Original Articles:
RESEARCH
Navindra Persaud, Emily Coleman, Dorothy Zwolakowski, Bert Lauwers, and Dan Cass

Nonuse of bicycle helmets and risk of fatal head injury: a proportional mortality, case–control study

CMAJ cmaj.120988; published ahead of print October 15, 2012, doi:10.1503/cmaj.120988

Abstract **Full Text (PDF)** **Résumé**

Helmets and bicycling deaths: the importance of context

Daniel Fuller, Post-Doctoral Fellow Kay Teschke, Meghan Winters and Moreno Zanotto
University of Saskatchewan

We were pleased that Persaud et al.[1] analyzed data on cycling fatalities abstracted for the Cycling Death Review by the Chief Coroner for Ontario.[2] Their analysis adds to the three decades of literature on bicycle helmet efficacy by examining 129 fatalities, more than previous studies. To facilitate good public policies and informed decisions by individuals, we respond to this article by placing the issue of cycling deaths in a broader context (including correcting an error the authors appear to have made) and commenting on risk factors, other than helmets, that are discussed in the Coroner's report.

The authors indicated in their abstract and conclusions that "cycling fatalities [are] a leading cause of death among young adults worldwide". They did not provide a reference and we could not find data to support this, even on a global level. Certainly, in Canada, this is not the case. Data from the Public Health Agency of Canada[3] and Transport Canada[4] indicate that in 2005, among adults 20 to 34 years of age, there were 4148 deaths from all causes, of which 849 (20.5%) resulted from traffic collisions. The number of bicycling traffic fatalities is not separately reported by age, but among all ages, there were 52 such fatalities. Using available age distribution data[1], we estimated that there were fewer than 18 bicycling deaths in the 20 to 34 age range (i.e., 0.43% of deaths from all causes). Thus, cycling plays a very small role in the mortality of young adults. In contrast, motor vehicle occupant fatalities are a leading cause of death in this age group. Perhaps the authors meant to indicate "traffic" fatalities, not "cycling" fatalities?

Other context is helpful to clarify the risk of death from cycling (rather than simply the burden, described above). Canadian data are not available, but in the United States, data analyzed by the US Centers for Disease Control and Prevention estimated 21 cycling fatalities per 100 million person-trips.[5] This was only slightly higher than the risk among pedestrians (14 per 100 million person-trips) and much lower than the risk among motorcyclists (537 per 100 million person-trips).[5]

Persaud et al.[1] limited their focus to helmets. The Coroner's report[2] abstracted data on many other factors, including time of day, alcohol and drug use, use of electronic devices, and motor vehicle involvement. Some of these, e.g., alcohol use[6,7], are related to risk- taking behaviour and have been shown to be related both to helmet use and to cycling injuries. Understanding whether these factors are confounders and/or effect modifiers of the relationship between helmet use and fatal injury would be a valuable contribution.

Other factors are not only of interest because they might affect the relationship between helmets and fatalities, but also because they may independently impact fatality risk and offer opportunities for prevention. By limiting the analyses to helmets, the authors were able to suggest only two public policies for mitigating the risk of cycling fatalities: helmet legislation and campaigns encouraging helmet use. Their data indicate how incomplete this approach would be. Of the 129 deaths, at least 71 could not be affected by new policies related to helmets (58 whose fatal injuries were not head injuries and 13 who wore a helmet and died of head injuries anyway). In addition, as stated in the Coroner's report[2], "helmets are, indeed, the last line of defence and of value only after a collision has occurred", clearly indicating the need for policies targeted to prevent crashes in the first place.

Research is increasingly clear that bicycle-specific facilities that reduce interactions between cyclists and motor vehicles prevent injury events, with potential reductions

of 50% or more.[8,9] Others have found that motor vehicle involvement greatly increases the risk of severe injury and death in the event of a crash.[10] Of the 129 Ontario fatalities, 99 (77%) involved collisions with motor vehicles.[1] Minimizing cyclists' interactions with motor vehicles aligns with the primary recommendation of the Coroner's report[2] that a "complete streets approach should be adopted" (described in the report as cycling networks with separated bike lanes, bike paths, and reduced motor vehicles speeds). In addition, there is consistent evidence that bike routes separated from traffic encourage cycling[11], whereas there remain disagreements in evidence and opinion about whether helmet legislation is a deterrent.[12] We believe the more nuanced population-based primary-prevention approach of the Coroner's report, rather than the limited focus of Persaud et al.,[1] is appropriate to reduce cycling injuries of all types and to encourage this healthy mode of travel.

