



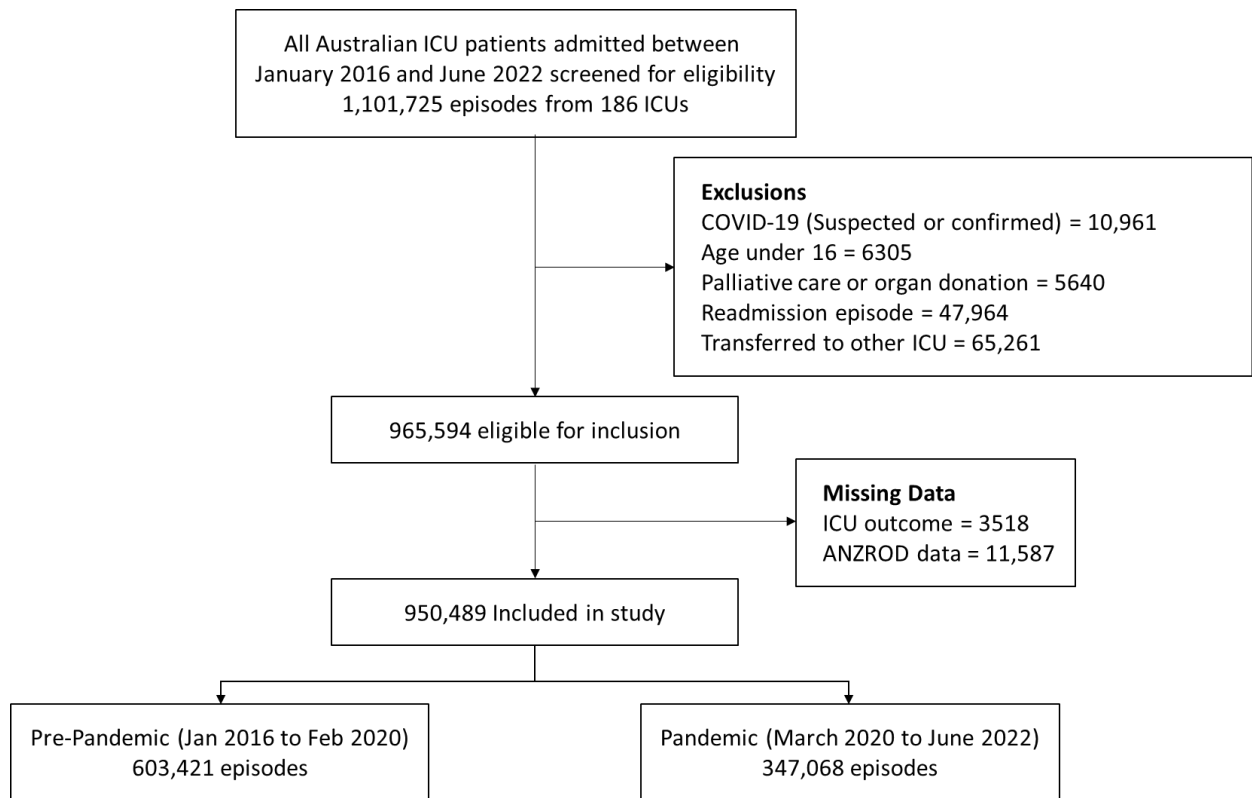
Supporting Information

Supplementary methods and results

**This appendix was part of the submitted manuscript and has been peer reviewed.
It is posted as supplied by the authors.**

Appendix to: Tan SC, Evans T, Durie ML, et al. Mortality among people admitted to Australian intensive care units for reasons other than COVID-19 during the COVID-19 pandemic: a retrospective cohort study. *Med J Aust* 2023; doi: 10.5694/mja2.51933.

Figure 1. Selection of intensive care unit (ICU) admissions of adults without COVID-19, 2016–22



ANZROD = Australian and New Zealand Risk of Death.(1)

1. Paul E, Bailey M, Kasza J, Pilcher D. The ANZROD model: better benchmarking of ICU outcomes and detection of outliers. Crit Care Resusc 2016; 18: 25-36.

