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PSI-02-06

Pole Side Impact GTR: Assessment of Safety Need: Updated Data Collection

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2nd Meeting - GRSP Informal Group on a Pole Side Impact GTR

Brussels, Belgium, 3-4 March 2011

Definition of Pole Side Impact

- Pole Side Impact: A side impact with a rigid narrow object including road signs/traffic signals, lamp posts, telegraph poles, electricity poles, trees, fire hydrants, and bridge supports/abutments.

Note: The data presented here has been compiled solely for the purposes of the GRSP informal group on pole side impact. All data is subject to ongoing review, and therefore also subject to the possibility of future correction, should any issues be identified (e.g. database coding issues/limitations).



Overview of Data Collection

- Varying levels of data provided by USA, UK, Japan, France, Germany, South Korea, Canada, New Zealand and the Netherlands.
 - Further data collection required.
- Australia has collected national fatality data (2000-2006) and more detailed fatality and serious injury data for state of Victoria (2000-2009).
- Difficult to get detailed time series data for all countries.
- In many cases, difficult to accurately identify pole side impacts:
 - May be understated due to data coding / definition issues.
- Different vehicle category and serious injury definitions used in the collection of crash statistics.

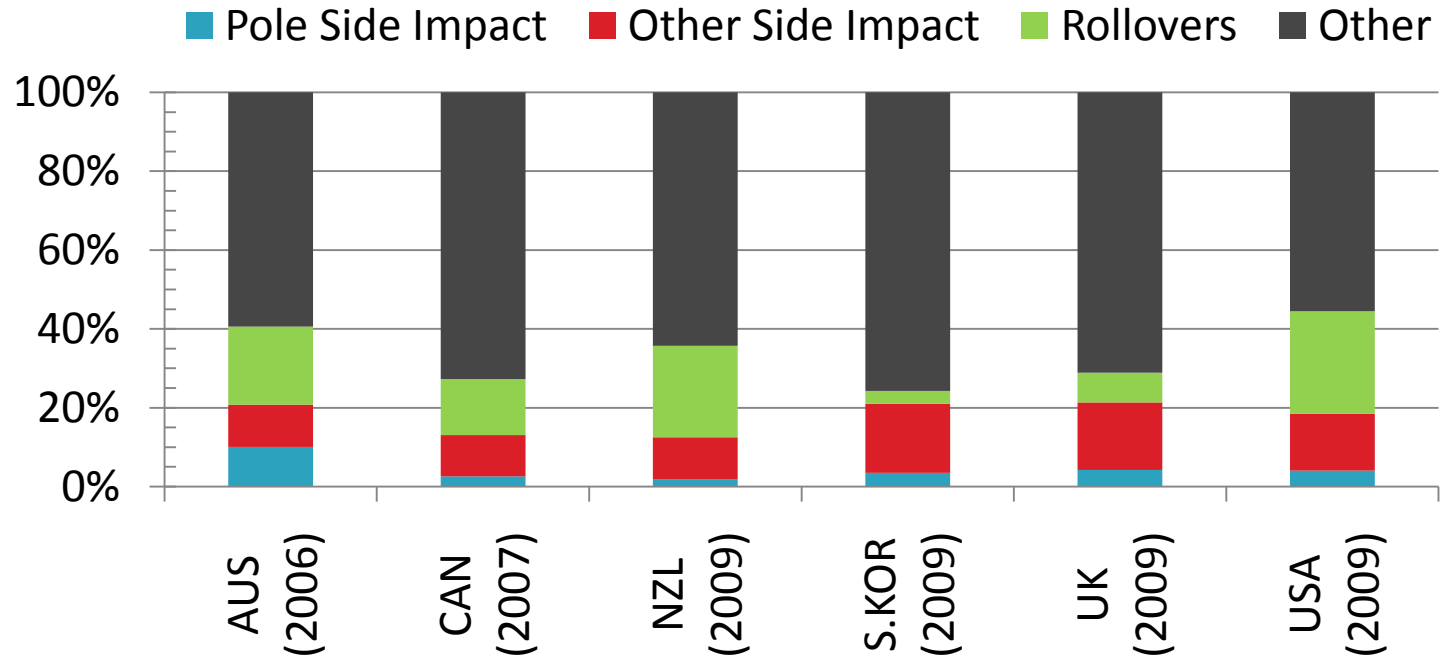


Recent Updates to Data

- UK provided comprehensive fatality and serious injury data for pole side impacts, other side impacts, and rollovers.
- Canada updated data to include all pole type side impacts – data presented last meeting only included poles and not all pole like objects such as trees.
- Netherlands provided fatality and serious injury data for pole side impacts and other side impacts.



Vehicle Side Impact & Rollover Fatalities as a percentage of total road toll



- All 4-wheel vehicle occupant side impact fatalities typically around 20% of national road tolls.
- Canadian figures derived from M1 and N1 figures. Further data required to be able to graph Germany, Japan, Netherlands and France.
- Other includes all other 4-wheel vehicle occupant fatalities as well as motorcyclist, cyclist and pedestrian fatalities.

