Hospital treated non-fatal farm injury among children in Victoria

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Victorian Injury Surveillance Unit (VISU)

- Aim: to provide data and information to reduce injuries in the Victorian community
- Functions:
  - Collate and analyse injury data to measure and characterise injury: counts, demographic distribution, causes, diagnoses etc.
  - Monitor injury trends e.g. health indicators
  - Disseminate data and information to support prevention, research and evaluation
- Funding: Victorian Department of Health (DH)
VISU - datasets

Three injury surveillance datasets held by VISU:

- Injury deaths for Victoria and Australia – Cause of Death Unit Record File (COD-URF) – data is currently out-of-date
- Injury hospital admissions (Victoria, all public & private hospitals) – Victorian Admitted Episodes Dataset (VAED)
- Injury Emergency Department (ED) presentations (Victoria, 39 hospitals) – Victorian Emergency Minimum Dataset (VEMD)

VISU – hospital-treated injury datasets

Injury hospital admissions dataset (VAED) - Years: July 1987 to June 2013

- Admissions data collected by DH from all Victorian public and private hospitals. Now supplied by DH to VISU annually
- Coded to International Statistical Classification of Diseases and Related Health Problems (ICD) – Australian Modifications. VISU dataset contains cases coded to Chapter 20 (external causes of morbidity and mortality) of the ICD version 10-AM
- 3.7+ million records on dataset (~100,000 injury hospitalisations in Vic. in 12/13)
VISU – hospital-treated injury datasets

Injury ED presentations dataset (VEMD) - Years: July 1999 to June 2013

- Now supplied by DH to VISU annually
- Hospitals have gradually been added to the collection over time - from 2004 all public hospitals that provide a 24-hour ED service have been included in the data collection (Bass Coast Regional Health added in July 2011)
- 3.5 million+ injury records (~300,000 injury ED presentations in Vic. in 12/13
- Limited coding – minimum dataset for injury plus a case narrative

Farm injury coding in Victorian hospital-treated injury data collections

- Cases selected based on location of injury occurrence code = “farm”
  - includes farm buildings, farm land, ranches
  - excludes farmhouse and home premises of farm (coded to “home”)
Hospital-treated unintentional injury by place of occurrence (average annual frequency, 08/09-12/13)

<table>
<thead>
<tr>
<th>Place of Occurrence</th>
<th>Children 7-17 years n</th>
<th>Children 7-17 years %</th>
<th>Adults 18+ years n</th>
<th>Adults 18+ years %</th>
<th>ALL n</th>
<th>ALL %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>37,809</td>
<td>37.9</td>
<td>76,100</td>
<td>31.9</td>
<td>113,909</td>
<td>33.6</td>
</tr>
<tr>
<td>Road, street &amp; highway</td>
<td>3,837</td>
<td>3.8</td>
<td>24,490</td>
<td>10.3</td>
<td>28,327</td>
<td>8.4</td>
</tr>
<tr>
<td>Sports &amp; athletic area</td>
<td>10,615</td>
<td>10.6</td>
<td>15,091</td>
<td>6.3</td>
<td>25,706</td>
<td>7.6</td>
</tr>
<tr>
<td>School, public building</td>
<td>13,528</td>
<td>13.6</td>
<td>7,467</td>
<td>3.1</td>
<td>20,994</td>
<td>6.2</td>
</tr>
<tr>
<td>Trade &amp; service area</td>
<td>1,076</td>
<td>1.1</td>
<td>14,313</td>
<td>6.0</td>
<td>15,389</td>
<td>4.5</td>
</tr>
<tr>
<td>Residential Institution</td>
<td>132</td>
<td>0.1</td>
<td>8,738</td>
<td>3.7</td>
<td>8,869</td>
<td>2.6</td>
</tr>
<tr>
<td>Industrial &amp; construction area</td>
<td>187</td>
<td>0.2</td>
<td>6,218</td>
<td>2.6</td>
<td>6,404</td>
<td>1.9</td>
</tr>
<tr>
<td>Farm</td>
<td>616</td>
<td>0.6</td>
<td>2,571</td>
<td>1.1</td>
<td>3,187</td>
<td>0.9</td>
</tr>
<tr>
<td>Other specified place</td>
<td>12,890</td>
<td>12.9</td>
<td>22,312</td>
<td>9.3</td>
<td>35,202</td>
<td>10.4</td>
</tr>
<tr>
<td>Unspecified place*</td>
<td>19,063</td>
<td>19.1</td>
<td>61,611</td>
<td>25.8</td>
<td>80,674</td>
<td>23.8</td>
</tr>
<tr>
<td><strong>ALL</strong></td>
<td><strong>99,751</strong></td>
<td><strong>100.0</strong></td>
<td><strong>238,910</strong></td>
<td><strong>100</strong></td>
<td><strong>338,661</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Children injured on farms: trends in hospital-treated injury (July 2000-June 2012)
Trends in CHILD farm injury hospital admissions by age, Victoria: 2000/01 to 2011/12