Table 1. Characteristics of adults admitted to 186 Australian intensive care units (ICUs) for reasons other than COVID-19, March 2020 – June 2022, by ICU COVID-19 caseload

| | Higher COVID-19 caseload: ACT/NSW/VIC | Lower COVID-19 caseload: NT/QLD/SA/TAS/WA |
|--|--|--|
| Admissions | 215,958 | 131,110 |
| Gender | | |
| Men | 95,128 (44.0%) | 57,777 (44.1%) |
| Women | 120656 (55.9%) | 73,234 (55.9%) |
| Other | 174 (0.1%) | 99 (0.1%) |
| Age (years), median (IQR) | 66.5 (52.5–76.2) | 65.1 (50.6–74.9) |
| Planned ICU admission after elective surgery | 85,526 (39.6%) | 62,490 (47.7%) |
| APACHE II score, median (IQR) | 14.0 (10.0–19.0) | 13.0 (10.0–18.0) |
| APACHE II score, mean (SD) | 14.9 (7.1) | 14.5 (7.1) |
| APACHE III score, median (IQR) | 46.0 (34.0–61.0) | 45.0 (33.0–60.0) |
| APACHE III score, mean (SD) | 49.5 (22.7) | 48.6 (22.9) |
| ANZROD, median (IQR) | 0.02 (0.01–0.06) | 0.01 (0.00–0.05) |
| ANZROD, mean (SD) | 0.08 (0.15) | 0.07 (0.14) |
| Interventions* | | |
| Extracorporeal membrane oxygenation | 345 (0.2%) | 182 (0.1%) |
| Invasive ventilation | 56,155 (26.0%) | 38,346 (29.2%) |
| Non-invasive ventilation | 18,743 (9.8%) | 9787 (8.6%) |
| Continuous renal replacement therapy | 6468 (3.0%) | 4626 (3.5%) |
| Inotropic or vasopressor agents | 69,126 (32.0%) | 40,567 (30.9%) |
| Diagnostic categories | | |
| Gastrointestinal | 37,194 (19.6%) | 23,934 (21.2%) |
| Cardiac Surgery | 25,581 (13.5%) | 19,852 (17.6%) |
| Respiratory | 27,085 (14.3%) | 16,891 (15.0%) |
| Neuro | 30,556 (16.1%) | 15,601 (13.8%) |
| Cardiovascular | 22,491 (11.8%) | 12,061 (10.7%) |
| Sepsis | 15,012 (7.9%) | 8872 (7.9%) |
| Metabolic | 16,054 (8.5%) | 7729 (6.8%) |
| Trauma | 10,500 (5.5%) | 5421 4.8%) |
| Renal | 3111 (1.6%) | 1618 (1.4%) |
| Other | 2274 (1.2%) | 976 (0.9%) |

