

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

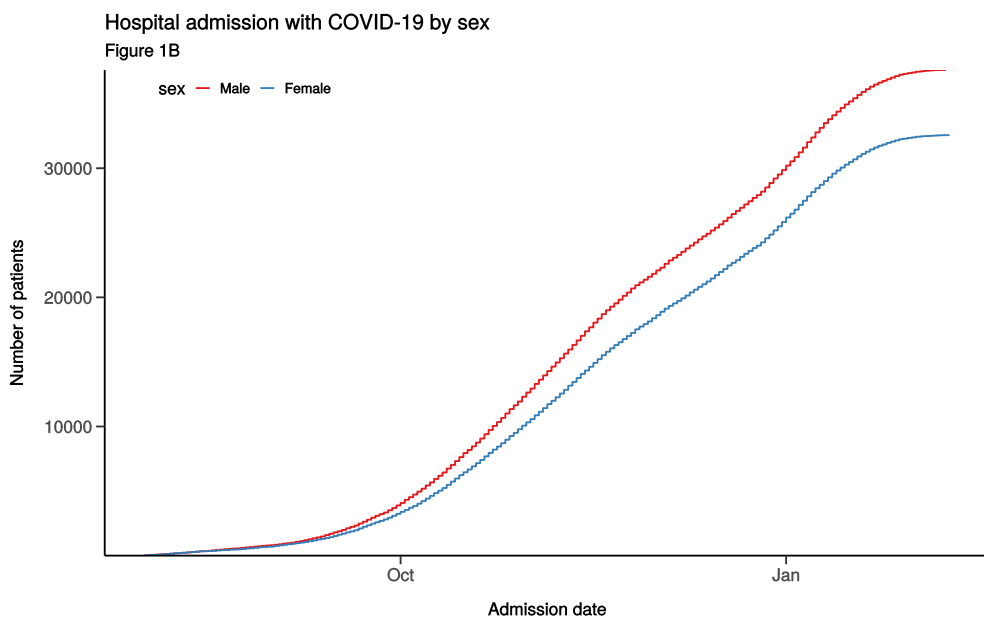
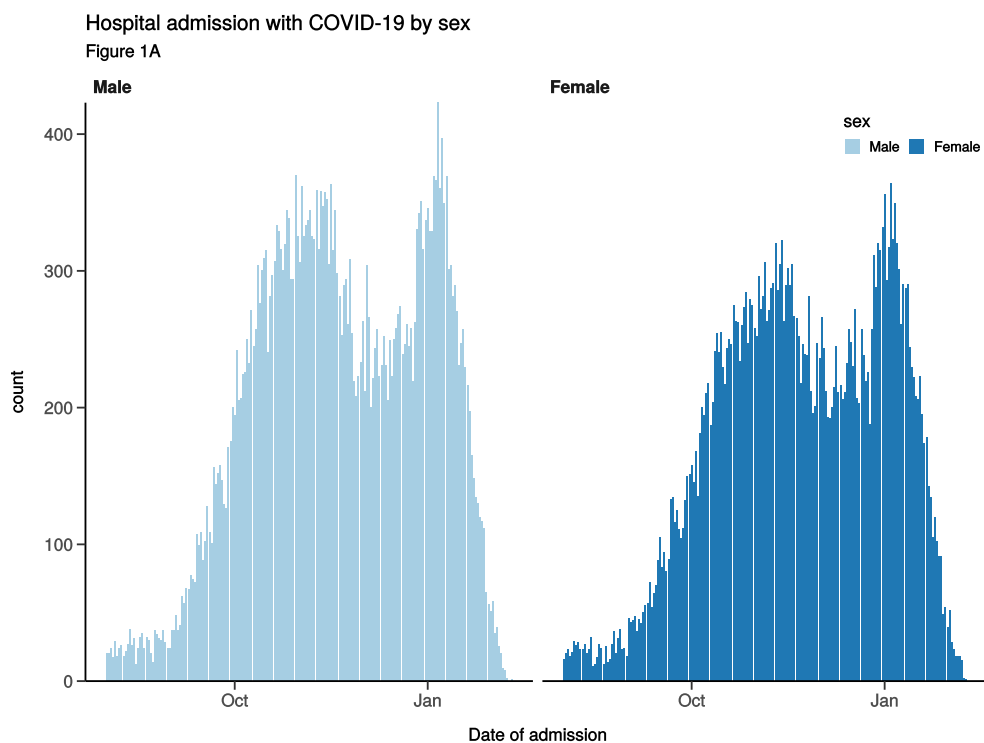
Executive summary

Includes patients admitted after 01 August 2020

There are 70420 patients included in CO-CIN. Of these, 12360 patient(s) have died and 12051 required ICU. 38013 have been discharged home.

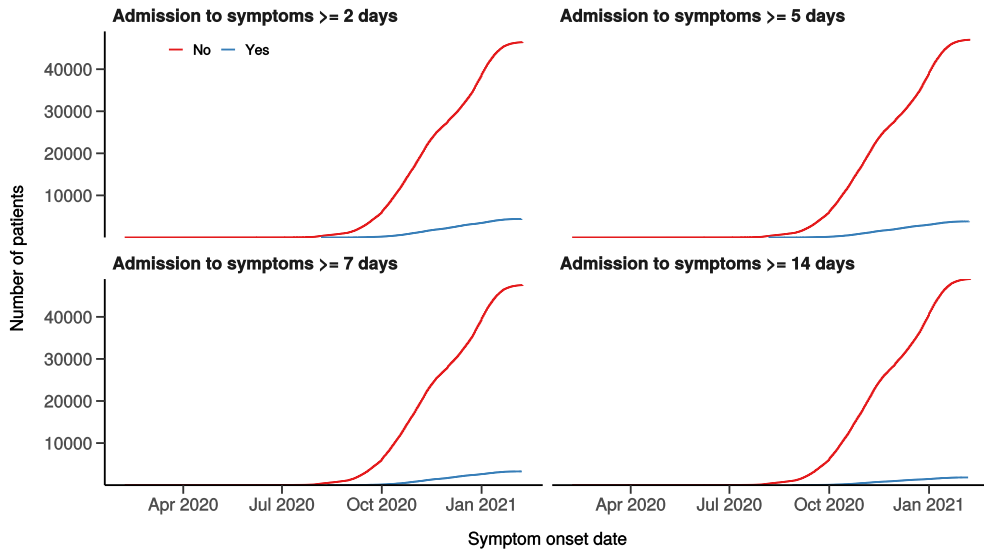
Admission

Figure 1



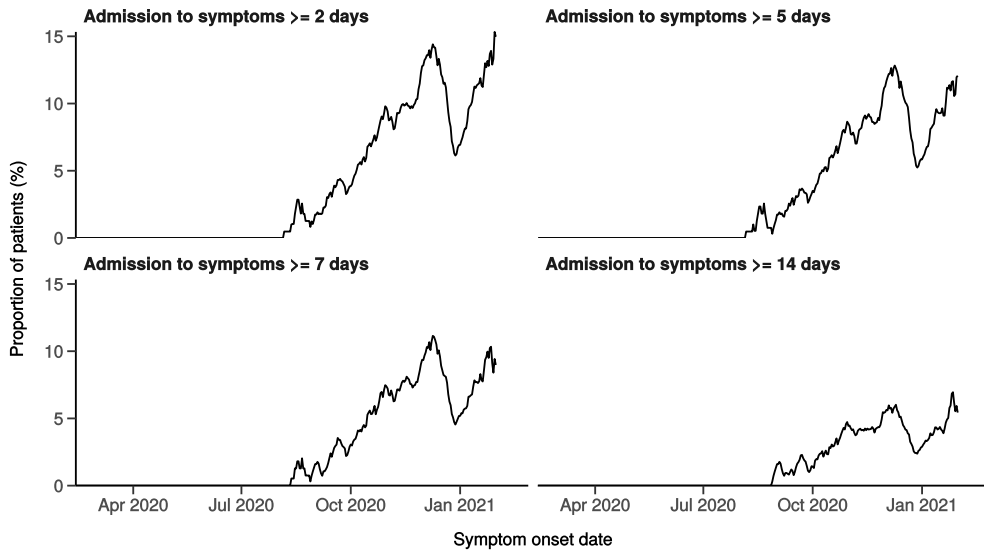
Number with symptom onset occurring after admission to hospital

