COMMENTARY

Mandatory helmet legislation and children's exposure to cycling

Macpherson AK, Parkin PC, To TM. Injury Prevention 2001;7:228-230

Original paper External Link

see also: Errors and omissions in Canadian research group's bicycle helmet papers

Summary of original paper

A mandatory helmet law for children was enacted in Ontario in October 1995. The study set out to examine trends in children's cycling rates before and after legislation in one health district (East York). Child cyclists were counted at 111 preselected sites in the late spring and summer of 1993 - 97 and in 1999.

Although the number of child cyclists per hour was significantly different in different years, the authors say that these differences could not be attributed to helmet legislation. In 1996, the year after the law came into effect, average cycling levels were higher than in 1995, the year before legislation (6.84 v 4.33 cyclists per hour).

The authors therefore conclude that, contrary to the findings in Australia, the introduction of helmet legislation did not have a significant negative impact on child cycling in this community.

Related publication

A letter pointing out serious shortcomings in the paper, together with the original authors' reply, was subsequently published in Injury Prevention. (Robinson, 2003)

Read the full published critique here. External Link

BHRF Commentary

Summary

Although the only paper producing such a result, and despite contradictory evidence from Australia, New Zealand and other jurisdictions where helmet laws have been introduced (BHRF, 1020), this paper is often cited as evidence that helmet laws do not discourage cycling.

Principal criticisms include:

- The Ontario law was not enforced although the authors do not mention this. The data from the post law period are poor, but it is clear that helmet use returned to pre-law levels within a few years due to lack of enforcement. When this happened, there was a resurgence in children cycling.
- Helmet use in the East York study area had been high for a number of years before the legislation came into effect due to an intensive helmet promotion campaign. This had already suppressed childrens' cycling before the enactment of the law, which therefore had little direct impact on cycle or helmet use.
- The data suggests that cycling was in decline in the years before the law but no count data are presented from the early years of helmet promotion. Although the study group conducted the same surveys in 1990, 1991 and 1992, and collected all the data necessary to report comparable ridership figures for those years, the data has not been made available.
- The cycle count and rate per hour data presented in this paper are contradicted by data presented by the same study group elsewhere. (Parkin, Khambalia and Macarthur, 2003)
- The target population of the surveys (East York children aged 5-14) increased by almost 50% between the

1991 and 2001 censuses. If the cycling rate data are corrected to account for this population growth, the suppression of cycling is evident.
- The formerly independent Borough of East York was merged into the city of Toronto in 1998. As a result, a major promotion campaign, The Cycling Ambassadors Programme, was extended into East York, chiefly from 1998 to 2000. This may explain the outlying cycling rate reported for 1999.
- Previous studies of the effect of helmet legislation on cycling have shown reductions in cycle use averaging 20% to 50%, depending on age group and intensity of enforcement (BHRF, 1020). However, the year-to-year fluctuations in cycling observed in this paper are up to 3 times these percentages. This suggests the presence of confounding factors, the effects of which are much greater than of those factors being tested. In other words, this study lacks the discriminatory power needed to detect an effect of the size the authors claim does not exist.

The lack of comprehensive data reported in this paper (especially with regard to helmet wearing rates) masks many of the above points. The paper would have been clearer and more valuable had the authors presented all the relevant data.

Other criticisms include:

- The sample size was small and the survey limited to a single health district.
- The study excluded the age group most deterred by helmet laws (15 - 17 year olds).
- It is not clear that the data from successive surveys were comparable.
- There were large variations in children counted in different years which are not adequately explained. (The summer of 1999 was particularly sunny and may have boosted cycle use, but changes in such external variables have not been controlled for).
- The authors are selective in the other research that they have referenced.

