

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

Dynamic content updated: 2020-11-16 03:34:40.

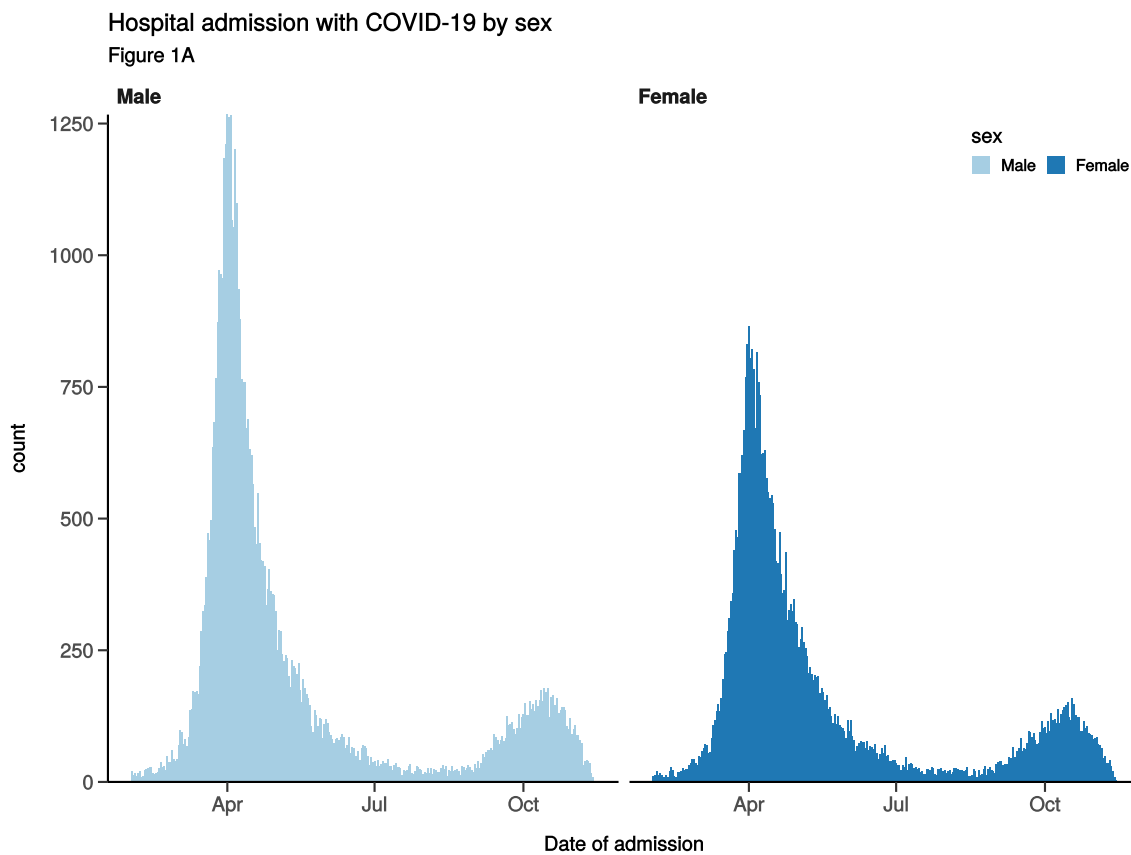
Executive summary

Includes all patients

There are 101749 patients included in CO-CIN. Of these, 25974 patient(s) have died and 12587 required ICU. 54089 have been discharged home.

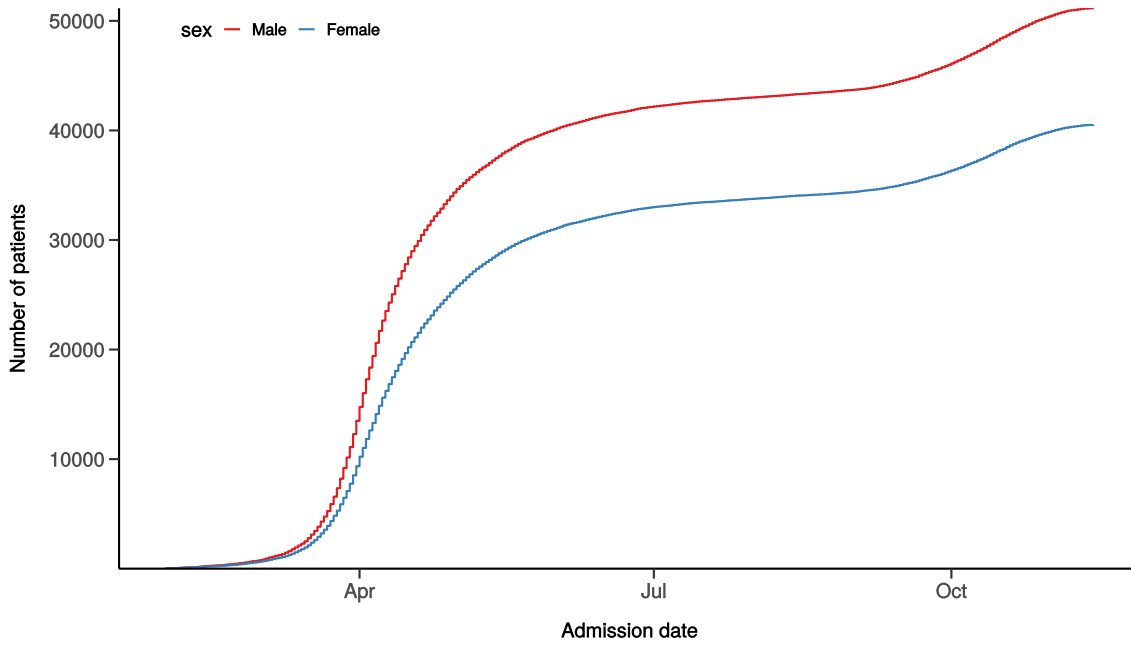
Admission

Figure 1



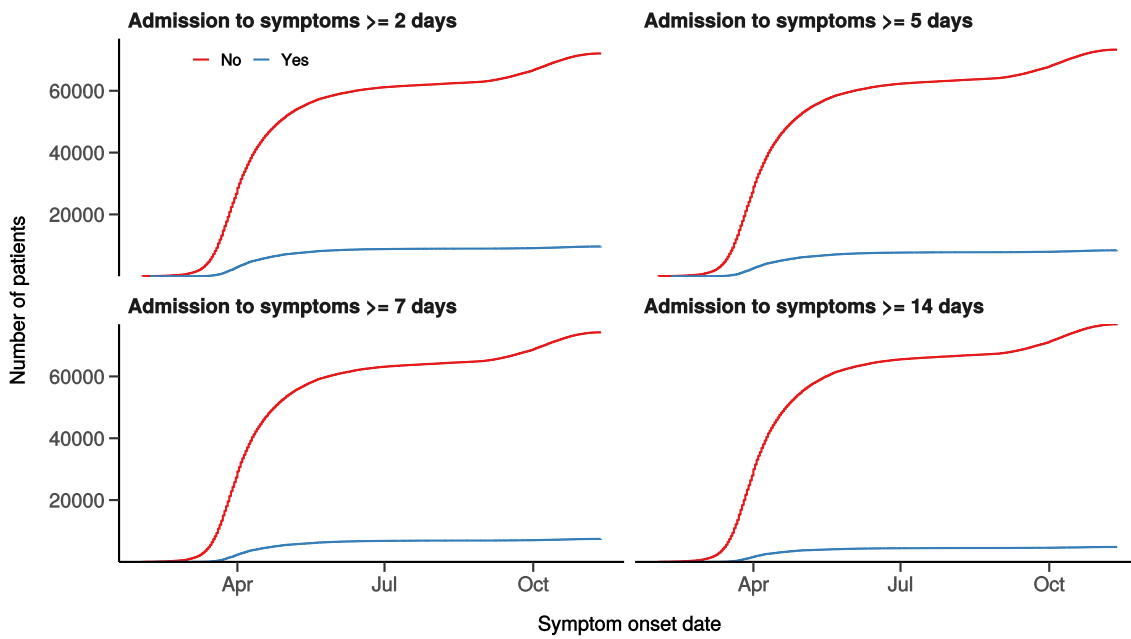
Hospital admission with COVID-19 by sex

Figure 1B



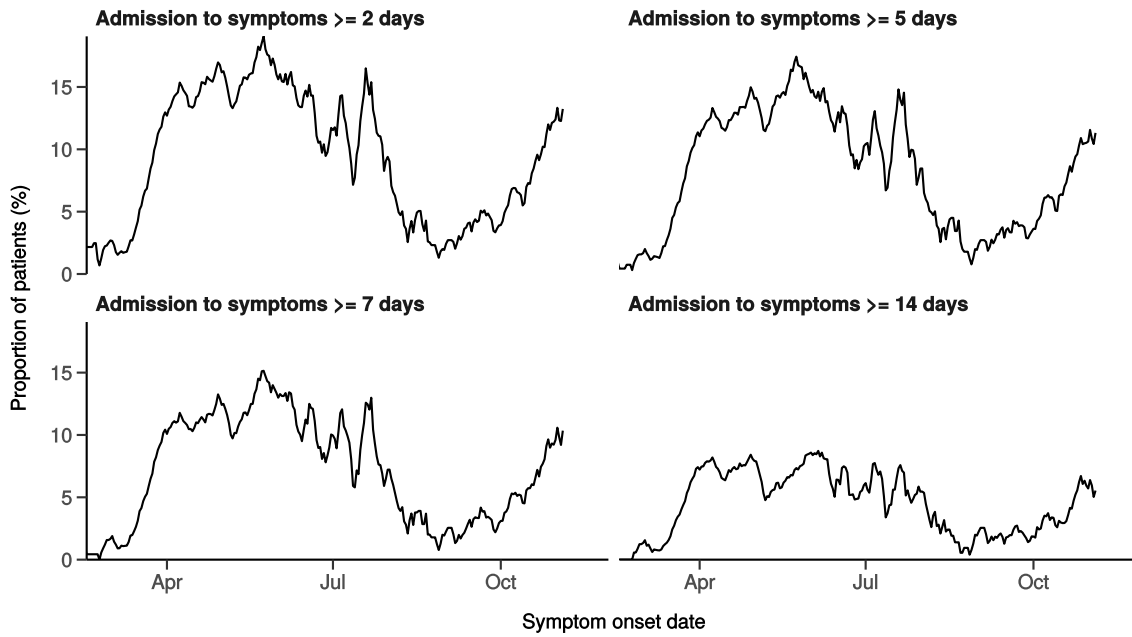
Number with symptom onset occurring after admission to hospital

