



ISARIC (International Severe Acute Respiratory and Emerging Infections Consortium)

A global federation of clinical research networks, providing a proficient, coordinated, and agile research response to outbreak-prone infectious diseases

COVID-19 Report: 10 February 2021

Containing data extracted 17 January 2021

Summary

The results in this report have been produced using data from the ISARIC COVID-19 database. For information, or to contribute to the collaboration, please contact ncov@isaric.org.

We thank all of the data contributors for collecting standardised data during these extraordinary times. We plan to issue this report of aggregate data regularly for the duration of the SARS-CoV-2/COVID-19 pandemic.

Please note the following caveats. This is a dynamic report which captures new variables and information as our understanding of COVID-19 evolves. Please observe the total number of patients of each result to note variables with fewer data points. Information is incomplete for the patients who are still being treated. Furthermore, it is likely that that we received more cases of severely ill individuals than those with relatively less severe illness; outcomes from these data, such as the proportion dying, must therefore not be used to infer outcomes for the entire population of people who might become infected. Some patients may be participants in clinical trials of experimental interventions. Note the variation in patient numbers per country. Additional caveats are provided in the in the 'Caveats' section below.

Up to the date of this report, data have been entered for **305241** individuals from **1736** sites across **64** countries.

The analysis detailed in this report only includes individuals:

1. for whom data collection commenced on or before 3 January 2021. (We have applied a 14-day rule to focus analysis on individuals who are more likely to have a recorded outcome. By excluding patients enrolled during the last 14 days, we aim to reduce the number of incomplete data records and thus improve the generalisability of the results and the accuracy of the outcomes;

AND

2. who have laboratory-confirmed SARS-COV-2 infection.

The cohort satisfying the above criteria has **240149** cases. The below flow chart gives an overview of the cohort and outcomes as of 17 January 2021.

Demographics and presenting features

Of these 240149 cases, 122993 are males and 116597 are females – sex is unreported for 559 cases. The minimum and maximum observed ages were 0 and 120 years respectively. The median age is 60 years.

The observed mean number of days from (first) symptom onset to hospital admission was 5.2, with a standard deviation (SD) of 5 days and a median of 4 days.

The observed mean duration for the number of days from hospital admission to outcome (death or discharge) was 9.8, with SD 8.8 days and a median of 7 days. These estimates are based on all cases which have complete records on length of hospital stay (N = 209301).

The observed symptoms on admission partly represent case definitions and policies for hospital admission, which may change as time passes. The five most common symptoms at admission were cough, shortness of breath, history of fever, fatigue/malaise, and altered consciousness/confusion. Frequencies of symptom prevalence vary with age. 28893/117947 (24.5%) patients presented with oxygen saturations <94%.

Outcomes

Outcomes have been recorded for 217885 patients (90.7%), consisting of 167796 recoveries and 50089 deaths. Outcome records are unavailable for 22264 patients.

ICU/HDU: Of the 136337 patients with data on ward admissions available, a total of 26160 (19%) patients were admitted at some point of their illness into an intensive care unit (ICU) or high dependency unit (HDU), 51% on the day of admission. Of these, 8368 died, and 12818 have recovered and been discharged. Outcome records are unavailable for 4974 cases.

The distribution of the number of days from admission to ICU admission is shown in Figure 11. The duration of stay in ICU/HDU had a mean of 10.8 days and a median of 7 (SD: 10.1 days) – estimated on only those cases with complete records for ICU/HDU duration or ICU/HDU start/end dates (N = 20614).

Treatment

Antibiotics were received by 98865/122526 (80.7%) patients, and 17479/122191 (14.3%) received antivirals. These treatment categories are not mutually exclusive since some patients received multiple treatments. (The denominators differ due to data completeness). 82439/134330 (61.4%) patients received some degree of oxygen supplementation: of these, 17118/127627 (13.4%) received NIV and 15163/133557 (11.4%) IMV.

Of the patients admitted into ICU/HDU, 19641/20993 (93.6%) received antibiotics and 6841/20476 (33.4%) antivirals. 20768/22081 (94.1%) received some degree of oxygen supplementation, of which, 10084/21112 (47.8%) received NIV and 13341/21991 (60.7%) IMV.

A total of 17118 patients received non-invasive mechanical ventilation (NIV). The mean and median durations from admission to receiving NIV were 13.2 days and 10 days respectively (SD: 11.1 days) – estimated from records on cases with complete records on dates of hospital admission and NIV onset (N = 15959). The mean and median durations for NIV were 3.4 days and 2 days respectively (SD: 3 days) – estimated based on only those cases which have complete NIV duration records (N = 1586).

A total of 15163 patients received invasive mechanical ventilation (IMV). The mean and median durations from admission to receiving IMV were 4.8 days and 2 days respectively (SD: 7 days) – estimated from records on cases with complete records on dates of hospital admission and IMV onset (N = 14042). The mean, median and SD for the duration of IMV – estimated based on all 12615 cases with complete records on IMV stays – were 11 days, 8 days and 9.4 days respectively.

Corticosteroids were administered to 41581/127488 (32.6%) patients. This includes 7638/14542 (52.5%) of those who received IMV, 25992/64834 (40.1%) of those who had oxygen therapy but not IMV, and 7650/47273 (16.2%) of those who had no oxygen therapy. On 16 June, results for dexamethasone were released for the RECOVERY randomized controlled trial (RECOVERY, 2020; RECOVERY Collaborative Group, 2020). This trial found that dexamethasone reduced deaths for patients receiving IMV and oxygen therapy, but not among patients not receiving respiratory support. Of patients admitted since 16 June, corticosteroids were received by 3198/4007 (79.8%) of those who received IMV, 17642/22273 (79.2%) of those who had oxygen therapy but not IMV, and 5028/18298 (27.5%) of those who had no oxygen therapy.

Patient Characteristics

Figure 1: Overview of cohort and outcomes as of 17 January 2021.

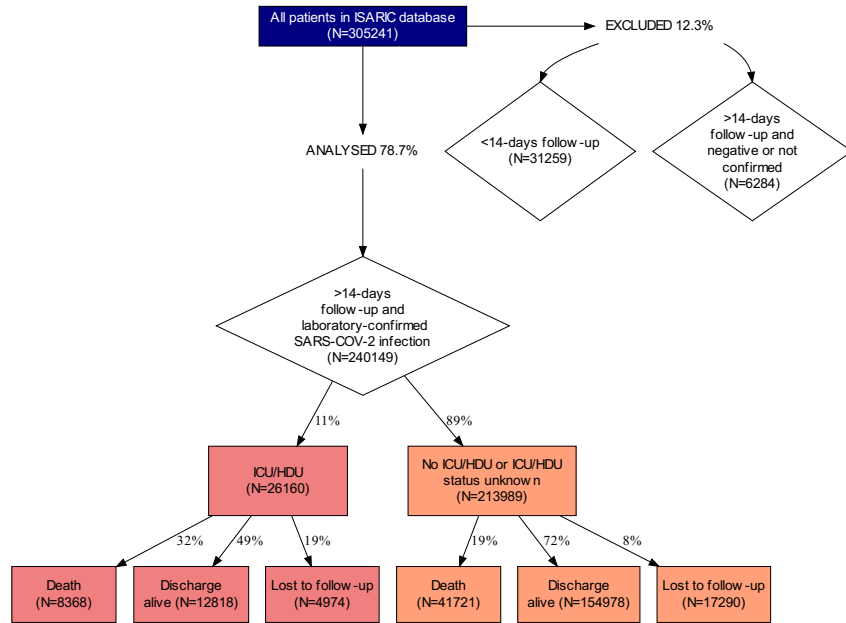


Figure 2: Age and sex distribution of patients. Bar fills are outcome (death/discharge/lost to follow-up (LTFU)/ongoing care) at the time of report.