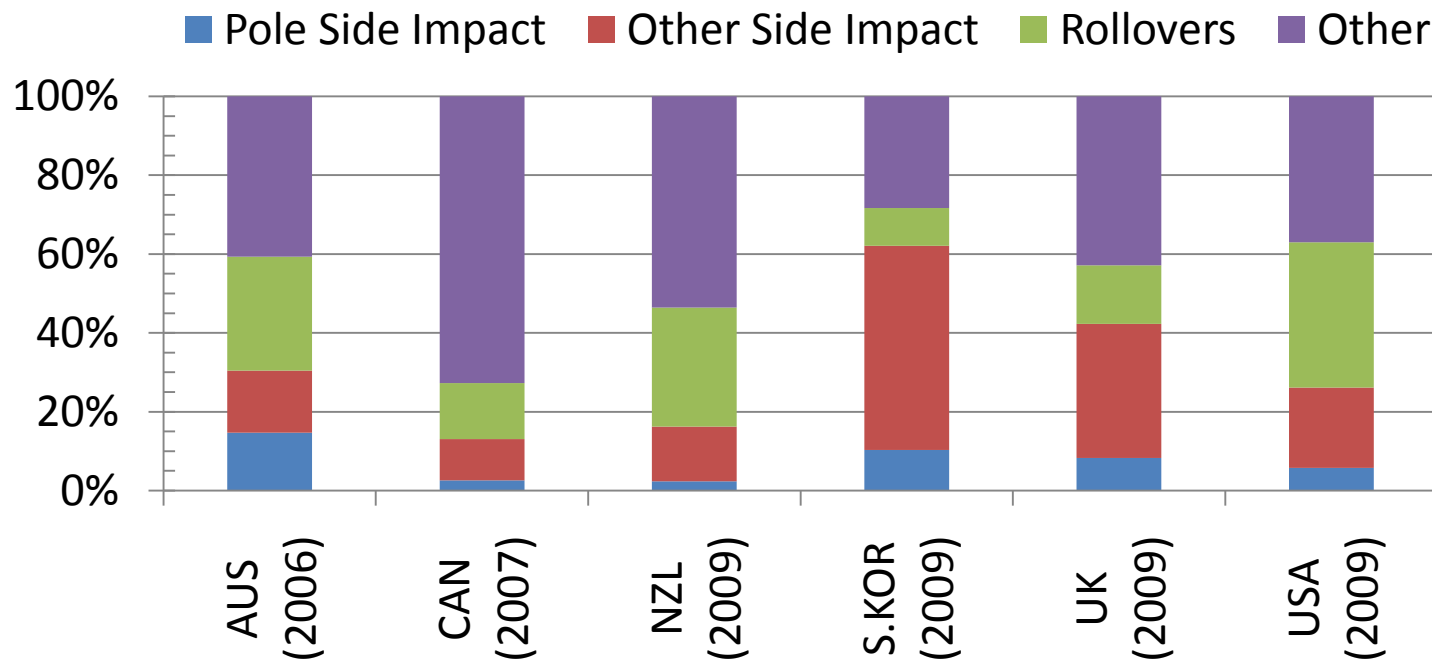


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Side Impact and Rollover Fatalities

as a percentage of all 4-wheeled vehicle occupant fatalities



- Side impact fatalities 15-65% of 4-wheeled vehicle occupant fatalities.
 - Pole side impact fatalities 3-13% of all 4-wheeled vehicle occupant fatalities.
 - Other side impact fatalities 10-50% of all 4-wheeled vehicle occupant fatalities.

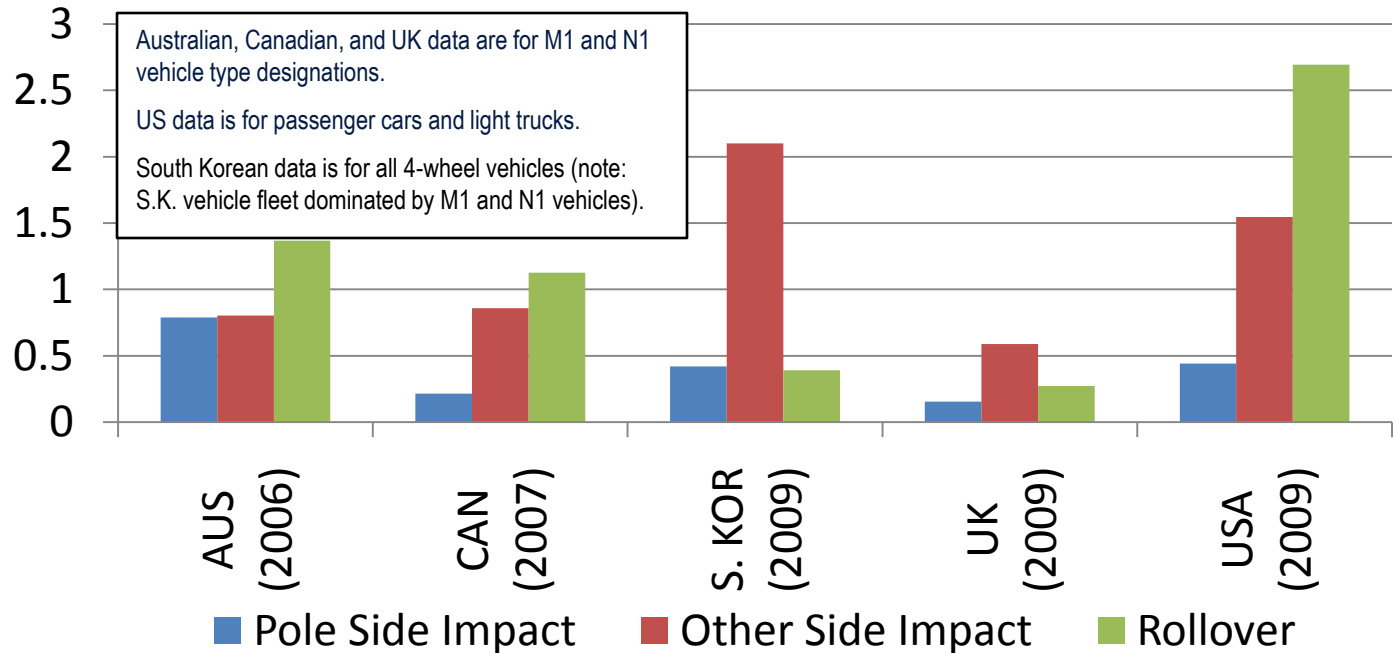


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Passenger & Light Commercial Vehicle Fatality Rates

Fatalities per 100,000 population



- Significant variation by country:
 - Pole side impact fatalities between 0.26 and 0.71 per 100,000 population.
 - Other side impact fatalities between 0.68 and 2.32 per 100,000 population.

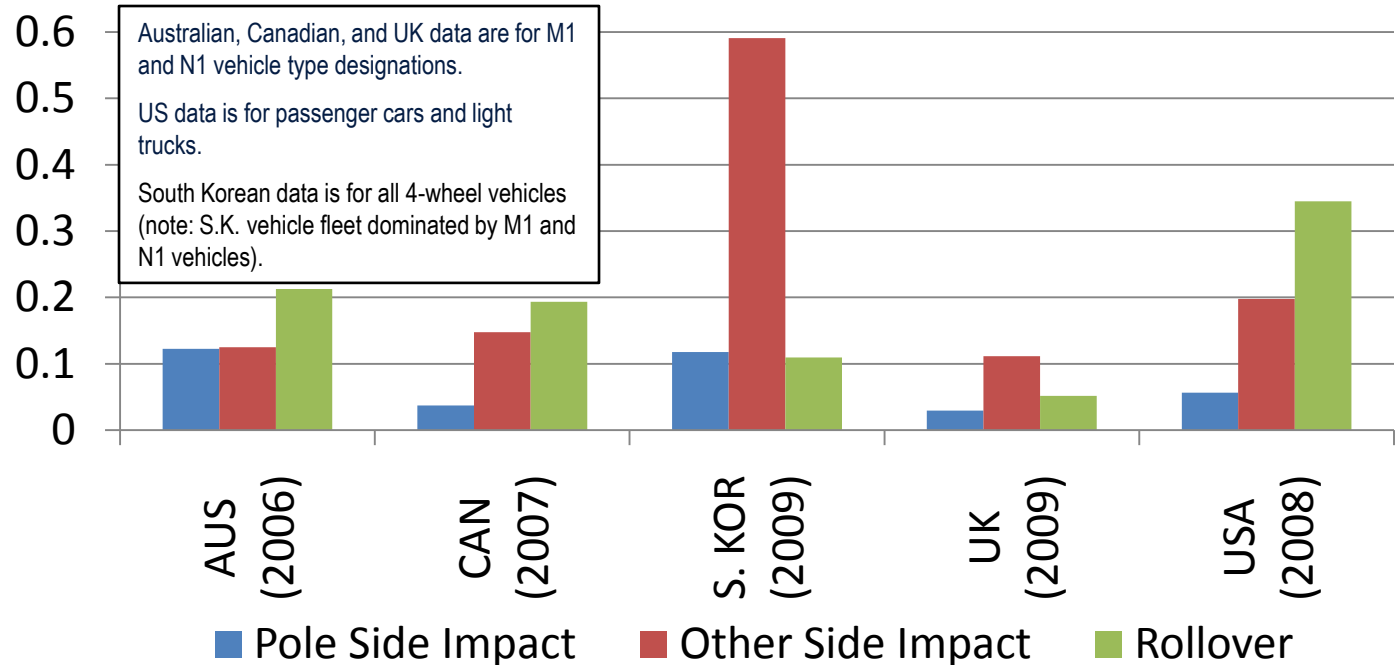


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Passenger & Light Commercial Vehicle Fatality Rates

Fatalities per 10,000 registered vehicles



- Significant variation by country:

- Pole side impact fatalities between 0.03 and 0.12 per 10,000 vehicles.
- Other side impact fatalities between 0.11 and 0.59 per 10,000 vehicles.