Figure 1C



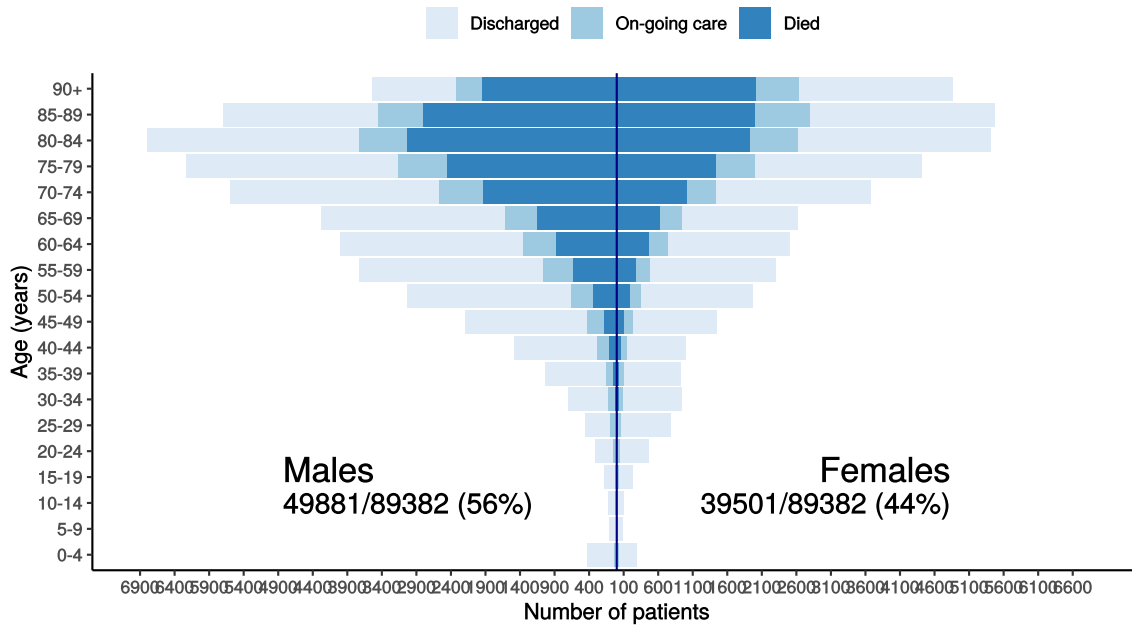
Proportion with symptom onset occurring after hospital admission

Figure 1D - 7-day rolling percentage. n = 81710



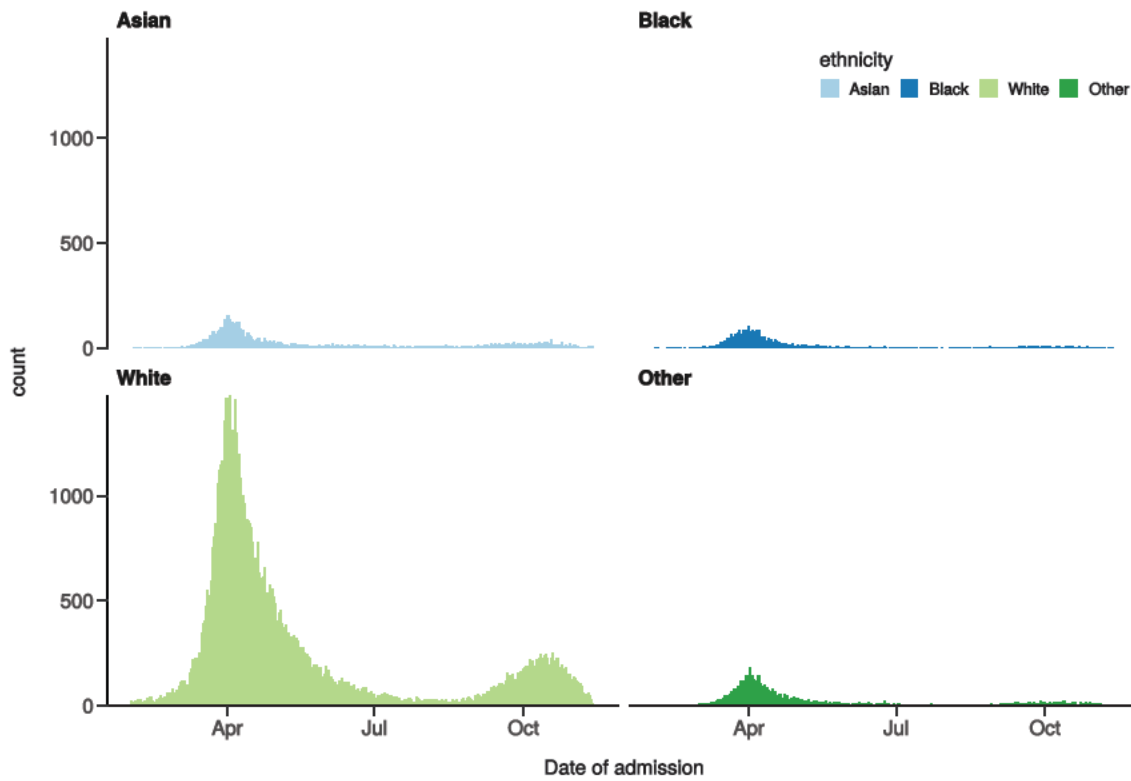
Patients with outcome stratified by age, and sex