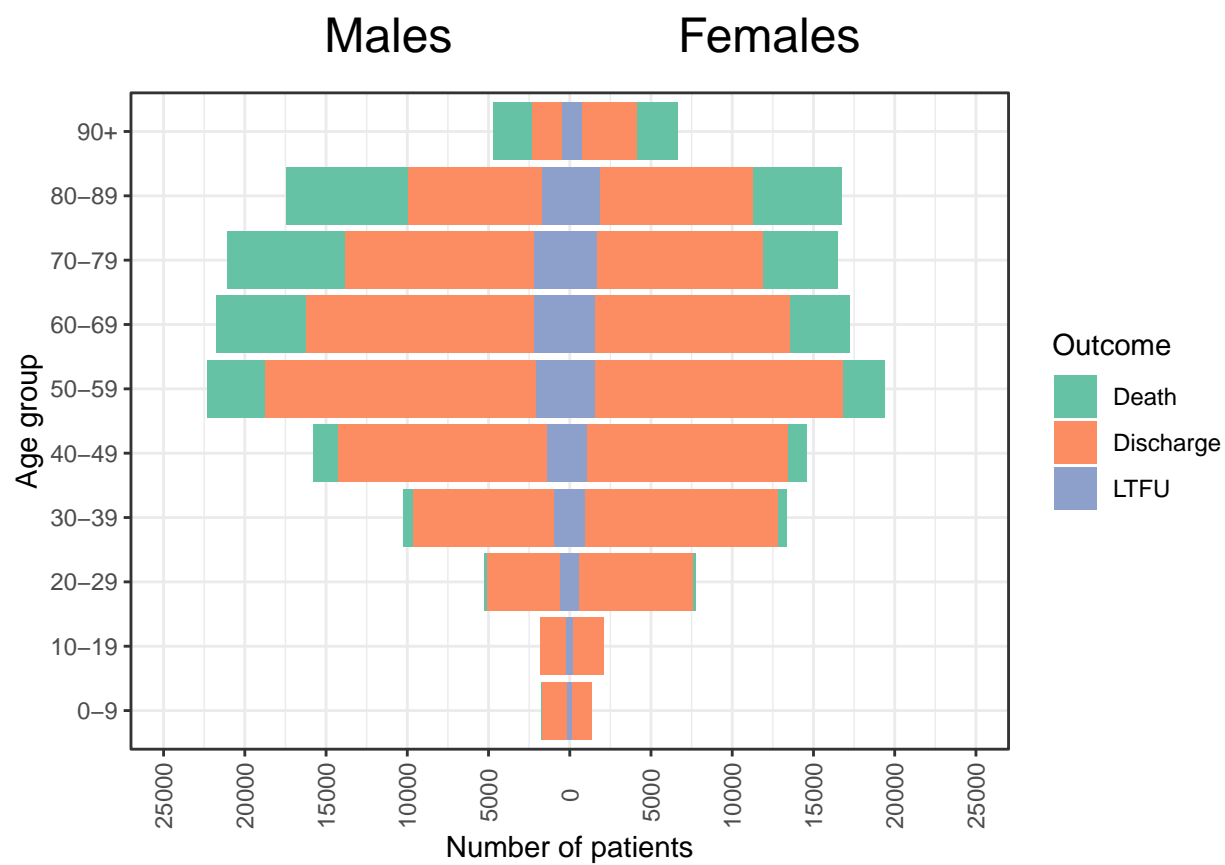
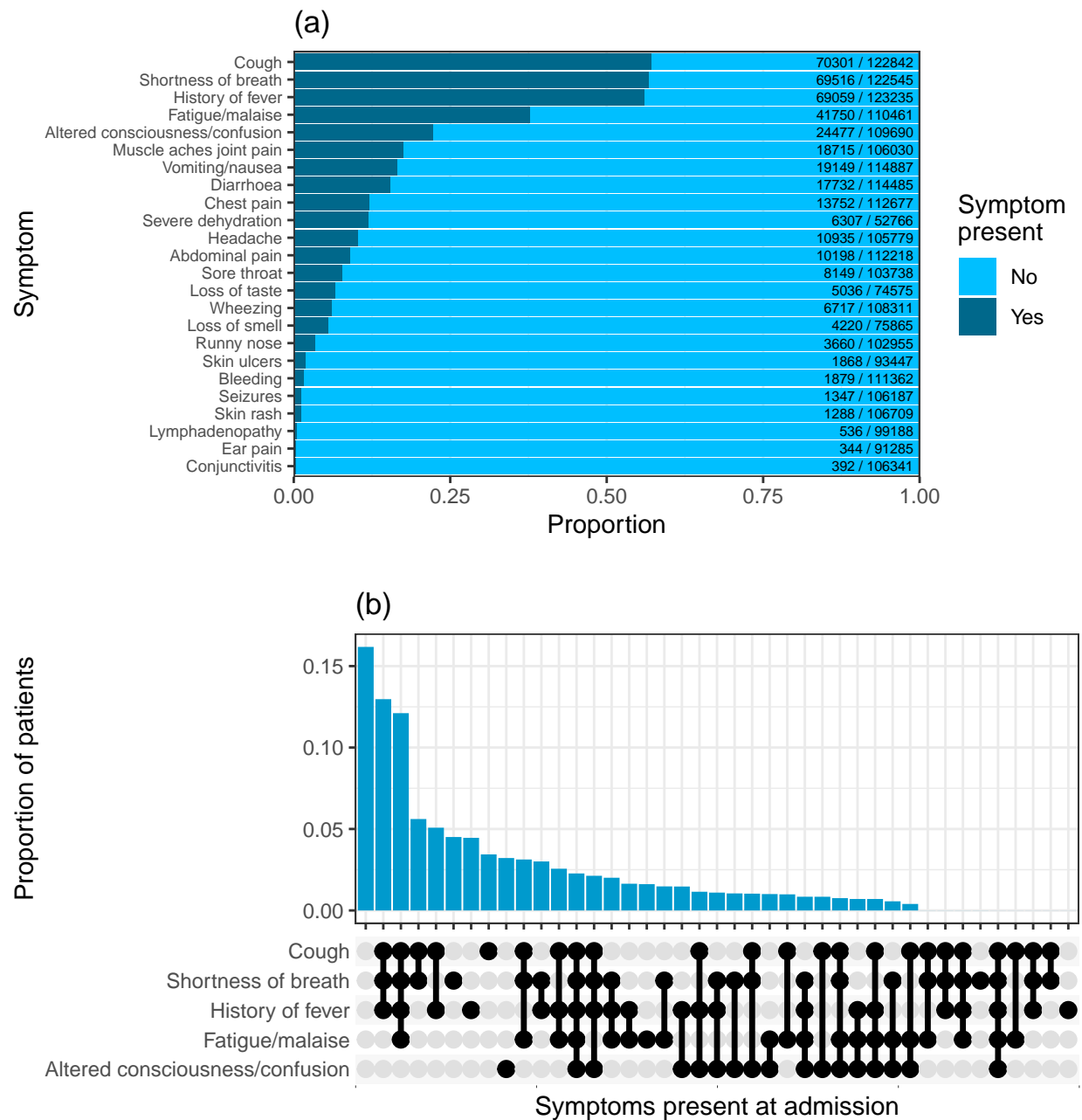


Figure 3: (a) Frequency of symptoms seen at admission amongst COVID-19 patients. Bars are annotated with a fraction representing the number of patients presenting with this symptom over the number of patients for whom presence or absence of this symptom was recorded. (b) The distribution of combinations of the five most common symptoms, amongst all patients for whom these data were recorded. Filled and empty circles below the x-axis indicate the presence or absence of each comorbidity. (c) Heatmap for correlation between symptoms. Fill colour is the phi correlation coefficient for each pair of symptoms, calculated amongst patients with recorded presence or absence of both.



(c)

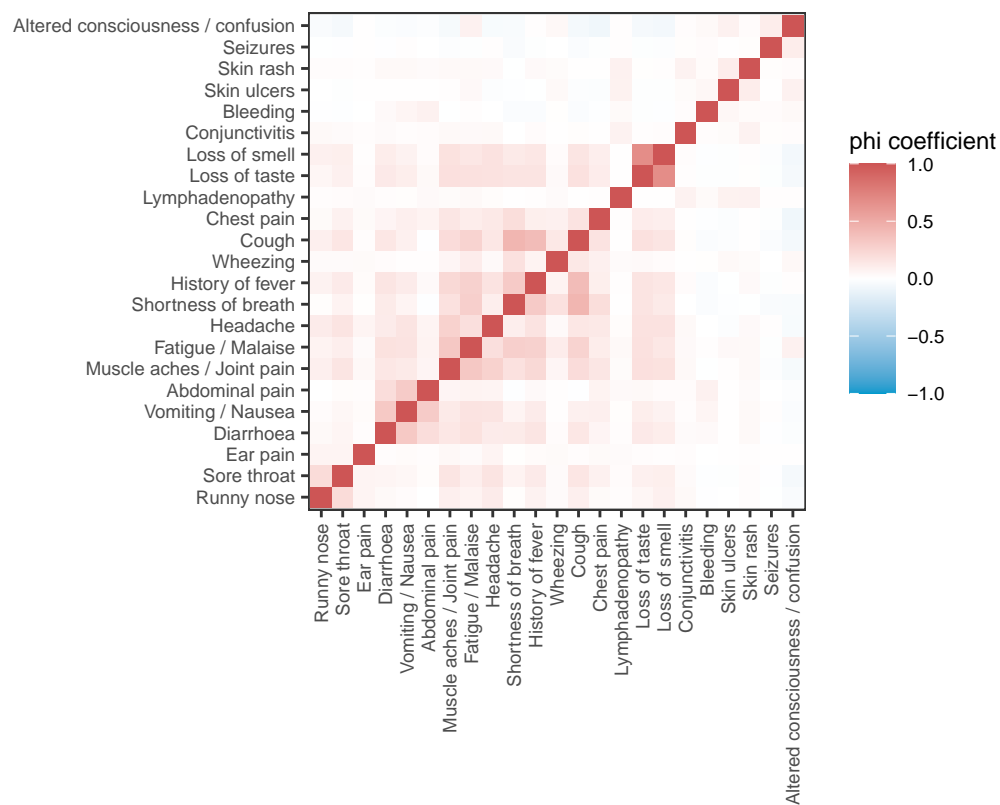
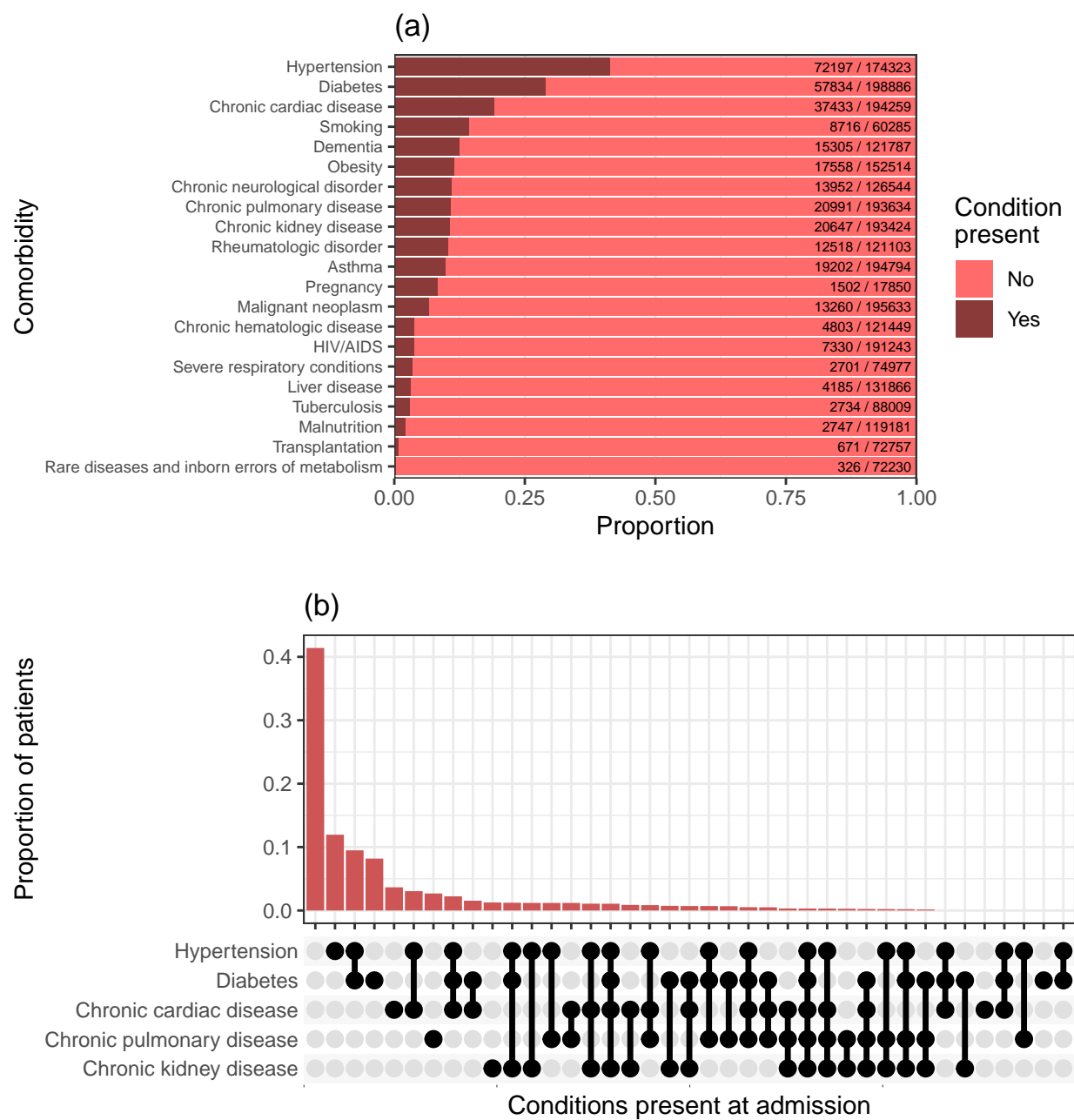


