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Submission to the Vulnerable Road Users Inquiry

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This report highlights key findings from a study of bicycle crashes in the ACT, funded by the ACT NRMA Road Safety Trust. The objective is to inform the Inquiry about specific issues relating to roads policy and management, which need to be addressed to make cycling safer for cyclists and pedestrians in the ACT. The key findings relate to the lack of reliable data about the number of cycle crashes and to issues associated with the designation, usage and management of shared paths in the ACT. More detailed accounts of the research findings are published elsewhere [1, 2] and two further papers are pending publication.

Introduction

1. Cycling is often promoted as an energy efficient, sustainable travel mode with many advantages over motorized transport including personal and public health benefits [3, 4]. However cycling is also relatively risky compared to other forms of transport, due to the fragility of the unprotected human body
2. In Australia cyclists represent almost 15% of all seriously injured road crash casualties compared to motorcyclists (22%) and pedestrians (9%)[5]. As increasing numbers of Australians take up cycling, so the number injured also increases [6].
3. The ACT has a well-established and extensive network of linked on-road and off-road cycling routes providing varying degrees of segregation from motorised traffic.
4. The serious injury rate for cyclists in the Australian Capital Territory (ACT) is significantly above the national rate (31 versus 23) per 100,000 population.[5] The high injury rate may be due to higher exposure as the ACT has the highest cycling participation rate¹ in Australia, with 18.2% of the population compared to 13.8% in Victoria and 9.9% in NSW, in any regard steps are required to address the increasing numbers of injured cyclists.[7].



The Pedal Study

5. Adult cyclists injured on- and off-road were recruited from the two hospital emergency departments in the ACT, between November 2009 and May 2010. Using hospital records over the 6 months (Nov 21, 2009 – May 21, 2010), The Pedal Study identified 723 injured cyclists attending one of the two emergency departments (Canberra Hospital and Calvary Hospital) servicing the ACT. Selection criteria for the Study excluded 351 cyclists including 227 children (under 17). Of the remaining 372, 84% participated in the study (n=313) and 35 were admitted.

6. Participants were interviewed and details of the crash, injuries and other associated factors and demographic information recorded. Crashes were classified as either transport-related (n=202, (64.5%) or non-transport- related (n=111) according to the crash location. Transport-related included crashes in-traffic, in cycle-lanes, on shared-paths or other pedestrian areas. Non-transport related included mountain bike trails or other unsealed bush tracks and sealed-surface areas such as BMX/skateboard parks and other areas of the build environment such as storm water drains and public steps. The findings for transport and non-transport related crashes are reported separately.

A. Scope of the problem

7. All traffic crashes in the ACT, irrespective of the amount of damage or extent of injury are required to be reported to Police and can be done in person or on-line. Data on crashes is published annually by calendar year by Roads ACT. Over the combined two years 2009-2010 there were 29 reported cycle casualties admitted to hospital and 104 treated and discharged, police have no records of any cyclist-pedestrian crashes over that time. [8, 9].

8. The Pedal study identified substantially greater numbers of casualties in the six months of its operation, than were reported over the entire two years of reported crash data. This included a total of 723 cycle casualties presenting to hospitals over the six months studied. At least 35 adults were admitted to hospital and an unknown number of the 227 children (due to study criteria), there were also at least 13 cyclists injured in crashes with pedestrians.

9. It was apparent from the interviews that participants were not aware of their legal obligations, to report their crashes to police. Only a minority (17%) of those involved in transport-related cycle crashes had reported them to police. Those that were reported had mostly occurred in traffic or on cycle lanes and involved a motor vehicle. None of those involved in crashes with pedestrians (n=13) had reported these incidents nor were they aware of them being reported to police by others. Most of these cyclist-pedestrian crashes occurred on shared paths, but the fate of those pedestrians is not known, nor that of any other pedestrians who may have been injured in cyclist crashes that were not included in this study.

