# External benchmarking of trauma services in New South Wales

## Risk adjusted mortality after moderate to severe injury from 2012 to 2016

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## Background

Trauma systems are improving the outcome of patients after severe injury. However, in any given system, patients will have different outcomes across various centres.

An effective way to make system-wide improvements and reduce unwarranted clinical variation across the system, is by using data for external benchmarking. To date this approach has been lacking in Australia.

In recent years, the New South Wales (NSW) Institute of Trauma and Injury Management has made improvements in the statewide trauma data collection. This is providing an opportunity to engage NSW Trauma Services (Figure 1) in data-driven improvements.

This study explored risk-adjusted outcomes in the existing NSW trauma data, as a way to provide external benchmarking of trauma services in NSW, and ultimately support quality improvement in the trauma system.

## Results

During 2012-16, 14,452 patients with moderate to severe injury received definitive care at one of seven MTS (n=12,547) or ten RTS (n=1,905).

Unadjusted mortality was lower at MTS (9.4%) compared to RTS (11.2%).

After adjusting for case-mix, the median odds ratio was 1.33, suggesting that the odds of death was 1.33-fold greater if a patient was admitted to any centre with worse, as opposed to any other one with better, risk-adjusted mortality (Figure 2).

Definitive care at an MTS was associated with a 41% lower likelihood of death compared to definitive care at an RTS (odds ratio 0.59, 95% confidence interval 0.35-0.97).

Similar findings were present in the sub-groups such as elderly and isolated severe brain injury (Figure 3).