Figure 4: (a) Frequency of comorbidities or other concomitant conditions seen at admission amongst COVID-19 patients. Bars are annotated with a fraction representing the number of patients presenting with this comorbidity over the number of patients for whom presence or absence of this comorbidity was recorded. (b) The distribution of combinations of the five most common such conditions, amongst all patients for whom these data were recorded. Filled and empty circles below the x-axis indicate the presence or absence of each comorbidity.



Variables by age

Figure 5: Symptoms recorded at hospital presentation stratified by age group. Boxes show the proportion of individuals with each symptom, with error bars showing 95% confidence intervals. The size of each box is proportional to the number of individuals represented. N is the number of individuals included in the plot (this varies between plots due to data completeness)

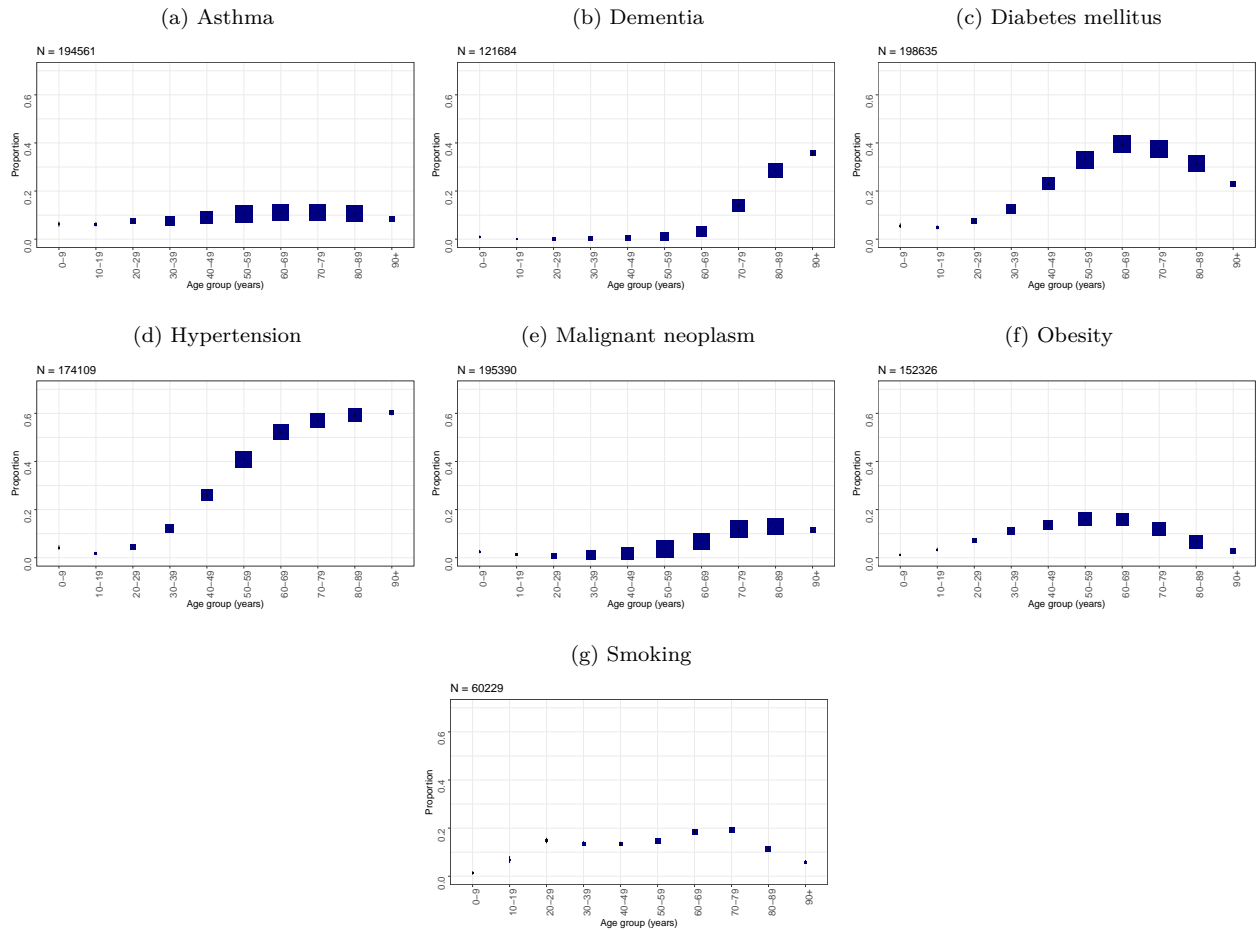


Figure 6: Symptoms recorded at hospital presentation stratified by age group. Boxes show the proportion of individuals with each symptom, with error bars showing 95% confidence intervals. The size of each box is proportional to the number of individuals represented. N is the number of individuals included in the plot (this varies between plots due to data completeness).

