

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

Dynamic content updated: 2020-10-15 04:31:14.

Executive summary

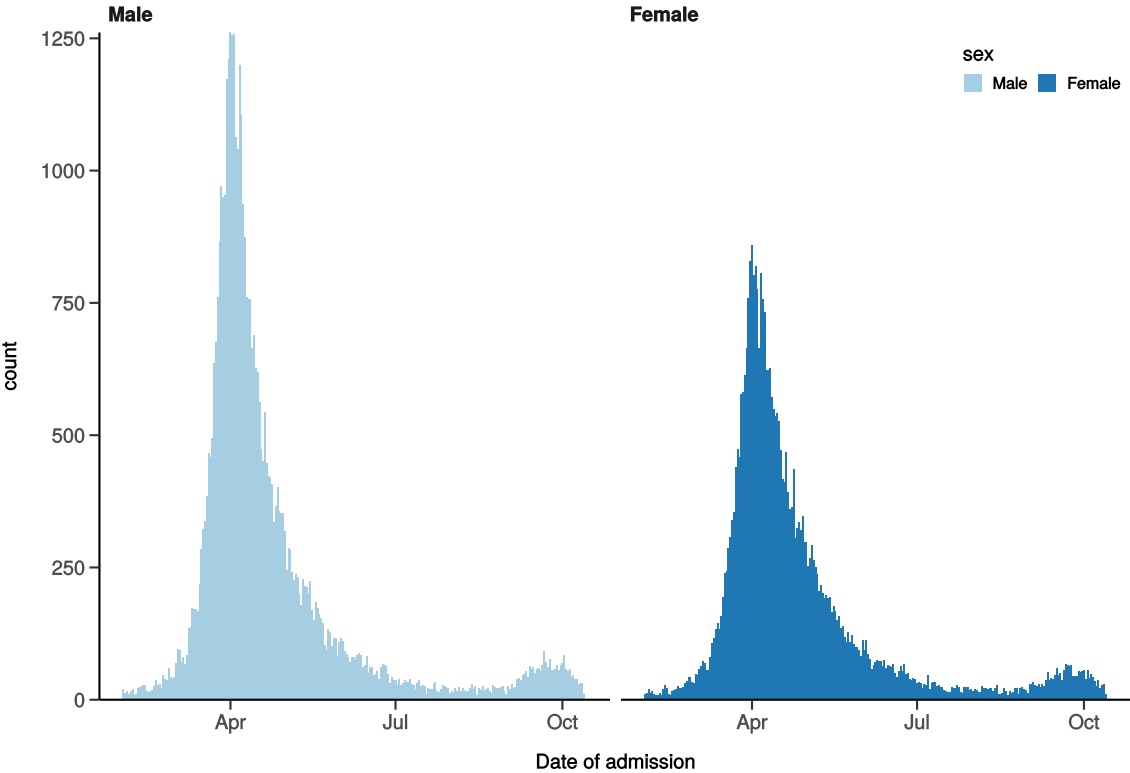
Includes all patients

There are 86548 patients included in CO-CIN. Of these, 24339 patient(s) have died and 11273 required ICU. 48507 have been discharged home.

Admission

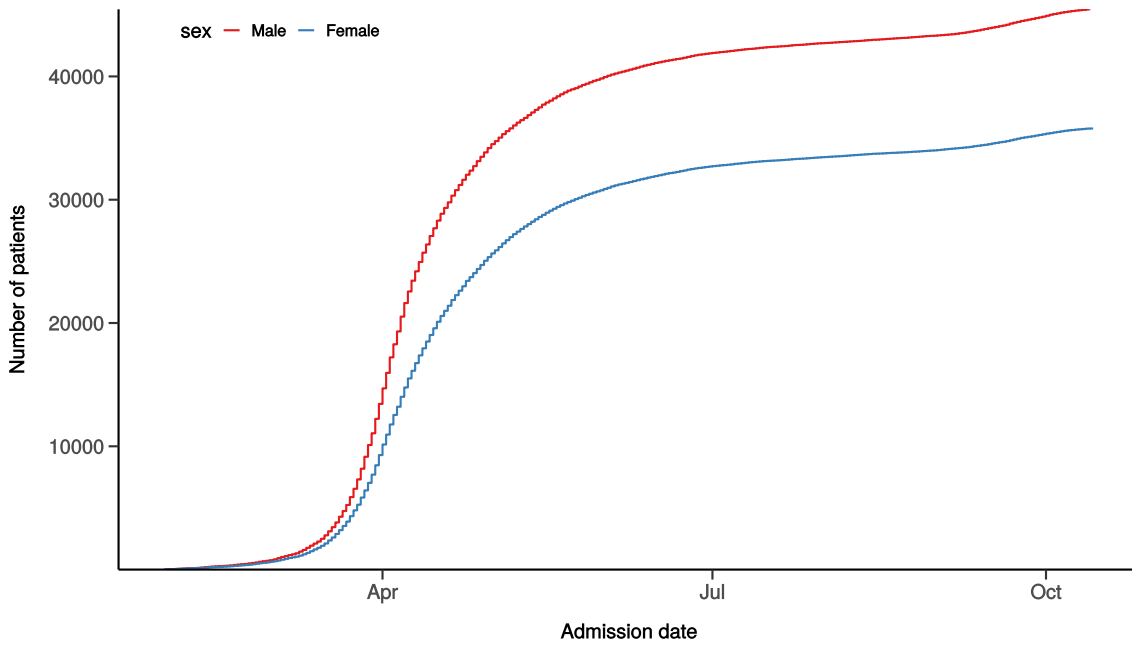
Figure 1

Hospital admission with COVID-19 by sex
Figure 1A



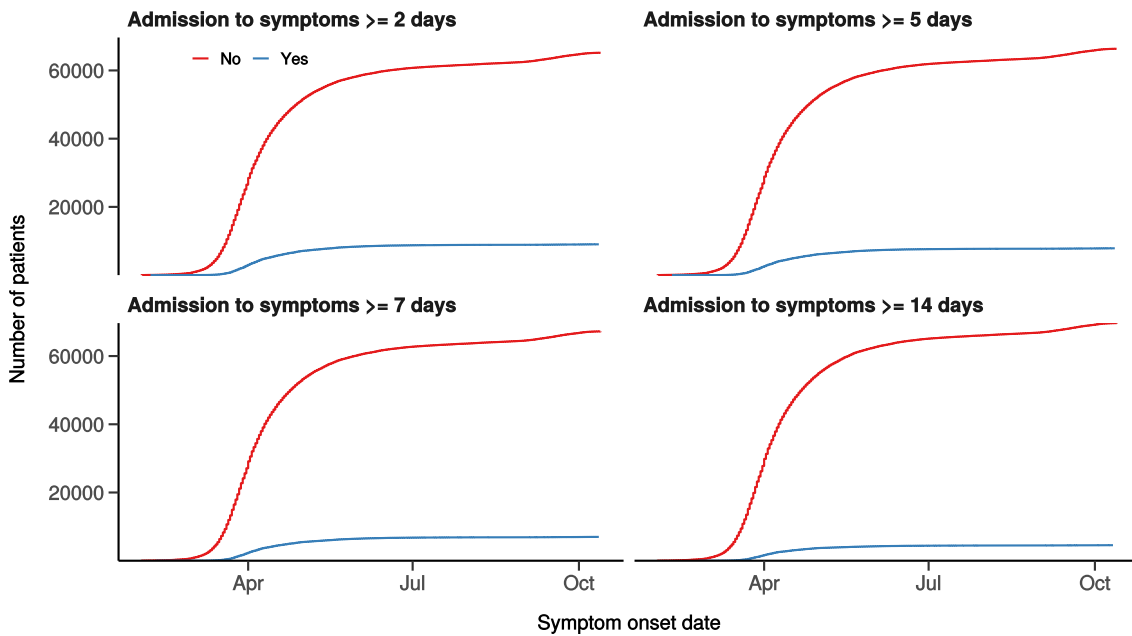
Hospital admission with COVID-19 by sex

Figure 1B



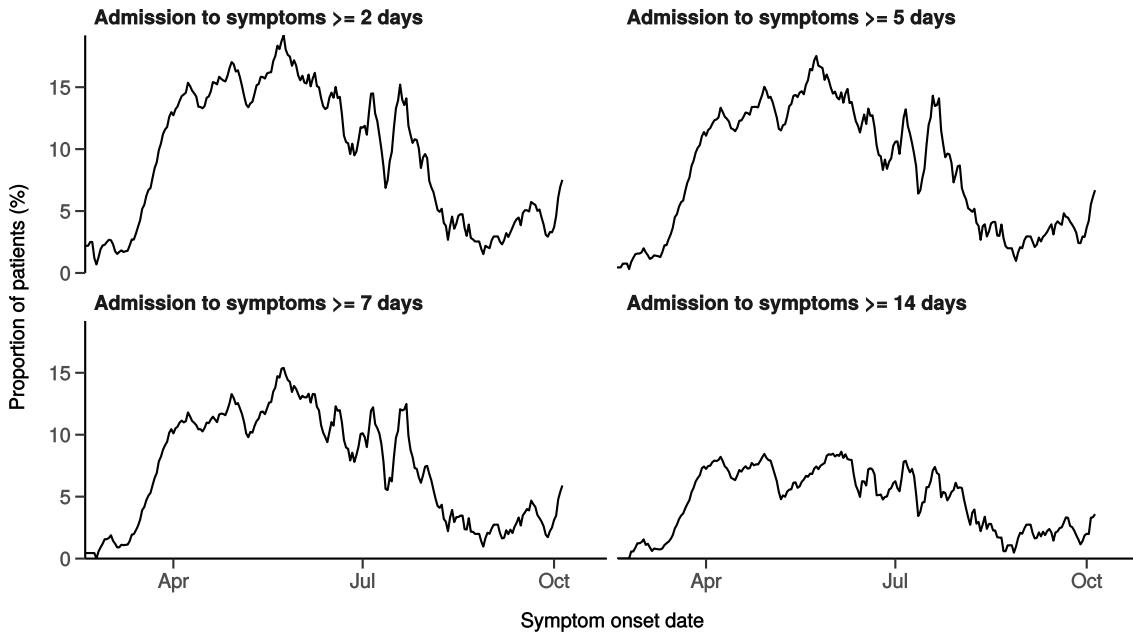
Number with symptom onset occurring after admission to hospital