10. These data demonstrate the extent to which the published records under- estimate the true prevalence of cycle crashes in the ACT. Lack of reliable information about the actual prevalence of cycle crashes is a significant limitation to efforts to determine causes and countermeasures for cycle crashes and injuries. Under reporting of cycle crashes, as with motorcycle and pedestrian crashes is not unique to the ACT and has been noted by other studies around the world.[10-13]



A. Policy implications:

A.1. *There is an urgent need to clarify and promote awareness of road users' obligations to report all injury crashes to police particularly in relation to crashes on shared paths and those involving non-motorised road users.*

A.2 *There is an urgent need to review the methodology for crash data collection and to establish linkage with hospital records to achieve more reliable information as to prevalence, type and severity of crashes particularly those involving vulnerable road users.*

B. Relative crash risks in different cycling environments

11. Of the 202 cyclists injured in transport related crashes 39% were riding in-traffic, 8% in cycle-lanes, 36% on shared-paths and 17% on footpaths or other pedestrian areas. Over half the participants (n=122, 60%) were injured in single vehicle bicycle crashes including impacts with pedestrians (n=13) and animals (n=4) on the path. The remainder involved either motor vehicles (21%) or other bicycles (19%).

12. Crashes on shared paths and in traffic were more likely to result in serious injury and to require admission to hospital than those on cycle lanes or other pedestrian facilities.

13. These findings are consistent with other studies that have concluded that separated cycle-only facilities such as on-road cycle lanes have a positive safety effect, whereas shared facilities such as footpaths (sidewalks) and shared paths (multiuse trails) have been found to pose higher injury risk than riding in traffic.[14-16]

14. Perhaps the most important finding of this study is to establish that the vast majority of these cyclists (79%) who attended a hospital emergency department had been injured in falls or crashes with other vulnerable road users but only 21% involving a motor vehicle. Those riding either in traffic or on shared paths were more likely to have serious injuries (AIS \geq 3) and be admitted to hospital than were those on cycle lanes or footpaths. There were no differences in other indicators of injury severity associated with type of cycling environment, nor type of road users involved (single bicycle, motor vehicle, other cyclist or pedestrian).

B. Policy implications:

B.1 *Though the injury risk of collisions with motor vehicles is undeniable, these findings indicate that undue focus on motor vehicles may lead cyclists to underestimate other sources of injury risk. The importance of these results is to direct cyclists' attention to the wider range of crash risks apart from motor vehicles.*

C. Uncontrolled intersections

15. Crashes involving motor vehicles were most likely to occur at uncontrolled intersections. This is consistent with studies from the United States and Europe, in particular those which have identified roundabouts as relatively high-risk intersection configurations for cyclists and pedestrians.[17, 18]

C. Policy implications:

C.1. *These findings provide further support for ongoing monitoring of uncontrolled intersections for safe access by cyclists and pedestrians and to provide more effective facilities where required.*



D. Shared paths

16. Perhaps the most important finding is the relatively high crash involvement rate on shared paths compared to cycle lanes. Using available cycle traffic counts, the crash involvement risk per 1000 cyclists using cycle lanes was calculated to be 5.8 compared to 11.8 for shared paths.

17. Over half of those injured on shared paths were in single bicycle-only crashes, almost one quarter involved other cyclists and 20% involved a pedestrian.

18. Under Australian national guidelines, shared paths are recommended only in areas where pedestrian and/or cyclist usage is low (<10 per hour). A minimum path width of 3 m is required on shared paths where high speeds occur (≥30 km/h) and a minimum of 2.0 m for shared paths where all usage is always very low (<10 per hour) at all times and on all days.[19]

19. It is apparent that many of the designated shared paths in the ACT have higher usage volumes than recommended, as more people engage in cycling and walking. Many of the cyclists who crashed on shared paths referred to them as bike paths, which may reflect longstanding usage but which must be addressed if public policy is for these paths to be shared with pedestrians.

20. The default speed limit in the ACT is 50 Km/h and was cited as the applicable speed limit by 67% of those who crashed on shared paths and 44% of those who crashed in other pedestrian areas.

21. Australian guidelines recommend that bike paths be designed for speeds of 30 km/h or more but that speeds on footpaths should not exceed 15 km/h.[19] These guidelines do not provide for the situation in ACT, where cyclists are permitted to cycle in all pedestrian areas.

22. It was apparent from the interviews that at least some cyclists believed shared paths were 'off-road' cycling and not subject to traffic regulations or police enforcement. These findings raise questions that need to be resolved urgently as public policy increasingly promotes the development of shared paths.

D. Policy implications:

D.1 The legal status of shared paths in relation to traffic regulation requires clarification to ensure that they are under appropriate jurisdiction for traffic management, enforcement, and crash reporting requirements.

D.2. Appropriate speed limits for shared paths and those segregated for cycle use need to be determined and widely publicized.

