

SPRINT-SARI AUS Report on COVID-19 Admissions to the Intensive Care Unit in Australia



Summary Report No.10

23 July 2020

The results in this report have been produced using data from the SPRINT-SARI AUS ICU COVID-19 database, Monash University. For further information, or to contribute to this project, please contact MNHS-Sprint.Sari@monash.edu.

We would like to thank all the research coordinators and data collectors across Australia for providing this data during the ongoing pandemic. This report of aggregate data will be issued weekly to monthly for the duration of the SARS-CoV-2/COVID-19 pandemic.

Data in this report was extracted on 23 July 2020 at 13:41h and pertains to ICU admissions in Australia reported to the SPRINT-SARI AUS ICU COVID-19 database between 27 February 2020 and 23 July 2020. At the time of this report, data has been entered for **394** individuals from **57** sites across **6** states and **2** territories.

Patients were entered if they were admitted to ICU and were 1) COVID-19 positive on PCR test or 2) COVID-19 infection was strongly clinically suspected but had negative COVID-19 swabs or 3) COVID-19 infection was strongly clinically suspected but were awaiting swab results at the time of this report. Patients admitted to the ICU and treated as COVID-19 as a precaution were not included.

The utmost effort has been made to ensure the highest quality data is being reported. However please note the following caveats:

- The population in this report reflect the sickest patients with COVID-19 infection being managed in the ICU, and do not reflect the overall population of COVID-19 positive patients.
- Due to a variable time lag in submission of data, there may be admissions in this timeframe that are yet to be included in the database at the time of reporting.
- In this extraction, **26** patients were admitted in the last 5 days or do not have yet an admission date entered (very recent imputed data), thus, a considerable amount of missing data is expected for these patients.
- Information is incomplete for some patients who are still having ongoing care, 24.9% of confirmed COVID-19 admissions were still receiving ongoing care in ICU or hospital wards.
- From the **5** duplicated patients in the dataset, **3** were aggregated into one record (**2** were transferred and **1** was re-admitted after 10 days), and **2** were transferred but no data after transfer is available yet.
- As the pandemic is ongoing and site contributions evolve, it is possible for trends and distributions to change as more data is collected with greater precision. This report is also descriptive and we urge caution in any inference particularly around causation.

Summary

As of July 23, 2020, a total of 77 ICU sites are participating in the SPRINT-SARI COVID-19 database. Currently 57 ICU sites are contributing data, while 4 sites are at various stages of ethical and governance approvals. This is an increase of one additional site contributing data in the last fortnight. A total of 394 ICU suspected or confirmed COVID-19 admissions have been reported to SPRINT-SARI, which is an increase of 60 over the last fortnight. This includes 269 confirmed COVID-19 patients, 31 patients with strong clinical suspicion of COVID-19 (negative swab result) and 91 patients with strong clinical suspicion of COVID-19 (awaiting swab result). Table 1 provides a breakdown by State and Territory.

Table 1. Overview by State/Territory – Participation and Admissions

State / Territory	Number of ICU Sites		Number of ICU Admissions		
	Participating	Contributing Data	Confirmed COVID-19	Suspected* COVID-19 (Negative swab)	Suspected* COVID-19 (Awaiting swab)
NSW	15	13	93	10	18
VIC	26	21	109	13	64
QLD	17	10	15	2	3
WA	9	7	29	5	3
SA	5	2	18	0	1
TAS	2	2	2	1	2
NT	2	1	1	0	0
ACT	1	1	2	0	0
Total	77	57	269	31	91

Notes: *ICU admissions with strong clinical suspicion of COVID-19 (with negative swab or awaiting swab) are managed as COVID-19.

The cohort of 269 confirmed COVID-19 ICU admissions includes 174 males and 89 females (and 6 unknown). The median age is 63 years (IQR: 51 to 71 years), ranging from 17 to 88 years. The most common comorbidities include diabetes, chronic cardiac disease, obesity, past use of ACE inhibitor/A2 blocker, smoking and asthma. The most prevalent symptoms at time of admission to hospital remain to be fever, cough, shortness of breath, fatigue, myalgia and diarrhoea. The main treatments reported at any time during ICU admission continue to include antibiotics, invasive ventilation, inotropic/vasopressor support, neuromuscular blocking agents and high-flow nasal canula oxygen therapy.

Of the 269 confirmed COVID-19 patients, outcomes for this cohort as at 23 July 2020 included 33 (12.2%) deaths, 139 (51.7%) discharged home, 23 (8.6%) transferred to rehabilitation, 5 (1.9%) transferred to another hospital/facility, 14 (5.2%) remain in ongoing hospital ward care and 53 (19.7%) remain in ongoing ICU care. For the 215 confirmed COVID-19 patients with both ICU admission and ICU discharge dates recorded, the observed median LOS in ICU was 8 days (IQR: 3 to 17 days).

Over half (141 of 239 patients with this information available) of confirmed COVID-19 admissions to ICU received invasive ventilation at some stage during their ICU stay. Patients who received invasive ventilation while in ICU had a longer observed median ICU LOS of 15 days (IQR: 9 to 25 days) with 19.1% of these patients still receiving ongoing ICU care or hospital ward care at the time of this report.

Number of ICU admissions

The cumulative number of confirmed or suspected COVID-19 ICU admissions by date of admission are shown in Figure 1. The daily number of ICU beds occupied by COVID-19 patients are shown in Figure 2 and a State/Territory breakdown of admissions is presented in Figure 3.

Figure 1. Cumulative number of ICU admissions with confirmed or strong clinical suspicion of COVID-19

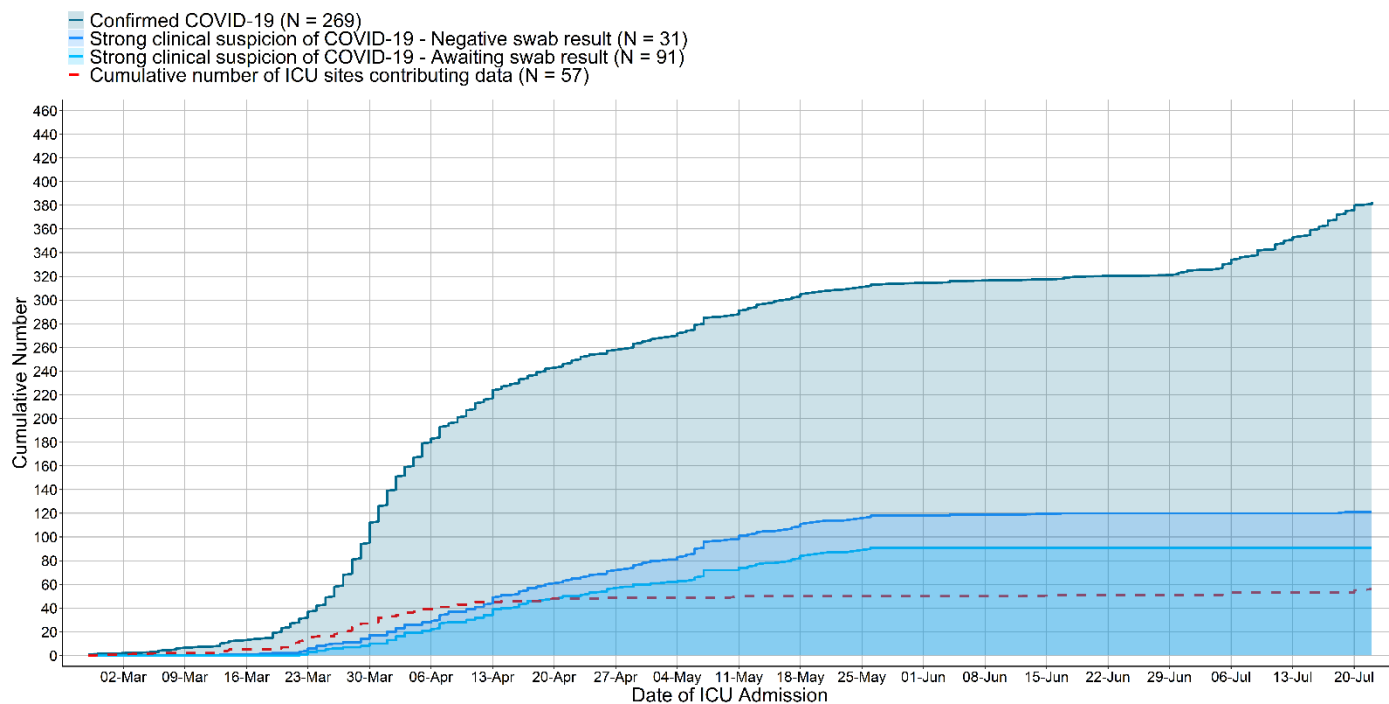


Figure 2. Daily number of ICU beds occupied by patients with confirmed or strong clinical suspicion of COVID-19

