Comparing risk-adjusted outcomes from out-of-hospital cardiac arrest across Australia and New Zealand

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PURPOSE

The aim of this study was to quantify the complex relationship between key Utstein variables to inform improvements in benchmarking of out-of-hospital cardiac arrest (OHCA) performance between regions.

METHODS

This was a population-based cohort study of OHCA using data from the Aus-ROC Australian and New Zealand OHCA Epistry over the period of 01 January 2015 to 31 December 2015. Backwards stepwise loglinear analysis was used to examine the relationship between key Utstein variables (arrest location, aetiology, witnessed status, bystander CPR, and cardiac arrest rhythm). For the loglinear analysis, cases were restricted to those with a presumed cardiac aetiology and with attempted resuscitation from EMS.

RESULTS

In 2015, there were 19,722 OHCA cases recorded in the Aus-ROC Epistry. Resuscitation was attempted by EMS in 48% of cases (range: 40%-68%). For those who received attempted resuscitation, variation between ambulance services was observed in unadjusted overall survival to hospital discharge or 30 days (range: 9%-17%).

Loglinear analysis revealed four key interactions between key Utstein variables:

1. Location * witnessed status * arrest rhythm
2. Bystander CPR * arrest rhythm
3. Location * bystander CPR
4. Witnessed status * bystander CPR

Figure 1: Proposed structural equation model demonstrating the inter-relationship between key OHCA variables

CONCLUSIONS

Given the significant variation in key Utstein variables between ambulance services, appropriate risk-adjusted modelling is required to account for this variation in underlying prognostic factors. As we have demonstrated, the interplay between these key factors is complex and multifactorial. This complexity is often not well accounted for in standard multivariable logistic regression models. We propose the use of structural equation models (Figure 1) to enable modelling the complex interplay between variables that will facilitate benchmarking of OHCA outcomes between regions.

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