HELMET WEARING AND CYCLIST SAFETY

Compulsory wearing of helmets by bicycle riders was introduced as part of the National Road Safety Program by States and Territories in Australia during the period 1990-1992. This report analyses trends in serious injury for bicycle riders and the incidence of helmet wearing by riders involved in serious crashes.

The data analysed is police reported incidents of serious bicycle crashes. The great majority of police reported crashes involve a collision between a vehicle and a bicycle. Crashes which do not involve a collision are rarely reported to police although they can still result in serious injury. As a result the incidence of serious injury to cyclists as reported by police is well below that reported from hospital data. While police data underestimates the absolute number of cyclists injured, it remains a reliable and consistent source from which trends may be established. The report also draws on autopsy findings for cyclists killed in road crashes.

Recent Trends in Casualties

A cyclist casualty is where a cyclist is killed or admitted to hospital as a result of a road crash. The trend in cyclist casualties for the period 1981-1996 is reported in Figure 1.

Cyclist casualties have decreased from a peak of 1,741 in 1988 to a low of 1,036 in 1995. These years include the period when compulsory helmet wearing was introduced. This introduction was accompanied by a drop of 31% in casualties from 1990 to 1993. In considering whether this dramatic drop in the incidence of cyclist casualty was related to the introduction of compulsory helmet wearing, one should take into account general changes in the road toll that occurred at that time.

From 1988 to 1991, there was a steep decline in the national road toll for all road users. To get a reasonable comparison between the overall drop in the toll and the reduction specific to cyclists, we can compare the average number of casualties for the four years prior to the introduction of compulsory helmet wearing (1987-1990) to the average for the four years after its introduction Australia-wide (1993-1996). The use of a number of years allows us to even out random variation that occurs from year to year. Figure 2 demonstrates that the reduction in cyclist casualties (down 33%) far exceeded the decline in the total road toll (down 23%).

Figure 1: Cyclist casualties 1981-1996

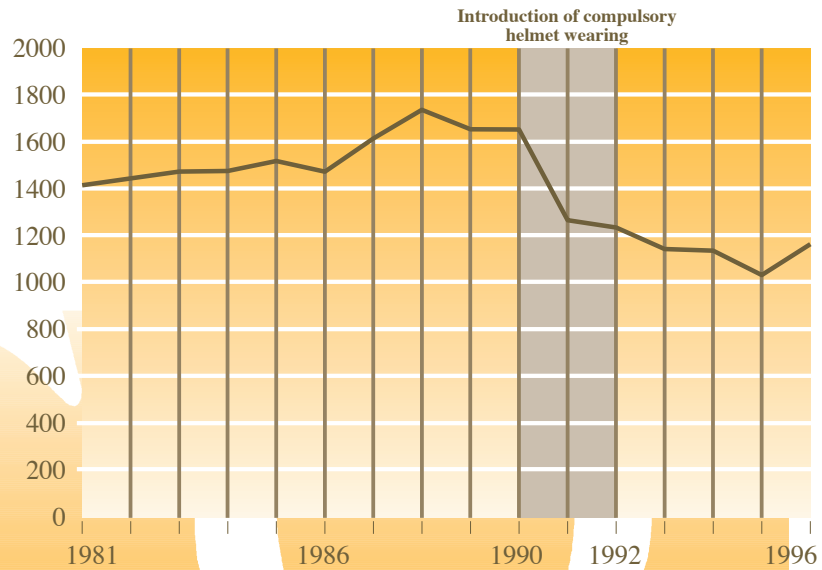
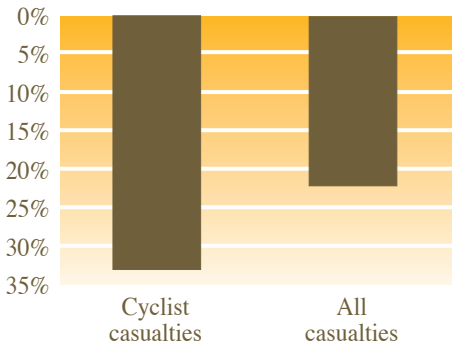


Figure 2: Percent reduction in road toll pre and post introduction of compulsory helmet wearing



There is other evidence to suggest that the introduction of compulsory helmet wearing has increased safety for cyclists. Using annual figures for the period 1990-1996, there is a strong correlation between helmet wearing rates as measured from casualty crashes and both the number of riders killed and the number admitted to hospital. High helmet wearing rates result in lower rates of death and injury for cyclists. Table 1 has details of the statistical analysis.