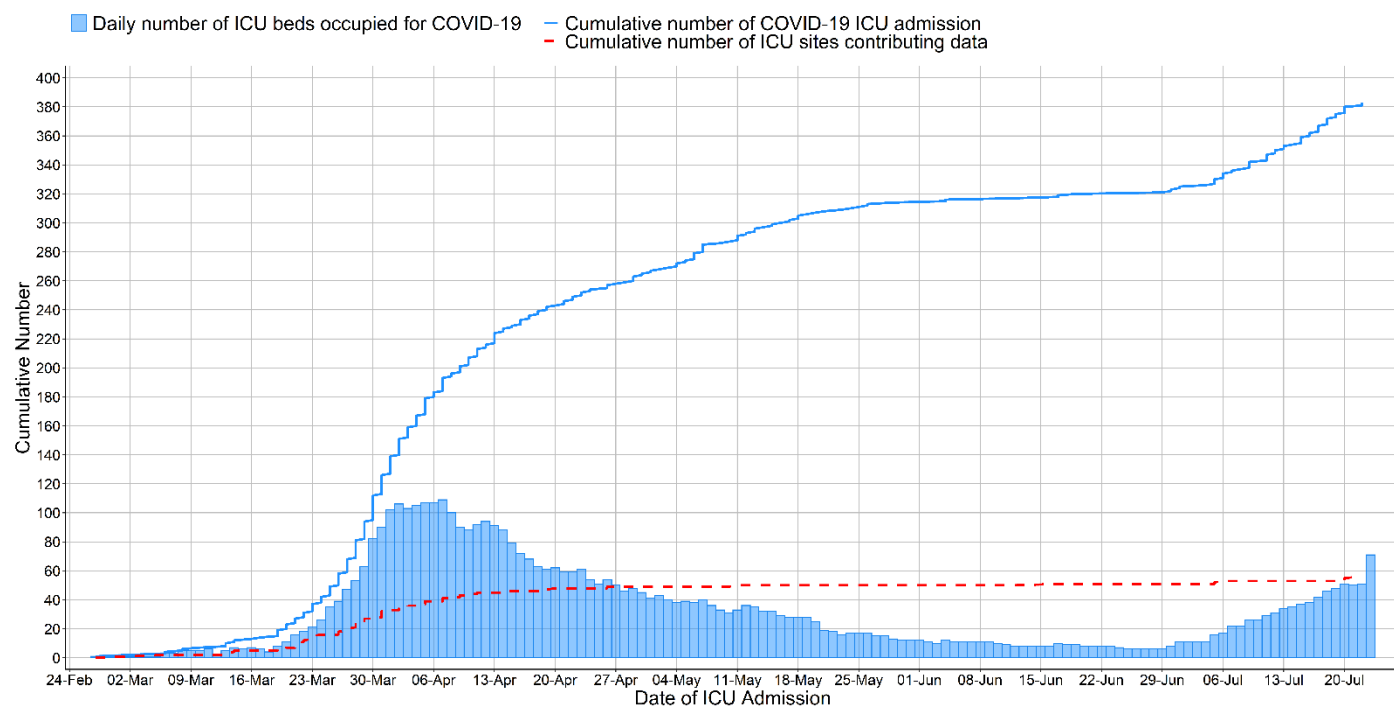
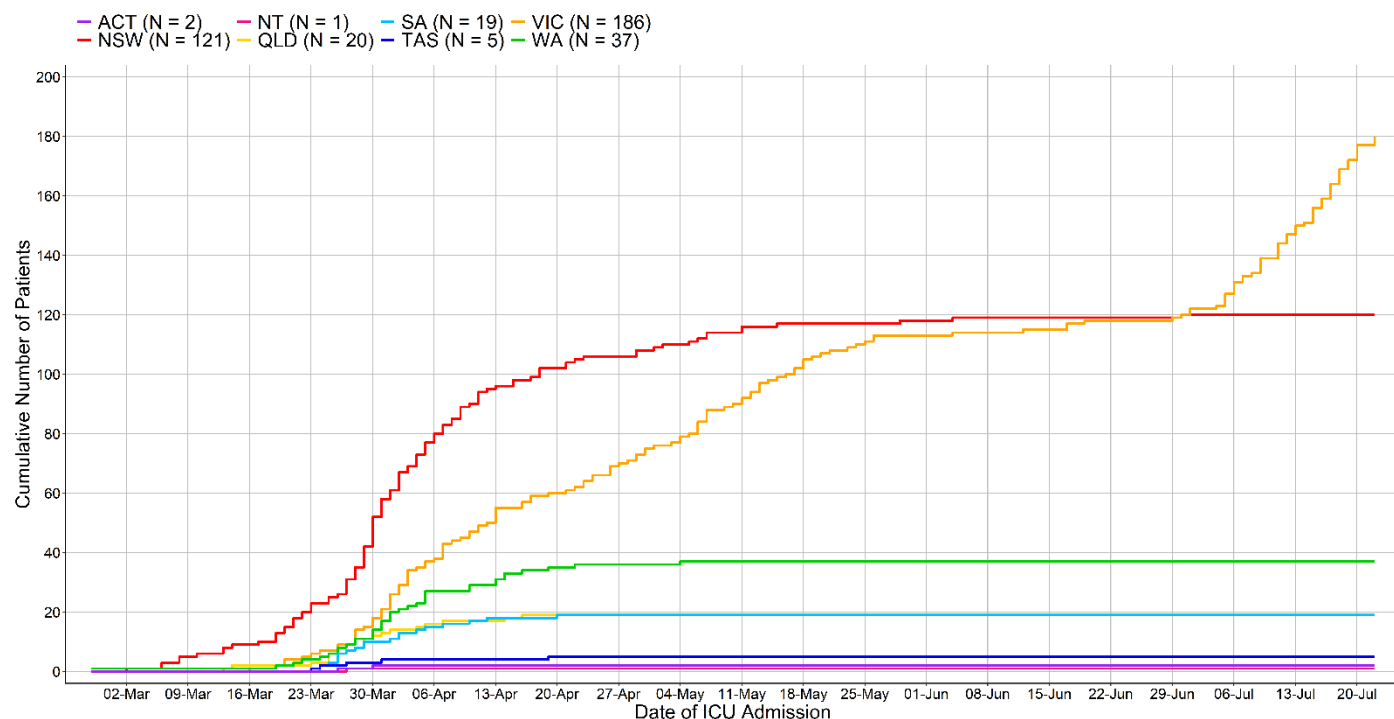


Figure 3. Cumulative number of ICU admissions with confirmed or strong clinical suspicion of COVID-19 by State and Territory



Demographics

Patient characteristics of ICU admission with confirmed COVID-19 are provided in Table 2. This table, and the remaining sections of this report will focus only on the confirmed COVID-19 admissions. Age and body mass index (BMI) distributions by sex for confirmed COVID-19 admissions are also provided in Figures 4 and 5.

Table 2. Characteristics of patients admitted to ICU with confirmed COVID-19

Demographics	Confirmed COVID-19		
	Overall	Phase 1 (≤ 30 June 2020)	Phase 2 (> 01 July 2020)
N	269	202	67
Age at admission, median (IQR)	63.0 (51.0 - 71.0)	64.0 (53.2 - 72.0)	62.0 (48.0 - 70.0)
Age group at admission, N (%)			
0-9 years	1 (0.4%)	1 (0.5%)	0 (0.0%)
10-19 years	2 (0.8%)	1 (0.5%)	1 (1.6%)
20-29 years	5 (1.9%)	3 (1.5%)	2 (3.3%)
30-39 years	19 (7.2%)	16 (7.9%)	3 (4.9%)
40-49 years	34 (12.9%)	22 (10.9%)	12 (19.7%)
50-59 years	44 (16.7%)	34 (16.8%)	10 (16.4%)
60-69 years	70 (26.6%)	54 (26.7%)	16 (26.2%)
70-79 years	74 (28.1%)	60 (29.7%)	14 (23.0%)
80-89 years	14 (5.3%)	11 (5.4%)	3 (4.9%)
Sex, N (%)			
Male	174 (66.2%%)	138 (68.3%%)	36 (59.0%%)
Female	89 (33.8%%)	64 (31.7%%)	25 (41.0%%)
Pregnant, N (%)	1 (1.2%%)	0 (0.0%%)	1 (4.5%%)
Indigenous, N (%)	0 (0.0%%)	0 (0.0%%)	0 (0.0%%)
Healthcare worker, N (%)	24 (9.8%%)	17 (8.8%%)	7 (13.0%%)
APACHE-II on day 1, median (IQR)	14.0 (10.0 - 18.0)	14.0 (10.0 - 18.0)	15.0 (12.5 - 17.0)
BMI at admission, median (IQR)	29.2 (24.8 - 33.2)	28.8 (24.5 - 32.3)	31.0 (26.6 - 35.7)
BMI group, N (%)			
Underweight	3 (1.1%)	3 (1.5%)	0 (0.0%)
Normal weight	58 (21.6%)	52 (25.7%)	6 (9.0%)
Overweight	62 (23.0%)	50 (24.8%)	12 (17.9%)
Obese - Class I	56 (20.8%)	45 (22.3%)	11 (16.4%)
Obese - Class II	29 (10.8%)	22 (10.9%)	7 (10.4%)
Obese - Class III	19 (7.1%)	14 (6.9%)	5 (7.5%)
Not state	42 (15.6%)	16 (7.9%)	26 (38.8%)
Notes: IQR is the interquartile range presented at the 25th and 75th percentiles. BMI is calculated for all aged 18 years and over.			