Figure 1C



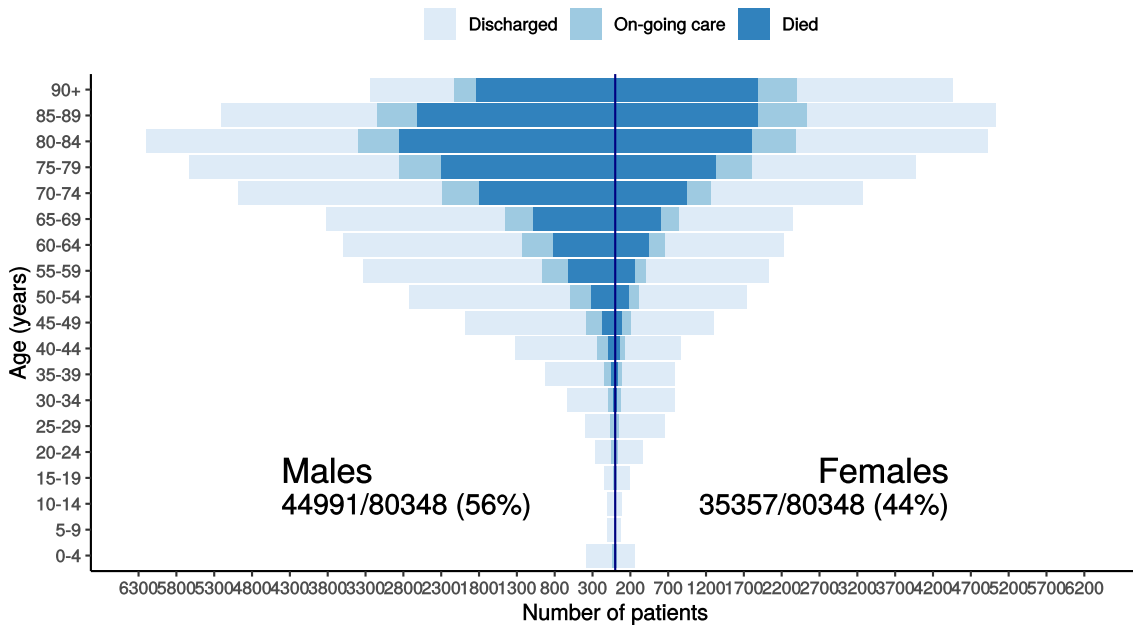
Proportion with symptom onset occurring after hospital admission

Figure 1D - 7-day rolling percentage. n = 74215

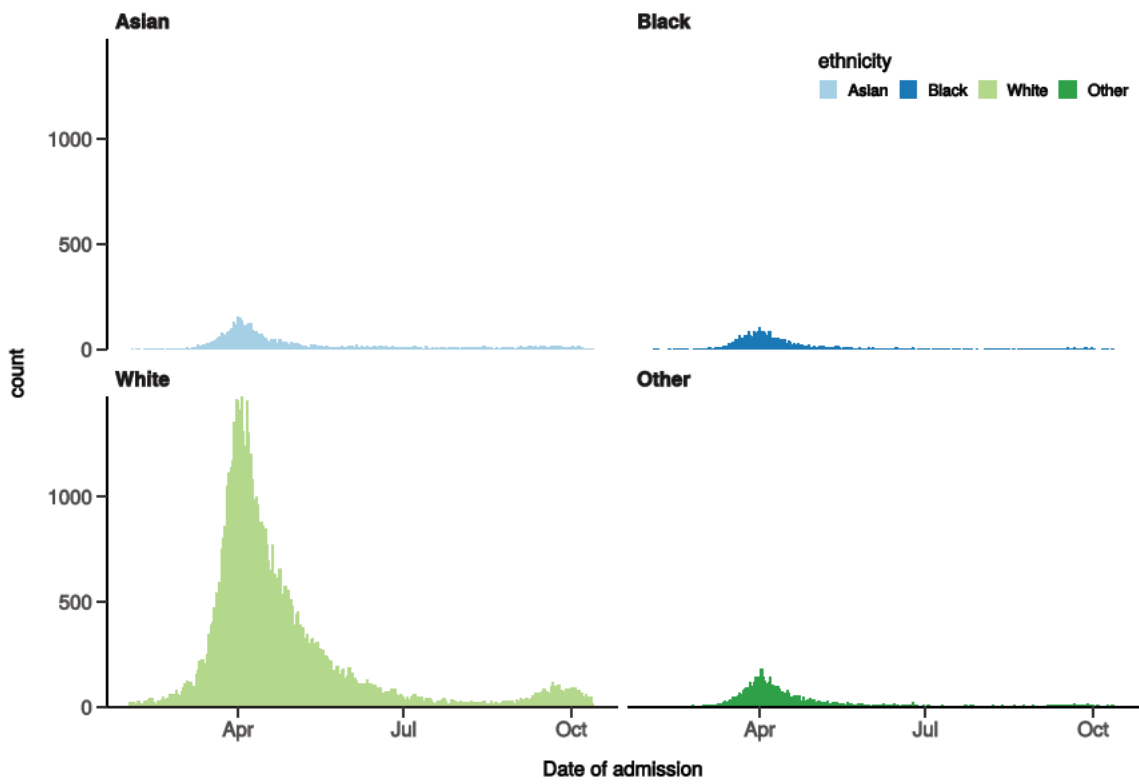


Patients with outcome stratified by age, and sex

Figure 1E



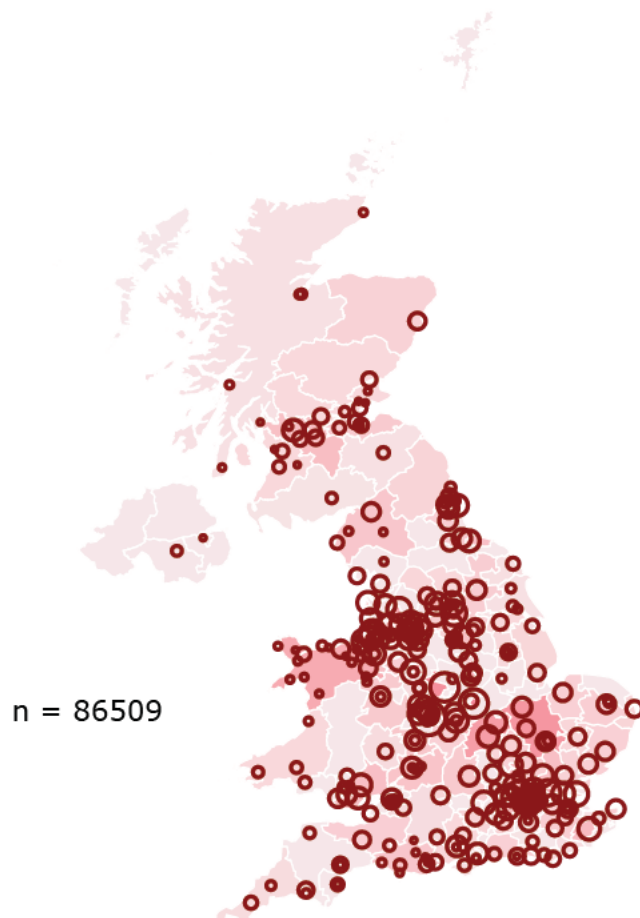
Hospital admission with COVID-19 by ethnicity
Figure 1F



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

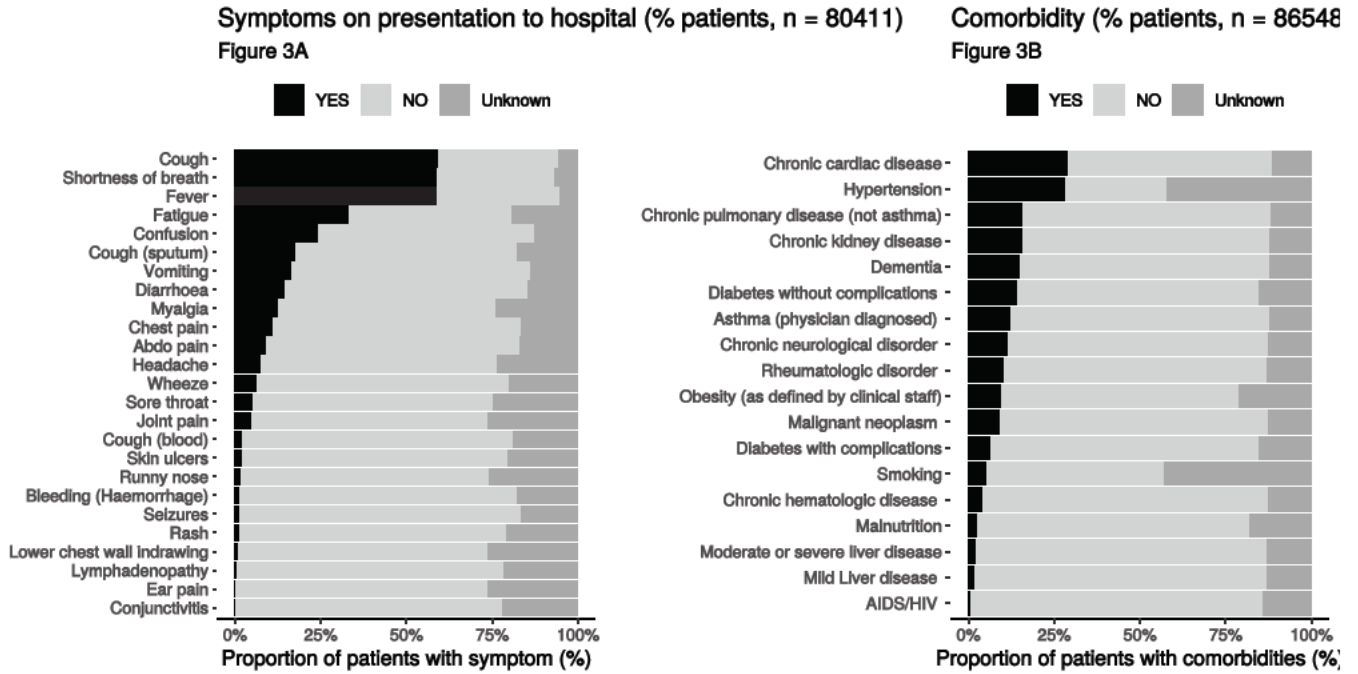
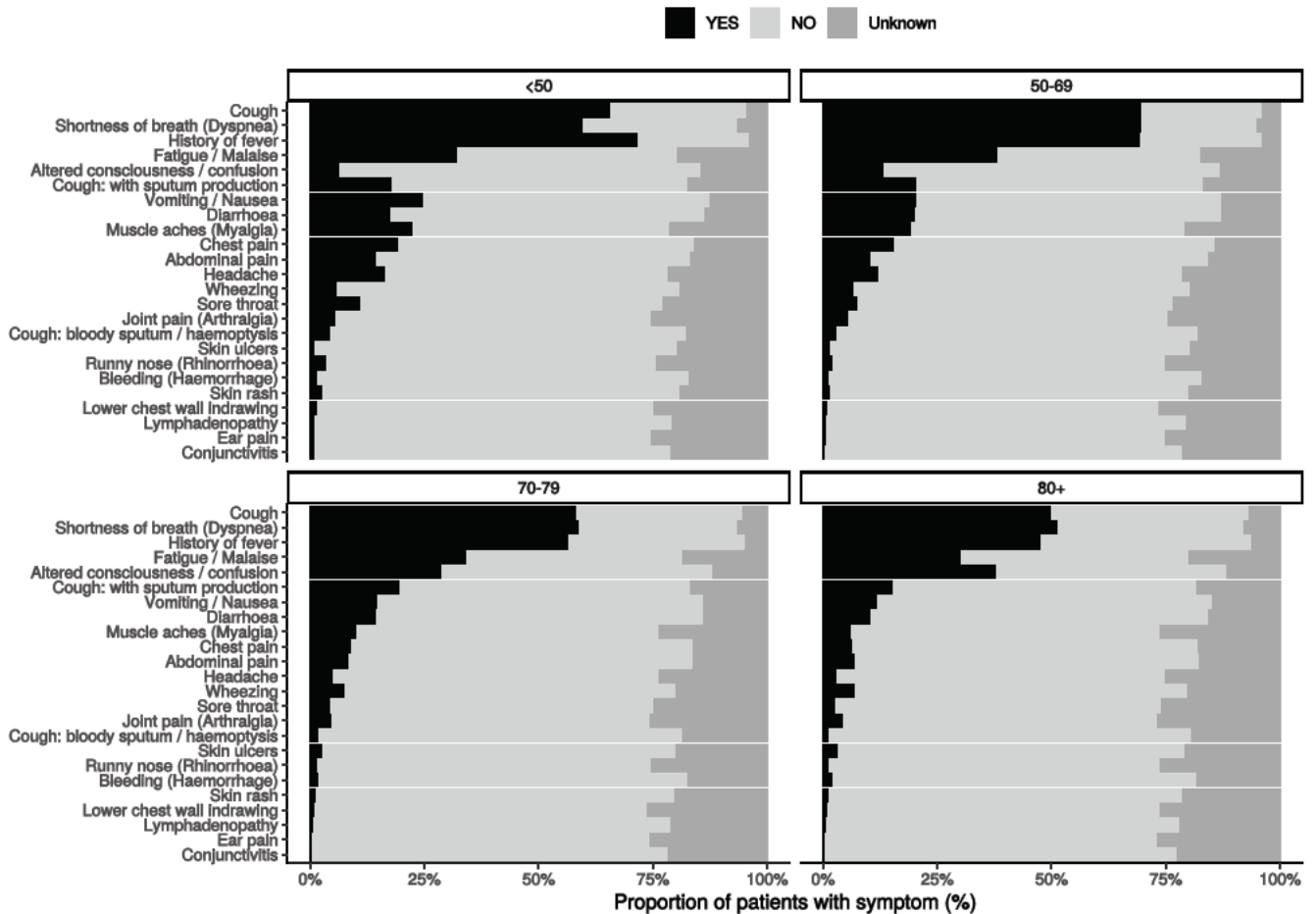


