

# CURRENT TRENDS IN MOTORCYCLE- RELATED CRASH AND INJURY RISK IN AUSTRALIA BY MOTORCYCLE TYPE AND ATTRIBUTES

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## AIM

To characterise current and future motorcycle related road trauma to guide effective safety interventions and future research.

## METHODS

The following data sources were used to analyse trends in motorcycle injury crashes and injury risk over 10 years (2005-2014):

- Police reported crash data for South Australia, Western Australia, Queensland, Victoria and New South Wales.
- Registration data for Victoria and New South Wales for the years 2005 to 2014.

Motorcycle characteristic data, including Redbook classification of motorcycle type and other specifications obtained from Road Vehicle Certification Scheme (RVCS) using vehicle identification numbers.

## RESULTS (HIGHLIGHTS)

### Overall

- The proportion of severe injury outcomes increased for motorcycle injury crashes over the 10-year period. The ratio of fatal and serious to minor injury crashes increased from 0.8 to 1.0.
- Motorcycle registrations in NSW and VIC increased by 74% over 10 years. Injury crash counts increased in these states over the ten years but at a slower rate than registrations, leading to an overall decrease in injury crash rates per registered motorcycle.
- The odds of a more severe injury crash outcome were lower for SA and higher for QLD and VIC when compared to NSW.
- There were more motorcycle injury crashes than population proportions would predict in remote and rural areas although this disparity reduced over time, and the odds of fatal or serious injury outcome relative to minor injury was higher (by 48%) in remote regions (relative to rural).

### Motorcycle characteristics

- The three most popular motorcycle types, Sport, Off-road, and Cruisers, were also ranked as the three with the highest relative risk of more severe injury crash outcomes.
- Both injury crash risks and the odds of a severe injury crash outcome were found to be associated with increasing Power to Weight ratio (PWR), although the estimated effects on crash severity were small within the normal PWR ranges.
- The highest injury crash rates (including fatal and serious injury) were for motorcycles in the highest PWR category (350 kW/t). While this represents a small proportion of all registered motorcycles, the proportion of these motorcycles in the fleet doubled over the 10-year period (from 4% to 7%).
- In reference to the definition of LAMS status, the association between engine capacity and injury crash risk varied significantly between different motorcycle types suggesting the LAMS criteria should also make reference to motorcycle type with PWR alone being a relatively crude predictor of likely crash risk.
- While older motorcycles were not a large presence in the registered fleet, their prevalence was high amongst crashes involving unlicensed and novice riders.
- The odds of an injury crash decreased with each (more recent) year of manufacture after 2007, suggesting a safety benefit associated with newer motorcycles.

### Crash types, speed zones and road conditions

- The risk of a severe injury crash was lower (by 12%) if the crash occurred at an intersection and lower by (by 11%) if the speed zone was 50 km/h or less (relative to 60 and 70 zones).

- Multi-vehicle motorcycle injury crashes had more serious injury outcomes (relative to single vehicle) and represented more than 50% of all injury crashes.
- The odds of a severe injury crash was higher (by 49%) in higher speed (80+ km/h) zones (relative to 50 and 70 zones).
- The odds of a more severe injury crash outcome in single vehicle crashes were higher (by ~30%) for motorcycles leaving the carriageway compared to those staying on the carriageway.

## Riders

- While the proportion of riders aged 60+ years involved in injury crashes was small, their rates doubled (from 3% to 7%) over the 10-year period.
- The odds of a severe injury crash outcome increased with rider age and were higher by 39% ( $p < 0.0001$ ) if the rider was aged 60 years and over (relative to riders aged 25-59).
- Female rider injury crash counts increased over the ten year period (average 10% of all crashes), and their rate of injury crashes (relative to registrations) decreased less than for male riders.
- The proportion of unlicensed rider crashes increased over ten years, and unlicensed riders were more likely to have a severe injury crash by 25% when compared to fully licenced riders.
- Learner riders were more likely to crash on older motorcycles and have poorer relative injury outcomes.

## SUGGESTED COUNTERMEASURES AND FUTURE RESEARCH (HIGHLIGHTS)

### Vehicles

- Promote vehicle technologies for both motorcycles and other vehicle types that mitigate high-speed run-off road, cornering, and multi-vehicle crashes.
- Further research to understand unreported and off-road motorcycle crashes using hospital admissions data.

### Speed related

- Reduction of speed limits where appropriate in current high speeds zones, rural/remote areas, intersections and corner approaches.

### Road Users

- Continued or increased enforcement of speed limits and licencing for for motorcyclists.
- Strategies to increase the motorcyclist's conspicuity, such as modulating headlights.
- License refresher training for older and returning riders.
- Promote use of high visibility clothing, and further research into its potential benefits.
- Support increase use of quality protective clothing, incl. introducing national standards.
- New strategies to gain more accurate measures of exposure for the motorcycle population.

### Infrastructure

- Improvement of road infrastructure for motorcyclists in higher speed zones (80+km/h), open roads in rural areas, and intersections including addressing turn-in-front crashes.
- A motorcycle specific road infrastructure evaluation.

## Further information

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