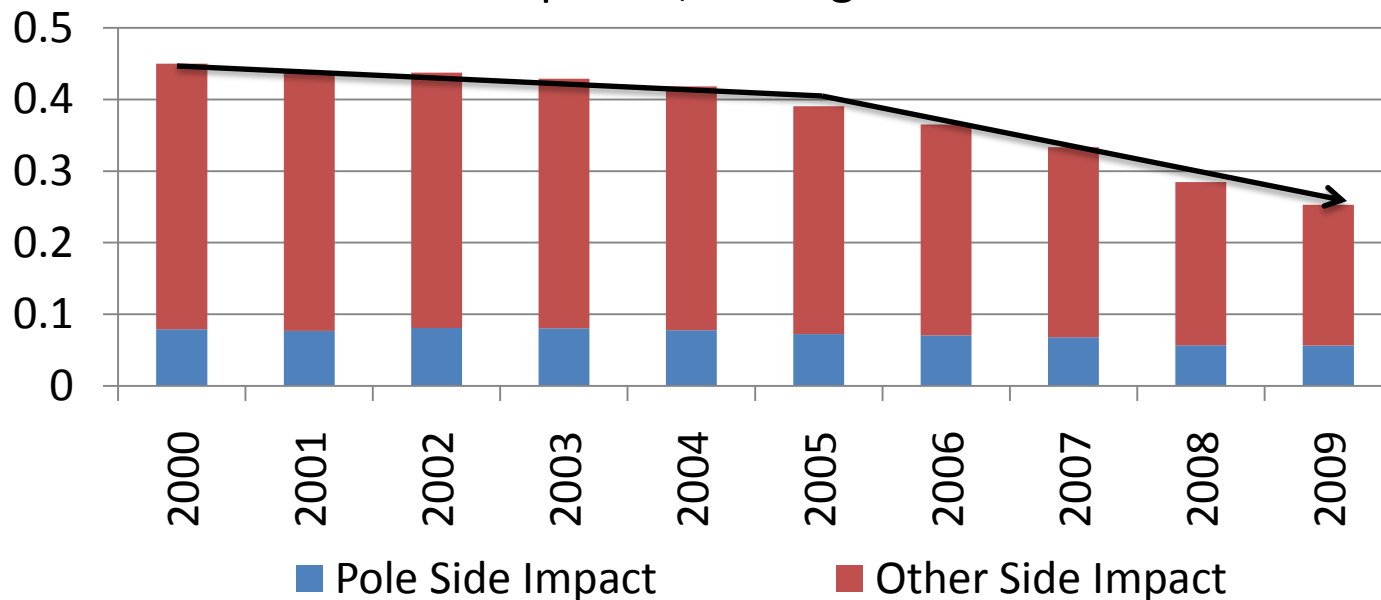


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Passenger and Light Truck Fatality Rate Over Time: United States

Fatalities per 10,000 registered vehicles



- Side impact fatalities per vehicle have declined most rapidly since 2005.
- Other side impact fatalities per vehicle have declined faster than pole side impact fatalities.

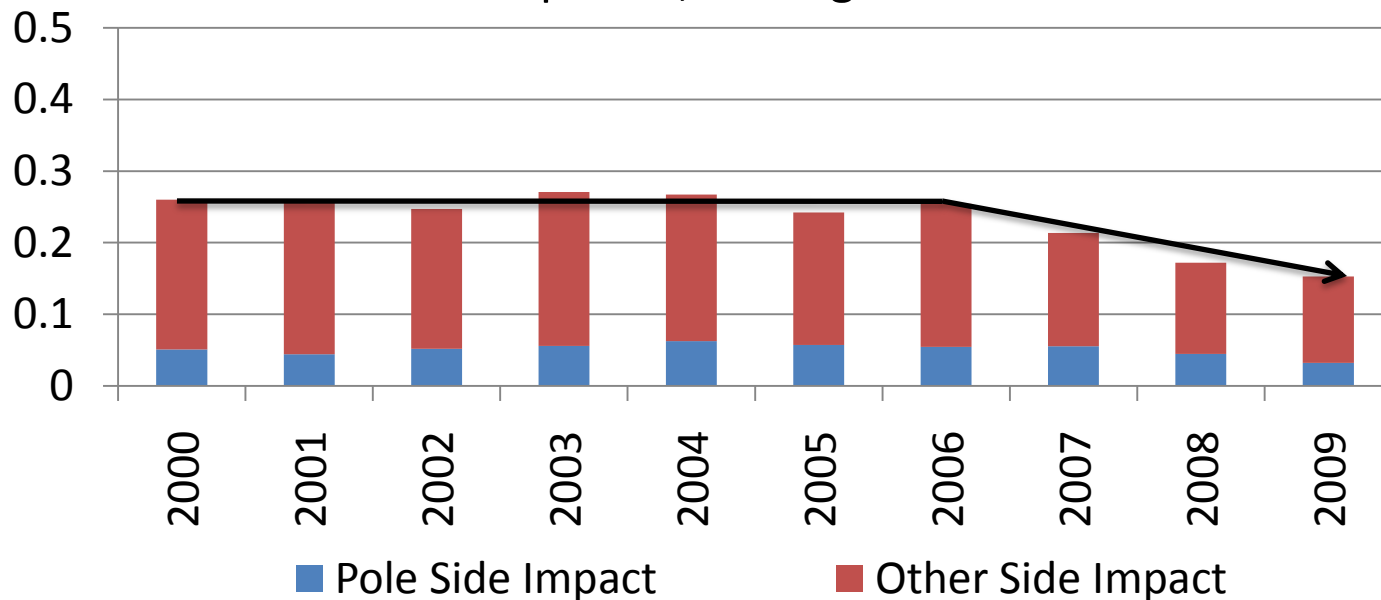


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Passenger Vehicle (M1) Fatality Rate Over Time: United Kingdom

Fatalities per 10,000 registered vehicles



- Side impact fatality rate relatively constant between 2000 and 2006, downward trend since 2006.
- Pole side impact fatalities a similar percentage of all side impact fatalities as in US; although side impact fatality rate per vehicle is much lower.

