

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

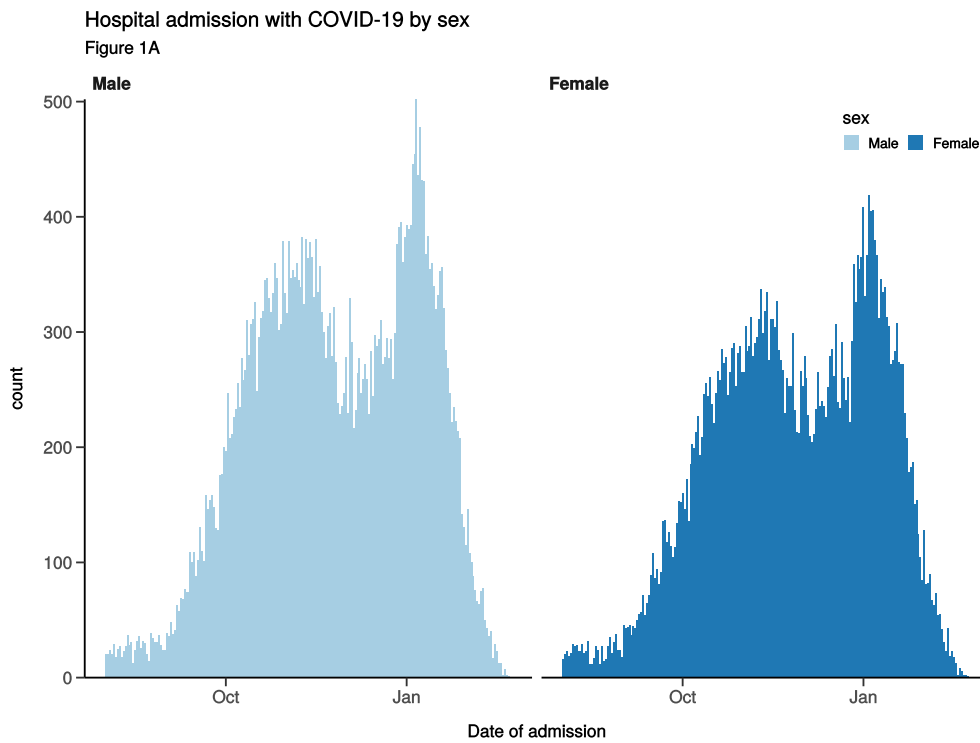
Executive summary

Includes patients admitted after 01 August 2020

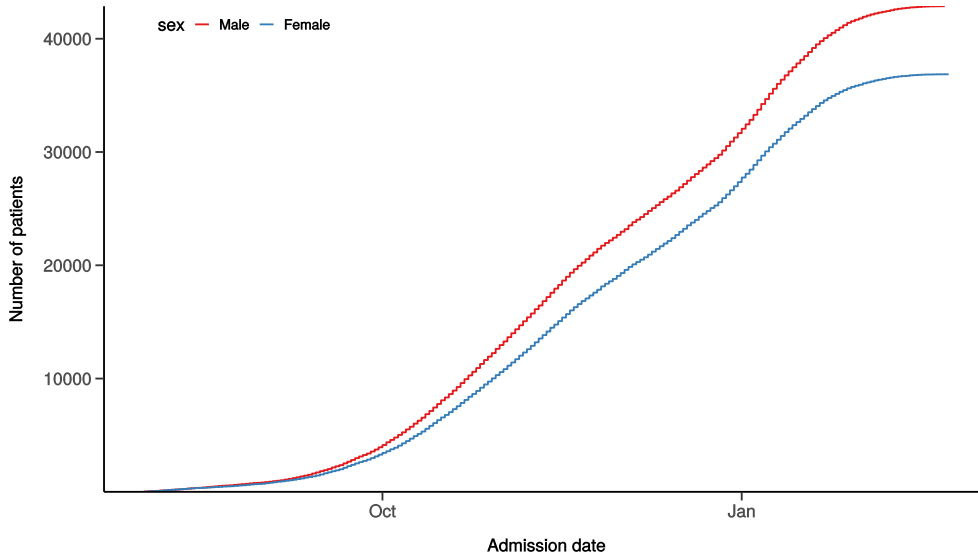
There are 79990 patients included in CO-CIN. Of these, 14840 patient(s) have died and 13687 required ICU. 44559 have been discharged home.

Admission

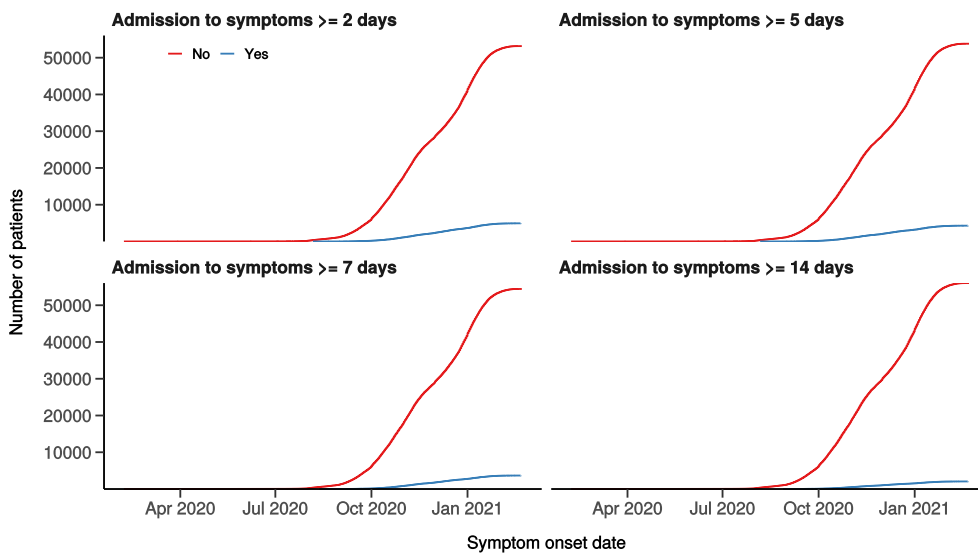
Figure 1



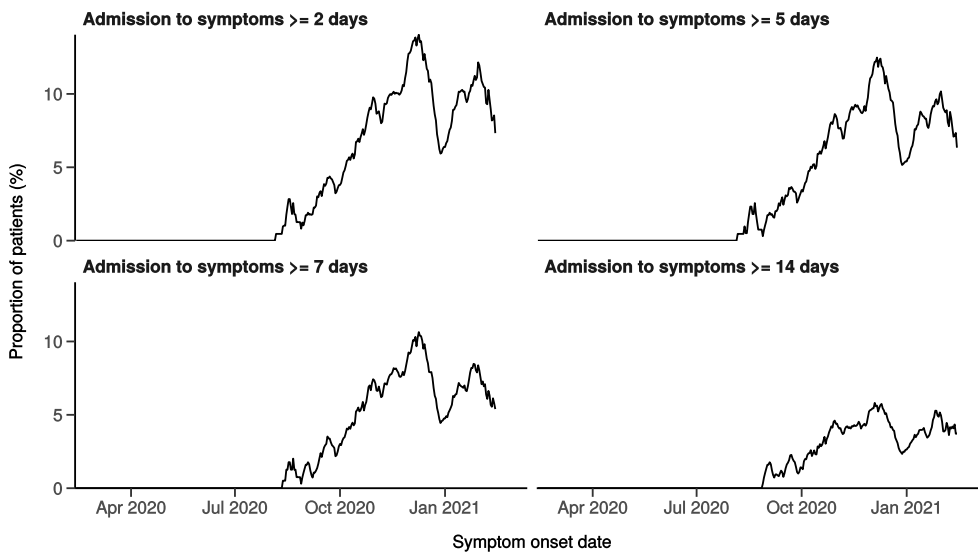
Hospital admission with COVID-19 by sex
Figure 1B



Number with symptom onset occurring after admission to hospital
Figure 1C

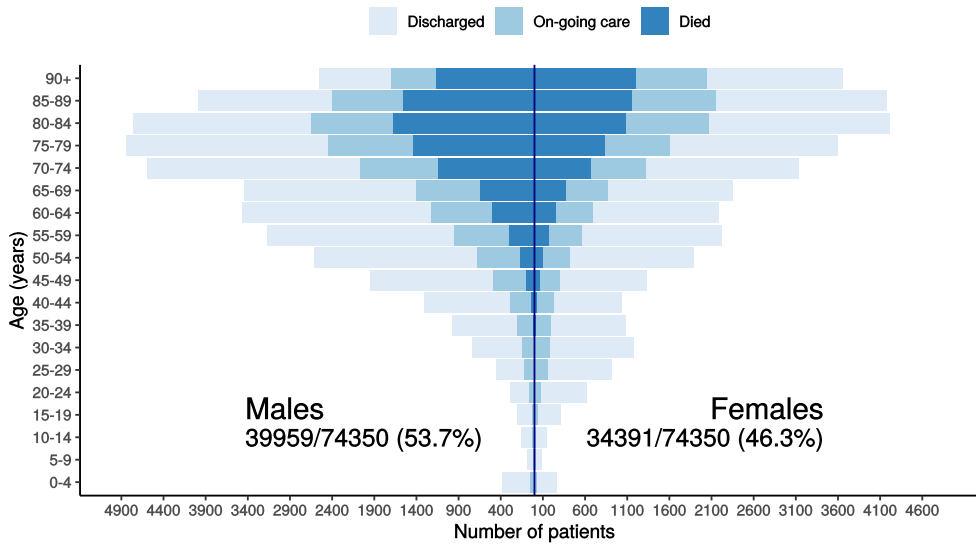


Proportion with symptom onset occurring after hospital admission
Figure 1D - 7-day rolling percentage. n = 58099



