

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

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

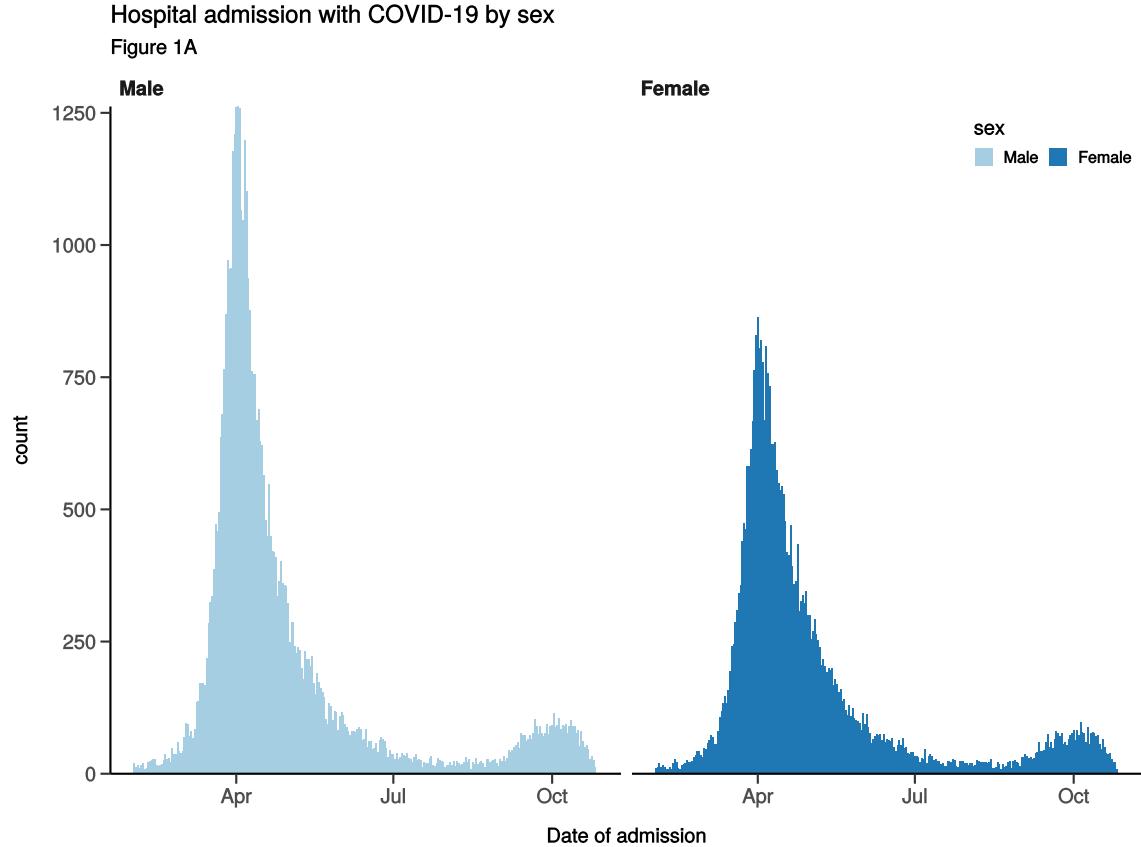
Executive summary

Includes all patients

There are 91427 patients included in CO-CIN. Of these, 24846 patient(s) have died and 11641 required ICU. 50355 have been discharged home.

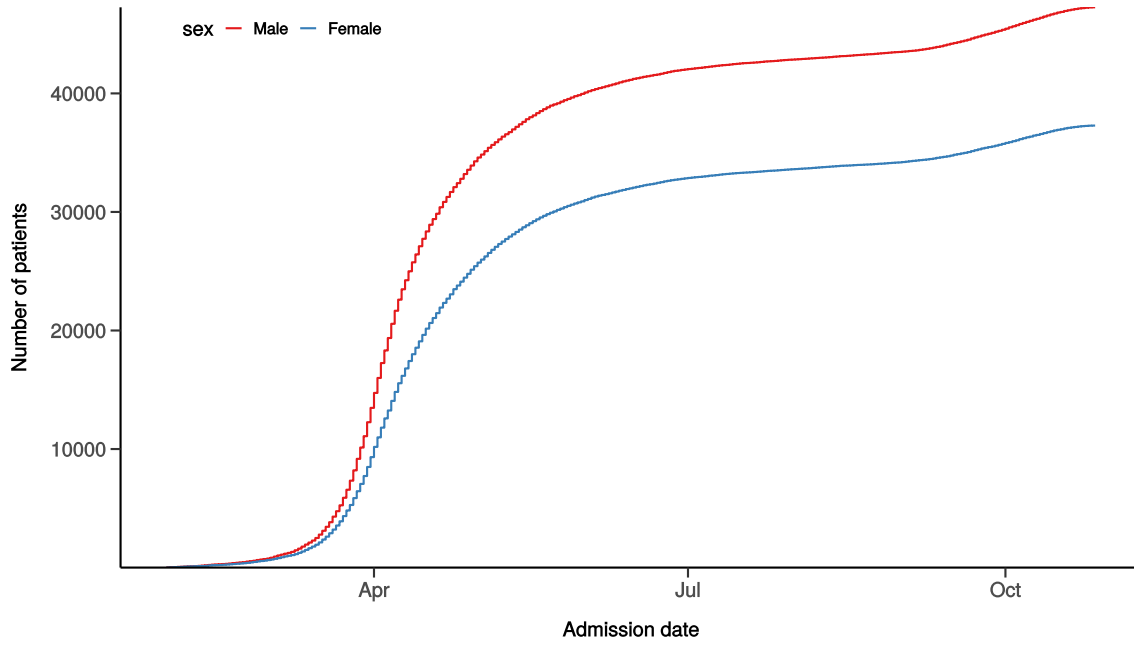
Admission

Figure 1



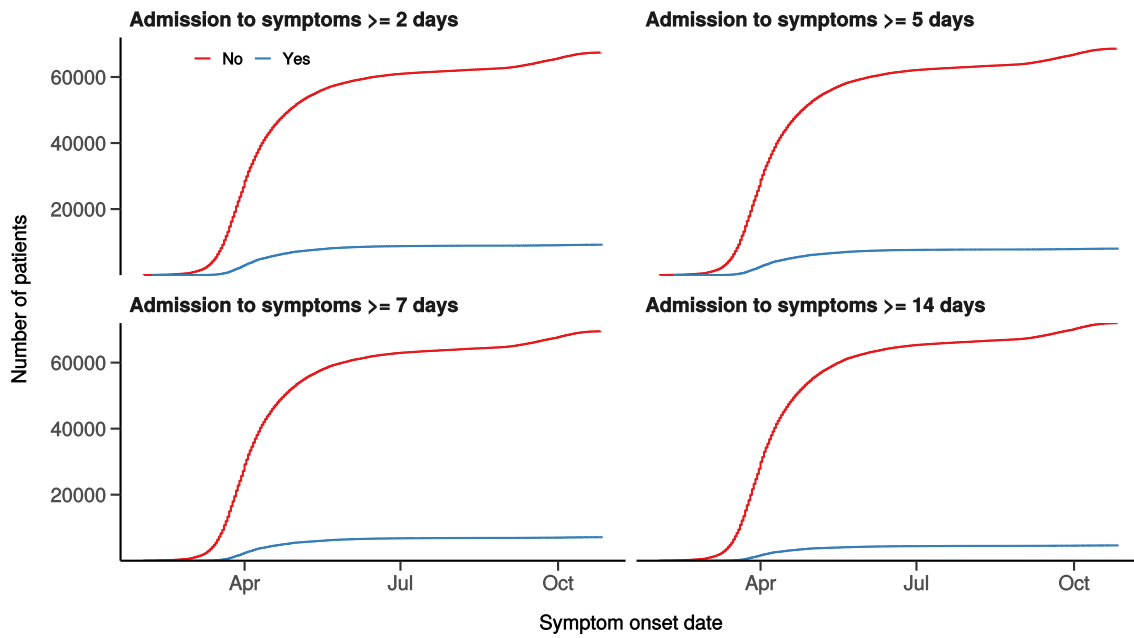
Hospital admission with COVID-19 by sex

Figure 1B



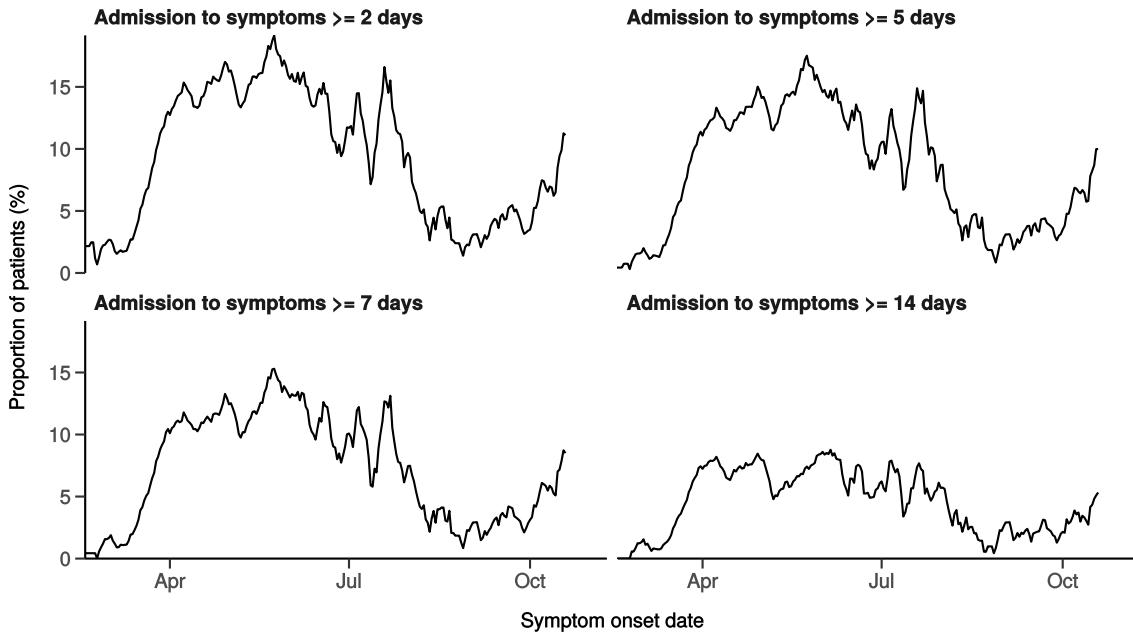
Number with symptom onset occurring after admission to hospital