Figure 1C



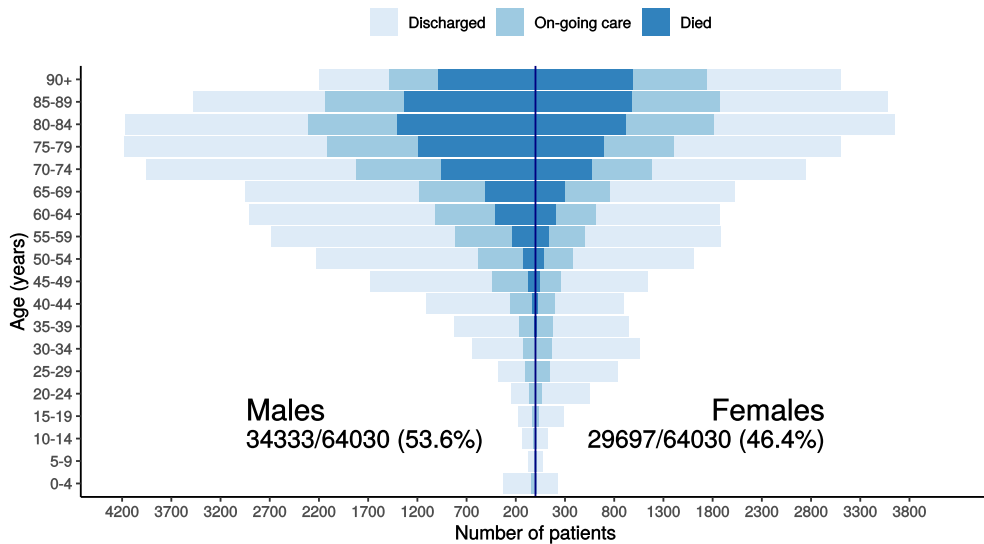
Proportion with symptom onset occurring after hospital admission

Figure 1D - 7-day rolling percentage. n = 50811

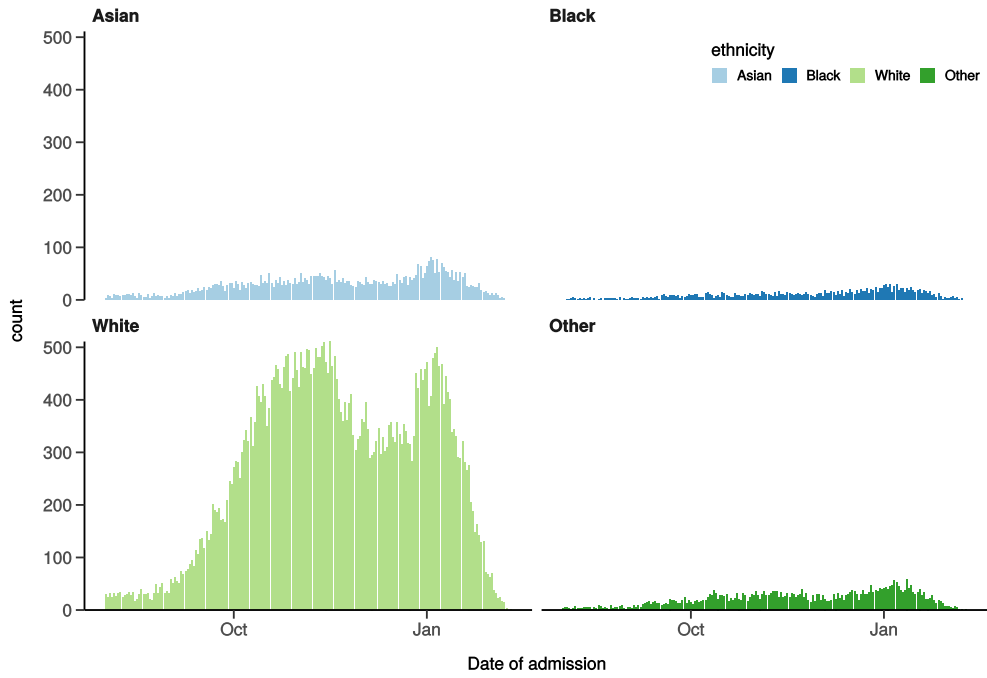


Patients with outcome stratified by age, and sex

Figure 1E



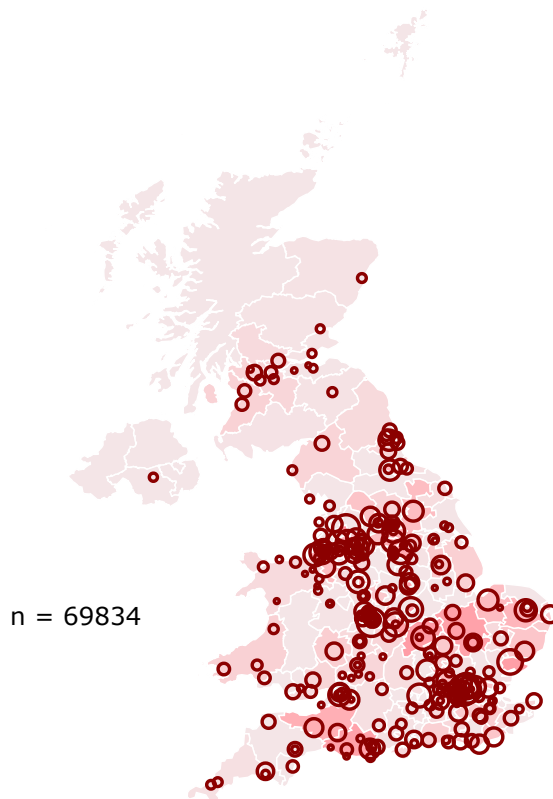
Hospital admission with COVID-19 by ethnicity
Figure 1F