Figure 1E



Hospital admission with COVID-19 by ethnicity

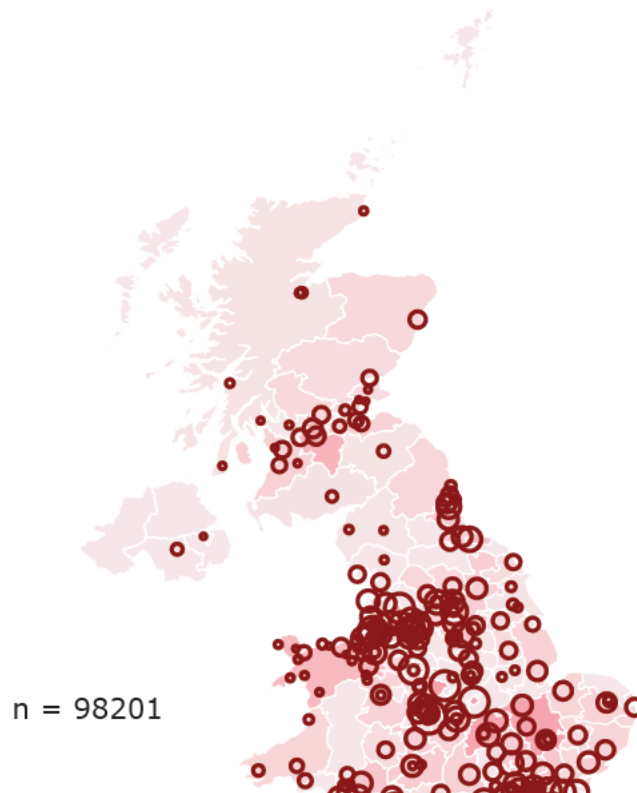
Figure 1F



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

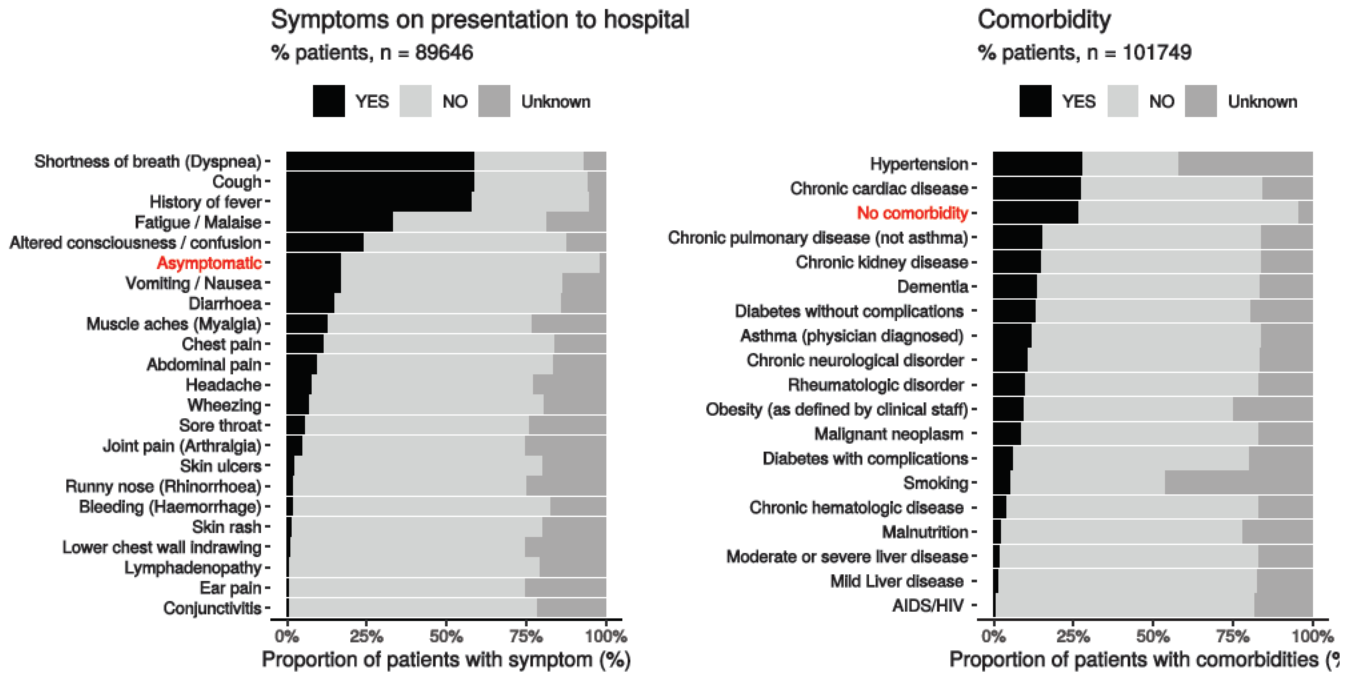


Figure 3B - Symptoms by Age

Symptoms on presentation to hospital
Stratified by age

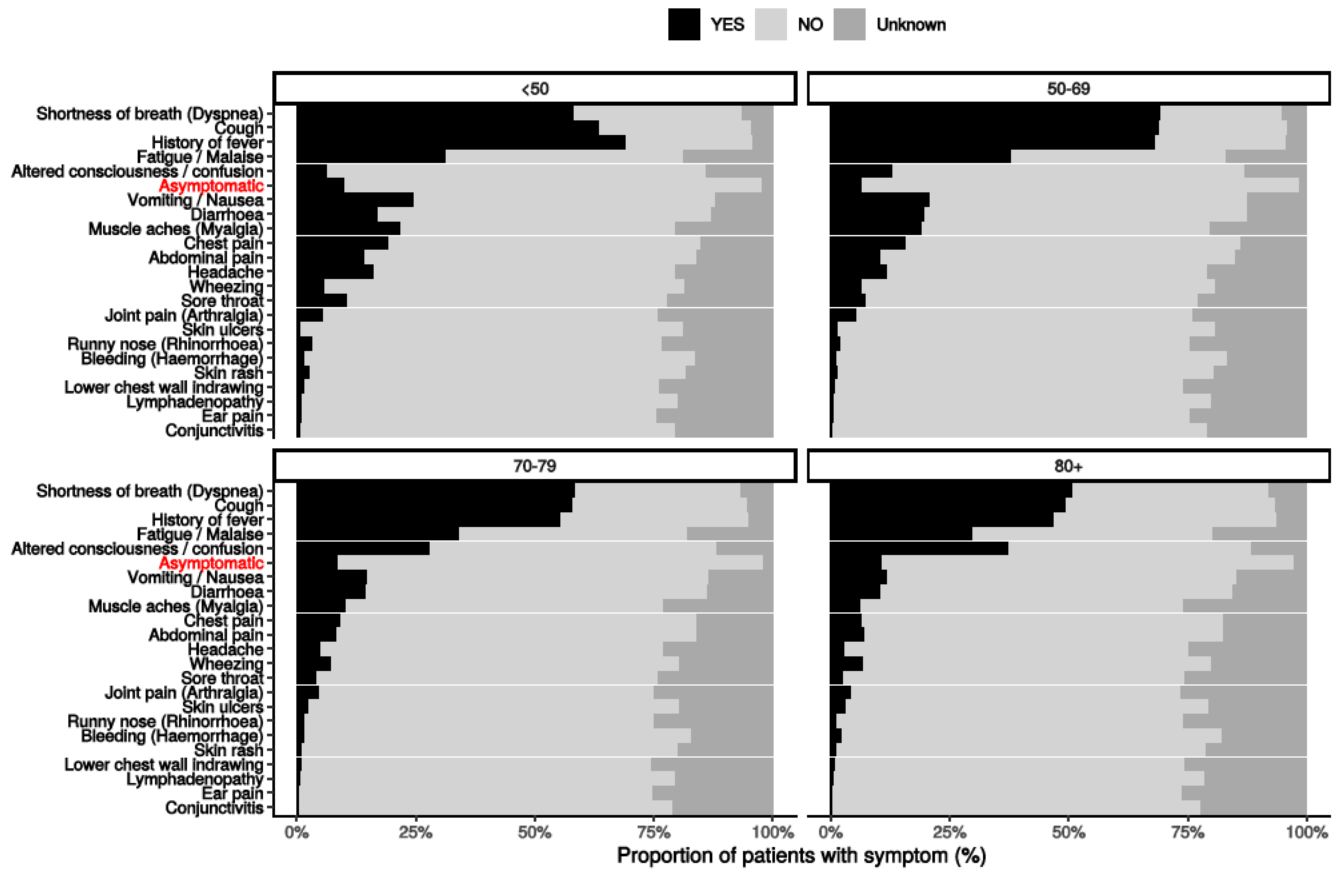
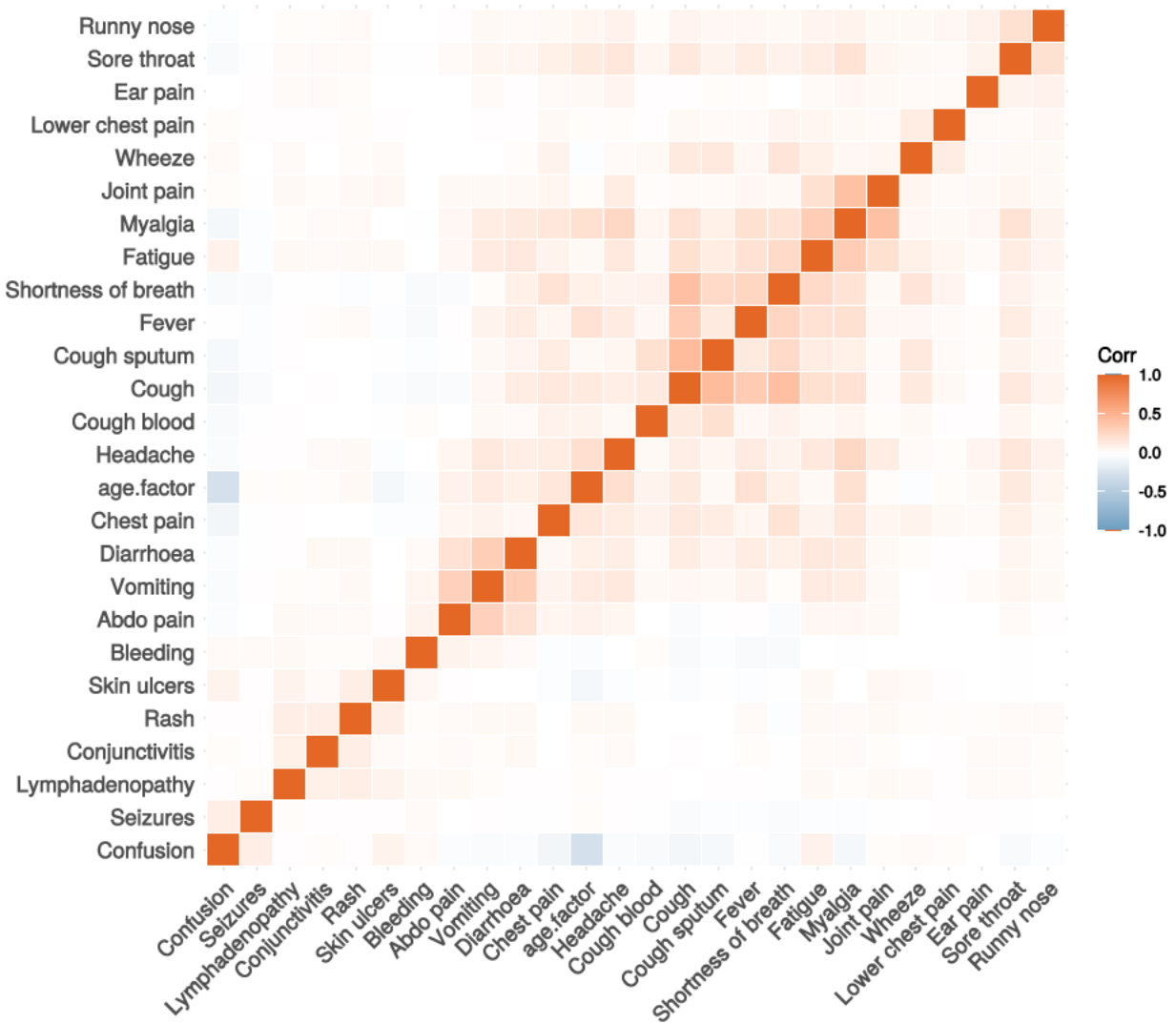


Figure 3C

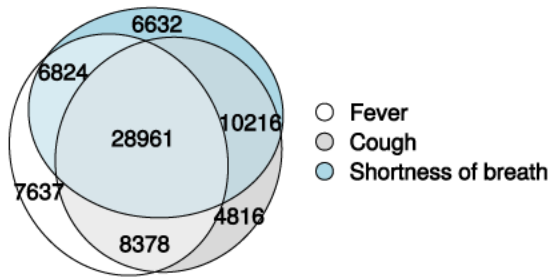
Correlation of symptoms in all pages. Note clusters, top right to bottom left, flu-like, coryzal, abdominal, respiratory, neurocutaneous.



Symptoms (diagnostic criteria)

Figure 4A

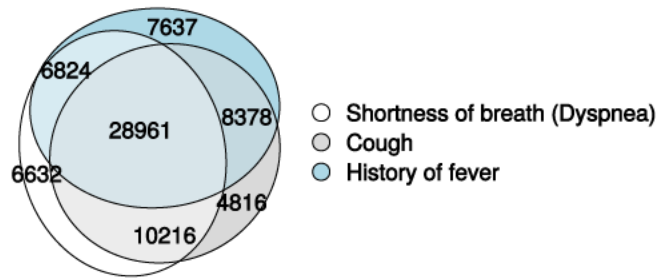
n = 89646



Symptoms (most common)

Figure 4B

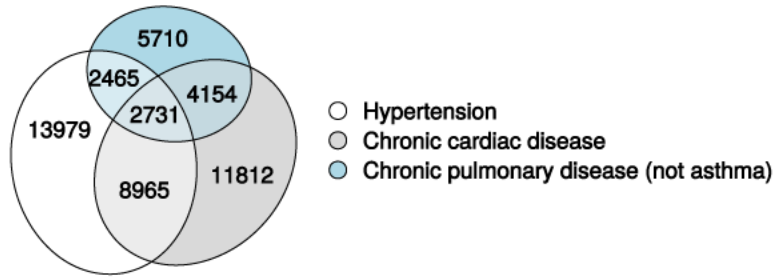
n = 89646



Comorbidity (most common)

