



Online Appendix

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Appendix to: Burrell AJC, Serpa Neto A, Broadley T, et al. Comparison of baseline characteristics, treatment and clinical outcomes of critically ill COVID-19 patients admitted in the first and second waves in Australia. *Crit Care Resusc* 2021; 23: 308-19. <https://doi.org/10.51893/2021.3.OA8>

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ADDITIONAL METHODS

Roadmap of restrictions in Australia

The following restrictions were applied in Australia (available in https://www1.health.gov.au/internet/main/publishing.nsf/Content/novel_coronavirus_2019_ncov_weekly_epidemiology_reports_australia_2020.htm):

1. **25 January 2020**: First confirmed COVID-19 case reported in Australia;
2. **01 February 2020**: Travel restrictions on foreign travelers coming from mainland China implemented;
3. **05 February 2020**: Limited local transmission within a cluster first reported in Australia;
4. **01 March 2020**: First COVID-19 death reported in Australia and travel restrictions on foreign travelers coming from Islamic Republic of Iran implemented;
5. **05 March 2020**: Restrictions on travelers from Republic of Korea;
6. **08 March 2020**: Recommended restrictions on COVID-19 contacts and travelers from listed higher risk countries;
7. **11 March 2020**: Restrictions on travelers from Italy;
8. **15 March 2020**: All overseas arrivals required to self-quarantine for 14 days and cruise ship arrivals banned;
9. **16 March 2020**: Non-essential static gatherings of >500 people banned;
10. **18 March 2020**: Restrictions on indoor gatherings;
11. **20 March 2020**: Travel ban on foreign nationals entering Australia and restriction on travel to remote communities (borders closed);
12. **21 March 2020**: Select states and territories close borders to non-essential travel;

- 13.23 **March 2020**: Scale up of social distancing measures (stage 1 lockdown);
- 14.25 **March 2020**: Scale up of social distancing measures (stage 2 lockdown);
- 15.28 **March 2020**: All people entering Australia required to undertake a mandatory 14-day quarantine at designated facilities (e.g. hotels) in their port of arrival;
- 16.29 **March 2020**: Public gatherings limited to two persons (stage 3 lockdown);
- 17.27 **April 2020**: Start of easing restrictions in selected states and territories;
- 18.08 **May 2020**: Government announced three-step plan to ease COVID-19 restrictions (implementation to vary in states and territories);
- 19.05 **June 2020**: Western Australia and Northern Territory commenced step 3 easing of restrictions;
- 20.01 **July 2020**: Victoria implements lockdowns on 'hotspot' suburbs and State of Emergency;
- 21.08 **July 2020**: New South Wales and Victoria border closes, and stage 3 lockdown of Melbourne and Mitchell Shire;
- 22.19 **July 2020**: Use of masks is compulsory in Victoria;
- 23.02 **August 2020**: Stage 4 restrictions for metropolitan Melbourne and stage 3 restrictions for regional Victoria and State of Disaster declared in Victoria;
- 24.13 **September 2020**: Victoria commenced easing of restrictions against the 'roadmap to reopening';

25. 16 October 2020: Select states and territories commence opening for quarantine free travel from New Zealand; and

26. 18 October 2020: Further easing of restrictions in Victoria.

Definition of stage lockdowns

Stage 3 lockdown

1. Stay at home order (leave only for shopping food or essential items, medical care and caregiving, work and study [if you can't do from home] and exercise [but don't leave or enter restricted areas]);
2. No private visitors and public gathering of up to 2 people only;
3. Work from home;
4. Remote learning;
5. Community sport, indoor sport, swimming pools, playcenters and playgrounds closed;
6. Restaurants, bars and pubs for take away and delivery only;
7. Saunas and personal care services closed;
8. Weddings up to 5 people and funerals up to 10 people;
9. Galleries, cinemas, concert venues, libraries, museums, casinos and stadiums closed.

