

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

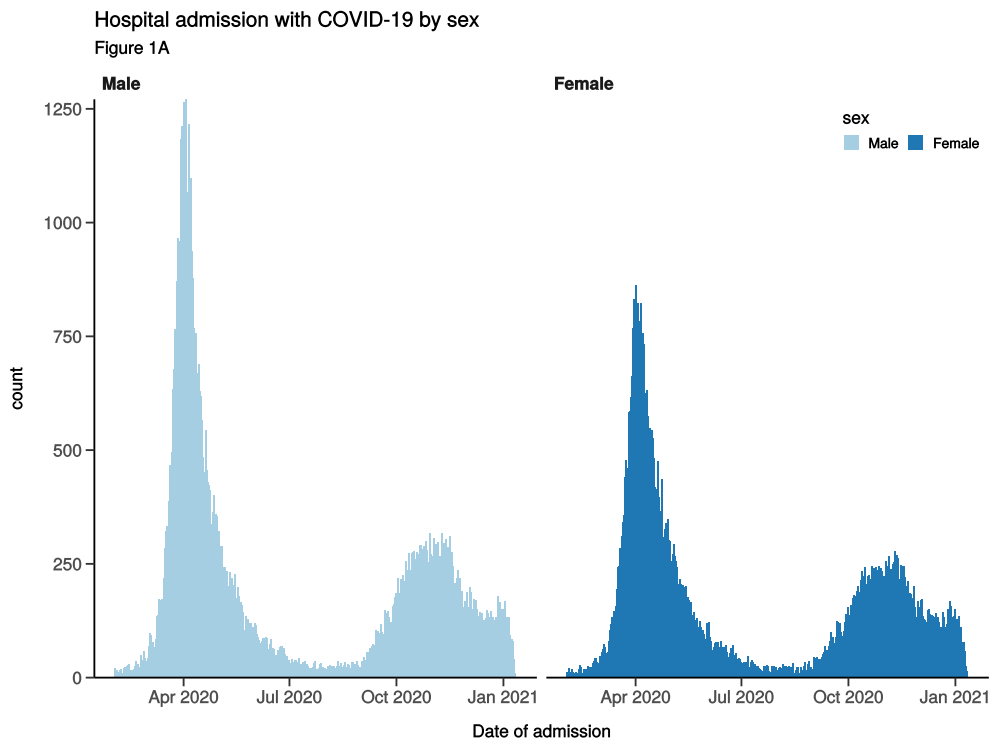
Executive summary

Includes all patients

There are 147152 patients included in CO-CIN. Of these, 31672 patient(s) have died and 18616 required ICU. 71357 have been discharged home.

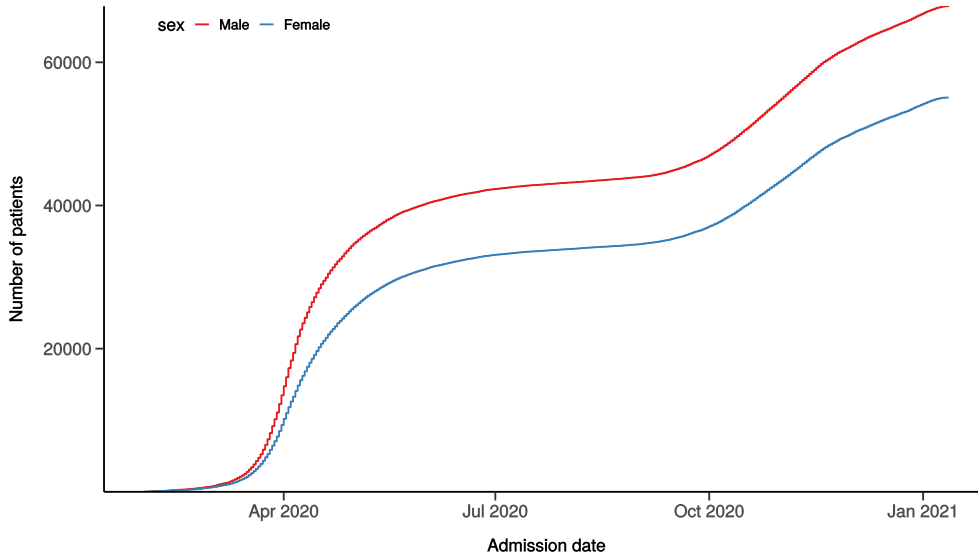
Admission

Figure 1



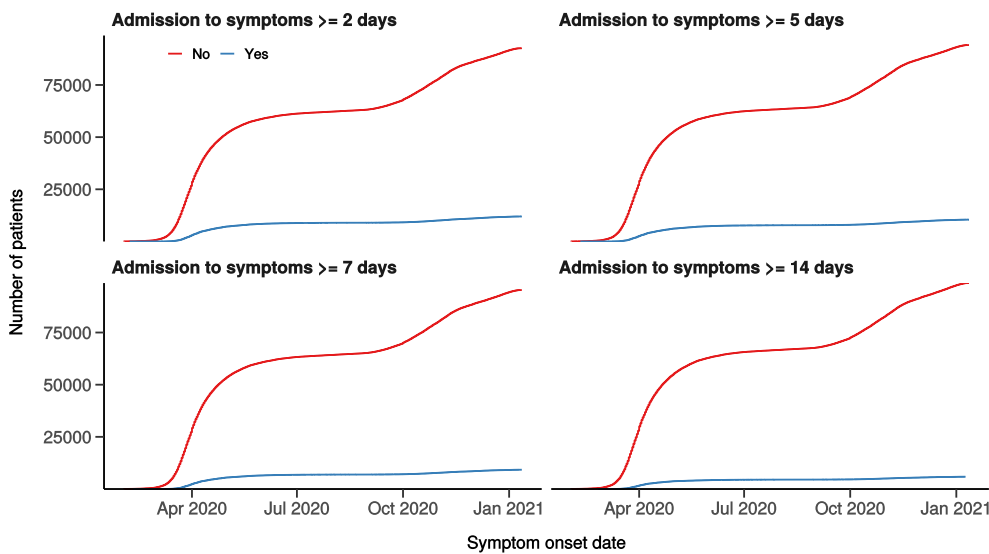
Hospital admission with COVID-19 by sex

Figure 1B



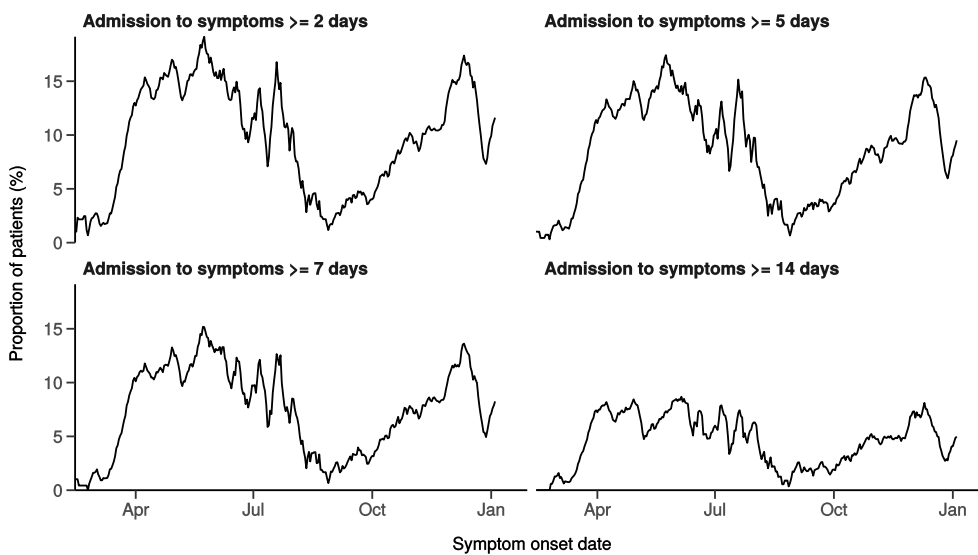
Number with symptom onset occurring after admission to hospital

Figure 1C



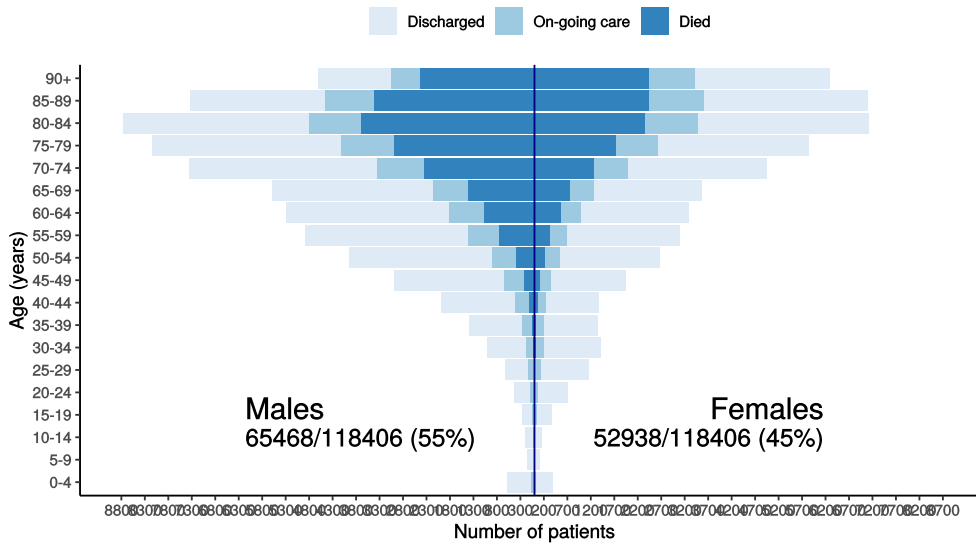
Proportion with symptom onset occurring after hospital admission