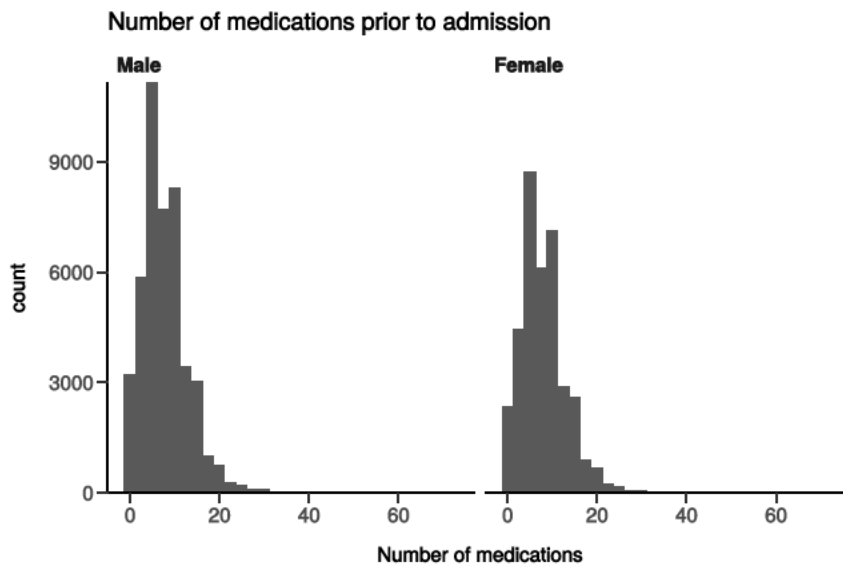
Figure 4C

n = 101749



Medication prior to illness

Figure 5

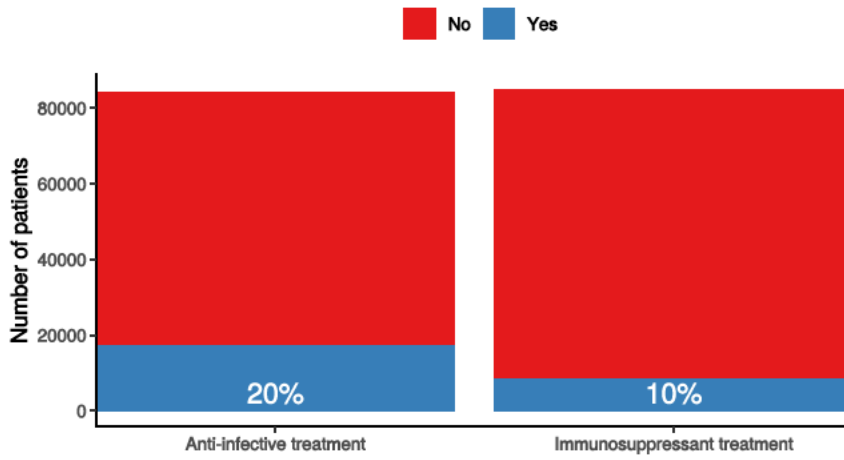


Preadmission treatment

Figure 6

Pre-admission treatment

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



Patient flow

Figure 7A - All patients

N = 91739

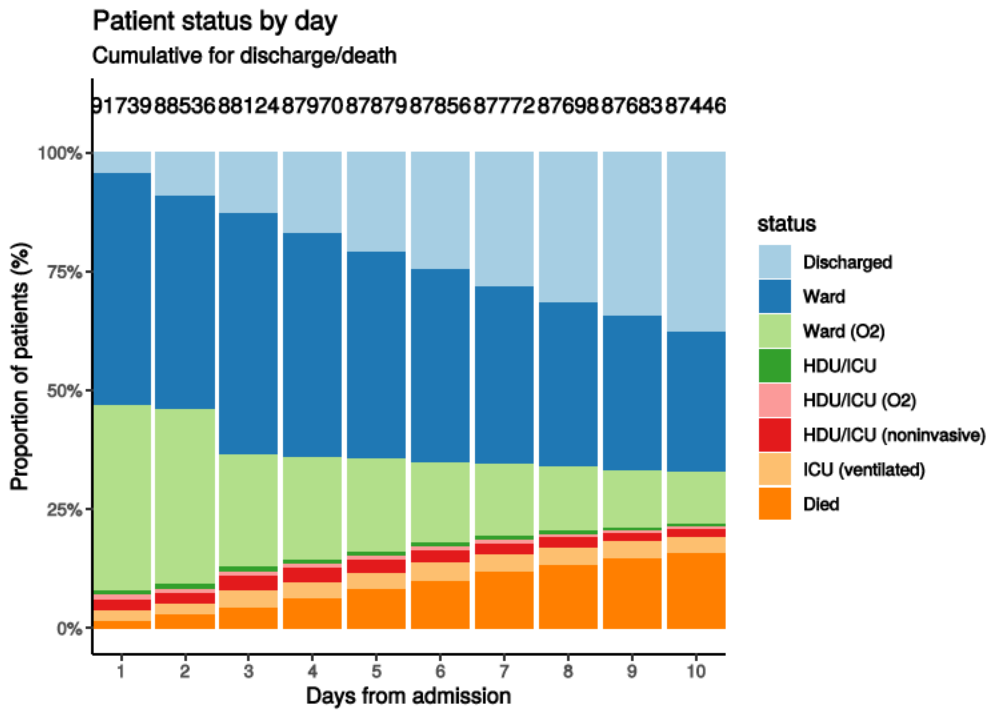
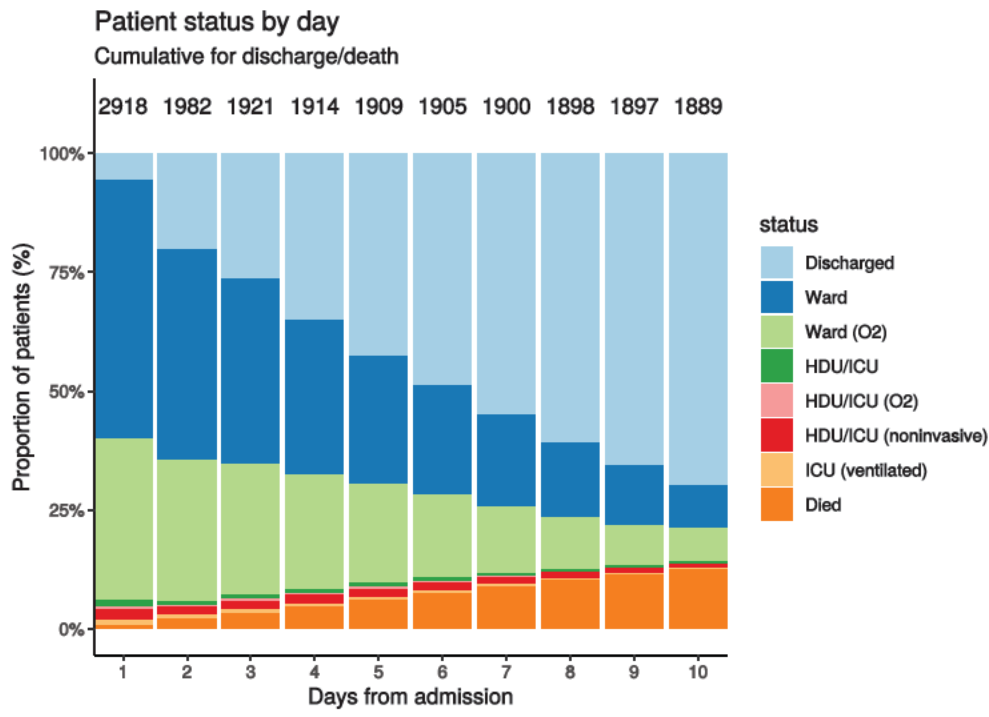


Figure 7B - Patients admitted ≥ 14 days and ≤ 28 days ago

N = 2918



Oxygen requirement

Figure 8A - All patients

N = 86902

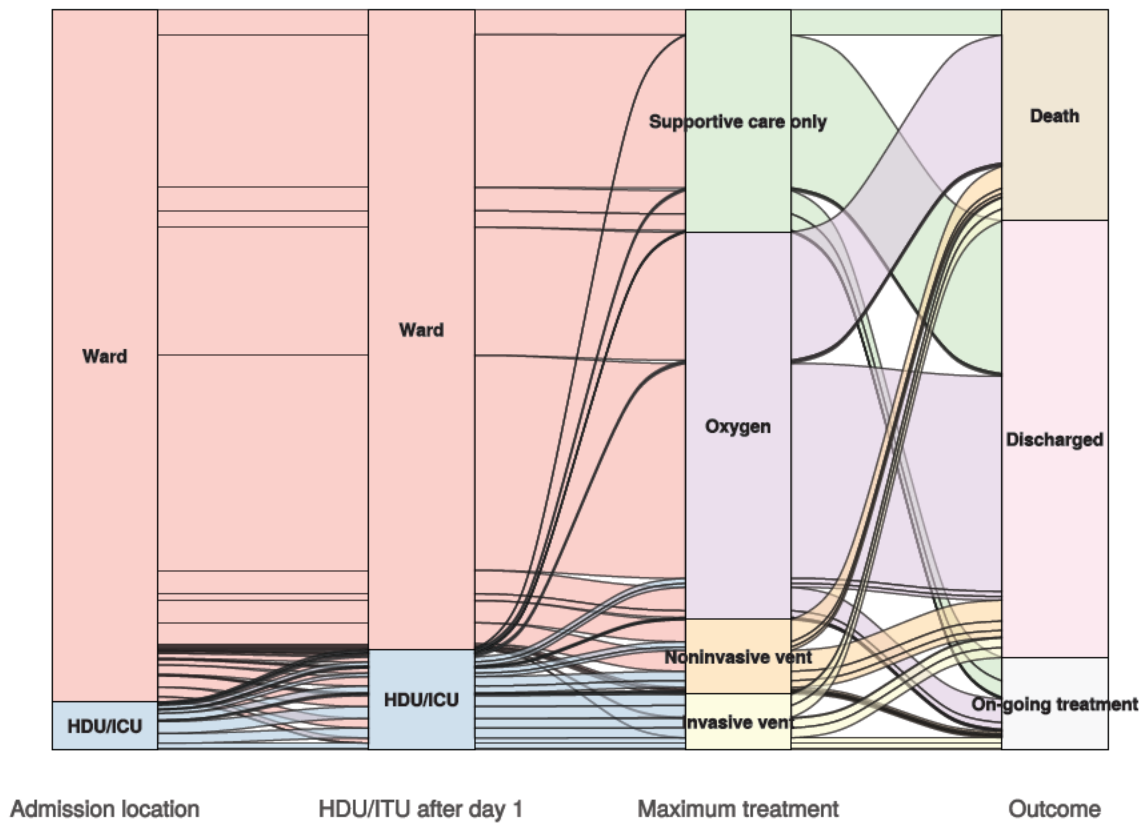


Figure 8B - Patients admitted ≥ 14 days and ≤ 28 days ago

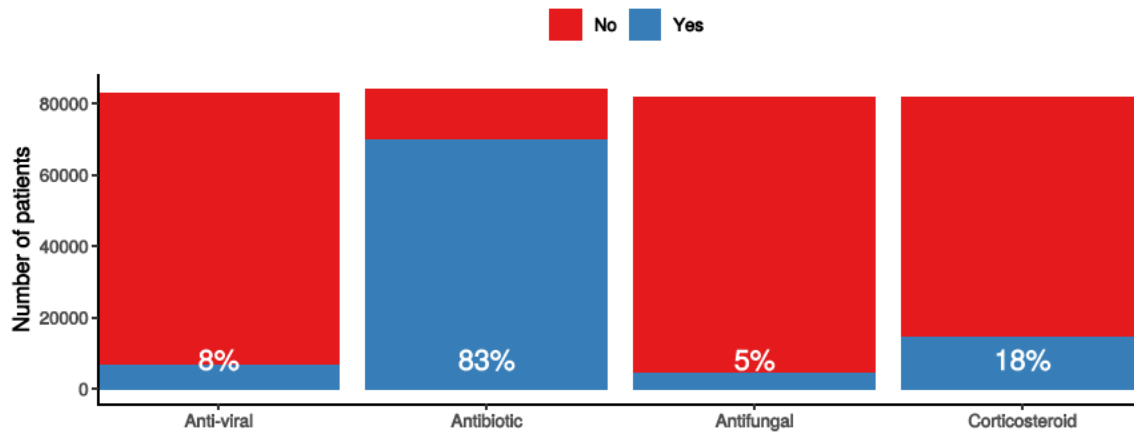
N = 2794

In-hospital medical treatment

Figure 9

In-hospital treatment

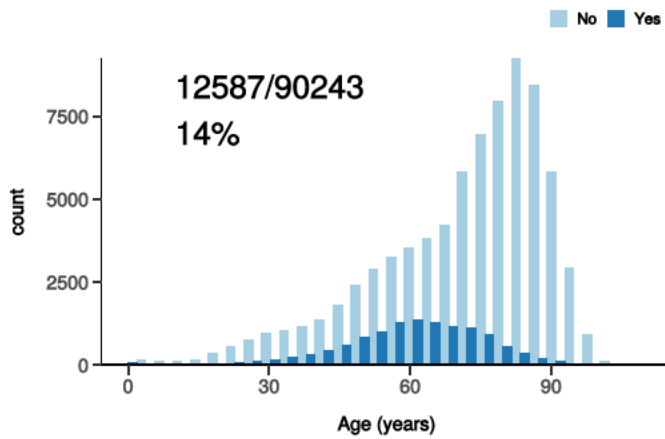
Anti-virals, antibiotics, corticosteroids, and anti-fungals for patients who have completed journey.