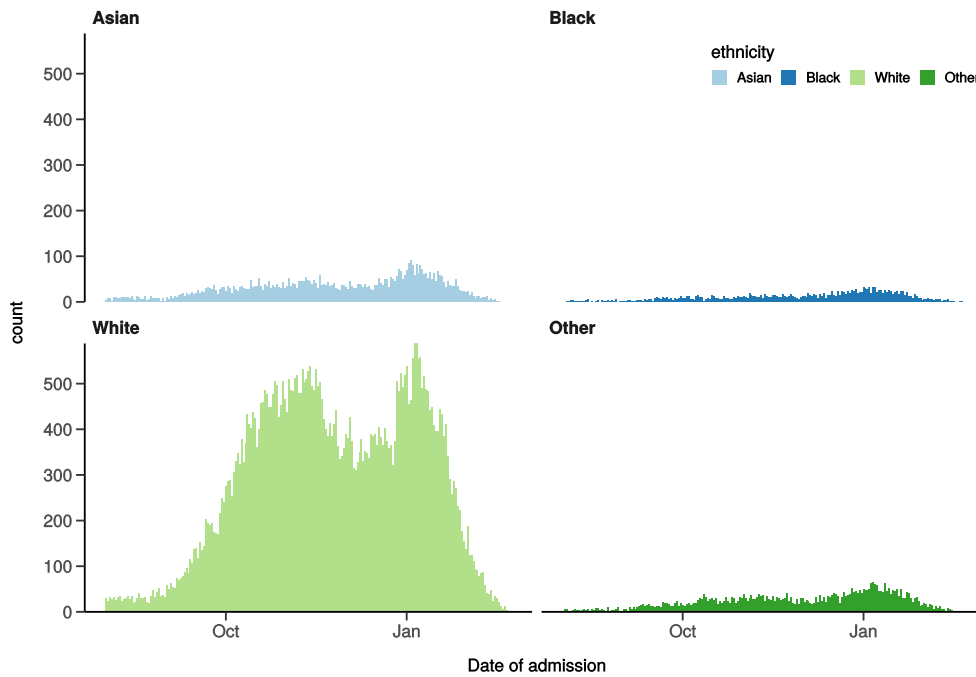
Patients with outcome stratified by age, and sex