Figure 4. Age and sex distribution according to the phase – Confirmed COVID-19

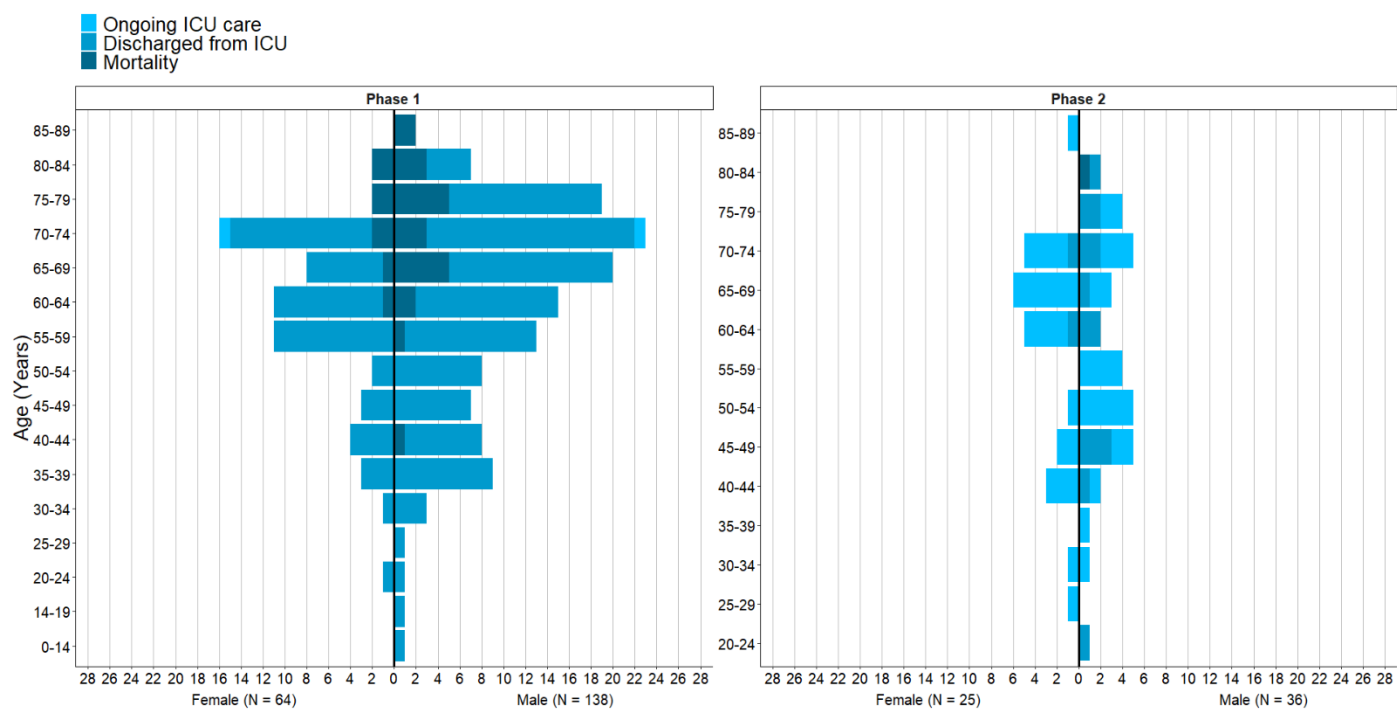
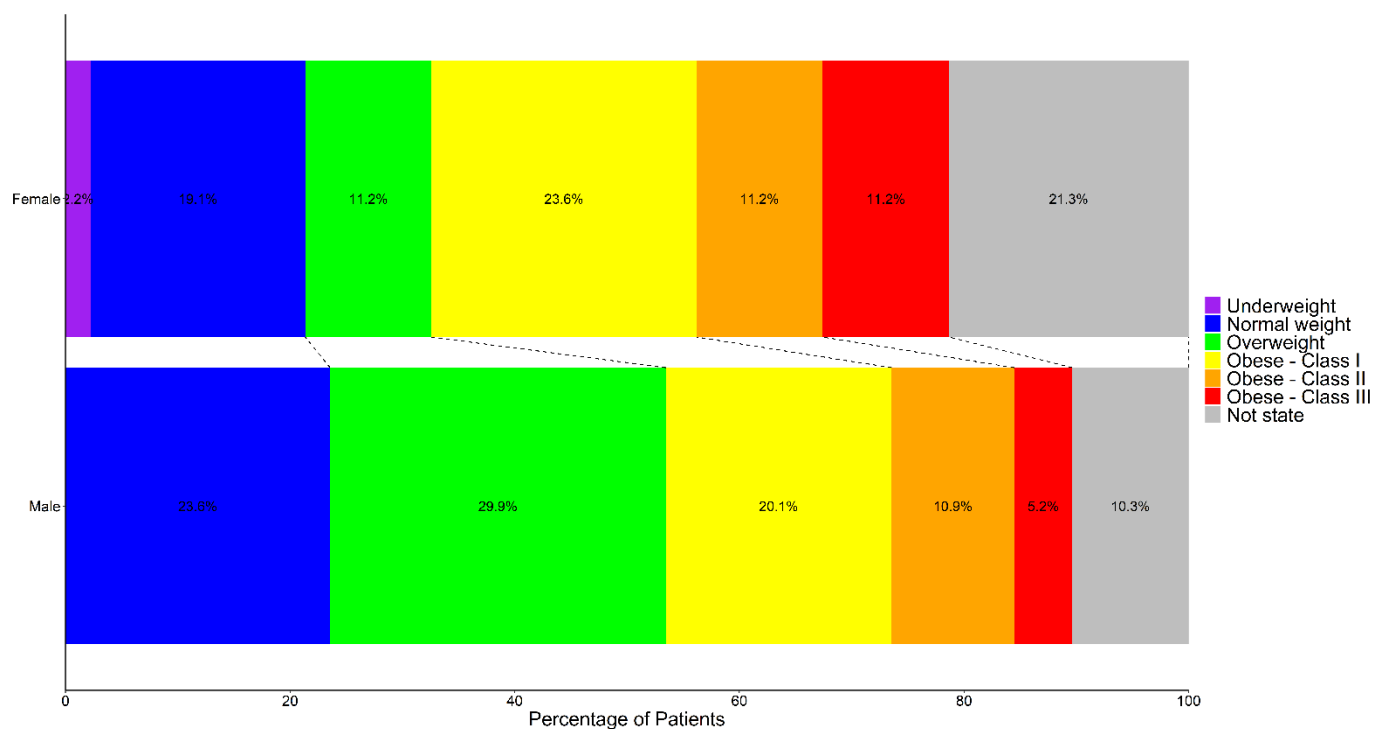


Figure 5. BMI and sex distribution – Confirmed COVID-19



Comorbidities

The prevalence of reported comorbidities is summarised in Figures 6 and 7 for ICU admission with confirmed COVID-19.

