

No strong evidence bicycle helmet legislation deters cycling

A focus on helmet legislation detracts from concerns about cycling infrastructure and safety

Opponents of helmet legislation often argue that mandatory bicycle helmet legislation (MHL) is the primary impediment to an increase in cycling.¹ The public debate regarding MHL recently flared up with the Leyonhjelm Senate inquiry² and the Australian Capital Territory proposing a relaxation of their MHL in low speed areas.³ As there are numerous health and social benefits to cycling, such arguments need to be evaluated with rigour against the highest quality evidence available.

Victoria was the first jurisdiction in the world to adopt MHL in July 1990. Other Australian states and territories adopted similar legislation by July 1992. Around this time, the governments of New South Wales, Queensland, South Australia, Victoria and Western Australia commissioned research to assess the impact of their state-specific laws on helmet wearing.⁴⁻⁸ In SA and WA, stratified random sampling surveys were employed to estimate cycling frequencies before and after the introduction of MHL.^{6,8} The results of these surveys suggest that there was no real impact on cycling frequencies following MHL (Box 1). Cycling frequencies were not estimated for NSW, Queensland or Victoria.

Recent evidence suggests that active travel modes (ie, walking, cycling and public transportation) steadily declined following World War II because more Australians used cars as their primary transportation mode.⁹ In a 2011 survey regarding barriers to cycling, over 50% of the responses from current cyclists and non-cyclists related to lack of cycling infrastructure and concerns about safety (Box 2).¹⁰ Dislike of helmets constituted only 6% of the responses for both groups and was the tenth and 13th most cited response among cyclists and non-cyclists respectively. Yet, MHL is sometimes proposed as a major barrier to cycling.¹¹

Complex study designs, such as the stratified random samples discussed above, are essential for estimating cycling frequencies to ensure that the sample is representative of the population. Stratified random



sampling surveys have long been used in countries with an entrenched cycling culture, such as the Netherlands,¹² and also recently in Australia since 2011 through the National Cycling Participation Survey conducted by Australian Bicycle Council (<http://www.bicyclecouncil.com.au/publication/national-cycling-participation-survey-2015>). There is a lack of international evidence using such methods to support the case that MHL acts as a deterrent to cycling. A Canadian study, in which participants were randomly identified from three sampling frames with elements of stratification and clustering, found no evidence that MHL deters cycling.¹³

Although complex survey designs are important for obtaining reliable data, they also require many resources and are not always feasible. On the other hand, convenience sampling often requires fewer resources, making it attractive for some studies. However, the cost of convenience is a biased sample. In NSW and Victoria, convenience sampling was used to collect data at various roadside locations in each state over one time period before the introduction of MHL and multiple time periods after its introduction. In addition to bias from convenience sampling, these studies were designed to estimate helmet wearing not cycling frequency. Nonetheless, some authors have used the cyclist counts from these surveys to

1 Frequency of cycling before and after the introduction of helmet legislation in South Australia and Western Australia, according to stratified random sampling surveys^{6,8}

	Frequency	1990	1993
South Australia	At least weekly	21.8%	21.0%
	At least monthly	5.2%	6.0%
	At least every 3 months	3.9%	4.4%
	Less often or never	69.1%	68.6%
Western Australia		1989	1993
	At least weekly	26.6%	27.7%
	At least every 3 months	11.1%	11.6%
	At least once per year	10.3%	11.5%
	Never	52.0%	49.2%

Jake Olivier

Soufiane Boufous

Raphael H Grzebieta

All the authors are from University of New South Wales, Sydney, NSW.

j.olivier@unsw.edu.au

2 Percentage of responses for reasons for not riding a bike for transport more frequently (current cyclists) or for transport (non-cyclists), 2011*

Response category	Current cyclists (n = 158/386)	Non-cyclists (n = 515/1289)
Lack of infrastructure [†]	30.6%	25.0%
Concerns about safety [‡]	27.7%	25.8%
Uncontrollable issues [§]	26.9%	24.4%
Do not like wearing a helmet	6.5%	6.3%
Miscellaneous [¶]	8.3%	18.6%

* Adapted with permission from the National Heart Foundation of Australia (numbers of respondents/responses).¹⁰ † Speed/volume of traffic, lack of bicycle lanes/trails, no place to park/store bicycle, no place to change/shower, nowhere to store clothes. ‡ Unsafe road conditions, do not feel safe riding, do not feel confident riding. § Weather conditions, destinations too far away, too hilly, not enough time, health problems. ¶ Not fit enough, none, unsure of best route, other, do not own a bicycle, need to transport other people (eg, children), do not know how to ride a bike. ◆

demonstrate a reduction in the number of cyclists following the introduction of helmet legislation. There is an argument that convenience samples taken over time are representative of population trends; however, such an

argument involves many assumptions that are almost always violated.¹⁴

In summary, there are reports indicating a decline in cycling based on convenience sampling data following the introduction of helmet legislation in Australia. However, there is also evidence based on better quality data which shows no significant impact on cycling participation. When faced with conflicting evidence, it is important to consider differences in study design and data quality. When these parameters are taken into account, the best evidence suggests that MHL has never been a major barrier to cycling in Australia. In addition, the focus on helmet legislation detracts from more important discussions around the uptake of cycling. These include concerns for personal safety, which can be addressed by the construction of dedicated cycling infrastructure,¹⁵ education of all road users, and supportive legislation to protect cyclists, such as minimum passing distances.¹⁶

Competing interests: No relevant disclosures.