Discussion of the data

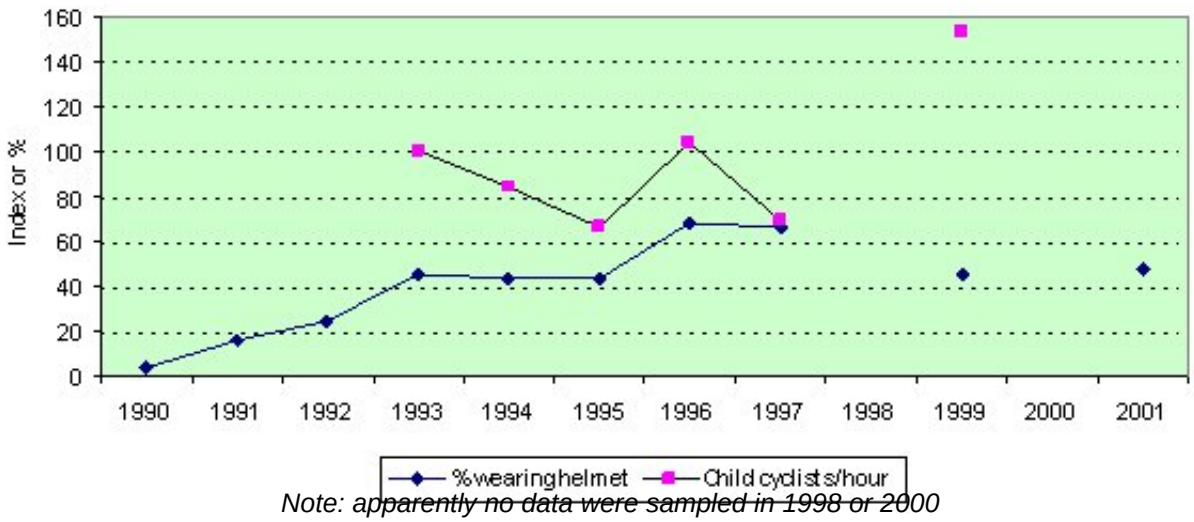
This paper presents figures for the number of child cyclists observed at different types of locations (schools, parks, residential streets and major intersections). The counts of child cyclists, and whether they wore a helmet or not, were taken at 111 survey points within the Borough of East York, a suburb near to Toronto, Canada, in the late spring and summer between 1990 and 2001. Helmet legislation (affecting under-18's only) came into effect in October 1995. Because of the early onset of winter in Toronto, and its prolonged nature, the legislation would not have had much effect until the spring of 1996 (if it was going to have an effect at all).

A major weakness of the study is that only data on the number of child cyclists are presented. Helmet wearing data are not presented. This is a critical point, because in Canada under-16s cannot be charged with a traffic offence. Rather, it is their parents who are subject to charges for failing to ensure their children are complying with the law. This makes it hard for the police to enforce a child helmet law, except on those in the 16-17 age band. In theory, a police officer could accompany a child home and charge the parents, but in practice this was never done. The Toronto Metropolitan Police never issued any tickets for violation of the child helmet law (Macpherson, 2004). Helmet use did increase for a short period after the introduction of the law, then declined back to pre-law levels, once it became clear that the police were not going to pursue any significant level of enforcement.

A further weakness of the study is that cyclist count data from the years 1990-1992 are not available either in this paper or any other, although the data are known to have been gathered. Hence it is not clear what level of cycling there was prior to helmet promotion.

The development of helmet wearing rates over time has been published separately (#190#). The chart below brings together the two data sets to observe whether there is a link between helmet use and child cyclist counts.

Child cyclists in Ontario
(helmet law effective from 1996)



Note: apparently no data were sampled in 1998 or 2000

Some observations can be made

Helmet use had already been high for some years before the law came into effect, and the law did not increase wearing rates greatly.

"Cyclist per hour" data are too limited to draw conclusions. Weather variation from year to year will have affected counts, but hours of sunshine are not presented. It is not clear, in available data, whether the number of child cyclists was affected by pre-law helmet campaigns. The promotion was clearly forceful to achieve such a high wearing rate (almost 50%) in only four years. In the UK, helmet use by child cyclists is only about 17% (Sharratt, Walter and Anjurn, 2009), despite more than 20 years of promotion. Government research has nonetheless observed declines in children cycling where promotional campaigns have run (BHRF, 1080). This experience has been seen in other countries following helmet promotion, even in countries with a prominent cycling culture, such as Denmark (BHRF, 1020). It is thus very likely that the strong promotion of helmets in East York also reduced cycling in the years before 1993.