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

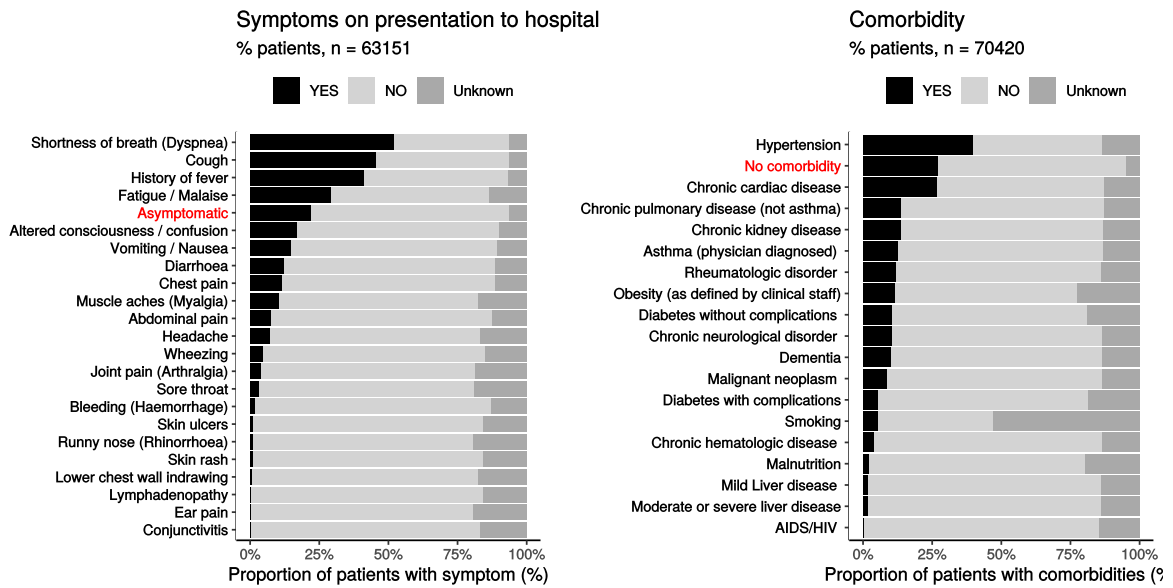


Figure 3B - Symptoms by Age

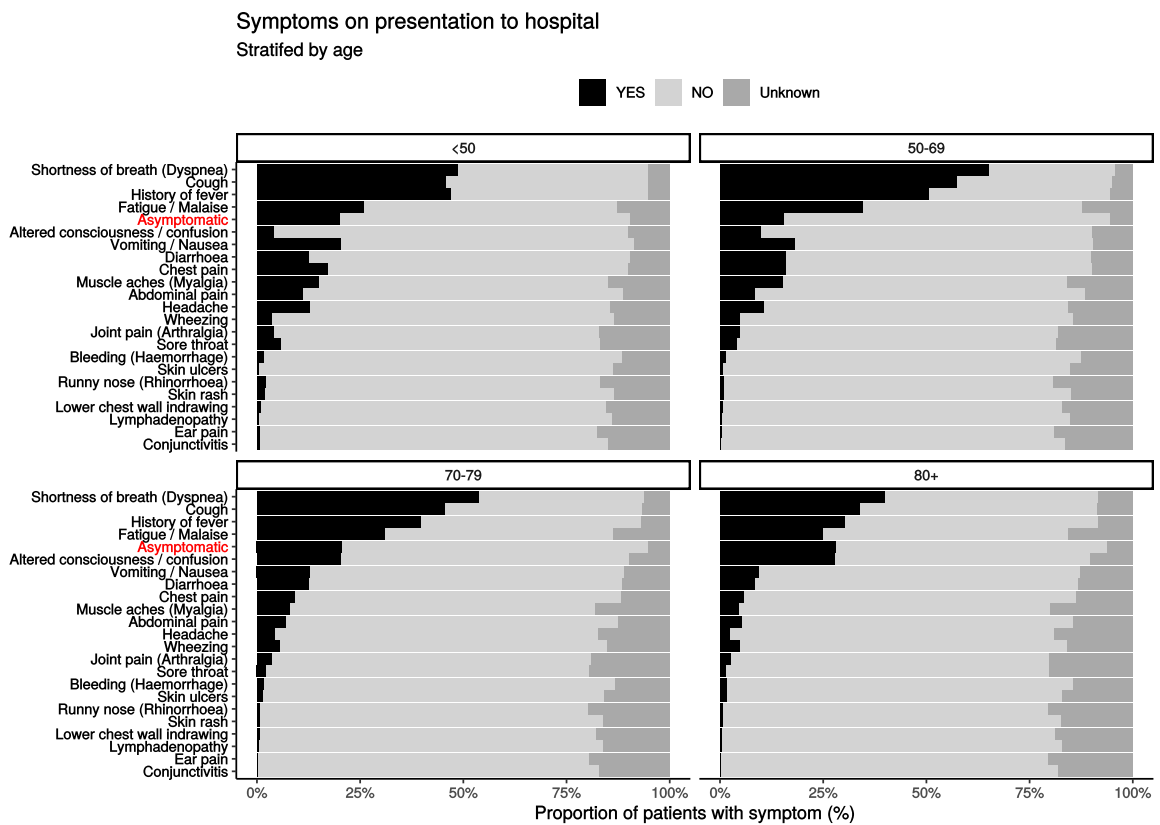
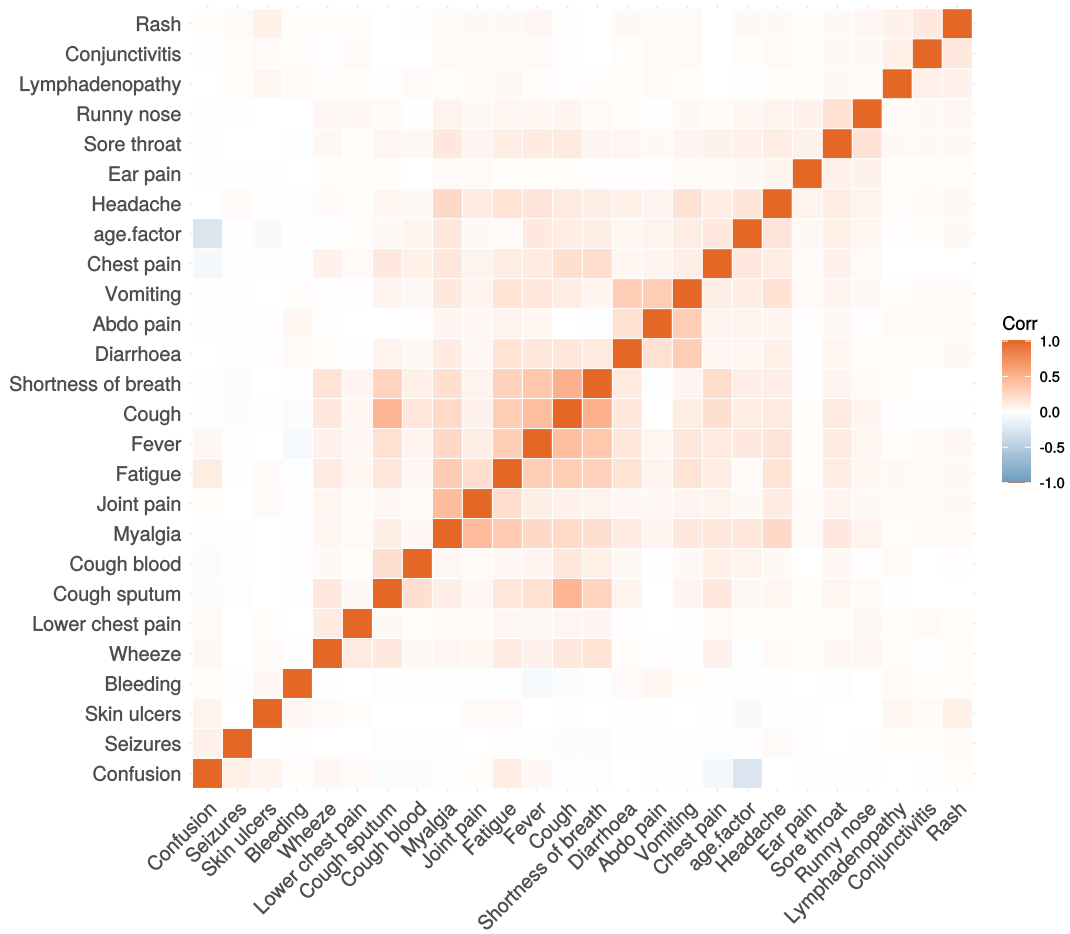


Figure 3C

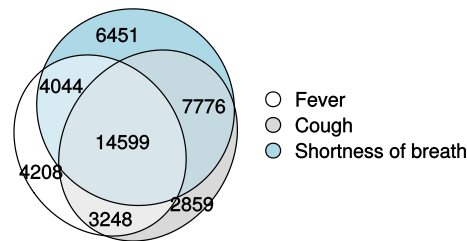
Correlation of symptoms in all pages. Note clusters, top right to bottom left, flu-like, coryzal, abdominal, respiratory, neurocutaneous.



Symptoms (diagnostic criteria)

Figure 4A

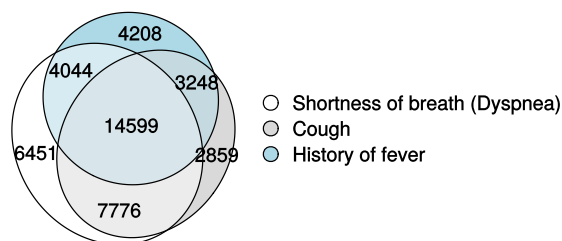
n = 63151



Symptoms (most common)

Figure 4B

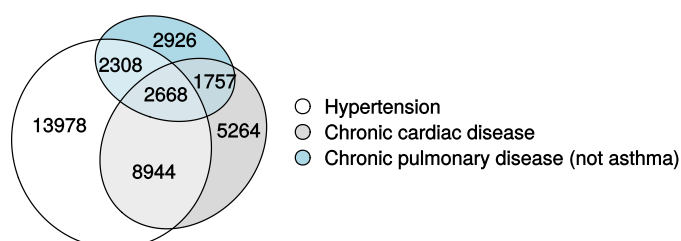
n = 63151



Comorbidity (most common)