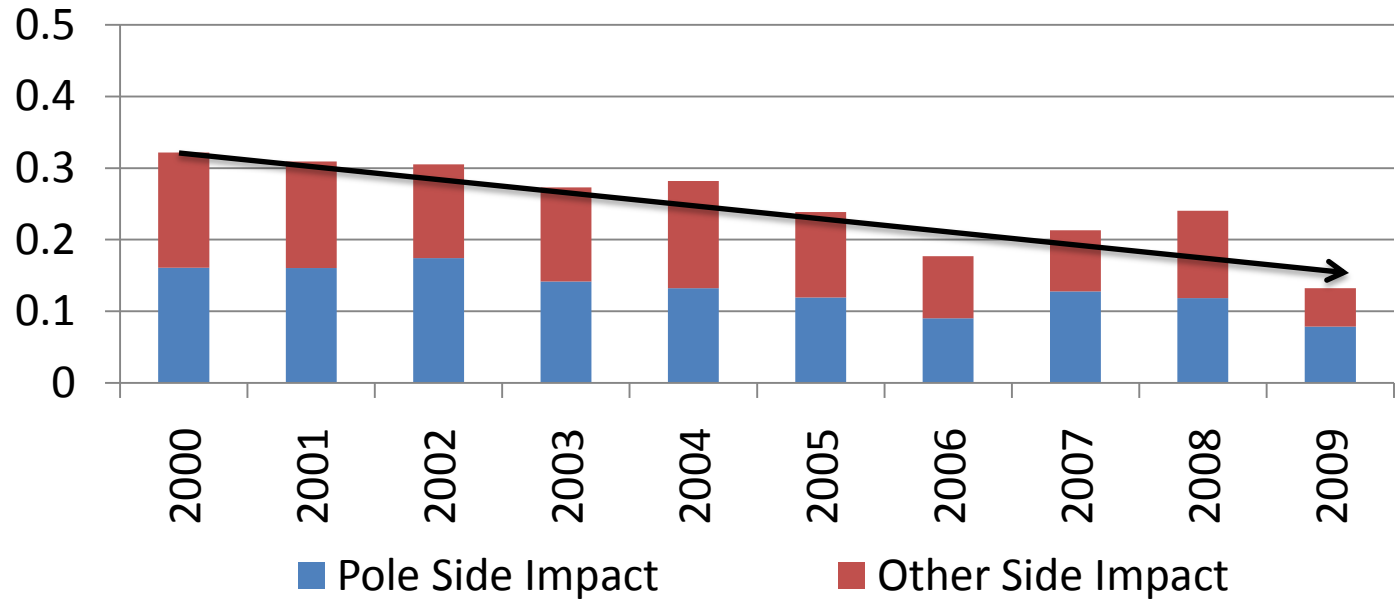


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Passenger (Category 1-1) Vehicle Fatality Rate Over Time: Victoria, Australia

Fatalities per 10,000 registered vehicles



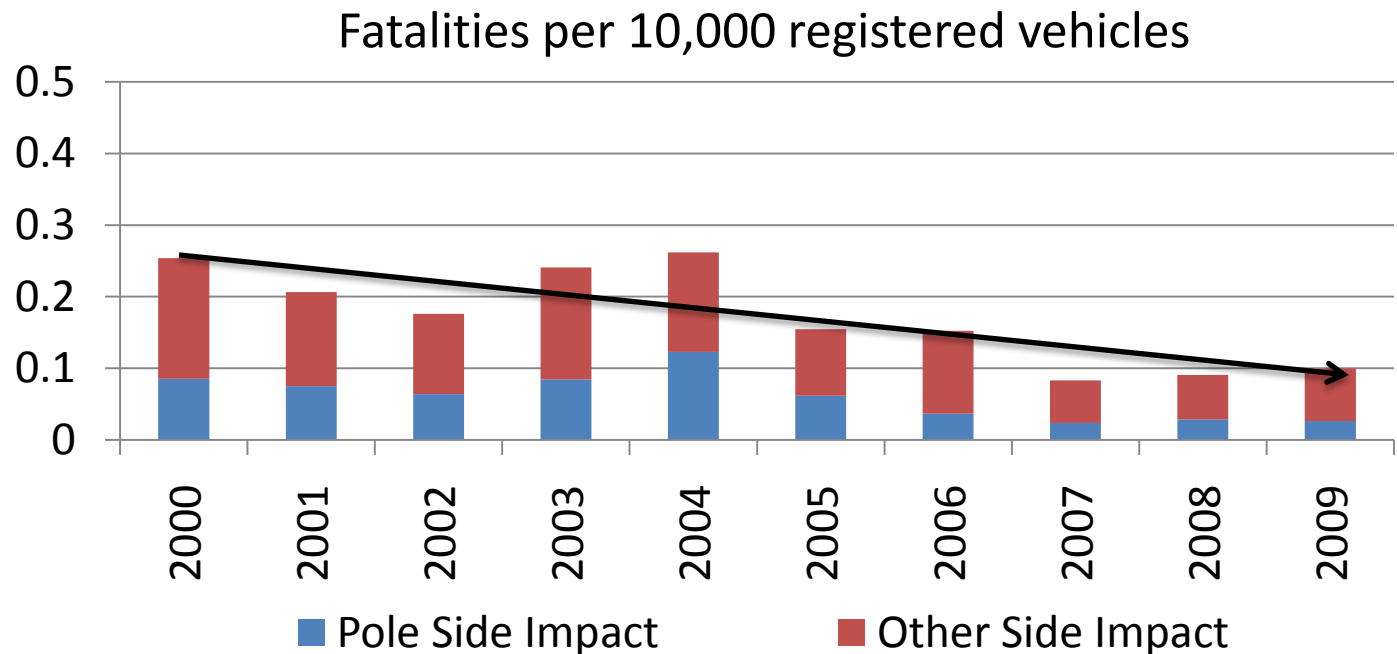
- Steady downward trend in side impact fatalities per vehicle.
- Similar side impact fatality rate per vehicle to UK; but pole side impacts are a much greater proportion of all side impacts.



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Passenger Vehicle (M1) Fatality Rate Over Time: Netherlands