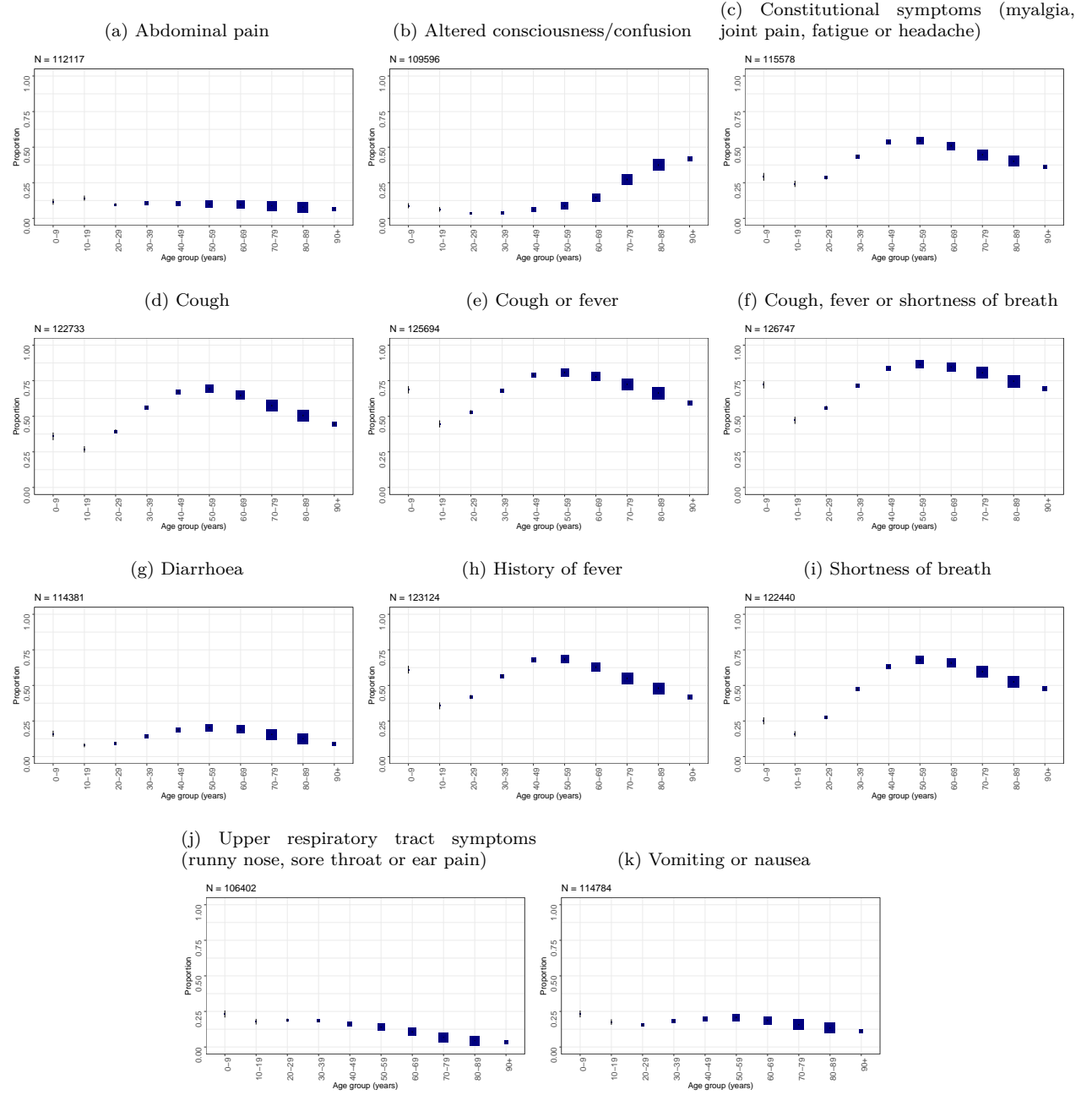


Figure 7: Box and whisker plots for observations at hospital presentation stratified by age group. Outliers are omitted. N is the number of individuals included in the plot (this varies between plots due to data completeness).

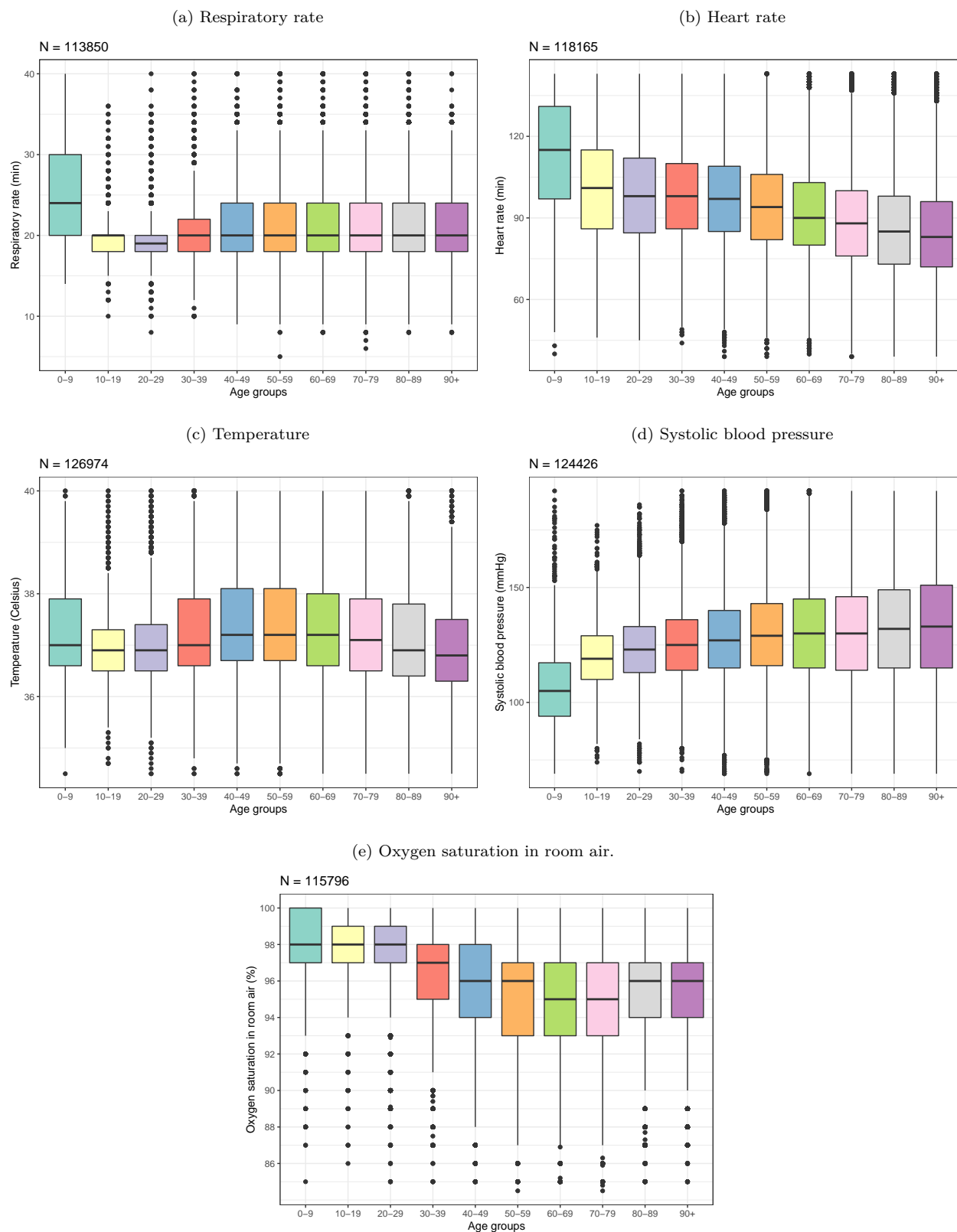
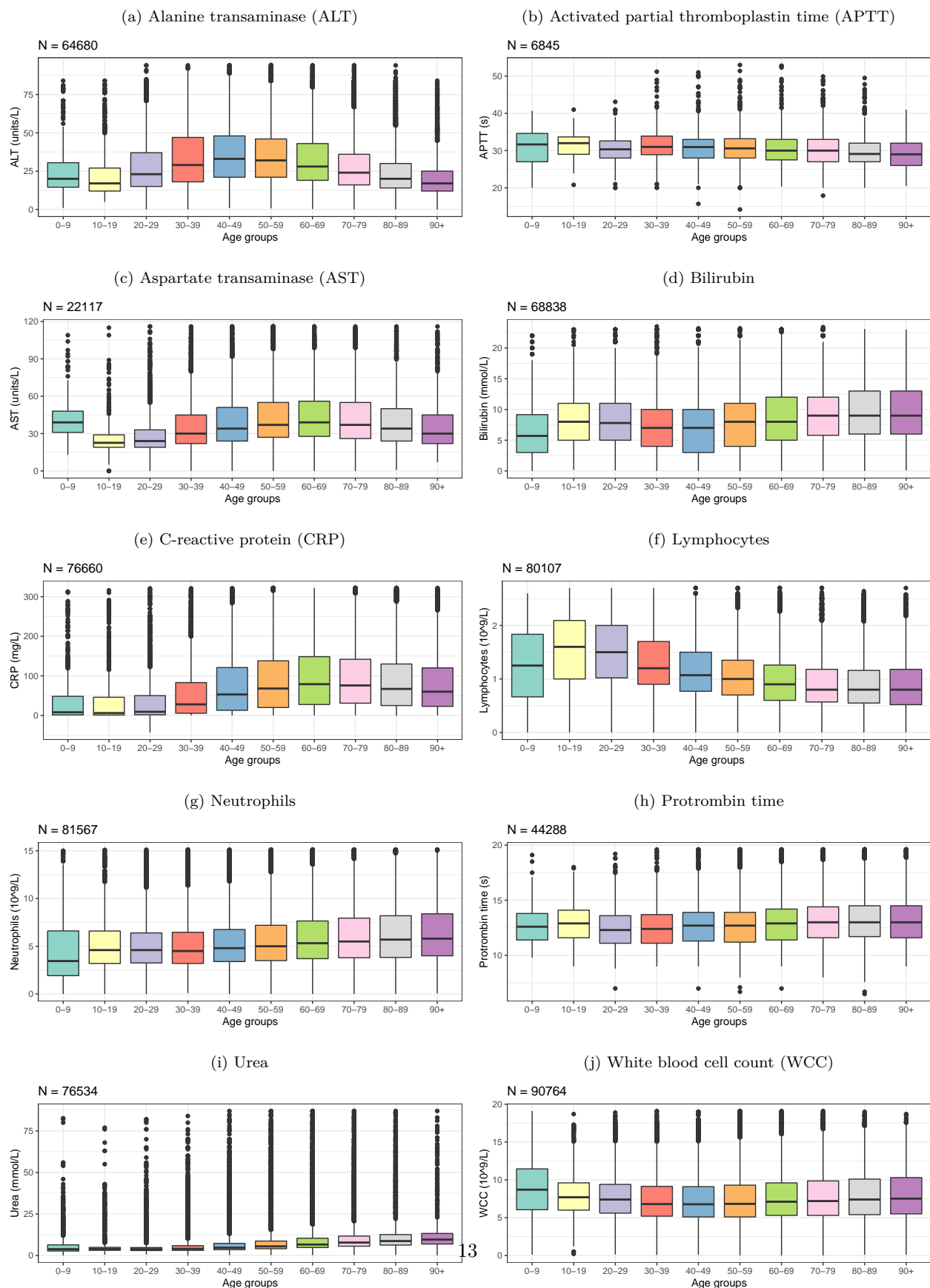


Figure 8: Box and whisker plots for laboratory results within 24 hours of hospital presentation stratified by age group. Outliers are omitted. N is the number of individuals included in the plot (this varies between plots due to data completeness).



Hospital stays and outcomes

Figure 9: Distribution of length of hospital stay, according to sex. This only includes cases with reported outcomes. The coloured areas indicate the kernel probability density of the observed data and the box plots show the median and interquartile range of the variable of interest.