Trends in CHILD farm injury ED presentations by age, Victoria: 2000/01 to 2011/12
Trends in CHILD HOSPITAL-TREATED farm injuries by age, Victoria: 2000/01 to 2011/12

![Graph showing trends in child hospital-treated farm injuries by age from 2000/01 to 2011/12.

Children injured on farms: injury pattern - latest 5 years (July 2008-June 2013)
Hospital-treated farm injury, average annual frequency (Victoria 08/09-12/13)

Leading causes of child farm injury (average annual frequency=616)

- Animal related (motorcycle, ex. quad bike), 171, 28%
- Horse related (ALL), 131, 21%
- Fall, 77, 13%
- Other animal related (ex. horse), 26, 4%
- Cutting & piercing, 38, 6%
- Other specified, 64, 10%
- Hit/struck/crush, 46, 8%
- Unspecified, 6, 1%
- Transport, 229, 37%

Note: other specified includes fires/burns/scalds, machinery related, poisoning, electricity related, near drowning, explosion/firearms and ‘other specified’
Leading causes - summary

- (1) **Transport** (37% hospital-treated cases, annual average = 229 cases)
  - Motorcyclists (n=171),
  - Car occupants (n=18),
  - Pedal cyclists (n=17),
  - Quad bike riders (n=14),
  - Other transport related circumstance (n=8)

- (2) **Animal-related** (25% of all hospital-treated cases, annual average = 157 cases)
  - Horses (n=131)
  - Other animals (n=26)

- (3) **Falls** (13% of all hospital-treated cases, annual average = 77 cases)

(1) **TRANSPORT**

Motorcycles (excl. quad bikes) – gender and age
(average annual frequency n=171)
Motorcycles – Injury diagnoses

- Fracture forearm (10%)
- Fracture wrist & hand level (9%)
- Fracture shoulder & upper arm (6%)
- Fracture lower leg, incl. ankle (5%)
- Dislocation, sprain & strain ankle & foot (5%)
- Dislocation, sprain & strain wrist & hand (4%)
- Open wound of lower leg (4%)
- Dislocation, sprain & strain shoulder girdle (4%)

Motorcycles – region of residence

Average annual frequency by region of residence

<table>
<thead>
<tr>
<th>Region</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hume</td>
<td>41</td>
</tr>
<tr>
<td>Gippsland</td>
<td>28</td>
</tr>
<tr>
<td>Loddon mallee</td>
<td>20</td>
</tr>
<tr>
<td>North &amp; West metro.</td>
<td>18</td>
</tr>
<tr>
<td>Barwon South Western</td>
<td>18</td>
</tr>
<tr>
<td>Grampians</td>
<td>17</td>
</tr>
<tr>
<td>Southern metro.</td>
<td>17</td>
</tr>
<tr>
<td>Eastern metro.</td>
<td>7</td>
</tr>
<tr>
<td>Interstate/ Overseas/ Unknown</td>
<td>7</td>
</tr>
</tbody>
</table>
Two main mechanisms of motorcycle-related injury admissions

- Non-collision incidents (62%)
  - Fall or thrown from motorcycle (without antecedent collision)
  - Overturning (without collision)

- Collision incidents (26%)
  - Fixed or stationary objects [fences, trees, stumps, “bumps”] (71% of collision incidents)
  - Other riders/pedestrians/cars (29% of collision incidents)

Other transport-related injury (average annual 58 cases)

- Car occupants (32%)
  - Male (59%), almost half aged 15+ years (47%)
  - Head/face/neck (40%), upper & lower extremity (20% each),

- Pedal cyclists (29%)
  - Male (73%), more than half aged 10-14 years (52%)
  - Upper extremity (43%), head/face/neck (27%)