Extending the foregoing point, the data do suggest that child cycling was in decline in the immediate pre-law period, even after growth in helmet use had stopped.

The data also strongly suggest that when helmet use fell post-law, due to lack of enforcement, there was a recovery in cycling.

In view of these criticisms, the paper is not a full and fair summary of the events that took place and the authors' conclusions are not valid.

The data suggest that cycling had already been deterred by helmet promotion in the years before the law was introduced. The large increase in cycling after 1998 was accompanied by helmet use dropping back to pre-law levels. Neither of these important outcomes is evident in this paper, since the authors do not publish helmet wearing rates.

Later paper by the same authors

A later paper by the same authors reported that the percentage of head injuries to children had declined after enactment of the Ontario law and that therefore the law had been beneficial (Macpherson et al, 2002).

However, re-analysis of the data (Robinson, 2003b) showed that head injuries had started falling well before the law. Indeed, the greatest annual reduction had taken place 2 years before the law was enacted. After the law, the

reduction in % head injuries was not significantly different to the situation in other Canadian provinces where cycle helmets were not mandatory. This suggests that trends, rather than helmet legislation, may have been responsible for the changes in head injuries. This would not be surprising if the law had no significant lasting effect on either helmet or cycle use.

References

BHRF, 1020

How helmet promotion and laws affect cycle use. .
http://www.cyclehelmets.org/1020.html

BHRF, 1080

Helmet wearing and cycle use in Great Britain. .
http://www.cyclehelmets.org/1080.html

Macpherson et al, 2002

Macpherson AK, To TM, Macarthur C, Chipman ML, Wright JG, Parkin PC, 2002. Impact of Mandatory Helmet Legislation on Bicycle-Related Head Injuries in Children: A Population-Based Study. Pediatrics 2002; 110(5):e60.
http://www.cyclehelmets.org/1100.html

Macpherson, 2004

Communication concerning unpublished research by Dr A. Macpherson et al, School of Kinesiology and Health Science, York University, Toronto, Ontario, and M J Wardlaw in April 2004. .

Parkin, Khambalia and Macarthur, 2003

Parkin PC, Khambalia A, Macarthur C, 2003. Influence of socioeconomic status on the effectiveness of bicycle helmet legislation for children: a prospective observational study. Pediatrics 2003;112:e192-e196. External Link
http://www.pediatrics.org/cgi/content/full/112/3/e192

Robinson, 2003

Robinson DL, 2003. Helmet laws and cycle use. Injury Prevention 2003;9:380-381. External Link
http://ip.bmjjournals.com/cgi/content/full/9/4/380

Robinson, 2003b

Robinson DL, 2003. Confusing trends with the effect of helmet laws. Pediatrics P3R 7 Jul 2003. External Link
http://pediatrics.aappublications.org/cgi/eletters/110/5/e60

Sharratt, Walter and Anjurn, 2009

Sharratt C, Walter L, Anjum O, 2009. Cycle helmet wearing in 2008. Transport Research Laboratory PPR420. External Link
http://www.trl.co.uk/online_store/reports_publications/trl_reports/cat_road_user_safety/report_cycle

The Bicycle Helmet Research Foundation (BHRF), an incorporated body with an international membership, exists to undertake, encourage and spread the scientific study of the use of bicycle helmets. Also to consider the effect of the promotion and use of helmets on the perception of cycling in terms of risk and the achievement of wider public health and societal goals.

BHRF strives to provide a resource of best-available factual information to assist the understanding of a complex subject, and one where some of the reasoning may conflict with received opinion. In particular BHRF seeks to provide access to a wider range of information than is commonly made available by those that take a strong helmet promotion stance. It is hoped that this will assist informed judgements about the pros and cons of cycle helmets.

For more information, please visit www.cyclehelmets.org.

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