	•
	YES	10834 (11.6)	1.37 (1.32-1.42, p<0.001)	•
Malignant neoplasm	NO	84063 (90.4)	•	•
	YES	8970 (9.6)	2.04 (1.96-2.11, p<0.001)	1.47 (1.41-1.54, p<0.001)
Chronic hematologic disease	NO	89205 (96.0)	•	•
	YES	3729 (4.0)	1.36 (1.27-1.45, p<0.001)	•
Obesity (as defined by clinical staff)	NO	70165 (84.4)	•	•
	YES	12933 (15.6)	0.83 (0.79-0.87, p<0.001)	1.10 (1.04-1.15, p<0.001)
Diabetes without complications	NO	76146 (87.9)	•	•
	YES	10505 (12.1)	1.18 (1.13-1.23, p<0.001)	•
Rheumatologic disorder	NO	80414 (86.7)	•	•
	YES	12302 (13.3)	1.24 (1.20-1.29, p<0.001)	•
Dementia	NO	82362 (88.9)	•	•
	YES	10284 (11.1)	2.18 (2.10-2.26, p<0.001)	1.18 (1.13-1.24, p<0.001)

Dependent: Surv(time, status)		all	HR (univariable)	HR (multivariable)
Malnutrition	NO	84414 (97.6)	•	•
	YES	2071 (2.4)	1.75 (1.62-1.89, p<0.001)	•
smoking_mhyn_2levels	NO	46151 (47.3)	•	•
	YES	5626 (5.8)	0.92 (0.86-0.98, p=0.016)	•
	N/K	45851 (47.0)	1.20 (1.17-1.24, p<0.001)	•

Number in dataframe = 108176, Number in model = 72054, Missing = 36122, Number of events = 14596, Concordance = 0.737 (SE = 0.002), R-squared = 0.134(Max possible = 0.989), Likelihood ratio test = 10382.576 (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	4.17 (3.75-4.63, p<0.001)
	70-79	8.77 (7.91-9.73, p<0.001)
	80+	12.16 (10.96-13.50, p<0.001)
Sex at Birth	Female	0.77 (0.74-0.80, p<0.001)
qSOFA score on admission	0	-
	1	1.75 (1.69-1.82, p<0.001)
	2	2.96 (2.81-3.13, p<0.001)
	3	4.18 (3.60-4.85, p<0.001)
Chronic cardiac disease	YES	1.21 (1.17-1.25, p<0.001)
Chronic kidney disease	YES	1.24 (1.19-1.29, p<0.001)
Moderate or severe liver disease	YES	1.65 (1.48-1.83, p<0.001)
Malignant neoplasm	YES	1.47 (1.41-1.54, p<0.001)
Obesity (as defined by clinical staff)	YES	1.10 (1.04-1.15, p<0.001)
Dementia	YES	1.18 (1.13-1.24, p<0.001)

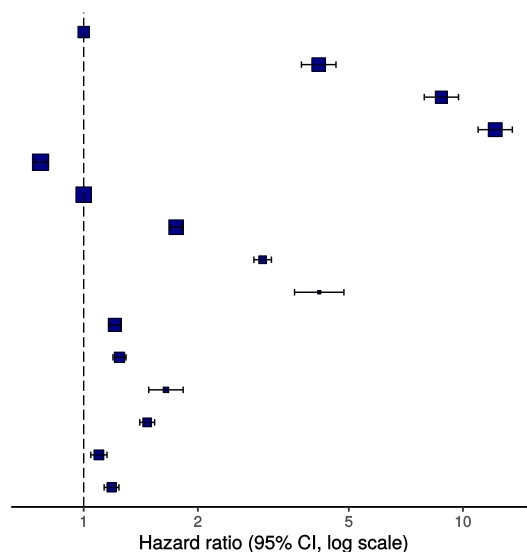
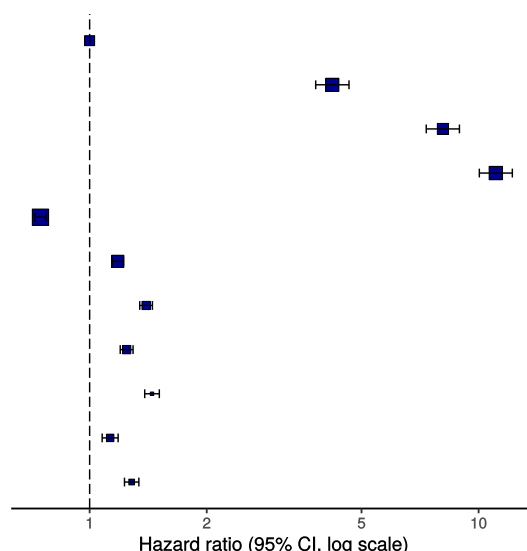