Stage 4 lockdown

In addition to the points described above for the stage 3 lockdown:

1. Curfew from 8PM to 5AM;
2. Night Network suspended and public transport services reduced during curfew hours;

3. Outdoor exercise limited to 1 hour per day and no more than 5 kilometers from your home;
4. Shopping limited to one person per household per day and limited to 5 kilometers;

Reduction in workforce of industries, markets and companies.

eTable 1 - Number of sites contributing data and patients with confirmed coronavirus disease 2019 (COVID-19) according to state

State / Territory	Contributing Data	Confirmed COVID-19		
		All	First Wave	Second Wave
New South Wales	12	120	94	26
Victoria	21	271	43	228
Queensland	9	18	17	1
Western Australia	6	29	29	0
Southern Australia	1	18	18	0
Tasmania	2	2	2	0
Northern Australia	1	1	1	0
ACT	1	2	2	0
Total	53	461	206	255

eTable 2 - Vital signs and laboratory test at intensive care unit admission according to the phase of inclusion

	First wave (n = 206)	Second wave (n = 255)	Absolute Difference (95% CI) ^a	p value
Signs				
Glasgow coma scale	15.0 (13.0 - 15.0)	15.0 (6.0 - 15.0)	0.22 (-0.78 to 1.22)	0.667
Mean arterial pressure, mmHg	70.0 (64.0 - 85.0)	75.0 (67.0 - 87.8)	4.41 (0.85 to 7.98)	0.015
Urine output, mL	802.5 (300.0 - 1341.2)	900.0 (465.0 - 1517.5)	95.10 (-146.35 to 336.55)	0.440
Fluid balance, mL	161.0 (-199.5 - 919.0)	237.5 (-336.2 - 691.2)	76.45 (-163.15 to 316.04)	0.531
Laboratory tests				
pH	7.42 (7.36 - 7.47)	7.42 (7.37 - 7.46)	0.01 (-0.01 to 0.03)	0.351
PaO ₂ , mmHg	70.0 (58.2 - 85.0)	65.1 (56.8 - 78.2)	-4.98 (-10.01 to 0.04)	0.052
FiO ₂	0.50 (0.30 - 0.60)	0.50 (0.32 - 0.64)	-0.02 (-0.09 to 0.06)	0.689
PaO ₂ / FiO ₂	137.5 (99.0 - 205.7)	133.3 (94.8 - 191.4)	-4.67 (-21.09 to 11.76)	0.577
PaCO ₂ , mmHg	37.0 (33.0 - 45.0)	37.0 (33.0 - 43.0)	-0.44 (-2.61 to 1.73)	0.692
SpO ₂ , %	94.0 (91.0 - 96.0)	93.0 (91.0 - 95.0)	-0.64 (-2.09 to 0.81)	0.388
Bicarbonate, mmol/L	24.0 (22.0 - 27.0)	24.0 (21.1 - 26.0)	-0.23 (-1.53 to 1.06)	0.724
Lymphocyte count, 10 ⁹ /L	0.85 (0.60 - 1.24)	0.70 (0.50 - 0.90)	-0.19 (-0.34 to -0.04)	0.015
Lactate, mmol/L	1.3 (1.0 - 1.7)	1.5 (1.1 - 2.2)	0.12 (-0.08 to 0.31)	0.237
Creatinine, μmol/L	78.0 (64.0 - 114.8)	74.0 (56.0 - 97.0)	-4.62 (-13.91 to 4.67)	0.329
C-reactive protein, mg/dL	132.0 (81.9 - 209.9)	122.0 (64.5 - 167.8)	-13.17 (-39.41 to 13.07)	0.325

Data are median (quartile 25% - quartile 75%) or No (%). Percentages may not total 100 because of rounding.

^a absolute difference is median difference. First wave was used as reference (negative values represent decrease in second wave)

eTable 3 - Clinical outcomes in the included patients (adjusted analyses)

	First wave (n = 206)	Second wave (n = 255)	Absolute Difference (95% CI)^a	p value
Duration of ventilation, days	12.0 (7.0 - 14.0)	8.0 (4.0 - 17.0)	-3.52 (-6.50 to -0.53)	0.021
ICU length of stay, days	8.1 (3.1 - 18.7)	5.9 (2.4 - 11.1)	1.55 (1.25 to 1.93) ^b	< 0.001
Truncated at extraction, days	8.4 (3.2 - 18.7)	6.0 (2.4 - 12.2)		
Hospital length of stay, days	17.3 (8.9 - 30.5)	14.2 (8.6 - 21.1)	1.43 (1.13 to 1.79) ^b	0.002
Truncated at extraction, days	17.6 (9.0 - 32.4)	14.7 (8.9 - 23.0)		
ICU mortality	30 (14.6)	27 (10.6)	-4.56 (-10.79 to 1.67)	0.156
Hospital mortality	30 (14.6)	31 (12.2)	-2.93 (-9.34 to 3.48)	0.373

Data are median (quartile 25% - quartile 75%) or No (%). Percentages may not total 100 because of rounding.