Figure 1D - 7-day rolling percentage. n = 104589



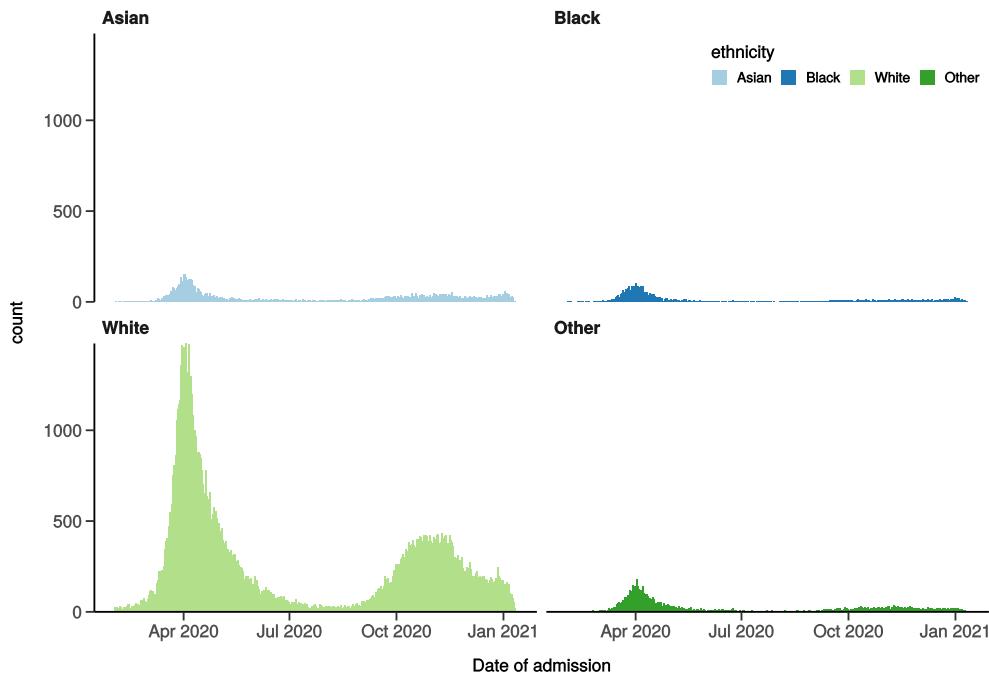
Patients with outcome stratified by age, and sex