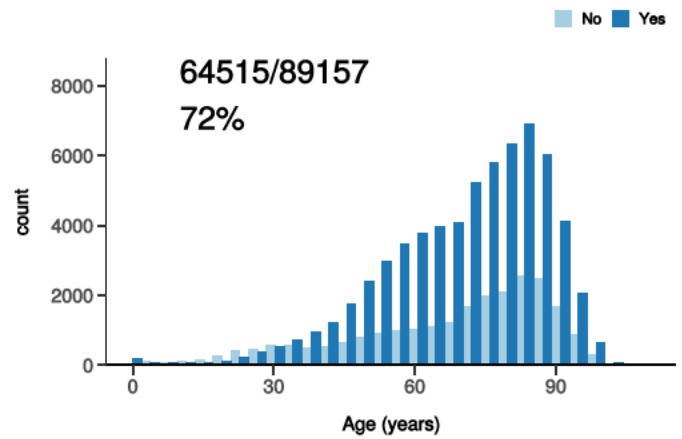
Treatment

Figure 10

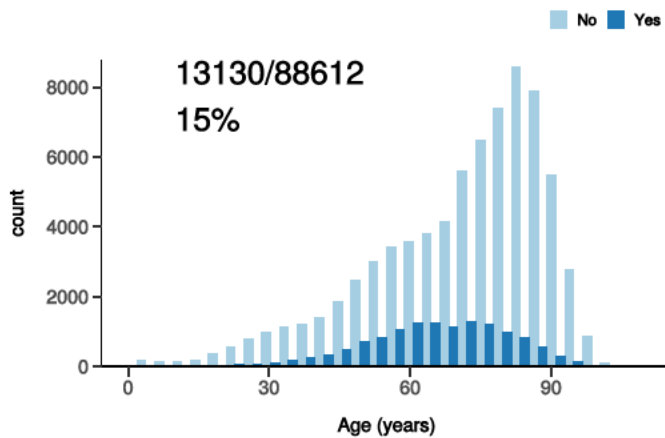
ICU/HDU admission
Figure 10A



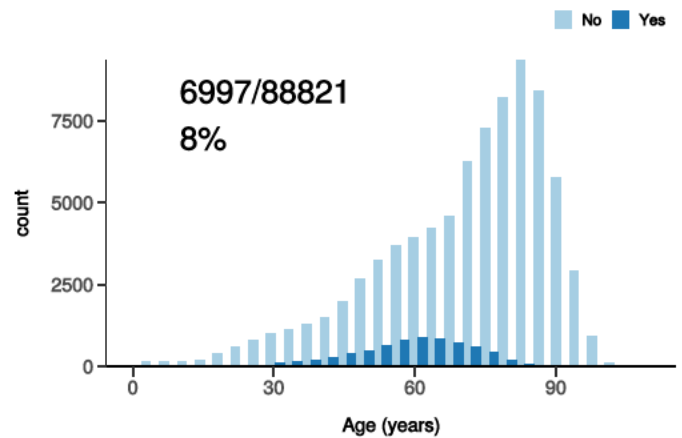
High flow oxygen
Figure 10B



Noninvasive ventilation
Figure 10C



Invasive ventilation
Figure 10D

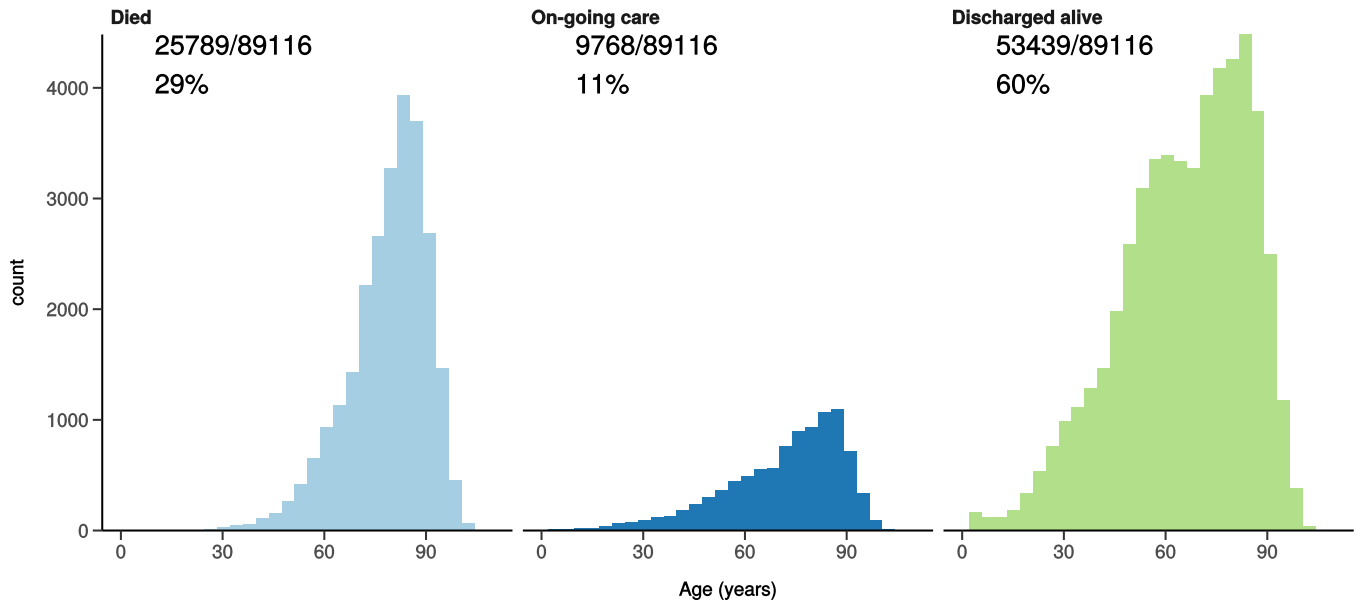


Status in patients admitted ≥ 14 days from today

Figure 11

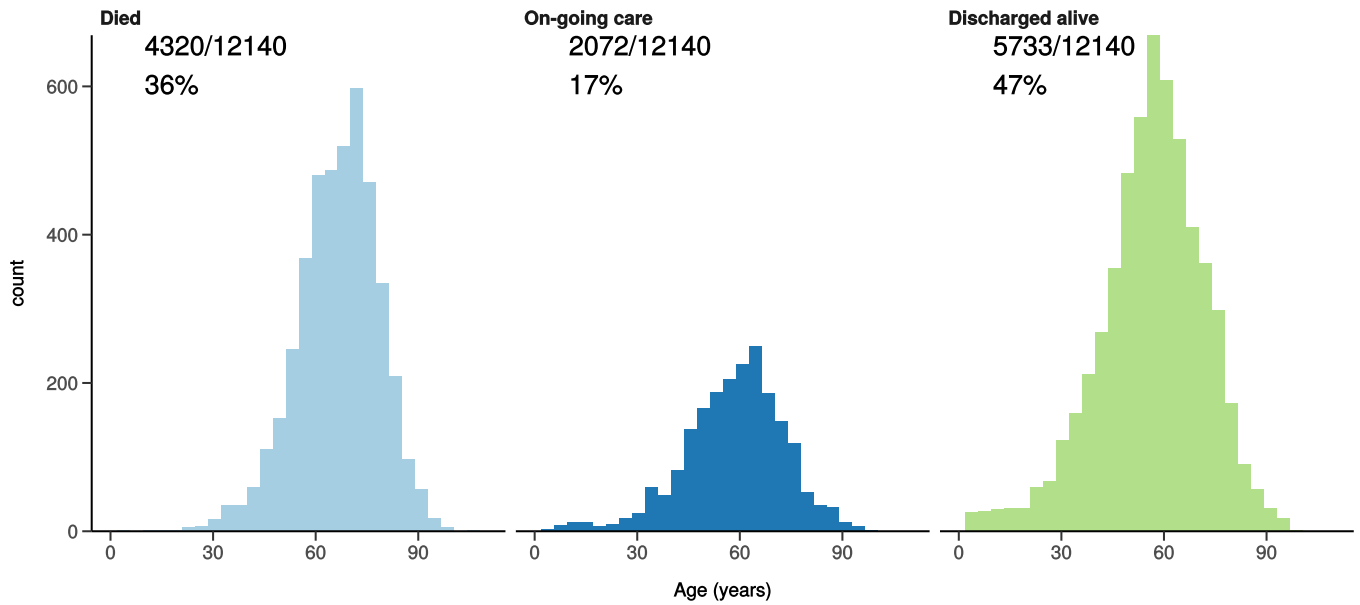
All: status in patients admitted ≥ 14 days ago

Figure 11A



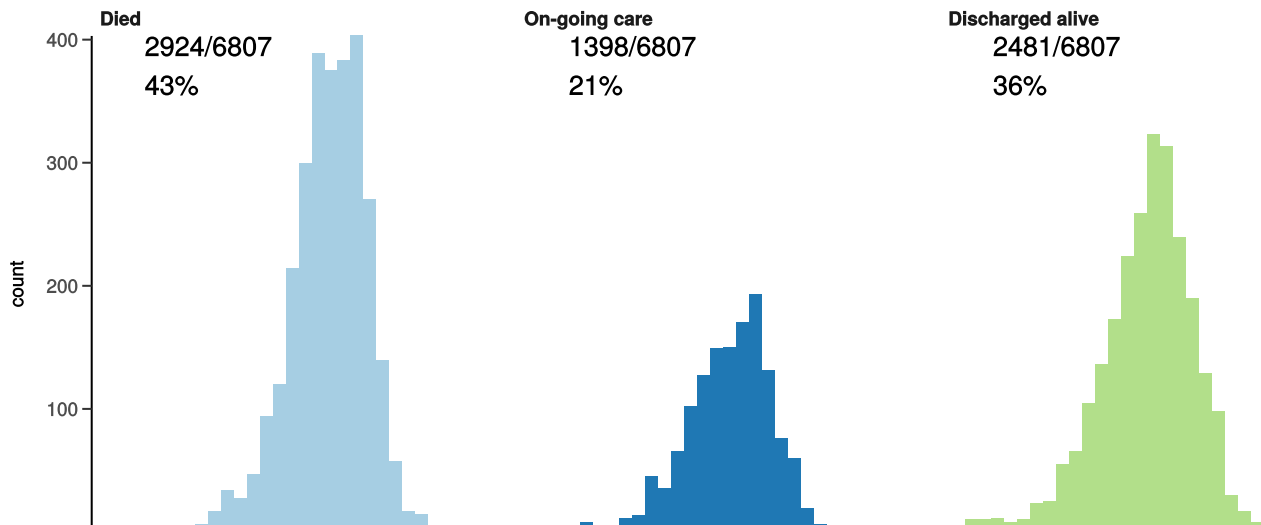
ICU/HDU admissions: status in patients admitted ≥ 14 days ago