Figure 1E



Hospital admission with COVID-19 by ethnicity

Figure 1F

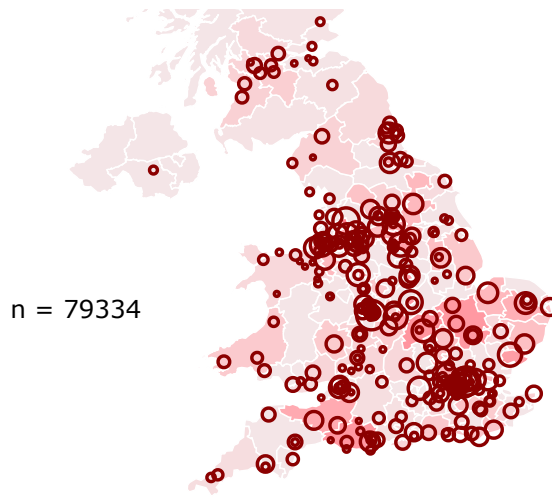


Location by CCG / Healthboard

Figure 2

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





Symptoms and comorbidity

Figure 3A

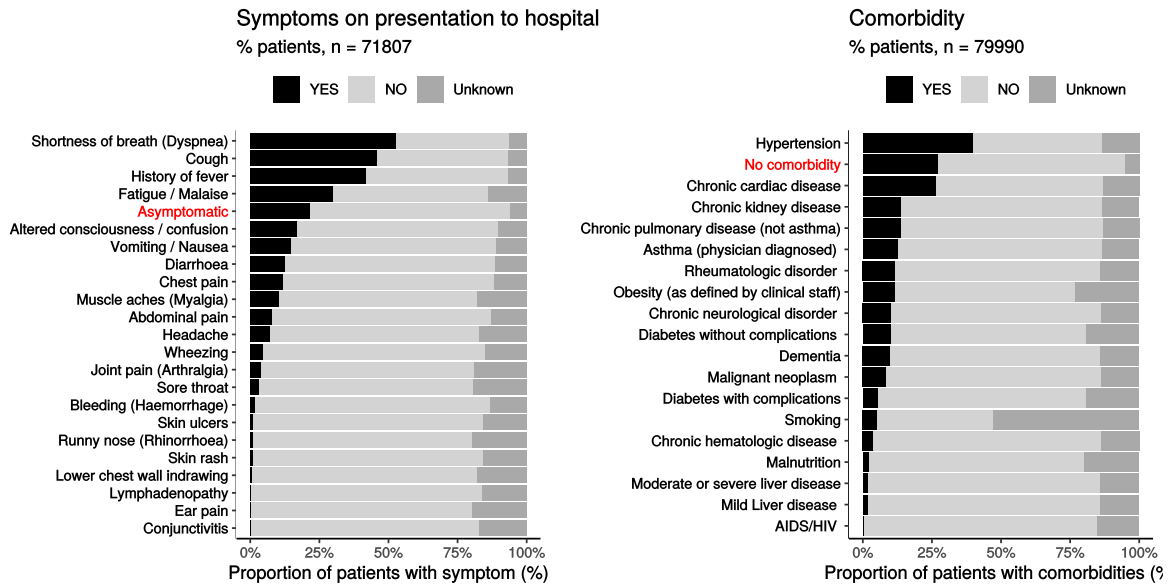


Figure 3B - Symptoms by Age

Symptoms on presentation to hospital
Stratified by age

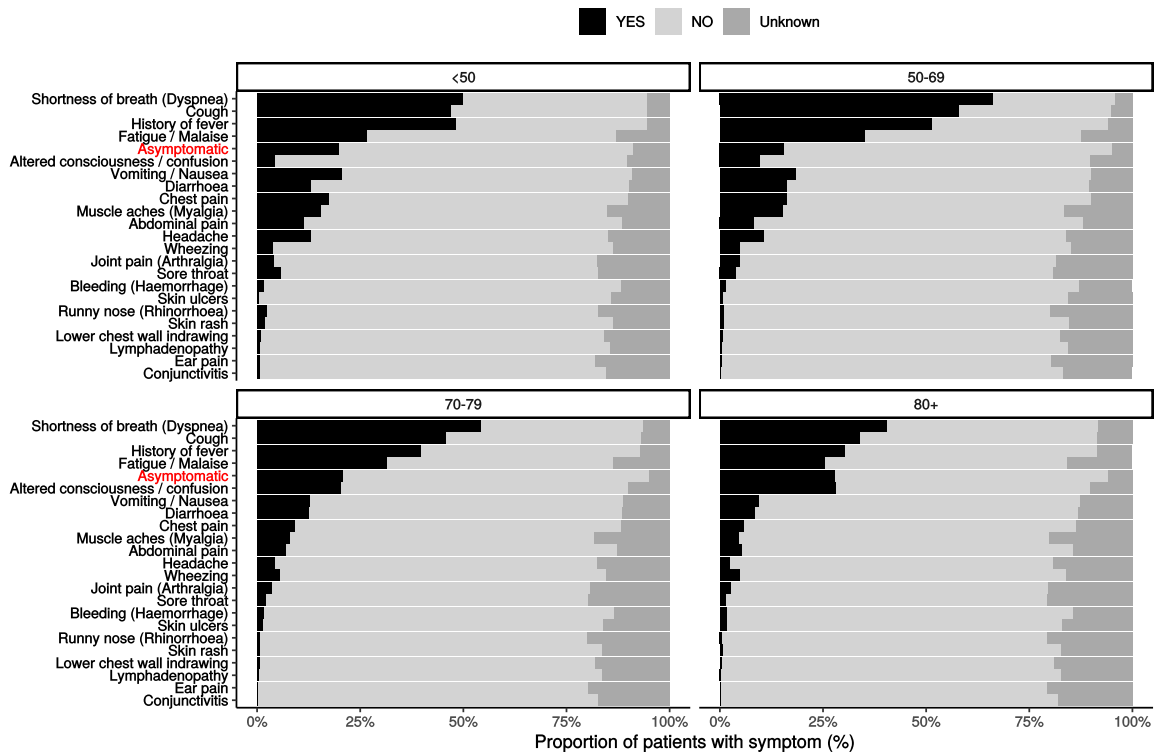
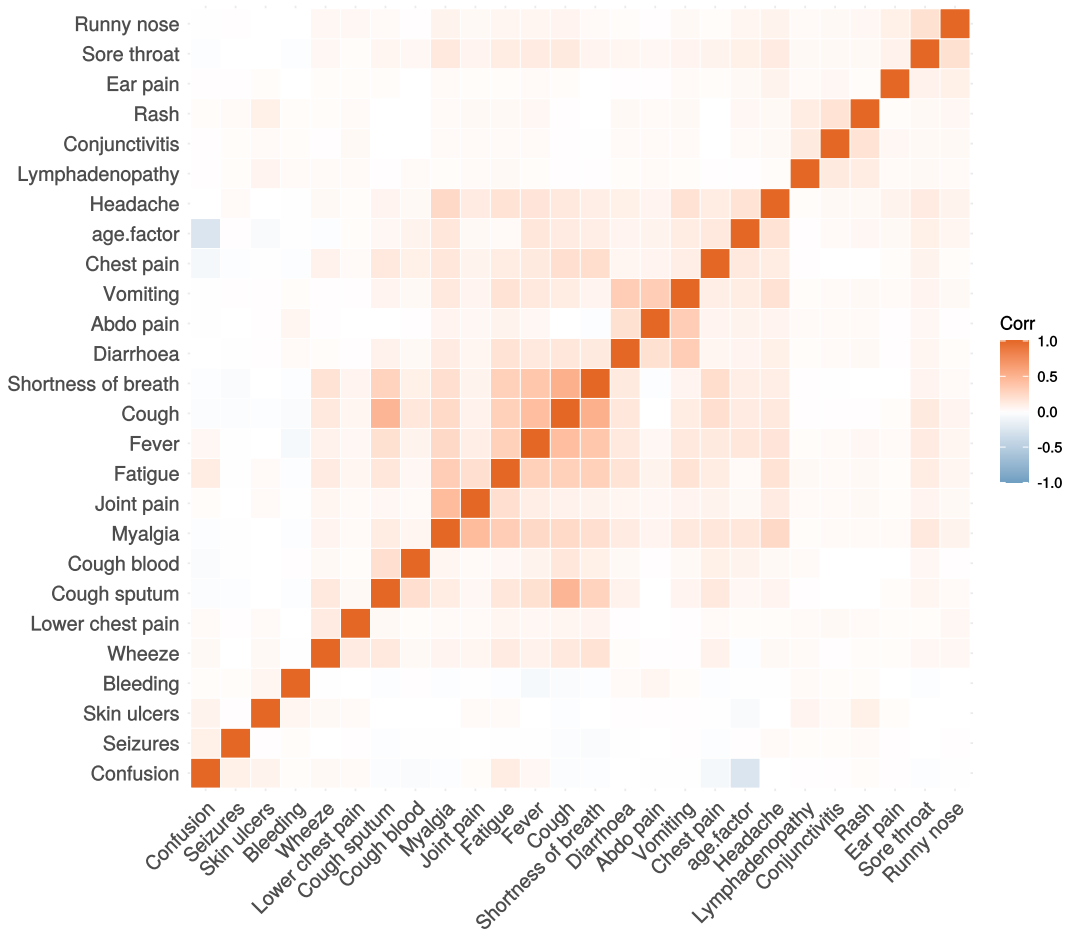


Figure 3C

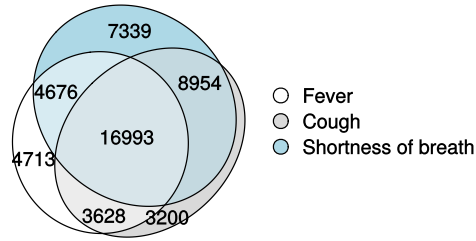
Correlation of symptoms in all pages. Note clusters, top right to bottom left, flu-like, coryzal, abdominal, respiratory, neurocutaneous.



Symptoms (diagnostic criteria)

Figure 4A

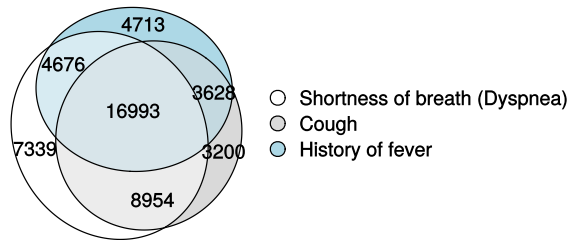
n = 71807



Symptoms (most common)

Figure 4B

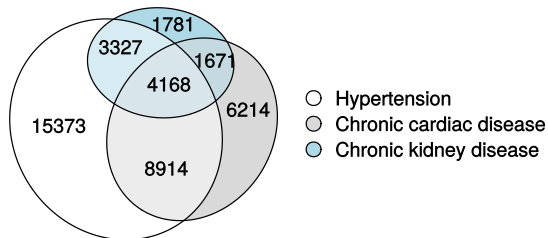
n = 71807



Comorbidity (most common)

