Transport System - System Failures

- Truck passenger
- Young male (no seat belt)
- Crash on an 80 km/h urban freeway

- No injury to restrained occupants
- Multiple spinal fractures and severe head injuries
- Acquired Brain Injury
- Quadriplegia
- 24-hour medical care required

Estimated Transport Accident Commission benefit payments: $21 million
Transport Accident Commission (TAC): 1987- Now

- Government-owned insurer of third-party personal liability for Victorian road traffic injuries
- Established under the Transport Accident Act 1986
- 16,000 claims per annum (over 30% hospitalised)
- From superficial and soft tissue injuries to Acquired Brain Injury (ABI), Quadriplegia and death
- Medical, income and impairment benefits (no-fault) and common law benefits: +$1,000,000,000 (2012)
TAC objectives – Transport Accident Act (1986)

“To ensure that the transport accident scheme emphasises accident prevention and effective rehabilitation”.

“To perform its functions and exercise its powers effectively, efficiently and economically”.
Financial burden of major trauma

TAC Claims Portfolio Profile

- Major Injury: 3%
- Moderate and Minor Injury: 97%

TAC’s Spread of Liability

- Major Injury: 64%
- Moderate and Minor Injury: 36%
Hospitalisation over 14 days
(Key Road Safety Performance Indicator)
Estimating Factors Influencing Hospitalisation over 14 Days Among Compensated Road Crash Injuries in Victoria

Hafez Alavi & Michael Nieuwesteeg
Road Safety Research Team
Study design

- 4,094 TAC claims (2010 – Admitted to hospital for 1+ days)
- Dependent variable: Binary variable (1: Hosp14+; 0: Hosp0-14)
- Explanatory variables: Road User; Vehicle; Road; Crash Circumstances
- Controlled for Injury Severity
Explanatory variables

**Road User**
- Type
- Age
- Gender
- License Type
- Seatbelt/Helmet

**Vehicle**
- Type
- Year of Manufacture

**Road**
- Speed Limit
- Intersection/Midblock
- Urban/Rural
- Divided/Undivided
- Straight/Curve

**Crash**
- Type
- Time of Day
- Day of Week
- Light Conditions
- Atmospheric Conditions
- Vehicle Movement
- Hit-and-run
Injury Severity

Threat to Life

- Maximum Abbreviated Injury Scale (MAIS)

  Body Regions: Head/Neck; Chest; Abdomen

Psychological Trauma

- TAC’s psychological injury flag
Modelling

- Binary logistic regression
- Backward elimination procedure
- Model comparison: Log-likelihood ratio
- GoF: Hosmer-Lemshow test
- Importance of attributes of DVs: Odds ratio
- SPSS package (v. 20)
Results

Road User
- Type
- Age
- Gender
- License Type
- Seatbelt/Helmet

Vehicle
- Type
- Year of Manufacture

Road
- Speed Limit
- Intersection/Midblock
- Urban/Rural
- Divided/Undivided
- Straight/Curve

Crash
- Type
- Time of Day
- Day of Week
- Light Conditions
- Atmospheric Conditions
- Vehicle Movement
- Hit-and-run

Threat to Life
- MAIS
- Body region

Psychological trauma
<table>
<thead>
<tr>
<th>Type</th>
<th>Sig.</th>
<th>Odds Ratio</th>
<th>Lower CI</th>
<th>Upper CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passenger</td>
<td>0.616</td>
<td>0.93</td>
<td>0.72</td>
<td>1.21</td>
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<tr>
<td>Motorcyclist</td>
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<td>2.45</td>
<td>1.9</td>
<td>3.16</td>
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<tr>
<td>Cyclist</td>
<td>0.423</td>
<td>1.19</td>
<td>0.78</td>
<td>1.82</td>
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<tr>
<td>Pedestrian</td>
<td>&lt; .01</td>
<td>1.93</td>
<td>1.25</td>
<td>3</td>
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</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>Sig.</th>
<th>Odds Ratio</th>
<th>Lower CI</th>
<th>Upper CI</th>
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<tbody>
<tr>
<td>0-14</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>15-24</td>
<td>&lt; .01</td>
<td>2.74</td>
<td>1.4</td>
<td>5.39</td>
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<tr>
<td>25-44</td>
<td>&lt; .01</td>
<td>2.51</td>
<td>1.28</td>
<td>4.93</td>
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<tr>
<td>45-64</td>
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<td>2.96</td>
<td>1.50</td>
<td>5.81</td>
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<td>65+</td>
<td>&lt; .001</td>
<td>10.44</td>
<td>5.32</td>
<td>20.5</td>
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### Vehicle

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<th>Manuf. Year</th>
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<th>Upper CI</th>
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</thead>
<tbody>
<tr>
<td>2001+</td>
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<tr>
<td><strong>2000-</strong></td>
<td>&lt; .05</td>
<td>1.26</td>
<td>1.02</td>
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### Road

<table>
<thead>
<tr>
<th>Speed Limit</th>
<th>Sig.</th>
<th>Odds Ratio</th>
<th>Lower CI</th>
<th>Upper CI</th>
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</thead>
<tbody>
<tr>
<td>&lt;= 50 km/h</td>
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<td>60-70 km/h</td>
<td>0.119</td>
<td>1.23</td>
<td>0.95</td>
<td>1.59</td>
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<tr>
<td>75-110 km/h</td>
<td>&lt; .01</td>
<td>1.52</td>
<td>1.16</td>
<td>1.99</td>
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<td>Injury Severity</td>
<td>MAIS</td>
<td>Sig.</td>
<td>Odds Ratio</td>
<td>Lower CI</td>
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<td>------</td>
<td>--------</td>
<td>------------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td>&lt;= 2</td>
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</tr>
<tr>
<td></td>
<td>3+</td>
<td>&lt; .001</td>
<td>5.1</td>
<td>4.14</td>
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<tr>
<td>Head/Neck</td>
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</tr>
<tr>
<td></td>
<td>3+</td>
<td>&lt; .001</td>
<td>2.06</td>
<td>1.57</td>
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<td>Psych. Trauma</td>
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</tr>
<tr>
<td></td>
<td>Yes</td>
<td>&lt; .001</td>
<td>4.03</td>
<td>2.97</td>
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<td>Road Safety Issue</td>
<td>Context</td>
<td>Public Awareness Campaign</td>
<td>Road Safety Investment</td>
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<tr>
<td>-----------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>----------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
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</tr>
</tbody>
</table>
| Vulnerable Road Users       | • Walking/Cycling promotion  
• Increase in motorcycles’ popularity | • Motorcycle safety       | • Community grants $1 m/yr  
• Safer Roads Infrastructure Program (SRIP): $100 m/yr                                |
| The elderly                 | • Ageing population                                                     | • Educational sessions    | • Ozcandrive  
• RACV                                                                                     |
| High-speed roads            | • Homogeneity  
• Mobility vs. Safety                                                  | • Anti-speeding            | • Funding Victoria Police: $2 m/yr  
• SRIP                                                                                       |
| Vehicle Safety              | • Emerging technologies                                                 | • Vehicle safety ratings   | • Enhanced Crash Investigation Study (ECIS): $2.3 m/yr                                 |
| Serious Injury (Head/Neck)  | • Definition  
• Measurement                                                        | • Safe System messages    | • SRIP  
• ECIS                                                                                       |
| Psychological Trauma        | • Common law cases/Damage                                               |                            |                                                                                        |
Limitations

- Resource use measures are influenced by extraneous factors: Pre-Crash; Crash; Post-Crash
- Injury severity may not be properly controlled for
- No specific insight on why these factors, especially: psychological trauma
Questions?