How do different definitions of ‘Serious Injury’ overlap?

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Context

- Traditional focus on fatal injuries – is it still useful?
- Safe System’s mandate to eliminate ‘Serious Injury’
- Defining ‘Serious Injury’ to fulfil different purposes
- Impact of the adopted definition on road safety resource allocations and intervention development
- Various lenses to define and measure ‘Serious Injury’
Perspectives to view injury severity

- Threat to Life: Risk of mortality
- Impairment: An anatomical or psychological damage that may or may not culminate in disability
- Pain and Suffering: Physical and emotional stress
- Quality of Life Loss: Victim’s loss of capability to enjoy the important possibilities in his/her life
- Financial Cost: Treatment, rehabilitation, compensation and other extraneous financial costs
- Resource Use: Medical and emergency resources to cater for an injury

Case Study

Socio-demography
- Age: 26-39
- Gender: Male
- Marital Status: Married
- Education: High School
- Bricklayer

Life Story (pre-injury)
- Married father with two young children
- Owned successful bricklaying business
- Employed other people
- Enjoyed boating, fishing, camping, water sports
- Suffered asthma
- Occasional recreational drug use

Road Crash Circumstances
- Road User: Driver
- Run-off-Road into a Pole
- Vehicle: Ute
- Rural intersection

Injury Details
- Concussive closed head injury
- Facial laceration
- Collapsed lung
- Internal chest injuries
- Multiple ribs fractures
- Fractured left hip, legs and ankles
- Psychological reaction

Injured Body Regions
Objectives

- Define ‘Serious Injury’ on the basis of identified injury consequences
- Investigate the relationship among proposed definitions (correlations and overlaps)
Data and methods

- 67,797 TAC claims (2006 to 2010)
- Data on threat to life, impairment, cost and resource use was extracted
- No data was available for pain and suffering, and quality of life loss
- Each claim was assigned serious or not serious on each of the four elements (four binary variables, 1: Serious Injury; 0: Not)
- Mean square contingency coefficients were calculated (Phi coefficients)
- An Euler diagram was developed to examine overlaps

Definitions

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Measure of Injury Severity</th>
<th>Cut-off Point</th>
<th>% of claims classified as serious injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threat to Life</td>
<td>Maximum Abbreviated Injury Scale (MAIS)</td>
<td>&gt;= 3</td>
<td>9.2</td>
</tr>
<tr>
<td>Impairment</td>
<td>Degree of impairment</td>
<td>&gt;= 30%</td>
<td>1</td>
</tr>
<tr>
<td>Resource Use</td>
<td>TAC claim with an admission to hospital within 7 days from the road crash</td>
<td>&gt; 14 days continually admitted</td>
<td>6.1</td>
</tr>
<tr>
<td>Cost</td>
<td>Estimated lifetime compensation payout by TAC for no-fault benefits</td>
<td>We chose a cut-off cost of $52,378 (75% of TAC liabilities come from claims costing more than this)</td>
<td>10.4</td>
</tr>
</tbody>
</table>
Results - correlations

<table>
<thead>
<tr>
<th>PHI</th>
<th>Threat to Life</th>
<th>Impairment</th>
<th>Resource Use</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threat to Life</td>
<td>1</td>
<td>0.208 (&lt;0.001)</td>
<td>0.451 (&lt;0.001)</td>
<td>0.385 (&lt;0.001)</td>
</tr>
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<td>0.208 (&lt;0.001)</td>
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</table>

Results – Euler diagram
### Results – TAC claims case studies

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age Range</th>
<th>Role</th>
<th>Injury Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>26-39</td>
<td>Driver</td>
<td>Run-off-Road</td>
</tr>
<tr>
<td>Female</td>
<td>31-40</td>
<td>Pedestrian</td>
<td>Hit by car</td>
</tr>
<tr>
<td>Male</td>
<td>21-30</td>
<td>Motorcyclist</td>
<td>Came off bike</td>
</tr>
<tr>
<td>Female</td>
<td>61-70</td>
<td>Passenger</td>
<td>Intersection</td>
</tr>
</tbody>
</table>

### Conclusions

- Injury means different things to different people
- Injury consequences can be captured through various aspects
- A selection of definitions based on these aspects correlate significantly, but do not highly overlap each other
- A high proportion of claims are classified as serious injury by only one definition of serious injury
- The adopted definition significantly impacts the magnitude of the problem and policy makers’ decisions to allocate road safety resources