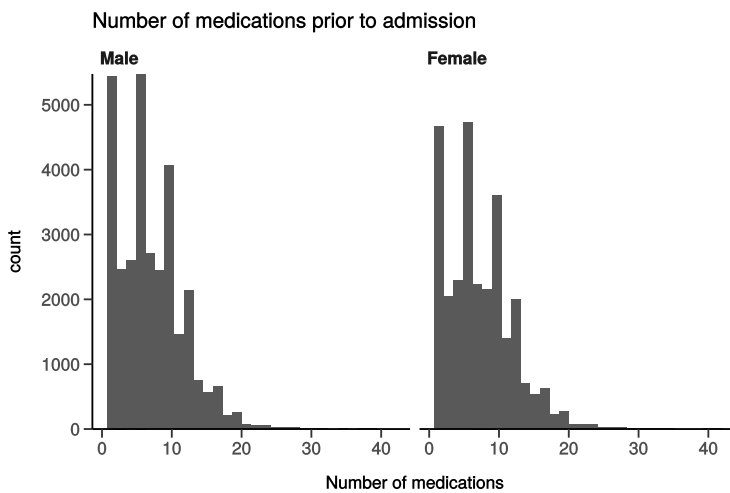
Figure 4C

n = 79990



Medication prior to illness

Figure 5

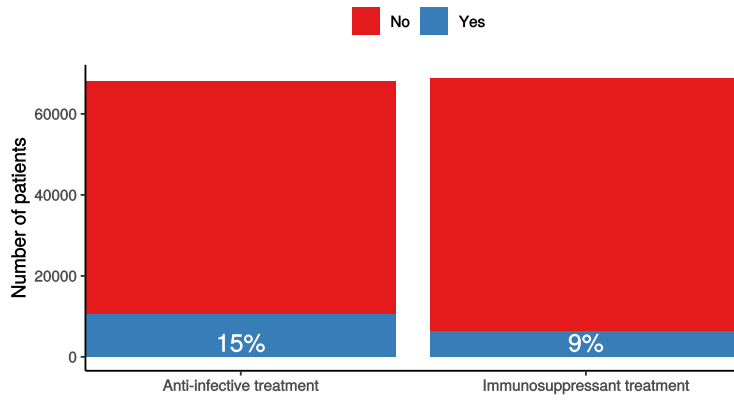


Preadmission treatment

Figure 6

Pre-admission treatment

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



Patient flow

Figure 7A - All patients

N = 75671

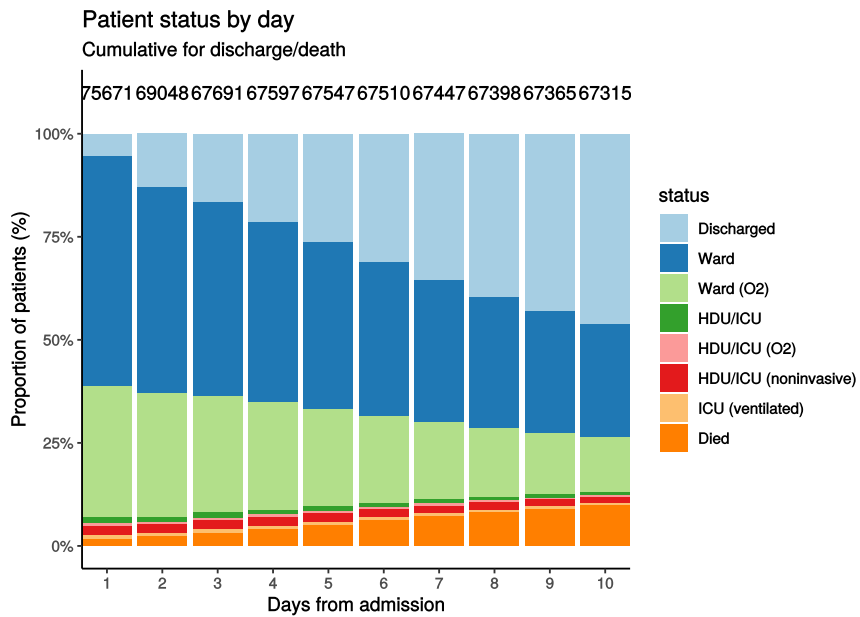
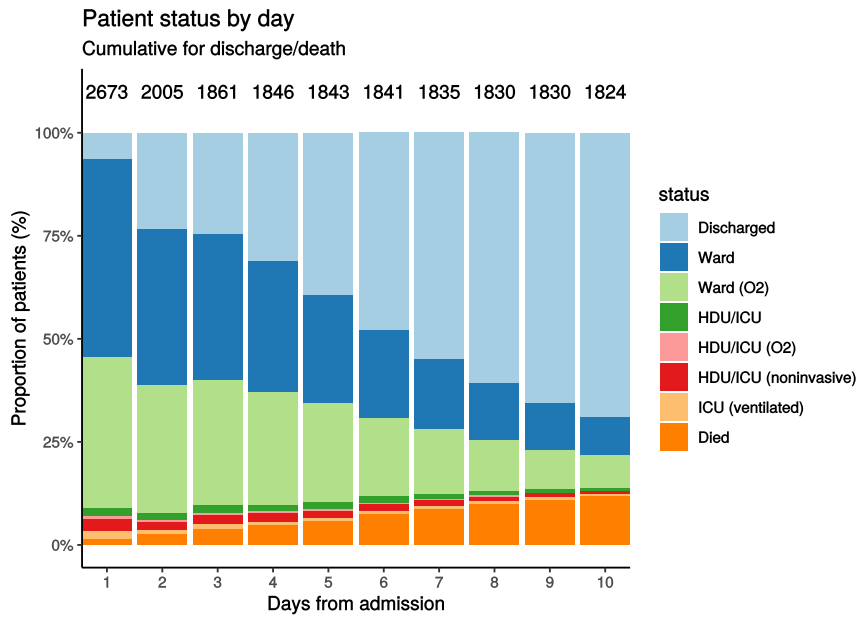


Figure 7B - Patients admitted ≥ 14 days and ≤ 28 days ago

N = 2673



Oxygen requirement

Figure 8A - All patients

N = 71336

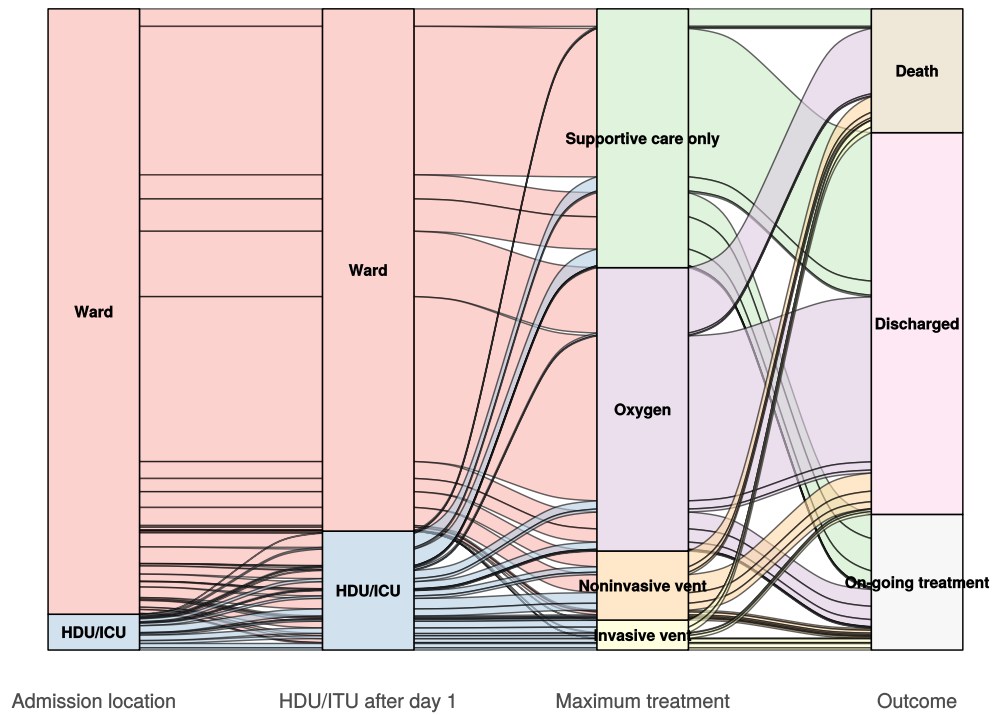


Figure 8B - Patients admitted ≥ 14 days and ≤ 28 days ago

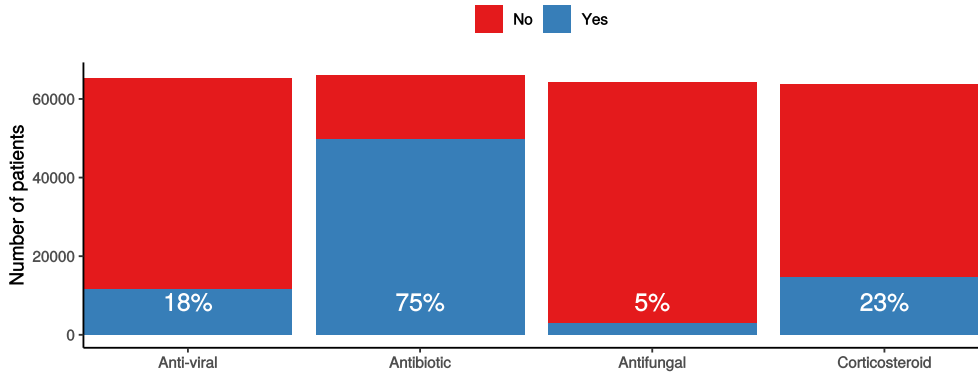
N = 2496

In-hospital medical treatment

Figure 9

In-hospital treatment

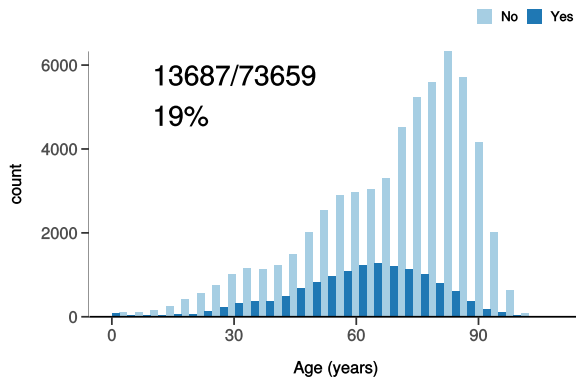
Anti-virals, antibiotics, corticosteroids, and anti-fungals for patients who have completed journey.