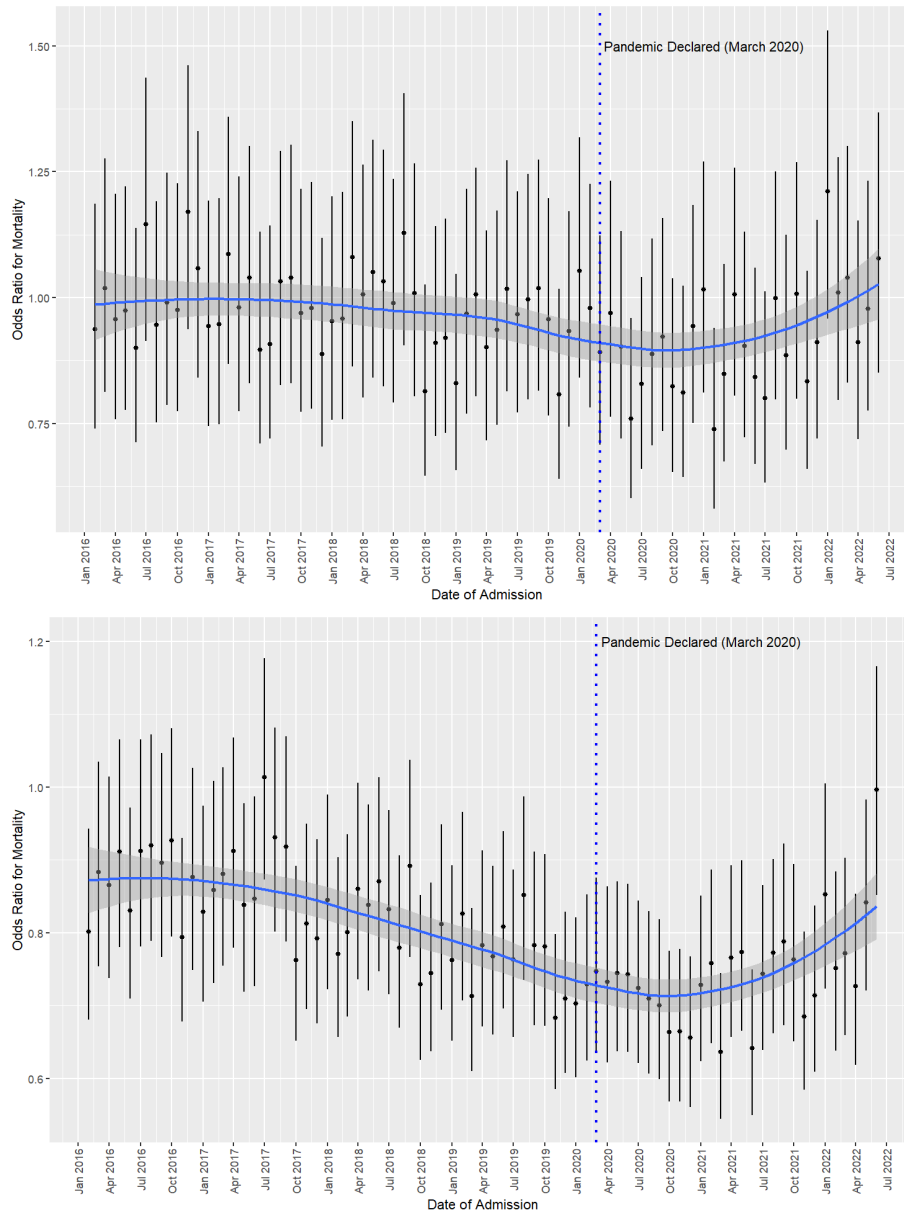
APACHE = Acute Physiology and Chronic Health Evaluation, ANZROD = Australian and New Zealand Risk of Death.

Table 2. Adults admitted to 186 Australian intensive care units (ICUs) for reasons other than COVID-19, January 2016 – June 2022: mixed effects regression model (site as random effect)