Figure 1C



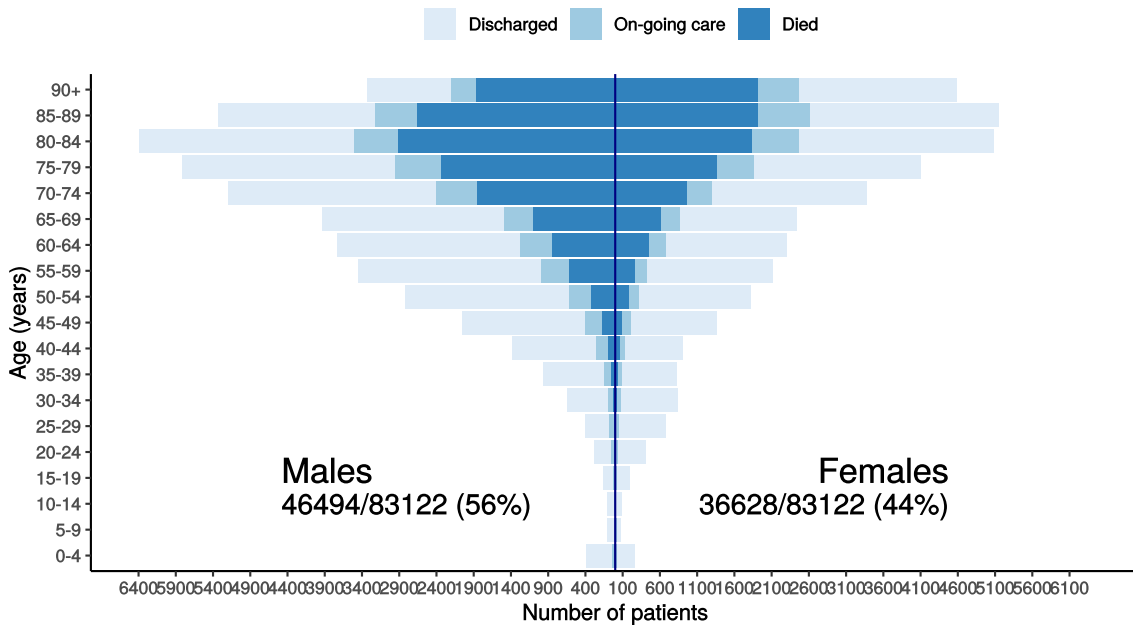
Proportion with symptom onset occurring after hospital admission

Figure 1D - 7-day rolling percentage. n = 76609

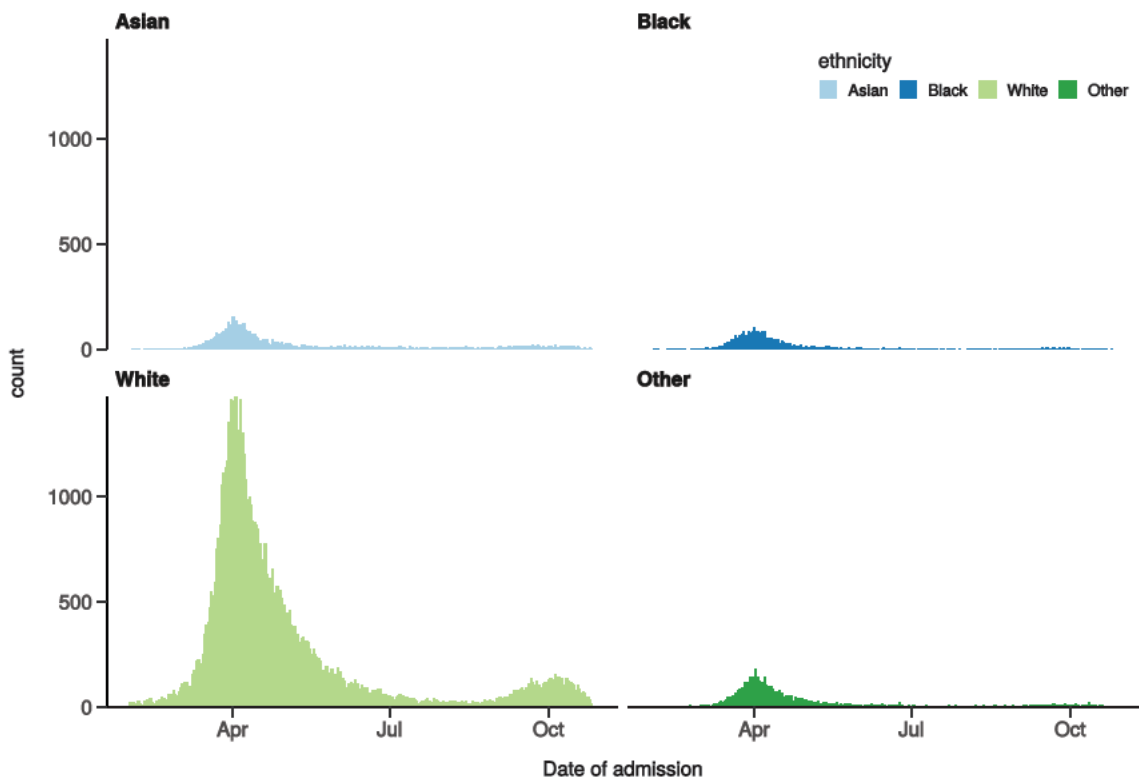


Patients with outcome stratified by age, and sex

Figure 1E



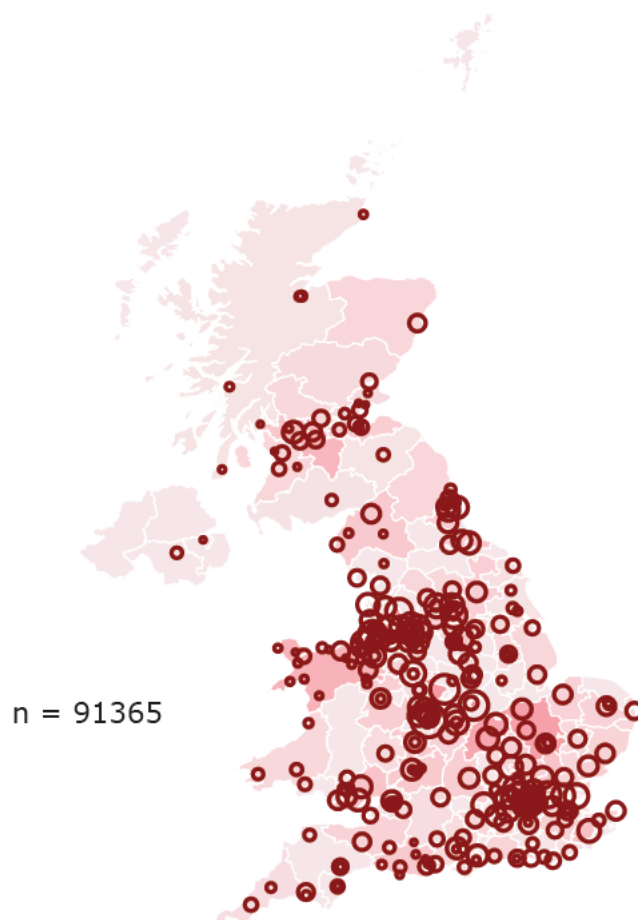
Hospital admission with COVID-19 by ethnicity
Figure 1F