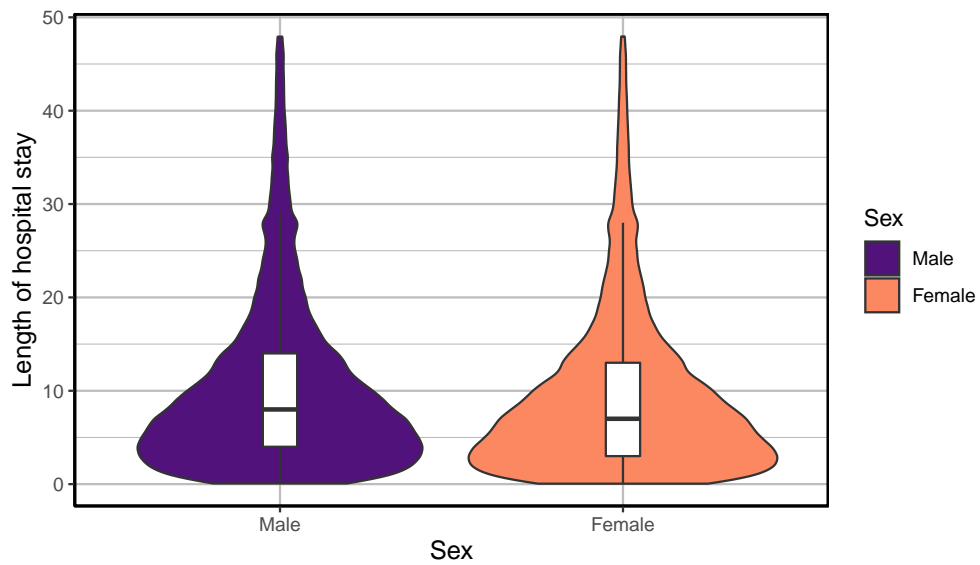


Figure 10: Distribution of length of hospital stay, according to patient age group. This only includes cases with reported outcomes. The coloured areas indicate the kernel probability density of the observed data and the box plots show the median and interquartile range of the variable of interest.

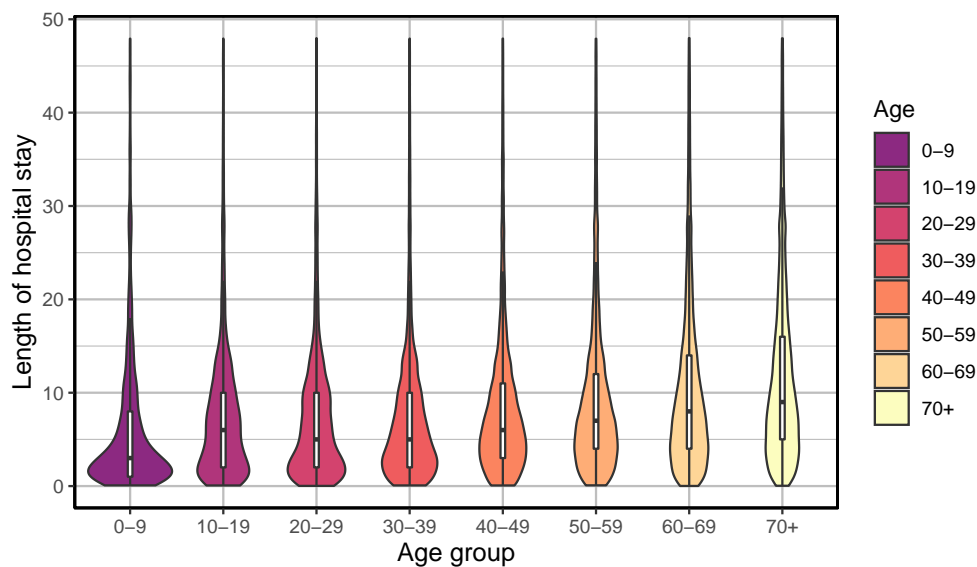


Figure 11: Distribution of time (in days) from hospital admission to ICU admission. The figure displays data on only those cases with a reported ICU start date.

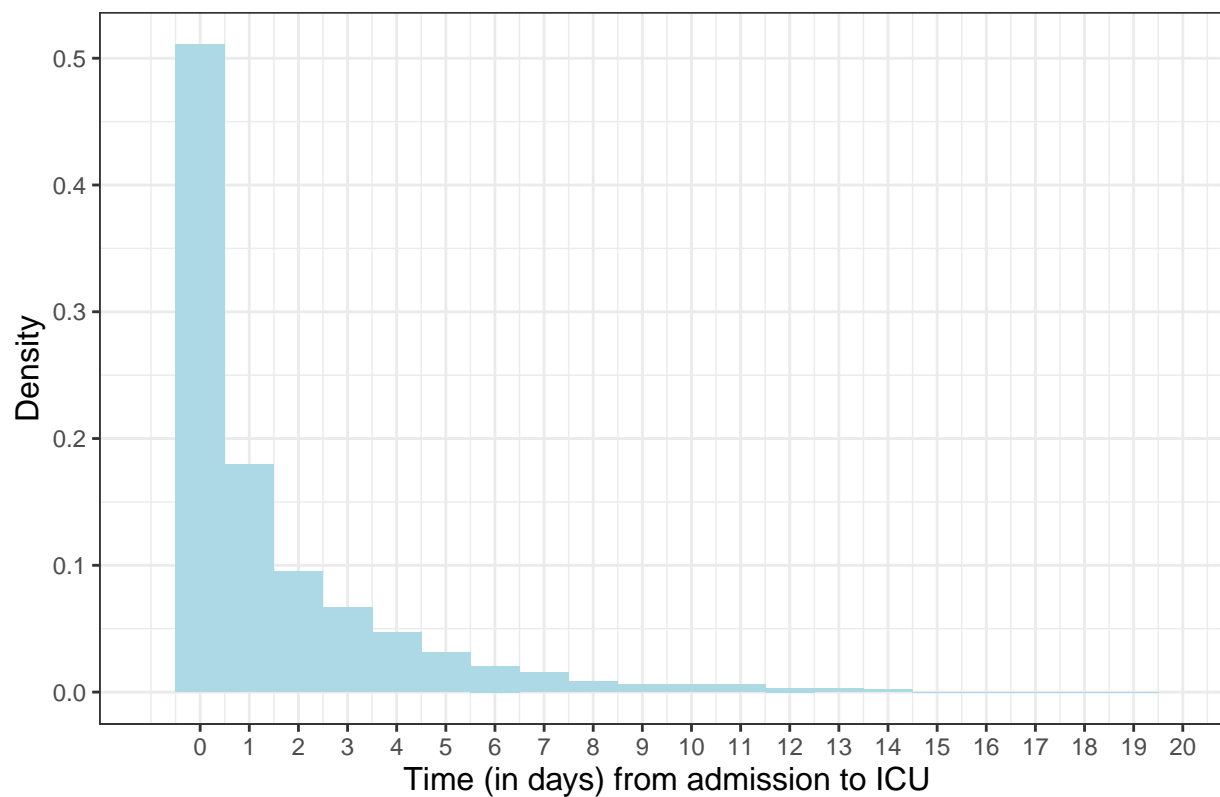


Figure 12: The distribution of patient status by number of days after admission. Patients with 'unknown' status have left the site at the time of report but have unknown outcomes due to missing data. The black line marks the end of 14 days.