Figure 3B - Symptoms by Age

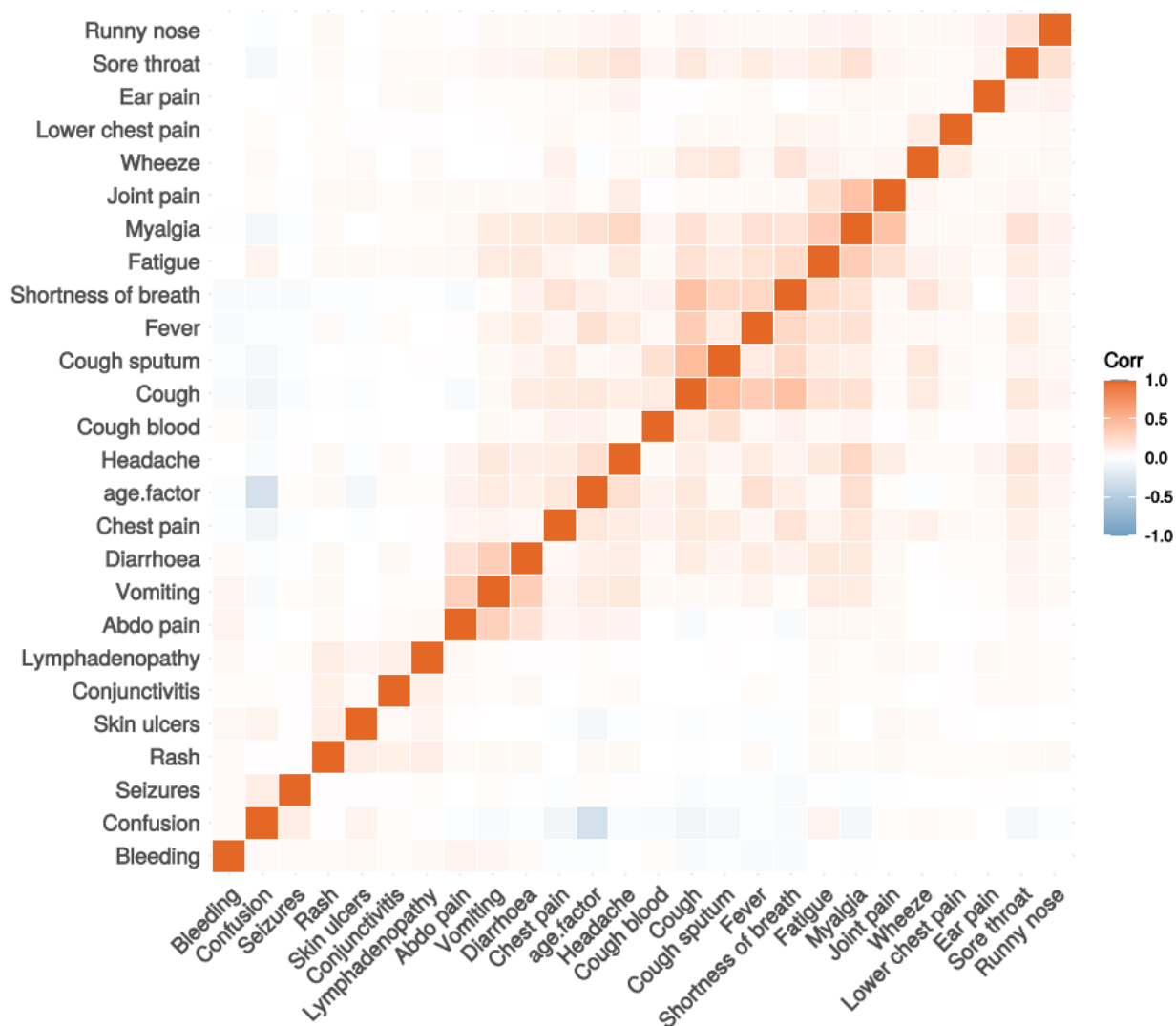


Age Group	Number of Patients included in Symptoms Plot
<50	11628

Age Group	Number of Patients included in Symptoms Plot
50-69	21939
70-79	17896
80+	29036

Figure 3C

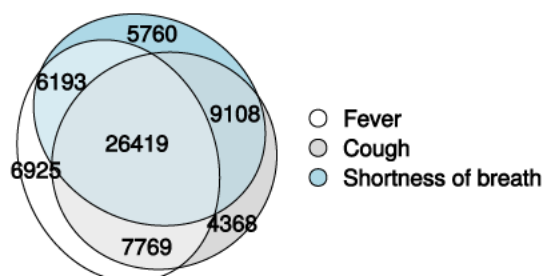
Correlation of symptoms in all pages. Note clusters, top right to bottom left, flu-like, coryzal, abdominal, respiratory, neurocutaneous.



Symptoms (diagnostic criteria)

Figure 4A

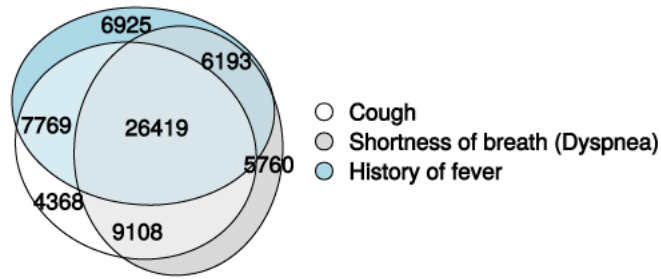
n = 80411



Symptoms (most common)

Figure 4B

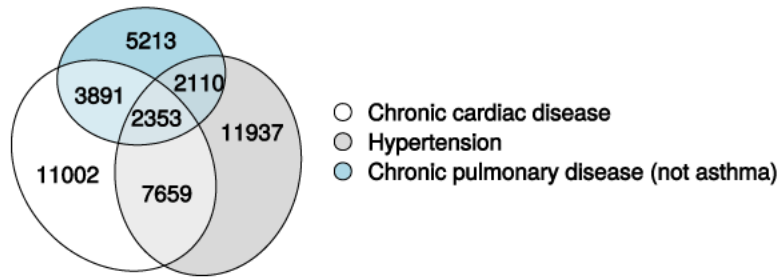
n = 80411



Comorbidity (most common)