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

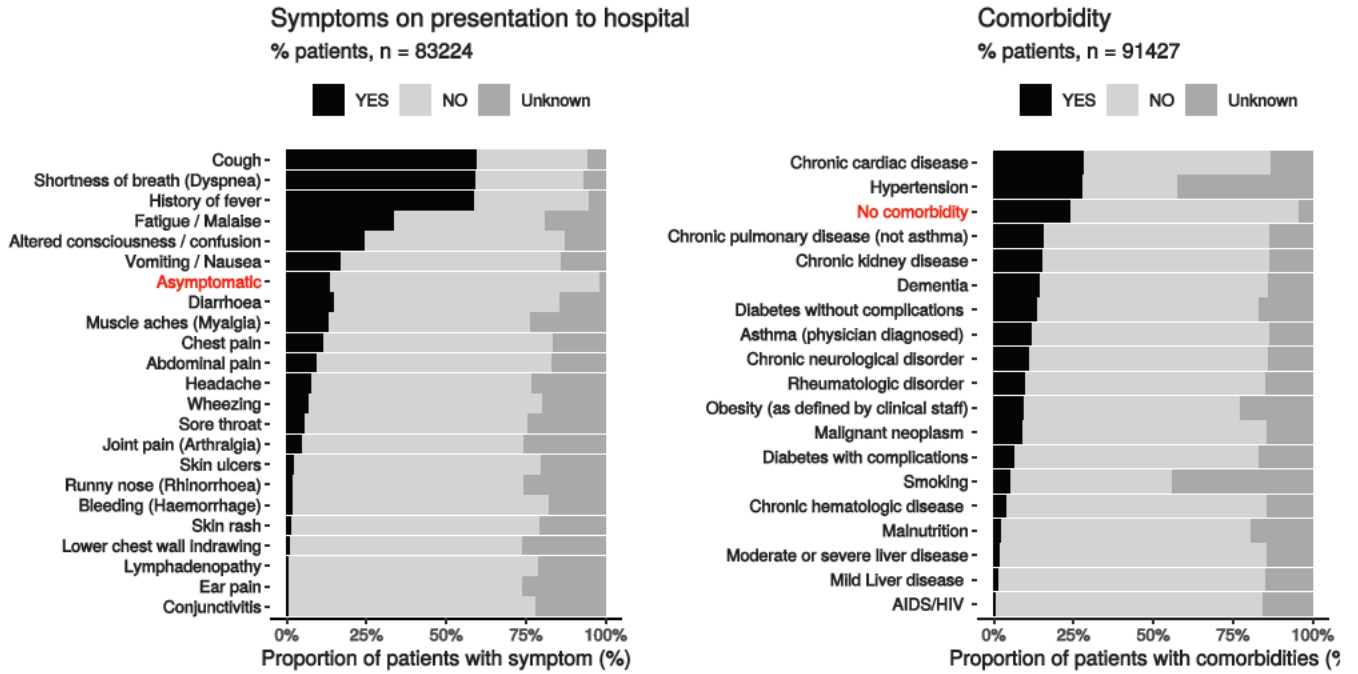


Figure 3B - Symptoms by Age

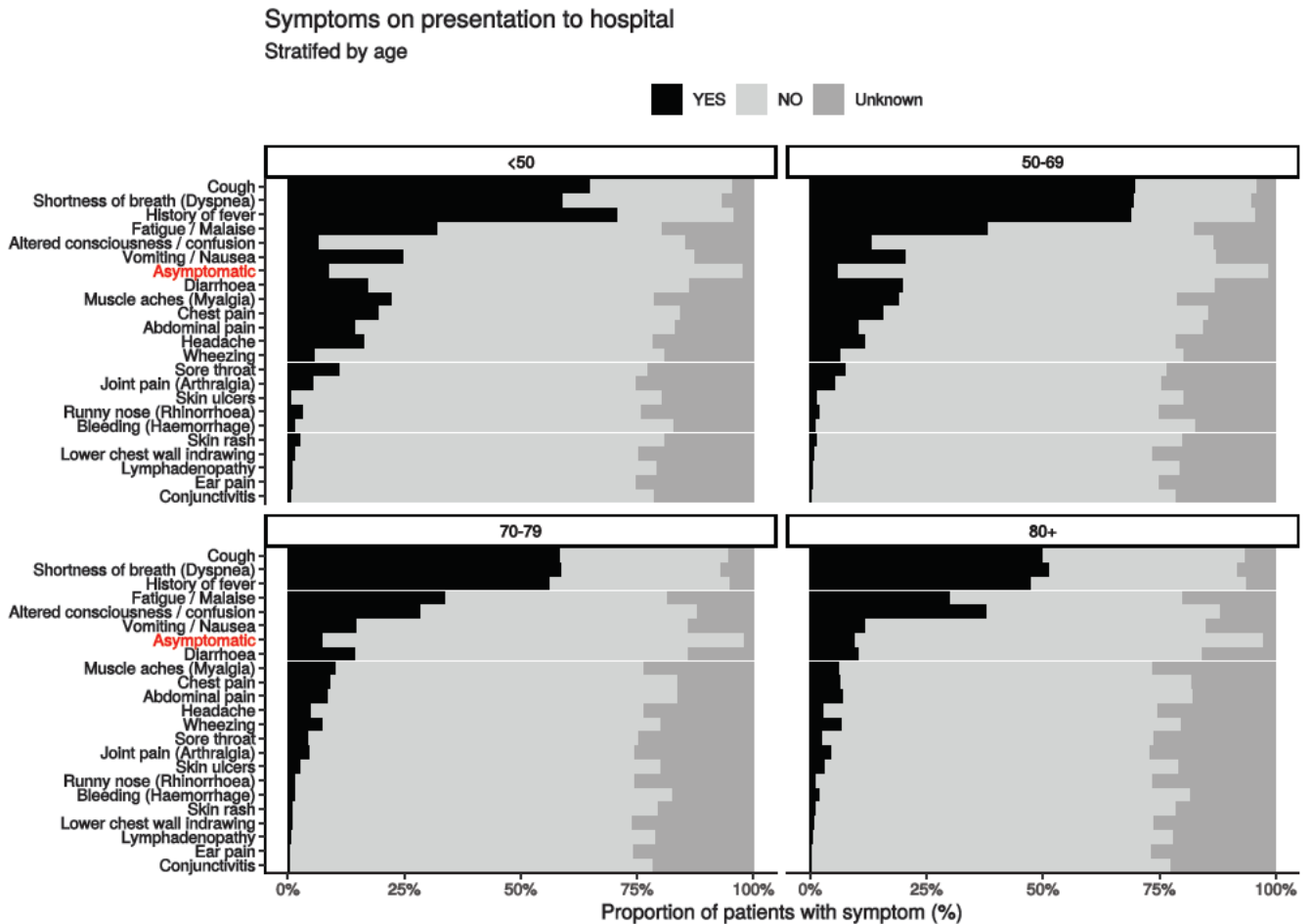
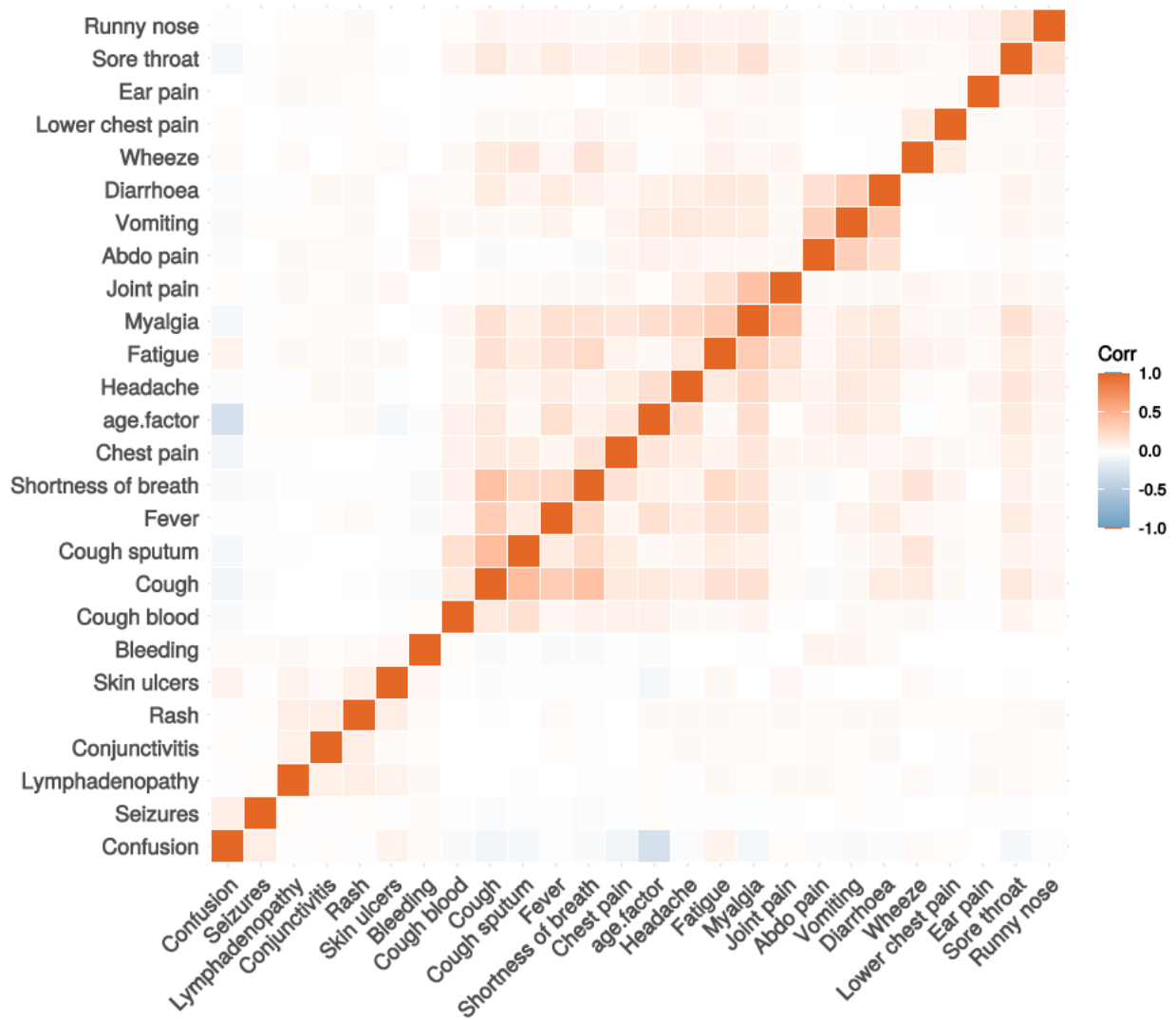


Figure 3C

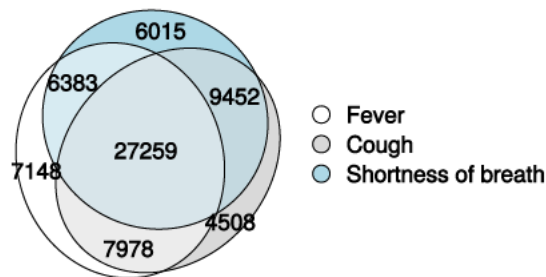
Correlation of symptoms in all pages. Note clusters, top right to bottom left, flu-like, coryzal, abdominal, respiratory, neurocutaneous.



Symptoms (diagnostic criteria)

Figure 4A

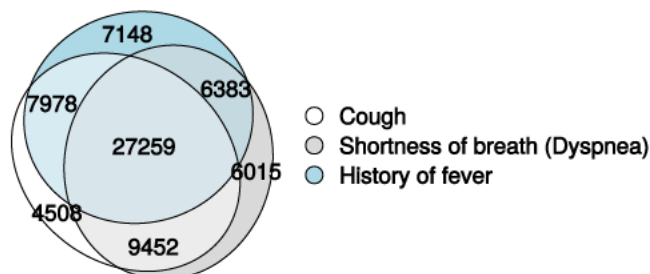
n = 83224



Symptoms (most common)

Figure 4B

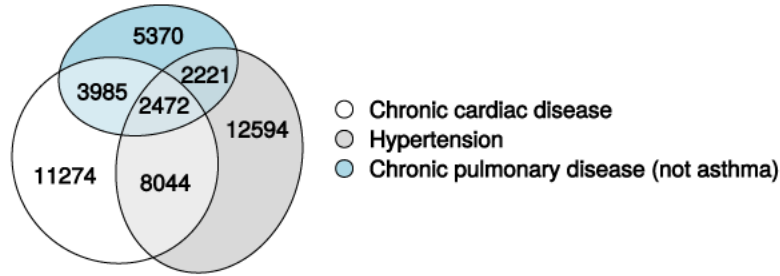
n = 83224



Comorbidity (most common)