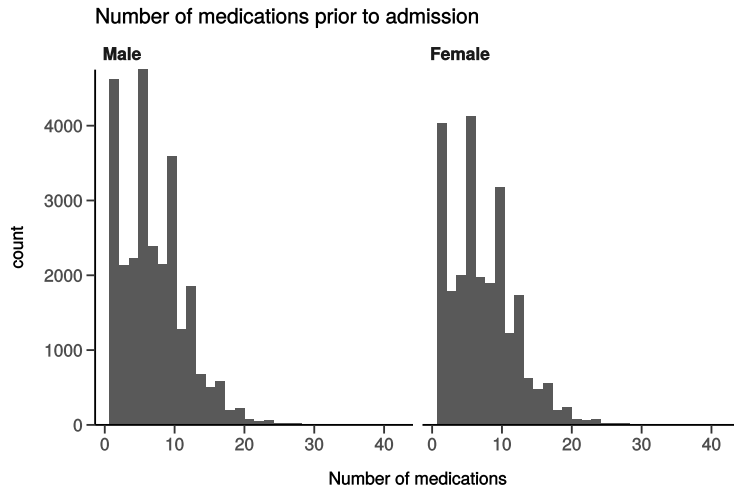
Figure 4C

n = 70420



Medication prior to illness

Figure 5

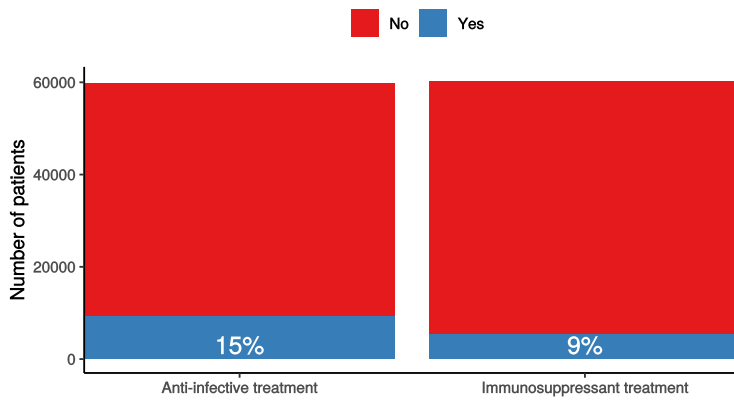


Preadmission treatment

Figure 6

Pre-admission treatment

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



Patient flow

Figure 7A - All patients

N = 65591

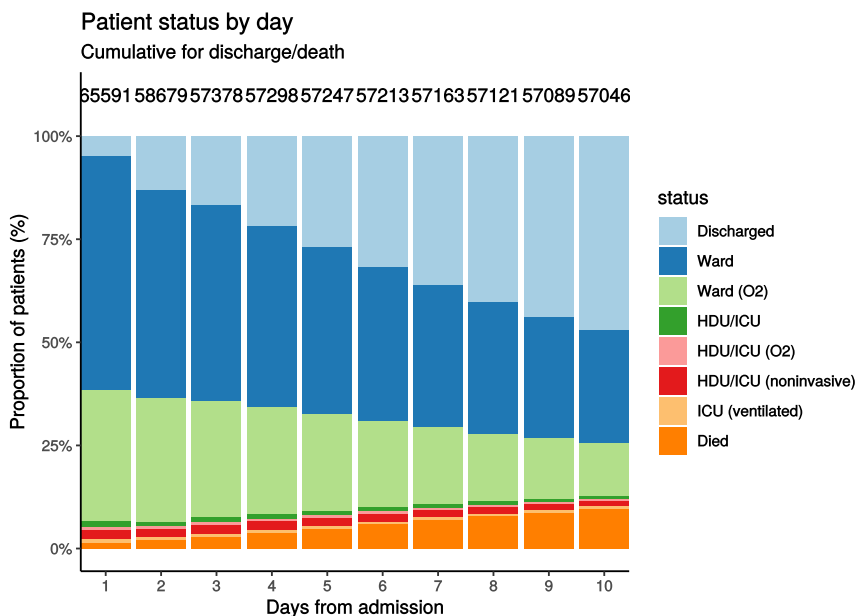
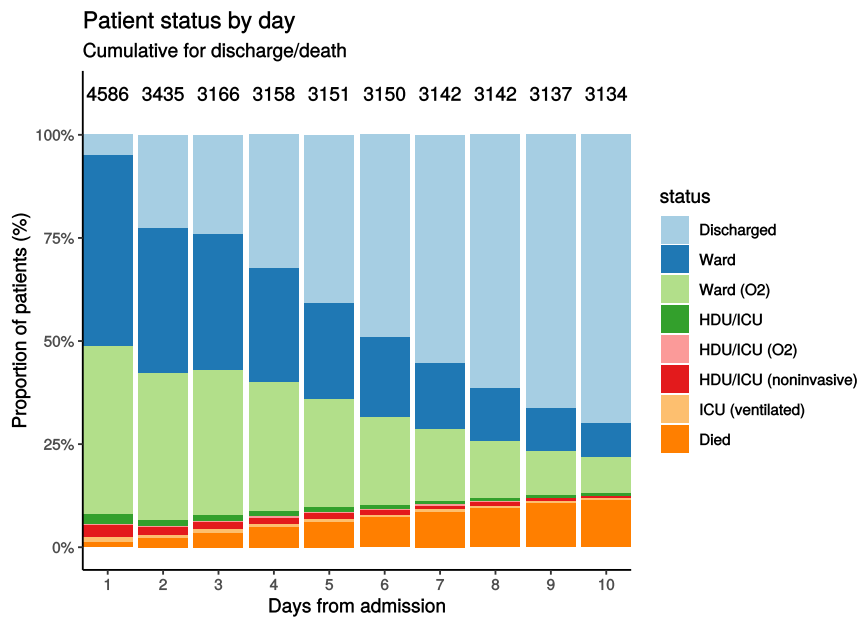


Figure 7B - Patients admitted >=14 days and <=28 days ago

N = 4586



Oxygen requirement

Figure 8A - All patients

N = 62383

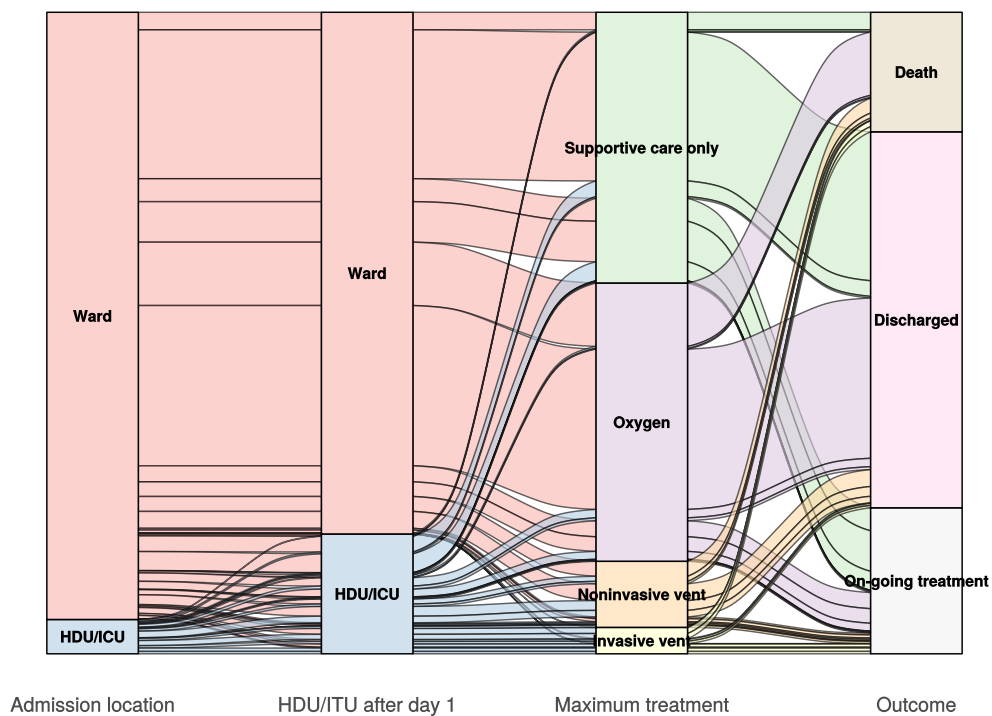


Figure 8B - Patients admitted ≥ 14 days and ≤ 28 days ago

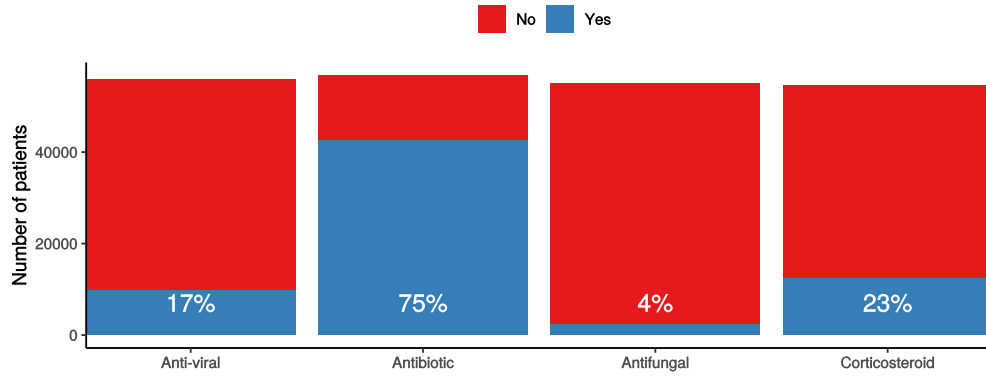
N = 4370

In-hospital medical treatment

Figure 9

In-hospital treatment

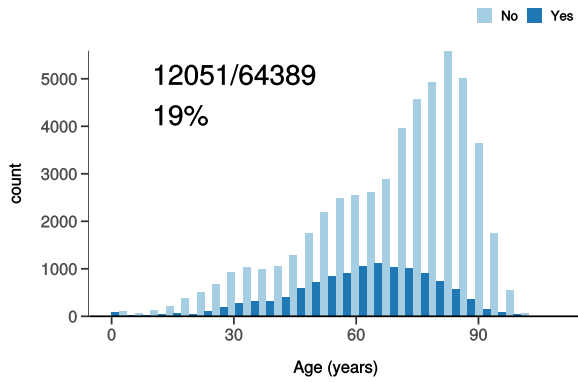
Anti-virals, antibiotics, corticosteroids, and anti-fungals for patients who have completed journey.