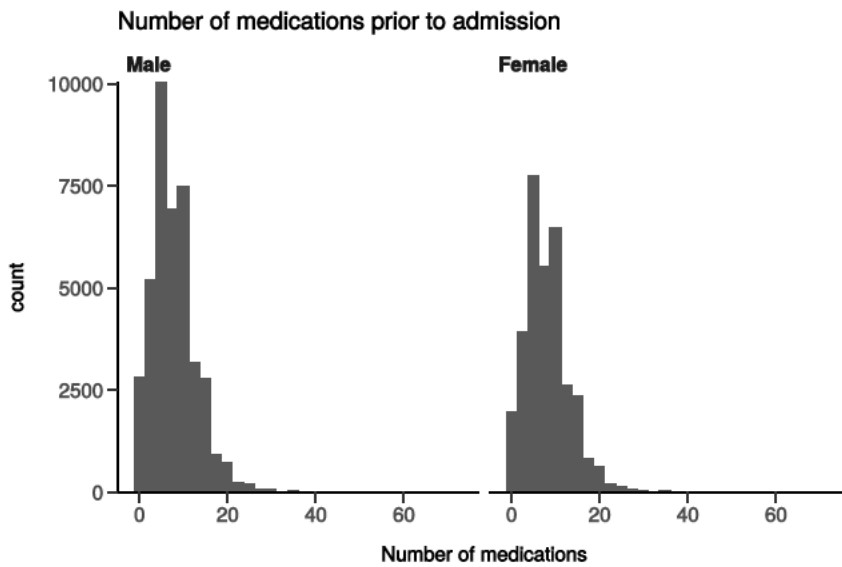
Figure 4C

n = 86548



Medication prior to illness

Figure 5

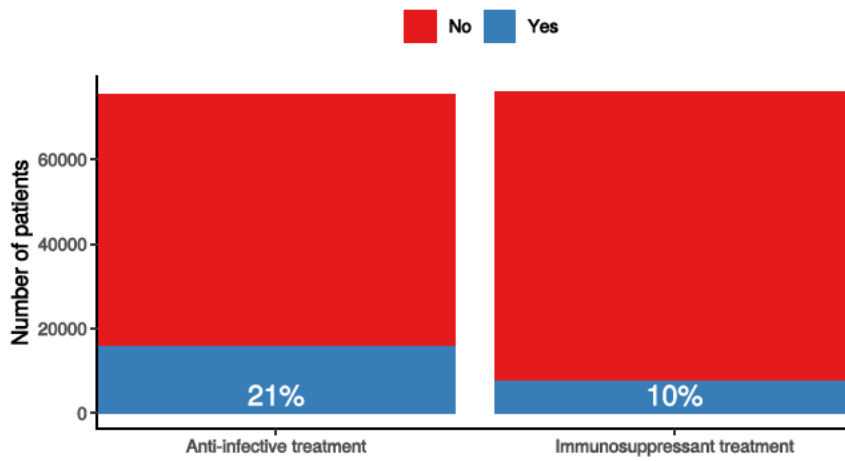


Preadmission treatment

Figure 6

Pre-admission treatment

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



Patient flow

Figure 7A - All patients

N = 82196

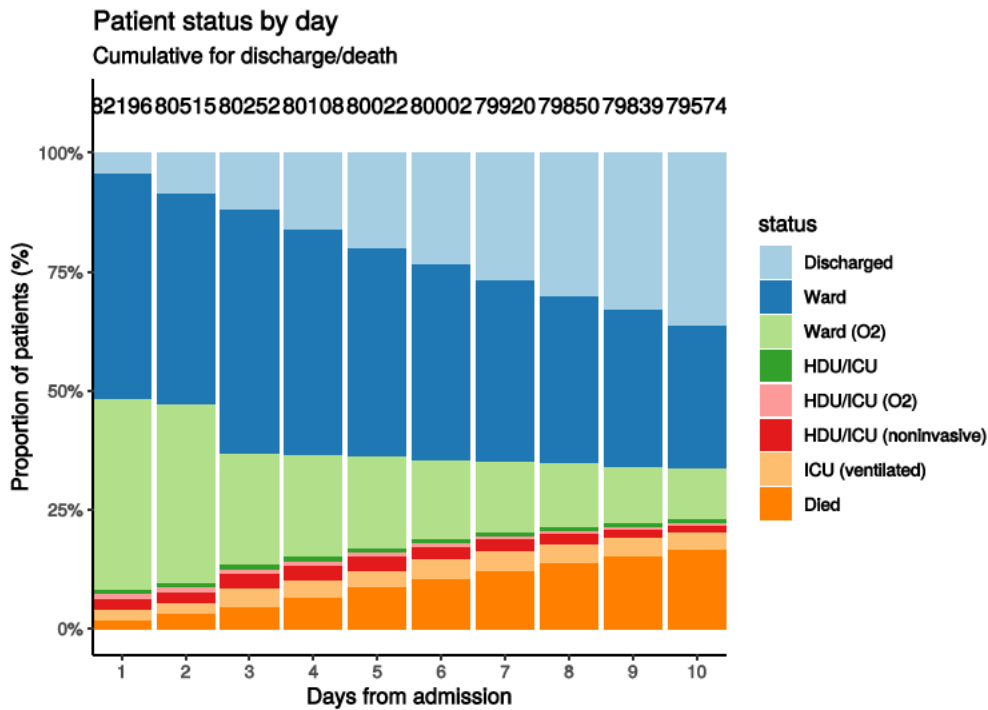
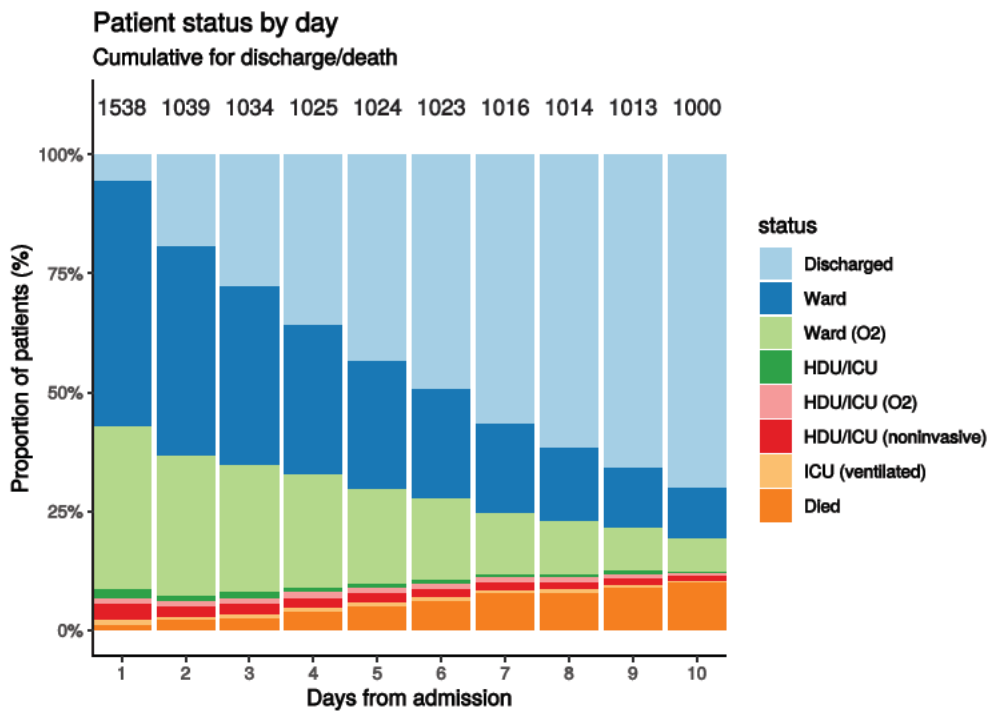


Figure 7B - Patients admitted ≥ 14 days and ≤ 28 days ago

N = 1538



Oxygen requirement

Figure 8A - All patients

N = 77772

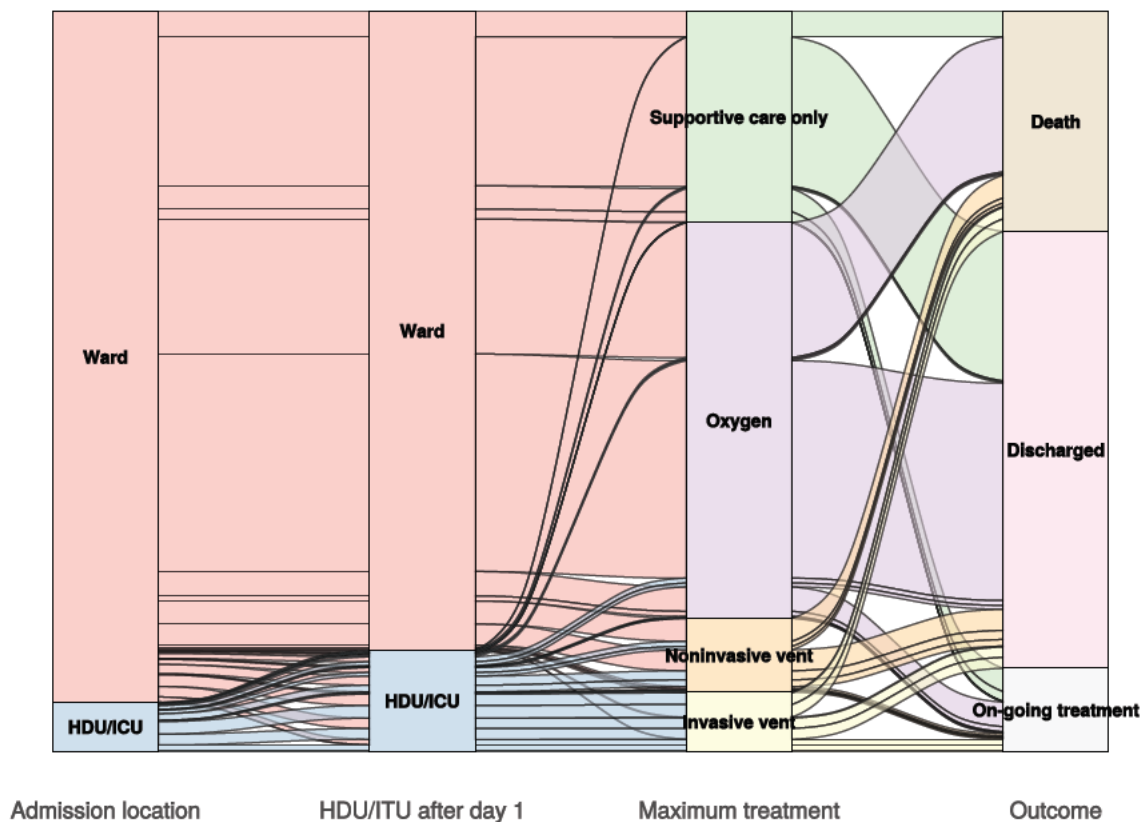


Figure 8B - Patients admitted ≥ 14 days and ≤ 28 days ago

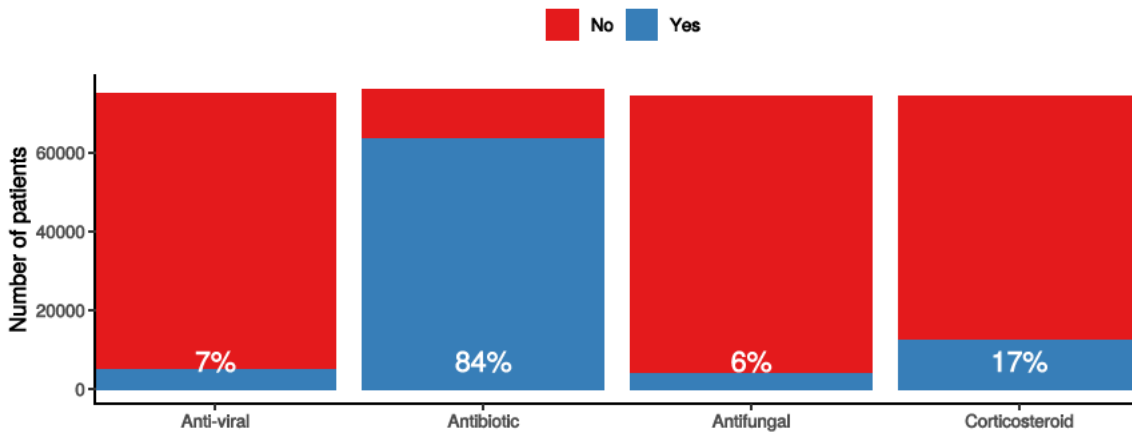
N = 1472

In-hospital medical treatment

Figure 9

In-hospital treatment

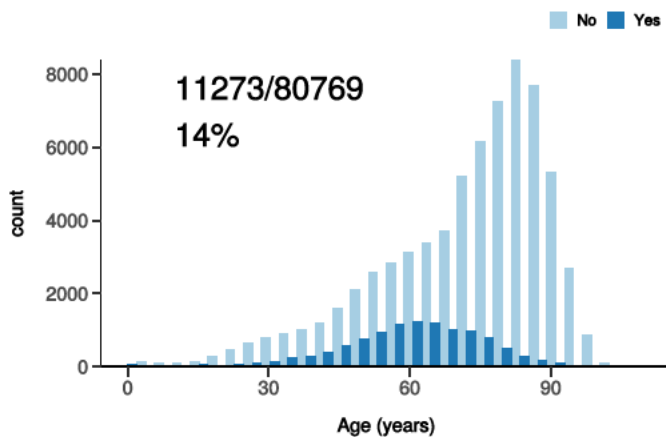
Anti-virals, antibiotics, corticosteroids, and anti-fungals for patients who have completed journey.