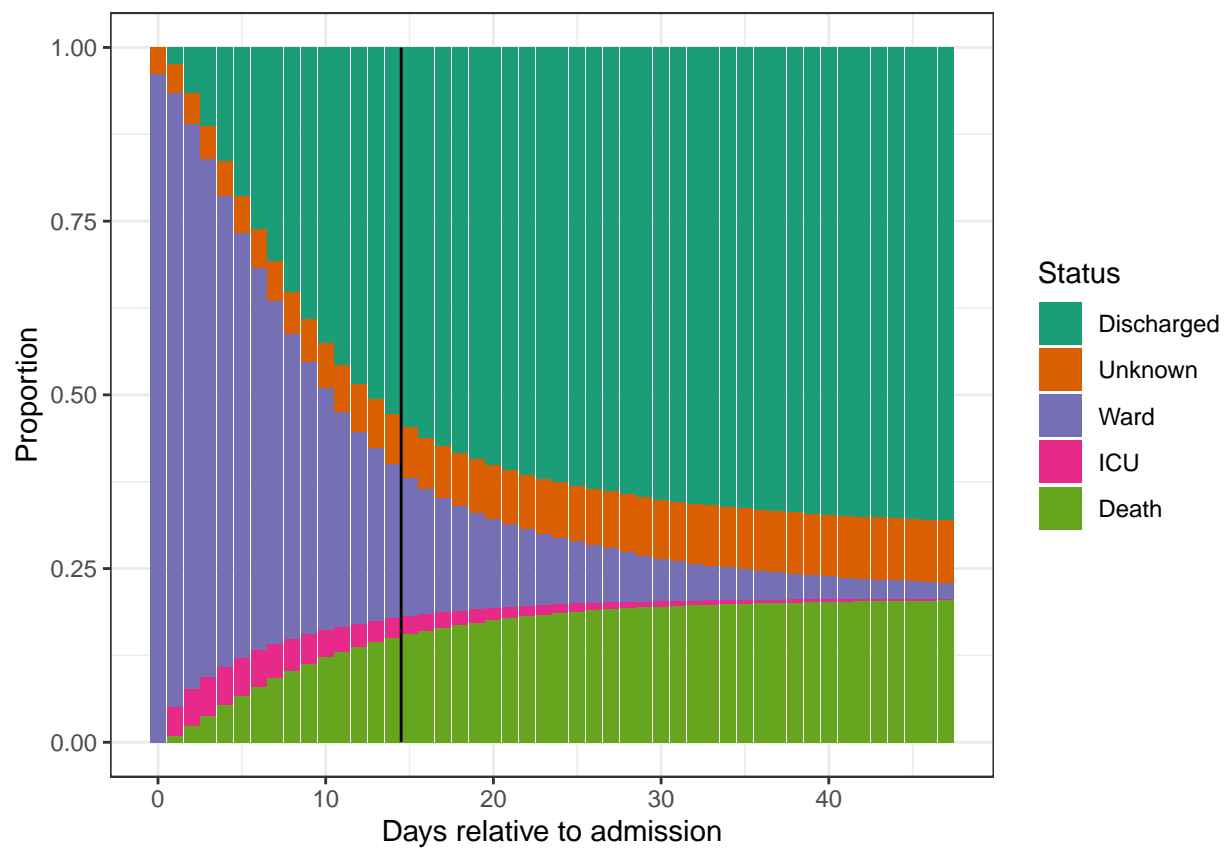
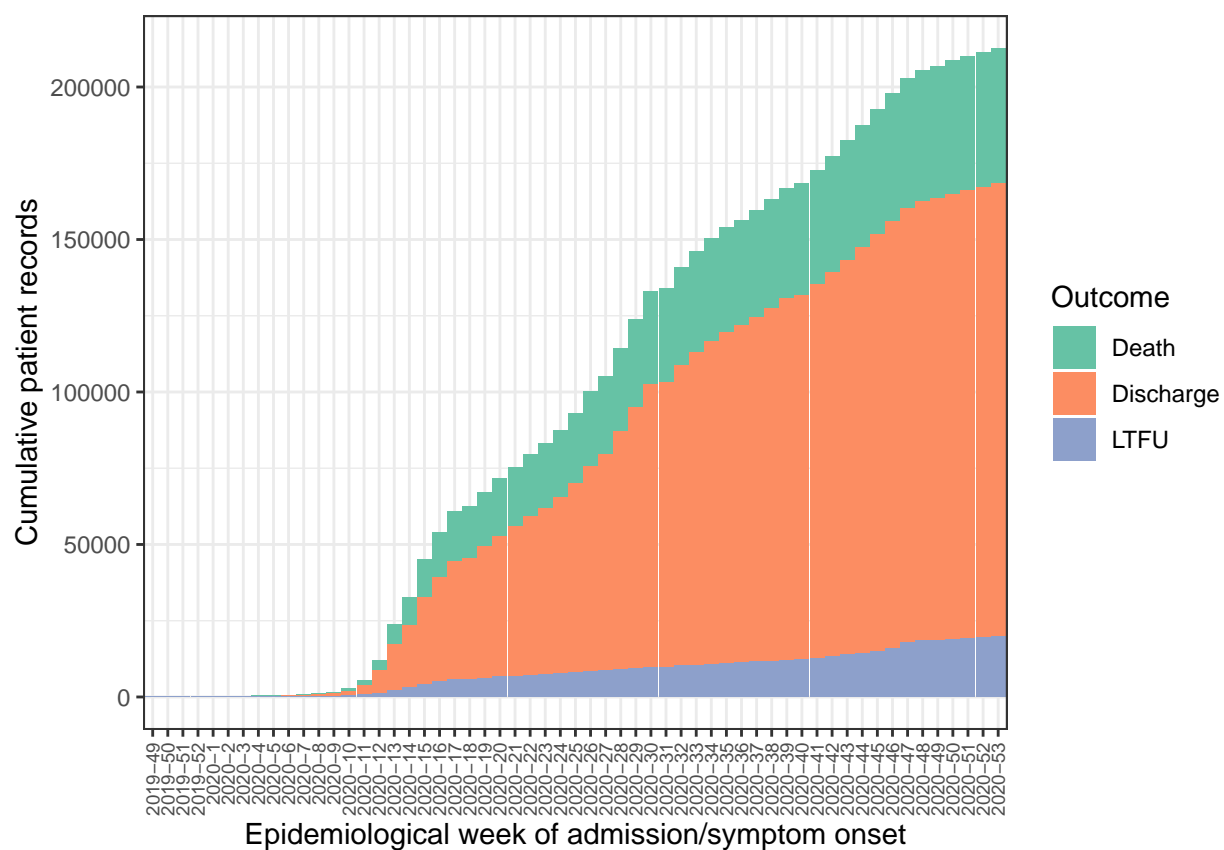
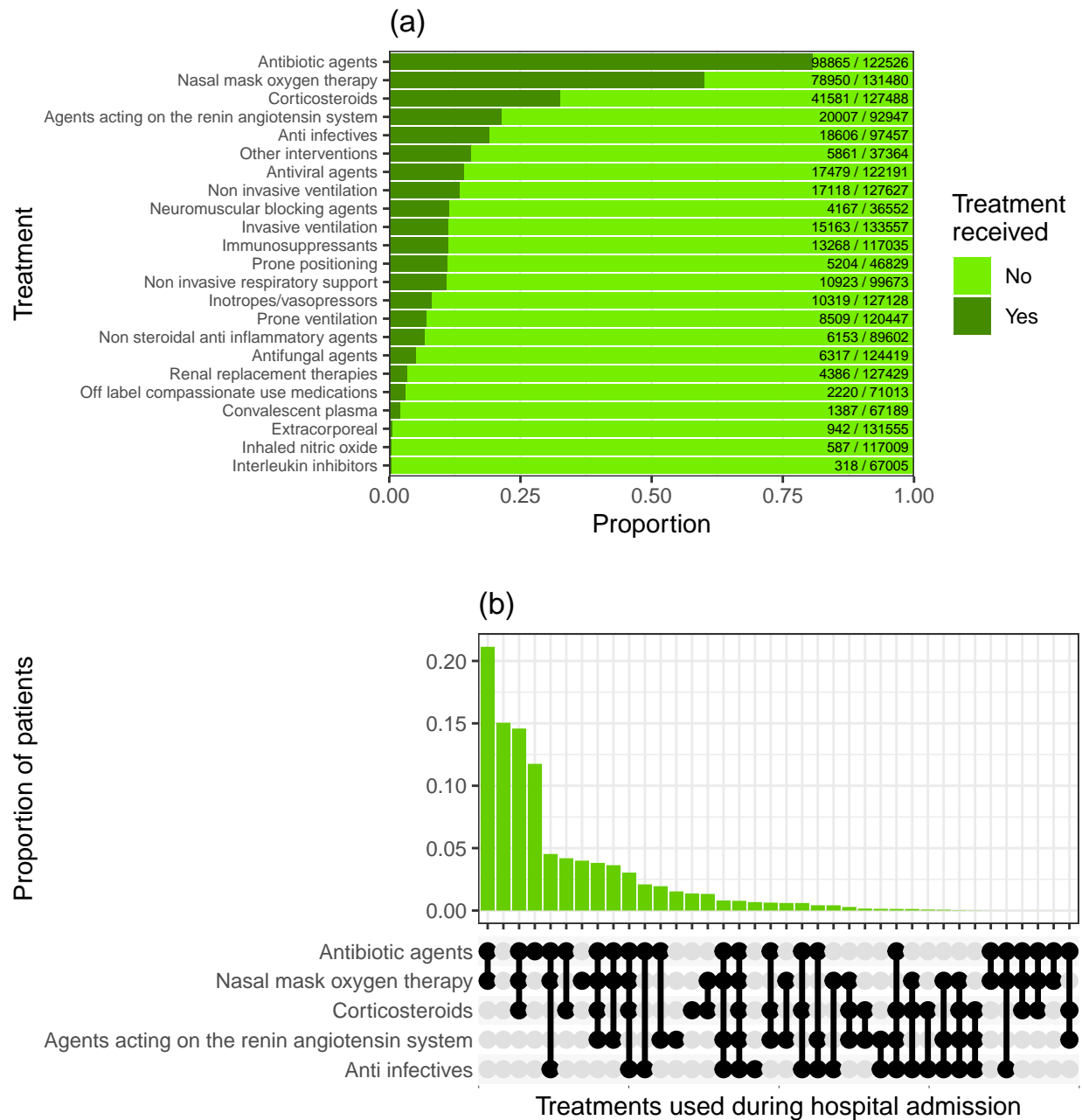


Figure 13: Cumulative patient numbers and outcomes by epidemiological week (of 2020) of admission (or, for patients infected in hospital, of symptom onset).