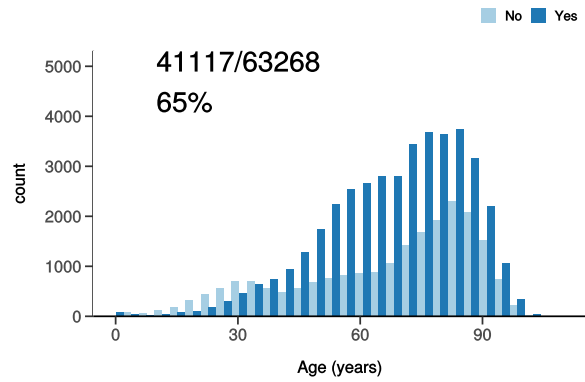
Treatment

Figure 10

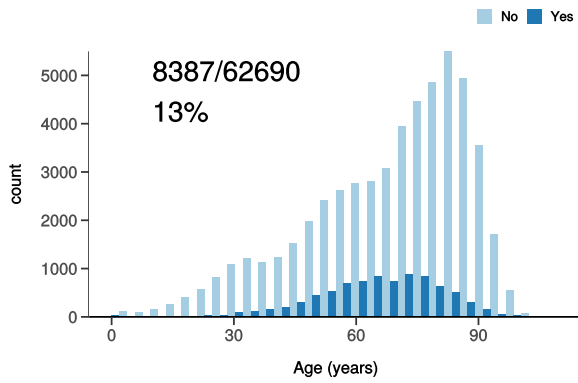
ICU/HDU admission
Figure 10A



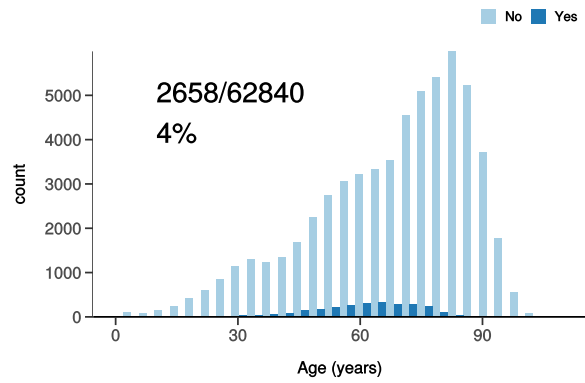
High flow oxygen
Figure 10B



Noninvasive ventilation
Figure 10C



Invasive ventilation
Figure 10D

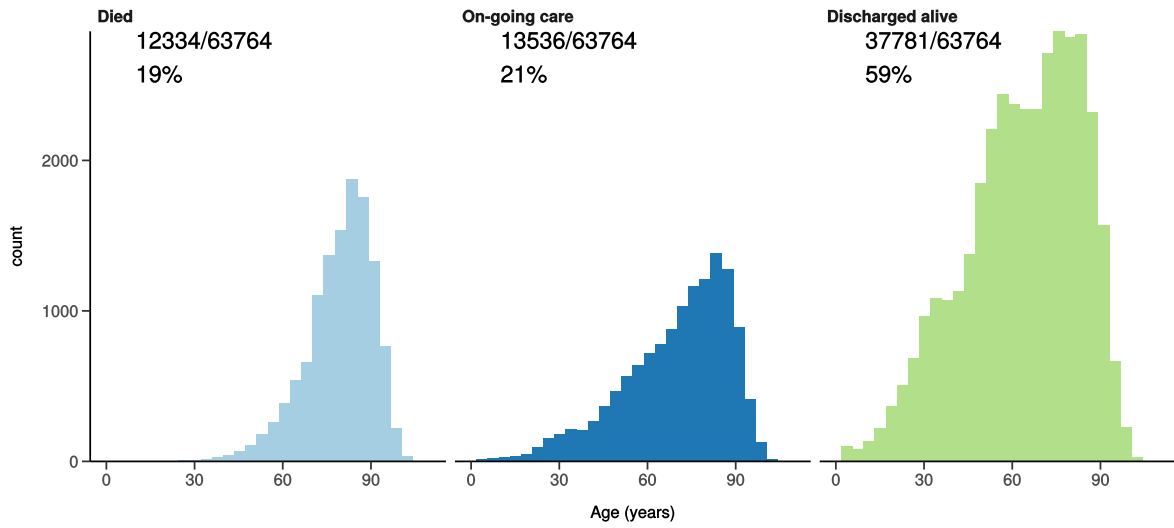


Status in patients admitted ≥ 14 days from today

Figure 11

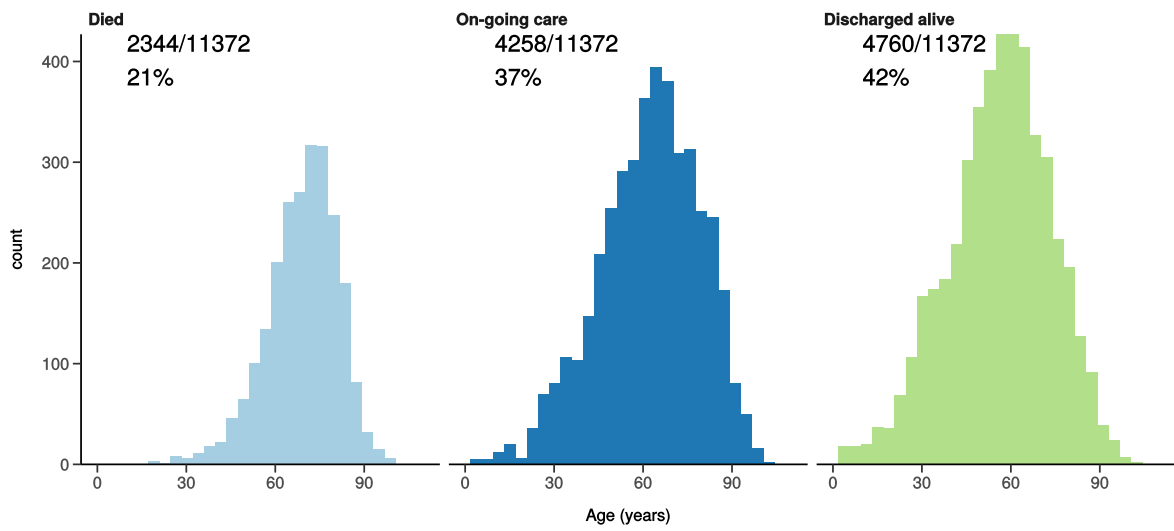
All: status in patients admitted ≥ 14 days ago

Figure 11A



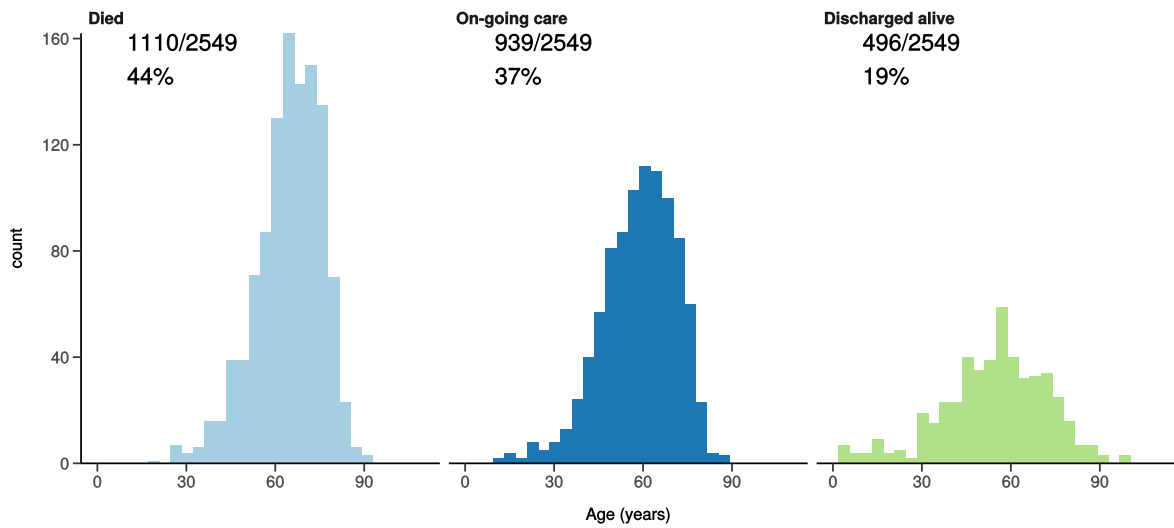
ICU/HDU admissions: status in patients admitted ≥ 14 days ago