**Figure 1: Map of the NSW trauma services**

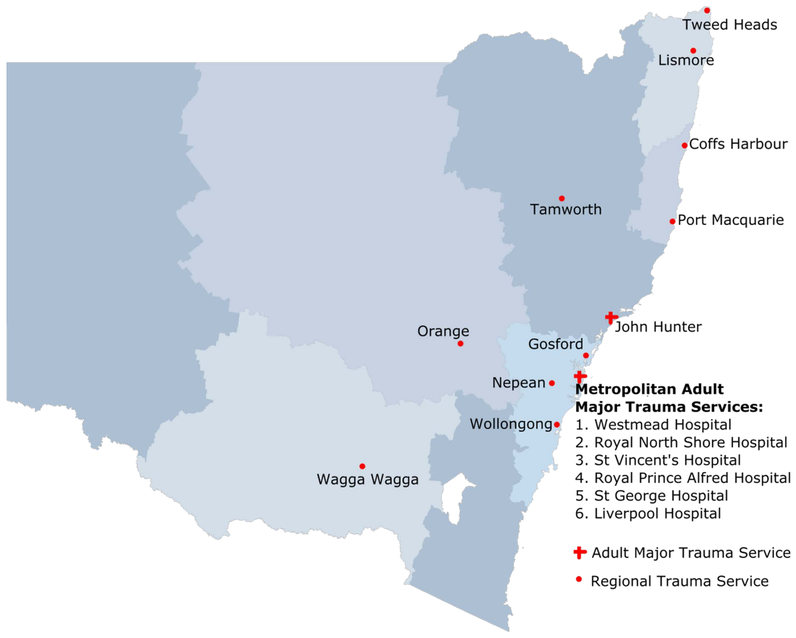



**Figure 2: Overall risk-adjusted outcomes across centre type**

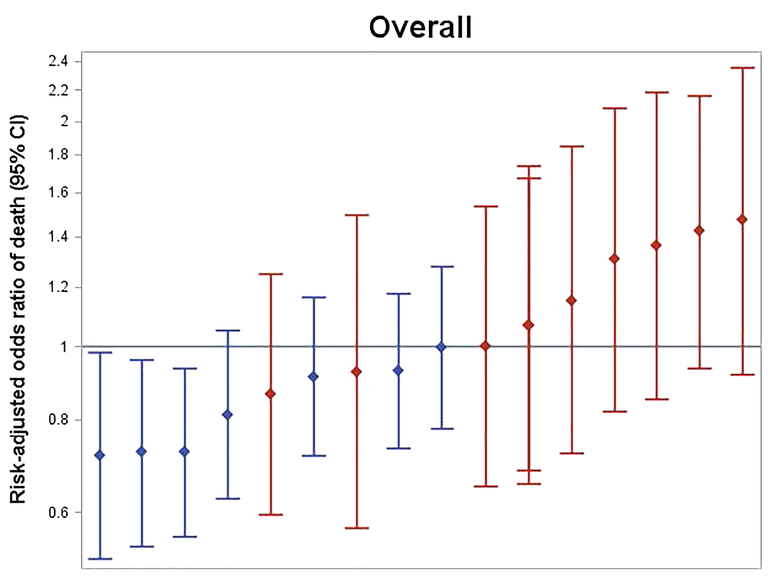
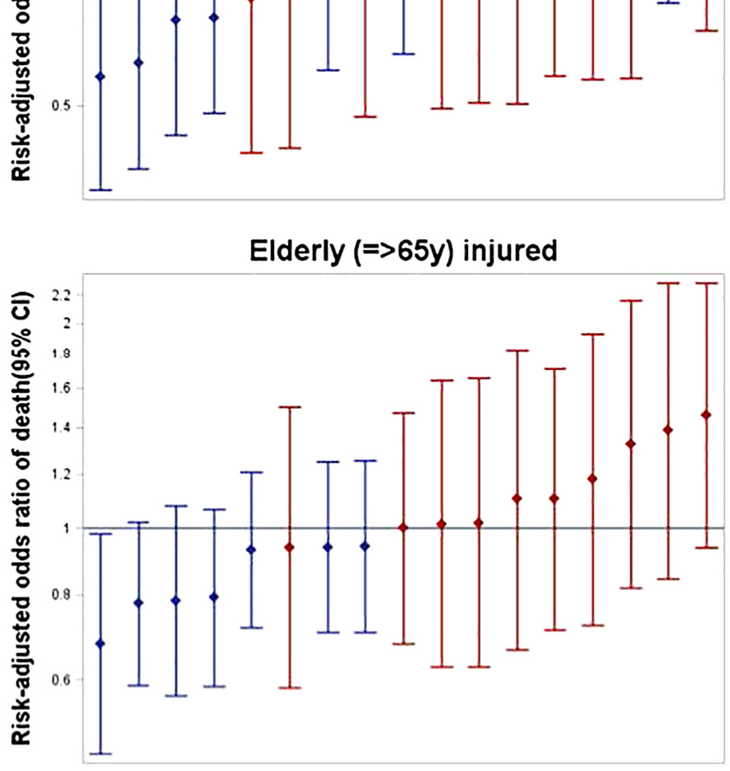



**Figure 3: Risk-adjusted outcomes of sub-groups across centre type**




**In Figures 2 and 3, each diamond represents an individual centre's risk-adjusted odds ratio of in-hospital death with bars representing the 95% confidence interval. Centres in blue are MTS while centres in red are RTS.**

## Method

Retrospective study of the NSW Trauma Registry. Included adults (≥16 years), with an Injury Severity Score ≥12, who received definitive care at either Major Trauma Services (MTS) or Regional Trauma Services (RTS) during 2012-16.

We used hierarchical logistic regression models to generate risk-adjusted outcomes. Demographics, vital signs, transfer status, survival risk ratios, and injury characteristics were included as fixed-effects.

Our outcome measure was in-hospital death.

Median odds ratios and centre-specific odds ratios with 95% confidence intervals were generated.

Centre-level variables were explored as sources of variability in outcomes.

## Conclusions

The NSW trauma system exhibited variability in risk-adjusted outcomes. However, we could not explain the variation by case-mix and it will be necessary to undertake more studies to achieve a better understanding of the underlying reasons for the variation. That insight will be crucial for designing locally-relevant quality improvement initiatives.

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