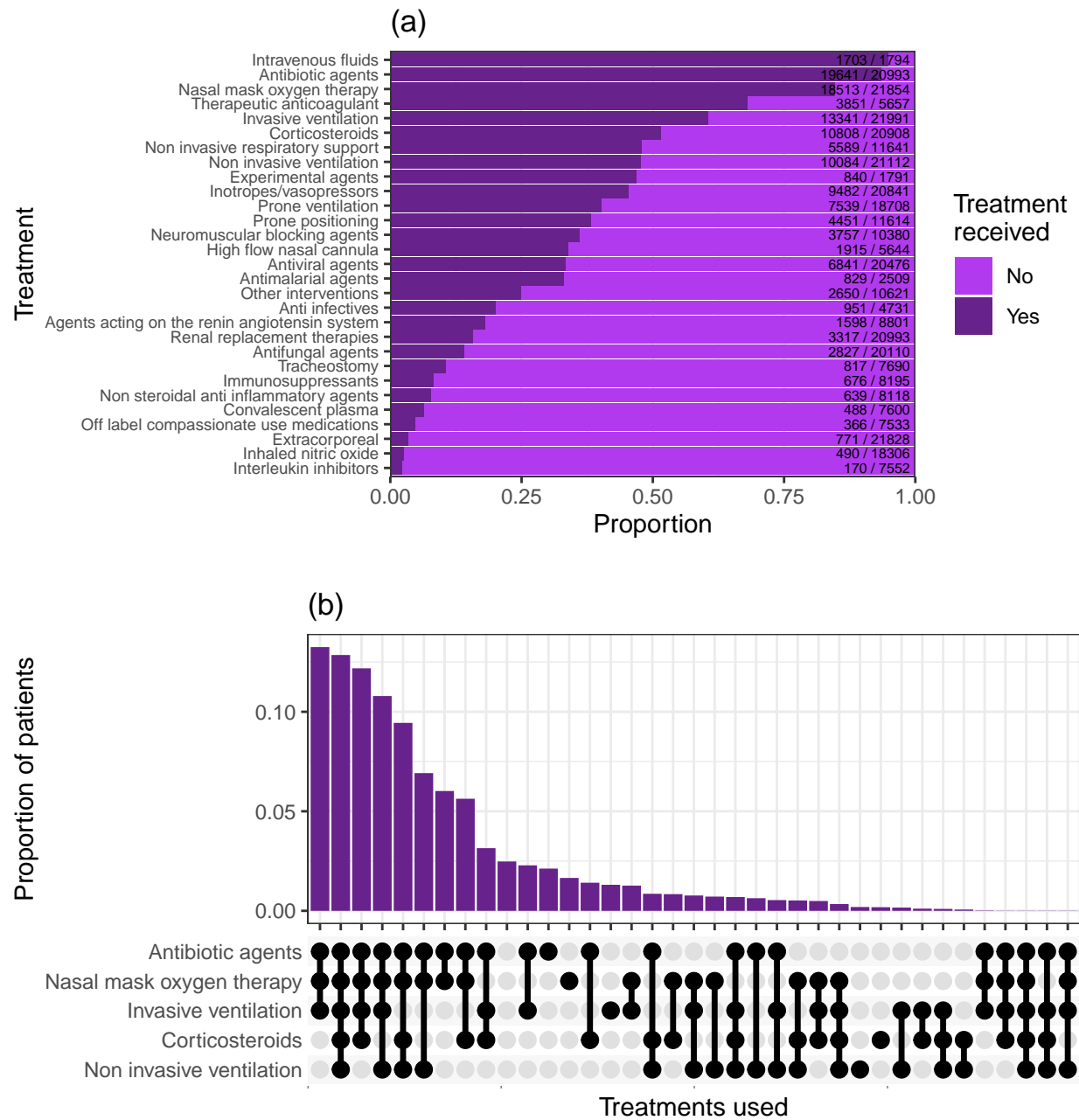
Treatment

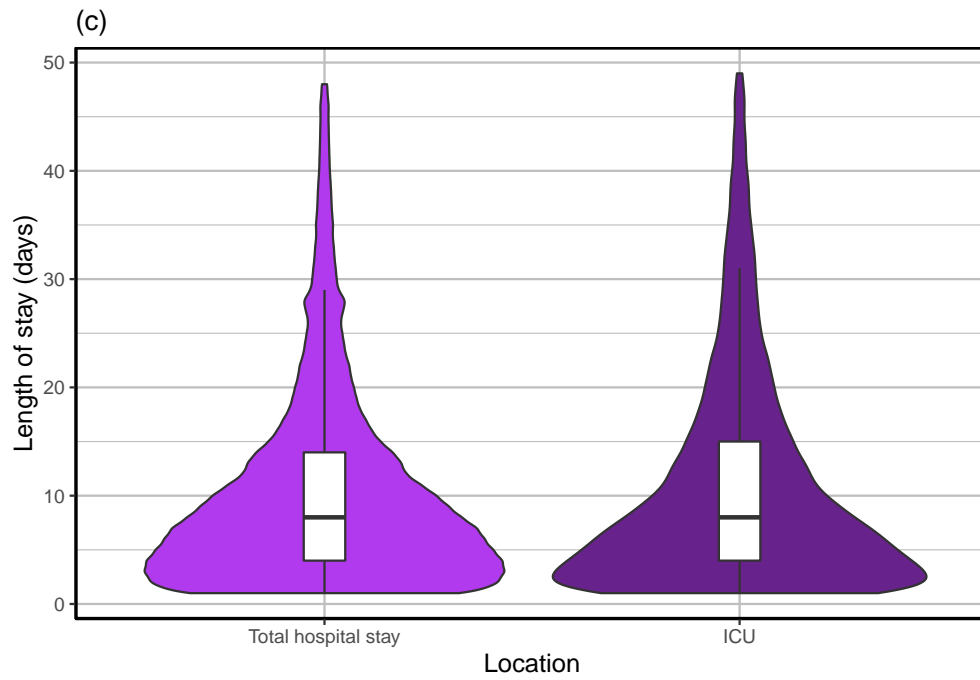
Figure 14: (a) Treatments used. This only includes patients for whom this information was recorded. (b) The distribution of combinations of antimicrobial treatments and steroids administered during hospital stay, across all patients with completed hospital stay and recorded treatment data.



Intensive Care and High Dependency Unit Treatments

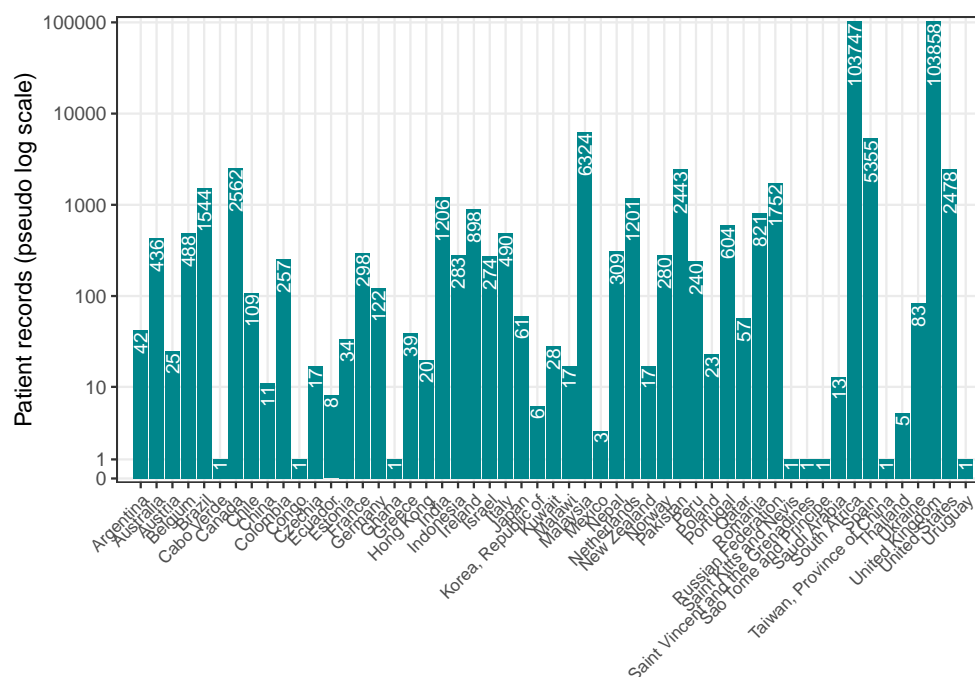
Figure 15: (a) Treatments used amongst patients admitted to the ICU. This only includes patients for whom this information was recorded. (b) The distribution of combinations of treatments administered during ICU/HDU stay. Filled and empty circles below the x-axis indicate treatments that were and were not administered respectively. (c) Distribution of lengths of stay for patients who were admitted to ICU/HDU: total length of stay for this group and length of stay within intensive care. This only includes cases with reported completed stays. The coloured areas indicate the kernel probability density of the observed data and the box plots show the median and interquartile range of the variable of interest.





Country Comparisons

Figure 16: Distribution of patients by country. This reflects data on only those countries that are contributing data on patients who satisfy the inclusion criteria outlined in the summary section.



Background

In response to the emergence of novel coronavirus (COVID-19), ISARIC launched a portfolio of resources to accelerate outbreak research and response. These include data collection, analysis and presentation tools which are freely available to all sites which have requested access to these resources. All data collection tools are designed to address the most critical public health questions, have undergone extensive review by international clinical experts, and are free for all to use. Resources are available on the ISARIC website.

The ISARIC-WHO COVID-19 Case Record Form (CRF) enables the collection of standardised clinical data to inform patient management and public health response. These forms should be used to collect data on suspected or confirmed cases of COVID-19. The CRF is available in multiple languages and is now in use across dozens of countries and research consortia, who are contributing data to these reports.

To support researchers to retain control of the data and samples they collect, ISARIC also hosts a data platform, where data can be entered to a web-based REDCap data management system, securely stored, and used to produce regular reports on their sites as above. Data contributors are invited to input on the methods and contents of the reports, and can also contribute to the aggregated data platform which aggregates site-specific data from all other sites across the world who are using this system. For more information, visit the ISARIC website.

All decisions regarding data use are made by the institutions that enter the data. ISARIC keeps contributors informed of any plans and welcomes their input to promote the best science and the interests of patients, institutions and public health authorities. Feedback and suggestions are welcome at ncov@isaric.org.

Methods

Patient details were submitted electronically by participating sites to the ISARIC database. Relevant background and presenting symptoms were recorded on the day of study recruitment. Daily follow-up was then completed until recovery or death. A final form was completed with details of treatments received and outcomes. All categories that represent fewer than five individuals have been suppressed to avoid the potential for identification of participants.

Graphs have been used to represent the age distribution of patients by sex and status (dead, recovered & still in hospital), the prevalence of individual symptoms on admission, comorbidities on admission, the length of hospital stay by sex and age group and the distribution of patient statuses by time since admission. In addition, the number of cases recruited by country and site, as well as the case count by status, has been represented.

All analysis were performed using the R statistical software (R Core Team, 2019).

Caveats

Patient data are collected and uploaded from start of admission, however a complete patient data set is not available until the episode of care is complete. This causes a predictable lag in available data influenced by the duration of admission which is greatest for the sickest patients, and accentuated during the up-phase of the outbreak.

