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Association between After-hours Admission and Discharge from the Intensive Care Unit and Mortality

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Background & Hypothesis

- Previous work is unclear on the relationship between after-hours ICU admission and mortality (1-9)
- After-hours ICU discharge has shown association with increased risk for hospital mortality (10,11)
- Prior studies have been heterogeneous in design, used varying definitions of “after-hours”, had variable case-mix, and assessed different ICU care models
- Whether there is small, but clinically significant risk to ICU admissions and discharges occurring after-hours in Alberta is uncertain

Methods

- Design: Retrospective, population-based cohort study
- Population: Adult patients from 9 mixed ICUs in Alberta (Jun 2012 – Dec 2014)
- Data sources: Derived from provincial CIS (*eCritical Alberta*; AHS administrative databases)
- Exposure: After-hours admission/discharge
- Outcome: ICU/hospital mortality
- Analysis: Path-analysis modeling strategy

Results: After-hours Admission

Characteristic	Work-Hour	After-Hour	Total	P-value
Total Admitted, n (%)	8,014 (65.3)	4,251 (34.7)	12,265 (100)	<0.0001
ICU mortality, n (%)	1,127 (14.1)	675 (15.9)	1,802 (14.7)	0.007
Hospital type, n (%)				
- Academic	3,676 (45.9)	2,100 (49.4)	4,897 (46.8)	0.0009
Bed occupancy, [med (IQR)]	85.7 (76.0-92.3)	86.7 (77.8-92.3)	85.7 (79.9-92.3)	0.040

Effect	Response	OR	LCL	UCL
After-Hours Admission	Death in ICU	1.024	0.923	1.135
Early Morning admission with bed occupancy >90%	Death within 30 hours	1.371	1.019	1.845
	Death within 3 days	1.327	1.043	1.689
	Death within 7 days	1.249	1.012	1.542
	Death in ICU	1.211	1.032	1.427

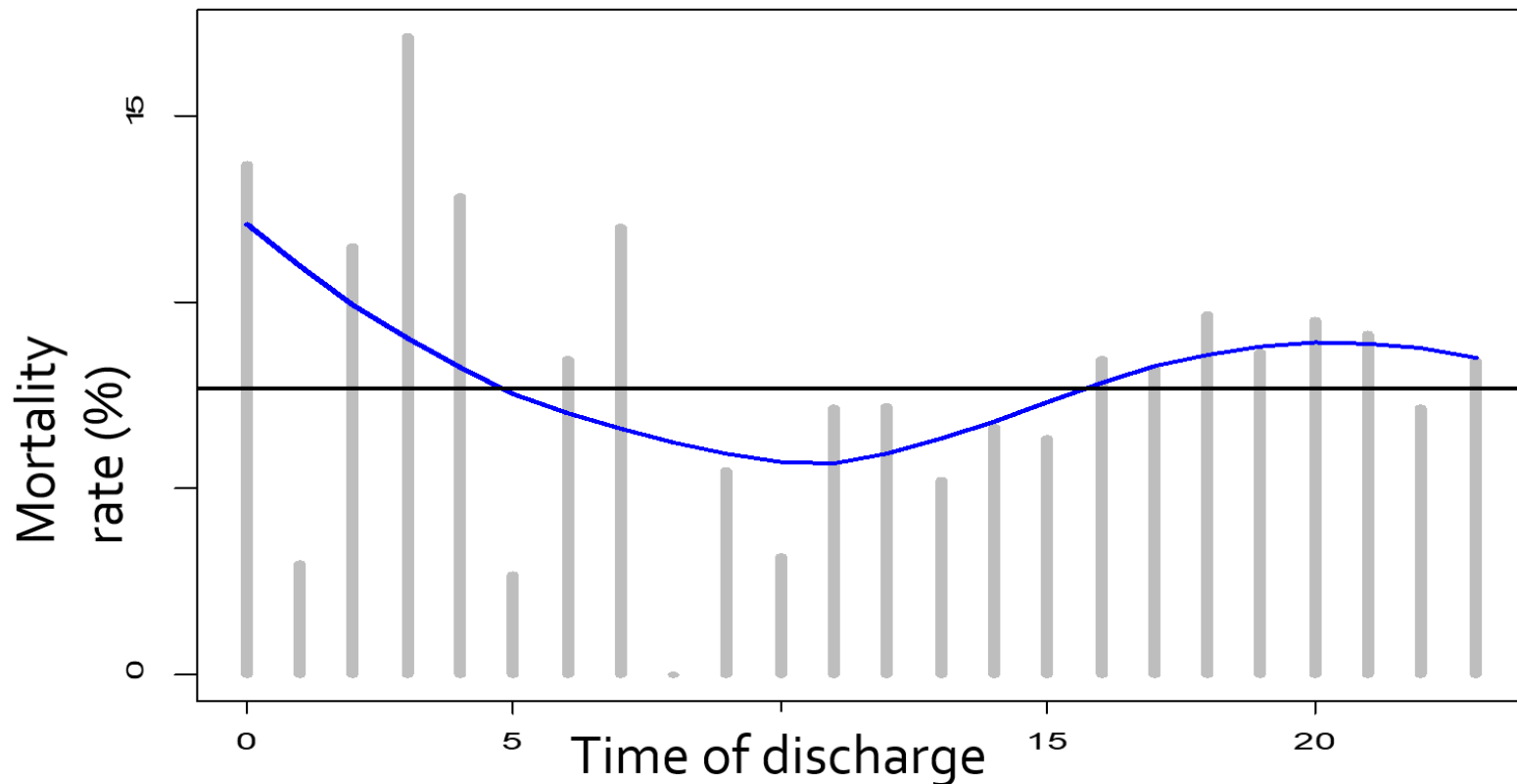
Results: After-hours Discharge

Characteristic	Work-Hour	After-Hour	Total	P-value
Total discharged, n (%)	7,983 (76.3 %)	2,480 (23.7 %)	10,463 (100 %)	<0.0001
Hospital mortality, n (%)	580 (7.3 %)	223 (9.0 %)	1,802 (7.7)	0.0048
Hospital type, n (%)				
- Academic	3,556 (44.5%)	1,341 (54.1%)	4,897 (46.8 %)	<0.0001
D/C ICU Occupancy Rate, [med (IQR)]	80.4 (76.0-84.8)	81.5 (76.9-85.7)	80.7 (76.1-85.1)	<0.0001
Pre-discharge data				
- SOFA, [mean (SD)]	4.02 (1.74)	4.14 (1.96)	4.05 (1.79)	<0.0001
- TISS, [mean (SD)]	23.88 (6.32)	24.01 (6.29)	23.91 (6.32)	<0.0001

Results: After-hours Discharge

Effect	Response	OR (95% CI)
After-hours discharge	Hospital mortality	1.185 (1.010-1.391)

Hourly Death Rate



Conclusions

After-hours Admission

- After-hours admission is not associated with increased ICU mortality.
- Strained capacity during admissions in early hours may be an important system factor contributing to increased risk of mortality.

After-hours Discharge

- High ICU bed occupancy is associated with after-hours discharge
- After-hours discharge independently predicts hospital mortality
- Further data is needed to unravel this apparent hazard

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