D.3. The application of the default speed limit in the ACT should be re-defined to exclude any areas shared with pedestrians.

D.4 The existing network of shared paths in the ACT needs to be audited for remediation and classified according to established criteria for classifying paths as suitable for shared or segregated usage.



E. Cyclist-pedestrian crashes

23. While there is substantial evidence of the incompatibility of cyclists and motor vehicles there is little to justify shifting the risk to shared paths where similar incompatibility exists between pedestrians and cyclists. As the usage of shared paths continues to increase, it is likely that the burden of injury will shift from bicyclists to pedestrians, particularly older pedestrians.[6]

24. There were 13 cyclists injured in crashes with pedestrians, most of which occurred on shared paths. The fate of those 13 pedestrians is not known, nor of any other pedestrians who may have been injured in crashes where the cyclists did not take part in this study. A limitation of the study was that the need to include pedestrians injured in collisions with cyclists was not anticipated.

25. There is evidence cycle-pedestrian crashes are more likely, than car-pedestrian crashes, to result in serious injuries from secondary impacts to the pedestrian's head with the ground.[6] Researchers modeling bicycle–pedestrian impacts have found that the risk of head injury to a pedestrian occurs at impacts from 10 km/h.[20, 21]

E. Policy implications:

E.1 Further research is needed to establish the prevalence, severity and factors associated with cyclist-pedestrian crashes in all public environments.

E.2. Policies based on assumptions of compatibility between pedestrians and cyclists need to be revised to take account of current and evolving changes in modes of usage and speeds.

F. Single bicycle and bicycle to bicycle crashes

26. The majority (79%) of cyclists who attended a hospital emergency department had been injured either in single bicycle-only crashes 60% or in collisions with other cyclists (19%).

27. The most common causes of single bicycle only crashes were riding out of control on a straight section of road/path (49%) or on a curve (13%) or colliding with an object on the path (19%).

28. Road environment hazards accounted for a small proportion compared to behavioural factors, including lack of bike maintenance, equipment failure, excessive speed, alcohol use, or carrying an excessive or unbalanced load.

29. Cyclist to cyclist crashes mostly occurred either mid-block in traffic (53%) or on shared paths (47%). A high proportion involved cycling in groups (45%) and crashes occurred when cyclists were clustered closely together.

F. Policy implications:

F.1 Work with cyclist organizations to ensure cycle training programs include information about the range of risk factors for cycle crashes and injury in addition to motor vehicles.

F.2. Group riding protocols to be promoted requiring cyclists to maintain crash avoidance space with other cyclists and road users.



G. Cyclist clothing and injury risk

30. Although head and thorax injuries are more likely to be life threatening, the majority of cyclists' hospital presentations involve less serious injuries, particularly to their upper and lower extremities.[21, 22]

31. Investigation of clothing worn by cyclists and the injuries they sustained found that those who covered their skin, were significantly less likely to have injuries compare to those who rode with skin exposed, when other factors including fabric type were controlled. Specifically those wearing: short-sleeved tops had double the risk of arm injuries; shorts or skirts had three times the risk of leg injuries and open footwear led to over 6 times the risk of foot and ankle injuries. Those with bare hands were almost 5 times more likely to have cuts, lacerations or abrasion injuries compared to wearing full-cover gloves.[2]

G. Policy implications:

G.1 Work with cyclist organisations to promote awareness that simply covering up with long sleeves and pants, gloves and enclosed shoes significantly reduces injury risk in crashes.

H. Non-Transport related crashes (Off-road)

32. No significant differences were observed in the severity of injuries between the Transport-related and Non-transport related cyclists, nor between the two groups of non-transport related - off-road sealed (BMX) and unsealed (Mountain bike) cyclists.

33. Most off-road cyclists (92.0%) were injured in falls involving jumping (16%), obstacles on the track (16%), sliding out (15%), riding too fast (12%) or simply losing balance (12%). Injuries were mostly minor (58%:AIS 1) with 36% moderately severe (AIS 2) and 6% serious (AIS3+), with the **most common injuries being cuts and lacerations. Sixteen percent sustained serious internal organ injuries, 36% sustained fractures and 22% had facial injuries.**

H. Policy implications:

H.1. The absence of significant differences in the severity of injuries from crashes on-road and off-road indicates that the injury risks associated with off-road cycling merits increased attention as a public health issue.

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