Figure 11B



Invasive ventilation: status in patients admitted ≥ 14 days ago

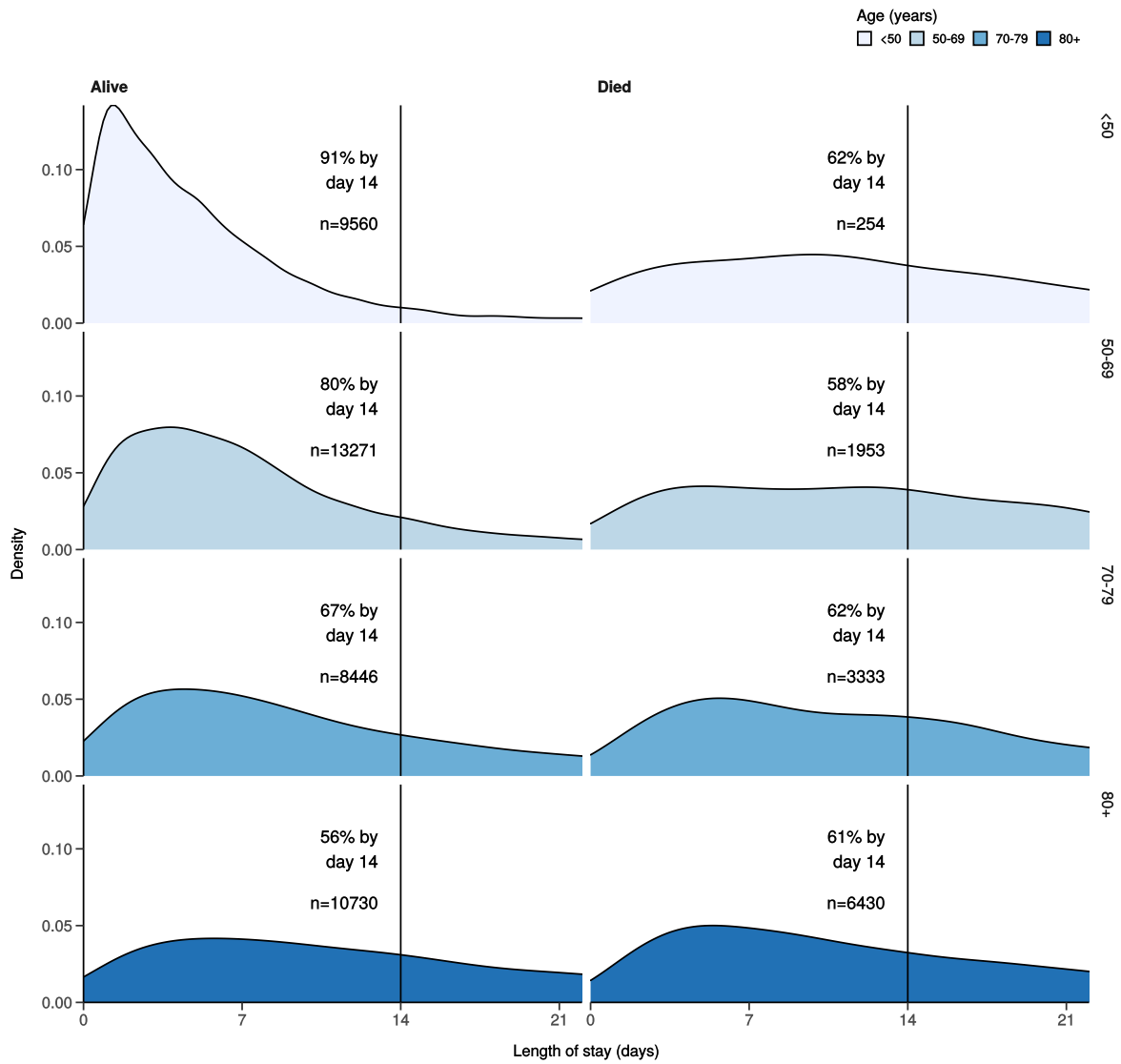
Figure 11c



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	10442 (97.5)	266 (2.5)	•	•
	50-69	14212 (87.6)	2004 (12.4)	5.54 (4.87-6.32, p<0.001)	4.82 (4.17-5.59, p<0.001)
	70-79	9118 (72.8)	3414 (27.2)	14.70 (12.96-16.74, p<0.001)	11.08 (9.59-12.86, p<0.001)
	80+	11572 (63.6)	6611 (36.4)	22.43 (19.83-25.48, p<0.001)	16.72 (14.49-19.40, p<0.001)
Sex at Birth	Male	23533 (76.3)	7316 (23.7)	•	•
	Female	21837 (81.4)	4989 (18.6)	0.73 (0.71-0.77, p<0.001)	0.69 (0.66-0.73, p<0.001)
	Not specified	0 (NaN)	0 (NaN)	•	•
Chronic cardiac disease	NO	31101 (83.8)	6000 (16.2)	•	•
	YES	11138 (68.1)	5229 (31.9)	2.43 (2.33-2.54, p<0.001)	1.20 (1.14-1.27, p<0.001)

Dependent: death		No	Yes	OR (univariable)	OR (multivariable)
Chronic pulmonary disease (not asthma)	NO	36679 (81.4)	8381 (18.6)	•	•
	YES	5576 (66.3)	2836 (33.7)	2.23 (2.11-2.34, p<0.001)	1.55 (1.46-1.65, p<0.001)
Chronic neurological disorder	NO	37475 (80.0)	9390 (20.0)	•	•
	YES	4595 (72.7)	1722 (27.3)	1.50 (1.41-1.59, p<0.001)	1.04 (0.97-1.12, p=0.265)
Chronic hematologic disease	NO	40249 (79.4)	10458 (20.6)	•	•
	YES	1753 (73.1)	646 (26.9)	1.42 (1.29-1.56, p<0.001)	0.92 (0.82-1.03, p=0.138)
Chronic kidney disease	NO	36665 (81.7)	8226 (18.3)	•	•
	YES	5525 (65.1)	2963 (34.9)	2.39 (2.27-2.51, p<0.001)	1.35 (1.27-1.44, p<0.001)
Dementia	NO	38224 (81.3)	8790 (18.7)	•	•
	YES	3772 (63.2)	2201 (36.8)	2.54 (2.40-2.69, p<0.001)	1.37 (1.28-1.47, p<0.001)
Obesity (as defined by clinical staff)	NO	32009 (79.1)	8475 (20.9)	•	•
	YES	5830 (82.6)	1229 (17.4)	0.80 (0.75-0.85, p<0.001)	1.11 (1.03-1.20, p=0.005)
Malignant neoplasm	NO	38713 (80.7)	9283 (19.3)	•	•
	YES	3328 (64.3)	1851 (35.7)	2.32 (2.18-2.47, p<0.001)	1.64 (1.52-1.76, p<0.001)

Number in dataframe = 69284, Number in model = 45551, Missing = 23733, AIC = 39409.9, C-statistic = 0.753, H&L = Chi-sq(8) 114.89 (p<0.001)

Figure 13 - Adjusted odds ratio plot

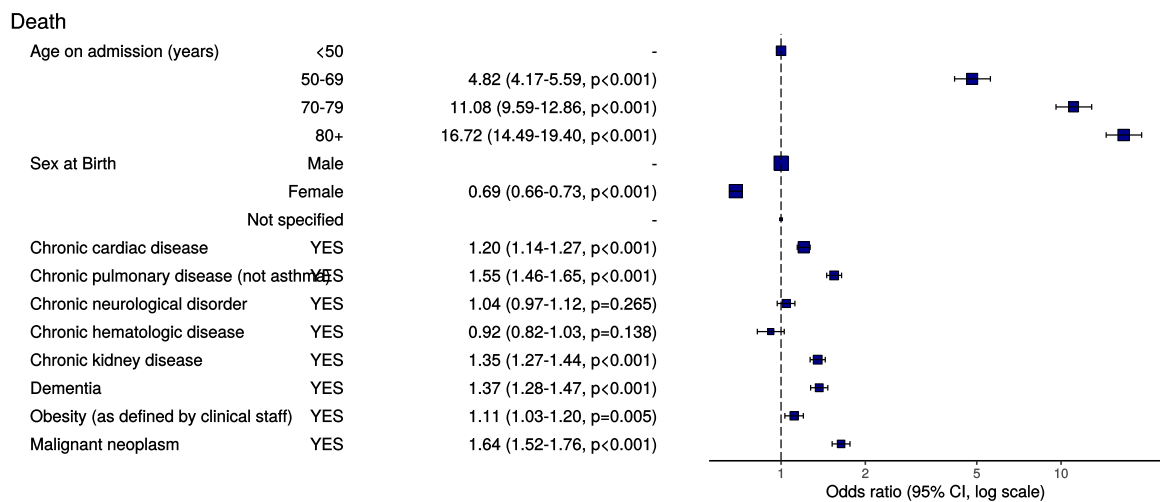
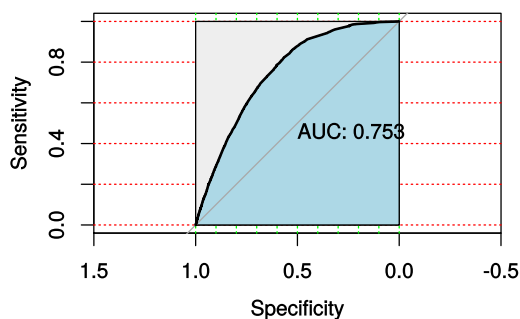