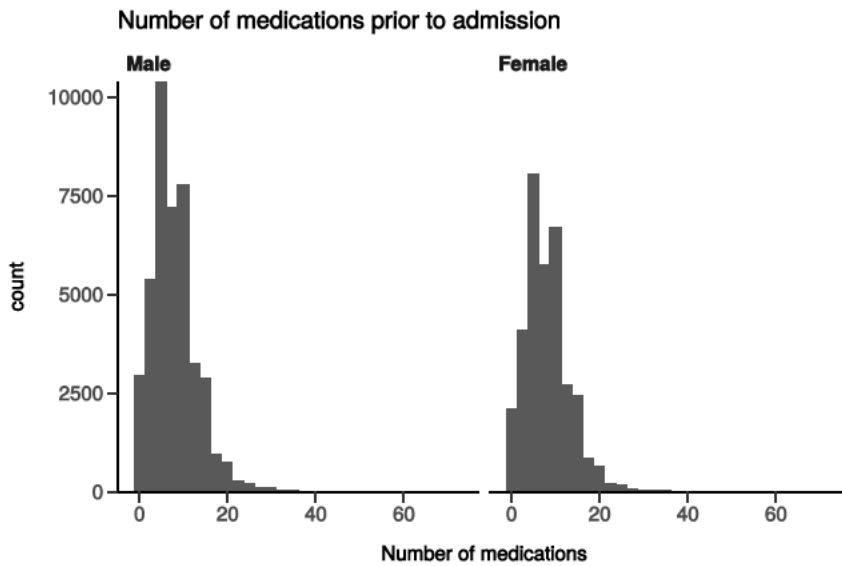
Figure 4C

n = 91427



Medication prior to illness

Figure 5

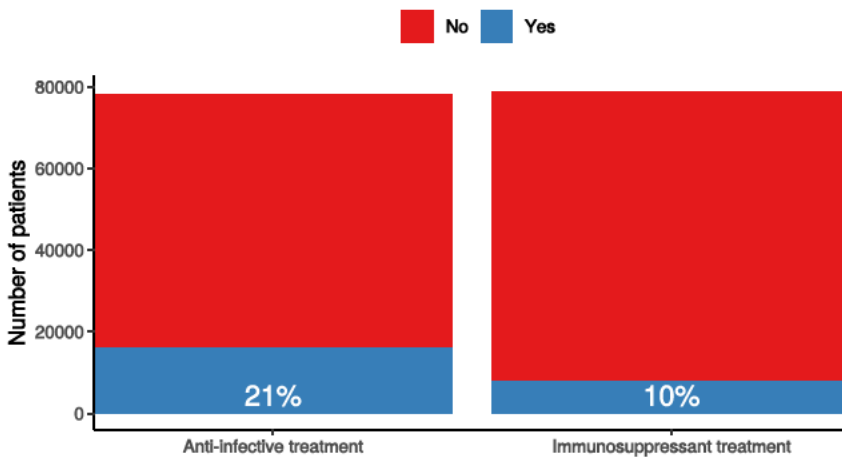


Preadmission treatment

Figure 6

Pre-admission treatment

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



Patient flow

Figure 7A - All patients

N = 85273

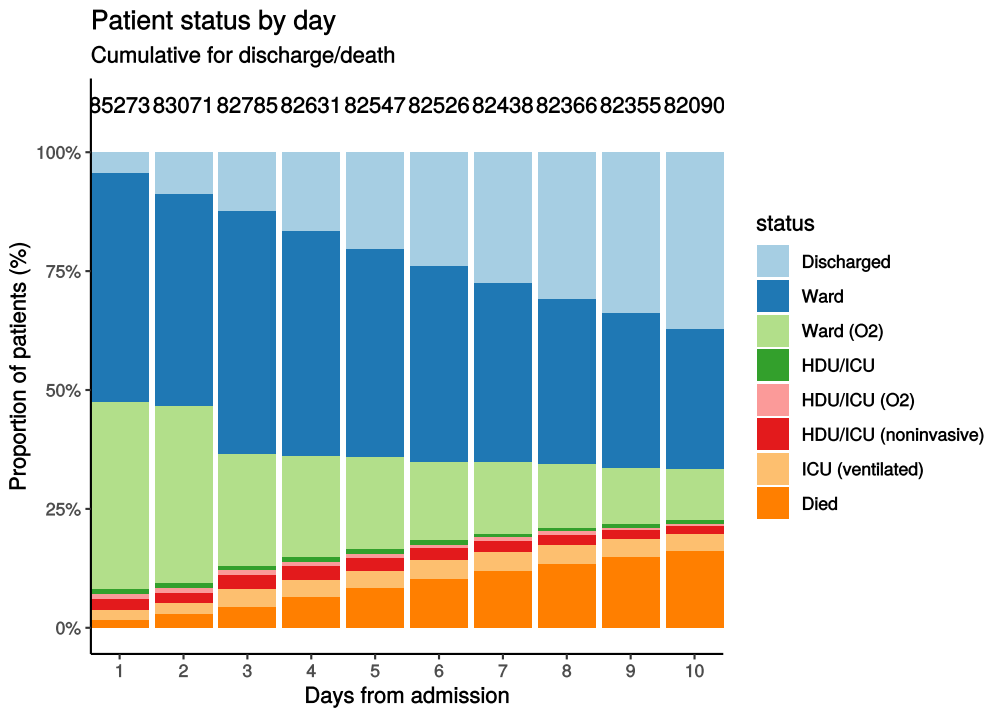
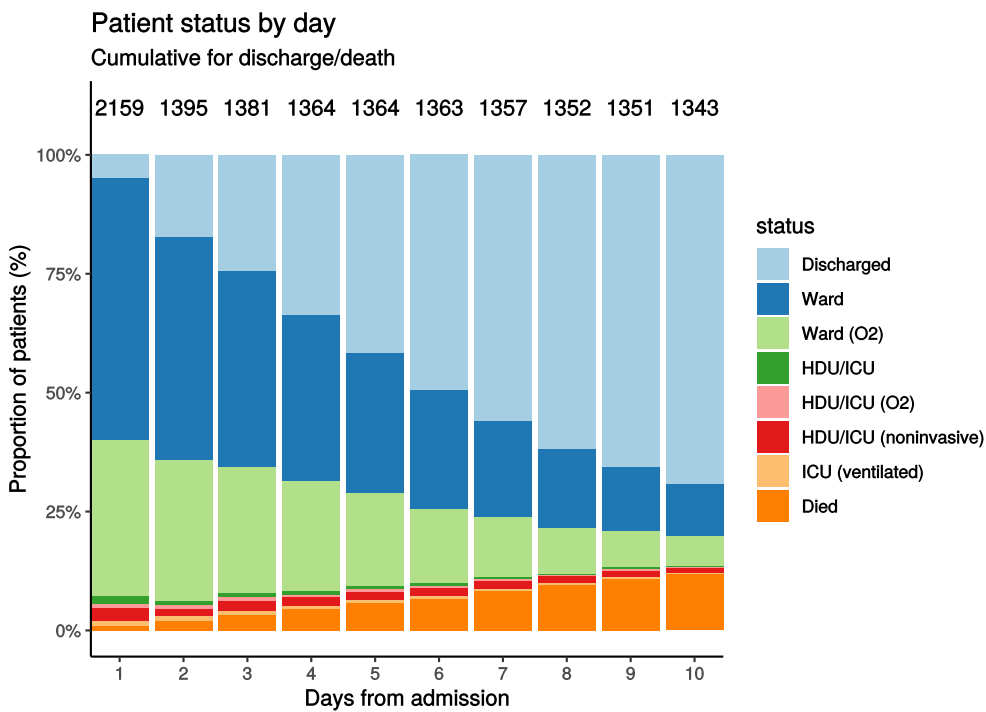


Figure 7B - Patients admitted ≥ 14 days and ≤ 28 days ago

N = 2159



Oxygen requirement

Figure 8A - All patients

N = 80681

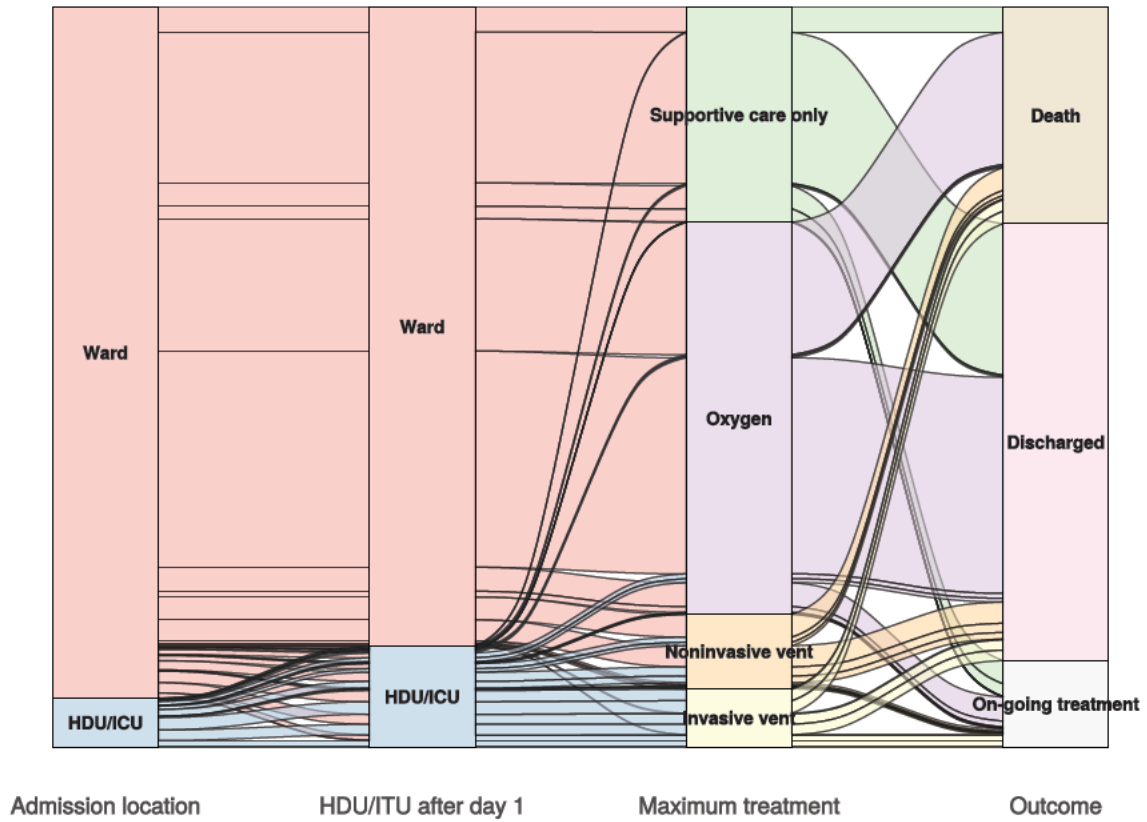


Figure 8B - Patients admitted ≥ 14 days and ≤ 28 days ago

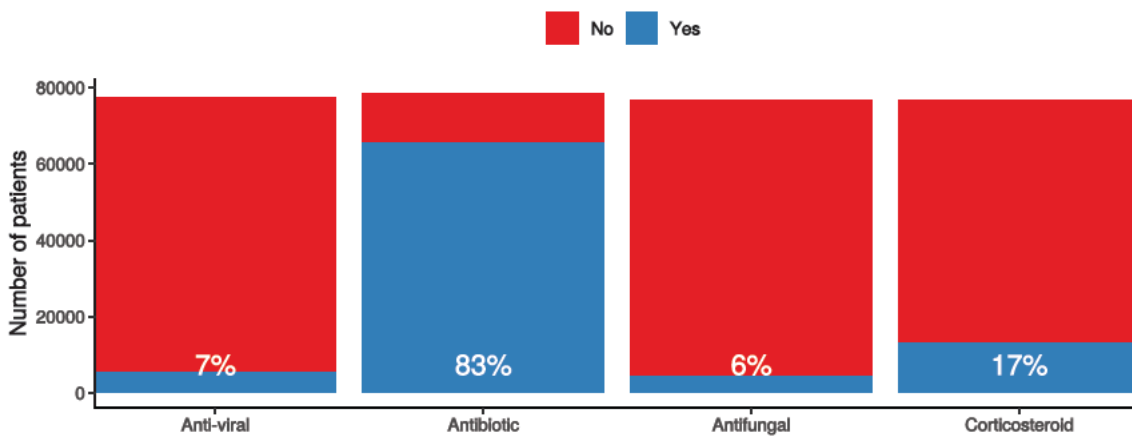
N = 2090

In-hospital medical treatment

Figure 9

In-hospital treatment

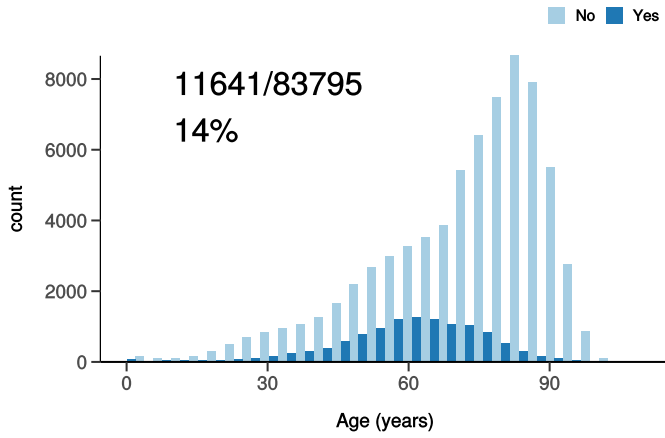
Anti-virals, antibiotics, corticosteroids, and anti-fungals for patients who have completed journey.