| Term | Odds ratio for mortality (95% CI) | P | Standard error | Z statistic |
|------------------------|-----------------------------------|--------|----------------|-------------|
| (Intercept) | 0.03 (0.02–0.03) | <0.001 | 0.00 | -43.65 |
| Risk of death (ANZROD) | 1475.76 (1409.55–1545.07) | <0.001 | 34.56 | 311.58 |
| Hospital Type | | | | |
| Metropolitan | 1 | | | |
| Private | 0.52 (0.44–0.62) | <0.001 | 0.04 | -7.65 |
| Rural/regional | 0.94 (0.78–1.13) | 0.522 | 0.09 | -0.64 |
| Tertiary | 1.18 (0.97–1.42) | 0.093 | 0.11 | 1.68 |
| Month | | | | |
| Jan-2016 | 1 | | | |
| Feb-2016 | 0.84 (0.74–0.96) | 0.013 | 0.06 | -2.49 |
| Mar-2016 | 0.92 (0.81–1.05) | 0.231 | 0.06 | -1.20 |
| Apr-2016 | 0.90 (0.79–1.03) | 0.113 | 0.06 | -1.59 |
| May-2016 | 0.94 (0.82–1.07) | 0.325 | 0.06 | -0.98 |
| Jun-2016 | 0.86 (0.76–0.98) | 0.024 | 0.06 | -2.26 |
| Jul-2016 | 0.99 (0.87–1.12) | 0.872 | 0.06 | -0.16 |
| Aug-2016 | 0.94 (0.83–1.07) | 0.347 | 0.06 | -0.94 |
| Sep-2016 | 0.93 (0.82–1.06) | 0.283 | 0.06 | -1.07 |
| Oct-2016 | 0.95 (0.84–1.08) | 0.454 | 0.06 | -0.75 |
| Nov-2016 | 0.91 (0.80–1.03) | 0.144 | 0.06 | -1.46 |
| Dec-2016 | 0.93 (0.82–1.06) | 0.301 | 0.06 | -1.04 |
| Jan-2017 | 0.86 (0.75–0.98) | 0.027 | 0.06 | -2.21 |
| Feb-2017 | 0.89 (0.78–1.01) | 0.082 | 0.06 | -1.74 |
| Mar-2017 | 0.95 (0.83–1.08) | 0.402 | 0.06 | -0.84 |
| Apr-2017 | 0.93 (0.82–1.06) | 0.298 | 0.06 | -1.04 |
| May-2017 | 0.91 (0.80–1.03) | 0.122 | 0.06 | -1.54 |
| Jun-2017 | 0.87 (0.77–0.99) | 0.031 | 0.06 | -2.15 |
| Jul-2017 | 1.00 (0.88–1.13) | 0.975 | 0.06 | -0.03 |
| Aug-2017 | 0.97 (0.86–1.10) | 0.667 | 0.06 | -0.43 |
| Sep-2017 | 0.96 (0.85–1.09) | 0.571 | 0.06 | -0.57 |
| Oct-2017 | 0.83 (0.73–0.94) | 0.005 | 0.05 | -2.84 |
| Nov-2017 | 0.87 (0.76–0.99) | 0.029 | 0.06 | -2.19 |
| Dec-2017 | 0.82 (0.72–0.94) | 0.004 | 0.05 | -2.90 |
| Jan-2018 | 0.88 (0.77–1.00) | 0.052 | 0.06 | -1.94 |
| Feb-2018 | 0.83 (0.73–0.94) | 0.005 | 0.06 | -2.81 |
| Mar-2018 | 0.88 (0.78–1.00) | 0.059 | 0.06 | -1.89 |
| Apr-2018 | 0.90 (0.79–1.03) | 0.124 | 0.06 | -1.54 |
| May-2018 | 0.90 (0.80–1.03) | 0.118 | 0.06 | -1.56 |
| Jun-2018 | 0.92 (0.81–1.04) | 0.189 | 0.06 | -1.31 |
| Jul-2018 | 0.89 (0.78–1.00) | 0.059 | 0.06 | -1.89 |
| Aug-2018 | 0.88 (0.77–0.99) | 0.040 | 0.06 | -2.06 |
| Sep-2018 | 0.93 (0.82–1.05) | 0.255 | 0.06 | -1.14 |
| Oct-2018 | 0.76 (0.67–0.86) | <0.001 | 0.05 | -4.23 |
| Nov-2018 | 0.80 (0.70–0.91) | 0.001 | 0.05 | -3.44 |
| Dec-2018 | 0.85 (0.75–0.96) | 0.012 | 0.06 | -2.52 |
| Jan-2019 | 0.79 (0.69–0.90) | <0.001 | 0.05 | -3.62 |
| Feb-2019 | 0.87 (0.77–0.99) | 0.039 | 0.06 | -2.07 |
| Mar-2019 | 0.80 (0.70–0.90) | <0.001 | 0.05 | -3.49 |
| Apr-2019 | 0.83 (0.73–0.94) | 0.003 | 0.05 | -2.92 |
| May-2019 | 0.82 (0.72–0.93) | 0.002 | 0.05 | -3.12 |