Figure 1E



Hospital admission with COVID-19 by ethnicity

Figure 1F

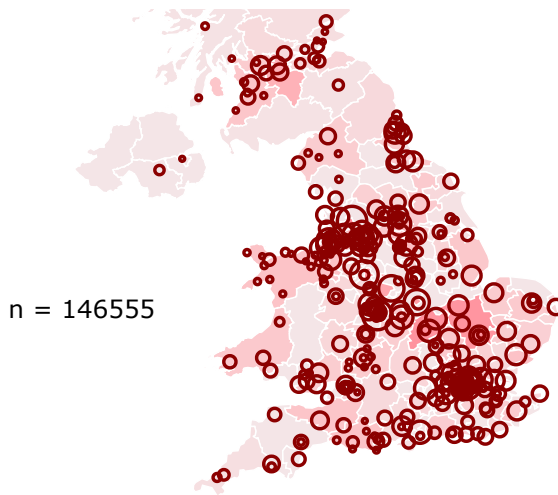


Location by CCG / Healthboard

Figure 2

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





Symptoms and comorbidity

Figure 3A

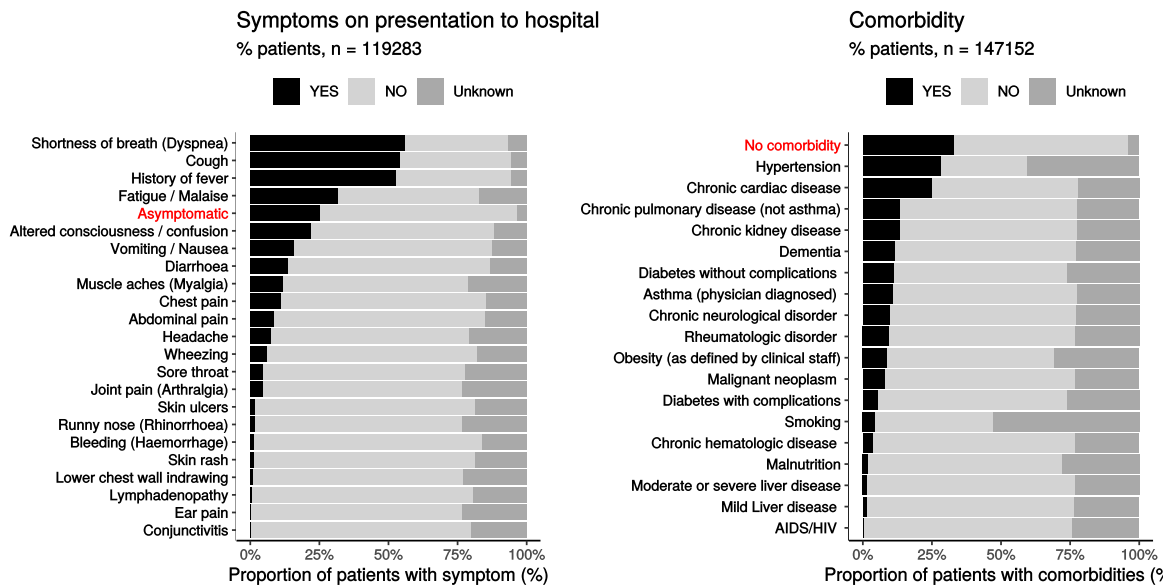


Figure 3B - Symptoms by Age

Symptoms on presentation to hospital
Stratified by age

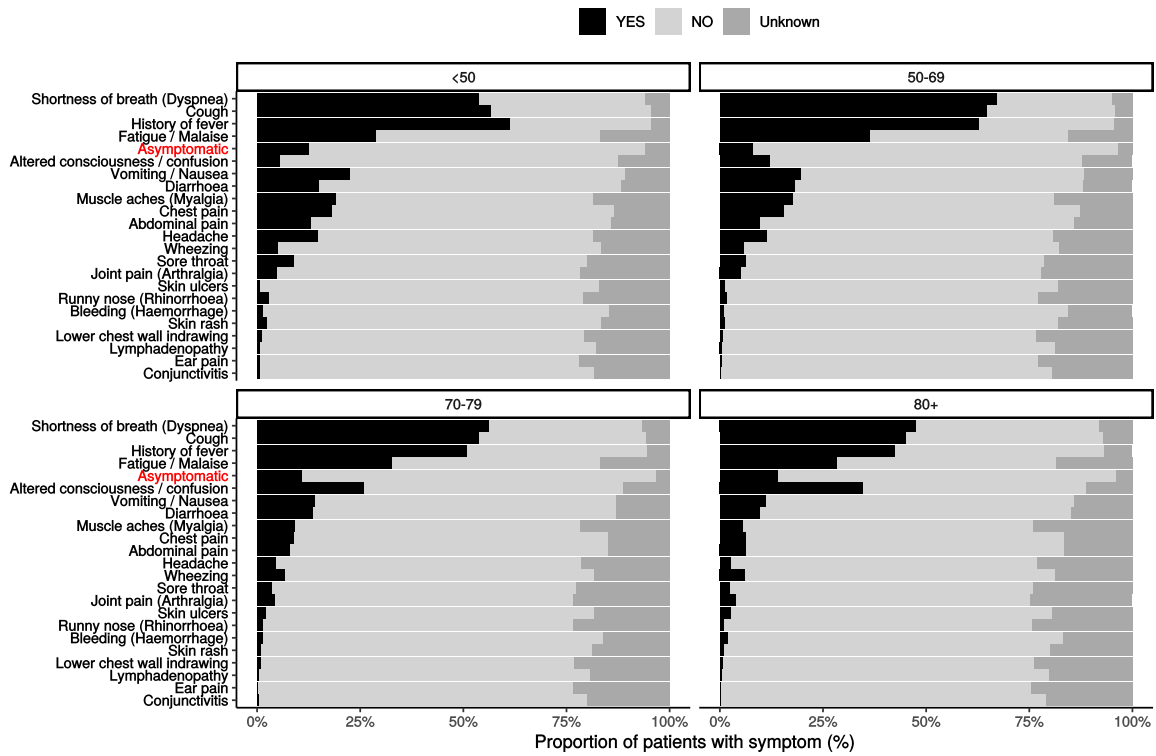
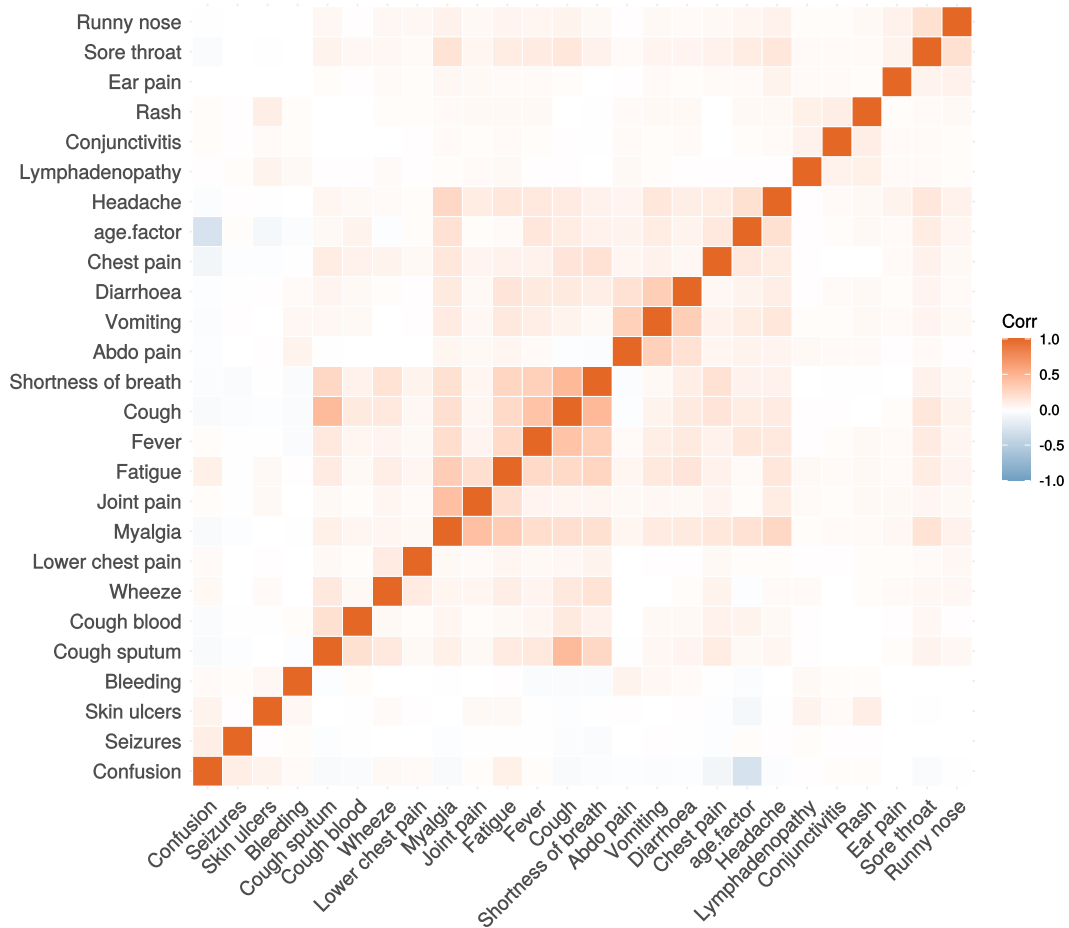


Figure 3C

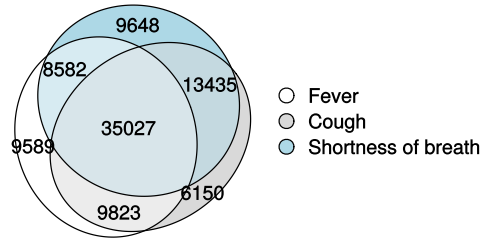
Correlation of symptoms in all pages. Note clusters, top right to bottom left, flu-like, coryzal, abdominal, respiratory, neurocutaneous.



Symptoms (diagnostic criteria)

Figure 4A

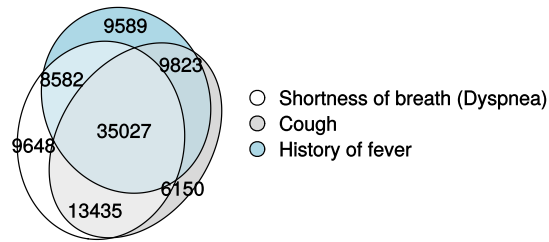
n = 119283



Symptoms (most common)

Figure 4B

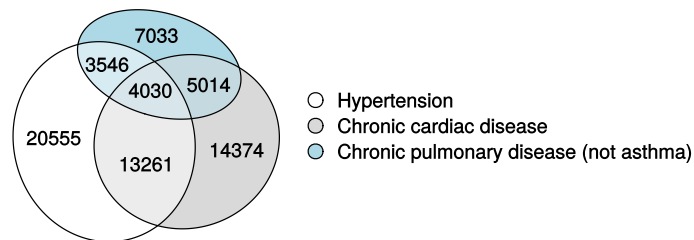
n = 119283



Comorbidity (most common)