Figure 16b - Multivariable Cox proportional hazards model (age, sex, comorbidities only)

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

Age on admission (years)	<50	-
	50-69	4.21 (3.81-4.64, p<0.001)
	70-79	8.09 (7.34-8.93, p<0.001)
	80+	11.07 (10.04-12.21, p<0.001)
Sex at Birth	Female	0.75 (0.72-0.77, p<0.001)
Chronic cardiac disease	YES	1.18 (1.14-1.22, p<0.001)
Chronic pulmonary disease (not asthma)	YES	1.40 (1.35-1.45, p<0.001)
Chronic kidney disease	YES	1.24 (1.20-1.29, p<0.001)
Malignant neoplasm	YES	1.45 (1.39-1.51, p<0.001)
Obesity (as defined by clinical staff)	YES	1.13 (1.08-1.18, p<0.001)
Dementia	YES	1.28 (1.23-1.34, p<0.001)



ROC = 0.7380117

Figure 17 - Predictions calibration plot

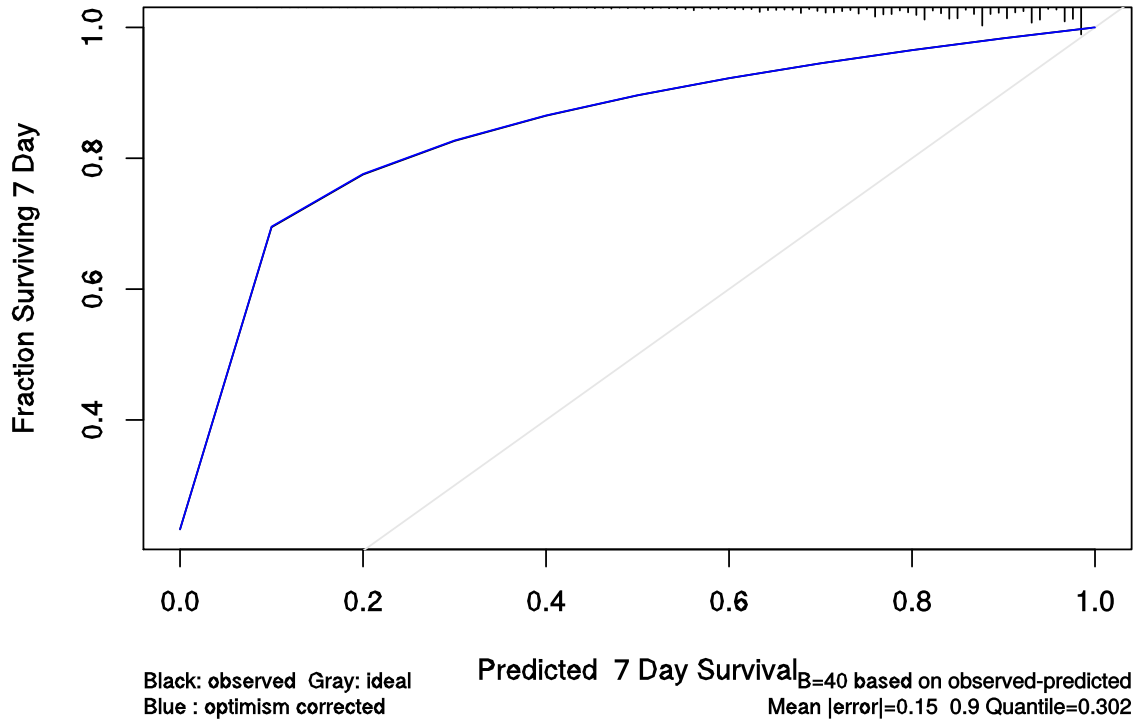


Figure 18 - Prognostic model predictions

Again, for demonstration of methods.