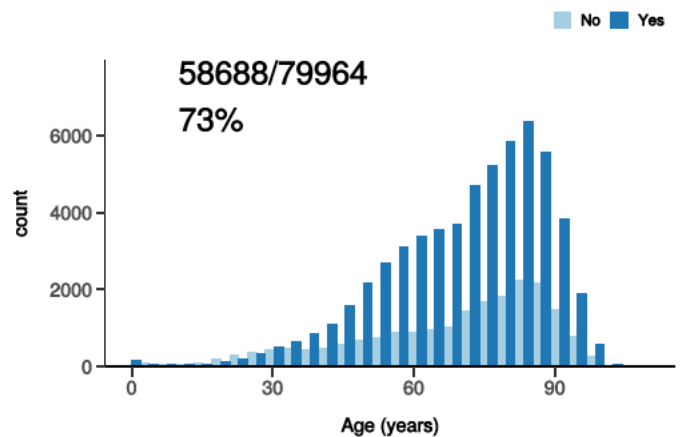
Treatment

Figure 10

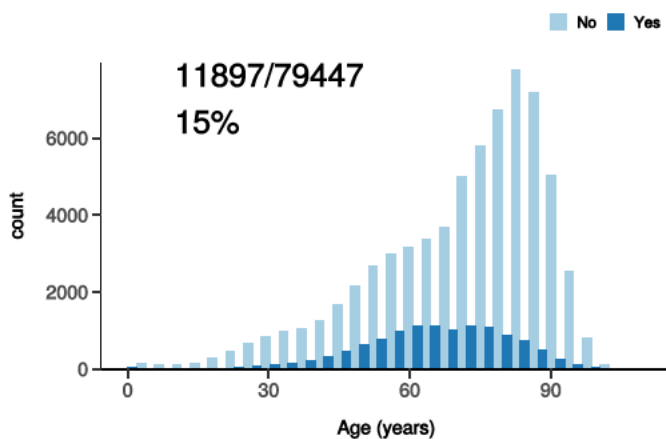
ICU/HDU admission
Figure 10A



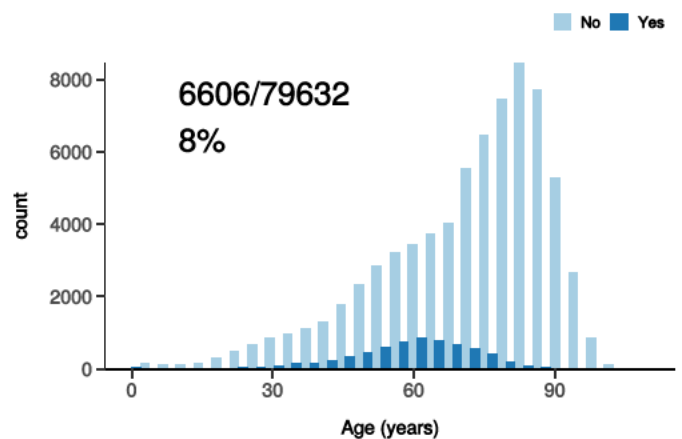
High flow oxygen
Figure 10B



Noninvasive ventilation
Figure 10C



Invasive ventilation
Figure 10D

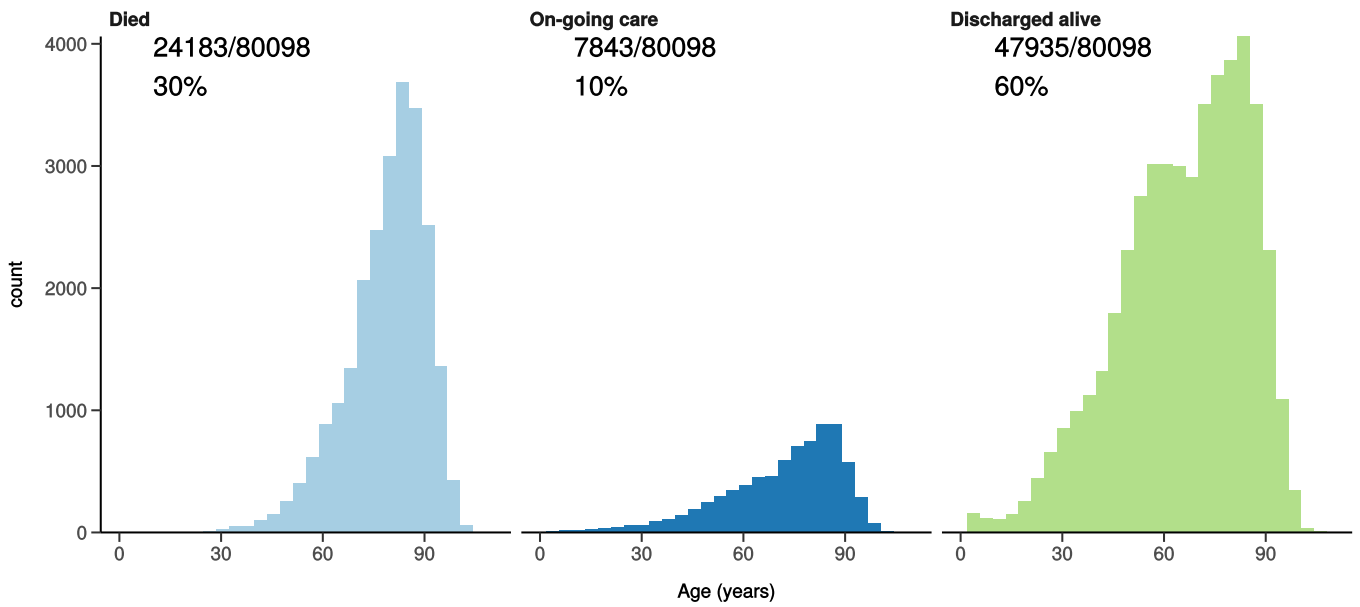


Status in patients admitted ≥ 14 days from today

Figure 11

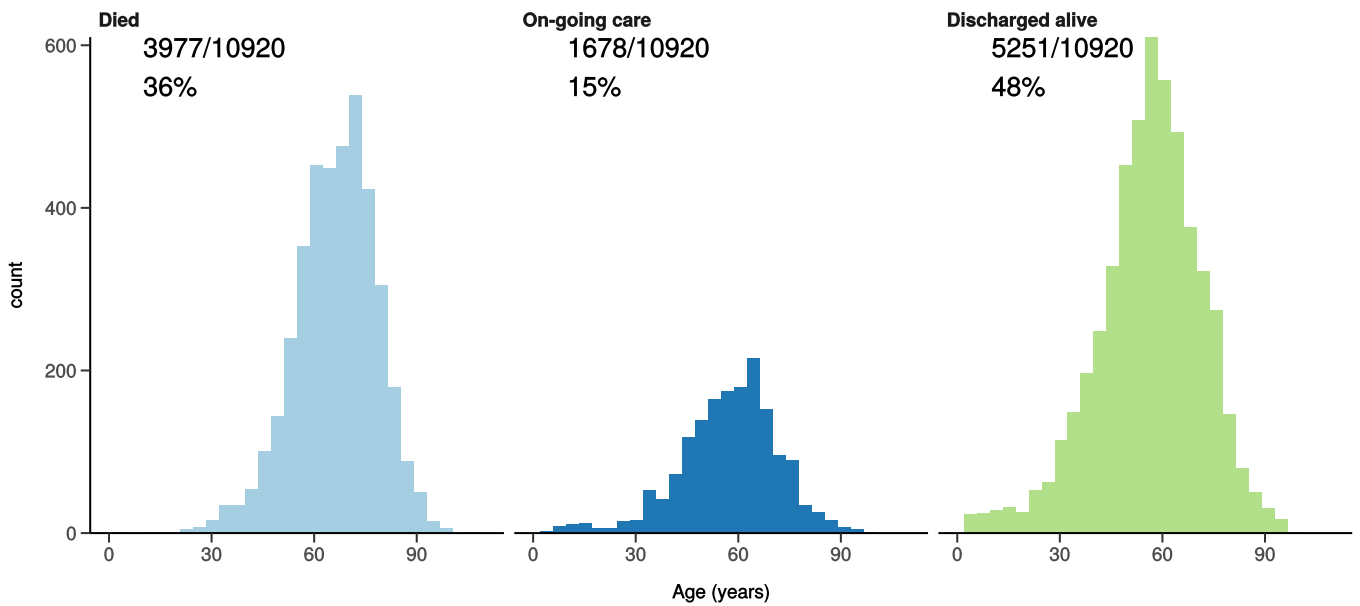
All: status in patients admitted ≥ 14 days ago

