

Meeting abstract

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## Using existing case-mix methodologies to fund trauma cases

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### Introduction

The purpose of this paper is to demonstrate how existing case-mix methodologies can be applied for funding of subpopulations of patients, taking as an example a suggested funding model for trauma.

Currently, trauma funding in Ontario is based on a flat rate per case. However, the distribution of the measures of resource utilization, such as average length of stay, hours in intensive care, and resource intensity weights in Ontario Lead Trauma Hospitals, suggests that facilities differ in patient case mix. For instance, average hours in intensive care ranged from 62 to 153 across facilities, average resource intensity weight varied from 3.2 to 4.7, and average length of stay ranged from 11 to 18 days.

The literature related to the development of a funding methodology for trauma is divided into two streams. Some studies suggested the need for the development of a new grouping methodology, specific for trauma cases, based on such factors as age, injury severity score (ISS), mechanism of injury, patient transfer, and the like. Other research was aimed at improvement of existing grouping methodologies and/or weights, such as diagnoses-related groups (DRG), case-mix groups (CMG), and resource intensity weights (RIWs) to better address characteristics of trauma patients.

### Methods

In order to determine if the current system of resource intensity weights used in Ontario appropriately reflects trauma case mix at Lead Trauma Hospitals, the following

analyses were undertaken. First, exploratory models (regression trees and spline models) were used to identify influential cost factors, such as resource intensity weights, age, hours in intensive care, and length of stay. Then the linear, no-intercept fit between the RIWs and costs was compared for goodness-of-fit to the more flexible spline models.

### Results

The results indicated that resource intensity weights were a good explanatory factor of costs in trauma patients with no need for any additional explanatory variables, such as age, sex, intensive care hours, or ISS. The regression tree model based on RIW explained 76% of the variance in costs. (The exploratory results also indicated that the ISS was not a good predictor of costs, contrary to the outcomes in some previous studies.)

### Conclusion

This series of analyses led to the conclusion that the existing case-mix groups (CMGs) and resource intensity weights (RIWs) can form the basis for rational and equitable hospital funding of trauma cases, decreasing the need to develop a different grouper for this subset of patients. Finally, this study confirmed that ISS was a poor predictor of costs for trauma patients.