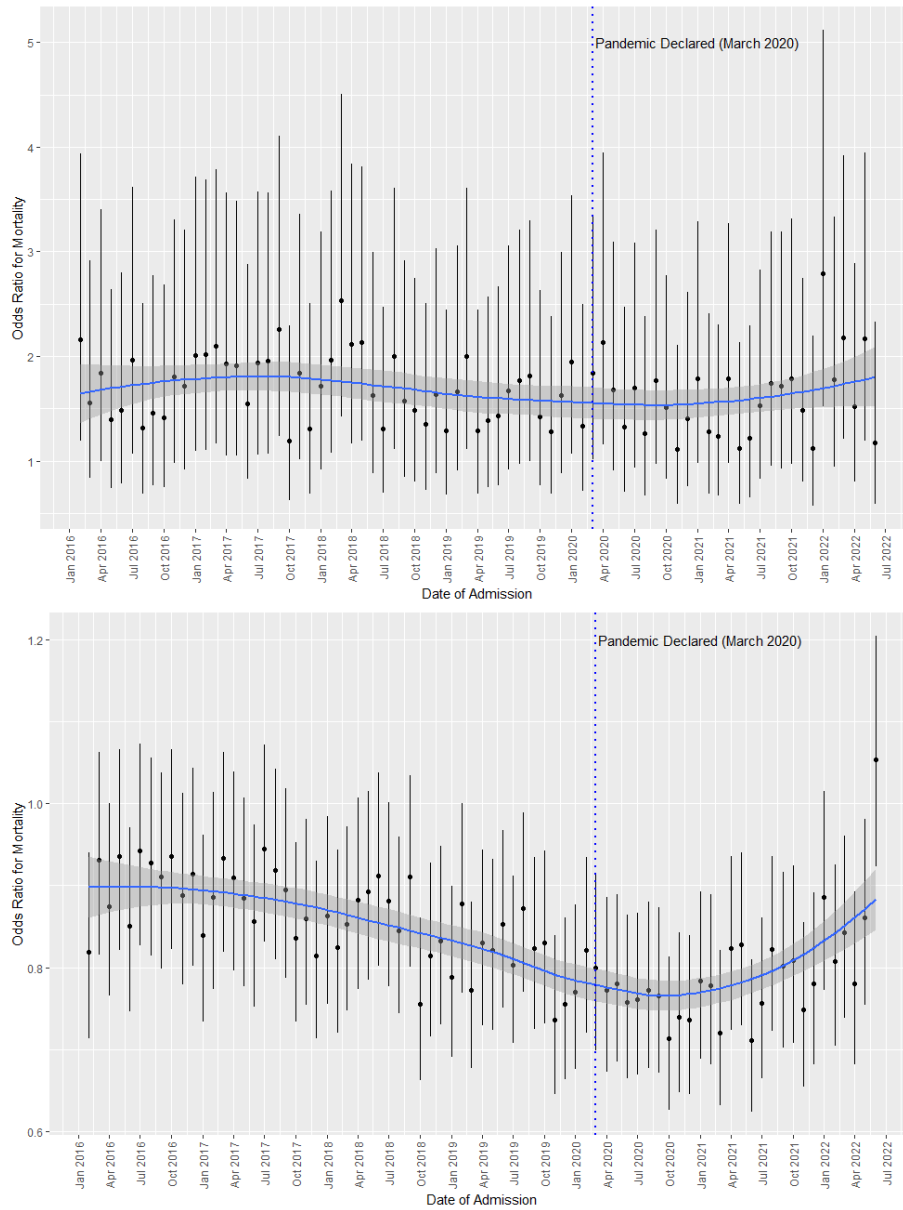
| Term | Odds ratio for mortality (95% CI) | P | Standard error | Z statistic |
|----------|-----------------------------------|--------|----------------|-------------|
| Jun-2019 | 0.87 (0.77–0.99) | 0.033 | 0.06 | -2.13 |
| Jul-2019 | 0.83 (0.73–0.94) | 0.003 | 0.05 | -2.99 |
| Aug-2019 | 0.90 (0.80–1.02) | 0.092 | 0.06 | -1.69 |
| Sep-2019 | 0.85 (0.75–0.97) | 0.013 | 0.05 | -2.47 |
| Oct-2019 | 0.84 (0.74–0.95) | 0.005 | 0.05 | -2.80 |
| Nov-2019 | 0.72 (0.64–0.82) | <0.001 | 0.05 | -4.95 |
| Dec-2019 | 0.78 (0.68–0.88) | <0.001 | 0.05 | -3.88 |
| Jan-2020 | 0.80 (0.70–0.91) | 0.001 | 0.05 | -3.41 |
| Feb-2020 | 0.80 (0.71–0.91) | 0.001 | 0.05 | -3.34 |
| Mar-2020 | 0.79 (0.70–0.90) | <0.001 | 0.05 | -3.49 |
| Apr-2020 | 0.80 (0.70–0.92) | 0.001 | 0.06 | -3.17 |
| May-2020 | 0.80 (0.70–0.91) | 0.001 | 0.05 | -3.47 |
| Jun-2020 | 0.75 (0.66–0.86) | <0.001 | 0.05 | -4.31 |
| Jul-2020 | 0.76 (0.67–0.86) | <0.001 | 0.05 | -4.25 |
| Aug-2020 | 0.77 (0.68–0.87) | <0.001 | 0.05 | -4.00 |
| Sep-2020 | 0.77 (0.68–0.87) | <0.001 | 0.05 | -4.03 |
| Oct-2020 | 0.71 (0.62–0.80) | <0.001 | 0.05 | -5.27 |