Figure 11B



Invasive ventilation: status in patients admitted ≥ 14 days ago

Figure 11c

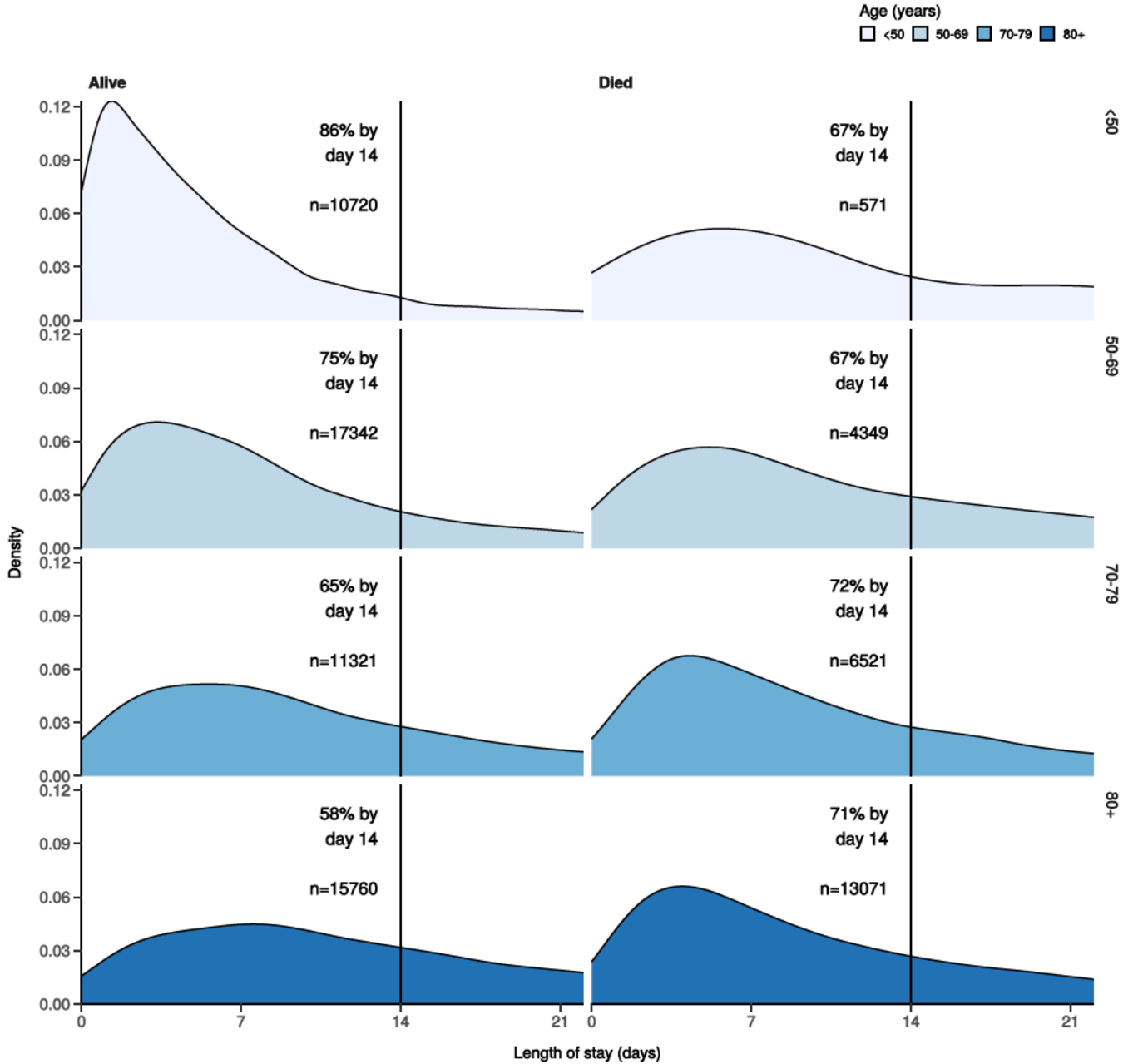




Length of stay stratified by age

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	12254 (95.2)	615 (4.8)	•	•

Dependent: death		No	Yes	OR (univariable)	OR (multivariable)
	50-69	19116 (80.7)	4566 (19.3)	4.76 (4.37-5.20, p<0.001)	4.40 (3.99-4.86, p<0.001)
	70-79	12484 (64.7)	6820 (35.3)	10.89 (9.99-11.88, p<0.001)	9.02 (8.18-9.97, p<0.001)
	80+	17252 (55.7)	13700 (44.3)	15.82 (14.56-17.23, p<0.001)	13.02 (11.82-14.38, p<0.001)
Sex at Birth	Male	32945 (67.9)	15548 (32.1)	•	•
	Female	28201 (73.5)	10168 (26.5)	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	41680 (75.4)	13623 (24.6)	•	•
	YES	15810 (59.9)	10564 (40.1)	2.04 (1.98-2.11, p<0.001)	1.16 (1.11-1.20, p<0.001)
Chronic pulmonary disease (not asthma)	NO	48722 (72.6)	18375 (27.4)	•	•
	YES	8652 (60.5)	5641 (39.5)	1.73 (1.66-1.79, p<0.001)	1.27 (1.21-1.33, p<0.001)
Chronic neurological disorder	NO	50566 (71.6)	20038 (28.4)	•	•
	YES	6440 (63.1)	3764 (36.9)	1.47 (1.41-1.54, p<0.001)	1.17 (1.11-1.23, p<0.001)
Chronic hematologic disease	NO	54687 (71.0)	22381 (29.0)	•	•
	YES	2165 (62.2)	1316 (37.8)	1.49 (1.38-1.59, p<0.001)	1.17 (1.07-1.27, p<0.001)
Chronic kidney disease	NO	49111 (73.2)	18013 (26.8)	•	•
	YES	8108 (57.7)	5933 (42.3)	2.00 (1.92-2.07, p<0.001)	1.30 (1.25-1.37, p<0.001)
Dementia	NO	49924 (73.6)	17929 (26.4)	•	•
	YES	7122 (54.5)	5947 (45.5)	2.33 (2.24-2.42, p<0.001)	1.38 (1.31-1.44, p<0.001)
Obesity (as defined by clinical staff)	NO	45067 (70.5)	18828 (29.5)	•	•
	YES	6564 (74.4)	2259 (25.6)	0.82 (0.78-0.87, p<0.001)	1.26 (1.19-1.33, p<0.001)
Malignant neoplasm	NO	52170 (72.1)	20210 (27.9)	•	•
	YES	4713 (57.2)	3526 (42.8)	1.93 (1.84-2.02, p<0.001)	1.47 (1.39-1.55, p<0.001)

Number in dataframe = 91706, Number in model = 69178, Missing = 22528, AIC = 73658.1, C-statistic = 0.721, H&L = Chi-sq(8) 127.42 (p<0.001)

Figure 13 - Adjusted odds ratio plot

Death

Age on admission (years)	<50	-
	50-69	4.40 (3.99-4.86, p<0.001)
	70-79	9.02 (8.18-9.97, p<0.001)
	80+	13.02 (11.82-14.38, 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	1.27 (1.21-1.33, p<0.001)
Chronic neurological disorder	YES	1.17 (1.11-1.23, p<0.001)
Chronic hematologic disease	YES	1.17 (1.07-1.27, p<0.001)
Chronic kidney disease	YES	1.30 (1.25-1.37, p<0.001)
Dementia	YES	1.38 (1.31-1.44, p<0.001)
Obesity (as defined by clinical staff)	YES	1.26 (1.19-1.33, p<0.001)
Malignant neoplasm	YES	1.47 (1.39-1.55, p<0.001)

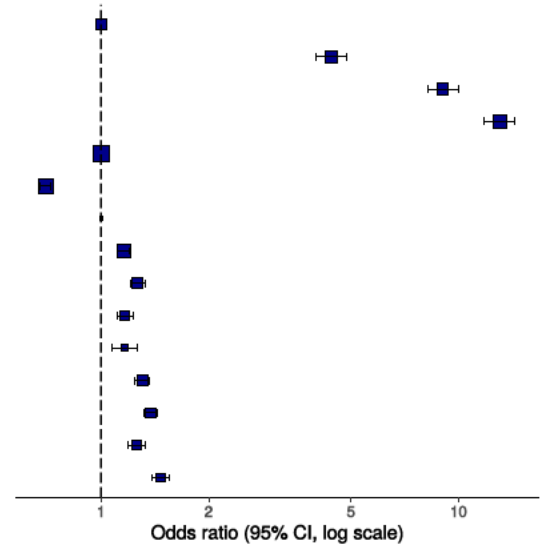
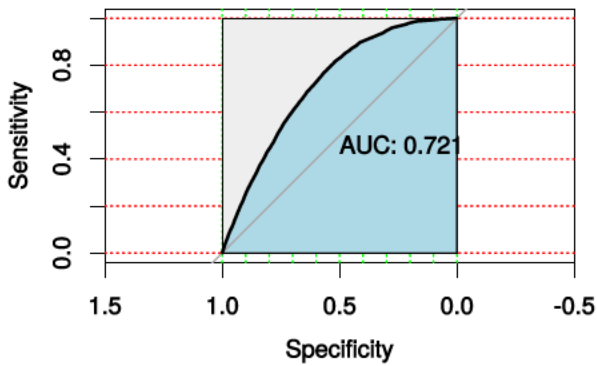