Table 1. Correlations between helmet wearing rates and cyclist deaths and casualties

Death	n = 7	r = -0.80	p = .015
Casualty	n = 7	r = -0.96	p = .001

Finally, there is direct evidence that helmets reduce the severity of head injuries to cyclists. The FORS Fatality File is based upon coroners' reports of fatal road crashes including autopsy details of victims. The location and severity of injuries are coded according the Abbreviated Injury Scale. One measure of the severity of injuries to the head is the total number of such injuries coded as 'Severe' or worse using the

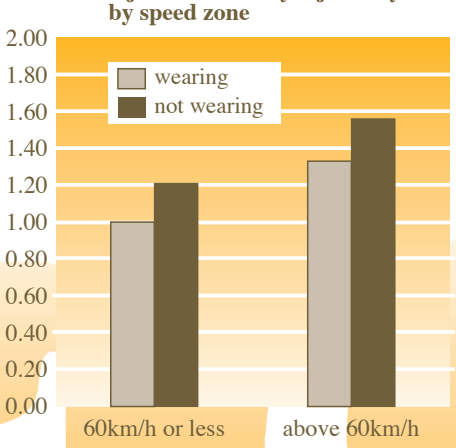
Abbreviated Injury Scale. The FORS Fatality File is available for fatal crashes occurring in 1988, 1990, 1992 and 1994. Due to the relatively, small number of cyclist deaths, results for all four years of data were pooled. There were 231 cyclists killed for whom coroners' reports were available. There were 173 cases (75% of total cases) where the presence/absence of a helmet could be established.

The majority of cyclist fatalities involve collision with a vehicle and the speed of that vehicle is a major determinant of the severity of injury sustained. Thus, separate analyses were carried out for crashes occurring at sites with a speed limit of 60km per hour or less and at sites with a limit in excess of 60km per hour.

There were 26 cyclists killed in speed zone of 60km per hour or less and they had an average of one severe head injury. There were 87 unhelmeted riders in the same speed zone with an average 1.21 severe head injuries. In speed zones exceeding 60km per hour, there were 24 helmeted and 36 unhelmeted riders with an average of 1.33 and 1.56 severe head injuries respectively. The average number of severe injuries is illustrated in Figure 3.

Overall, the absence of a helmet increased the number of severe injuries by 21% in lower speed zones and 17% in higher speed zones. This difference was statistically significant ($F=5.6$, $p<.02$). As expected, there was a higher incidence of severe head injuries in higher speed zones than in lower speed zones.

Figure 3: Average number of severe head injuries for fatally injured cyclists by speed zone



It should be noted that this link between severity of head injury and helmet wearing has been demonstrated for fatally injured riders. The size of the effect demonstrated here may vary for surviving riders involved in crashes of lesser severity.

Trends in helmet wearing

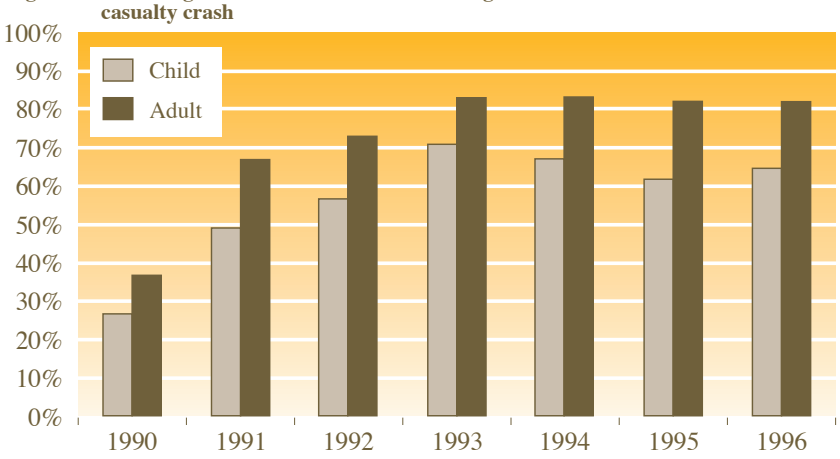
An indication of the number of cyclists wearing helmets can be found in the police data on casualty crashes. Figure 4 has percentage of children and adults wearing a helmet for the period 1990-1996 based on the police data. A child is defined as being 16 years of age or younger.

Helmet wearing rates soared with the introduction of compulsory use. Adult wearing rates increased from 37% in 1990 to 83% in 1992. Rates for children also increased from 27% to 71% in that period. Both rates appear to have reached a plateau.

The lower compliance rate by children is a source of some concern. Based on this data and in comparison with adult cyclists, children are nearly twice as likely not to wear a helmet. It is also a concern that the compliance rate for children has also shown a decline after peaking at 71% in 1993. This is in contrast to the adult compliance rate which has remained steady at over 80% since 1993.

This information suggests that there is a need for the parents and guardians to encourage children to wear a properly designed helmet when cycling. Advice on the choice of a helmet for children is contained in the inset.

Figure 4: Percentage of children and adults wearing a crash helmet when involved in a casualty crash



The right helmet for your child

- is a good fit
- has a number of holes or openings to allow ventilation
- allows the wearer to hear and see normally
- is light weight
- is a bright colour
- is approved by the Standards Association of Australia

Parents should remember to check the helmet for damage and to replace the helmet when damage has occurred. Helmets will also need to be replaced as the child grows.