| Nov-2020 | 0.71 (0.62–0.81) | <0.001 | 0.05 | -5.20 |
| Dec-2020 | 0.74 (0.65–0.84) | <0.001 | 0.05 | -4.64 |
| Jan-2021 | 0.81 (0.71–0.92) | 0.001 | 0.05 | -3.25 |
| Feb-2021 | 0.76 (0.66–0.86) | <0.001 | 0.05 | -4.19 |
| Mar-2021 | 0.70 (0.62–0.80) | <0.001 | 0.05 | -5.40 |
| Apr-2021 | 0.84 (0.74–0.95) | 0.006 | 0.05 | -2.73 |
| May-2021 | 0.82 (0.72–0.93) | 0.002 | 0.05 | -3.12 |
| Jun-2021 | 0.70 (0.62–0.80) | <0.001 | 0.05 | -5.34 |
| Jul-2021 | 0.77 (0.68–0.87) | <0.001 | 0.05 | -4.07 |
| Aug-2021 | 0.84 (0.74–0.96) | 0.008 | 0.05 | -2.66 |
| Sep-2021 | 0.82 (0.72–0.93) | 0.003 | 0.05 | -2.98 |
| Oct-2021 | 0.83 (0.73–0.95) | 0.006 | 0.06 | -2.74 |
| Nov-2021 | 0.74 (0.65–0.84) | <0.001 | 0.05 | -4.57 |
| Dec-2021 | 0.77 (0.68–0.88) | <0.001 | 0.05 | -3.82 |
| Jan-2022 | 0.96 (0.84–1.10) | 0.560 | 0.07 | -0.58 |
| Feb-2022 | 0.83 (0.73–0.95) | 0.008 | 0.06 | -2.67 |
| Mar-2022 | 0.85 (0.75–0.97) | 0.016 | 0.06 | -2.41 |
| Apr-2022 | 0.79 (0.69–0.90) | 0.000 | 0.05 | -3.51 |
| May-2022 | 0.89 (0.78–1.01) | 0.068 | 0.06 | -1.83 |
| Jun-2022 | 1.03 (0.90–1.17) | 0.702 | 0.07 | 0.38 |