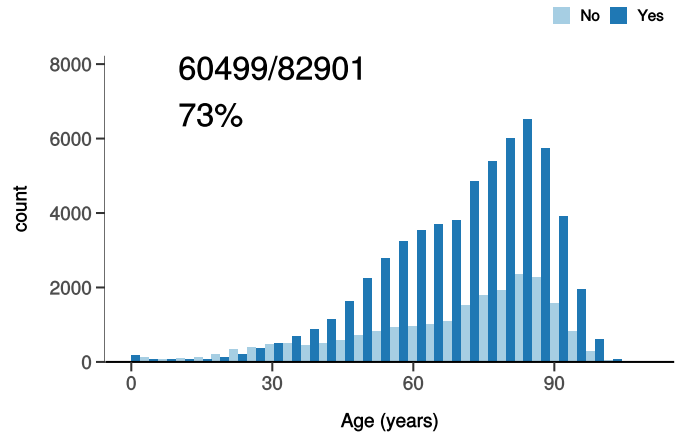
Treatment

Figure 10

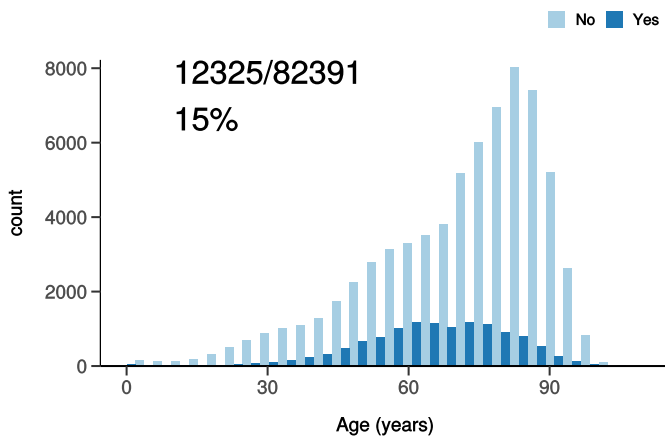
ICU/HDU admission
Figure 10A



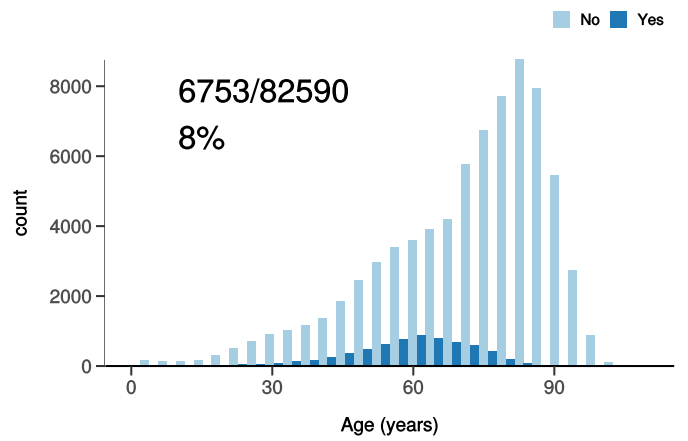
High flow oxygen
Figure 10B



Noninvasive ventilation
Figure 10C



Invasive ventilation
Figure 10D

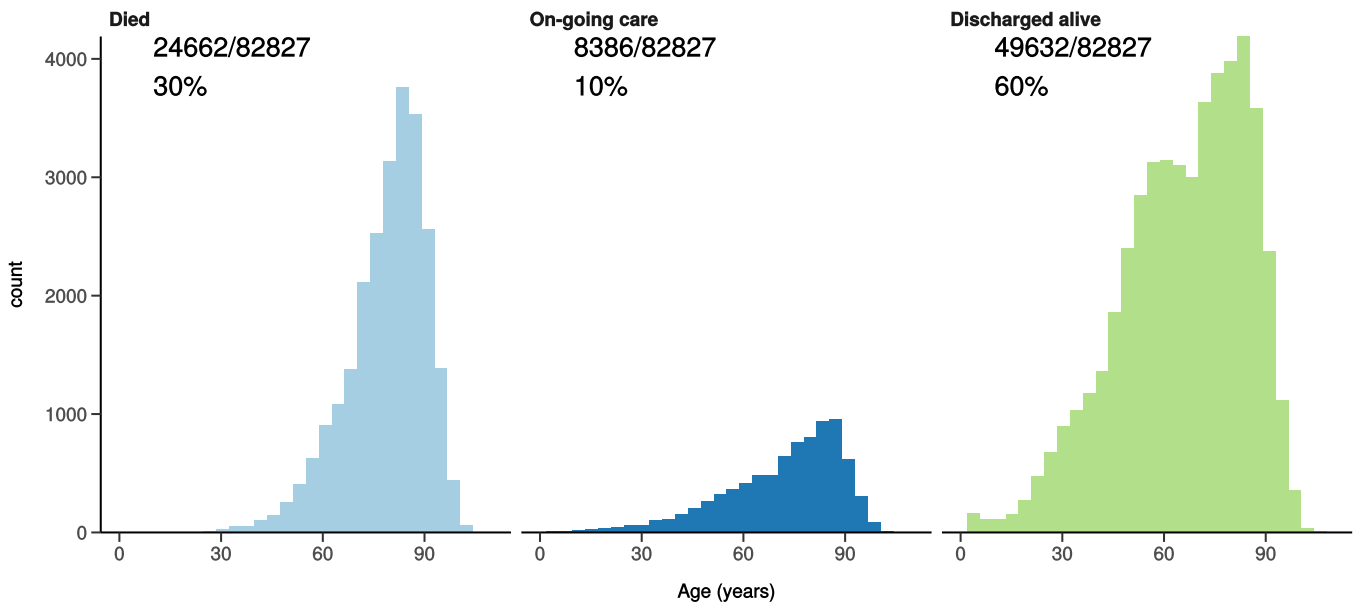


Status in patients admitted ≥ 14 days from today

Figure 11

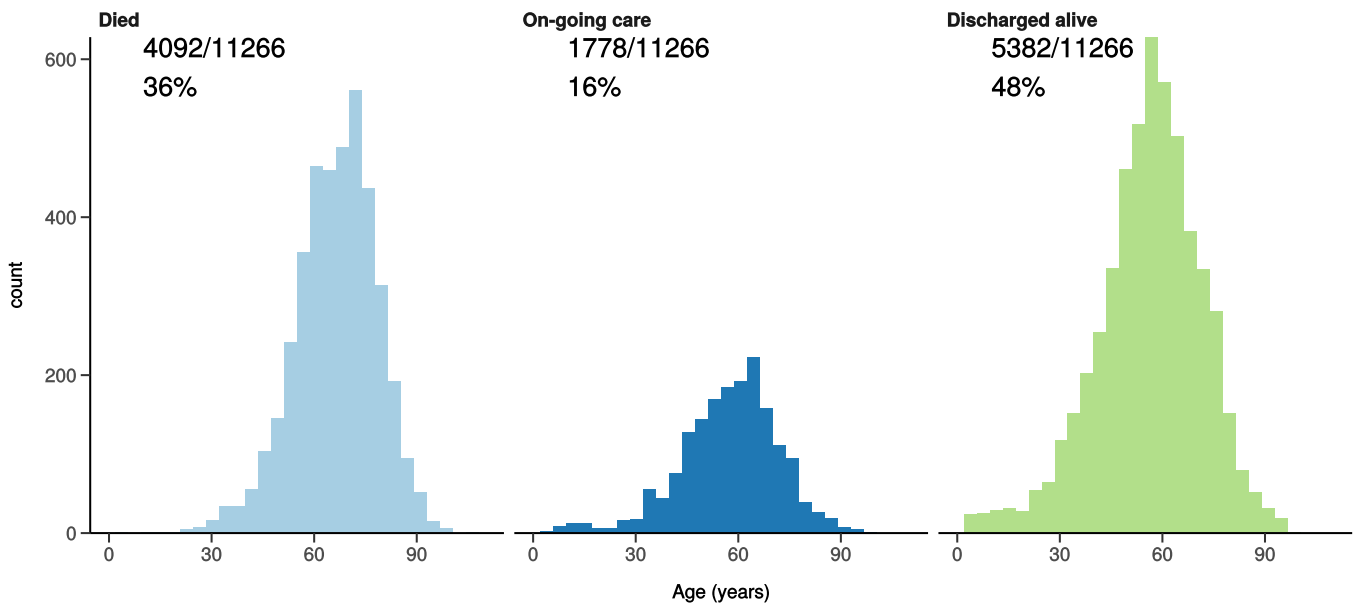
All: status in patients admitted ≥ 14 days ago

Figure 11A



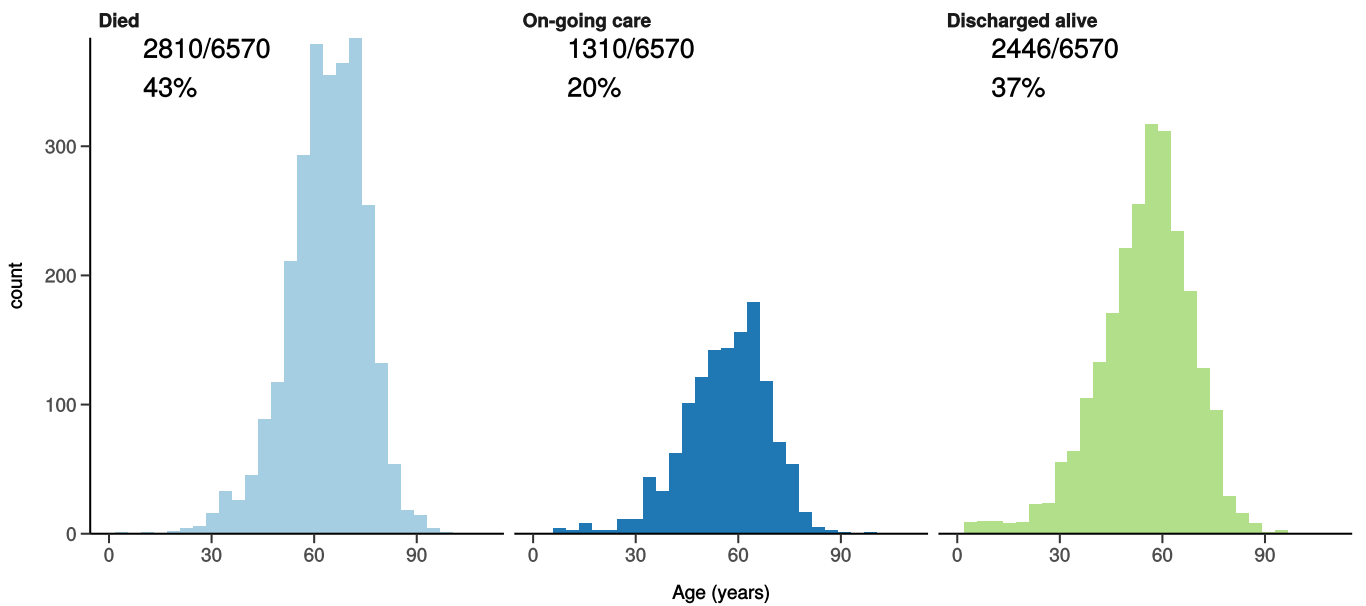
ICU/HDU admissions: status in patients admitted ≥ 14 days ago