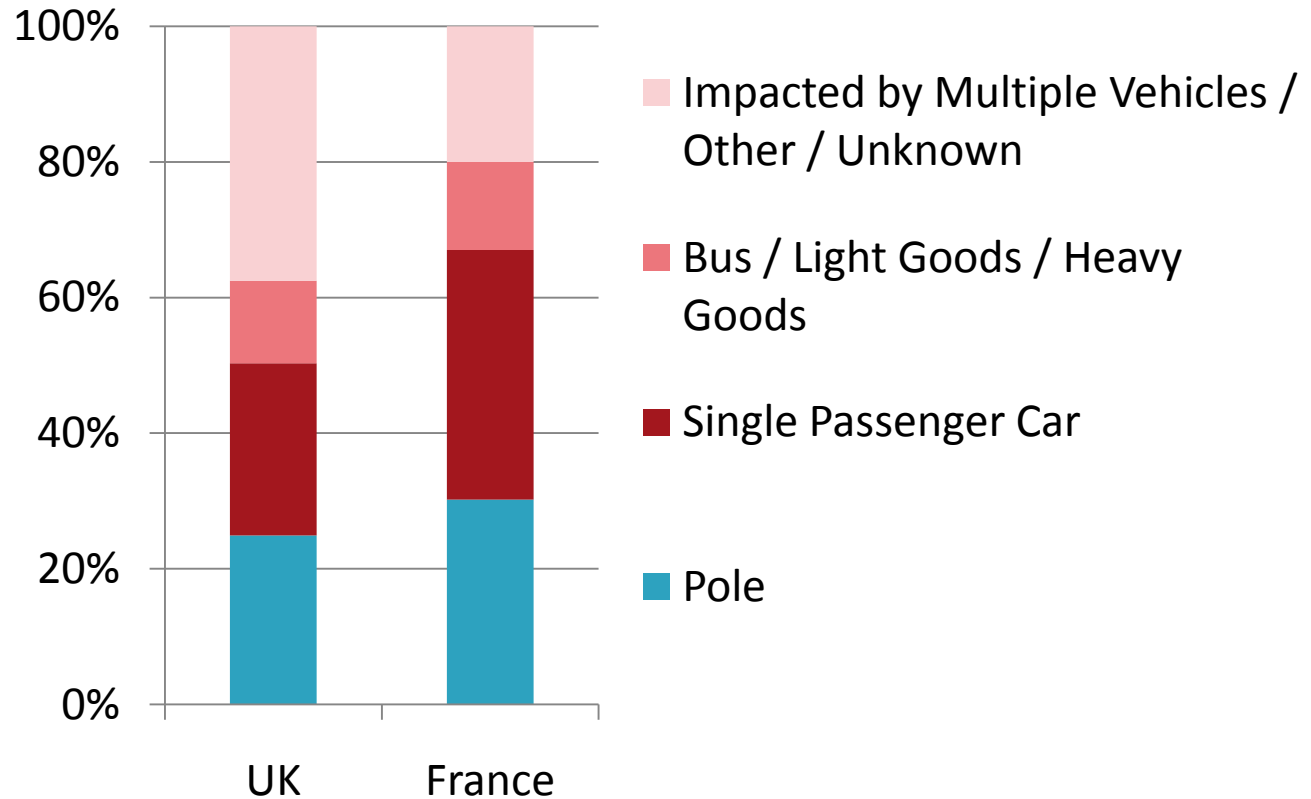
- Overall downward trend with some year to year fluctuation.
- Pole side impact fatalities accounted for around 35% of all side impact fatalities between 2000 and 2009.



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Types of Fatal Side Impacts: Post 1998 Vehicles by impacted / impacting object



Fatal pole side impacts are almost as common as fatal single passenger car to car side impacts simulated in mobile deformable barrier side impact tests.

Source: EENC WG21 Side Impact Analysis

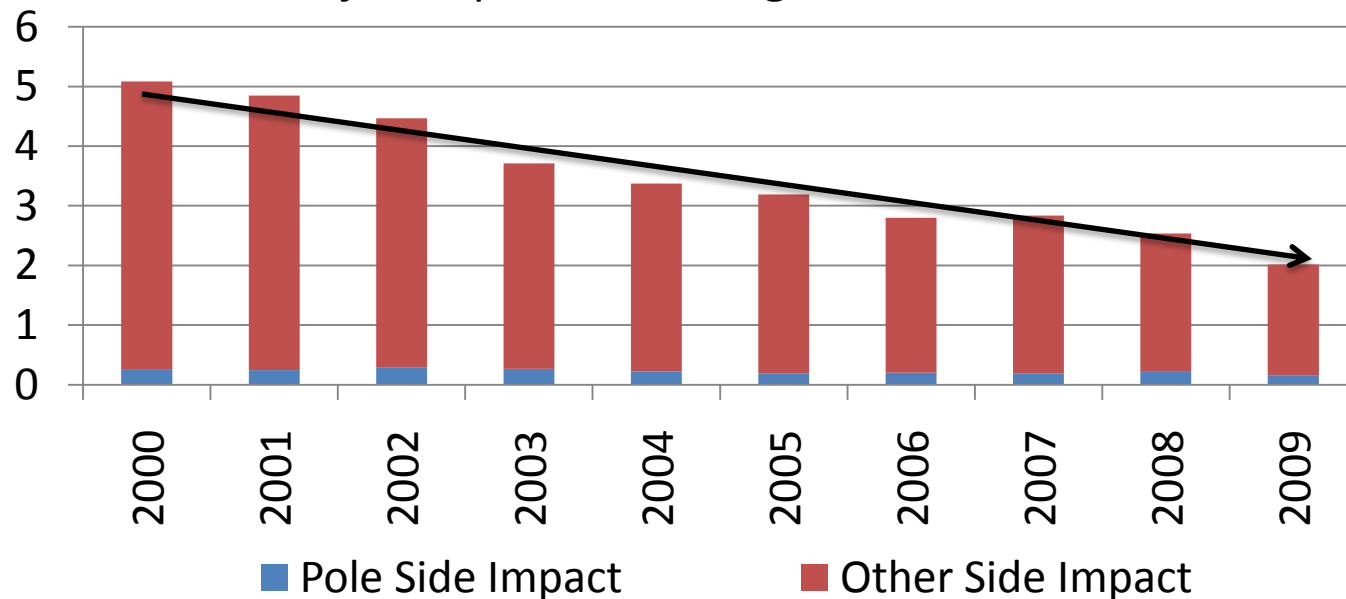


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Passenger and Light Truck Incapacitating Injury Rate Over Time: United States

Injuries per 10,000 registered vehicles



- Incapacitating injuries per vehicle have decreased at a greater rate than fatalities.
- Incapacitating pole side impact injuries have not decreased as much as other side impact injuries.
- Pole side impact injuries are a small proportion of all side impact injuries, but the average cost of injury in each type of side impact may be quite different (need to determine costs).