Figure 2. Adults admitted to 186 Australian intensive care units (ICUs) for reasons other than COVID-19, January 2016 – June 2022: adjusted odds ratios with 95% confidence intervals (reference: January 2016)*
Top: people under 65 years of age; bottom: people aged 65 years or more



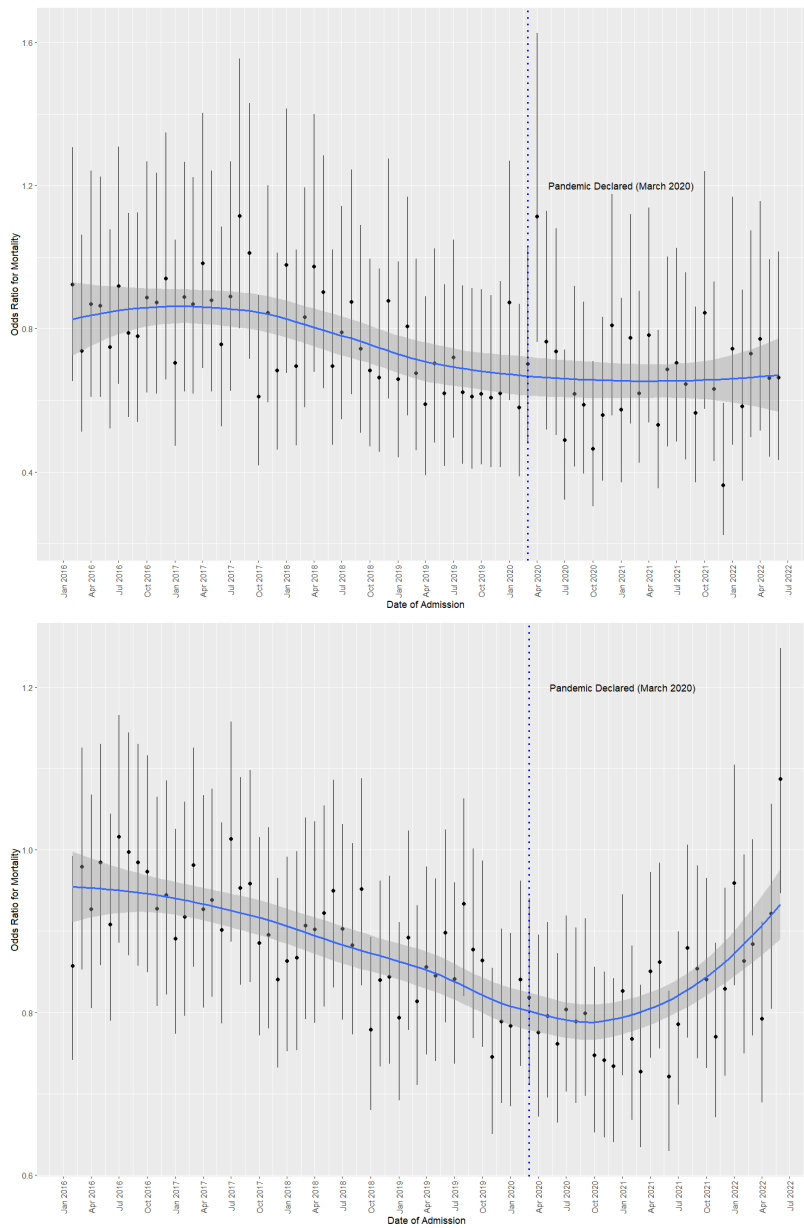
* Blue curves: locally estimated scatterplot smoothing curves; red curves: monthly ICU admissions of people with COVID-19 (suspected or confirmed); vertical dotted line: beginning of pandemic period.

Figure 3. Adults admitted to 186 Australian intensive care units (ICUs) for reasons other than COVID-19, January 2016 – June 2022: adjusted odds ratios with 95% confidence intervals (reference: January 2016)*
Top: people with ANZROD less than 2%; bottom: people with ANZROD of 2% or more



* Blue curves: locally estimated scatterplot smoothing curves; red curves: monthly ICU admissions of people with COVID-19 (suspected or confirmed); vertical dotted line: beginning of pandemic period.

Figure 4. Adults admitted to 186 Australian intensive care units (ICUs) for reasons other than COVID-19, January 2016 – June 2022: adjusted odds ratios with 95% confidence intervals (reference: January 2016)*
Top: planned ICU admissions after elective surgery; bottom: unplanned ICU admissions



* Blue curves: locally estimated scatterplot smoothing curves; red curves: monthly ICU admissions of people with COVID-19 (suspected or confirmed); vertical dotted line: beginning of pandemic period.

Table 3. Unadjusted outcomes for adults admitted to 186 Australian intensive care units for reasons other than COVID-19, March 2020 – June 2022, for states/territories with higher or lower numbers of COVID-19-related ICU admissions

| Outcomes | Higher COVID-19 caseload: ACT/NSW/VIC | Lower COVID-19 caseload: NT/QLD/SA/TAS/WA |
|-----------------------------|--|--|
| Admissions | 215,958 | 131,110 |
| Intensive care unit stay | | |
| Length (days), median (IQR) | 42.2 (22.1–74.4) | 35.2 (21.0–70.0) |
| Deaths in ICU | 8645 (4.0%) | 4957 (3.8%) |
| Hospital stay | | |
| Length (days), median (IQR) | 7.8 (4.2–14.0) | 7.2 (3.9–13.2) |
| Deaths in hospital | 14,461 (6.7%) | 7788 (5.9%) |

Higher COVID-19-related ICU admission numbers: Australian Capital Territory, New South Wales, Victoria;
lower COVID-19-related ICU admission numbers: Northern Territory, Queensland, South Australia, Tasmania,
Western Australia.