Figure 11B



Invasive ventilation: status in patients admitted ≥ 14 days ago

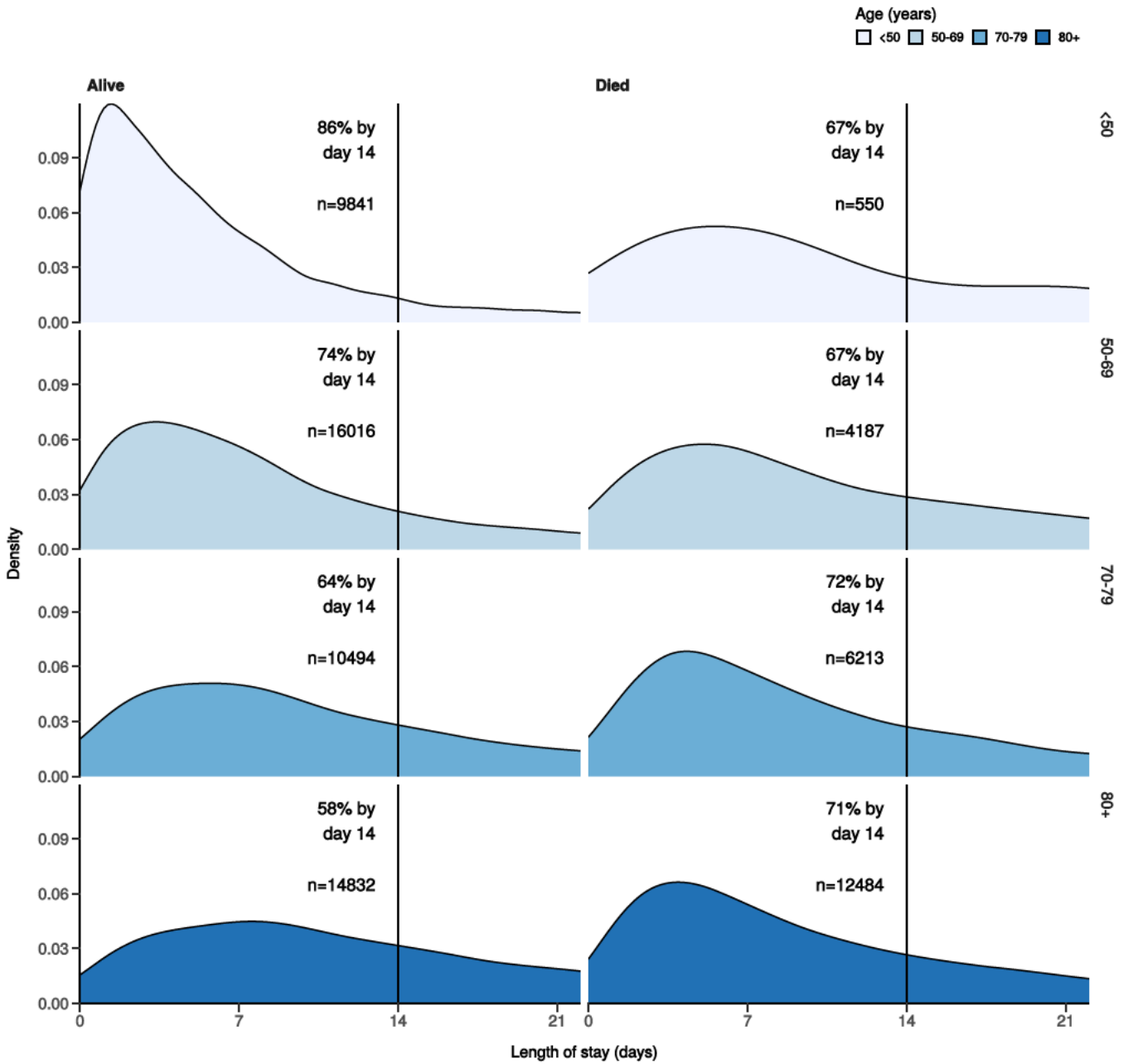
Figure 11c



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	11211 (95.0)	589 (5.0)	•	•
	50-69	17699 (80.1)	4392 (19.9)	4.72 (4.32-5.17, p<0.001)	4.40 (3.98-4.87, p<0.001)
	70-79	11572 (64.0)	6500 (36.0)	10.69 (9.80-11.69, p<0.001)	8.96 (8.11-9.93, p<0.001)
	80+	16234 (55.4)	13086 (44.6)	15.34 (14.09-16.74, p<0.001)	12.80 (11.59-14.18, p<0.001)

Dependent: death		No	Yes	OR (univariable)	OR (multivariable)
Sex at Birth	Male	30632 (67.3)	14872 (32.7)	•	•
	Female	26126 (72.9)	9713 (27.1)	0.77 (0.74-0.79, p<0.001)	0.70 (0.68-0.73, p<0.001)
	Not specified	0 (NaN)	0 (NaN)	•	•
Chronic cardiac disease	NO	38488 (74.7)	13049 (25.3)	•	•
	YES	14754 (59.5)	10053 (40.5)	2.01 (1.95-2.08, p<0.001)	1.15 (1.11-1.20, p<0.001)
Chronic pulmonary disease (not asthma)	NO	45032 (72.0)	17551 (28.0)	•	•
	YES	8089 (60.1)	5374 (39.9)	1.70 (1.64-1.77, p<0.001)	1.26 (1.20-1.31, p<0.001)
Chronic neurological disorder	NO	46695 (71.0)	19106 (29.0)	•	•
	YES	6078 (62.7)	3617 (37.3)	1.45 (1.39-1.52, p<0.001)	1.17 (1.10-1.23, p<0.001)
Chronic hematologic disease	NO	50589 (70.3)	21373 (29.7)	•	•
	YES	2034 (62.0)	1246 (38.0)	1.45 (1.35-1.56, p<0.001)	1.14 (1.05-1.25, p=0.002)
Chronic kidney disease	NO	45363 (72.5)	17216 (27.5)	•	•
	YES	7611 (57.4)	5646 (42.6)	1.95 (1.88-2.03, p<0.001)	1.29 (1.23-1.35, p<0.001)
Dementia	NO	46036 (72.9)	17073 (27.1)	•	•
	YES	6780 (54.2)	5738 (45.8)	2.28 (2.19-2.37, p<0.001)	1.37 (1.31-1.44, p<0.001)
Obesity (as defined by clinical staff)	NO	41863 (69.9)	17990 (30.1)	•	•
	YES	6010 (73.7)	2150 (26.3)	0.83 (0.79-0.88, p<0.001)	1.28 (1.21-1.36, p<0.001)
Malignant neoplasm	NO	48266 (71.4)	19295 (28.6)	•	•
	YES	4382 (56.6)	3360 (43.4)	1.92 (1.83-2.01, p<0.001)	1.47 (1.39-1.56, p<0.001)

Number in dataframe = 84515, Number in model = 64658, Missing = 19857, AIC = 69708.9, C-statistic = 0.717, H&L = Chi-sq(8) 127.31 (p<0.001)

Figure 13 - Adjusted odds ratio plot

Death

Age on admission (years)	<50	-
	50-69	4.40 (3.98-4.87, p<0.001)
	70-79	8.96 (8.11-9.93, p<0.001)
	80+	12.80 (11.59-14.18, p<0.001)
Sex at Birth	Male	-
	Female	0.70 (0.68-0.73, p<0.001)
	Not specified	-
Chronic cardiac disease	YES	1.15 (1.11-1.20, p<0.001)
Chronic pulmonary disease (not asthma)	YES	1.26 (1.20-1.31, p<0.001)
Chronic neurological disorder	YES	1.17 (1.10-1.23, p<0.001)
Chronic hematologic disease	YES	1.14 (1.05-1.25, p=0.002)
Chronic kidney disease	YES	1.29 (1.23-1.35, p<0.001)
Dementia	YES	1.37 (1.31-1.44, p<0.001)
Obesity (as defined by clinical staff)	YES	1.28 (1.21-1.36, p<0.001)
Malignant neoplasm	YES	1.47 (1.39-1.56, p<0.001)

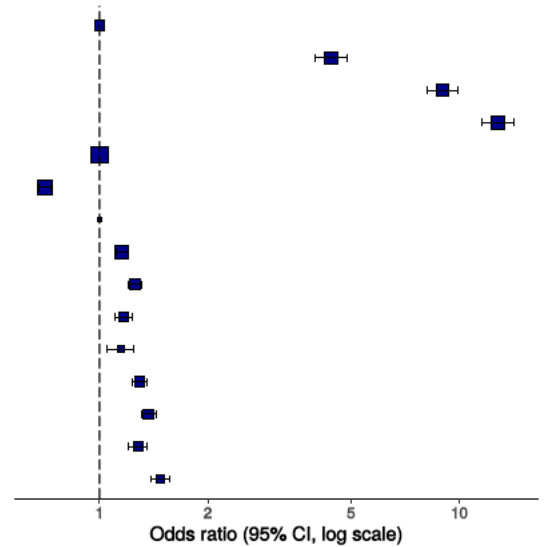
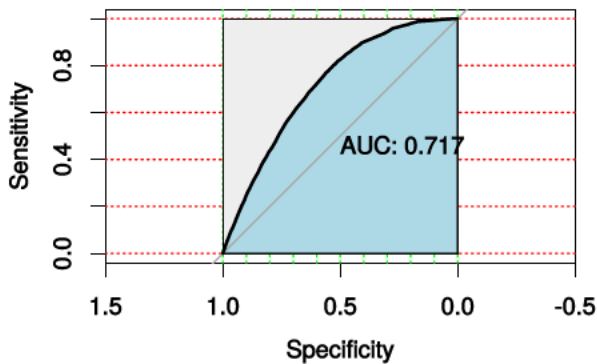