Figure 6. Prevalence of comorbidities reported for admitted Confirmed COVID-19

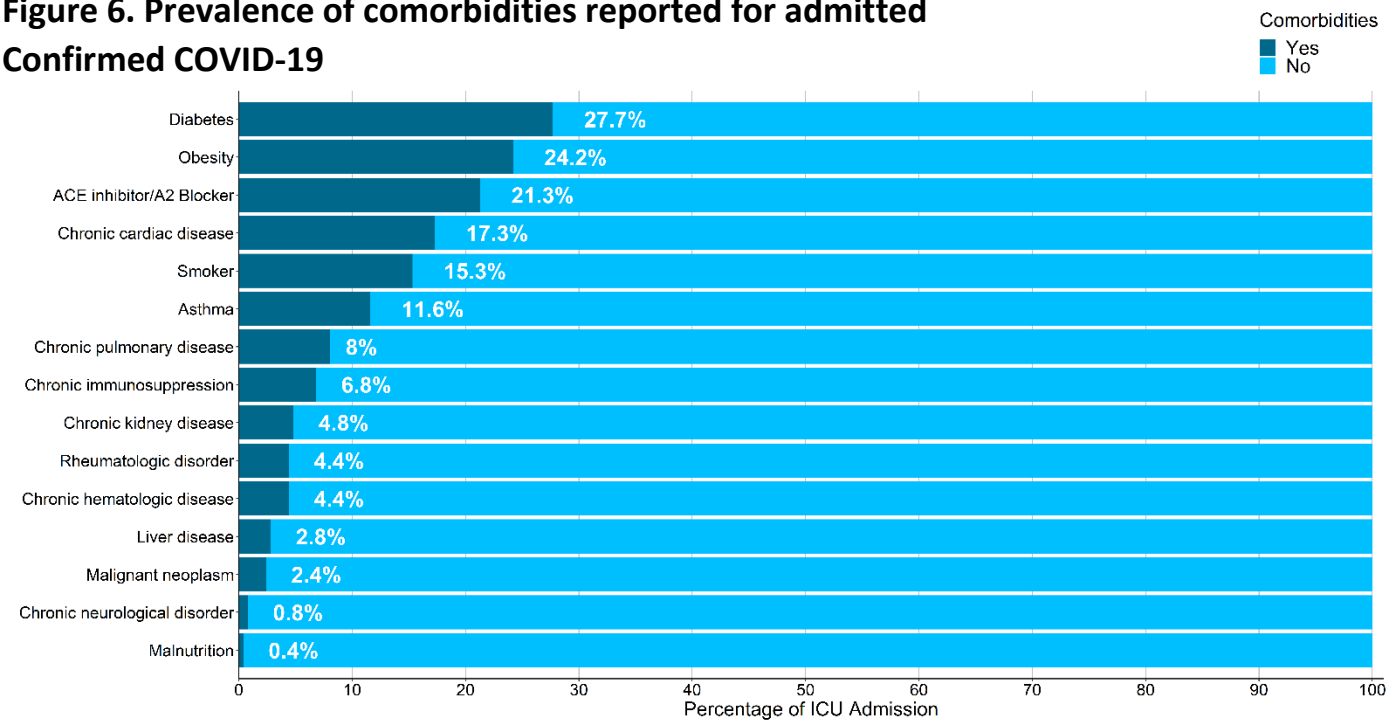
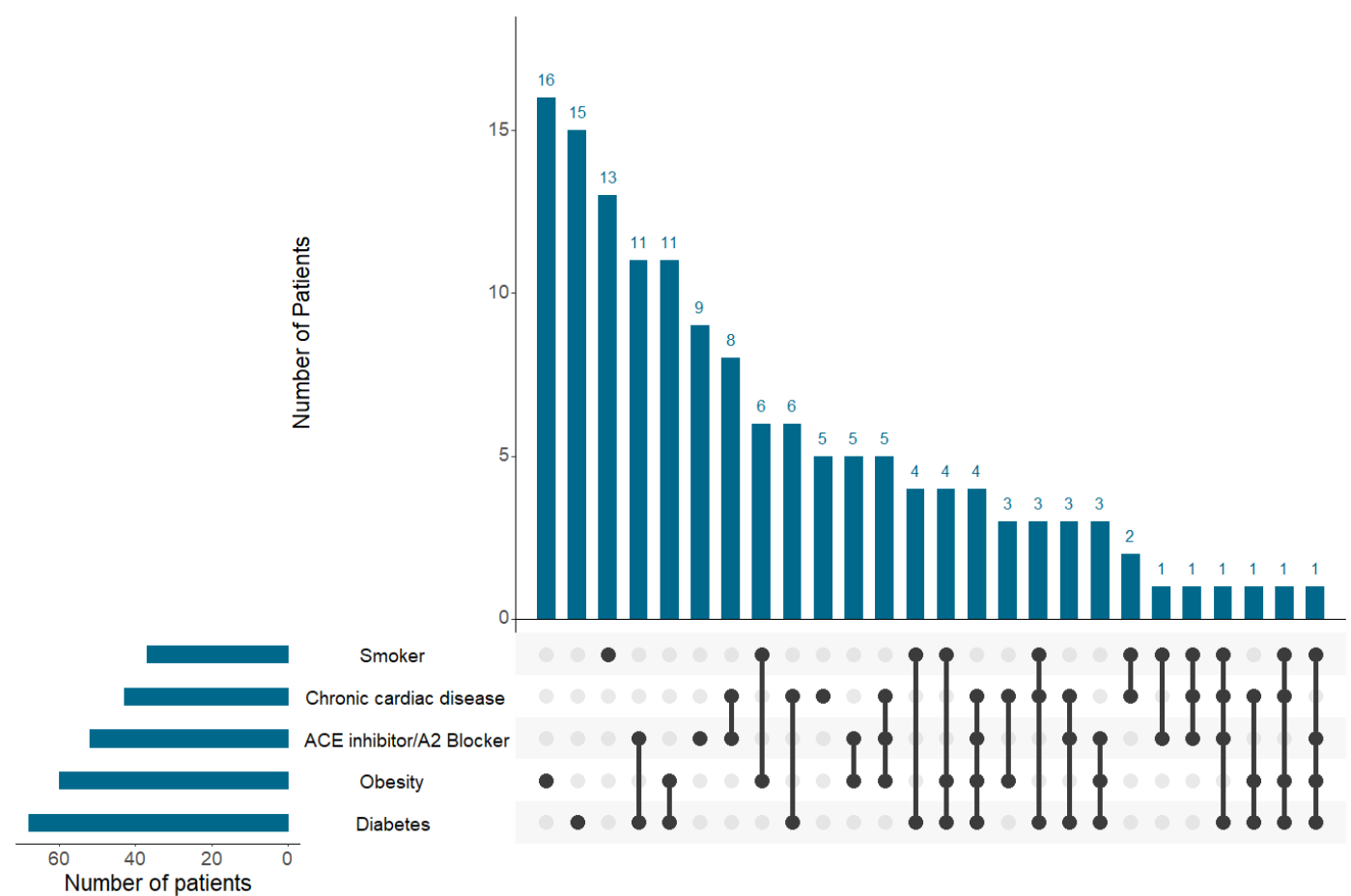


Figure 7. Distribution of common combinations of reported comorbidities – Confirmed COVID-19



Symptoms

The prevalence of symptoms reported at hospital presentation is summarised in Figures 8 and 9 for confirmed COVID-19 admissions.

Figure 8. Prevalence of symptoms reported at hospital presentation – Confirmed COVID-19

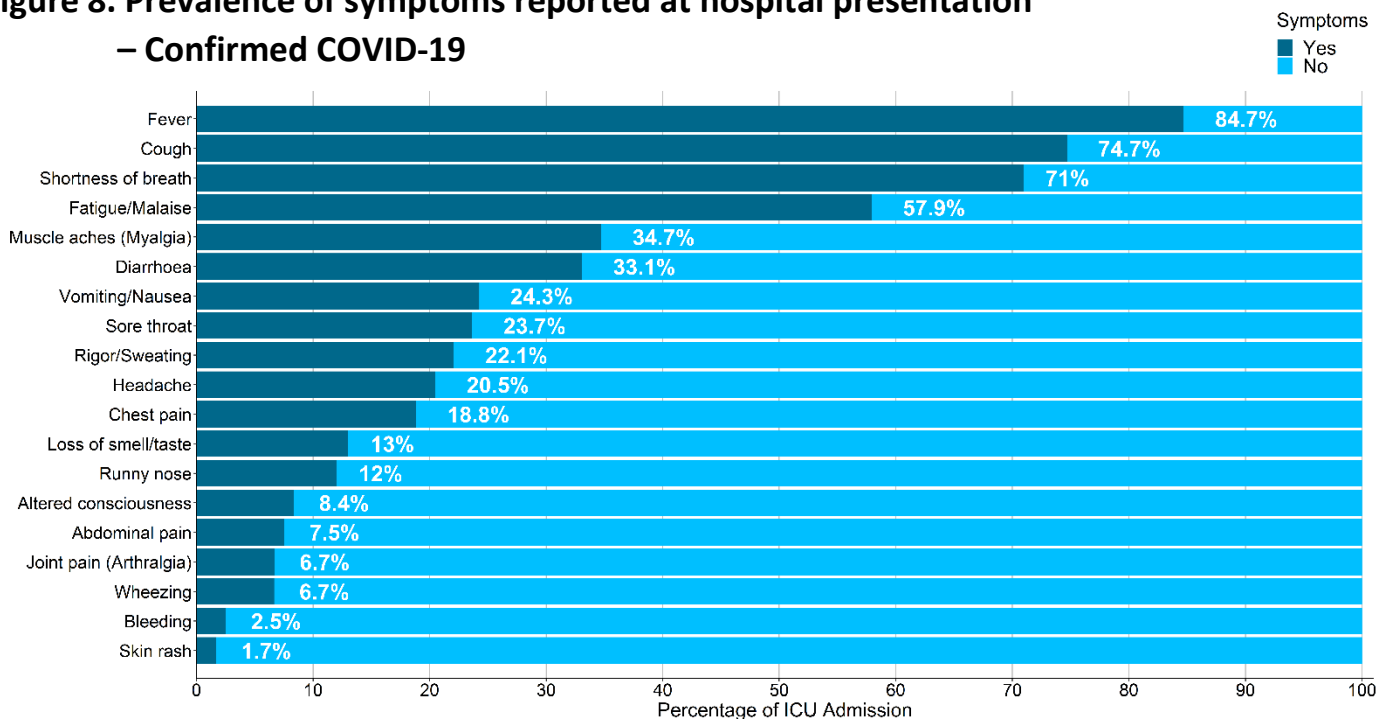
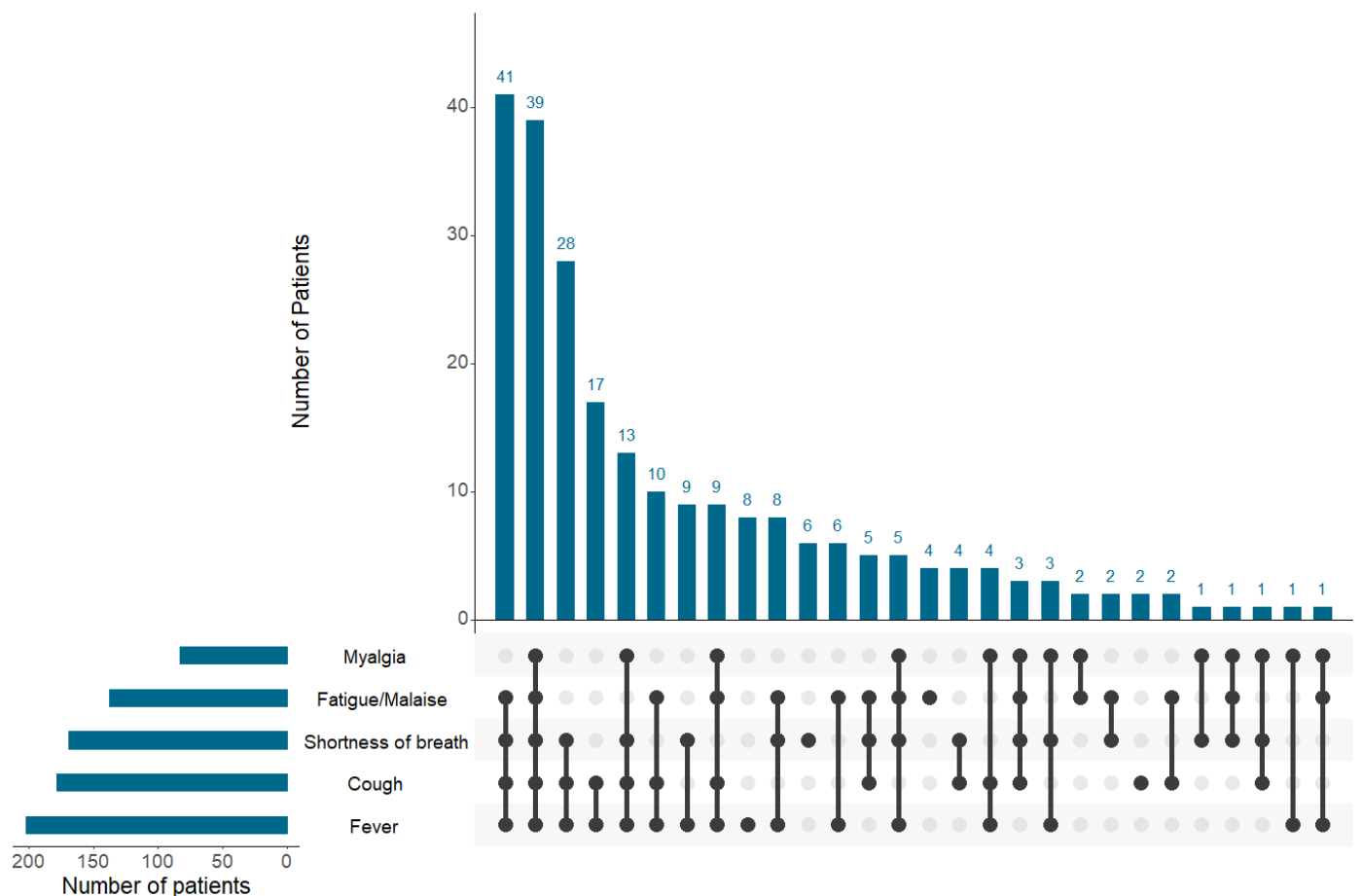


