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Wicked problems in the development of AR-DRG V7.0

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Abstract
AR-DRG is a patient classification system that provides a clinically meaningful way of relating the types of patients treated in a hospital to the resources required by the hospital. AR-DRG will be used for activity based funding of acute inpatient episodes from 2012/13.

Keywords
development, problems, wicked, v7, drg, ar

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“Wicked problem” is a phrase originally used in social planning to describe a problem that is difficult or impossible to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognize. The term ‘wicked’ is used, not in the sense of evil but rather its resistance to resolution. Moreover, because of complex interdependencies, the effort to solve one aspect of a wicked problem may reveal or create other problems.”
Introduction

The AR-DRG Classification

- AR-DRG is a patient classification system that provides a clinically meaningful way of relating the types of patients treated in a hospital to the resources required by the hospital.
- AR-DRG will be used for activity based funding of acute inpatient episodes from 2012/13.
Introduction

Major diagnostic category (MDC)

Broad categories generally based on a single body system

Adjacent diagnosis related groups (ADRGs)

Groups within an MDC defined by the same diagnosis or procedure code list

Diagnosis related groups

Groups of similar resource usage within an ADRG
Each round of development builds on the previous version of AR-DRG

- AR-DRG V7.0 built on AR-DRG V6.0

Each level of the classification is analysed from top to bottom (MDC to DRG) to determine if improvements can be made.
AR-DRG uses diagnoses to categorize episodes into different groups which are clinically similar and have similar levels of resource consumption
Introduction

Total Cost by AR-DRG V6.0, MDC22 Burns

Australian Health Services Research Institute
Introduction

What about when diagnosis is not a predictor of cost and LOS?

Historically, diagnoses for mental health episodes have not been a good predictor of cost or LOS.
Introduction
Issues

- Cost data is not available for private hospitals and some public hospitals
- Need to avoid perverse incentives
- Different models performed better for different sectors
Methods

MDCs are analysed to determine if the division into ADRGs could be more effective.

In some MDCs, the proportion of same-day separations were so high that they brought down the average cost (and therefore cost weight) in each DRG.

Removing the same-day separations resulted in the remaining separations being more homogeneous.
An example

MDC 20 Alcohol/drug use contained a large proportion of same day separations which resulted in a high cost variation in each DRG.

Creating two same day ADRGs in MDC 20 meant that the remaining separations in the original DRGs were more homogeneous.
Methods

## Change in average cost and LOS when same-day separations are removed

<table>
<thead>
<tr>
<th>ADRG Description</th>
<th>V6.0</th>
<th>V7.0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average cost</td>
<td>Average LOS</td>
</tr>
<tr>
<td>V60 Alcohol Intoxication and Withdrawal</td>
<td>$2,112</td>
<td>$3,031</td>
</tr>
<tr>
<td></td>
<td>2.2</td>
<td>3.0</td>
</tr>
<tr>
<td>V61 Drug Intoxication and Withdrawal</td>
<td>$5,492</td>
<td>$6,830</td>
</tr>
<tr>
<td></td>
<td>5.4</td>
<td>7.3</td>
</tr>
<tr>
<td>V63 Opioid Use and Dependence Disorders</td>
<td>$3,429</td>
<td>$3,655</td>
</tr>
<tr>
<td></td>
<td>5.1</td>
<td>8.2</td>
</tr>
<tr>
<td>V64 Other Drug Use and Dependence Disorders</td>
<td>$3,387</td>
<td>$3,928</td>
</tr>
<tr>
<td></td>
<td>5.5</td>
<td>9.1</td>
</tr>
<tr>
<td>V65 Treatment for Alcohol Disorders, Same Day</td>
<td>n/a</td>
<td>$811</td>
</tr>
<tr>
<td></td>
<td>n/a</td>
<td>1.0</td>
</tr>
<tr>
<td>V66 Treatment for Drug Disorders, Same Day</td>
<td>n/a</td>
<td>$851</td>
</tr>
<tr>
<td></td>
<td>n/a</td>
<td>1.0</td>
</tr>
</tbody>
</table>

* V62 had a same-day split in V6.0 and therefore was excluded from this table.
Splitting ADRGs into DRGs

All variables are examined to find which are most effective in creating homogeneous groups in terms of cost and LOS.

Combinations of variables may also be used.
An example

ADRG Y02 *Skin Grafts for Other Burns* was previously split on complications, however within the lower cost DRG, a split was found that improved the performance of this ADRG by 13%
Methods

- Using the variable urgency of admission we found that emergency admissions were higher cost.
- Possible issue with private hospitals not recording urgency of admission and therefore always receiving the lower funded DRG.
- Less than 5% of separations in this ADRG were in private hospitals.
Improvement in cost distribution when urgency of admission is used for splitting

<table>
<thead>
<tr>
<th>DRG</th>
<th>Description</th>
<th>Average cost</th>
<th>Average LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>V6.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y02A</td>
<td>Skin Grafts for Other Burns W CC</td>
<td>$29,700</td>
<td>16.8</td>
</tr>
<tr>
<td>Y02B</td>
<td>Skin Grafts for Other Burns W/O CC</td>
<td>$10,106</td>
<td>5.5</td>
</tr>
<tr>
<td>V7.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y02A</td>
<td>Skin Grafts for Other Burns W CSCC</td>
<td>$31,457</td>
<td>17.8</td>
</tr>
<tr>
<td>Y02B</td>
<td>Skin Grafts for Other Burns W/O CSCC, Emergency</td>
<td>$16,610</td>
<td>9.5</td>
</tr>
<tr>
<td>Y02C</td>
<td>Skin Grafts for Other Burns W/O CSCC, Non Emergency</td>
<td>$6,342</td>
<td>3.2</td>
</tr>
</tbody>
</table>
Results

Measuring performance

- Reduction in deviance (RID) was selected as the statistical measure for comparing the performance of different models.
- RID shows the amount of variation explained by the model as a percentage.
Results

RID based on LOS has also improved significantly

- V6.0 70.9
- V6.X 71.2
- V7.0 75.3
Results

RID based on cost has improved significantly

- V6.0 65.0
- V6.X 65.5
- V7.0 69.4
Conclusion

Although the classification refers to *diagnosis related groups*, this is not always possible.

Other variables should be investigated to determine whether their inclusion would improve the performance of the classification.

For the long term, cost need to be improved to enable more effective grouping.
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Thank you