

## **Factors in cyclist fatality crashes: outcomes from an analysis of medico-legal investigations in Victoria**

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### **Abstract**

Death investigations generate the most comprehensive information for sudden and unexpected deaths, including fatalities that result from road trauma. However, these data have not been analysed in Victoria to understand cyclist fatality crash factors. This study examined the coroner's records for all cyclist fatalities in Victoria from 1 January 2000 to December 2014 (n=137). The majority of crashes involved adult cyclists (86.1%) and 8 times as many males as female cyclists. The majority of crashes involved a motor vehicle (77.3%) or were a cyclist-only crash (14.5%). Crash factors were analysed in depth and priority areas for action were identified.

### **Background**

Medico-legal investigations of road fatality crashes are routinely conducted in Australia in accordance with state and territory coronial legislation. However, these reports have been under-utilised in Australia to identify the presence of risk factors for cyclist fatality crashes.

Internationally, coronial data has been examined to understand factors in cyclist fatality crashes (Johnson et al. In Press). Previous studies have recommended helmet use (Oström et al. 1993, Sjöegren et al. 1993, Bajanowski et al. 1994), reported a relationship between substance impairment, particularly alcohol and fatalities (Olkkonen et al. 1993, Rowe et al. 1995) and an increased likelihood crash risk at night or low light conditions (Rowe et al. 1995, Bíl et al. 2010). Heavy vehicles were overrepresented (McCarthy and Gilbert 1996, Moore-Bridger 2009) and speed has been identified as a major contributing factor (Bíl et al. 2010).

The aim of this study was to examine the coronial records for all cyclist fatality crashes, including on- and off-road, in Victoria, Australia from 2000 to 2014 to identify the presence and pattern of contributing factors and to identify priority areas for action.

### **Method**

This study was a retrospective population-based case series study of fatal cyclist crashes that occurred in Victoria, Australia. The coroners' record was reviewed by three authors (AL, MJ and LB) and consensus on eligibility of complex cases was reached by discussion between LB and MJ.

### **Data analysis**

A series of univariate and bivariate descriptive statistical analyses were performed to describe the: frequency of deaths over time and as a proportion of all fatal transport crashes; socio-demographics of the cyclist and counterpart (where relevant); crash characteristics; and presence and contribution of individual factors, speed, vehicle and road and road sides.

### ***Expert consultation forum***

An expert consultation forum was convened with representatives from the Coroners Court of Victoria (CCOV), transport industry including heavy vehicles, and road safety policy to determine the application of the findings to road safety policy and programs and identify priority areas for action.

### **Results**

In total, 156 cyclist deaths were reported to CCOV during the study period. Nineteen deaths were excluded (ongoing case: n=11; natural cause death: n=4; cyclist not astride, n=2; crash outside Victoria, n=1; crash outside study period, n=1).

Total cases were examined for 137 cyclist deaths. The majority (n=115, 83.9%) involved a counterpart (motor vehicle: 92.2%; train/tram: 4.3%; other cyclist: 3.5%) and 22 deaths involved no counterpart with most cyclist only (n=20) and 2 involving a fixed/stationary object. Heavy vehicles were overrepresented.

The majority of fatal crashes occurred in daylight, in clear, dry conditions and one in five crashes involved a cyclist being hit from behind. Males were overrepresented, both as cyclists and drivers. For the cyclists this is likely to be a function of exposure. While this may also contribute to higher involvement of male drivers, in attitudinal research about speeding, male drivers report being less concerned about being fined or involved in a crash compared to female drivers (Lewis et al. 2013).

### **Conclusions**

This study and the discussions in the expert forum identified ten priority areas for action, including: safe driver intersection with cyclists; regional areas; cyclist conspicuity; child cycling skills; and cycling infrastructure. Special mention was made for the need to engage male drivers and cyclists in behaviour change programs.

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