Figure 14 - ROC

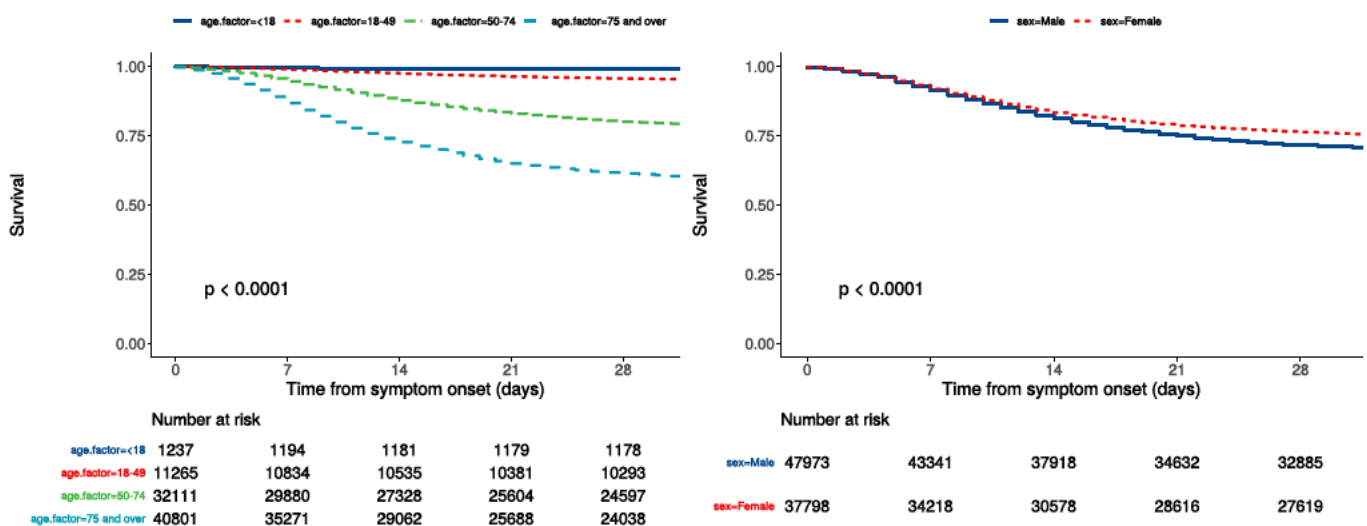


Survival models

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	12502 (14.6)	•	•
	50-69	23294 (27.3)	4.32 (3.96-4.71, p<0.001)	4.17 (3.75-4.64, p<0.001)
	70-79	19015 (22.3)	8.80 (8.08-9.57, p<0.001)	8.23 (7.41-9.14, p<0.001)
	80+	30610 (35.8)	11.88 (10.94-12.91, p<0.001)	10.86 (9.79-12.06, p<0.001)
Sex at Birth	Male	47973 (55.9)	•	•
	Female	37798 (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	31451 (43.2)	•	•
	1	32581 (44.7)	1.61 (1.56-1.67, p<0.001)	1.72 (1.66-1.78, p<0.001)
	2	7928 (10.9)	3.12 (3.00-3.24, p<0.001)	2.90 (2.78-3.04, p<0.001)
	3	869 (1.2)	5.10 (4.68-5.56, p<0.001)	4.59 (4.17-5.06, p<0.001)
Symptomatic at presentation	No symptoms	4574 (5.5)	•	•
	Symptoms	78672 (94.5)	1.59 (1.49-1.70, p<0.001)	•
Chronic cardiac disease	NO	53545 (67.6)	•	•
	YES	25672 (32.4)	1.80 (1.75-1.85, p<0.001)	1.14 (1.10-1.17, p<0.001)
Chronic kidney disease	NO	64997 (82.6)	•	•
	YES	13697 (17.4)	1.75 (1.70-1.80, p<0.001)	1.23 (1.18-1.27, p<0.001)
Moderate or severe liver disease	NO	76422 (98.0)	•	•
	YES	1535 (2.0)	1.31 (1.21-1.43, p<0.001)	1.45 (1.30-1.60, p<0.001)
Chronic neurological disorder	NO	68366 (87.3)	•	•
	YES	9960 (12.7)	1.38 (1.34-1.44, p<0.001)	•
Malignant neoplasm	NO	70164 (89.8)	•	•
	YES	7980 (10.2)	1.68 (1.62-1.74, p<0.001)	1.34 (1.28-1.40, p<0.001)
Chronic hematologic disease	NO	74713 (95.7)	•	•
	YES	3354 (4.3)	1.35 (1.27-1.43, p<0.001)	•
Obesity (as defined by clinical staff)	NO	62118 (88.0)	•	•
	YES	8482 (12.0)	0.85 (0.81-0.89, p<0.001)	1.17 (1.11-1.23, p<0.001)
Diabetes without complications	NO	63524 (83.8)	•	•
	YES	12269 (16.2)	1.26 (1.21-1.30, p<0.001)	•
Rheumatologic disorder	NO	68928 (88.5)	•	•
	YES	8942 (11.5)	1.19 (1.15-1.24, p<0.001)	•

Dependent: Surv(time, status)		all	HR (univariable)	HR (multivariable)
Dementia	NO	65618 (83.6)	•	•
	YES	12848 (16.4)	2.02 (1.96-2.08, p<0.001)	1.17 (1.13-1.22, p<0.001)
Malnutrition	NO	71413 (97.2)	•	•
	YES	2027 (2.8)	1.45 (1.35-1.55, p<0.001)	•
smoking_mhyn_2levels	NO	46104 (57.3)	•	•
	YES	4479 (5.6)	0.87 (0.81-0.92, p<0.001)	•
	N/K	29899 (37.1)	1.23 (1.20-1.27, p<0.001)	•

Number in dataframe = 86129, Number in model = 59558, Missing = 26571, Number of events = 16900, Concordance = 0.721 (SE = 0.002), R-squared = 0.160 (Max possible = 0.998), Likelihood ratio test = 10368.277 (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 (3.75-4.64, p<0.001)
	70-79	8.23 (7.41-9.14, p<0.001)
	80+	10.86 (9.79-12.06, p<0.001)
Sex at Birth	Female	0.79 (0.76-0.81, p<0.001)
qSOFA score on admission	0	-
	1	1.72 (1.66-1.78, p<0.001)
	2	2.90 (2.78-3.04, p<0.001)
	3	4.59 (4.17-5.06, p<0.001)
Chronic cardiac disease	YES	1.14 (1.10-1.17, p<0.001)
Chronic kidney disease	YES	1.23 (1.18-1.27, p<0.001)
Moderate or severe liver disease	YES	1.45 (1.30-1.60, p<0.001)
Malignant neoplasm	YES	1.34 (1.28-1.40, p<0.001)
Obesity (as defined by clinical staff)	YES	1.17 (1.11-1.23, p<0.001)
Dementia	YES	1.17 (1.13-1.22, p<0.001)

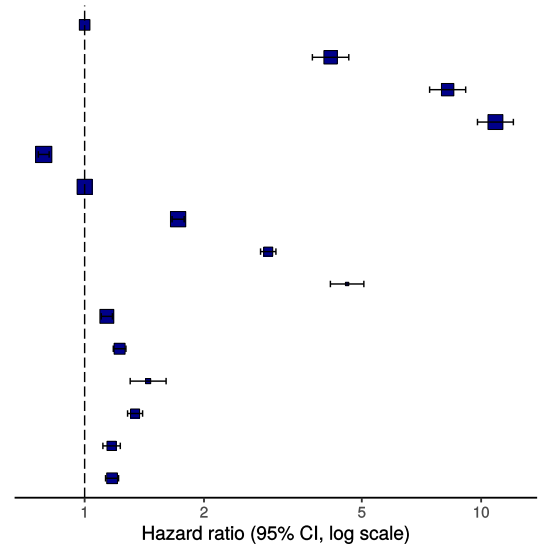
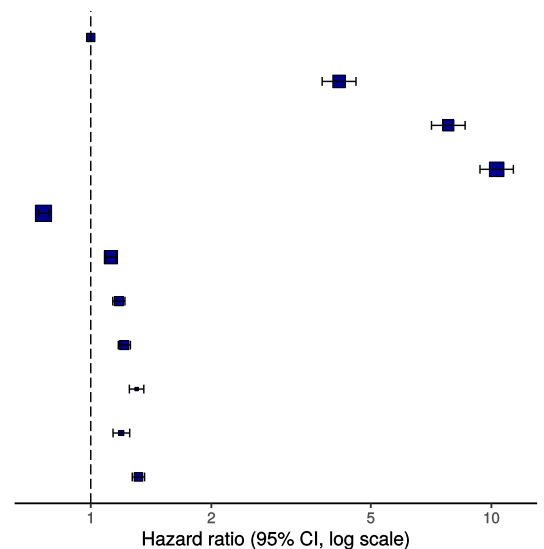


Figure 16b - Multivariable Cox proportional hazards model (age, sex, comorbidities only)

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

Age on admission (years)	<50	-
	50-69	4.17 (3.78-4.59, p<0.001)
	70-79	7.81 (7.09-8.60, p<0.001)
	80+	10.31 (9.36-11.35, 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 (1.13-1.22, p<0.001)
Chronic kidney disease	YES	1.21 (1.17-1.26, p<0.001)
Malignant neoplasm	YES	1.30 (1.25-1.36, p<0.001)
Obesity (as defined by clinical staff)	YES	1.19 (1.14-1.25, p<0.001)
Dementia	YES	1.32 (1.27-1.36, p<0.001)



ROC = 0.7207463

Figure 17 - Predictions calibration plot

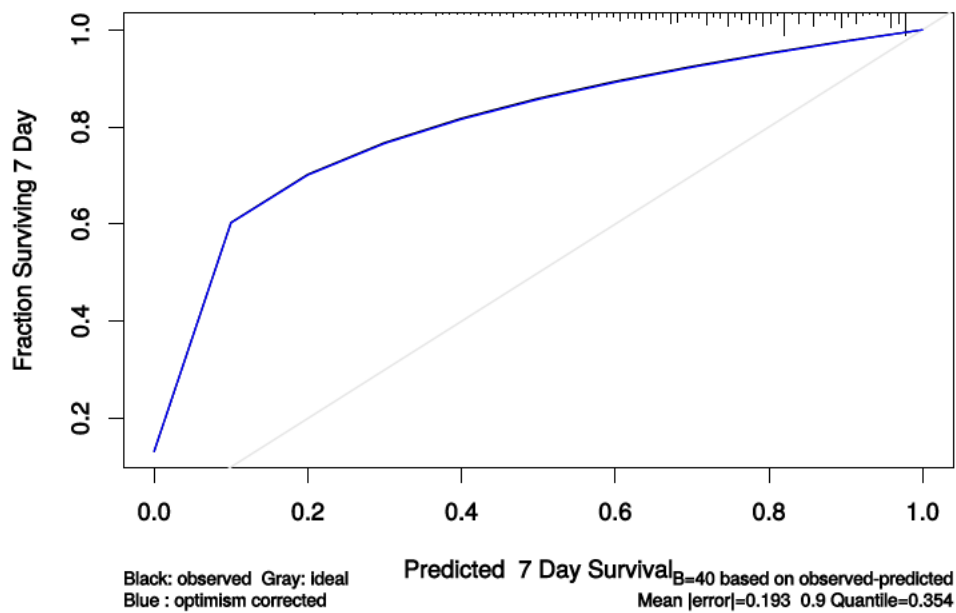


Figure 18 - Prognostic model predictions

Again, for demonstration of methods.