Figure 9. Distribution of common combinations of reported symptoms – Confirmed COVID-19



Treatments

The treatments received by patients at any time during ICU admission are presented in Figures 10 and 11 for ICU admissions with confirmed COVID-19.

Figure 10. Treatment reported at any time during ICU admission – Confirmed COVID-19

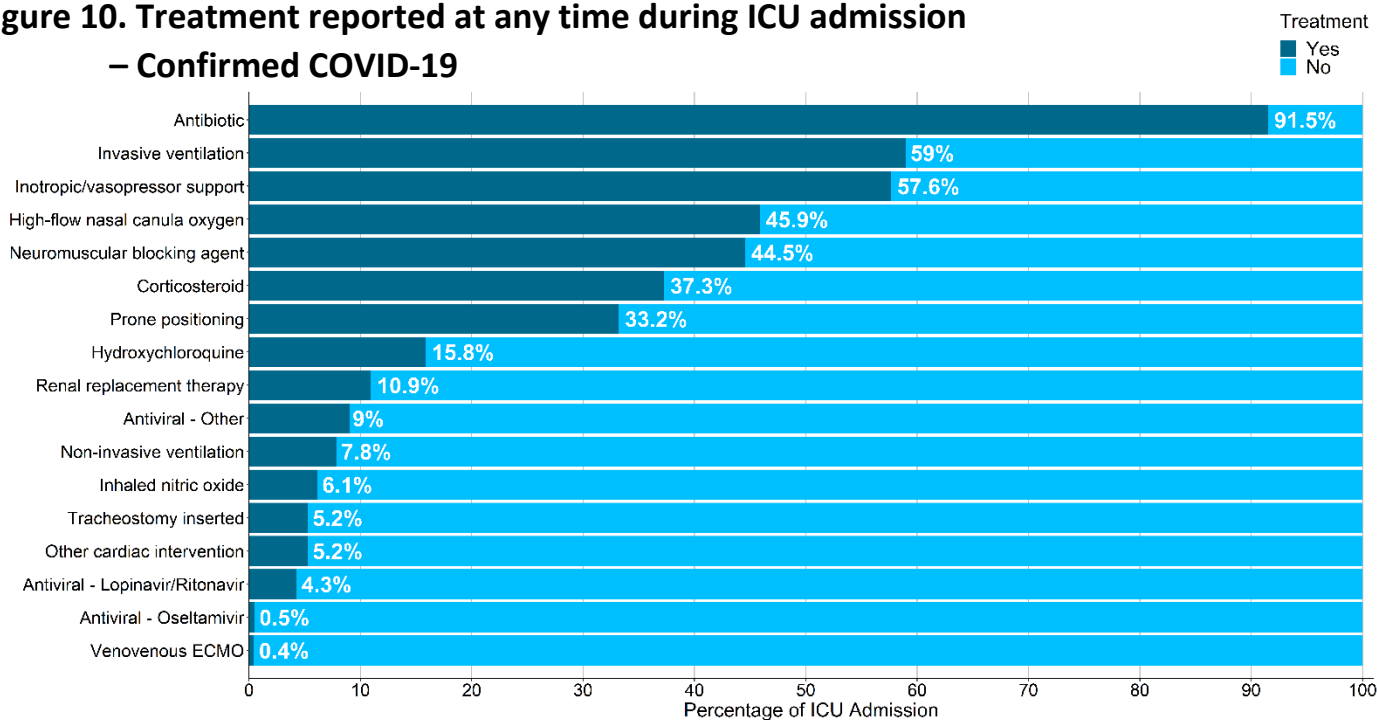
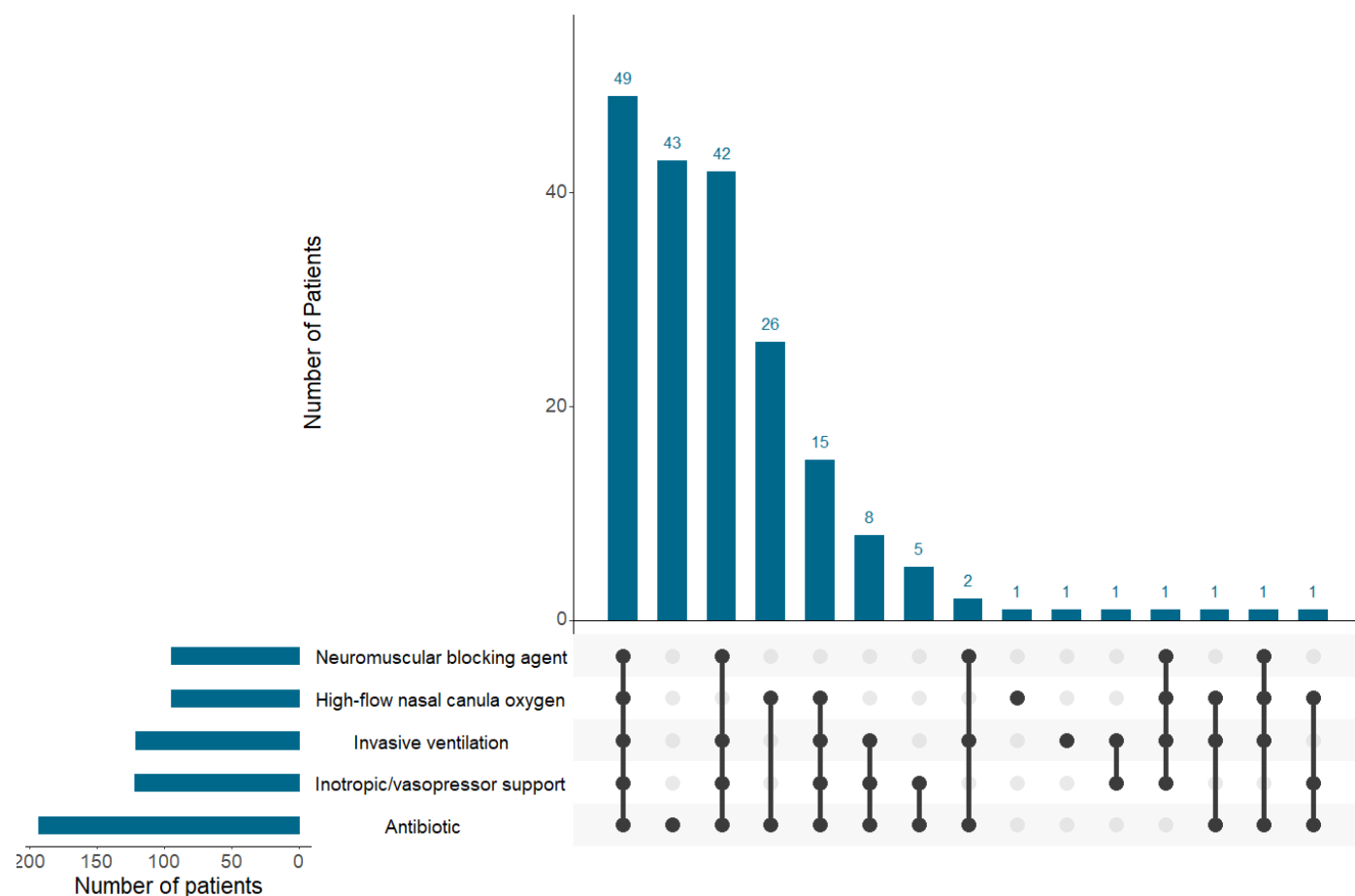


Figure 11. Distribution of combinations of the most common treatments – Confirmed COVID-19



Daily Follow-up

The SPRINT-SARI database records daily follow-up data for patients during their stay in ICU. The nursing-to-patient ratio for confirmed COVID-19 patients was 1:1 for 87.7% of patients in ICU on any given day. The daily treatments received by confirmed COVID-19 patients during their stay in ICU are presented in Figure 12. Figure 13 and 14 respectively show the average worst daily PaO₂ : FiO₂ ratio and average daily lactate observed in confirmed COVID-19 patients during their stay in ICU.