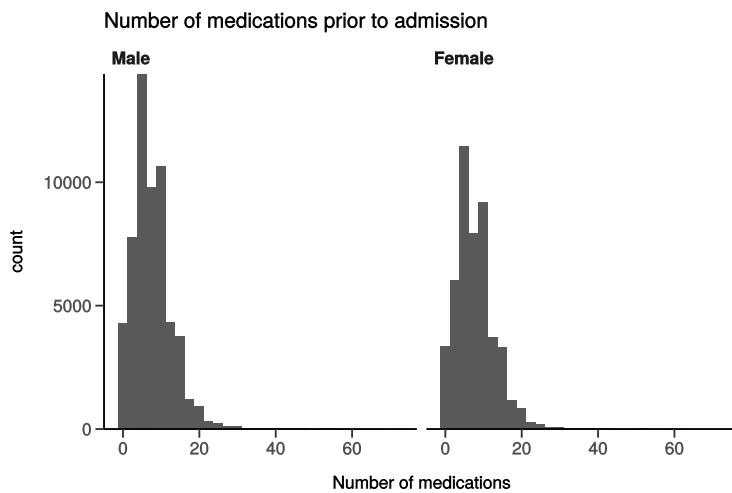
Figure 4C

n = 147152



Medication prior to illness

Figure 5

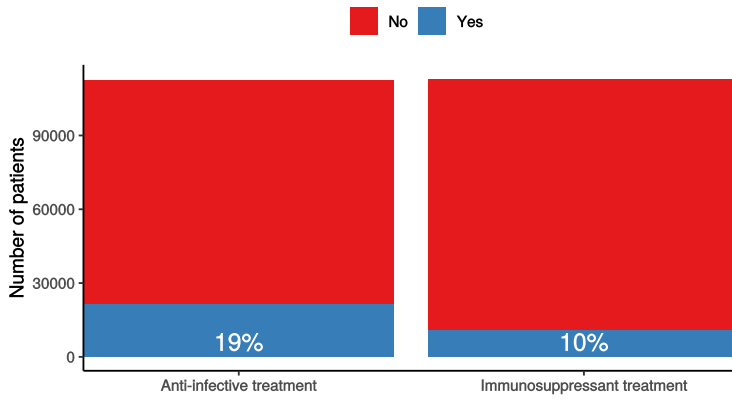


Preadmission treatment

Figure 6

Pre-admission treatment

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



Patient flow

Figure 7A - All patients

N = 122200

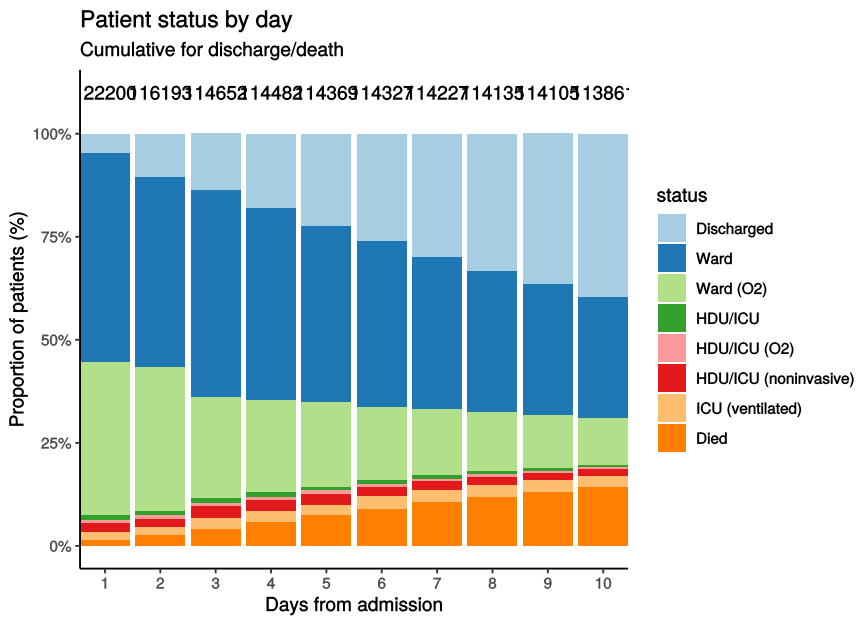
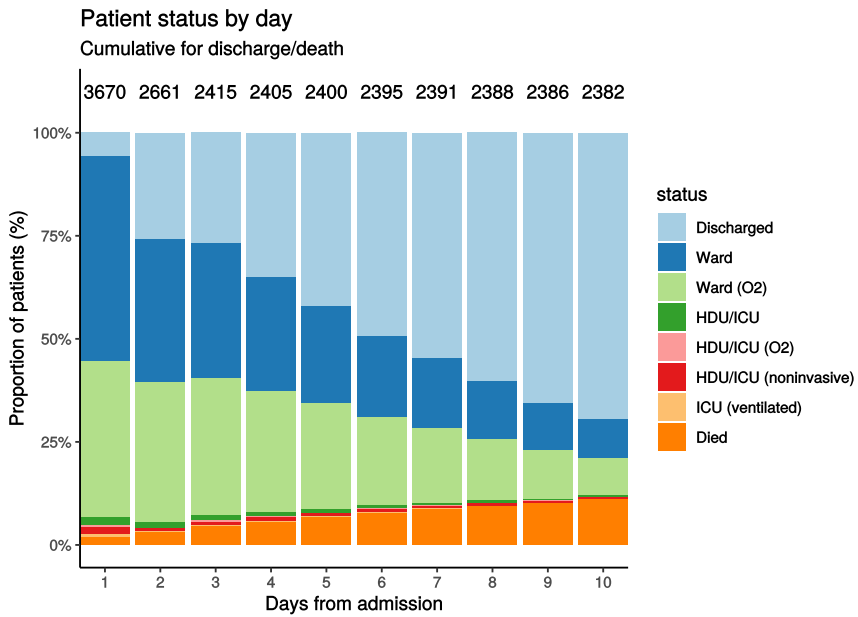