Figure 14 - ROC

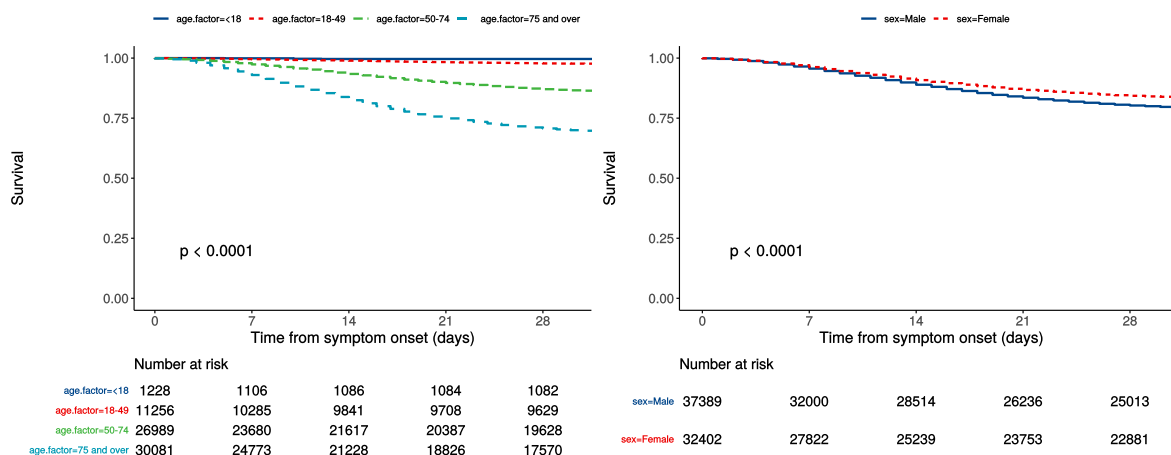


Survival models

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	12484 (17.9)	•	•
	50-69	19667 (28.3)	5.19 (4.57-5.90, p<0.001)	4.42 (3.80-5.15, p<0.001)
	70-79	15339 (22.0)	12.56 (11.08-14.23, p<0.001)	10.27 (8.84-11.93, p<0.001)
	80+	22075 (31.7)	18.11 (16.02-20.48, p<0.001)	14.91 (12.84-17.31, p<0.001)
Sex at Birth	Male	37389 (53.6)	•	•
	Female	32402 (46.4)	0.77 (0.74-0.80, p<0.001)	0.76 (0.72-0.79, p<0.001)
qSOFA score on admission	0	28671 (51.4)	•	•
	1	23178 (41.6)	1.64 (1.57-1.71, p<0.001)	1.83 (1.75-1.92, p<0.001)
	2	3647 (6.5)	3.27 (3.07-3.47, p<0.001)	3.06 (2.85-3.28, p<0.001)
	3	247 (0.4)	5.75 (4.84-6.84, p<0.001)	5.14 (4.23-6.24, p<0.001)
Symptomatic at presentation	No symptoms	11346 (17.9)	•	•
	Symptoms	52178 (82.1)	1.53 (1.45-1.62, p<0.001)	•
Chronic cardiac disease	NO	42488 (69.6)	•	•
	YES	18550 (30.4)	2.21 (2.13-2.30, p<0.001)	1.20 (1.14-1.25, p<0.001)
Chronic kidney disease	NO	51288 (84.2)	•	•
	YES	9606 (15.8)	2.14 (2.05-2.23, p<0.001)	1.27 (1.20-1.34, p<0.001)
Moderate or severe liver disease	NO	59272 (98.1)	•	•
	YES	1152 (1.9)	1.57 (1.41-1.76, p<0.001)	1.62 (1.41-1.86, p<0.001)
Chronic neurological disorder	NO	53509 (88.2)	•	•
	YES	7169 (11.8)	1.43 (1.36-1.51, p<0.001)	•
Malignant neoplasm	NO	54798 (90.3)	•	•
	YES	5871 (9.7)	2.05 (1.95-2.16, p<0.001)	1.47 (1.39-1.57, p<0.001)

Dependent: Surv(time, status)		all	HR (univariable)	HR (multivariable)
Chronic hematologic disease	NO	57929 (95.7)	•	•
	YES	2622 (4.3)	1.38 (1.28-1.50, p<0.001)	•
Obesity (as defined by clinical staff)	NO	46203 (85.3)	•	•
	YES	7962 (14.7)	0.82 (0.77-0.87, p<0.001)	1.07 (1.00-1.14, p=0.063)
Diabetes without complications	NO	49665 (87.3)	•	•
	YES	7196 (12.7)	1.17 (1.10-1.23, p<0.001)	•
Rheumatologic disorder	NO	52147 (86.3)	•	•
	YES	8312 (13.7)	1.22 (1.16-1.28, p<0.001)	•
Dementia	NO	53601 (88.6)	•	•
	YES	6882 (11.4)	2.26 (2.16-2.37, p<0.001)	1.19 (1.13-1.26, p<0.001)
Malnutrition	NO	54979 (97.6)	•	•
	YES	1325 (2.4)	1.69 (1.52-1.87, p<0.001)	•
smoking_mhyn_2levels	NO	29189 (46.1)	•	•
	YES	3616 (5.7)	0.90 (0.83-0.98, p=0.020)	•
	N/K	30489 (48.2)	1.19 (1.14-1.23, p<0.001)	•

Number in dataframe = 70022, Number in model = 45420, Missing = 24602, Number of events = 8237, Concordance = 0.751 (SE = 0.002), R-squared = 0.137 (Max possible = 0.978), Likelihood ratio test = 6666.220 (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	4.42 (3.80-5.15, p<0.001)
	70-79	10.27 (8.84-11.93, p<0.001)
	80+	14.91 (12.84-17.31, p<0.001)
Sex at Birth	Female	0.76 (0.72-0.79, p<0.001)
qSOFA score on admission	0	-
	1	1.83 (1.75-1.92, p<0.001)
	2	3.06 (2.85-3.28, p<0.001)
	3	5.14 (4.23-6.24, p<0.001)
Chronic cardiac disease	YES	1.20 (1.14-1.25, p<0.001)
Chronic kidney disease	YES	1.27 (1.20-1.34, p<0.001)
Moderate or severe liver disease	YES	1.62 (1.41-1.86, p<0.001)
Malignant neoplasm	YES	1.47 (1.39-1.57, p<0.001)
Obesity (as defined by clinical staff)	YES	1.07 (1.00-1.14, p=0.063)
Dementia	YES	1.19 (1.13-1.26, p<0.001)

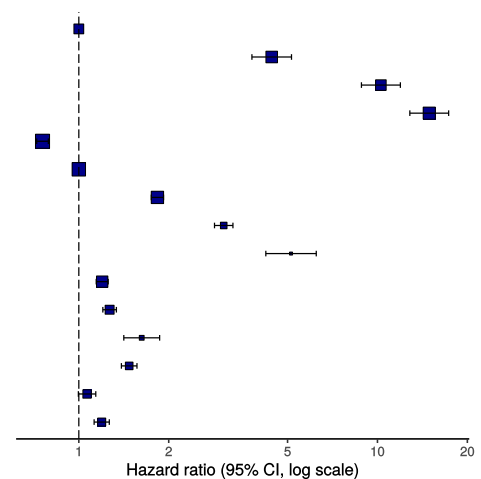
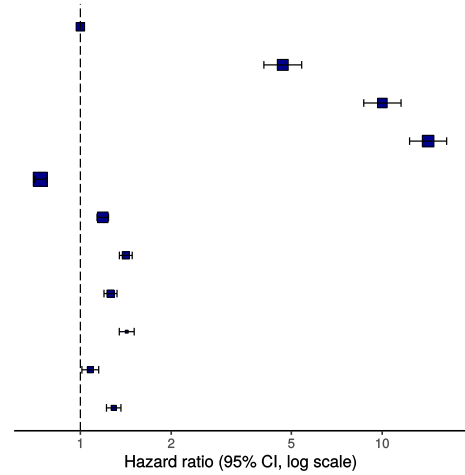


Figure 16b - Multivariable Cox proportional hazards model (age, sex, comorbidities only)

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

Age on admission (years)	<50	-
	50-69	4.68 (4.06-5.41, p<0.001)
	70-79	10.02 (8.69-11.55, p<0.001)
	80+	14.20 (12.32-16.35, p<0.001)
Sex at Birth	Female	0.74 (0.71-0.77, p<0.001)
Chronic cardiac disease	YES	1.19 (1.14-1.24, p<0.001)
Chronic pulmonary disease (not asthma)	YES	1.41 (1.35-1.49, p<0.001)
Chronic kidney disease	YES	1.26 (1.20-1.32, p<0.001)
Malignant neoplasm	YES	1.42 (1.35-1.51, p<0.001)
Obesity (as defined by clinical staff)	YES	1.08 (1.01-1.15, p=0.020)
Dementia	YES	1.29 (1.22-1.36, p<0.001)



ROC = 0.7519905

Figure 17 - Predictions calibration plot

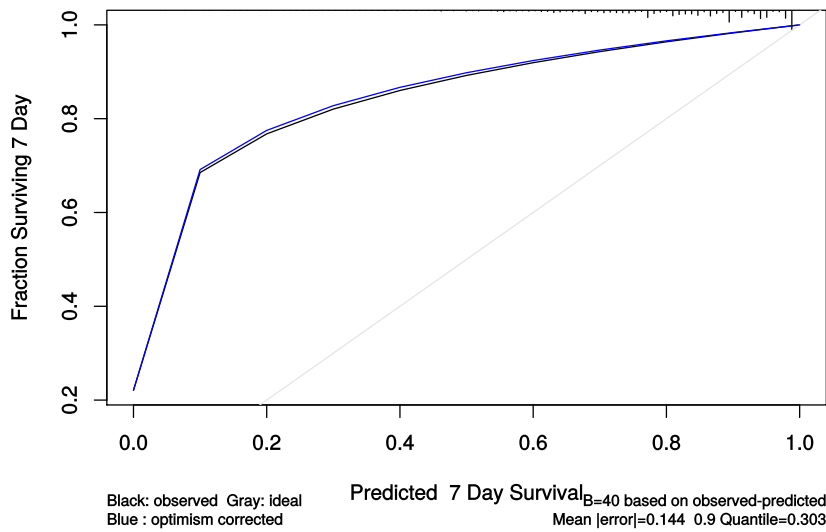


Figure 18 - Prognostic model predictions

Again, for demonstration of methods.