These reports provide regular outputs from the ISARIC COVID-19 database. We urge caution in interpreting unexpected results. We have noted some unexpected results in the report, and are working with sites that submitted data to gain a greater understanding of these.

Acknowledgements

This report is made possible through the efforts and expertise of the staff collecting data at our partner institutions across the globe, and the ISARIC Team. For a list of partners and team members, please visit <https://isaric.org/research/covid-19-clinical-research-resources/covid-19-data-management-hosting/covid-19-clinical-data-contributors-list/>.

References

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- RECOVERY (2020, 16 June). Low-cost dexamethasone reduces death by up to one third in hospitalised patients with severe respiratory complications of COVID-19. <https://www.recoverytrial.net/news/low-cost-dexamethasone-reduces-death-by-up-to-one-third-in-hospitalised-patients-with-severe-respiratory-complications-of-covid-19>
- RECOVERY Collaborative Group (2020). Dexamethasone in hospitalized patients with Covid-19 — preliminary report. *New England Journal of Medicine* doi: [10.1056/NEJMoa2021436](https://doi.org/10.1056/NEJMoa2021436)

Summary tables

Table 1: Patient Characteristics. Proportions are presented in parentheses. Proportions have been rounded to two decimal places.

Description	value
Size of cohort	240149
By sex	
Female	116597 (0.49)
Male	122993 (0.51)
Unknown	559 (0)
By outcome status	
Death	50089 (0.21)
Discharge	167796 (0.7)
LTFU	22264 (0.09)
By age group	
0-9	3140 (0.01)
10-19	3950 (0.02)
20-29	12995 (0.05)
30-39	23635 (0.1)
40-49	30402 (0.13)
50-59	41712 (0.17)
60-69	39071 (0.16)
70+	83276 (0.35)
Unknown	1968 (0.01)
Admitted to ICU/HDU?	
No	105016 (0.44)
Unknown	108973 (0.45)
Yes	26160 (0.11)

Table 2: Outcome by age and sex. Proportions are calculated using the column total as the denominator.

Variable	Death	Discharge	LTFU
Age			
0-9	95 (0)	2801 (0.02)	244 (0.01)
10-19	77 (0)	3465 (0.02)	408 (0.02)
20-29	372 (0.01)	11442 (0.07)	1181 (0.05)
30-39	1196 (0.02)	20568 (0.12)	1871 (0.08)
40-49	2694 (0.05)	25256 (0.15)	2452 (0.11)
50-59	6118 (0.12)	32035 (0.19)	3559 (0.16)
60-69	9293 (0.19)	26057 (0.16)	3721 (0.17)
70+	29842 (0.6)	44834 (0.27)	8600 (0.39)
Sex			
Female	21037 (0.42)	85336 (0.51)	10224 (0.46)
Male	28884 (0.58)	82158 (0.49)	11951 (0.54)

Table 3: Prevalence of symptoms.

Symptoms	Present	Absent	Unknown
Cough	70301 (0.29)	52541 (0.22)	117307 (0.49)
Shortness of breath	69516 (0.29)	53029 (0.22)	117604 (0.49)
History of fever	69059 (0.29)	54176 (0.23)	116914 (0.49)
Fatigue/malaise	41750 (0.17)	68711 (0.29)	129688 (0.54)
Altered consciousness/confusion	24477 (0.1)	85213 (0.35)	130459 (0.54)
Vomiting/nausea	19149 (0.08)	95738 (0.4)	125262 (0.52)
Muscle aches joint pain	18715 (0.08)	87315 (0.36)	134119 (0.56)
Diarrhoea	17732 (0.07)	96753 (0.4)	125664 (0.52)
Chest pain	13752 (0.06)	98925 (0.41)	127472 (0.53)
Headache	10935 (0.05)	94844 (0.39)	134370 (0.56)
Abdominal pain	10198 (0.04)	102020 (0.42)	127931 (0.53)
Sore throat	8149 (0.03)	95589 (0.4)	136411 (0.57)
Wheezing	6717 (0.03)	101594 (0.42)	131838 (0.55)
Severe dehydration	6307 (0.03)	46459 (0.19)	187383 (0.78)
Loss of taste	5036 (0.02)	69539 (0.29)	165574 (0.69)
Loss of smell	4220 (0.02)	71645 (0.3)	164284 (0.68)
Runny nose	3660 (0.02)	99295 (0.41)	137194 (0.57)
Bleeding	1879 (0.01)	109483 (0.46)	128787 (0.54)
Skin ulcers	1868 (0.01)	91579 (0.38)	146702 (0.61)
Seizures	1347 (0.01)	104840 (0.44)	133962 (0.56)
Skin rash	1288 (0.01)	105421 (0.44)	133440 (0.56)
Lymphadenopathy	536 (0)	98652 (0.41)	140961 (0.59)
Conjunctivitis	392 (0)	105949 (0.44)	133808 (0.56)
Ear pain	344 (0)	90941 (0.38)	148864 (0.62)

Table 4: Prevalence of comorbidities.

Comorbidities	Present	Absent	Unknown
Hypertension	72197 (0.3)	102126 (0.43)	65826 (0.27)
Diabetes	57834 (0.24)	141052 (0.59)	41263 (0.17)
Chronic cardiac disease	37433 (0.16)	156826 (0.65)	45890 (0.19)
Chronic pulmonary disease	20991 (0.09)	172643 (0.72)	46515 (0.19)
Chronic kidney disease	20647 (0.09)	172777 (0.72)	46725 (0.19)
Asthma	19202 (0.08)	175592 (0.73)	45355 (0.19)
Obesity	17558 (0.07)	134956 (0.56)	87635 (0.36)
Dementia	15305 (0.06)	106482 (0.44)	118362 (0.49)
Chronic neurological disorder	13952 (0.06)	112592 (0.47)	113605 (0.47)
Malignant neoplasm	13260 (0.06)	182373 (0.76)	44516 (0.19)
Rheumatologic disorder	12518 (0.05)	108585 (0.45)	119046 (0.5)
Smoking	8716 (0.04)	51569 (0.21)	179864 (0.75)
HIV/AIDS	7330 (0.03)	183913 (0.77)	48906 (0.2)
Chronic hematologic disease	4803 (0.02)	116646 (0.49)	118700 (0.49)
Liver disease	4185 (0.02)	127681 (0.53)	108283 (0.45)
Malnutrition	2747 (0.01)	116434 (0.48)	120968 (0.5)
Tuberculosis	2734 (0.01)	85275 (0.36)	152140 (0.63)
Severe respiratory conditions	2701 (0.01)	72276 (0.3)	165172 (0.69)
Pregnancy	1502 (0.01)	16348 (0.07)	222299 (0.93)
Transplantation	671 (0)	72086 (0.3)	167392 (0.7)
Rare diseases and inborn errors of metabolism	326 (0)	71904 (0.3)	167919 (0.7)

Table 5: Treatment use. The counts presented for treatments include all cases, not only cases with complete details of treatments (as expressed in the summary).

Treatments	Present	Absent	Unknown
Antibiotic agents	98865 (0.41)	23661 (0.1)	117623 (0.49)
Nasal mask oxygen therapy	78950 (0.33)	52530 (0.22)	108669 (0.45)
Corticosteroids	41581 (0.17)	85907 (0.36)	112661 (0.47)
Agents acting on the renin angiotensin system	20007 (0.08)	72940 (0.3)	147202 (0.61)
Anti infectives	18606 (0.08)	78851 (0.33)	142692 (0.59)
Antiviral agents	17479 (0.07)	104712 (0.44)	117958 (0.49)
Non invasive ventilation	17118 (0.07)	110509 (0.46)	112522 (0.47)
Invasive ventilation	15163 (0.06)	118394 (0.49)	106592 (0.44)
Immunosuppressants	13268 (0.06)	103767 (0.43)	123114 (0.51)
Non invasive respiratory support	10923 (0.05)	88750 (0.37)	140476 (0.58)
Inotropes/vasopressors	10319 (0.04)	116809 (0.49)	113021 (0.47)
Prone ventilation	8509 (0.04)	111938 (0.47)	119702 (0.5)
Antifungal agents	6317 (0.03)	118102 (0.49)	115730 (0.48)
Non steroidal anti inflammatory agents	6153 (0.03)	83449 (0.35)	150547 (0.63)
Other interventions	5861 (0.02)	31503 (0.13)	202785 (0.84)
Prone positioning	5204 (0.02)	41625 (0.17)	193320 (0.81)
Renal replacement therapies	4386 (0.02)	123043 (0.51)	112720 (0.47)
Neuromuscular blocking agents	4167 (0.02)	32385 (0.13)	203597 (0.85)
Off label compassionate use medications	2220 (0.01)	68793 (0.29)	169136 (0.7)
Convalescent plasma	1387 (0.01)	65802 (0.27)	172960 (0.72)
Extracorporeal	942 (0)	130613 (0.54)	108594 (0.45)
Inhaled nitric oxide	587 (0)	116422 (0.48)	123140 (0.51)
Interleukin inhibitors	318 (0)	66687 (0.28)	173144 (0.72)

Table 6: Key time variables. SD: Standard deviation; IQR: Interquartile range. Outliers (values greater than 120) were excluded prior to the computation of estimates.

Time (in days)	Mean (observed)	SD (observed)	Median (observed)	IQR (observed)
Length of hospital stay	10.0	9.0	7	9
Symptom onset to admission	5.2	5.0	4	7
Admission to ICU entry	1.5	2.4	0	2
Duration of ICU	10.8	10.1	7	12
Admission to IMV	4.8	7.0	2	6
Duration of IMV	11.0	9.4	8	13
Admission to NIV	13.2	11.1	10	13
Duration of NIV	3.4	3.0	2	3