Figure 7B - Patients admitted ≥ 14 days and ≤ 28 days ago

N = 3670



Oxygen requirement

Figure 8A - All patients

N = 115718

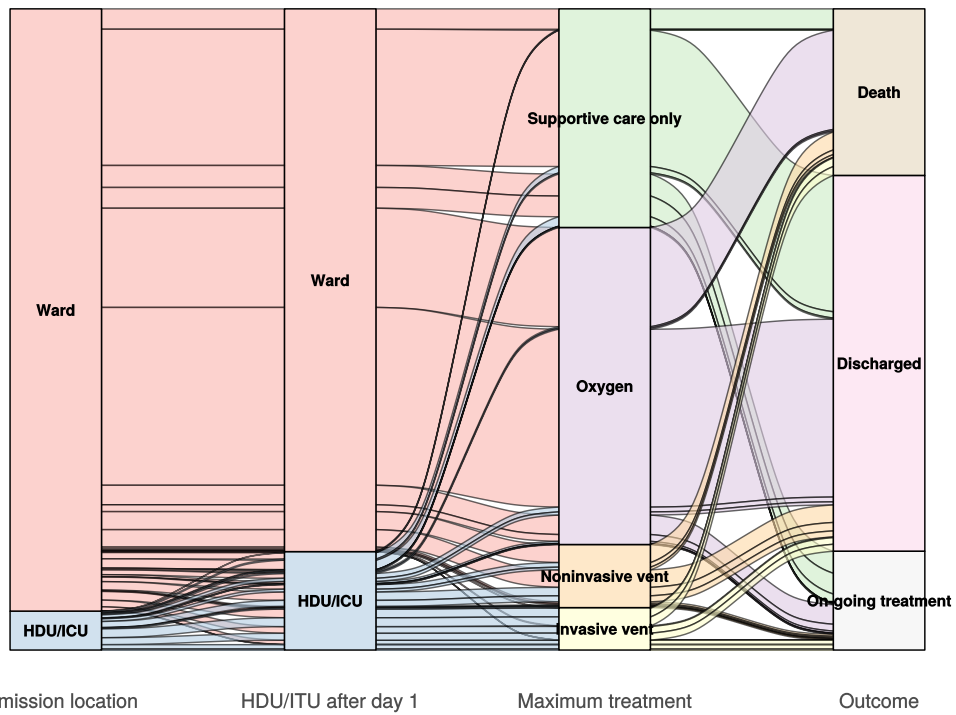


Figure 8B - Patients admitted ≥ 14 days and ≤ 28 days ago

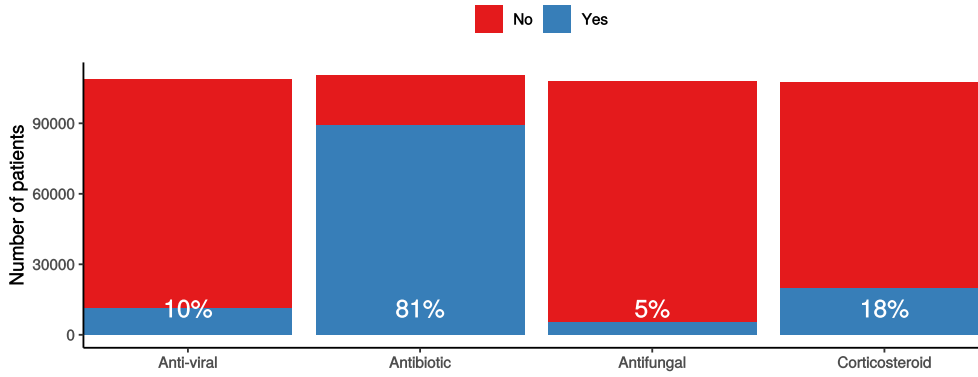
N = 3434

In-hospital medical treatment

Figure 9

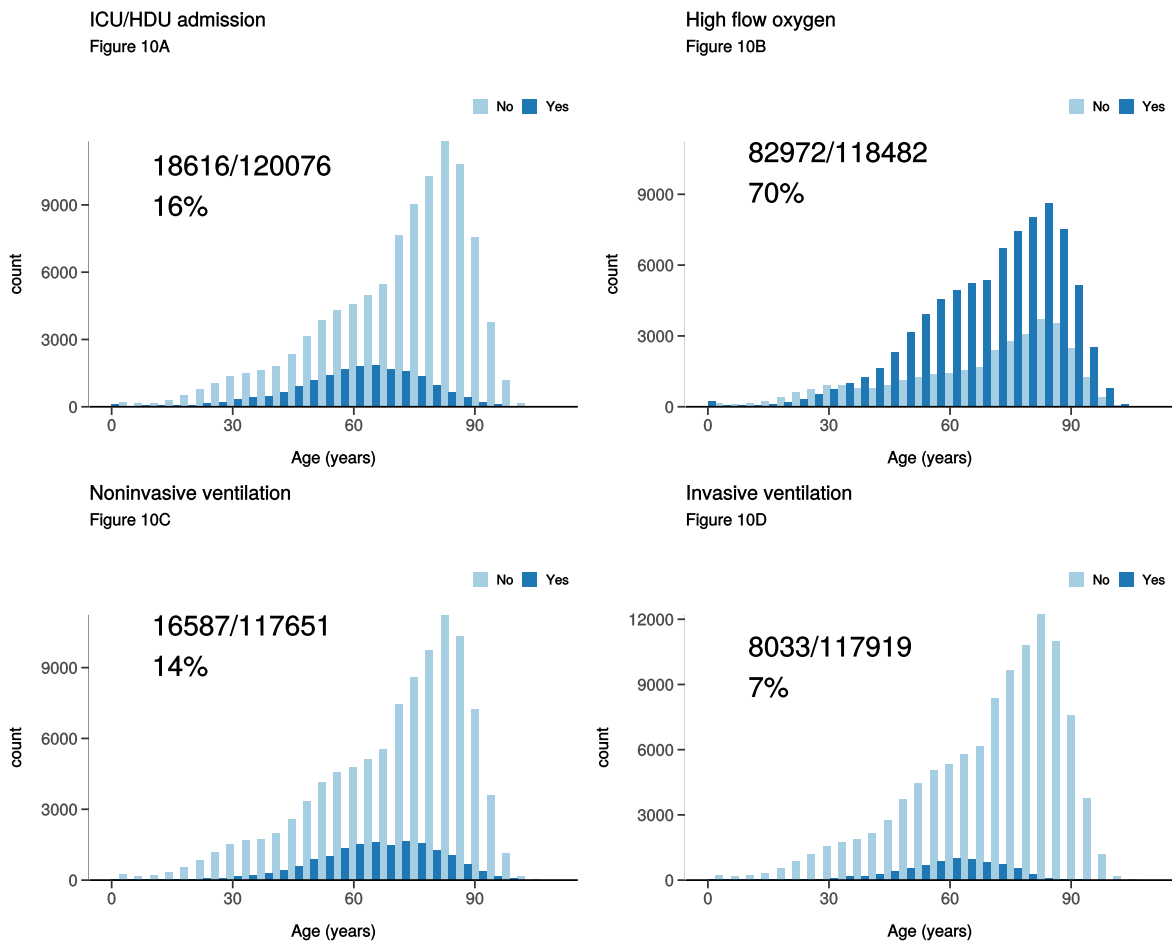
In-hospital treatment

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



Treatment

Figure 10

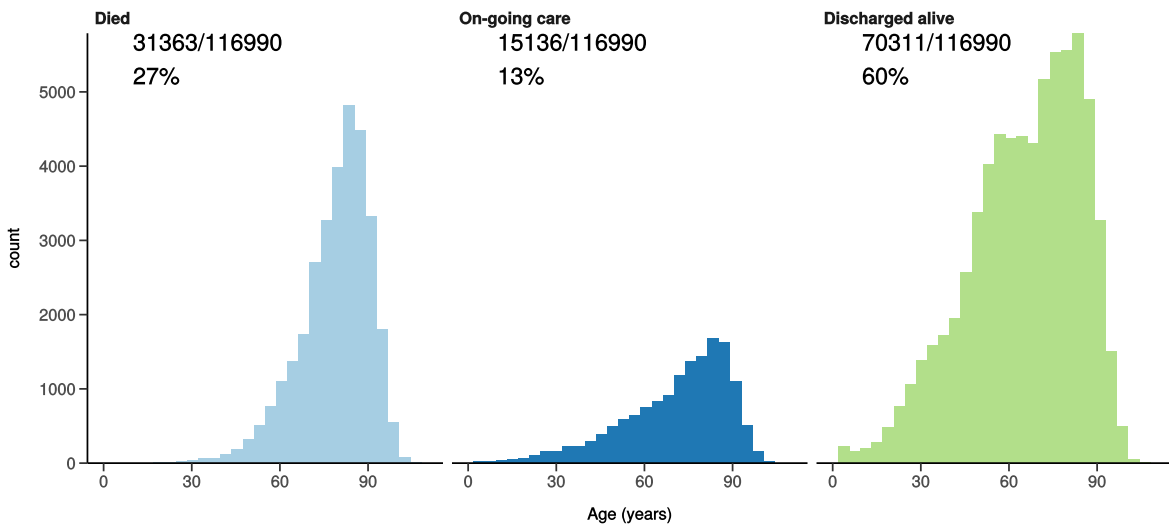


Status in patients admitted ≥ 14 days from today

Figure 11

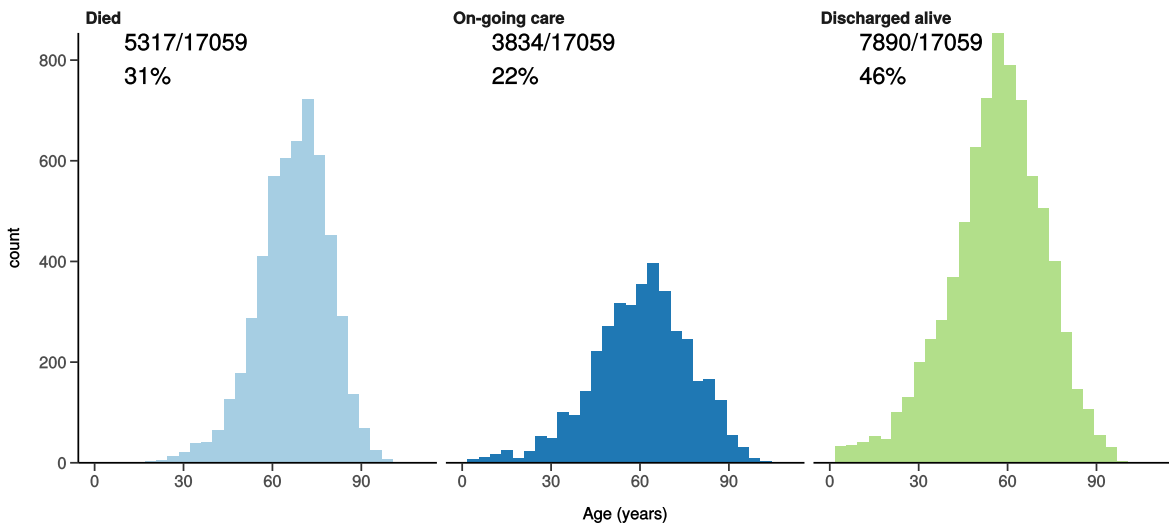
All: status in patients admitted ≥ 14 days ago

Figure 11A



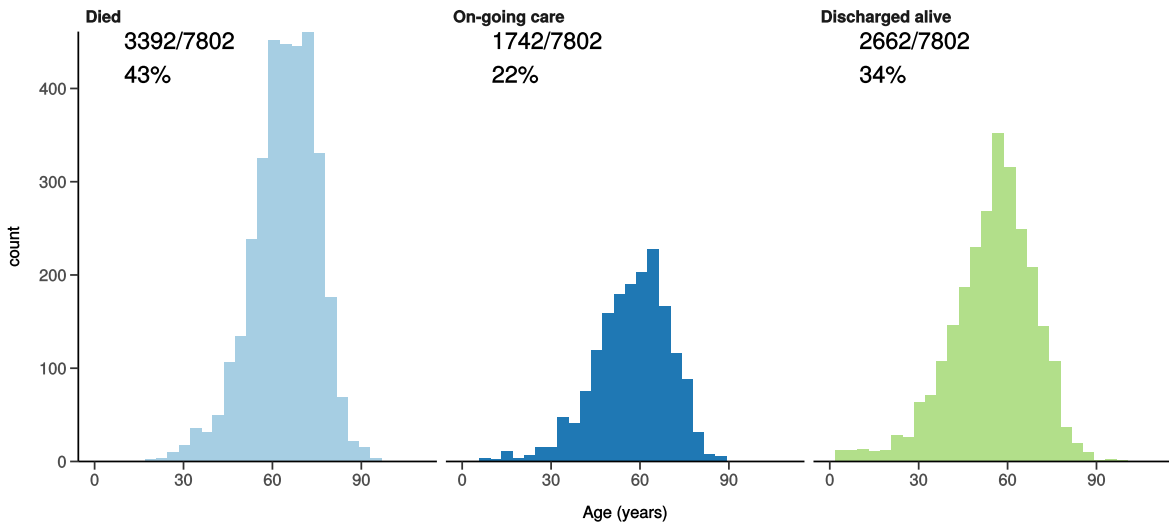
ICU/HDU admissions: status in patients admitted ≥ 14 days ago