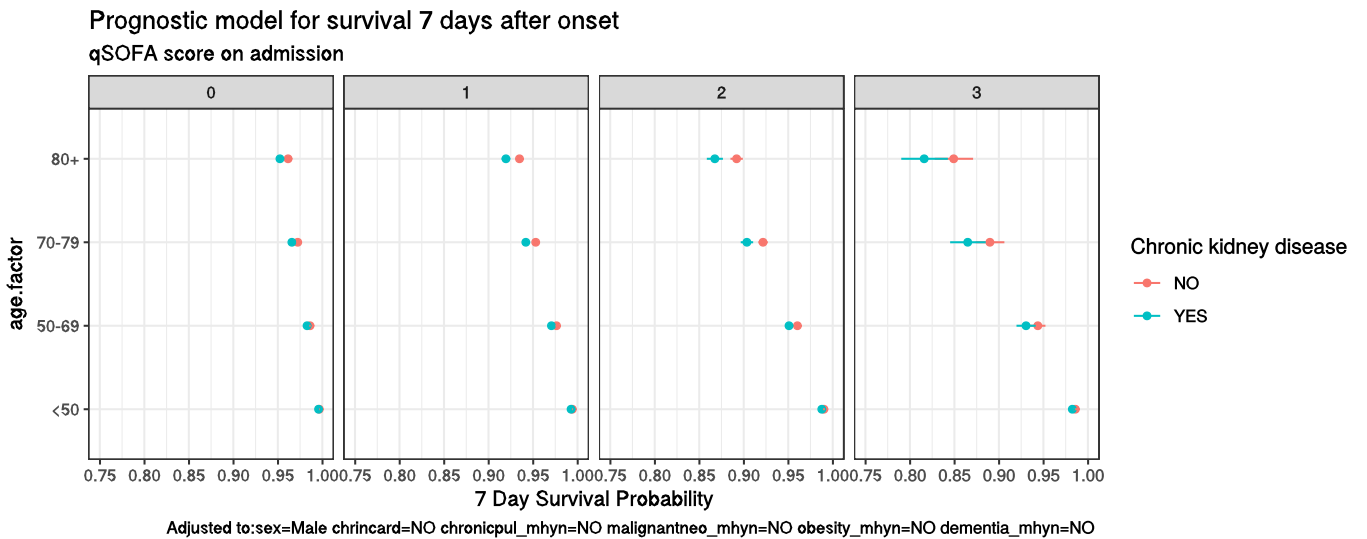


Figure 19 - Death by severity (NEWS) on admission

Number of deaths by NEWS score at admission

Alive Died

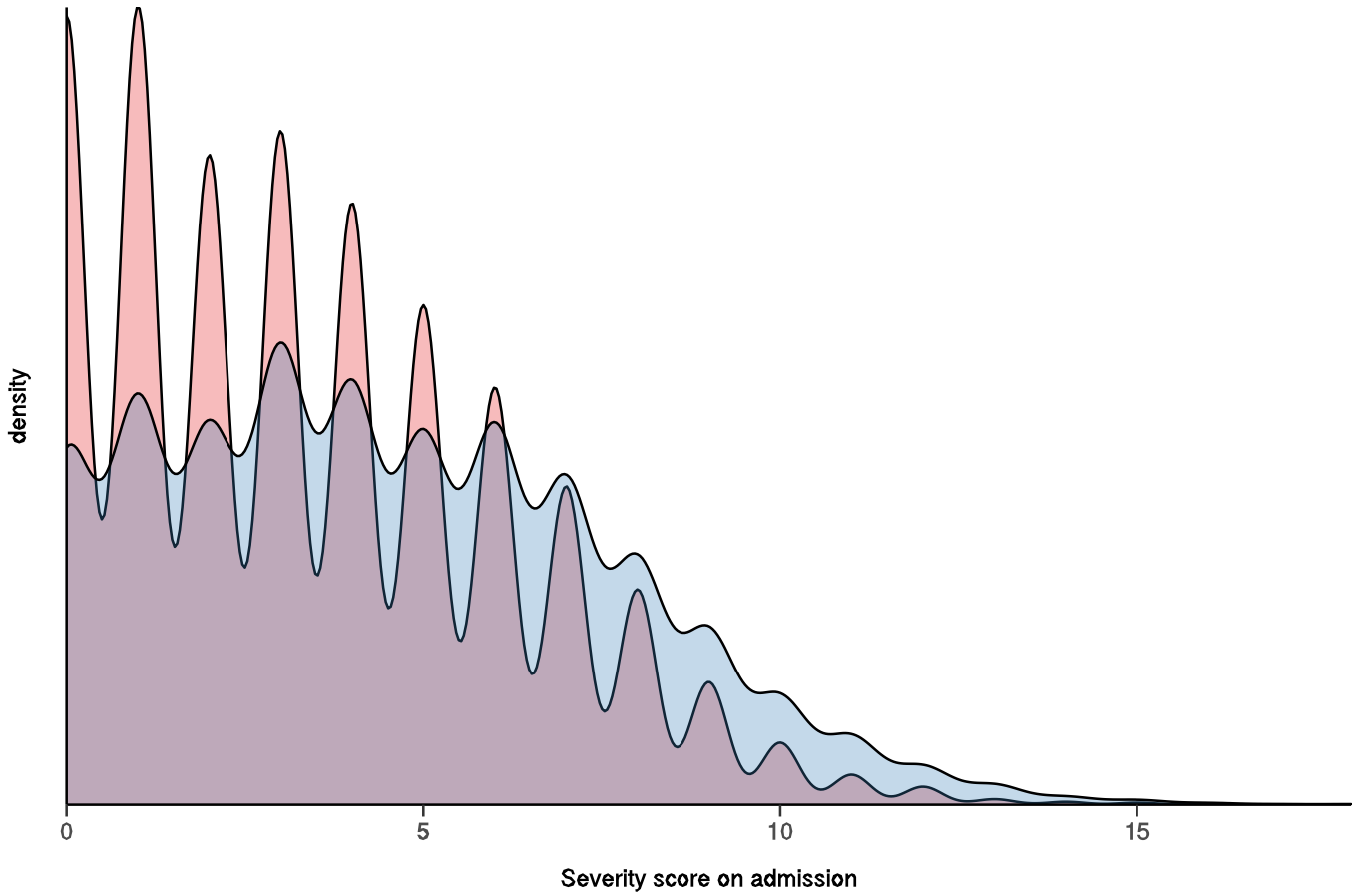