- Quad bike riders (24%)
  - Male (59%), 10-14 years (39%) and 15+ years (30%)
  - Upper extremity (31%), head/face/neck (24%)

- Other transport (15%)
Horse-related injury – gender and age (average annual frequency n=131)

- Male, n=17, 13%
- Female, n=114, 87%

Horse related injury cases – Injury diagnoses

Most common specific injury diagnoses:
- Fracture at wrist and hand level (9%)
- Intracranial injury (6%)
- Fracture of shoulder and upper arm (6%)
- Fracture of forearm (6%)
- Dislocation, sprain and strain wrist & hand (5%)
- Dislocation, sprain and strain ankle & foot (5%)
- Dislocation, sprain and strain neck level (3%)
Horse related injury – region of residence

Mechanisms of horse related injury admissions

- Non-collision incidents (58%)
  - Rider or occupant injured by fall from or being thrown from horse
  - Overturning (without collision)

- Struck or bitten by horse (42%)
Other animal-related injury on farms (annual average 26 cases)

- Bitten or struck by cattle, sheep or pigs
- Dog bites
- Contact with snakes (brown snakes, tiger snakes, unknown snakes)
- Contact with insects

Falls
(annual average frequency = 77 cases)

Age and gender
- Male (57%), female (43%)
- 0-4 (22%), 5-9 (27%), 10-14 (34%), 15+ (17%)

Mechanisms:
- Falls from or out of buildings or structures (e.g., gates, fences, railings)
- Falls from trees
- Other fall from one level to another
- Slips, trips and stumbles on same level
Injury severity – threat to life

International Classification of Disease (ICD)-based Injury Severity Score (ICISS)

The ICISS involves estimating probability of death using the injury diagnosis codes recorded in a person’s hospital record.

Determining which injuries are ‘serious’ involves calculating a survival risk ratio (SRR) for each individual injury diagnosis code. A given SRR represents the likelihood that a patient will survive a particular injury.

Each patient’s final ICISS is the product of the SRRs associated with all the diagnoses listed on the patient hospital record.


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Ranking of causes of farm injury hospital admissions by mean ICISS

<table>
<thead>
<tr>
<th>Cause</th>
<th>Number of cases</th>
<th>Mean injury severity score</th>
</tr>
</thead>
<tbody>
<tr>
<td>quad bike rider</td>
<td>15</td>
<td>0.9157</td>
</tr>
<tr>
<td>near drowning</td>
<td>6</td>
<td>0.9274</td>
</tr>
<tr>
<td>horse related</td>
<td>43</td>
<td>0.9336</td>
</tr>
<tr>
<td>other transport-related</td>
<td>33</td>
<td>0.9424</td>
</tr>
<tr>
<td>pedal cyclist</td>
<td>8</td>
<td>0.9435</td>
</tr>
<tr>
<td>fall</td>
<td>34</td>
<td>0.9438</td>
</tr>
<tr>
<td>car occupant</td>
<td>24</td>
<td>0.9446</td>
</tr>
<tr>
<td>motorbike (ex. quad bike)</td>
<td>148</td>
<td>0.9646</td>
</tr>
<tr>
<td>fires/burns/scalds</td>
<td>6</td>
<td>0.9700</td>
</tr>
<tr>
<td>machinery related</td>
<td>16</td>
<td>0.9732</td>
</tr>
<tr>
<td>other animal related (ex. horse)</td>
<td>22</td>
<td>0.9826</td>
</tr>
<tr>
<td>hit/struck/crush</td>
<td>16</td>
<td>0.9865</td>
</tr>
<tr>
<td>cutting &amp; piercing</td>
<td>8</td>
<td>0.9907</td>
</tr>
</tbody>
</table>

lower score equals higher severity
“Serious” (high threat to life) injury cases

Using generally accepted cut-off of ICISS .941 (probability of death of at least 5.9%).

n=64 cases over 5-year period (16% of all farm injury admission cases)

- Mostly transport-related (66%)
  - Motorcyclists, car occupants, other transport (incl. tractors), quad bikes
- Horses (14%)
- Falls (8%)
- Near drowning (6%)

Further information?
VISU data request service

- Approximately 200 data requests each year
  - Clients: government departments/ agencies; medical, health, safety and injury prevention bodies; university researchers; industry/business; community groups; and media
- Contact VISU office
  - 03 9905 1805 or angela.clapperton@monash.edu