Figure 11A



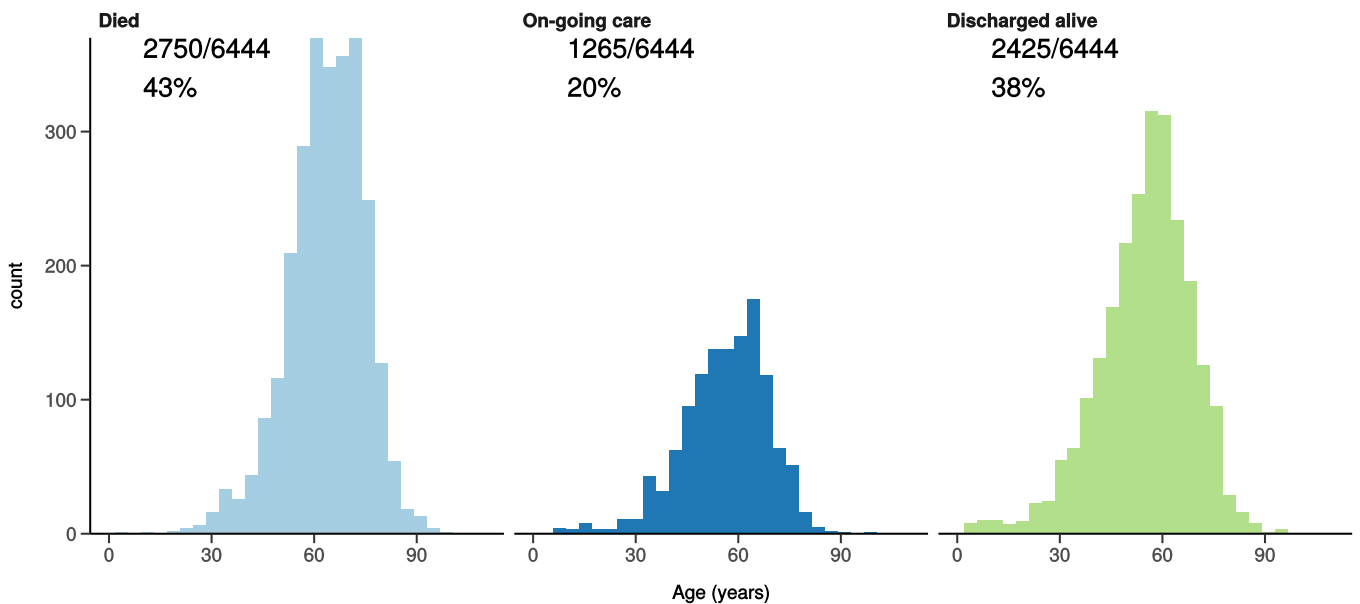
ICU/HDU admissions: status in patients admitted ≥ 14 days ago

Figure 11B



Invasive ventilation: status in patients admitted ≥ 14 days ago

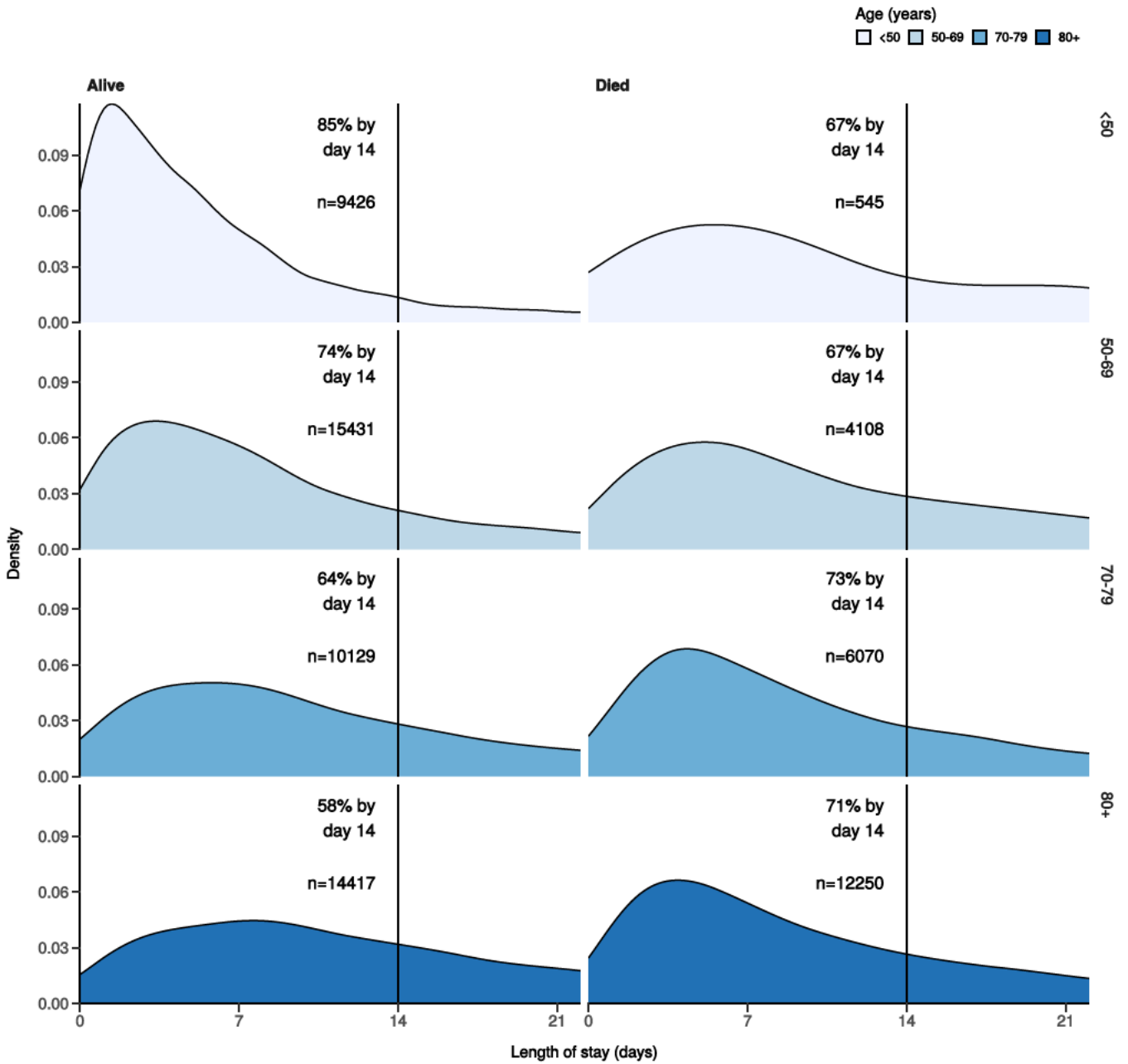
Figure 11c



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	10769 (94.9)	581 (5.1)	•	•
	50-69	17096 (79.9)	4309 (20.1)	4.67 (4.27-5.12, p<0.001)	4.37 (3.95-4.84, p<0.001)
	70-79	11196 (63.8)	6356 (36.2)	10.52 (9.64-11.51, p<0.001)	8.86 (8.00-9.82, p<0.001)
	80+	15794 (55.1)	12845 (44.9)	15.07 (13.84-16.46, p<0.001)	12.61 (11.41-13.98, p<0.001)

Dependent: death		No	Yes	OR (univariable)	OR (multivariable)
Sex at Birth	Male	29661 (67.1)	14574 (32.9)	•	•
	Female	25236 (72.6)	9535 (27.4)	0.77 (0.75-0.79, p<0.001)	0.71 (0.68-0.73, p<0.001)
	Not specified	0 (NaN)	0 (NaN)	•	•
Chronic cardiac disease	NO	37152 (74.4)	12804 (25.6)	•	•
	YES	14306 (59.3)	9818 (40.7)	1.99 (1.93-2.06, p<0.001)	1.15 (1.11-1.20, p<0.001)
Chronic pulmonary disease (not asthma)	NO	43514 (71.7)	17193 (28.3)	•	•
	YES	7827 (59.8)	5254 (40.2)	1.70 (1.63-1.77, p<0.001)	1.25 (1.20-1.31, p<0.001)
Chronic neurological disorder	NO	45080 (70.7)	18703 (29.3)	•	•
	YES	5928 (62.6)	3549 (37.4)	1.44 (1.38-1.51, p<0.001)	1.16 (1.10-1.22, p<0.001)
Chronic hematologic disease	NO	48886 (70.0)	20923 (30.0)	•	•
	YES	1971 (61.7)	1222 (38.3)	1.45 (1.35-1.56, p<0.001)	1.15 (1.05-1.25, p=0.002)
Chronic kidney disease	NO	43783 (72.2)	16866 (27.8)	•	•
	YES	7419 (57.3)	5522 (42.7)	1.93 (1.86-2.01, p<0.001)	1.28 (1.22-1.34, p<0.001)
Dementia	NO	44412 (72.7)	16672 (27.3)	•	•
	YES	6640 (54.0)	5660 (46.0)	2.27 (2.18-2.36, p<0.001)	1.37 (1.30-1.44, p<0.001)
Obesity (as defined by clinical staff)	NO	40482 (69.7)	17632 (30.3)	•	•
	YES	5800 (73.4)	2098 (26.6)	0.83 (0.79-0.88, p<0.001)	1.27 (1.20-1.35, p<0.001)
Malignant neoplasm	NO	46636 (71.2)	18898 (28.8)	•	•
	YES	4248 (56.4)	3284 (43.6)	1.91 (1.82-2.00, p<0.001)	1.47 (1.39-1.56, p<0.001)

Number in dataframe = 81320, Number in model = 62750, Missing = 18570, AIC = 68026.4, C-statistic = 0.716, H&L = Chi-sq(8) 122.24 (p<0.001)

Figure 13 - Adjusted odds ratio plot

Death

Age on admission (years)	<50	-
	50-69	4.37 (3.95-4.84, p<0.001)
	70-79	8.86 (8.00-9.82, p<0.001)
	80+	12.61 (11.41-13.98, p<0.001)
Sex at Birth	Male	-
	Female	0.71 (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	1.25 (1.20-1.31, p<0.001)
Chronic neurological disorder	YES	1.16 (1.10-1.22, p<0.001)
Chronic hematologic disease	YES	1.15 (1.05-1.25, p=0.002)
Chronic kidney disease	YES	1.28 (1.22-1.34, p<0.001)
Dementia	YES	1.37 (1.30-1.44, p<0.001)
Obesity (as defined by clinical staff)	YES	1.27 (1.20-1.35, p<0.001)
Malignant neoplasm	YES	1.47 (1.39-1.56, p<0.001)