Figure 20 - Death by severity (NEWS) on admission stratified by age

Number of deaths by NEWS score at admission
Stratified by age

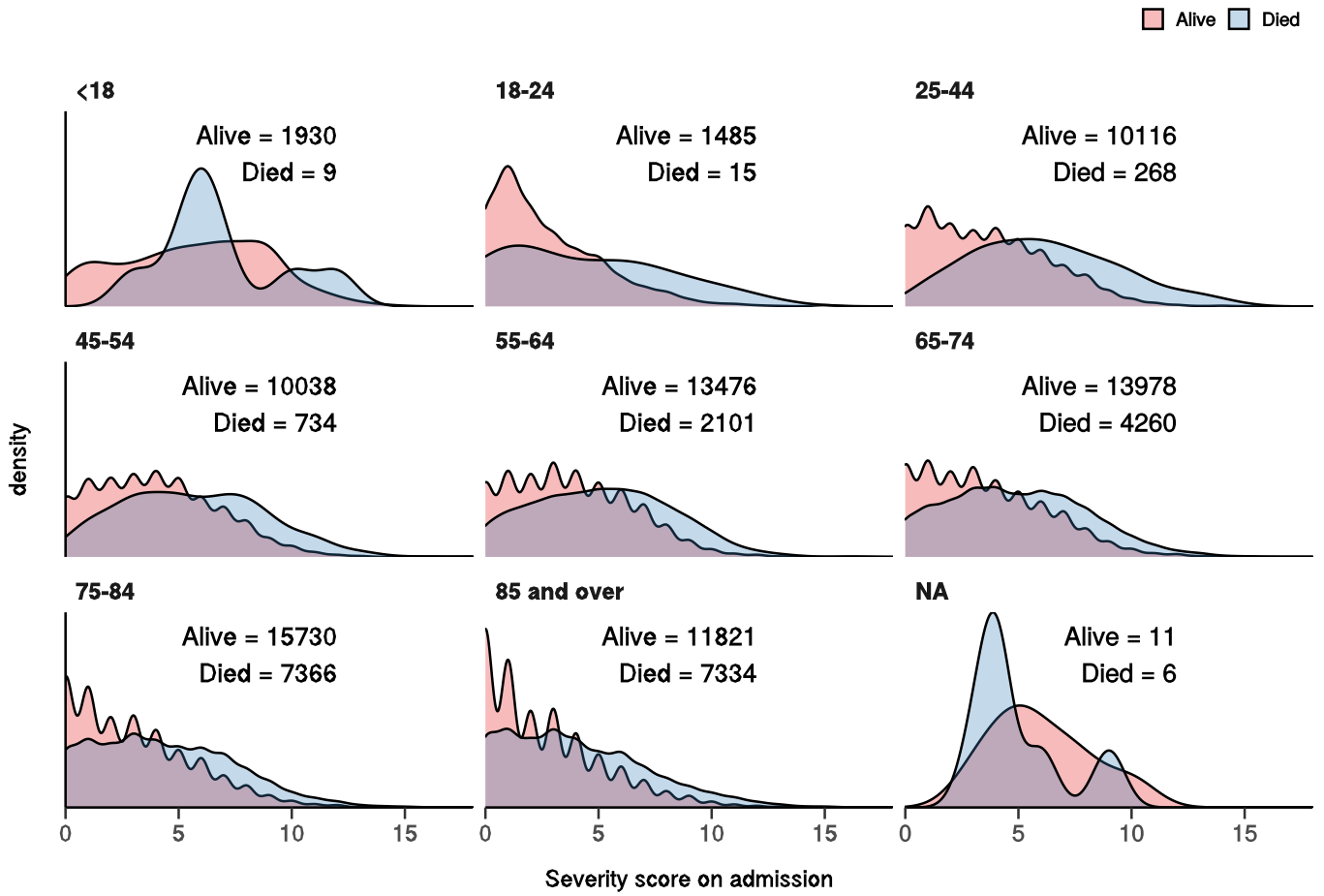
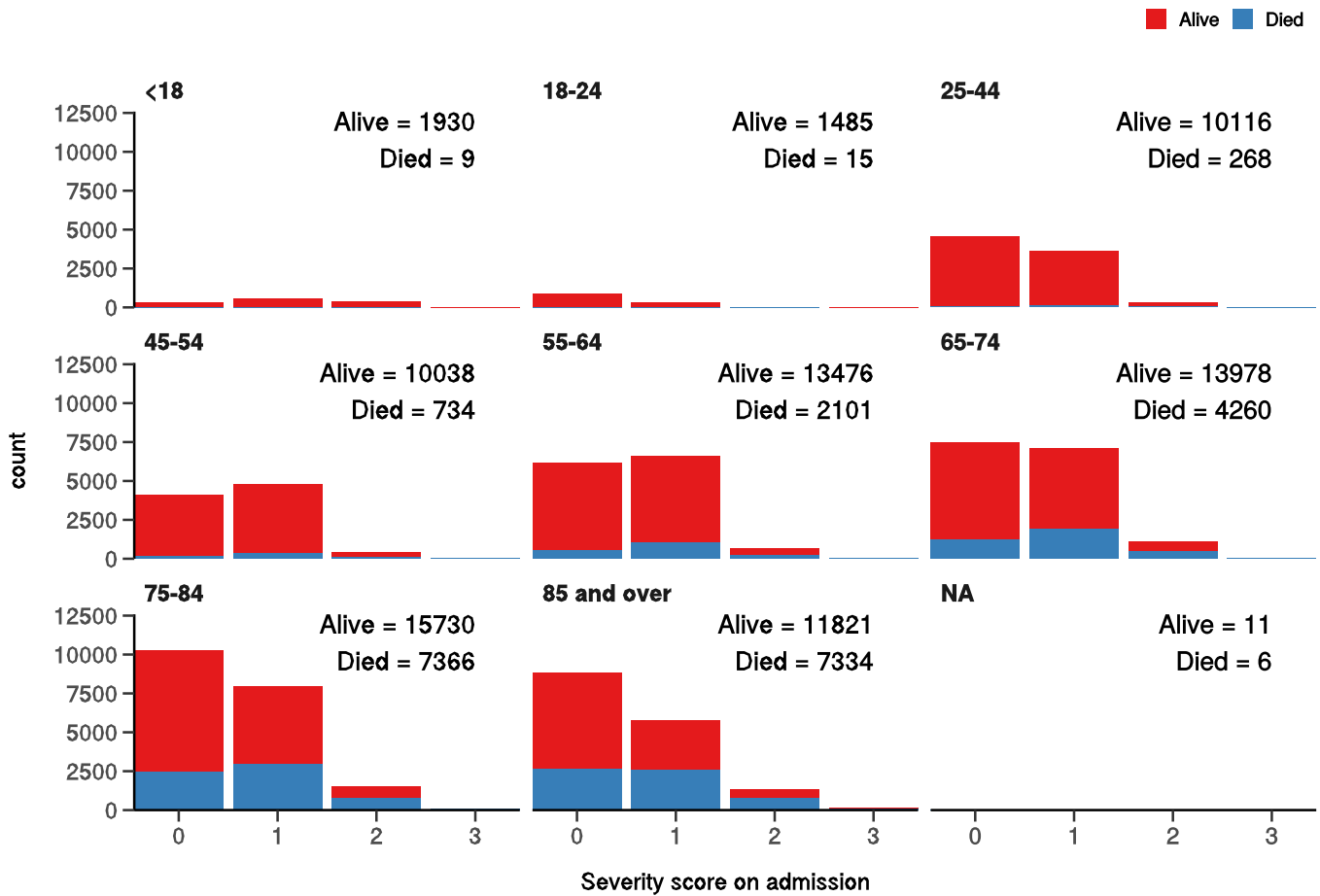


Figure 21 - Death by severity (qSOFA) on admission stratified by age

Number of deaths by qSOFA score at admission

Stratified by age



Healthcare workers

Employed as a healthcare worker?		NO	YES	p
Total N (%)		83273 (97.5)	2176 (2.5)	
NEWS score on admission	Median (IQR)	3.0 (5.0)	4.0 (4.0)	<0.001
Death	No	58727 (75.4)	1914 (93.1)	<0.001
	Yes	19166 (24.6)	141 (6.9)	