ICU: *intensive care unit*

All models adjusted by APACHE II and considering the center as random effect

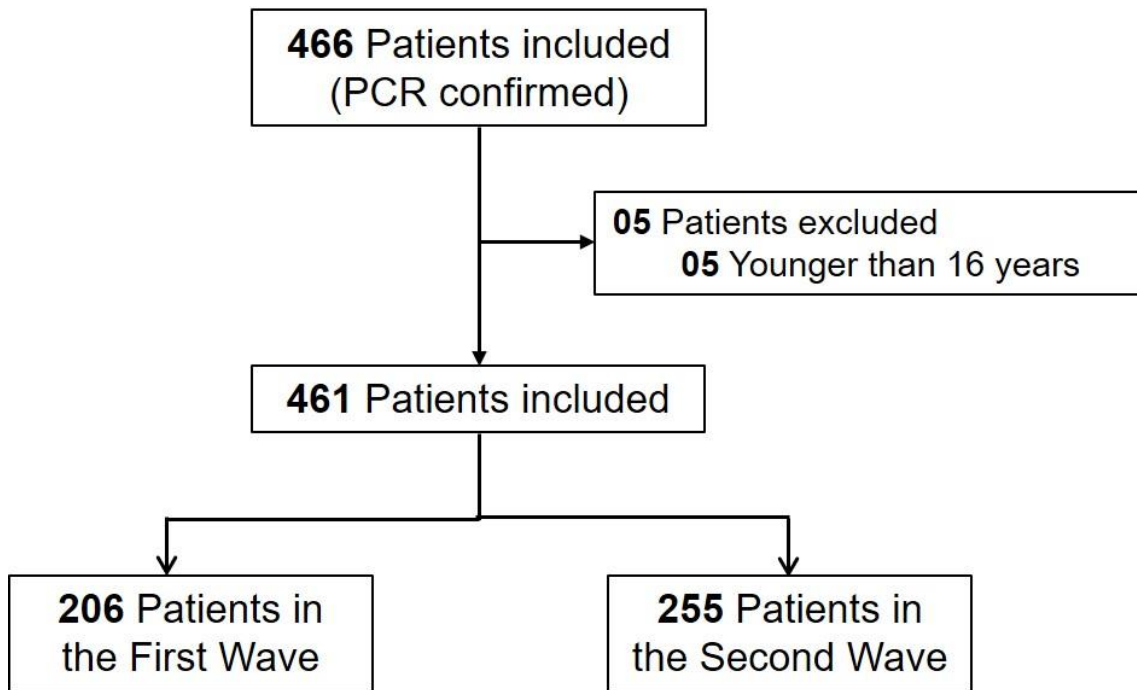
^a absolute difference is risk difference for categorical variables and median difference for continuous variables. First wave was used as reference (negative values represent decrease in second wave).

