**HIGH INTENSIVE CARE UNIT STRAIN IS ASSOCIATED WITH ADVERSE MORTALITY OUTCOMES**

ABSTRACT

**Background and objective**: High Intensive Care Unit (ICU) occupancy with a low number of available empty beds, otherwise known as ‘ICU strain’ may be associated with a delay in ICU admission and adverse patient outcomes. We aimed to describe the impact of ICU strain on the association between time spent in hospital prior to ICU admission and mortality

**Methods**: Individual patient and ICU resources data were accessed from the Australian and New Zealand Intensive Care Society (ANZICS) Clinical Outcomes and Resource Evaluation. First admissions to ICU from the ward (n=52,378) or emergency department (n=122,538) at 117 hospitals between January 2013 and December 2016 were analysed. ICU strain was classified as low (<50%), medium (50-100%) or high (>100%) occupancy in 8-hour blocks on the day of admission and was estimated by dividing the number of patients admitted in the 8-hour block by the total number of beds available in the ICU. Logistic regression fitted within a generalised estimating equation framework to adjust for the repeated measurements within hospital, was used to examine the association between time in hospital prior to ICU admission and risk of death after adjusting for baseline severity of illness.

**Results:** There was a U-shaped relationship between time in hospital prior to ICU admission and risk of death, with highest risk seen for patients who had spent more than 48 hours in hospital (OR (95% CI = 1.74 (1.63, 1.87)) compared to those who spent <4 hours in hospital. There was a higher risk of death when the occupancy was between 50% and 100% (OR (95%CI) = 1.14 (1.07, 1.21)) and when occupancy was above 100% (1.15 (1.08, 1.23)) compared to when occupancy was <50%.

**Conclusion**: Moderate and high ICU strain prior to ICU admission are associated with adverse patient cantered outcomes.