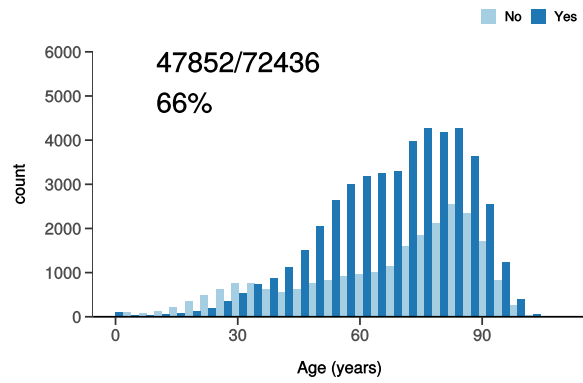
Treatment

Figure 10

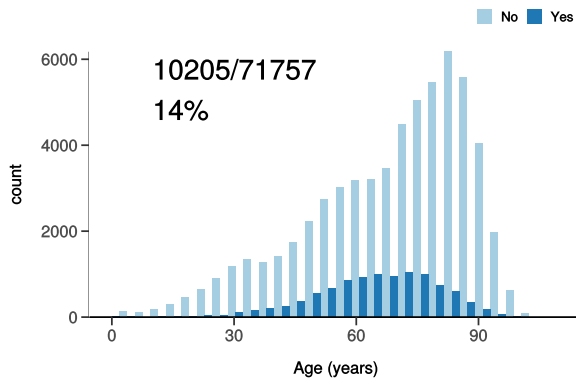
ICU/HDU admission
Figure 10A



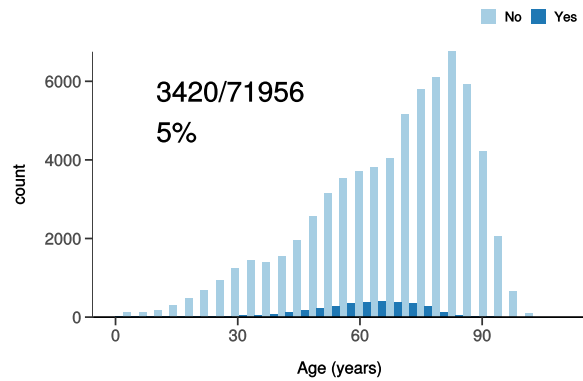
High flow oxygen
Figure 10B



Noninvasive ventilation
Figure 10C



Invasive ventilation
Figure 10D

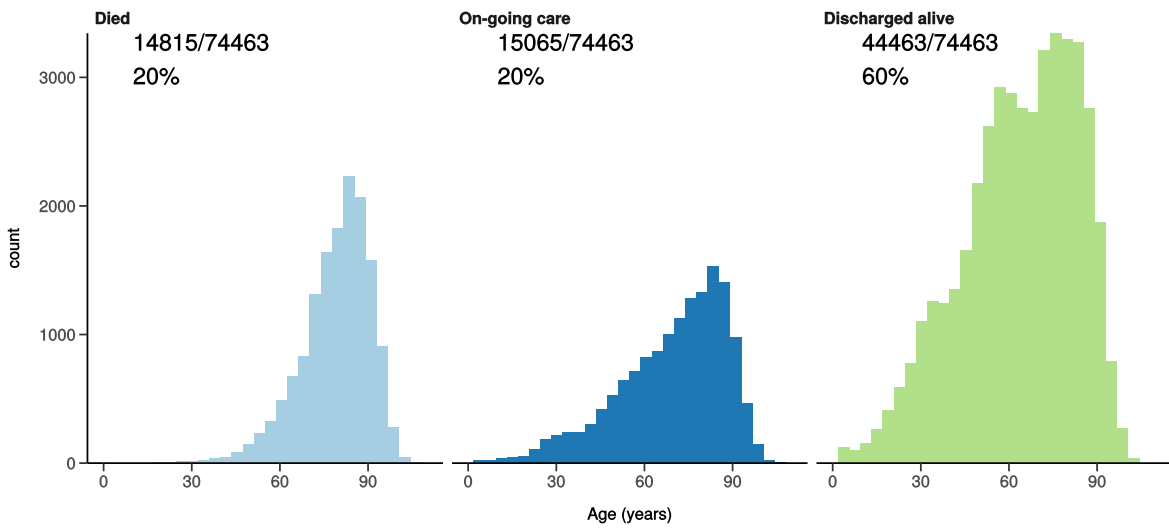


Status in patients admitted ≥ 14 days from today

Figure 11

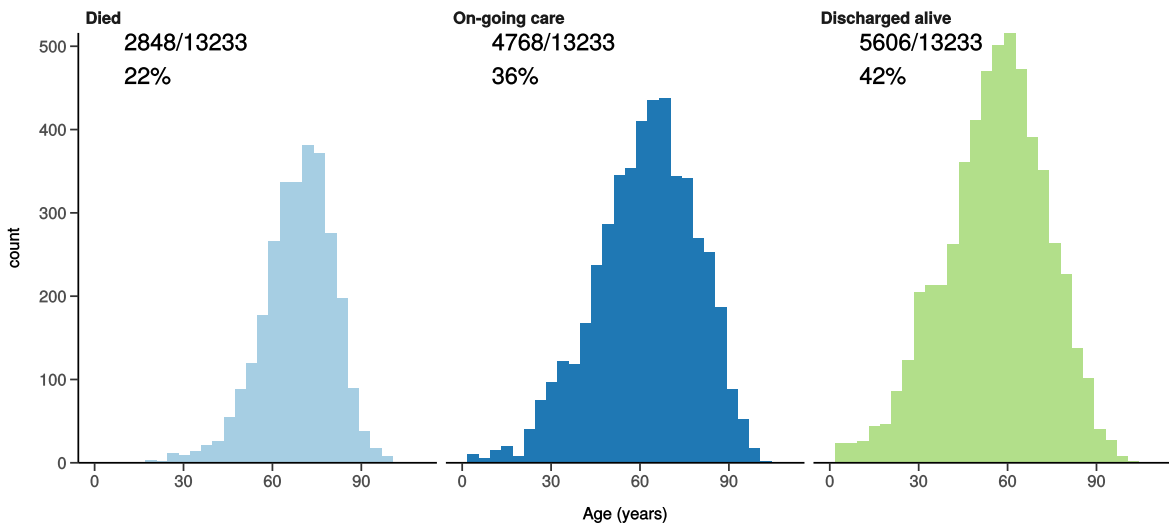
All: status in patients admitted ≥ 14 days ago

Figure 11A



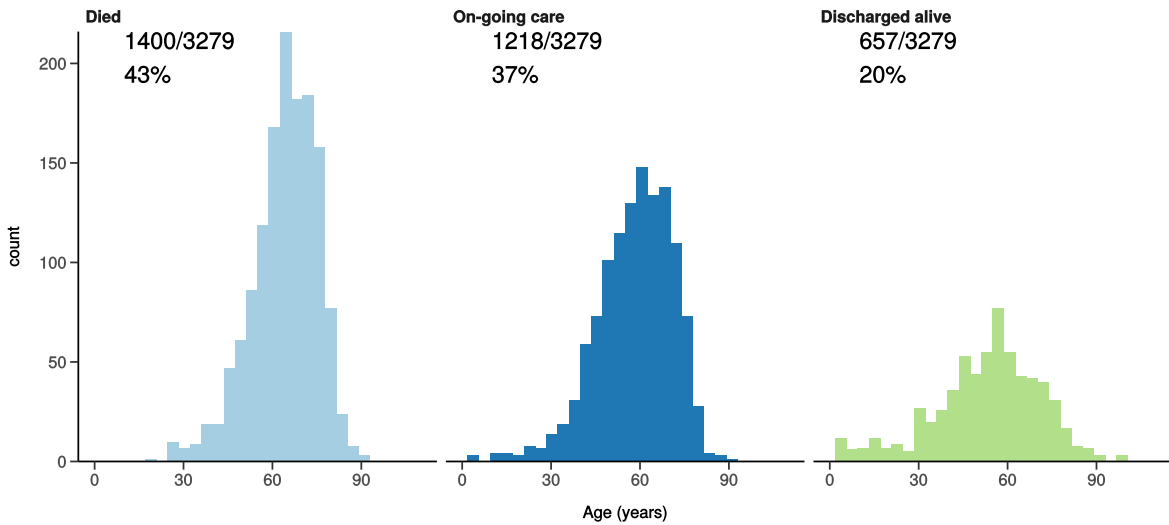
ICU/HDU admissions: status in patients admitted ≥ 14 days ago