Daniel Fuller, University of Saskatchewan; Kay Teschke, University of British Columbia; Meghan Winters and Moreno Zanotto, Simon Fraser University.

References

1. Persaud N, Coleman E, Zwolakowski D, Lauwers B, Cass D. Nonuse of bicycle helmets and risk of fatal head injury: a proportional mortality, case-control study. CMAJ 2012;Oct 15. [Epub ahead of print]

2. Office of the Chief Coroner for Ontario. Cycling death review, June 2012. Available: www.mcscs.jus.gov.on.ca/stellent/groups/public/@mcscs/@www/@com/documents/webasset/ec159773.pdf (accessed 2012 Oct. 21)

3. Public Health Agency of Canada. Leading Causes of Death and Hospitalization in Canada, 2005. http://www.phac-aspc.gc.ca/publicat/lcd- pcd97/table1-eng.php (accessed 2012 Oct. 21)

4. Transport Canada. Canadian Motor Vehicle Traffic Collision Statistics: 2005. 2006. TP 3322 (12/2006) http://www.tc.gc.ca/media/documents/roadsafety/st2005es.pdf (accessed 2012 Oct. 21)

5. Beck LF, Dellinger AM, O'Neil ME. Motor vehicle crash injury rates by mode of travel, United States: using exposure-based methods to quantify differences. Am J Epidemiol 2007;166:212-8

6. Crocker P, Zad O, Milling T, Lawson KA. Alcohol, bicycling, and head and brain injury: a study of impaired cyclists' riding patterns. Am J Emerg Med 2010;28:68-72
7. Li G, Baker SP, Smialek JE, Soderstrom CA. Use of alcohol as a risk factor for bicycling injury. JAMA. 2001;285:893-896

8. Reynolds CCO, Harris MA, Teschke K, Cripton PA, Winters M. The impact of transportation infrastructure on bicycling injuries and crashes: a review of the literature. Env Health 2009;8:47

9. Teschke K, Harris MA, Reynolds CCO et al. Route infrastructure and the risk of injuries to bicyclists: A case-crossover study. Am J Public Health 2012; Oct 18 [Epub ahead of print]

10. Rivara FP, Thompson DC, Thompson RS. Epidemiology of bicycle injuries and risk factors for serious injury. Inj Prev 1997:3:110-114

11. Winters M, Davidson G, Kao D, Teschke K. Motivators and deterrents of bicycling: comparing influences on decisions to ride. Transportation 2011;38:153-168

12. Karkhaneh M. Bicycle helmet use and bicyclists head injuries before and after helmet legislation in Alberta Canada. [Dissertation]. Edmonton, AB: University of Alberta. 2011

Conflict of Interest:

None declared

... less

Submit response

Published October 23, 2012

Focus on helmets rather than motorists: blaming the victim

John D. Neary, Assistant Professor
McMaster University

Persaud et al note that 88% of decedents in their study of cycling fatalities were above the age (18 years) at which helmet use is optional in Ontario. They argue that this finding may suggest a "gap in public policy." Yet 77% of cycling deaths in this study occurred in collisions with motor vehicles, and in 18% of these cases the drivers

More...

Submit response

Published October 19, 2012

Public health benefit of appropriate cycle helmet use

Ediriweera Desapriya, Research Associate
Department of Pediatrics, Faculty of Medicine, UBC

Considerable numbers of studies have examined the relation between helmet laws and head injuries, and all found a reduction in head injuries after legislation was enacted. Many countries have laws in place requiring all cyclists to wear helmets and have shown that laws directly affect these outcomes. We all know that our health care systems are

More...

Submit response

Published October 19, 2012

Epidemiologists should put on their thinking caps before asking bicyclists to wear helmets

M Kary, Mathematician
Montréal, Que.

This study is of the type epidemiologists call "case-control". In science, a control group is one entirely or statistically identical to the experimental group, but for undergoing the experimental treatment. On the other hand in epidemiology a "control" group can be almost anything, and this is why many trained in science, and even some epidemiologists, prefer a more suitably

More...

Submit response

Published October 19, 2012