Figure 12. Daily treatment while in ICU – Confirmed COVID-19

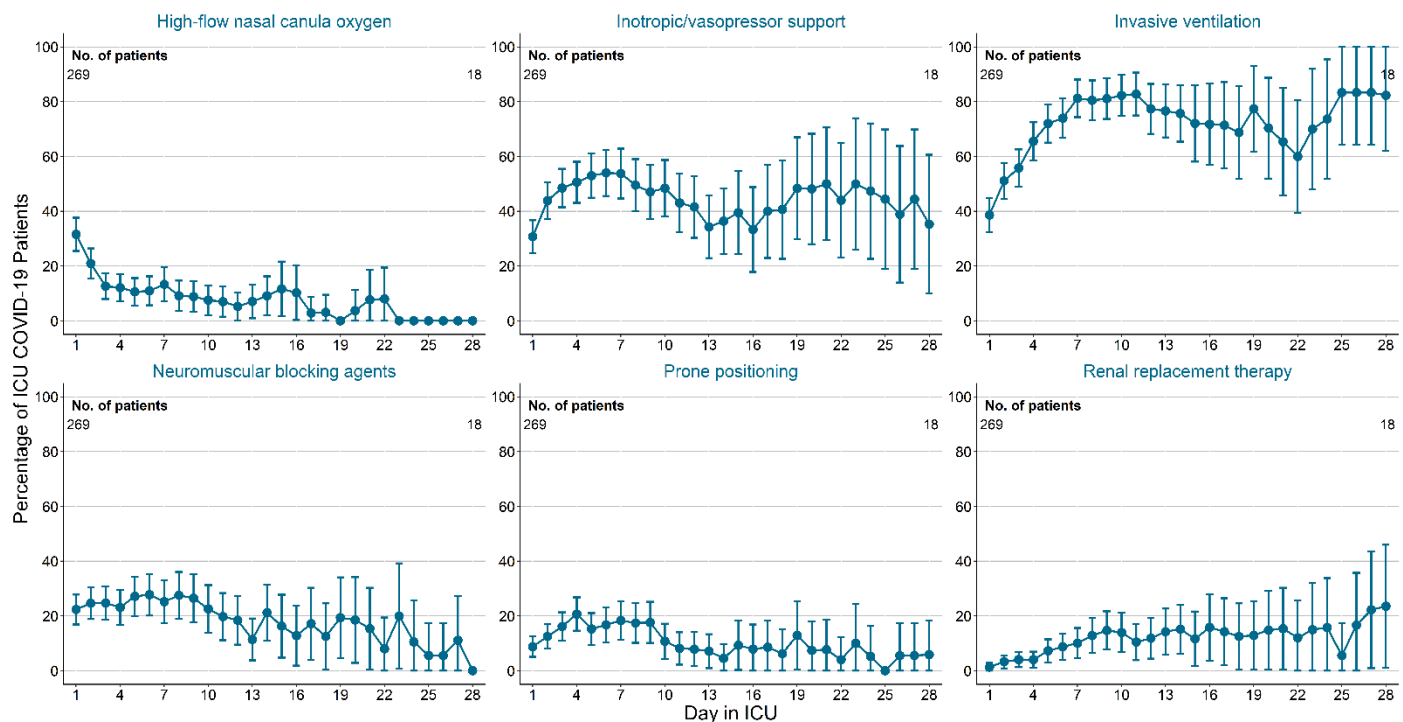


Figure 13. The worst daily PaO₂ / FiO₂ ratio while in ICU – Confirmed COVID-19

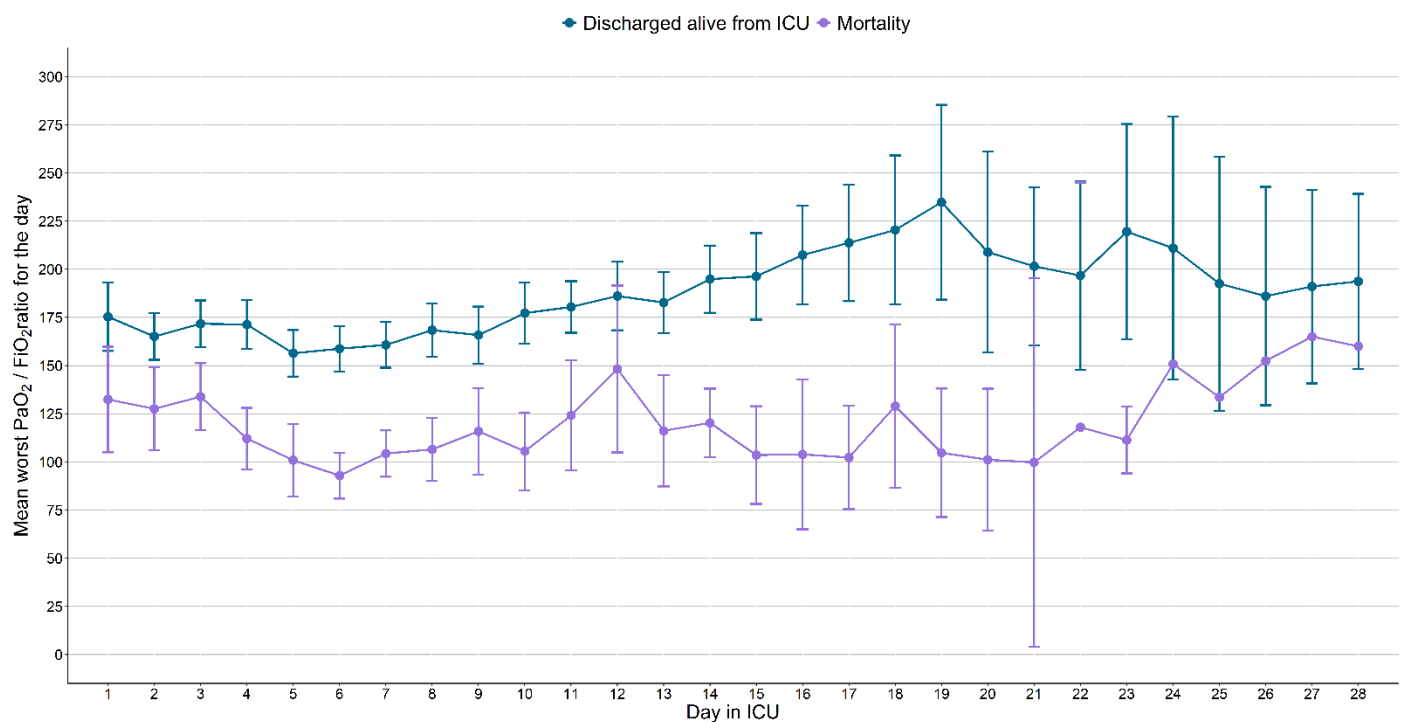
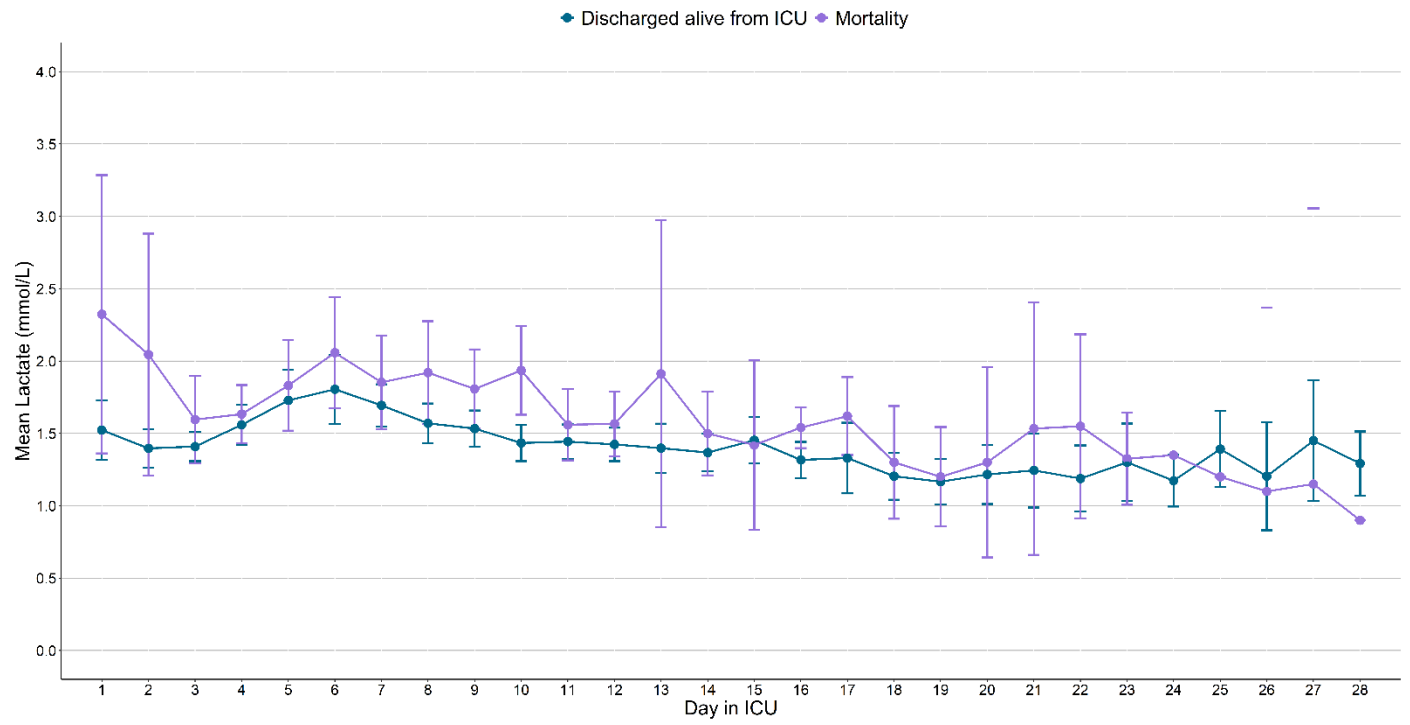


Figure 14. Daily lactate recorded while in ICU – Confirmed COVID-19



Outcomes

ICU and hospital outcomes are summarised in Tables 3 and 4 for ICU admission with confirmed COVID-19 and with completed outcome data. LOS in ICU for this cohort is provided in Figure 15 and LOS in hospital is provided in Figure 16.