Figure 11B



Invasive ventilation: status in patients admitted ≥ 14 days ago

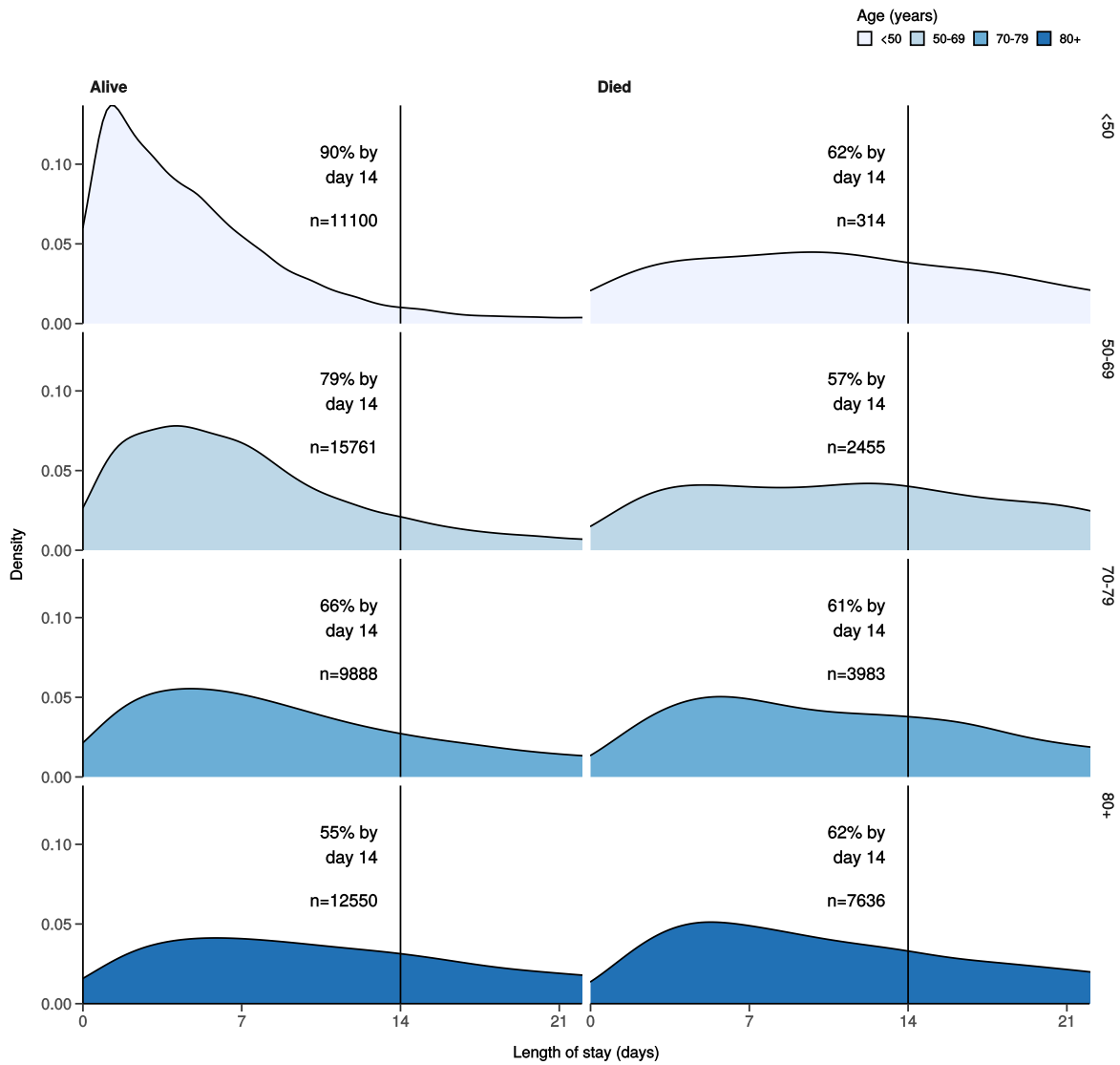
Figure 11c



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	12235 (97.4)	326 (2.6)	•	•
	50-69	16953 (87.1)	2518 (12.9)	5.57 (4.96-6.28, p<0.001)	4.75 (4.17-5.43, p<0.001)
	70-79	10736 (72.5)	4079 (27.5)	14.26 (12.72-16.04, p<0.001)	10.64 (9.34-12.17, p<0.001)
	80+	13579 (63.4)	7850 (36.6)	21.70 (19.40-24.35, p<0.001)	15.95 (14.01-18.23, p<0.001)
Sex at Birth	Male	27839 (76.0)	8790 (24.0)	•	•
	Female	25690 (81.1)	5995 (18.9)	0.74 (0.71-0.77, p<0.001)	0.69 (0.66-0.72, p<0.001)
	Not specified	0 (NaN)	0 (NaN)	•	•

Dependent: death		No	Yes	OR (univariable)	OR (multivariable)
Chronic cardiac disease	NO	36347 (83.5)	7187 (16.5)	•	•
	YES	12777 (67.8)	6072 (32.2)	2.40 (2.31-2.50, p<0.001)	1.20 (1.14-1.26, p<0.001)
Chronic pulmonary disease (not asthma)	NO	42740 (81.1)	9933 (18.9)	•	•
	YES	6411 (65.9)	3315 (34.1)	2.22 (2.12-2.33, p<0.001)	1.55 (1.46-1.64, p<0.001)
Chronic neurological disorder	NO	43531 (79.7)	11102 (20.3)	•	•
	YES	5387 (72.8)	2017 (27.2)	1.47 (1.39-1.55, p<0.001)	1.04 (0.97-1.11, p=0.273)
Chronic hematologic disease	NO	46866 (79.1)	12377 (20.9)	•	•
	YES	1980 (73.1)	728 (26.9)	1.39 (1.28-1.52, p<0.001)	0.90 (0.81-1.00, p=0.043)
Chronic kidney disease	NO	42626 (81.4)	9749 (18.6)	•	•
	YES	6440 (65.1)	3449 (34.9)	2.34 (2.23-2.45, p<0.001)	1.32 (1.25-1.40, p<0.001)
Dementia	NO	44442 (81.1)	10370 (18.9)	•	•
	YES	4355 (62.6)	2600 (37.4)	2.56 (2.43-2.70, p<0.001)	1.38 (1.29-1.47, p<0.001)
Obesity (as defined by clinical staff)	NO	37088 (78.9)	9944 (21.1)	•	•
	YES	6862 (82.0)	1505 (18.0)	0.82 (0.77-0.87, p<0.001)	1.16 (1.08-1.25, p<0.001)
Malignant neoplasm	NO	45043 (80.4)	10971 (19.6)	•	•
	YES	3844 (64.0)	2165 (36.0)	2.31 (2.18-2.45, p<0.001)	1.64 (1.54-1.76, p<0.001)

Number in dataframe = 79315, Number in model = 53040, Missing = 26275, AIC = 46375.8, C-statistic = 0.75, H&L = Chi-sq(8) 129.42 (p<0.001)

Figure 13 - Adjusted odds ratio plot

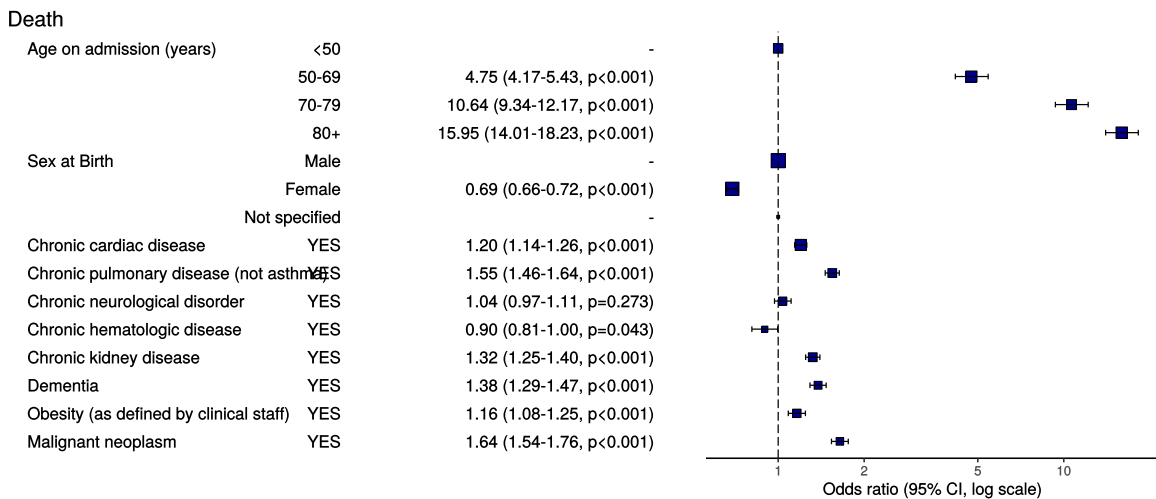
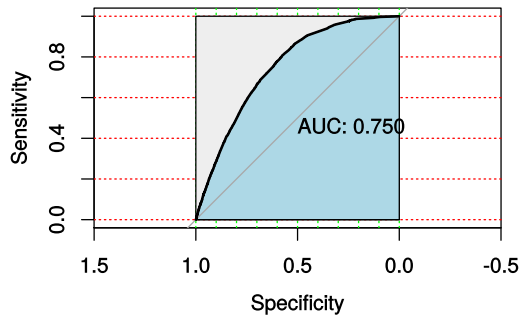


Figure 14 - ROC

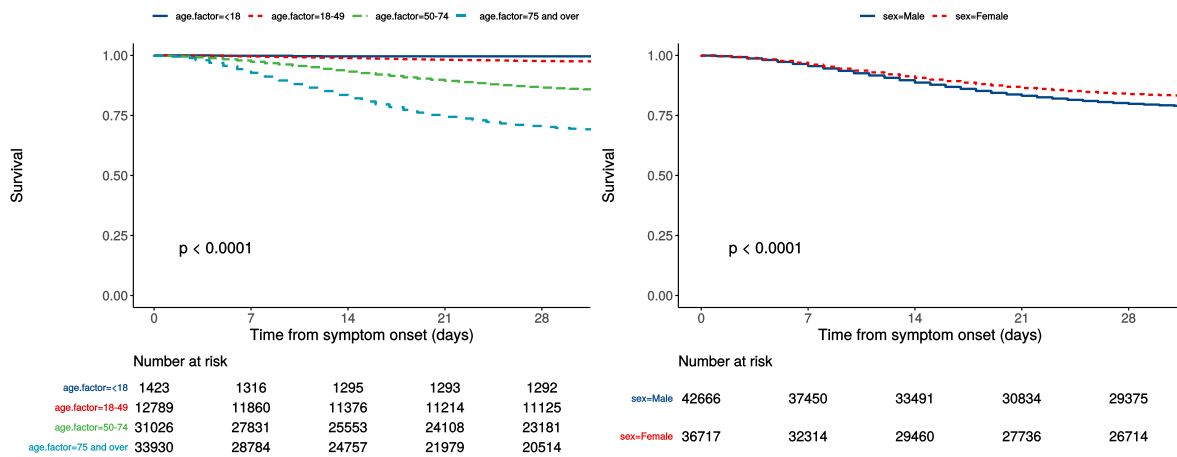


Survival models

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	14240 (18.0)	•	•
	50-69	22769 (28.7)	5.19 (4.63-5.83, p<0.001)	4.52 (3.94-5.20, p<0.001)
	70-79	17356 (21.9)	12.15 (10.86-13.61, p<0.001)	10.23 (8.92-11.73, p<0.001)
	80+	24870 (31.4)	17.42 (15.59-19.46, p<0.001)	14.65 (12.78-16.79, p<0.001)
Sex at Birth	Male	42722 (53.8)	•	•
	Female	36717 (46.2)	0.77 (0.75-0.80, p<0.001)	0.76 (0.73-0.79, p<0.001)
qSOFA score on admission	0	32427 (50.8)	•	•
	1	26871 (42.1)	1.60 (1.54-1.66, p<0.001)	1.77 (1.70-1.85, p<0.001)
	2	4261 (6.7)	3.18 (3.01-3.37, p<0.001)	3.02 (2.83-3.22, p<0.001)
	3	296 (0.5)	5.37 (4.57-6.30, p<0.001)	4.95 (4.13-5.92, p<0.001)
Symptomatic at presentation	No symptoms	12426 (17.2)	•	•