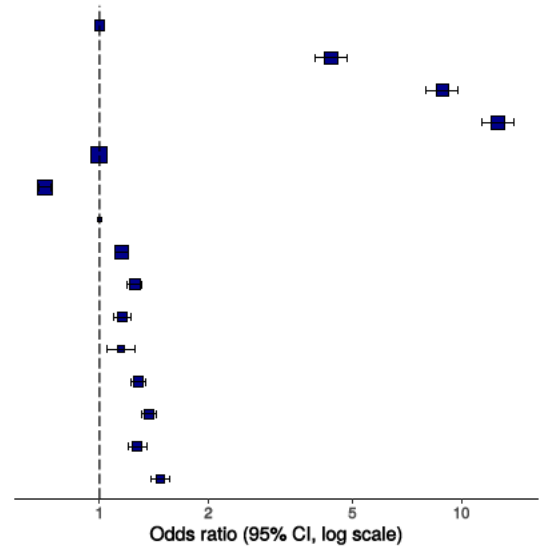
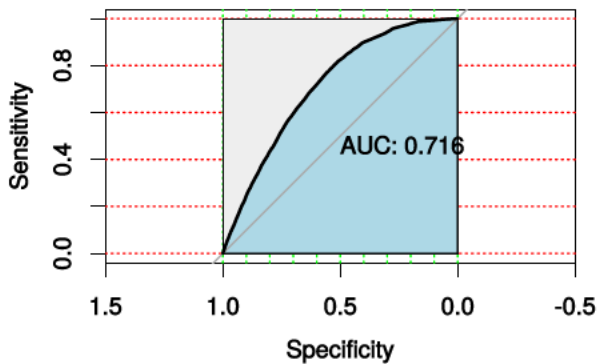


Figure 14 - ROC

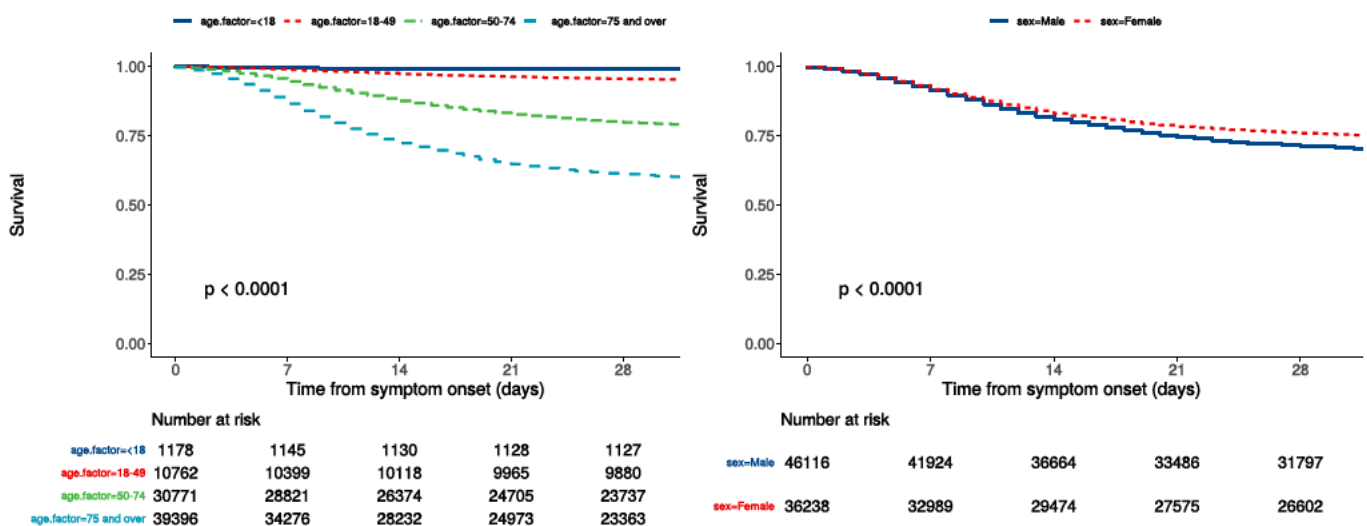


Survival models

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	11940 (14.5)	•	•
	50-69	22345 (27.2)	4.26 (3.90-4.64, p<0.001)	4.13 (3.71-4.59, p<0.001)
	70-79	18235 (22.2)	8.64 (7.93-9.41, p<0.001)	8.12 (7.31-9.02, p<0.001)
	80+	29594 (36.0)	11.64 (10.70-12.65, p<0.001)	10.66 (9.60-11.84, p<0.001)
Sex at Birth	Male	46116 (56.0)	•	•
	Female	36238 (44.0)	0.81 (0.79-0.83, p<0.001)	0.79 (0.77-0.82, p<0.001)
qSOFA score on admission	0	30198 (43.0)	•	•
	1	31460 (44.8)	1.61 (1.56-1.66, p<0.001)	1.71 (1.65-1.77, p<0.001)
	2	7751 (11.0)	3.08 (2.96-3.21, p<0.001)	2.87 (2.75-3.01, p<0.001)
	3	855 (1.2)	5.02 (4.60-5.48, p<0.001)	4.53 (4.11-5.00, p<0.001)
Symptomatic at presentation	No symptoms	4241 (5.3)	•	•
	Symptoms	76050 (94.7)	1.57 (1.47-1.68, p<0.001)	•
Chronic cardiac disease	NO	51605 (67.5)	•	•
	YES	24811 (32.5)	1.78 (1.74-1.83, p<0.001)	1.13 (1.10-1.17, p<0.001)
Chronic kidney disease	NO	62620 (82.5)	•	•
	YES	13286 (17.5)	1.73 (1.68-1.78, p<0.001)	1.22 (1.17-1.26, p<0.001)
Moderate or severe liver disease	NO	73694 (98.0)	•	•
	YES	1492 (2.0)	1.28 (1.17-1.39, p<0.001)	1.42 (1.28-1.58, p<0.001)
Chronic neurological disorder	NO	65873 (87.2)	•	•
	YES	9677 (12.8)	1.38 (1.33-1.43, p<0.001)	•
Malignant neoplasm	NO	67654 (89.8)	•	•
	YES	7708 (10.2)	1.67 (1.61-1.73, p<0.001)	1.34 (1.28-1.40, p<0.001)
Chronic hematologic disease	NO	72032 (95.7)	•	•
	YES	3257 (4.3)	1.35 (1.27-1.43, p<0.001)	•
Obesity (as defined by clinical staff)	NO	59956 (88.0)	•	•
	YES	8165 (12.0)	0.85 (0.81-0.89, p<0.001)	1.16 (1.11-1.23, p<0.001)
Diabetes without complications	NO	61262 (83.7)	•	•
	YES	11930 (16.3)	1.26 (1.21-1.30, p<0.001)	•
Rheumatologic disorder	NO	66458 (88.5)	•	•
	YES	8647 (11.5)	1.19 (1.15-1.24, p<0.001)	•

Dependent: Surv(time, status)		all	HR (univariable)	HR (multivariable)
Dementia	NO	63122 (83.4)	•	•
	YES	12561 (16.6)	2.01 (1.95-2.07, p<0.001)	1.17 (1.13-1.22, p<0.001)
Malnutrition	NO	68858 (97.2)	•	•
	YES	1969 (2.8)	1.44 (1.34-1.55, p<0.001)	•
smoking_mhyn_2levels	NO	44643 (57.6)	•	•
	YES	4326 (5.6)	0.87 (0.81-0.92, p<0.001)	•
	N/K	28598 (36.9)	1.24 (1.20-1.27, p<0.001)	•

Number in dataframe = 82711, Number in model = 57473, Missing = 25238, Number of events = 16565, Concordance = 0.719 (SE = 0.002), R-squared = 0.159 (Max possible = 0.998), Likelihood ratio test = 9969.085 (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 (3.71-4.59, p<0.001)
	70-79	8.12 (7.31-9.02, p<0.001)
	80+	10.66 (9.60-11.84, p<0.001)
Sex at Birth	Female	0.79 (0.77-0.82, p<0.001)
qSOFA score on admission	0	-
	1	1.71 (1.65-1.77, p<0.001)
	2	2.87 (2.75-3.01, p<0.001)
	3	4.53 (4.11-5.00, p<0.001)
Chronic cardiac disease	YES	1.13 (1.10-1.17, p<0.001)
Chronic kidney disease	YES	1.22 (1.17-1.26, p<0.001)
Moderate or severe liver disease	YES	1.42 (1.28-1.58, p<0.001)
Malignant neoplasm	YES	1.34 (1.28-1.40, p<0.001)
Obesity (as defined by clinical staff)	YES	1.16 (1.11-1.23, p<0.001)
Dementia	YES	1.17 (1.13-1.22, p<0.001)

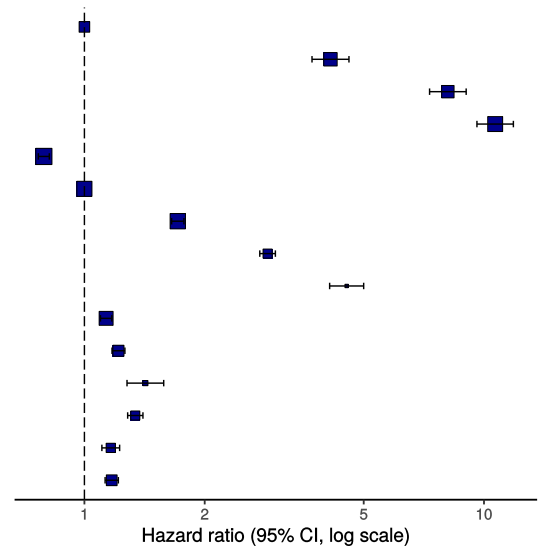
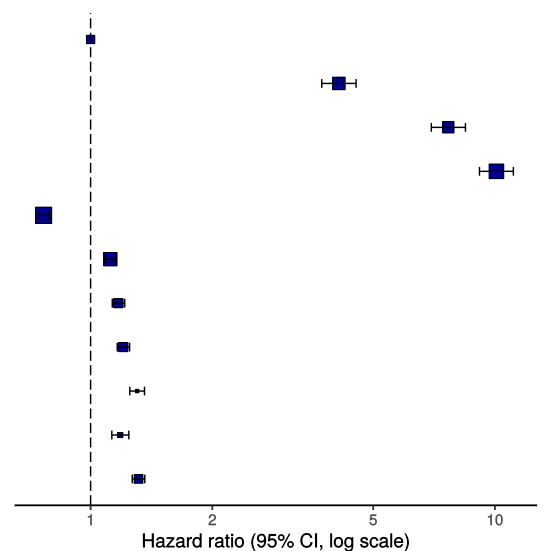


Figure 16b - Multivariable Cox proportional hazards model (age, sex, comorbidities only)

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

Age on admission (years)	<50	-
	50-69	4.11 (3.73-4.54, p<0.001)
	70-79	7.67 (6.96-8.46, p<0.001)
	80+	10.09 (9.16-11.11, p<0.001)
Sex at Birth	Female	0.77 (0.74-0.79, p<0.001)
Chronic cardiac disease	YES	1.12 (1.09-1.15, p<0.001)
Chronic pulmonary disease (not asthma)	YES	1.17 (1.13-1.21, p<0.001)
Chronic kidney disease	YES	1.21 (1.16-1.25, p<0.001)
Malignant neoplasm	YES	1.30 (1.25-1.36, p<0.001)
Obesity (as defined by clinical staff)	YES	1.18 (1.13-1.24, p<0.001)
Dementia	YES	1.31 (1.27-1.36, p<0.001)