Table 3. Patient outcomes – Confirmed COVID-19*

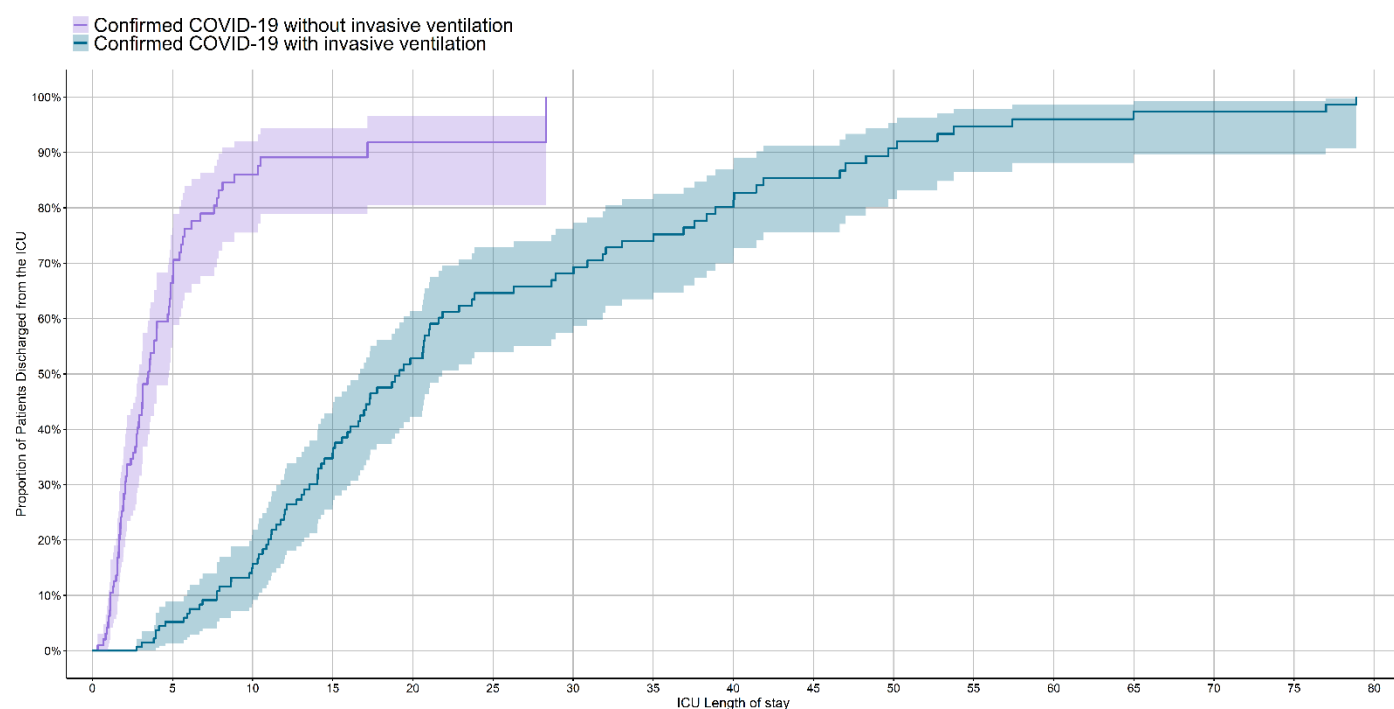
Outcomes	All Confirmed COVID-19	Confirmed COVID-19 WITH invasive ventilation	Confirmed COVID-19 WITHOUT invasive ventilation
N	269	141	98
Length of ICU stay (days)**			
Median (IQR)	7.8 (3.1 - 17.1)	15.0 (9.2 - 24.5)	2.9 (1.7 - 4.8)
Truncated at the date of extraction	7.8 (3.4 - 16.3)	14.5 (9.1 - 22.4)	3.1 (1.8 - 4.9)
Length of stay in hospital (days)**			
Median (IQR)	16.0 (8.1 - 27.1)	24.9 (13.9 - 39.1)	9.1 (5.3 - 14.5)
Truncated at the date of extraction	13.7 (7.8 - 25.5)	23.9 (12.1 - 39.0)	9.2 (5.5 - 14.8)
Patient status, N (%)			
Ongoing care in ICU	53 (19.7%)	16 (11.3%)	9 (9.2%)
Ongoing care in hospital ward	14 (5.2%)	11 (7.8%)	2 (2.0%)
Transfer to other hospital/facility	5 (1.9%)	4 (2.8%)	1 (1.0%)
Transfer to rehabilitation	23 (8.6%)	22 (15.6%)	1 (1.0%)
Discharged home	139 (51.7%)	59 (41.8%)	80 (81.6%)
Mortality - ICU	31 (11.5%)	27 (19.1%)	4 (4.1%)
Mortality - Ward	2 (0.7%)	1 (0.7%)	0 (0.0%)
Unknown	2 (0.7%)	1 (0.7%)	1 (1.0%)

Notes: This weekly report includes data from 57 sites.

* Data about mechanical ventilation is missing for 30 patients (28 still in the ICU, 1 still in the ward and 1 dead in the ward but without information about mechanical ventilation during hospital stay).

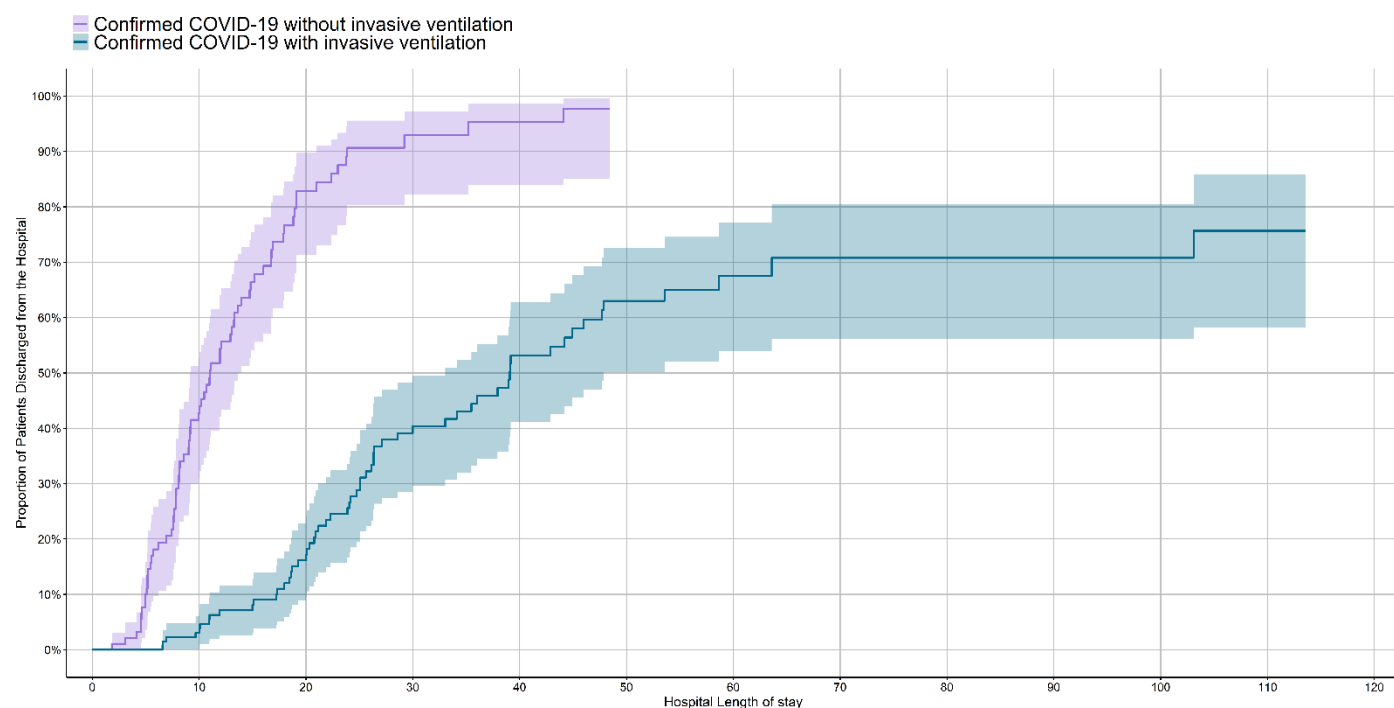
** ICU/hospital LOS is reported as the observed median time between ICU/hospital admission and discharge dates. The observed LOS is also only calculated for patients with both ICU/hospital admission and discharge dates recorded. IQR is the interquartile range presented as observed ICU/hospital LOS at the 25th and 75th percentiles. The Kaplan-Meier graphs in Figures 15 and 16 display median LOS for the entire sample, censoring at the date of data extraction for patients with discharge date not yet reported.

**Figure 15. Length of stay in ICU, with and without invasive ventilation
– Confirmed COVID-19**



Note: The difference between the length of stay from the figure and the table reflects the amount of censoring.

Figure 16. Length of stay in hospital, with and without invasive ventilation – Confirmed COVID-19



Note: The difference between the length of stay from the figure and the table reflects the amount of censoring.