Dependent: Surv(time, status)		all	HR (univariable)	HR (multivariable)
	Symptoms	59829 (82.8)	1.50 (1.43-1.58, p<0.001)	•
Chronic cardiac disease	NO	48479 (69.9)	•	•
	YES	20881 (30.1)	2.18 (2.11-2.26, p<0.001)	1.20 (1.15-1.26, p<0.001)
Chronic kidney disease	NO	58280 (84.2)	•	•
	YES	10903 (15.8)	2.10 (2.02-2.19, p<0.001)	1.24 (1.18-1.30, p<0.001)
Moderate or severe liver disease	NO	67342 (98.1)	•	•
	YES	1305 (1.9)	1.54 (1.38-1.71, p<0.001)	1.60 (1.41-1.82, p<0.001)
Chronic neurological disorder	NO	60787 (88.2)	•	•
	YES	8133 (11.8)	1.41 (1.34-1.48, p<0.001)	•
Malignant neoplasm	NO	62240 (90.3)	•	•
	YES	6673 (9.7)	2.04 (1.95-2.14, p<0.001)	1.47 (1.39-1.56, p<0.001)
Chronic hematologic disease	NO	65893 (95.8)	•	•
	YES	2903 (4.2)	1.36 (1.26-1.47, p<0.001)	•
Obesity (as defined by clinical staff)	NO	52229 (85.1)	•	•
	YES	9167 (14.9)	0.84 (0.80-0.89, p<0.001)	1.11 (1.05-1.18, p=0.001)
Diabetes without complications	NO	56445 (87.5)	•	•
	YES	8048 (12.5)	1.19 (1.13-1.25, p<0.001)	•
Rheumatologic disorder	NO	59356 (86.5)	•	•
	YES	9302 (13.5)	1.25 (1.19-1.30, p<0.001)	•
Dementia	NO	60891 (88.7)	•	•
	YES	7768 (11.3)	2.27 (2.17-2.37, p<0.001)	1.20 (1.14-1.27, p<0.001)
Malnutrition	NO	62371 (97.6)	•	•
	YES	1536 (2.4)	1.72 (1.56-1.88, p<0.001)	•
smoking_mhyn_2levels	NO	33358 (46.3)	•	•
	YES	4087 (5.7)	0.90 (0.83-0.97, p=0.008)	•
	N/K	34566 (48.0)	1.19 (1.15-1.23, p<0.001)	•

Number in dataframe = 79681, Number in model = 51841, Missing = 27840, Number of events = 9730, Concordance = 0.747 (SE = 0.002), R-squared = 0.137 (Max possible = 0.982), Likelihood ratio test = 7614.191 (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	4.52 (3.94-5.20, p<0.001)
	70-79	10.23 (8.92-11.73, p<0.001)
	80+	14.65 (12.78-16.79, p<0.001)
Sex at Birth	Female	0.76 (0.73-0.79, p<0.001)
qSOFA score on admission	0	-
	1	1.77 (1.70-1.85, p<0.001)
	2	3.02 (2.83-3.22, p<0.001)
	3	4.95 (4.13-5.92, p<0.001)
Chronic cardiac disease	YES	1.20 (1.15-1.26, p<0.001)
Chronic kidney disease	YES	1.24 (1.18-1.30, p<0.001)
Moderate or severe liver disease	YES	1.60 (1.41-1.82, p<0.001)
Malignant neoplasm	YES	1.47 (1.39-1.56, p<0.001)
Obesity (as defined by clinical staff)	YES	1.11 (1.05-1.18, p=0.001)
Dementia	YES	1.20 (1.14-1.27, p<0.001)

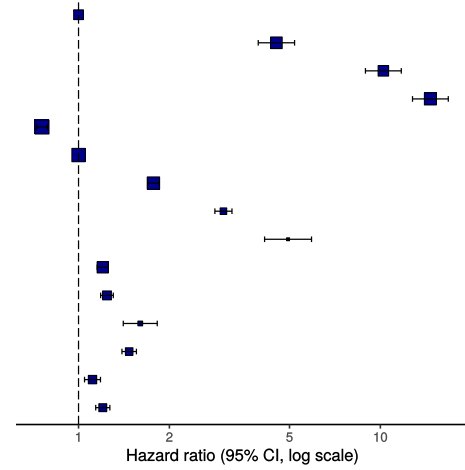
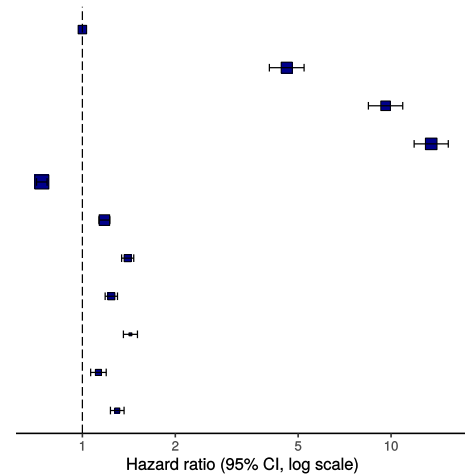


Figure 16b - Multivariable Cox proportional hazards model (age, sex, comorbidities only)

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

Age on admission (years)	<50	-
	50-69	4.59 (4.03-5.23, p<0.001)
	70-79	9.60 (8.44-10.91, p<0.001)
	80+	13.49 (11.88-15.32, p<0.001)
Sex at Birth	Female	0.74 (0.71-0.77, p<0.001)
Chronic cardiac disease	YES	1.18 (1.13-1.23, p<0.001)
Chronic pulmonary disease (not asthma)	YES	1.40 (1.34-1.47, p<0.001)
Chronic kidney disease	YES	1.24 (1.19-1.30, p<0.001)
Malignant neoplasm	YES	1.43 (1.36-1.51, p<0.001)
Obesity (as defined by clinical staff)	YES	1.13 (1.06-1.19, p<0.001)
Dementia	YES	1.30 (1.23-1.36, p<0.001)



ROC = 0.7479127

Figure 17 - Predictions calibration plot

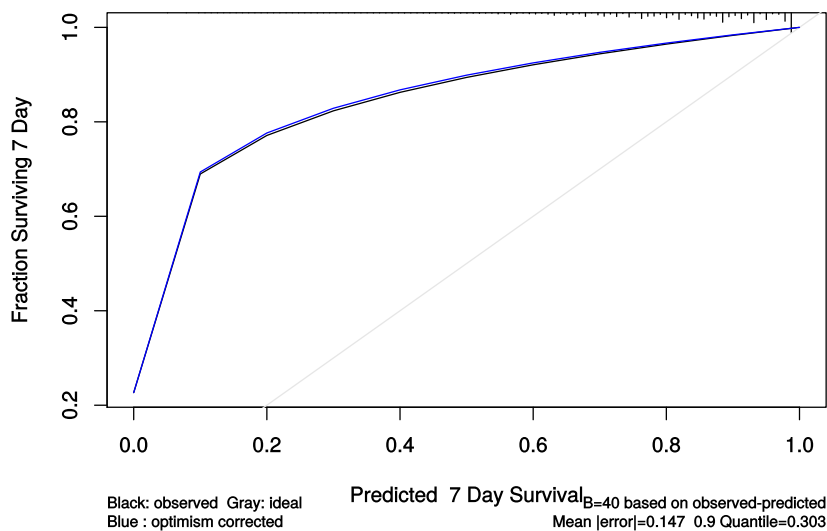


Figure 18 - Prognostic model predictions

Again, for demonstration of methods.