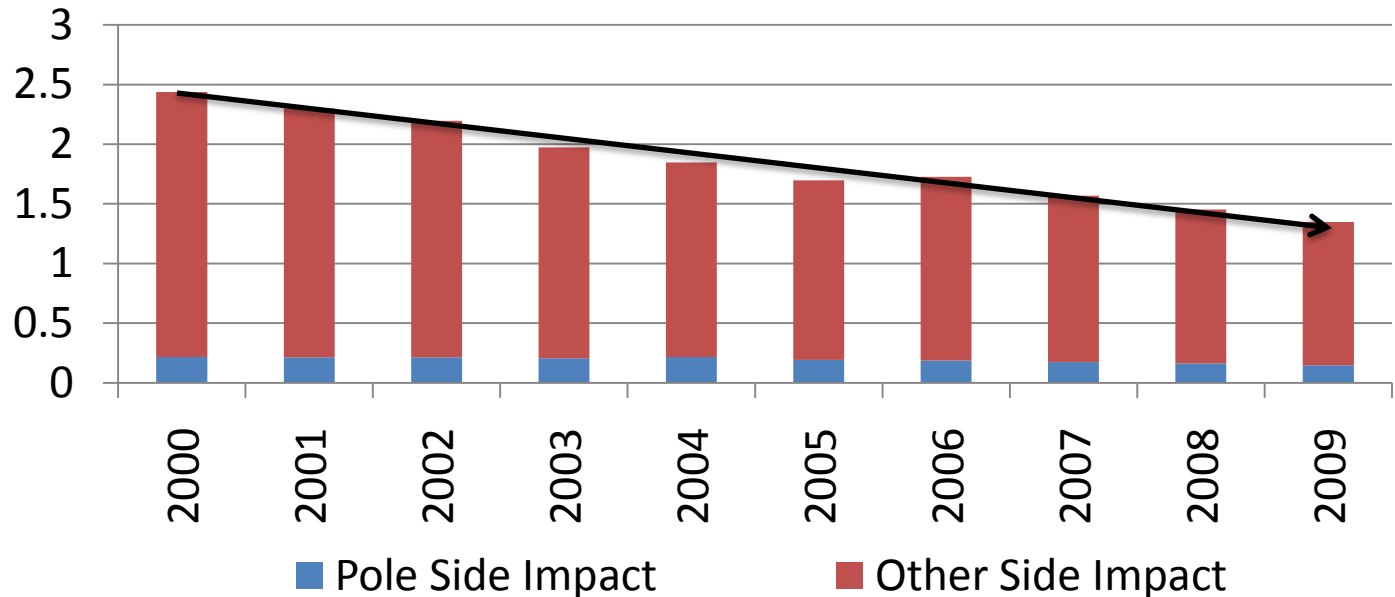


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Passenger (M1) Serious Injury Rate Over Time: United Kingdom

Injuries per 10,000 registered vehicles



- Similar trend to US:

- Serious injuries in side impacts have decreased at a greater rate than fatalities.
- Pole side impact injuries have not shown the same rate of decline.
- Relative injury rates may not be representative of the relative costs of each impact type.

Serious injuries include all those detained in hospital, as well as those known to have received a defined serious injury irrespective of hospital admission status, and those who die more than 30 days after an accident.



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Detailed Australian Side Impact Data Collection by Gender, Seating Position and Age

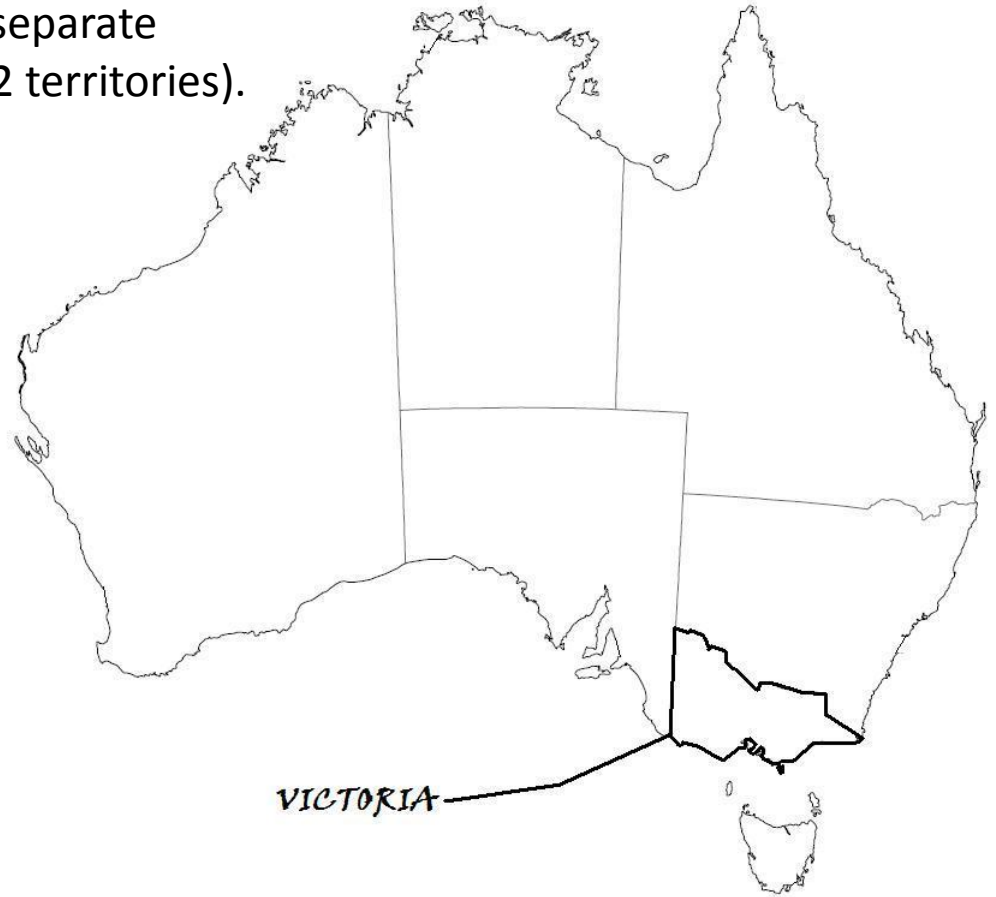
In Australia, road crash fatality and serious injury data is collected by separate jurisdictions (6 states and 2 territories).

Australian Fatality File:

- PSI and OSI data only available to 2006 (3 year delay for detailed national data compilation from police and coroner's reports).

Most comprehensive and up to date data exists in state of Victoria:

- Approx 25% of Australian population & vehicles; and
- Approx 25% of Australian pole side impact fatalities (2000-2006) occurred in Victoria.