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

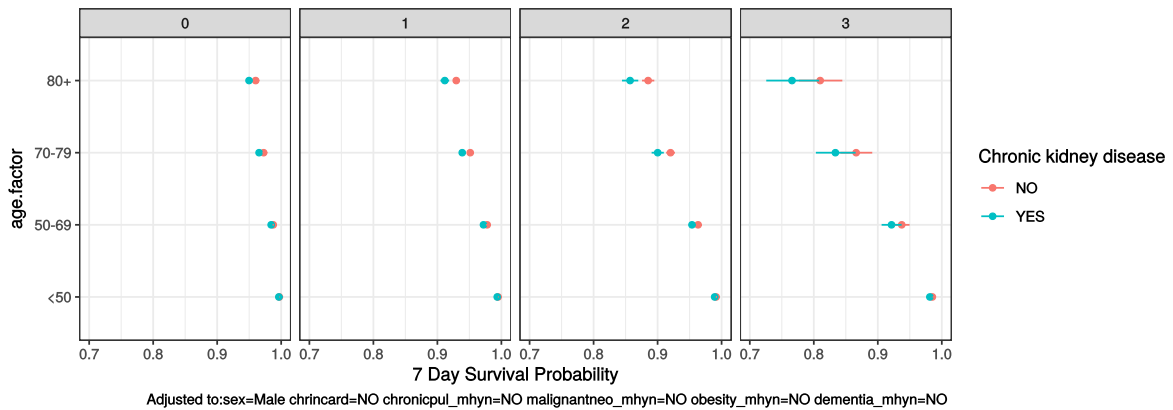


Figure 19 - Death by severity (NEWS) on admission

Number of deaths by NEWS score at admission

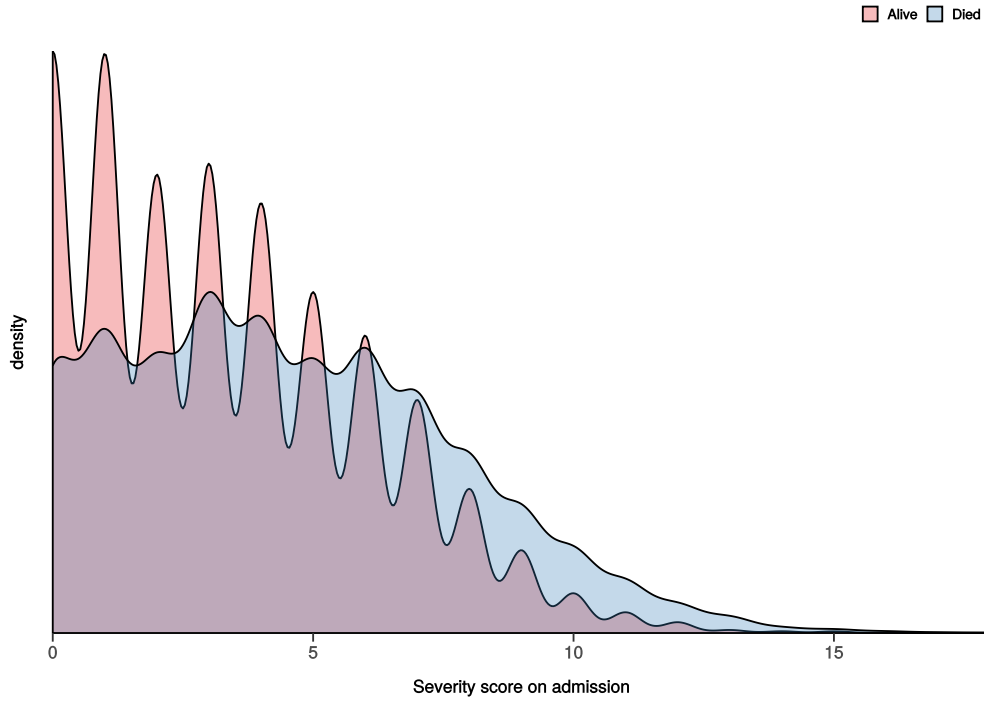


Figure 20 - Death by severity (NEWS) on admission stratified by age

Number of deaths by NEWS score at admission
Stratified by age

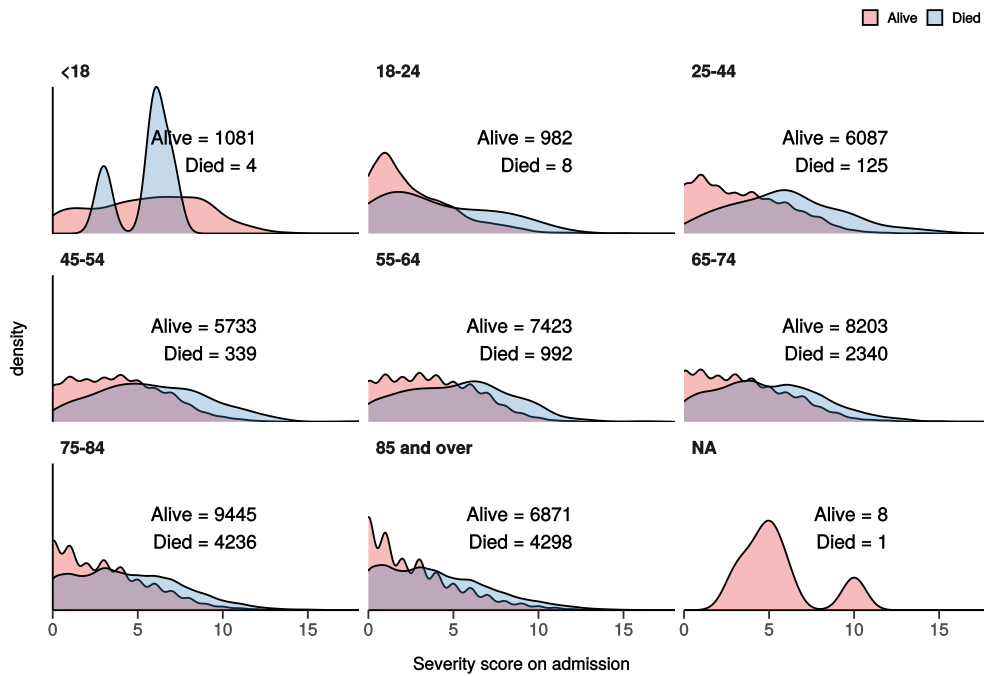
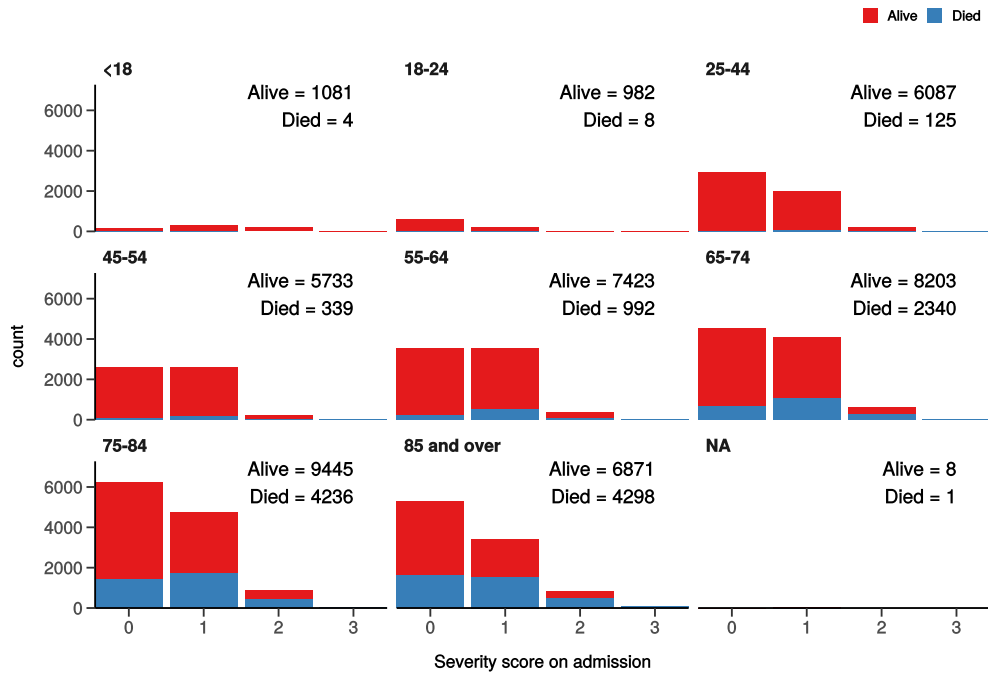


Figure 21 - Death by severity (qSOFA) on admission stratified by age

Number of deaths by qSOFA score at admission
Stratified by age



Healthcare workers

Employed as a healthcare worker?		NO	YES	p
Total N (%)		53666 (97.5)	1351 (2.5)	
NEWS score on admission	Median (IQR)	3.0 (4.0)	4.0 (5.0)	<0.001
Death	No	33862 (75.7)	1096 (93.9)	<0.001
	Yes	10876 (24.3)	71 (6.1)	