Figure 11B



Invasive ventilation: status in patients admitted ≥ 14 days ago

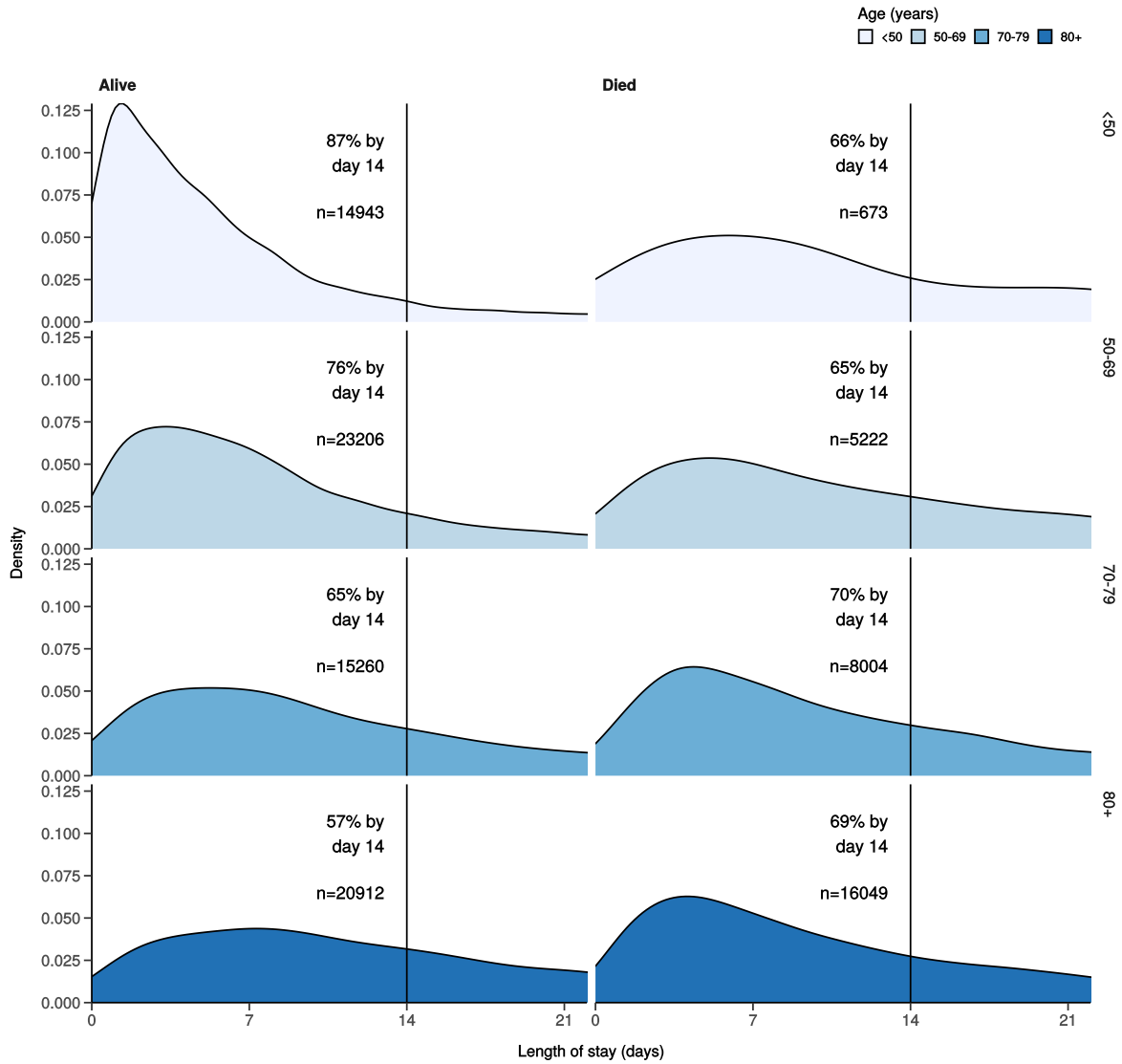
Figure 11c



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	16800 (95.9)	721 (4.1)	•	•
	50-69	25361 (82.3)	5463 (17.7)	5.02 (4.64-5.44, p<0.001)	4.58 (4.19-5.02, p<0.001)
	70-79	16791 (66.8)	8330 (33.2)	11.56 (10.69-12.52, p<0.001)	9.44 (8.63-10.34, p<0.001)
	80+	22820 (57.7)	16755 (42.3)	17.11 (15.85-18.50, p<0.001)	13.74 (12.58-15.05, p<0.001)
Sex at Birth	Male	43660 (69.8)	18923 (30.2)	•	•
	Female	38158 (75.5)	12367 (24.5)	0.75 (0.73-0.77, p<0.001)	0.69 (0.66-0.71, p<0.001)
	Not specified	0 (NaN)	0 (NaN)	•	•

Dependent: death		No	Yes	OR (univariable)	OR (multivariable)
Chronic cardiac disease	NO	55865 (77.3)	16422 (22.7)	•	•
	YES	21169 (62.0)	12974 (38.0)	2.08 (2.03-2.14, p<0.001)	1.15 (1.12-1.19, p<0.001)
Chronic pulmonary disease (not asthma)	NO	65617 (74.6)	22290 (25.4)	•	•
	YES	11321 (62.0)	6952 (38.0)	1.81 (1.75-1.87, p<0.001)	1.32 (1.27-1.37, p<0.001)
Chronic neurological disorder	NO	67800 (73.5)	24423 (26.5)	•	•
	YES	8677 (65.6)	4557 (34.4)	1.46 (1.40-1.52, p<0.001)	1.12 (1.07-1.18, p<0.001)
Chronic hematologic disease	NO	73239 (72.9)	27265 (27.1)	•	•
	YES	3034 (65.4)	1605 (34.6)	1.42 (1.34-1.51, p<0.001)	1.06 (0.98-1.14, p=0.150)
Chronic kidney disease	NO	65961 (75.1)	21870 (24.9)	•	•
	YES	10772 (59.7)	7286 (40.3)	2.04 (1.97-2.11, p<0.001)	1.30 (1.25-1.36, p<0.001)
Dementia	NO	67457 (75.4)	22014 (24.6)	•	•
	YES	9016 (56.4)	6984 (43.6)	2.37 (2.29-2.46, p<0.001)	1.39 (1.34-1.46, p<0.001)
Obesity (as defined by clinical staff)	NO	60029 (72.4)	22834 (27.6)	•	•
	YES	9233 (76.8)	2783 (23.2)	0.79 (0.76-0.83, p<0.001)	1.17 (1.11-1.23, p<0.001)
Malignant neoplasm	NO	69998 (74.1)	24515 (25.9)	•	•
	YES	6336 (59.0)	4406 (41.0)	1.99 (1.91-2.07, p<0.001)	1.49 (1.42-1.56, p<0.001)

Number in dataframe = 121683, Number in model = 90407, Missing = 31276, AIC = 92784.5, C-statistic = 0.726, H&L = Chi-sq(8) 156.18 (p<0.001)

Figure 13 - Adjusted odds ratio plot

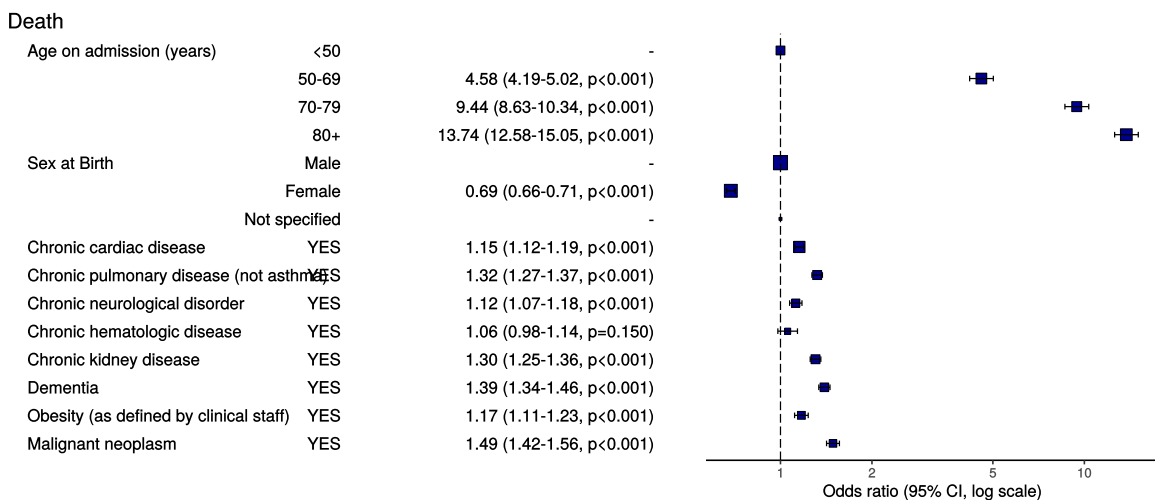
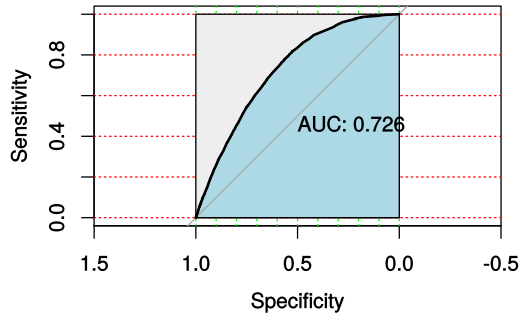