Table 4. Patient characteristics, with and without invasive ventilation – Confirmed COVID-19

	Confirmed COVID-19 WITH invasive ventilation		Confirmed COVID-19 WITHOUT invasive ventilation	
	Discharged from ICU alive	Mortality in ICU	Discharged from ICU alive	Mortality in ICU
N	97	27	84	4
Age at admission, median (IQR)	65.0 (56.0 - 71.0)	73.0 (68.5 - 76.0)	59.5 (44.8 - 69.0)	80.5 (77.8 - 83.2)
Age group, N (%)				
0-9 years	1 (1.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
10-19 years	0 (0.0%)	0 (0.0%)	1 (1.2%)	0 (0.0%)
20-29 years	0 (0.0%)	0 (0.0%)	4 (4.8%)	0 (0.0%)
30-39 years	5 (5.2%)	0 (0.0%)	11 (13.1%)	0 (0.0%)
40-49 years	11 (11.3%)	1 (3.7%)	13 (15.5%)	0 (0.0%)
50-59 years	20 (20.6%)	1 (3.7%)	13 (15.5%)	0 (0.0%)
60-69 years	24 (24.7%)	9 (33.3%)	23 (27.4%)	0 (0.0%)
70-79 years	34 (35.1%)	10 (37.0%)	17 (20.2%)	2 (50.0%)
80-89 years	2 (2.1%)	6 (22.2%)	2 (2.4%)	2 (50.0%)
Sex, N (%)				
Male	68 (70.1%)	20 (74.1%)	58 (69.0%)	3 (75.0%)
Female	29 (29.9%)	7 (25.9%)	26 (31.0%)	1 (25.0%)
APACHE-II on day 1, median (IQR)	16.0 (14.0 - 19.0)	22.0 (16.0 - 27.5)	10.0 (6.0 - 13.0)	8.0 (7.5 - 12.5)
Treatments reported at any time during ICU, N (%)				
Antibiotic	86 (98.9%)	24 (92.3%)	69 (83.1%)	4 (100.0%)
Invasive ventilation	97 (100.0%)	27 (100.0%)	0 (0.0%)	0 (0.0%)
Inotropic/vasopressor support	87 (98.9%)	24 (92.3%)	5 (6.0%)	1 (25.0%)
Neuromuscular blocking agent	70 (79.5%)	21 (80.8%)	0 (0.0%)	0 (0.0%)
High-flow nasal canula oxygen	50 (56.8%)	11 (42.3%)	24 (28.6%)	2 (50.0%)
Corticosteroid	41 (47.1%)	14 (53.8%)	12 (14.5%)	1 (25.0%)
Prone positioning	37 (42.0%)	17 (65.4%)	8 (9.5%)	0 (0.0%)
Hydroxychloroquine	16 (19.5%)	6 (23.1%)	10 (12.2%)	0 (0.0%)
Renal replacement therapy	15 (17.0%)	8 (30.8%)	1 (1.2%)	0 (0.0%)
Non-invasive ventilation	11 (12.4%)	1 (3.8%)	2 (2.4%)	1 (25.0%)
Other cardiac intervention	8 (9.1%)	3 (11.5%)	1 (1.2%)	0 (0.0%)
Tracheostomy inserted	11 (12.5%)	1 (3.8%)	0 (0.0%)	0 (0.0%)
Inhaled nitric oxide	6 (6.8%)	6 (23.1%)	0 (0.0%)	0 (0.0%)
Antiviral - Oseltamivir	1 (1.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Antiviral - Lopinavir/Ritonavir	6 (7.0%)	0 (0.0%)	2 (2.4%)	1 (25.0%)
Antiviral - Other	7 (8.1%)	0 (0.0%)	5 (6.0%)	0 (0.0%)
Venovenous ECMO	1 (1.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)

Notes: This weekly report includes data from 57 sites.

IQR is the interquartile range presented as age at the 25th and 75th percentiles.

Background

In response to the COVID-19 pandemic, the Australian and New Zealand Intensive Care Society Clinical Trials Group (ANZICS-CTG), the Australian and New Zealand Intensive Care Research Center (ANZIC-RC), Monash University, and with international collaborators in Oxford, launched the SPRINT-SARI database.

The goal of SPRINT-SARI was to provide near real time, detailed reporting of the sickest patients admitted to the ICU with confirmed or suspected COVID-19 infection. This data will be used to inform the ongoing clinical management of such patients and the public health response.

Methods

Participating sites across Australia were identified following an expression of interest to ANZICS-CTG affiliated sites, or through previous affiliation with the SPRINT SARI AUS team. The ANZICS-CTG is a well-established research network with highly experienced research coordinators familiar with conducting high quality research studies.

The case report form (CRF) had extensive development by local and international clinical experts, and includes standardized data fields that align with our international SPRINT-SARI collaborators.

Data in this report was entered by the research coordinator at the participating site. The patients relevant background and presenting symptoms were recorded on the day of study recruitment. Daily follow-up was then completed until discharge from ICU. A final form was completed with details of the hospital outcomes.

To support the rapid institution of data collection and reporting, SPRINT-SARI AUS hosts a data platform that includes an electronic data capture system, a secure repository and an analytic framework. Data are entered to a web-based REDCap data management system, securely stored, and used to inform regular reports as above. All analysis was performed by the Monash University team using Stata version 16 (Stata Corp, College Station, Tx, USA) and R statistical software (R Core Team, 2019).

Descriptive statistics and bar graphs were reported in this report to summarise patient demographics and clinical characteristics for confirmed COVID-19 patients. Continuous variables have been reported with the mean and standard deviation (SD) or median and interquartile range (IQR) and frequencies and percentages have been presented for categorical variables. Phase 1 included admissions occurring earlier than July 1st, 2020 and phase 2 admission occurring on July 1st, 2020 and after.

In some instances, categories are collapsed due to small numbers and with appropriate clinical input. Length of stay (LOS) in ICU/hospital has been reported as the observed median time from ICU/hospital admission date to ICU/hospital discharge date and the IQR is also presented as observed LOS in ICU/hospital at the 25th and 75th percentiles. LOS in ICU/hospital has also been graphically summarised using the Kaplan-Meier survival curve with patients censored at the date of data extraction (23 July 2020) for patients with a date of discharge from ICU/hospital not yet reported.

Acknowledgements

Participating sites

ACT	Canberra Hospital*	SA	Royal Adelaide Hospital*
NSW	Bankstown-Lidcombe Hospital	SA	The Queen Elizabeth Hospital
NSW	Calvary Mater Newcastle	SA	Wakefield Hospital
NSW	Campbelltown Hospital*	TAS	Launceston Hospital*
NSW	Children's Hospital at Westmead*	TAS	Royal Hobart Hospital*
NSW	Concord Hospital*	VIC	Albury Wodonga Health
NSW	John Hunter Hospital*	VIC	Angliss Hospital
NSW	Liverpool Hospital*	VIC	Austin Hospital*
NSW	Nepean Hospital*	VIC	Ballarat Base Hospital*
NSW	Prince of Wales Hospital	VIC	Barwon Health*
NSW	Royal North Shore Hospital*	VIC	Bendigo Hospital*
NSW	Royal Prince Alfred Hospital*	VIC	Box Hill Hospital*
NSW	St George Hospital*	VIC	Cabrini Hospital*
NSW	St Vincent's Hospital Sydney*	VIC	Dandenong Hospital*
NSW	Westmead Hospital*	VIC	Epworth Richmond*
NSW	Wollongong Hospital*	VIC	Footscray Hospital*
NSW	Sydney Children's Hospital, Randwick*	VIC	Frankston Hospital*
NT	Alice Springs Hospital	VIC	Maroondah Hospital*
NT	Royal Darwin Hospital*	VIC	Mildura Base Hospital
QLD	Bundaberg Hospital*	VIC	Monash Children's Hospital*
QLD	Caboolture Hospital*	VIC	Monash Medical Centre*
QLD	Cairns Hospital	VIC	Northeast Health Wangaratta
QLD	Gold Coast Hospital*	VIC	Royal Children's Hospital*
QLD	Hervey Bay Hospital*	VIC	Royal Melbourne Hospital*
QLD	Ipswich Hospital*	VIC	St Vincent's Hospital Melbourne*
QLD	Logan Hospital*	VIC	Sunshine Hospital*
QLD	Mater Misericordiae Limited	VIC	The Alfred Hospital*
QLD	Princess Alexandra Hospital*	VIC	The Northern Hospital*
QLD	Queensland Children's Hospital	VIC	Werribee Mercy Hospital*
QLD	Redcliffe Hospital*	WA	Bunbury Hospital
QLD	Royal Brisbane and Women's Hospital	WA	Fiona Stanley Hospital*
QLD	Sunshine Coast University Hospital (ICU and PCCU)*	WA	Joondalup Health Campus*
QLD	The Prince Charles Hospital*	WA	Perth Children's Hospital*
QLD	Toowoomba Hospital	WA	Rockingham General Hospital*
SA	Adelaide Women's and Children's Hospital	WA	Royal Perth Hospital*
SA	Ashford Community Hospital	WA	Sir Charles Gairdner Hospital*
SA	Flinders Medical Centre*	WA	St John of God Midland*
SA	Flinders Private Hospital	WA	St John of God Murdoch
SA	Lyell McEwin		

Notes: All sites have Ethics approval either under NMA (The Alfred Hospital) or local HREC authority. All sites have governance authority to enter data either through jurisdictional Enhanced Surveillance or through local governance approval.

**The site contributed data during this reporting period.*

Statistical analysis and reporting team

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