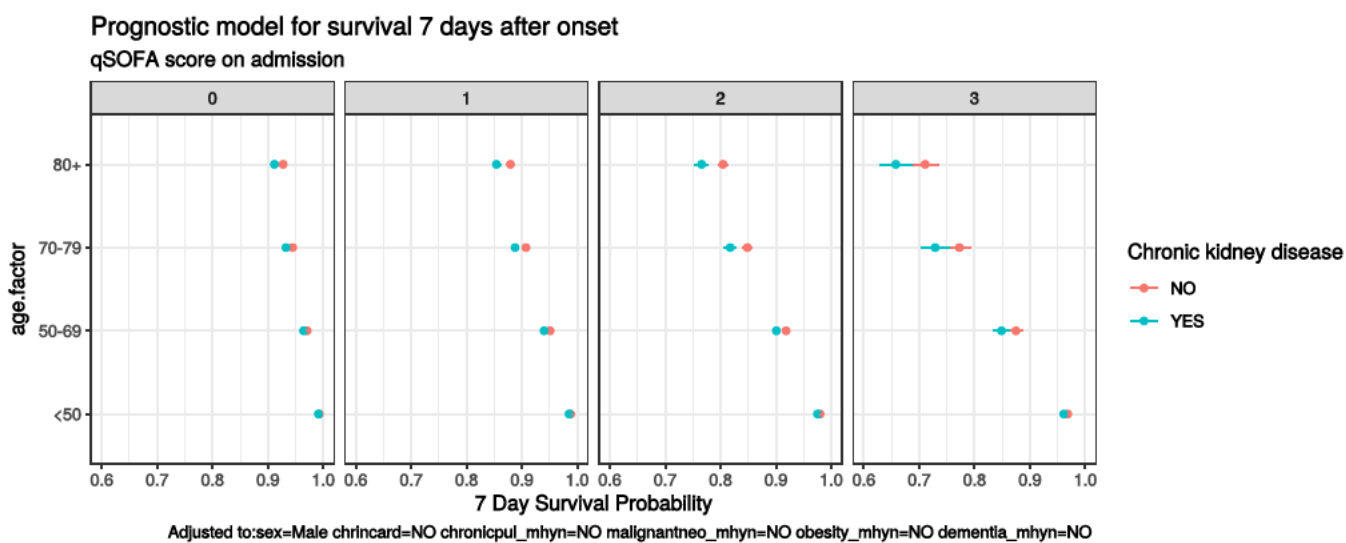


Figure 19 - Death by severity (NEWS) on admission

Number of deaths by NEWS score at admission

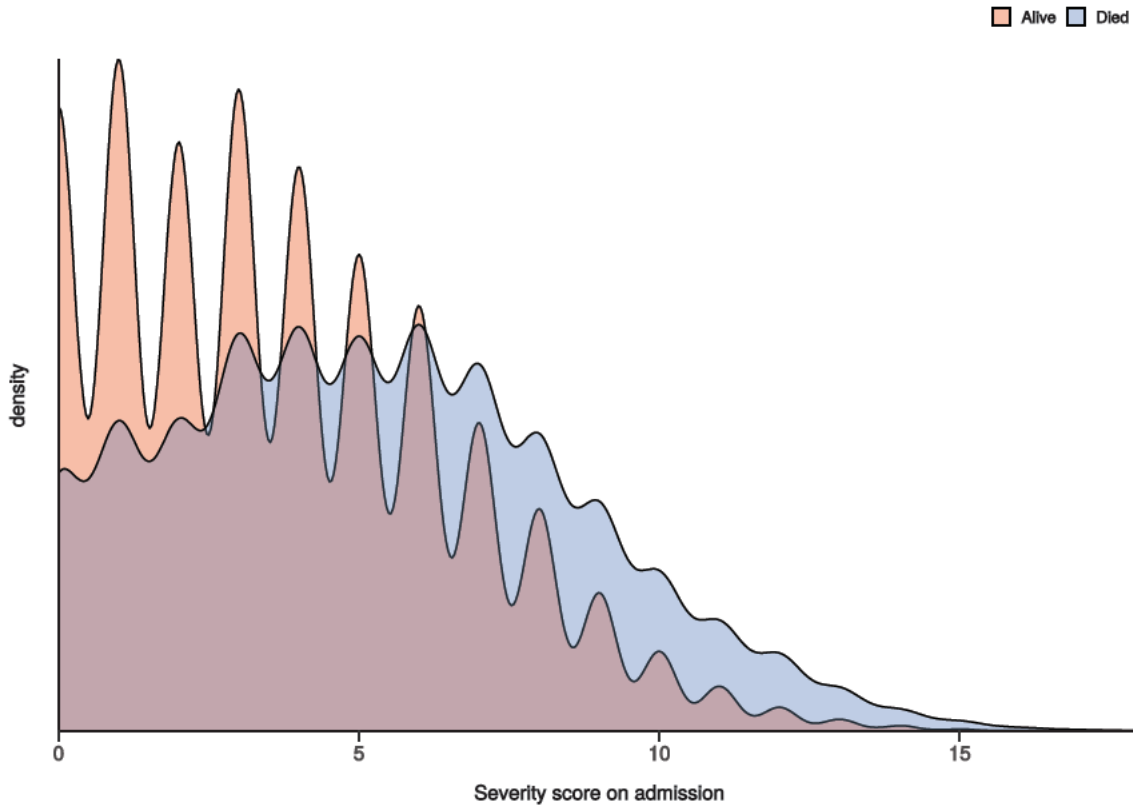


Figure 20 - Death by severity (NEWS) on admission stratified by age

Number of deaths by NEWS score at admission
Stratified by age

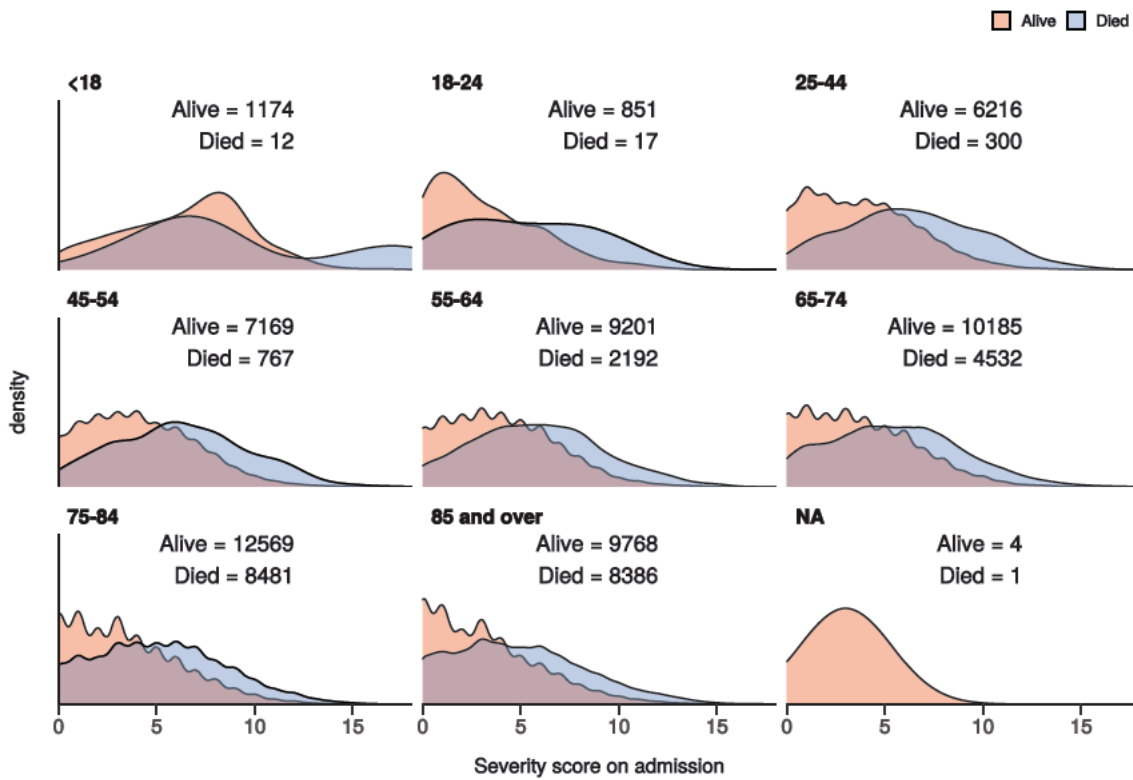
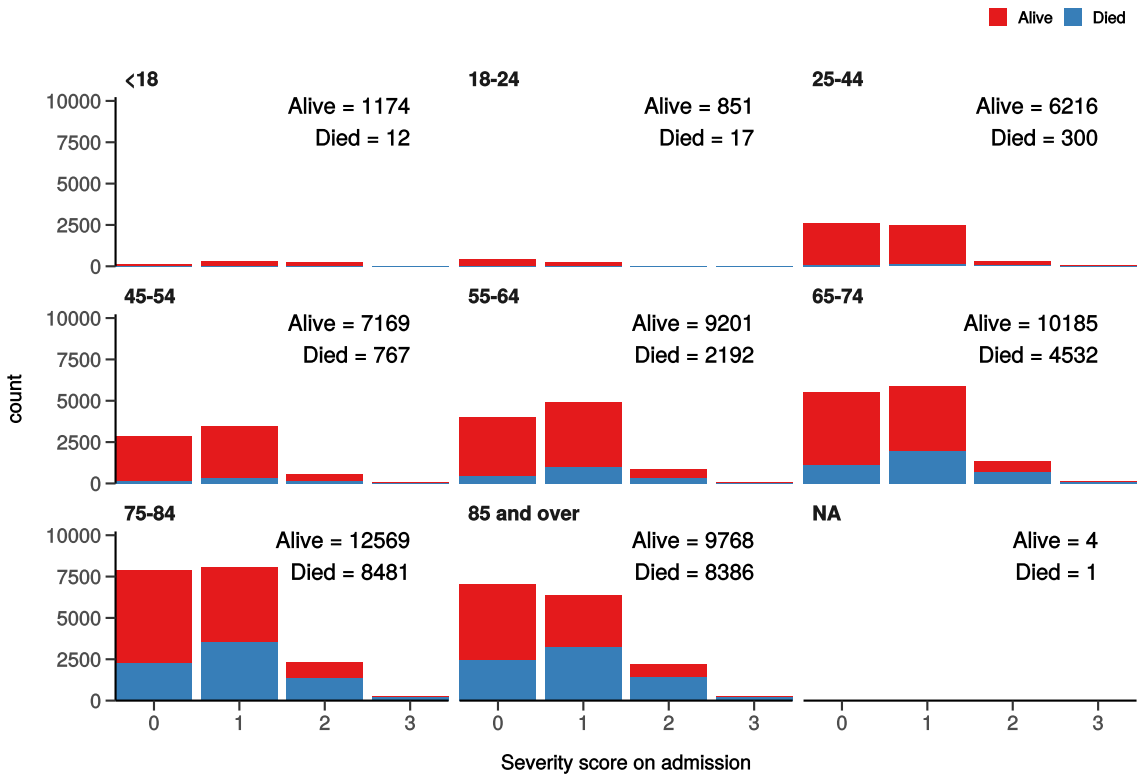


Figure 21 - Death by severity (qSOFA) on admission stratified by age

Number of deaths by qSOFA score at admission
Stratified by age



Healthcare workers

Employed as a healthcare worker?		NO	YES	p
Total N (%)		74573 (95.3)	3638 (4.7)	
NEWS score on admission	Median (IQR)	4.0 (4.0)	4.0 (4.0)	<0.001
Death	No	47796 (68.0)	3272 (92.7)	<0.001
	Yes	22529 (32.0)	258 (7.3)	