^b subdistribution hazard ratio from a Fine-Gray competing risk model

eTable 4 - Rate of missing data			
	Total (n = 461)	First wave (n = 206)	Second wave (n = 255)
Age	0 (0)	0 (0)	0 (0)
Gender	0 (0)	0 (0)	0 (0)
APACHE II	28 (6.1)	2 (1)	26 (10.2)
Days symptoms - hospital admission	32 (6.9)	11 (5.3)	21 (8.2)
Days symptoms - ICU admission	32 (6.9)	11 (5.3)	21 (8.2)
Body mass index	62 (13.4)	16 (7.8)	46 (18)
Healthcare worker	26 (5.6)	10 (4.9)	16 (6.3)
Number of comorbidities	0 (0)	0 (0)	0 (0)
Diabetes	19 (4.1)	0 (0)	19 (7.5)
Obesity	20 (4.3)	0 (0)	20 (7.8)
Use of ACEi or ARB	20 (4.3)	1 (0.5)	19 (7.5)
Chronic cardiac failure	19 (4.1)	0 (0)	19 (7.5)
Smoker	21 (4.6)	0 (0)	21 (8.2)
Chronic pulmonary disease*	19 (4.1)	0 (0)	19 (7.5)
Asthma	19 (4.1)	0 (0)	19 (7.5)
Immunosuppression	19 (4.1)	0 (0)	19 (7.5)
Chronic kidney disease	19 (4.1)	0 (0)	19 (7.5)
Chronic hematological disease	19 (4.1)	0 (0)	19 (7.5)
Cancer	19 (4.1)	0 (0)	19 (7.5)
Fever	29 (6.3)	10 (4.9)	19 (7.5)
Cough	29 (6.3)	10 (4.9)	19 (7.5)
Shortness of breath	29 (6.3)	10 (4.9)	19 (7.5)
Fatigue	29 (6.3)	10 (4.9)	19 (7.5)
Myalgia	30 (6.5)	10 (4.9)	20 (7.8)
Diarrhea	31 (6.7)	11 (5.3)	20 (7.8)
Sore throat	29 (6.3)	10 (4.9)	19 (7.5)
Anosmia	31 (6.7)	11 (5.3)	20 (7.8)
Runny nose	29 (6.3)	10 (4.9)	19 (7.5)
Heart rate	32 (6.9)	10 (4.9)	22 (8.6)
Respiratory rate	40 (8.7)	11 (5.3)	29 (11.4)
Mean arterial pressure	31 (6.7)	11 (5.3)	20 (7.8)
Temperature	33 (7.2)	11 (5.3)	22 (8.6)
SpO ₂	47 (10.2)	11 (5.3)	36 (14.1)
Antibiotics	31 (6.7)	11 (5.3)	20 (7.8)
Invasive ventilation	14 (3)	0 (0)	14 (5.5)
Inotropic or vasopressor	35 (7.6)	10 (4.9)	25 (9.8)
Neuromuscular blocking agent	33 (7.2)	10 (4.9)	23 (9)
High-flow nasal cannula	31 (6.7)	10 (4.9)	21 (8.2)

