

Are there differences in patient characteristics and risk-adjusted outcomes related to ICU admission source?

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BACKGROUND

- The transfer of critically ill patients between hospitals has been associated with increased risk of mortality, adverse events, and costs. (Flabouris, 2008, Hills et al, 2007, CEC, 2013).
- This often involves moving patients far from their home and social networks (Durairaj, 2003; Parmentier et al 2013).
- Reasons for transfer are complex, and include the patient's requirements for higher level, specialised or more invasive care, or lack of local ICU capacity.

AIMS

- To determine whether there are differences in patient characteristics and outcomes depending on ICU admission source.
- To determine whether there is an increased risk of hospital mortality for those patients admitted to ICU from another hospital ICU compared with those patients admitted from other sources?

METHOD

- Australian & New Zealand Intensive Care Society (ANZICS) Datathon - Melbourne
- De-identified ANZICS Adult Patient Database records for 1,196,089 cases for patients admitted from 2005-2015 (See Figure 1).
- Data were extracted for 603,312 cases: emergency adult public ICU admissions
- SPSS: Descriptive & exploratory analyses, binomial regression

RESULTS

- Characteristics described for 603,312 patients: Mean age was 58.4 years (SD=19.4, range = 16-110). 56.7% patients were male and 41204 (8.4%) patients identified as Indigenous.
- Patients transferred from an 'other hospital' (ANZICS, 2014) were predominately admitted to tertiary hospitals (64%), with 26% admitted to metropolitan hospitals and 4.5% admitted to rural / regional hospitals. 83.6% of patients transferred from an 'other hospital ICU' were admitted to a tertiary hospital, with 12.1% admitted to metropolitan units and 4.2% to rural/regional hospital.
- Australian New Zealand Risk of Death (ANZROD) estimates by ICU Admission source suggests the majority of patients are of a low acuity, (See Figure 3). Differences in median ANZROD estimates were significant across all ICU admission sources ($\chi^2(df=4)=598.046, P<.0001$).

Table 1: Results by ICU Admission Source and for whole sample

Description	Whole Sample	Within same facility			Outside facility	
		OT/ recovery	ED	Ward	Other hospital	Other hospital ICU
Numbers	100%	21%	44%	23%	10%	1.1%
Median ANZROD Risk of Death*(IQR)	.054703 (0.1640)	.034407 (.0934)	.040664 (.1277)	.128545 (.2757)	.055993 (.1639)	.096334 (.9912)
Ventilated*	43%	53%	39%	34%	60%	72%
ICU LOS hrs*, Median, (IQR)	52.18 (86.83)	46.42 (77.30)	47.92 (72.07)	64.03 (99.7)	65.93 (110.77)	114.08 (197.31)
Died in hospital	16.0%	11.3%	14.0%	23.8%	16.0%	19.4%

The **regression** model (N=98.6%) included In-hospital mortality, ICU admission source, site ID, and ANZROD estimates ($\chi^2(132) = 152803.898, p < .0001$).

Table 2: Risk of mortality for different ICU admission sources

ICU Admission Source	Odds ratio	95% CI	Sig.
OT / recovery	0.877	0.807 0.954	0.002
ED	0.849	0.782 0.923	<.0001
Ward	1.004	0.924 1.091	0.921
Other hospital	0.889	0.816 0.968	0.007
Other hospital ICU	1		

DISCUSSION

- Our findings are consistent with previous Australasian studies demonstrating a higher risk adjusted hospital mortality and longer LOS for those patients whose admission source was an *other hospital* compared with to those admitted from the ED
- The persistence of this problem suggests there is a need to:
 - address the safety and timeliness of inter-hospital transfers
 - improve capacity of smaller ICU to reduce the need for transfer of lower acuity patients.
- Next steps: Examine change in patient needs and interventions for those admitted from one ICU to another using data linkage to examine the impact of critical care transfer networks.



Figure 1: Datathon Team #therightmoves

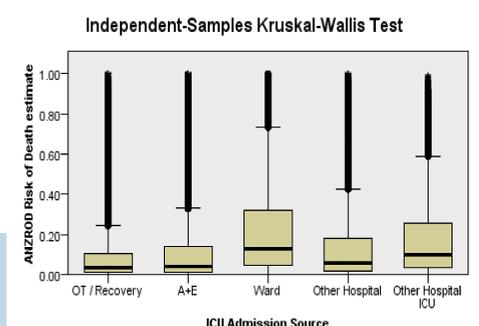


Figure 2: Median ANZROD by ICU Admission Source

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