Figure 14 - ROC

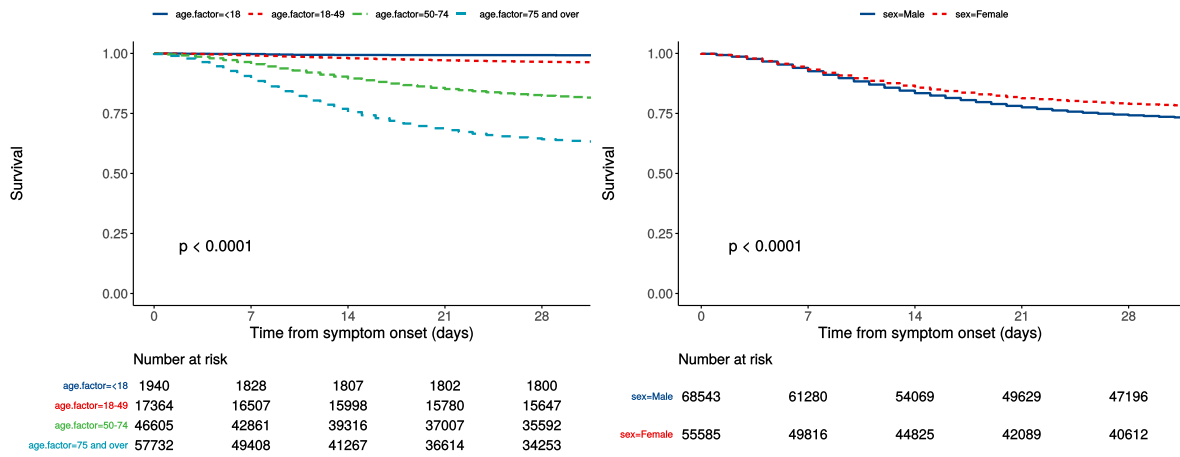


Survival models

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	19316 (15.6)	•	•
	50-69	33756 (27.3)	4.65 (4.30-5.03, p<0.001)	4.28 (3.90-4.71, p<0.001)
	70-79	27548 (22.3)	9.74 (9.03-10.52, p<0.001)	8.72 (7.94-9.58, p<0.001)
	80+	43046 (34.8)	13.55 (12.58-14.61, p<0.001)	11.85 (10.80-13.01, p<0.001)
Sex at Birth	Male	68555 (55.2)	•	•
	Female	55585 (44.8)	0.79 (0.77-0.80, p<0.001)	0.77 (0.75-0.79, p<0.001)
qSOFA score on admission	0	47893 (45.9)	•	•
	1	45513 (43.6)	1.66 (1.61-1.70, p<0.001)	1.78 (1.72-1.83, p<0.001)
	2	9895 (9.5)	3.29 (3.18-3.41, p<0.001)	3.04 (2.92-3.17, p<0.001)
	3	996 (1.0)	5.55 (5.12-6.01, p<0.001)	4.92 (4.49-5.39, p<0.001)
Symptomatic at presentation	No symptoms	11940 (10.0)	•	•

Dependent: Surv(time, status)		all	HR (univariable)	HR (multivariable)
	Symptoms	107414 (90.0)	1.91 (1.82-2.01, p<0.001)	•
Chronic cardiac disease	NO	77599 (68.0)	•	•
	YES	36498 (32.0)	1.87 (1.83-1.92, p<0.001)	1.14 (1.11-1.18, p<0.001)
Chronic kidney disease	NO	94269 (83.0)	•	•
	YES	19268 (17.0)	1.83 (1.78-1.88, p<0.001)	1.24 (1.20-1.28, p<0.001)
Moderate or severe liver disease	NO	110308 (98.0)	•	•
	YES	2220 (2.0)	1.33 (1.24-1.43, p<0.001)	1.44 (1.32-1.58, p<0.001)
Chronic neurological disorder	NO	98853 (87.4)	•	•
	YES	14196 (12.6)	1.38 (1.34-1.43, p<0.001)	•
Malignant neoplasm	NO	101418 (89.9)	•	•
	YES	11424 (10.1)	1.75 (1.69-1.81, p<0.001)	1.37 (1.32-1.43, p<0.001)
Chronic hematologic disease	NO	107728 (95.6)	•	•
	YES	4963 (4.4)	1.33 (1.26-1.40, p<0.001)	•
Obesity (as defined by clinical staff)	NO	88772 (87.3)	•	•
	YES	12872 (12.7)	0.81 (0.78-0.84, p<0.001)	1.11 (1.06-1.16, p<0.001)
Diabetes without complications	NO	92116 (85.0)	•	•
	YES	16218 (15.0)	1.27 (1.23-1.31, p<0.001)	•
Rheumatologic disorder	NO	98646 (87.7)	•	•
	YES	13848 (12.3)	1.15 (1.11-1.19, p<0.001)	•
Dementia	NO	96172 (85.0)	•	•
	YES	16917 (15.0)	2.12 (2.06-2.17, p<0.001)	1.19 (1.15-1.23, p<0.001)
Malnutrition	NO	102800 (97.4)	•	•
	YES	2782 (2.6)	1.55 (1.45-1.65, p<0.001)	•
smoking_mhyn_2levels	NO	62336 (53.4)	•	•
	YES	6501 (5.6)	0.85 (0.81-0.90, p<0.001)	•
	N/K	47825 (41.0)	1.14 (1.12-1.17, p<0.001)	•

Number in dataframe = 124645, Number in model = 85451, Missing = 39194, Number of events = 21563, Concordance = 0.731 (SE = 0.002), R-squared = 0.156 (Max possible = 0.996), Likelihood ratio test = 14514.490 (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	4.28 (3.90-4.71, p<0.001)
	70-79	8.72 (7.94-9.58, p<0.001)
	80+	11.85 (10.80-13.01, p<0.001)
Sex at Birth	Female	0.77 (0.75-0.79, p<0.001)
qSOFA score on admission	0	-
	1	1.78 (1.72-1.83, p<0.001)
	2	3.04 (2.92-3.17, p<0.001)
	3	4.92 (4.49-5.39, p<0.001)
Chronic cardiac disease	YES	1.14 (1.11-1.18, p<0.001)
Chronic kidney disease	YES	1.24 (1.20-1.28, p<0.001)
Moderate or severe liver disease	YES	1.44 (1.32-1.58, p<0.001)
Malignant neoplasm	YES	1.37 (1.32-1.43, p<0.001)
Obesity (as defined by clinical staff)	YES	1.11 (1.06-1.16, p<0.001)
Dementia	YES	1.19 (1.15-1.23, p<0.001)

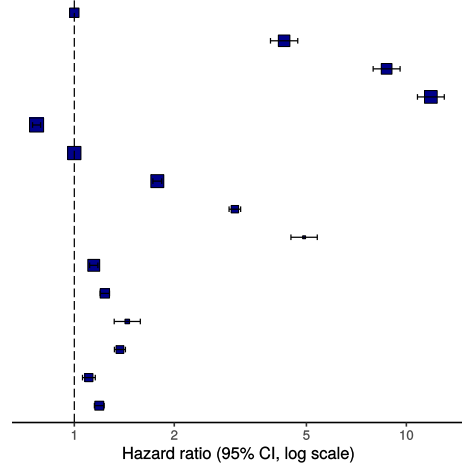
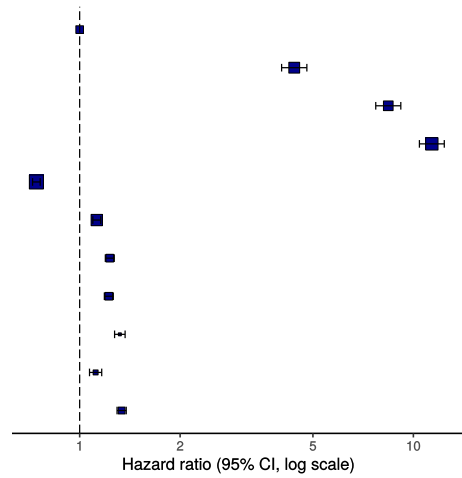


Figure 16b - Multivariable Cox proportional hazards model (age, sex, comorbidities only)

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

Age on admission (years)	<50	-
	50-69	4.40 (4.03-4.80, p<0.001)
	70-79	8.41 (7.71-9.17, p<0.001)
	80+	11.36 (10.42-12.38, p<0.001)
Sex at Birth	Female	0.74 (0.72-0.76, p<0.001)
Chronic cardiac disease	YES	1.13 (1.10-1.16, p<0.001)
Chronic pulmonary disease (not asthma)	YES	1.23 (1.19-1.27, p<0.001)
Chronic kidney disease	YES	1.22 (1.19-1.26, p<0.001)
Malignant neoplasm	YES	1.32 (1.27-1.37, p<0.001)
Obesity (as defined by clinical staff)	YES	1.12 (1.07-1.16, p<0.001)
Dementia	YES	1.34 (1.29-1.38, p<0.001)



ROC = 0.7309016

Figure 17 - Predictions calibration plot

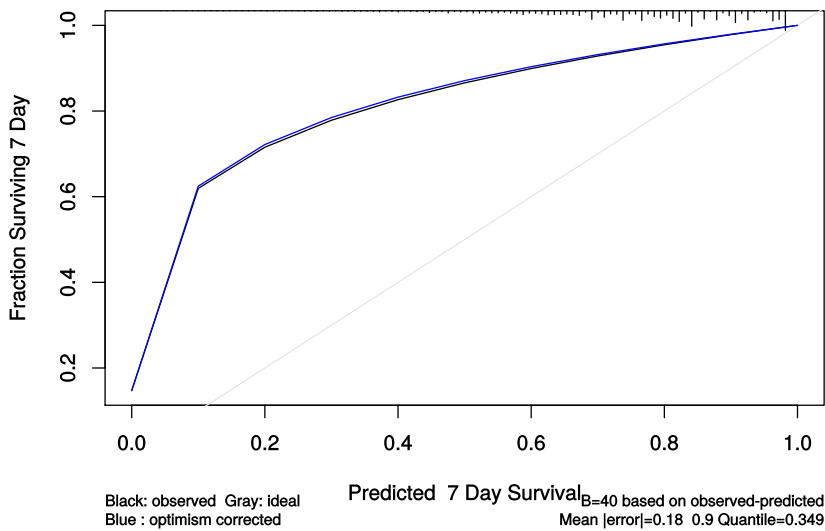


Figure 18 - Prognostic model predictions

Again, for demonstration of methods.