ROC = 0.7186279

Figure 17 - Predictions calibration plot

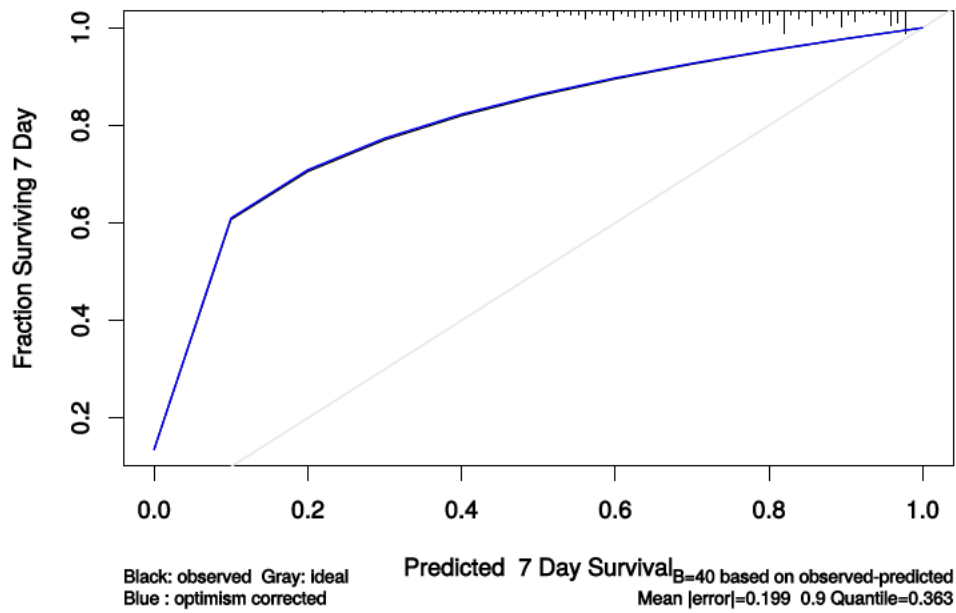


Figure 18 - Prognostic model predictions

Again, for demonstration of methods.

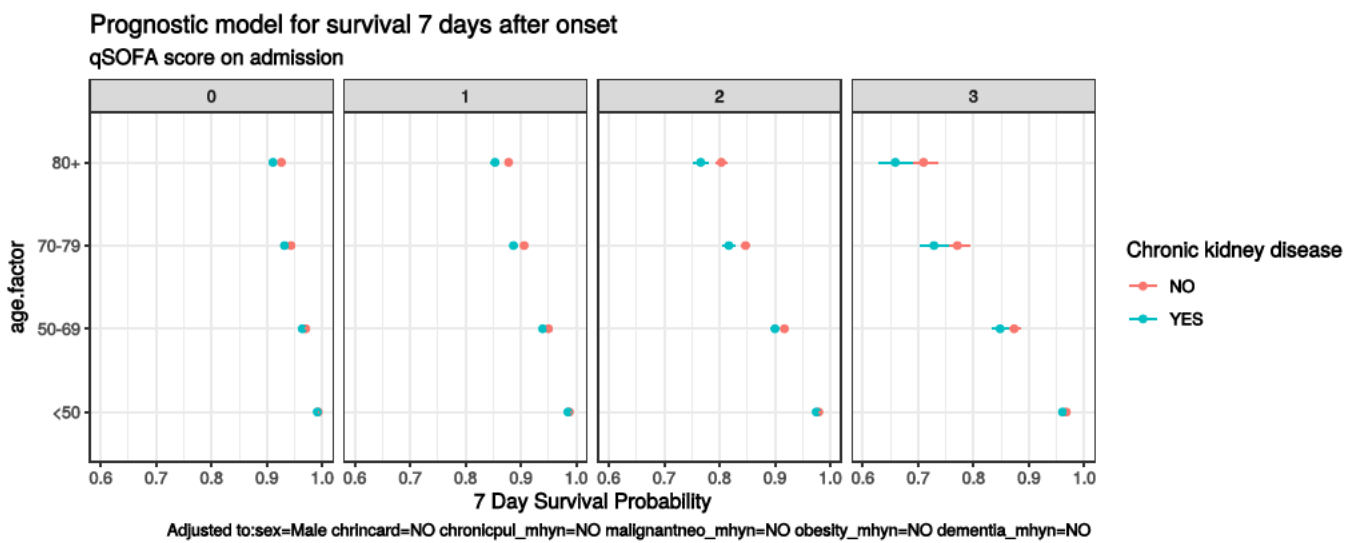


Figure 19 - Death by severity (NEWS) on admission

Number of deaths by NEWS score at admission

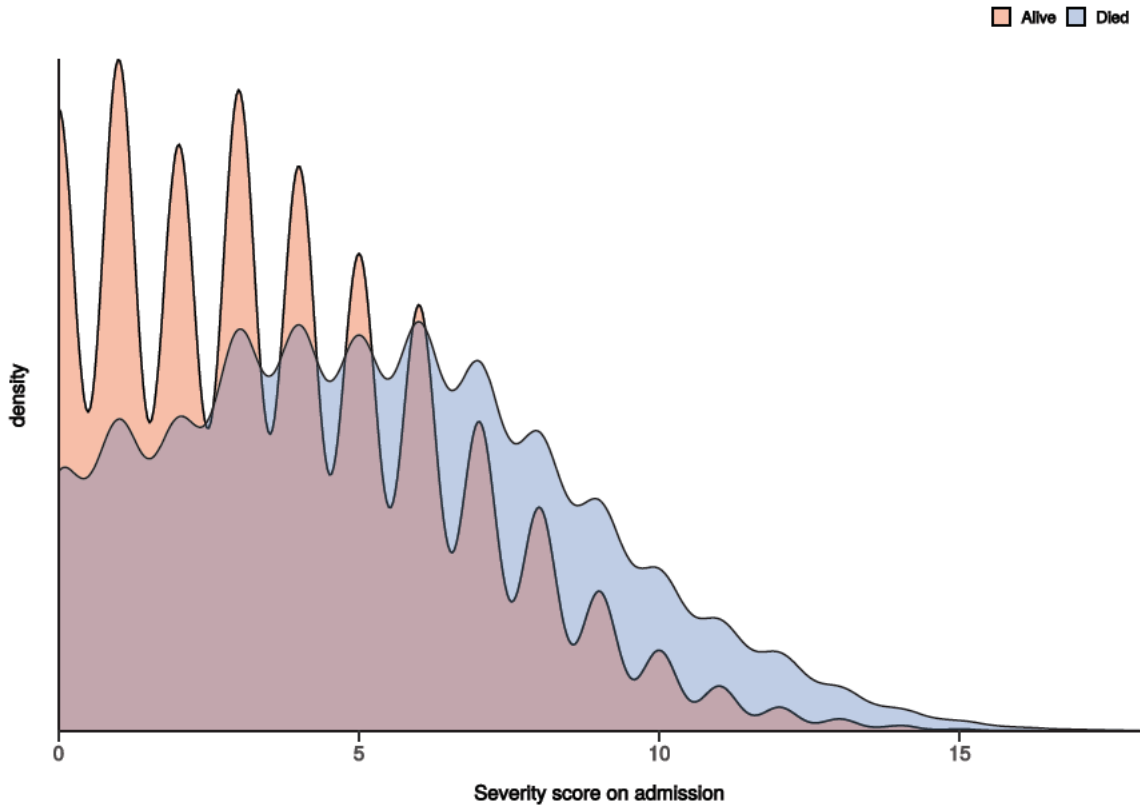


Figure 20 - Death by severity (NEWS) on admission stratified by age

Number of deaths by NEWS score at admission
Stratified by age

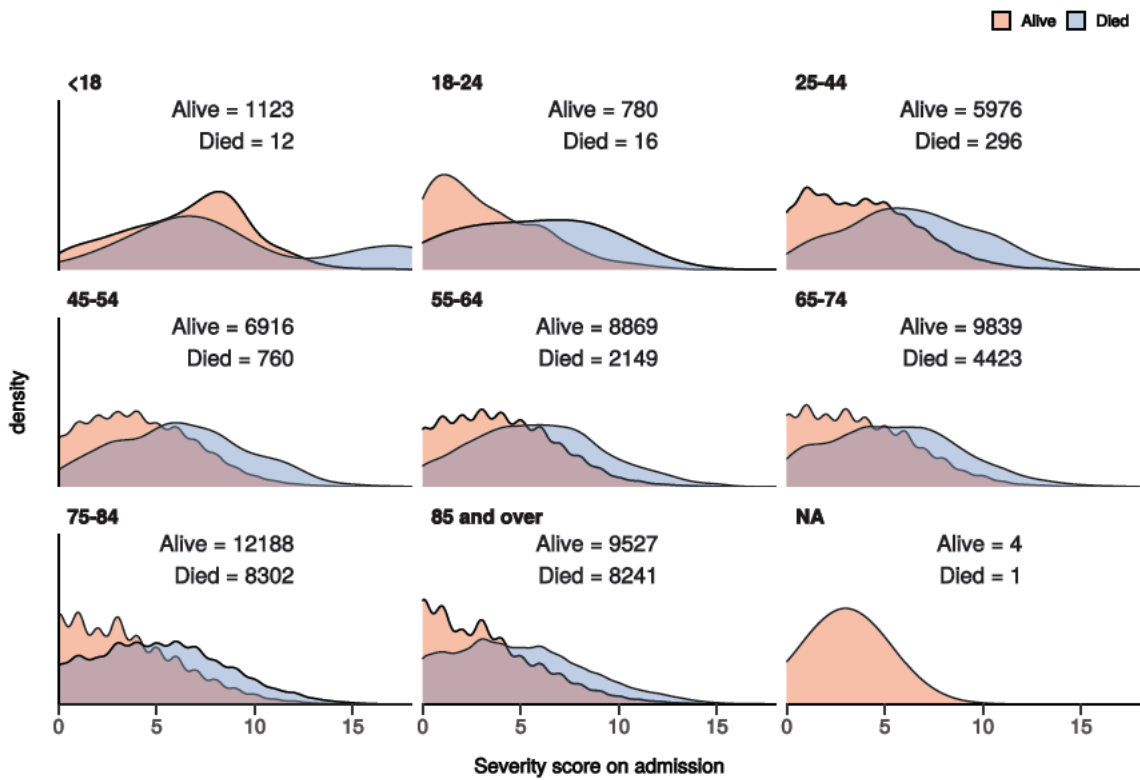


Figure 21 - Death by severity (qSOFA) on admission stratified by age