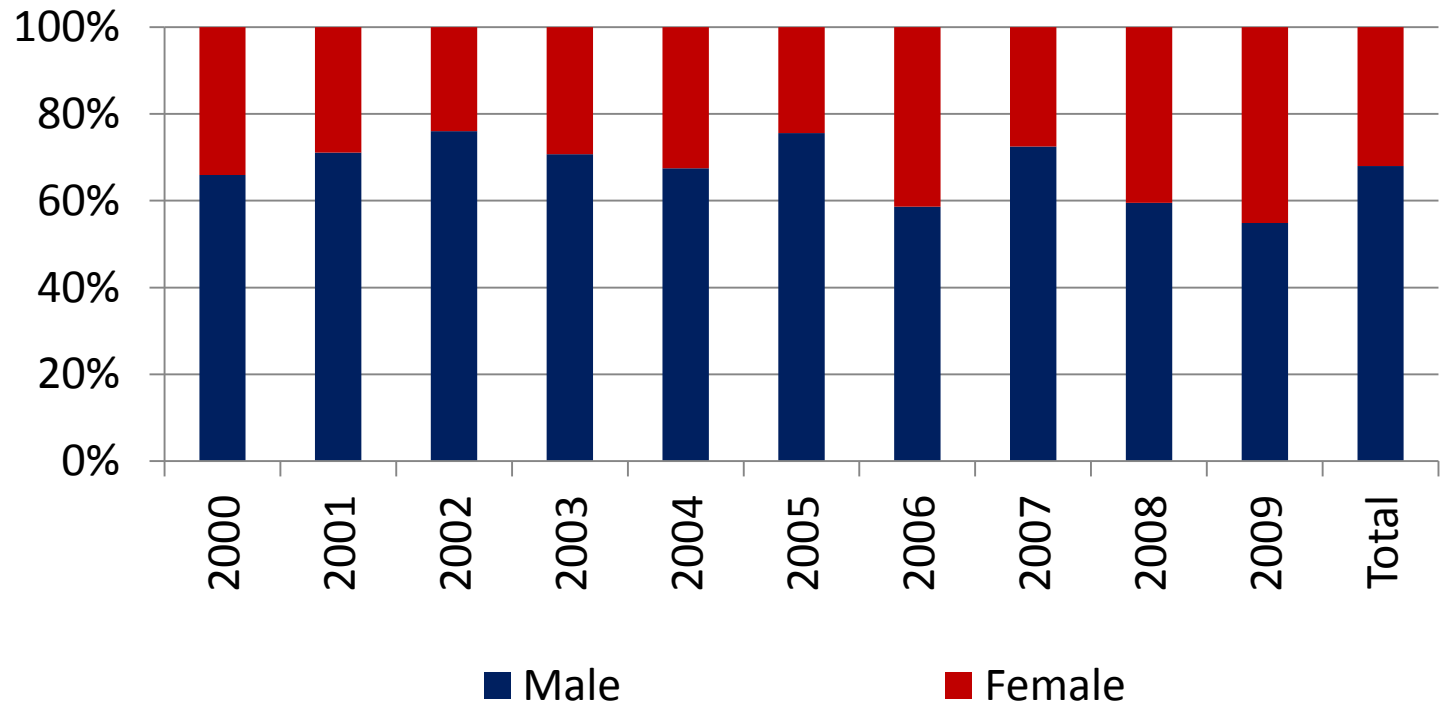
Detailed Victorian data provided by VicRoads from analysis of Victorian CrashStats database.



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Pole Side Impact Fatalities by Gender Victoria, Australia



In 10 years between 2000 and 2009 (see Total above), 68% of pole side impact fatalities were male, 32% were female.

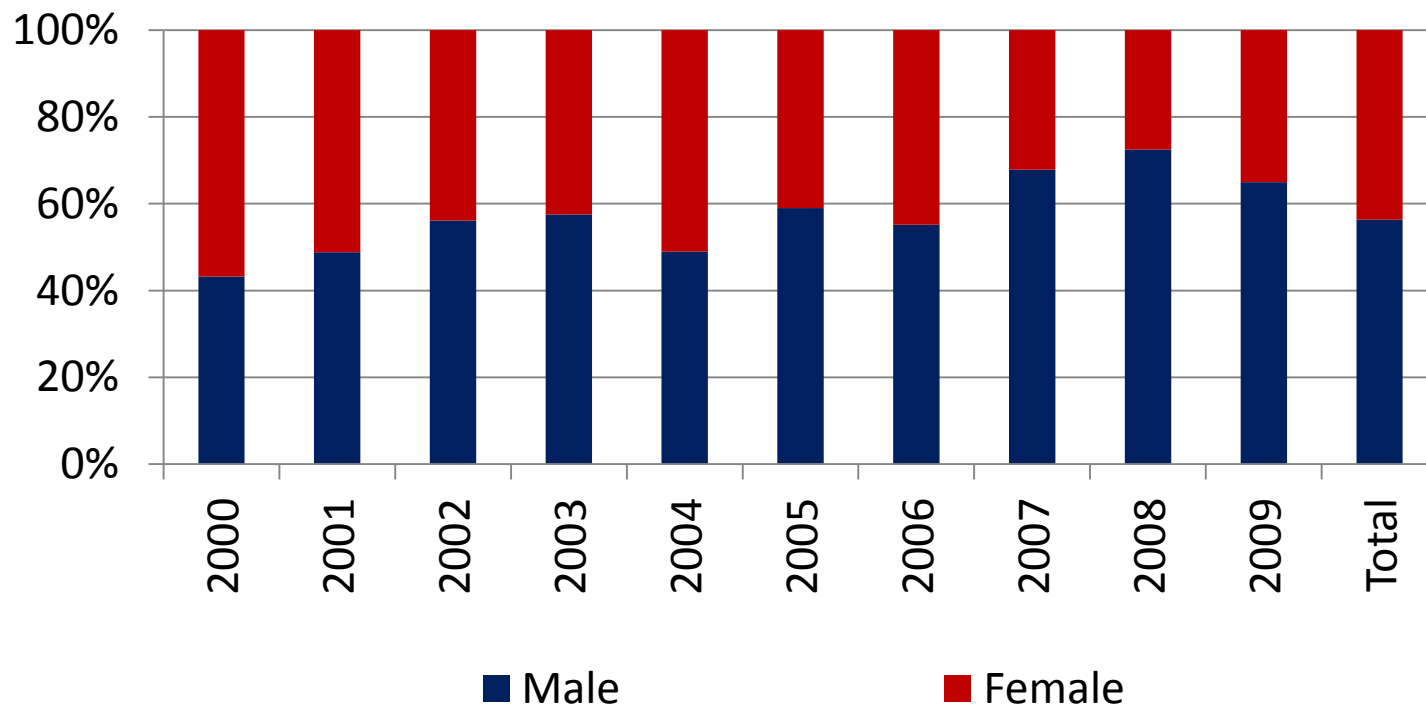
Close to a 2/3 male, 1/3 female ratio over last 10 years.



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Other Side Impact Fatalities by Gender Victoria, Australia



In 10 years between 2000 and 2009 (see Total above), 55% of other side impact fatalities were male, 45% were female.



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Pole Side Impact Fatalities by Seating Position, Victoria, Australia



In 10 years between 2000 and 2009 (see Total above), 64% of pole side impact fatalities were drivers, 21% were front outboard passengers.