Prognostic model for survival 7 days after onset

qSOFA score on admission

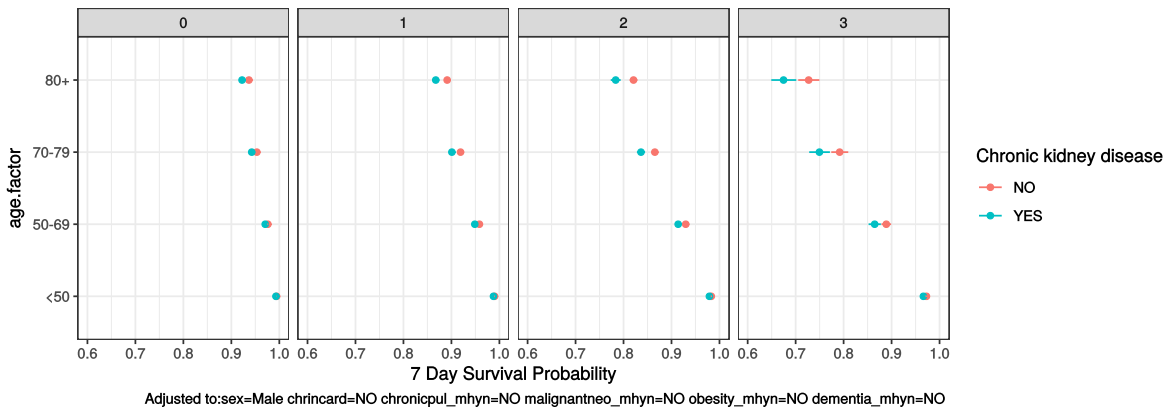


Figure 19 - Death by severity (NEWS) on admission

Number of deaths by NEWS score at admission

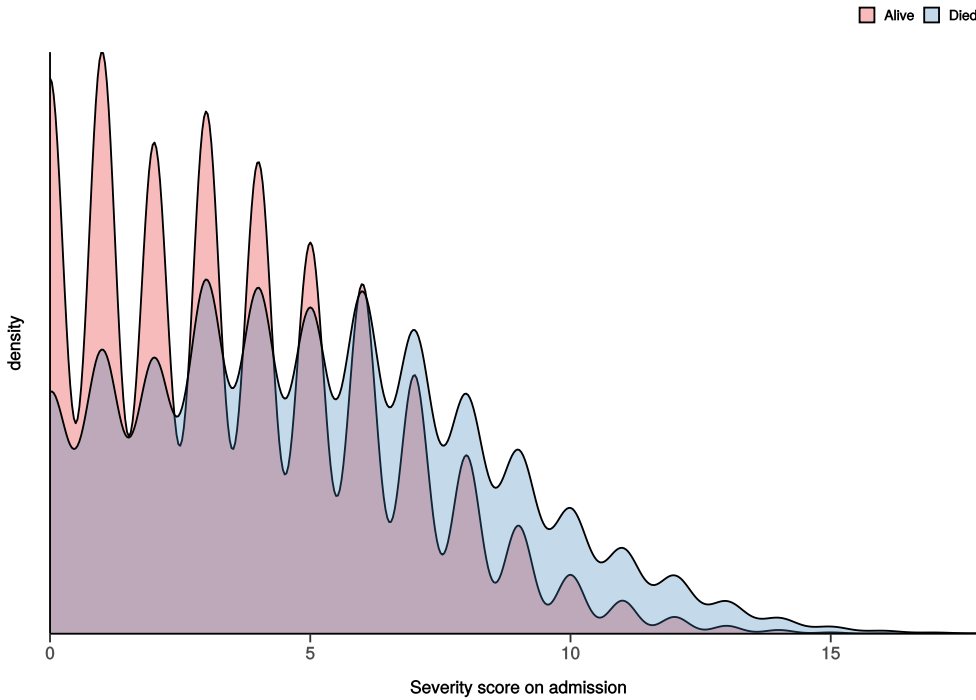


Figure 20 - Death by severity (NEWS) on admission stratified by age

Number of deaths by NEWS score at admission
Stratified by age

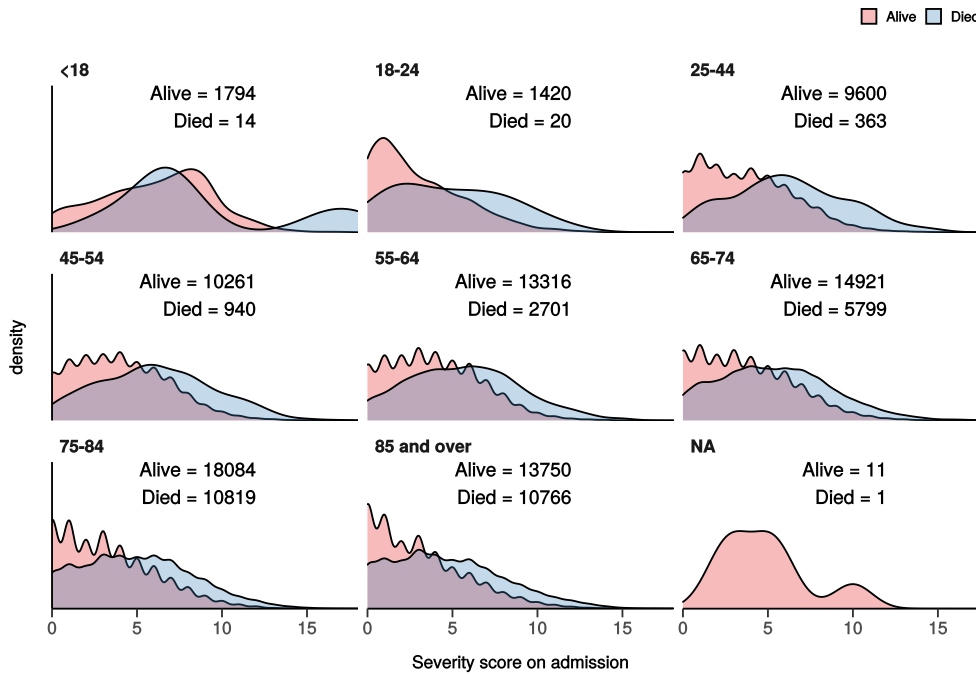
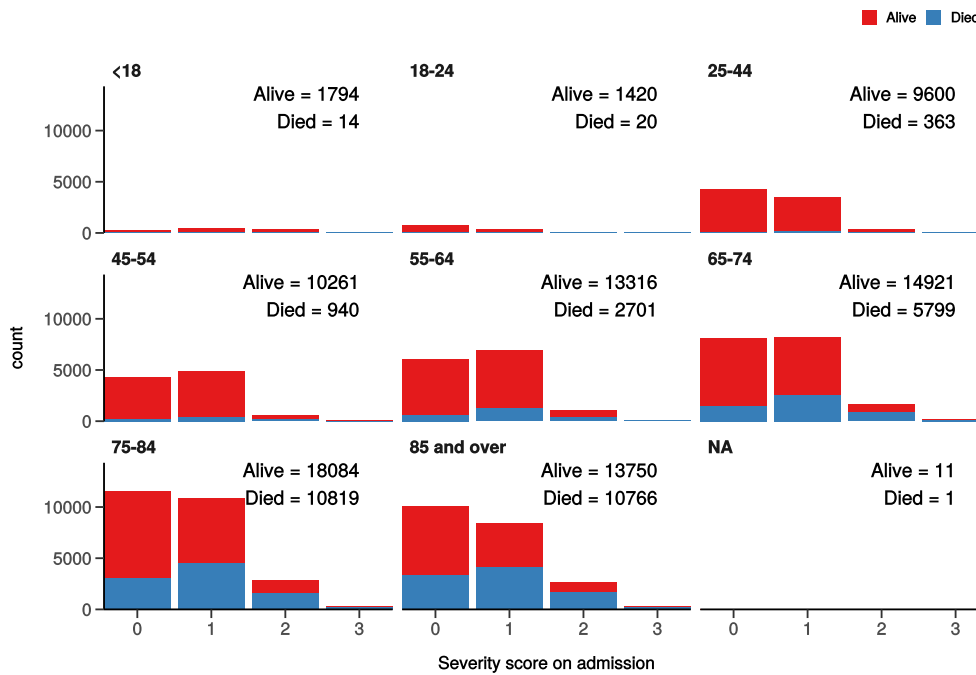


Figure 21 - Death by severity (qSOFA) on admission stratified by age

Number of deaths by qSOFA score at admission
Stratified by age



Healthcare workers

Employed as a healthcare worker?		NO	YES	p
Total N (%)		105874 (96.0)	4372 (4.0)	
NEWS score on admission	Median (IQR)	3.0 (5.0)	4.0 (4.0)	<0.001
Death	No	66898 (70.0)	3867 (93.0)	<0.001
	Yes	28604 (30.0)	289 (7.0)	