Figure 14 - ROC

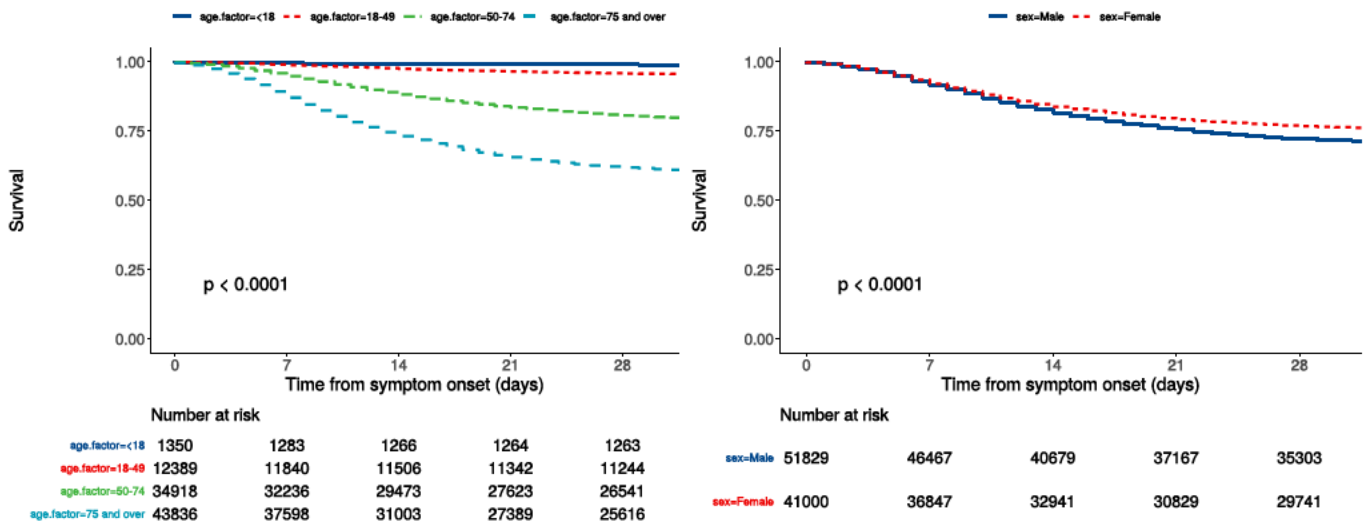


Survival models

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	13739 (14.9)	•	•
	50-69	25326 (27.4)	4.35 (4.00-4.74, p<0.001)	4.14 (3.73-4.59, p<0.001)
	70-79	20649 (22.3)	8.97 (8.26-9.75, p<0.001)	8.24 (7.44-9.13, p<0.001)
	80+	32787 (35.4)	12.26 (11.30-13.30, p<0.001)	10.98 (9.92-12.15, p<0.001)
Sex at Birth	Male	51829 (55.8)	•	•
	Female	41000 (44.2)	0.81 (0.79-0.83, p<0.001)	0.79 (0.76-0.81, p<0.001)
qSOFA score on admission	0	34277 (43.8)	•	•
	1	34837 (44.5)	1.63 (1.58-1.68, p<0.001)	1.74 (1.68-1.80, p<0.001)
	2	8261 (10.6)	3.19 (3.07-3.32, p<0.001)	2.95 (2.82-3.08, p<0.001)
	3	889 (1.1)	5.22 (4.79-5.68, p<0.001)	4.66 (4.23-5.13, p<0.001)
Symptomatic at presentation	No symptoms	5440 (6.1)	•	•
	Symptoms	84249 (93.9)	1.65 (1.55-1.76, p<0.001)	•
Chronic cardiac disease	NO	57918 (67.8)	•	•
	YES	27541 (32.2)	1.83 (1.78-1.87, p<0.001)	1.14 (1.11-1.18, p<0.001)
Chronic kidney disease	NO	70286 (82.8)	•	•
	YES	14623 (17.2)	1.78 (1.73-1.83, p<0.001)	1.23 (1.19-1.28, p<0.001)
Moderate or severe liver disease	NO	82465 (98.0)	•	•
	YES	1663 (2.0)	1.30 (1.20-1.41, p<0.001)	1.41 (1.28-1.57, p<0.001)
Chronic neurological disorder	NO	73936 (87.5)	•	•
	YES	10592 (12.5)	1.40 (1.35-1.45, p<0.001)	•
Malignant neoplasm	NO	75774 (89.8)	•	•
	YES	8572 (10.2)	1.69 (1.63-1.75, p<0.001)	1.35 (1.30-1.41, p<0.001)
Chronic hematologic disease	NO	80665 (95.7)	•	•
	YES	3592 (4.3)	1.38 (1.30-1.46, p<0.001)	•
Obesity (as defined by clinical staff)	NO	66830 (87.8)	•	•
	YES	9249 (12.2)	0.84 (0.80-0.88, p<0.001)	1.16 (1.10-1.22, p<0.001)

Dependent: Surv(time, status)		all	HR (univariable)	HR (multivariable)
Diabetes without complications	NO	68705 (84.2)	•	•
	YES	12911 (15.8)	1.27 (1.23-1.31, p<0.001)	•
Rheumatologic disorder	NO	74296 (88.4)	•	•
	YES	9773 (11.6)	1.19 (1.15-1.24, p<0.001)	•
Dementia	NO	71136 (84.0)	•	•
	YES	13542 (16.0)	2.05 (1.99-2.11, p<0.001)	1.17 (1.13-1.22, p<0.001)
Malnutrition	NO	77036 (97.3)	•	•
	YES	2134 (2.7)	1.48 (1.38-1.59, p<0.001)	•
smoking_mhyn_2levels	NO	49178 (56.6)	•	•
	YES	4817 (5.5)	0.87 (0.81-0.92, p<0.001)	•
	N/K	32920 (37.9)	1.22 (1.19-1.25, p<0.001)	•

Number in dataframe = 93201, Number in model = 63975, Missing = 29226, Number of events = 17683, Concordance = 0.724 (SE = 0.002), R-squared = 0.160(Max possible = 0.998), Likelihood ratio test = 11140.533 (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	4.14 (3.73-4.59, p<0.001)
	70-79	8.24 (7.44-9.13, p<0.001)
	80+	10.98 (9.92-12.15, p<0.001)
Sex at Birth	Female	0.79 (0.76-0.81, p<0.001)
qSOFA score on admission	0	-
	1	1.74 (1.68-1.80, p<0.001)
	2	2.95 (2.82-3.08, p<0.001)
	3	4.66 (4.23-5.13, p<0.001)
Chronic cardiac disease	YES	1.14 (1.11-1.18, p<0.001)
Chronic kidney disease	YES	1.23 (1.19-1.28, p<0.001)
Moderate or severe liver disease	YES	1.41 (1.28-1.57, p<0.001)
Malignant neoplasm	YES	1.35 (1.30-1.41, p<0.001)
Obesity (as defined by clinical staff)	YES	1.16 (1.10-1.22, p<0.001)
Dementia	YES	1.17 (1.13-1.22, p<0.001)

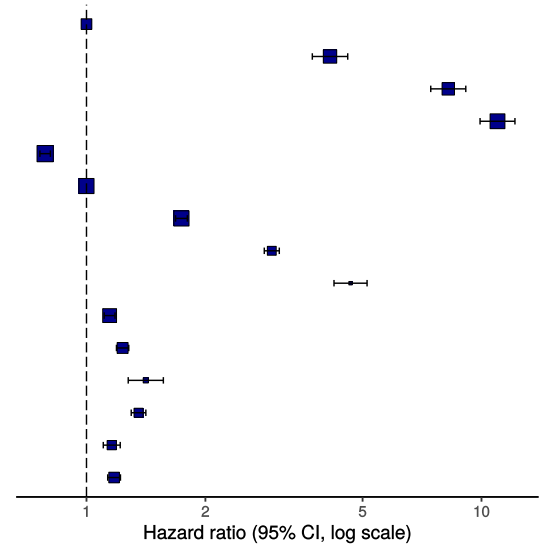
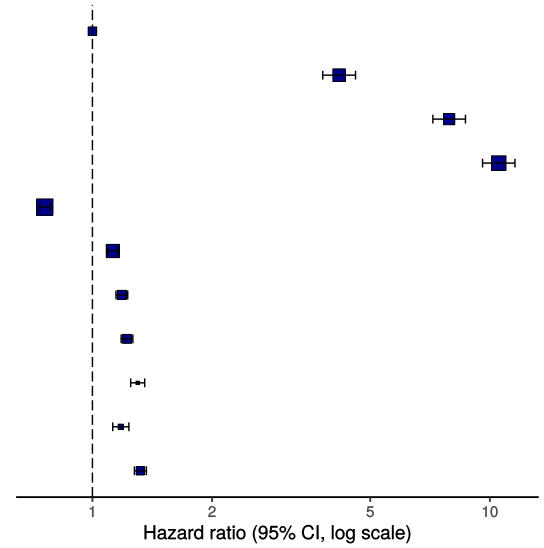


Figure 16b - Multivariable Cox proportional hazards model (age, sex, comorbidities only)

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

Age on admission (years)	<50	-
	50-69	4.18 (3.80-4.59, p<0.001)
	70-79	7.90 (7.19-8.68, p<0.001)
	80+	10.53 (9.59-11.56, p<0.001)
Sex at Birth	Female	0.76 (0.74-0.78, p<0.001)
Chronic cardiac disease	YES	1.13 (1.09-1.16, p<0.001)
Chronic pulmonary disease (not asthma)	YES	1.19 (1.15-1.23, p<0.001)
Chronic kidney disease	YES	1.22 (1.18-1.26, p<0.001)
Malignant neoplasm	YES	1.30 (1.25-1.35, p<0.001)
Obesity (as defined by clinical staff)	YES	1.18 (1.12-1.24, p<0.001)
Dementia	YES	1.32 (1.28-1.37, p<0.001)



ROC = 0.7237218

Figure 17 - Predictions calibration plot

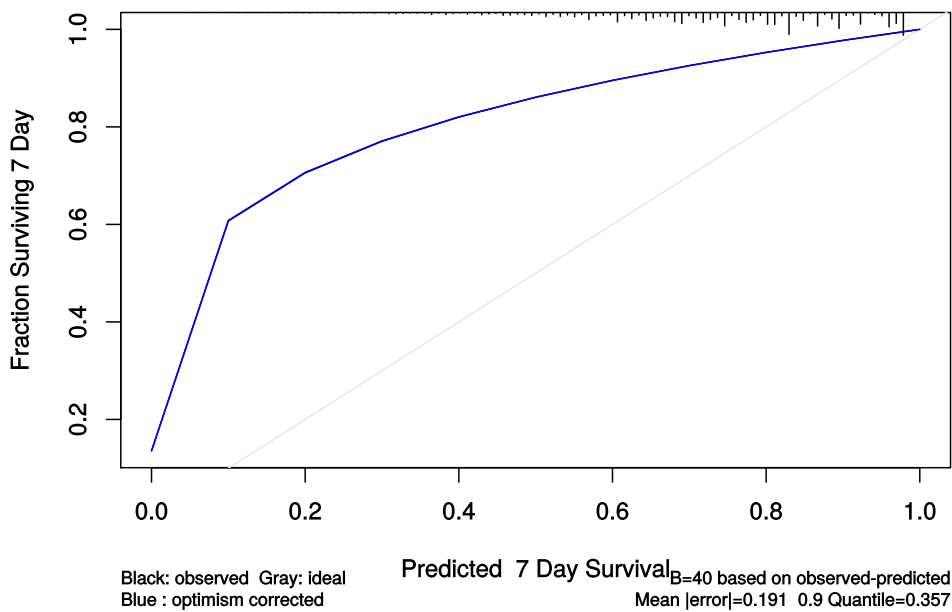


Figure 18 - Prognostic model predictions

Again, for demonstration of methods.

