What is ANCIS?

• Study of modern vehicle real world crash performance and occupant injuries

• Criteria:
  – Occupants of crashed vehicles who have been hospitalised as a result of their injuries
  – The car in which they were travelling was manufactured since 1989
Objectives

• To determine patterns and severities of severe crashes and occupant injury causation
• To help devise countermeasures to minimise these injuries
• To evaluate existing safety features
• To identify crash injury trends and car safety issues
• To understand human, vehicle and environmental factors contributing to crash occurrence
Case Timeline

1. Crash
   OCCUPANT TAKEN TO HOSPITAL

2. Occupant Data (Human)
   VEHICLE DETAILS FROM OCCUPANT

3. Vehicle Inspection
   SITE DETAILS FROM AMB. NOTES, POLICE REPORT

4. Crash Site (Environment)

5. Case Finalisation
Method – Occupant Data

- **Purpose:** Occupant ‘performance’, account of crash, injuries, contributing factors
- Research Nurses recruit participants in hospitals
  - Melbourne (6), Sydney (3) and Hobart (1)
- **Occupant**
  - Patient and/or relative’s consent required
  - Structured interview where possible
  - Injury data from medical records
Method – Vehicle Inspection

**Purpose:** Type and severity of impact(s), performance of vehicle structure, restraint and safety systems

**Vehicle examination**
- Impacts and deformations
- Structural integrity
- Intrusion
- Seating and restraints (inc. child restraints)
- Occupant contact points with interior
Method – Crash Site

• **Purpose:** Role of road environment

• **Retrospective site examination**
  – Exact crash location, time and type (DCA)
  – Road and intersection type, configuration, surface
  – Medians and shoulders
  – Traffic control devices
  – Crash evidence
  – Environment and weather
Method – Summing Up

- Crash severity (Delta-V, EBS)
- Injury contacts
- Crash circumstances
- Contributing factors
- Review panel
- Summary sheet
- Database entry

HUMAN
VEHICLE
ENVIRONMENT
Results
Occupant Characteristics

• Overall:
  – 216 cases in database
  – 55% male, 45% female
  – 74% drivers, 18% front seat passengers, 9% rear seat passengers

• Drivers/Front seat passenger
  – Mean age 43 yrs (range 4-87 yrs)
  – 87% belted, 5% unbelted (cf. 95% overall)
## Belt Use

<table>
<thead>
<tr>
<th></th>
<th>Passenger</th>
<th>Front Centre</th>
<th>Driver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passengers</td>
<td>81%</td>
<td>0%</td>
<td>89%</td>
</tr>
<tr>
<td>Rear Left</td>
<td>67%</td>
<td>100%</td>
<td>50%</td>
</tr>
<tr>
<td>Rear Centre</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rear Right</td>
<td></td>
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</tr>
</tbody>
</table>
Airbags

• Front:
  – 24% fitted and deployed
  – 76% not fitted/not deployed

• Side:
  – 3% fitted and deployed
  – 97% not fitted/not deployed
ANCIS Crash Types

- Front: 51%
- Side: 35%
- Rollover: 9%
- Rear: 5%
ANCIS vs TAC Crash Types

TAC
- Front: 69%
- Side: 19%
- Rollover: 7%
- Rear: 5%

ANCIS
- Front: 51%
- Side: 35%
- Rollover: 9%
- Rear: 5%
Injury Severity by Impact Type

Percentage of crashes
Mean ISS

- Front: 20 (28%)
- Near side: 19 (9%)
- Far side: 9 (6%)
- Rear: 9 (5%)
- Rollover: 14 (52%)
Crash Type by Collision Partner

Percentage of crashes

- Tree/pole/post: 29%
- Car/utility: 27%
- Multiple: 16%
- Heavy: 7%
- 4WD: 7%
- Impact + roll: 7%
- Roll: 3%
- Other: 4%
Injury Severity by Collision Partner

Percentage of crashes
Mean ISS

- **Car/utility**: 12, 27%
- **Tree/pole/post**: 18, 29%
- **Multiple**: 17, 16%
- **Impact + roll**: 19, 7%
- **Roll**: 14, 3%
- **Other**: 13, 4%
- **Heavy**: 15, 7%
- **4WD**: 9, 7%
- **Other**: 4%
Front/Side Impact Severity

Frontal:
- Number: 29
- Mean EBS: 53
- Car-car: 37
- Car-pole/tree: 51

Side:
- Number: 21
- Mean EBS: 36
- Car-car: 23
- Car-pole/tree: 32
Front/Side Impact Severity

Mean ISS
Number

Frontal

29
15

24
21

23
12

Car-car  Car-pole/tree

Car-car  Car-pole/tree
AIS2+ Injuries – All Impacts

• Overall injuries suffered
  – 44% chest (69% in car-heavy vehicle)
  – 22% head (35% in rollover)
  – 16% spine (24% in rollover)
AIS2+ Injuries – Side Impacts

• Car-to-car vs car-to-pole/tree
  – Head, 17% vs 43%
  – Abdomen, 22% vs 33%
  – Lower extremity, 48% vs 62%

• Near side vs far side
  – Chest, 60% vs 17%
  – Lower extremities, 57% vs 33%
  – Abdomen, 32% vs 8%
  – Spine 17% vs 33%
What Will ANCIS Contribute?

- **Recent Improvements**
  - More site information
  - System-wide approach
    - Contributing factors
- **Analyses**
  - Airbag effectiveness (ADR69)
  - Head injury modelling
  - Characteristics of multiple impacts
  - Road environment modelling
Acknowledgements

• **Sponsors**
  - Australian Transport Safety Bureau
  - Autoliv Australia
  - DIER (Tas.)
  - Ford Motor Company of Australia
  - Holden
  - MAA (NSW)
  - NRMA (NSW)
  - RACV (Vic.)
  - RTA (NSW)
  - Toyota Motor Corporation
  - TAC (Vic.)
  - VicRoads

• **Observers**
  - FCAI
  - AAA
  - Mitsubishi

• **Victorian Hospitals**
  - The Alfred
  - Box Hill Hospital
  - Dandenong Hospital
  - Geelong Hospital
  - Monash Medical Centre
  - Royal Children’s Hospital
  - The Royal Melbourne Hospital

• **NSW Hospitals**
  - Liverpool Hospital
  - Prince of Wales Hospital
  - St George Hospital

• **Tasmanian Hospitals**
  - Royal Hobart Hospital

http://www.monash.edu.au/muarc