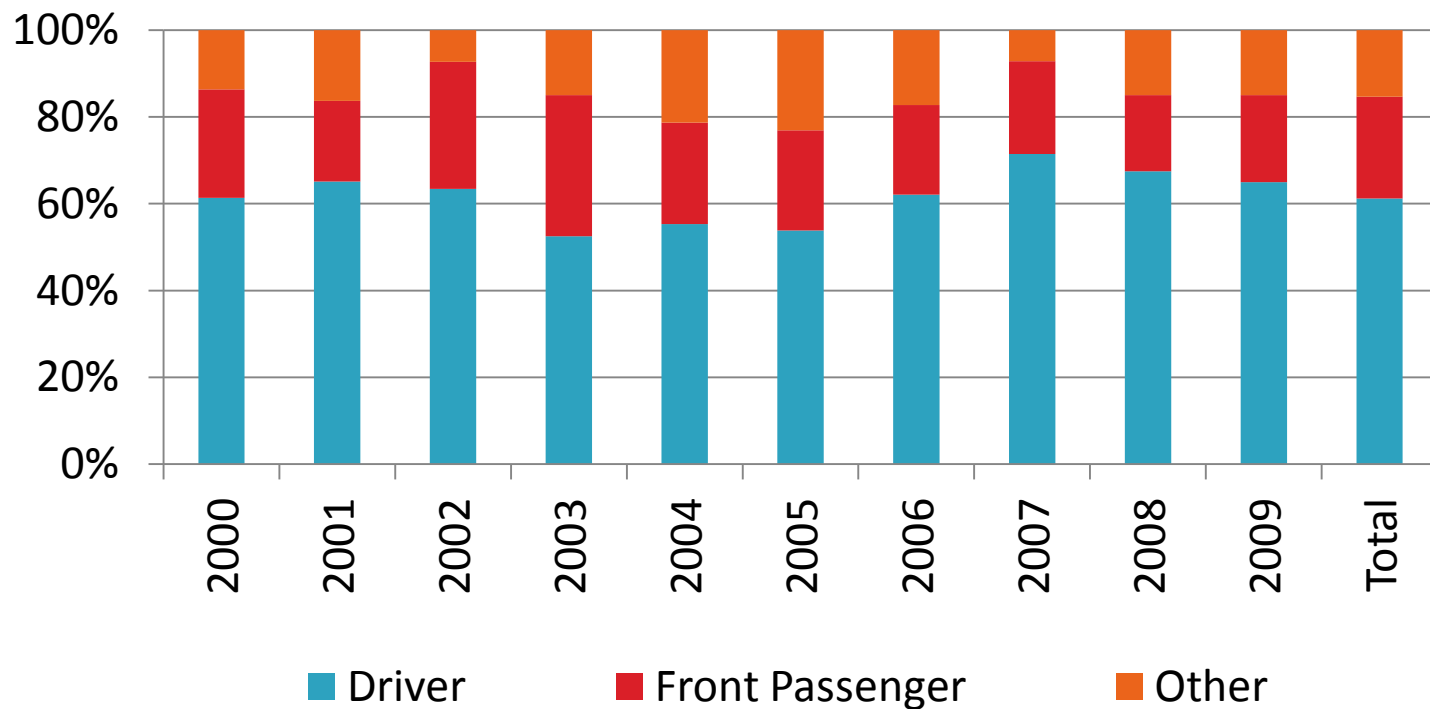
85% of fatalities were occupants of front row seats.



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Other Side Impact Fatalities by Seating Position, Victoria, Australia



In 10 years between 2000 and 2009 (see Total above), 62% of other side impact fatalities were drivers, 23% were front outboard passengers.

85% of fatalities were occupants of front row seats (same as pole impacts).



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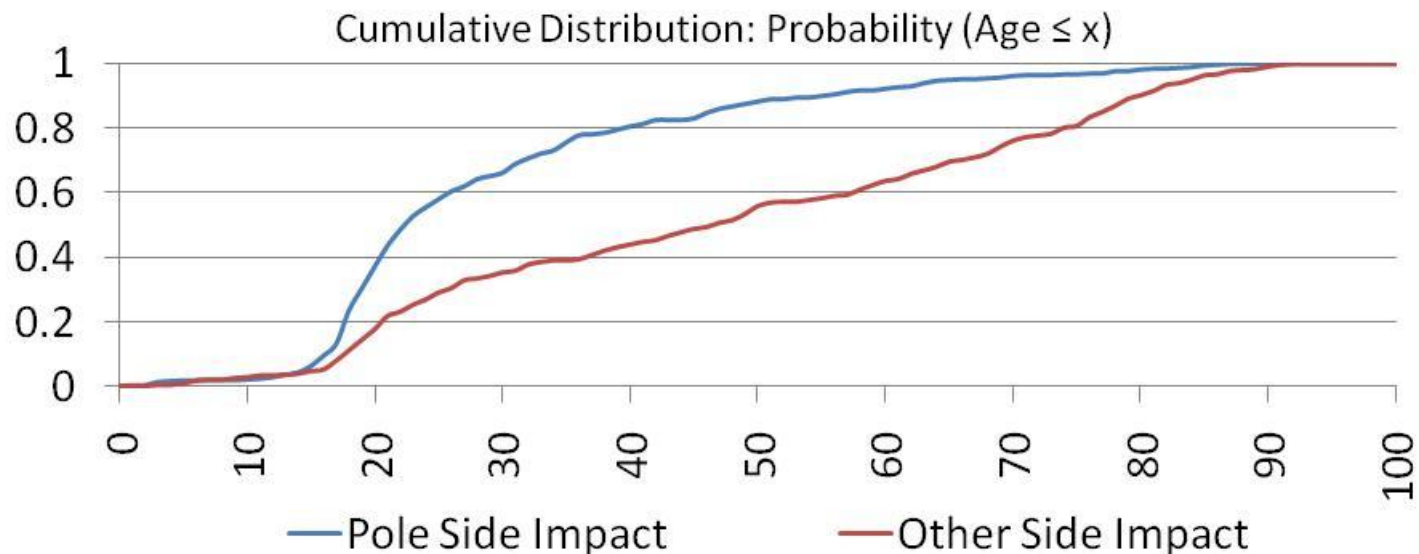
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Importance of Head Injuries in Side Impact

- The cost of a serious head injury can be almost as high as the lost earnings associated with a road crash fatality.
- Mobile deformable barrier tests generally do not require head protection countermeasures in vehicles.
 - UNECE R95 barrier height is 800 mm with a 300 mm ground clearance.
 - FMVSS 214 barrier height is 838 mm with a 279 mm ground clearance.
 - Some vehicles have front structures (e.g. vans, utilities, SUV's, light trucks) which are significantly higher than 800/838 mm, and may therefore produce much greater head injury risk than barrier-to-vehicle impact tests.
- FMVSS 214 pole test Regulatory Impact Analysis Appendix F reported that FARS and GES data show significant reductions in farside impact head injury risk for vehicles fitted with side airbags.
- Any benefit/cost analysis of a pole side impact GTR must differentiate between the cost of a serious head injury and other serious injuries.



Side Impact Fatalities by Age Victoria, Australia (2000-2009)



FMVSS 214 ES-2re and UNECE R95 ES-2 thorax and abdomen injury criteria limits are based on injury risk curves for 45 year old occupant:

- 83% of occupants killed in pole side impacts were aged 45 or less; but
- Only 49% of occupants killed in other side impacts were aged 45 or less.

Countermeasures used to achieve adequate thorax protection in a pole side impact GTR may have additional benefits in vehicle-to-vehicle side impacts for older people.



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Summary

- Side impacts are a significant proportion (generally around 20%) of national road tolls.
- Pole side impact, other side impact, and rollover fatality rates can vary quite considerably from one country to another.
- Benefits of a pole side impact GTR will therefore vary by country.
- Males are over-represented in pole side impacts.
- Young people are over-represented in pole side impacts.
- A large majority of side impact fatalities are front row occupants.



Summary cont'd

- Side impact casualty rates have been declining, but a PSI GTR will help to accelerate this decline.
- Estimates were presented at the Bonn meeting that ESC will reduce pole side impact fatalities by 30-40% for passenger cars (more for SUVs), but ESC is expected to have limited impact for other side impacts.
- The countermeasures manufacturers are currently likely to use to meet a pole test, are expected to improve side impact performance generally, and also have potential in rollover protection (further sensor(s) and/or a different algorithm may be necessary).



Thank you



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