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

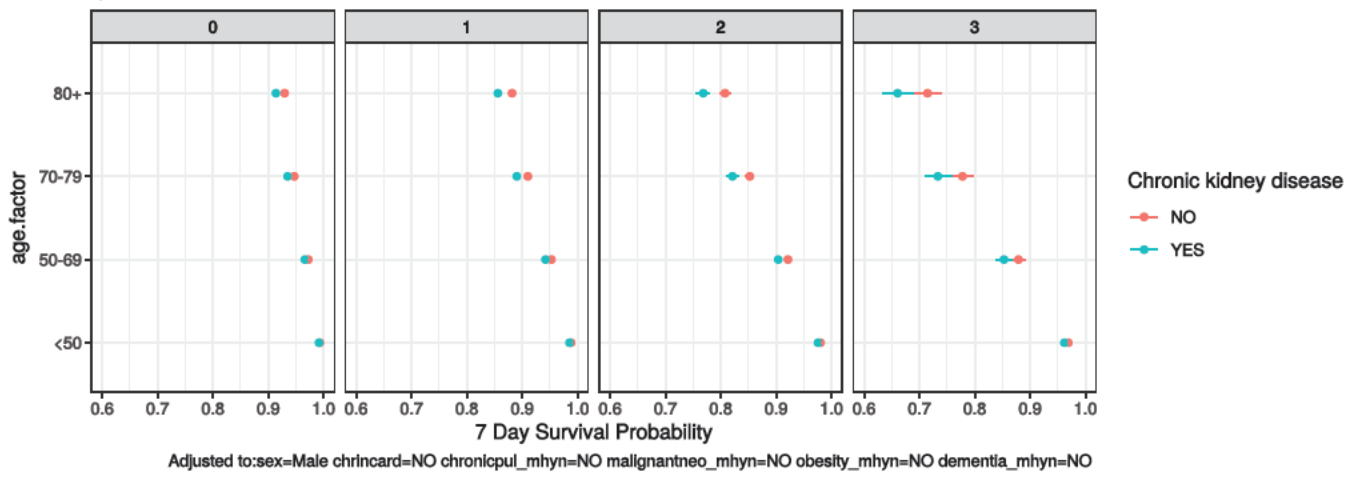


Figure 19 - Death by severity (NEWS) on admission

Number of deaths by NEWS score at admission

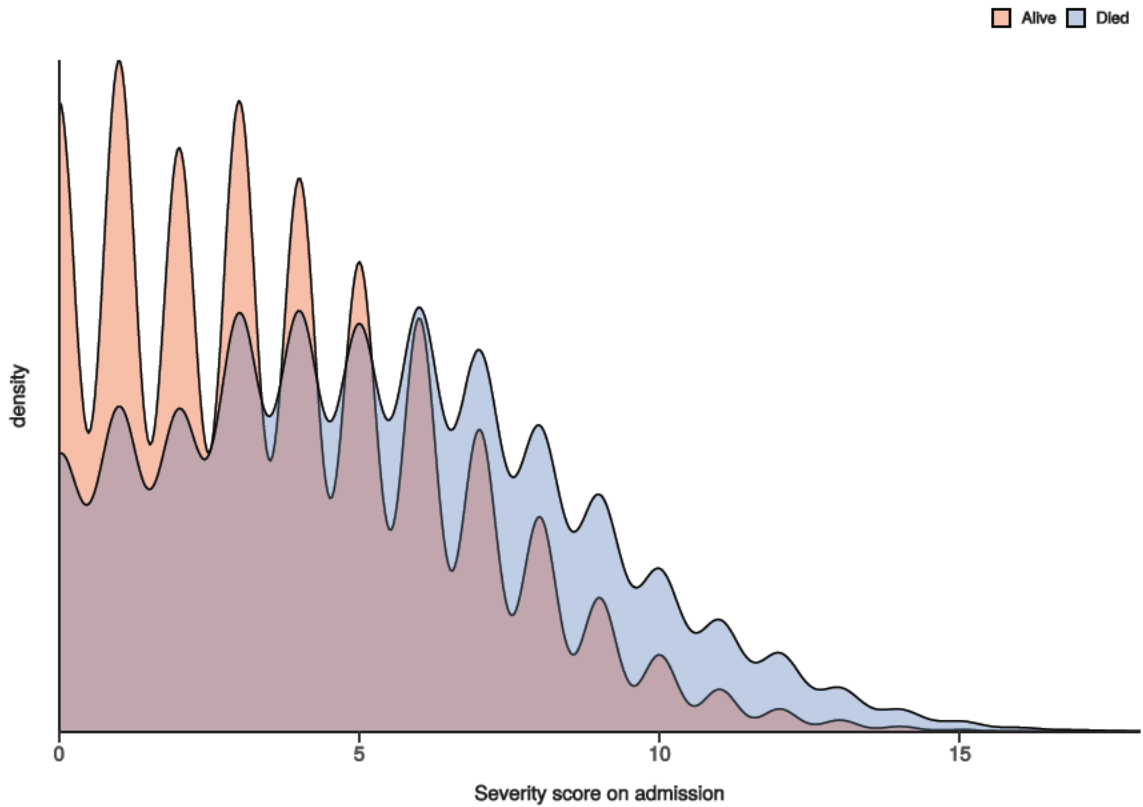


Figure 20 - Death by severity (NEWS) on admission stratified by age

Number of deaths by NEWS score at admission
Stratified by age

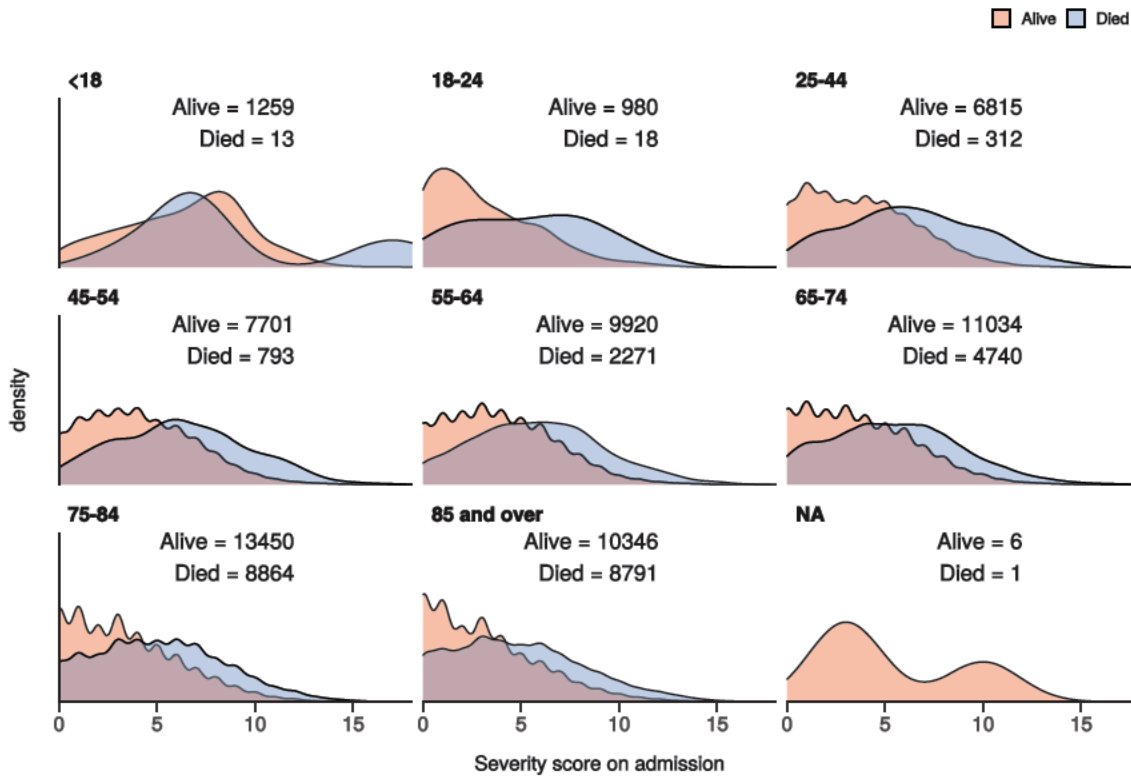
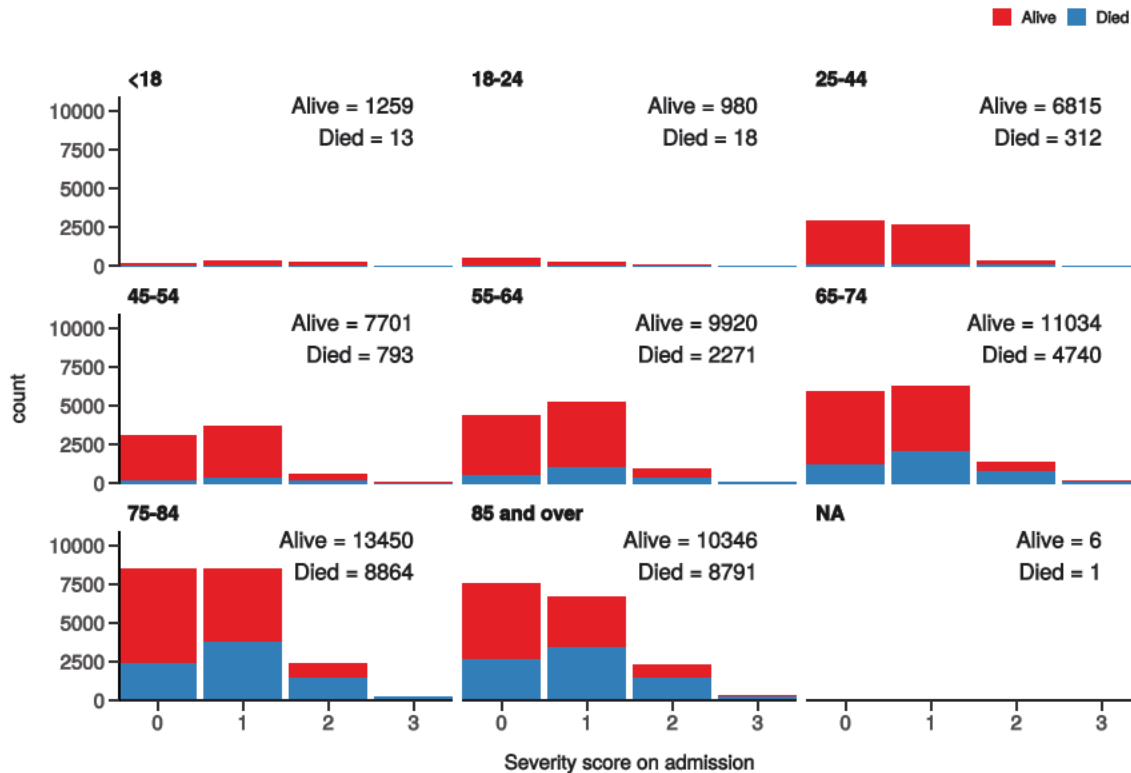


Figure 21 - Death by severity (qSOFA) on admission stratified by age

Number of deaths by qSOFA score at admission
Stratified by age



Healthcare workers

Employed as a healthcare worker?

NO

YES

p

Employed as a healthcare worker?		NO	YES	p
Total N (%)		81062 (95.5)	3790 (4.5)	
NEWS score on admission	Median (IQR)	4.0 (4.0)	4.0 (4.0)	<0.001
Death	No	51341 (68.5)	3382 (92.8)	<0.001
	Yes	23569 (31.5)	262 (7.2)	