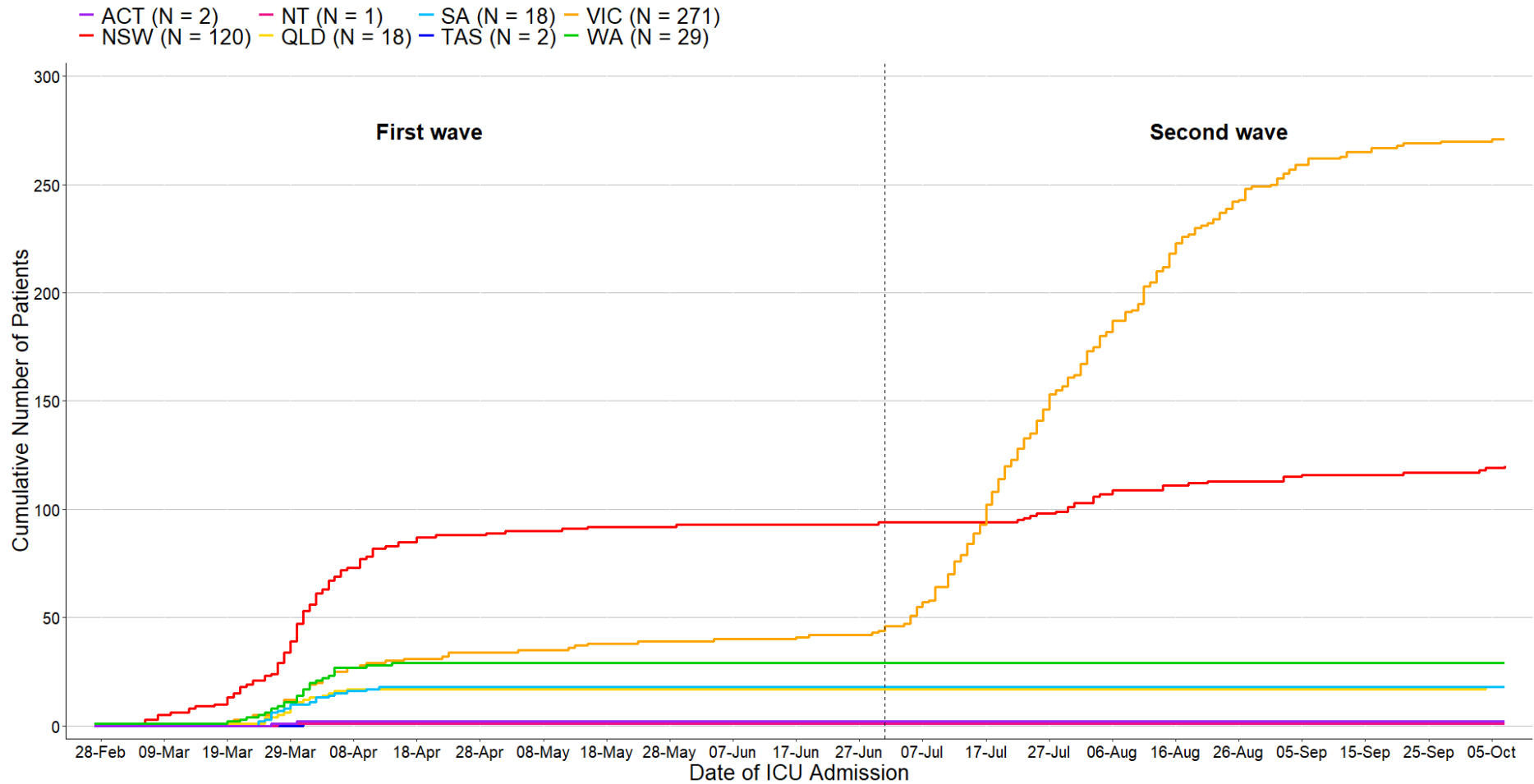
eTable 4 - Rate of missing data			
	Total (n = 461)	First wave (n = 206)	Second wave (n = 255)
Steroids	25 (5.4)	11 (5.3)	14 (5.5)
Prone positioning	34 (7.4)	10 (4.9)	24 (9.4)
Hydroxichloroquine	30 (6.5)	13 (6.3)	17 (6.7)
Renal replacement therapy	34 (7.4)	10 (4.9)	24 (9.4)
Non-invasive ventilation	34 (7.4)	9 (4.4)	25 (9.8)
Other cardiac procedures	33 (7.2)	10 (4.9)	23 (9)
Tracheostomy	34 (7.4)	10 (4.9)	24 (9.4)
Inhaled nitric oxide	33 (7.2)	10 (4.9)	23 (9)
Oseltamivir	28 (6.1)	11 (5.3)	17 (6.7)
Lopinavir-Ritonavir	28 (6.1)	11 (5.3)	17 (6.7)
Remdesevir	0 (0)	0 (0)	0 (0)
Extracorporeal membrane oxygenation	33 (7.2)	10 (4.9)	23 (9)
Viral pneumonitis	45 (9.8)	13 (6.3)	32 (12.5)
Bacterial pneumonia	56 (12.1)	16 (7.8)	40 (15.7)
Bacteremia	46 (10)	16 (7.8)	30 (11.8)
Stroke	43 (9.3)	14 (6.8)	29 (11.4)
Arrhythmia	41 (8.9)	13 (6.3)	28 (11)
Barotrauma	43 (9.3)	13 (6.3)	30 (11.8)
Cardiac arrest	43 (9.3)	14 (6.8)	29 (11.4)
Pulmonary embolism	61 (13.2)	30 (14.6)	31 (12.2)
Deep vein thrombosis	59 (12.8)	30 (14.6)	29 (11.4)
Myocarditis	60 (13)	30 (14.6)	30 (11.8)
ICU length of stay	5 (1.1)	1 (0.5)	4 (1.6)
Truncated at extraction	0 (0)	0 (0)	0 (0)
Hospital length of stay	10 (2.2)	2 (1)	8 (3.1)
Truncated at extraction	0 (0)	0 (0)	0 (0)
ICU mortality	0 (0)	0 (0)	0 (0)
Hospital mortality	0 (0)	0 (0)	0 (0)

eFigure 1 - Flowchart of the study



PCR = polymerase chain reaction.

eFigure 2 - Cumulative number of patients with COVID-19 admitted to ICU in each state



ACT = Australia Capital Territory; COVID-19 = coronavirus disease 2019; ICU = intensive care unit; NSW = New South Wales; NT = Northern Territory; QLD = Queensland; SA = South Australia; TAS = Tasmania; VIC = Victoria; WA = Western Australia.