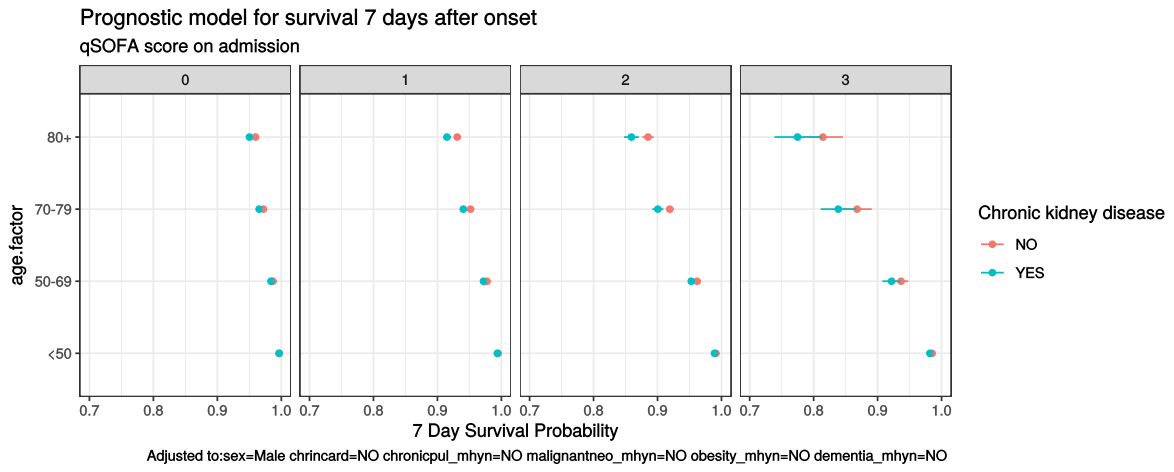


Figure 19 - Death by severity (NEWS) on admission

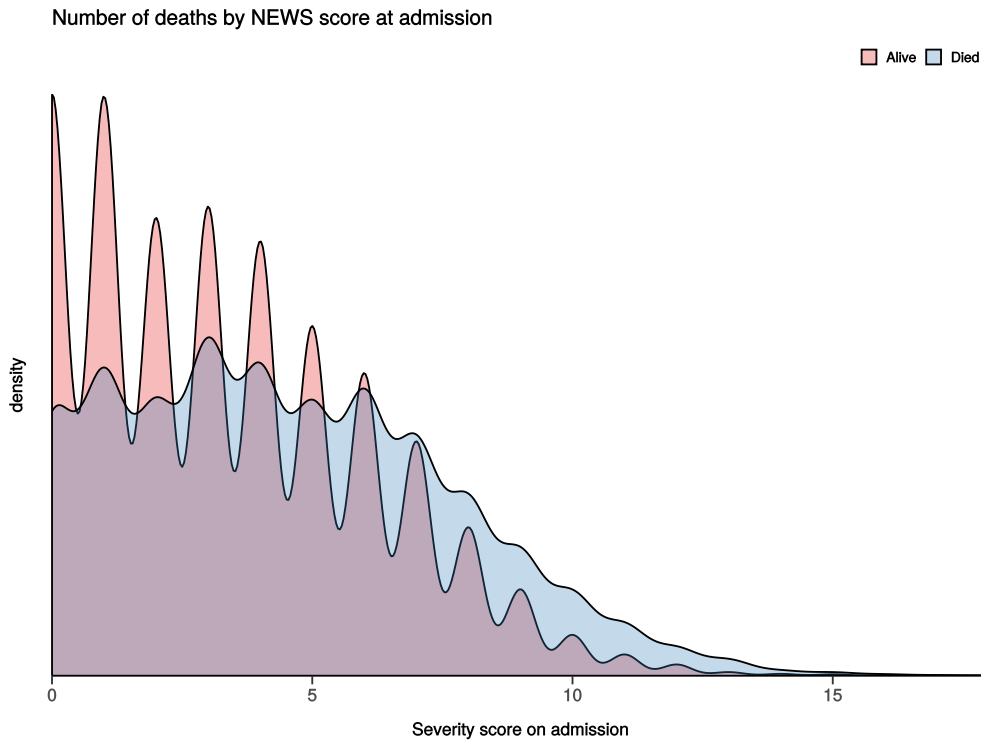


Figure 20 - Death by severity (NEWS) on admission stratified by age

Number of deaths by NEWS score at admission
Stratified by age

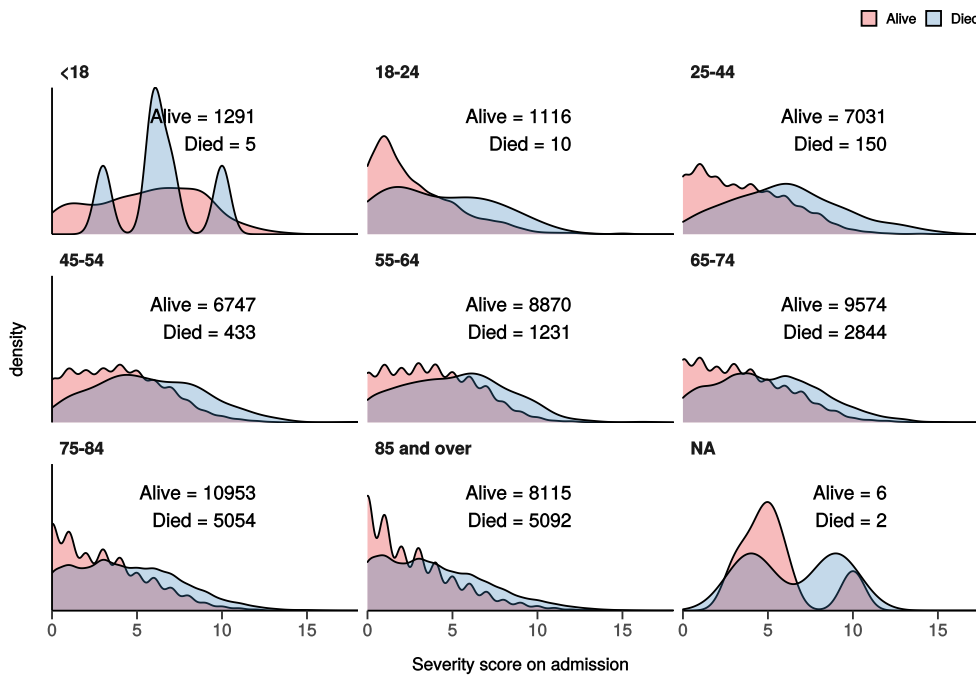
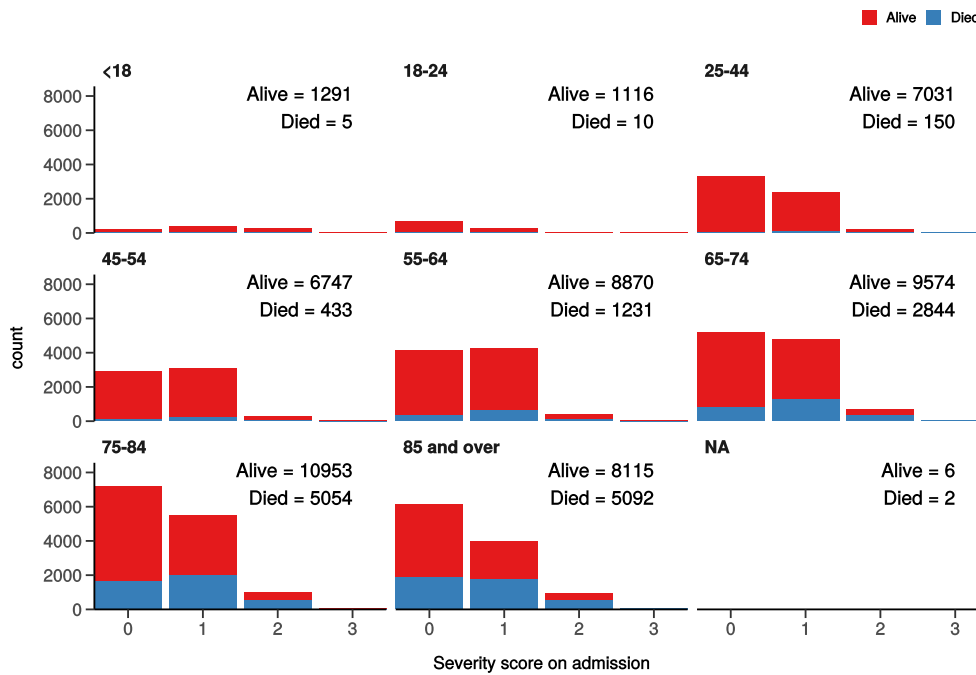


Figure 21 - Death by severity (qSOFA) on admission stratified by age

Number of deaths by qSOFA score at admission
Stratified by age



Healthcare workers

Employed as a healthcare worker?		NO	YES	p
Total N (%)		60914 (97.5)	1560 (2.5)	
NEWS score on admission	Median (IQR)	3.0 (4.0)	4.0 (4.0)	<0.001
Death	No	39834 (75.4)	1298 (93.4)	<0.001
	Yes	13010 (24.6)	92 (6.6)	