Provenance: Not commissioned; externally peer reviewed. ■

© 2016 AMPCo Pty Ltd. Produced with Elsevier B.V. All rights reserved.

References are available online at www.mja.com.au.

- 1 Olivier J, Wang J, Walter S, Grzebieta R. Anti-helmet arguments: lies, damned lies and flawed statistics. *J Australas Coll Road Saf* 2014; 25: 10-23.
- 2 Parliament of Australia. Senate Economics References Committee. Inquiry into personal choice and community impacts. Canberra: Commonwealth of Australia, 2015. http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Economics/Personal_choice (accessed Feb 2016).
- 3 Australian Capital Territory Government. Road Safety Action Plan 2016–2020. Canberra: ACT, 2016 (ISBN 0-642-60406-1). <https://assets.documentcloud.org/documents/2712610/MIN-2016-000402-005-Att-2-ACT-Road-Safety-Action.pdf> (accessed Feb 2016).
- 4 Smith N, Milthorpe F. An observational survey of law compliance and helmet wearing by bicyclists in New South Wales – 1993. Sydney: NSW Roads and Traffic Authority, 1993. <http://www.rms.nsw.gov.au/documents/roads/bicycles/bicycles-law-compliance-helmet-use-nsw-1993.pdf> (accessed Feb 2016).
- 5 King M, Fraine G. Bicycle helmet legislation and enforcement in Queensland 1991–1993: effects on helmet wearing and crashes. Brisbane: CARRS-Q, 1994.
- 6 Marshall J, White M. Evaluation of the compulsory helmet wearing legislation for bicyclists in South Australia. Adelaide: South Australian Department of Transport, 1994. (Office of Road Safety Report Series 8/94.) https://www.bicyclenetwork.com.au/media/vanilla_content/files/SA%20Helmet%20eval%201994%20SA%20Marshall.pdf
- 7 Finch CF, Heiman L, Neiger D. Bicycle use and helmet wearing rates in Melbourne, 1987 to 1992: the influence of the helmet wearing law. Melbourne: Monash University Accident Research Centre, 1993. <http://www.monash.edu/muarc/research/reports/muarc045> (accessed Feb 2016).
- 8 Heathcote B, Maisey G. Bicycle use and attitudes to the helmet wearing law. Perth: Traffic Board of Western Australia, 1994. (Rep. No. TB94-1.) <http://www.cycle-helmets.com/wa-heathcote-1994.pdf> (accessed May 2016).
- 9 Department of Infrastructure and Transport. Walking, riding and access to public transport. Canberra: Commonwealth of Australia, 2012. https://infrastructure.gov.au/infrastructure/pab/active_transport/files/active_travel_discussion.pdf (accessed Feb 2016).
- 10 National Heart Foundation of Australia. Riding a bike for transport: 2011 survey findings. Melbourne: NHFA, 2011. <http://heartfoundation.org.au/images/uploads/publications/Cycling-Survey-2011-Riding-a-Bike-for-Transport.pdf> (accessed Feb 2016).
- 11 Robinson DL. No clear evidence from countries that have enforced the wearing of helmets. *BMJ* 2006; 332: 722-725.
- 12 Stichting Wetenschappelijk Onderzoek Verkeersveiligheid. Mobility of persons. The Hague: SWOV, 2010. <https://www.swov.nl/UK/Research/cijfers/Toelichting-gegevensbronnen/Personenmobiliteit-UK.html> (accessed Feb 2016).
- 13 Dennis J, Potter B, Ramsay T, Zarychanski R. The effects of provincial bicycle helmet legislation on helmet use and bicycle ridership in Canada. *Inj Prev* 2010; 16: 219-224.
- 14 Hedt BL, Pagano M. Health indicators: eliminating bias from convenience sampling estimators. *Stat Med* 2011; 30: 560-568.
- 15 Olivier J, Walter SR, Grzebieta R. Long term bicycle related head injury trends for New South Wales, Australia following mandatory helmet legislation. *Accid Anal Prev* 2013; 50: 1128-1134.
- 16 Haworth N, Schramm A. The safety of bicycles being overtaken by cars: what do we know and what do we need to know? Proceedings of the Australasian Road Safety Research, Policing and Education Conference; 2014 Nov 12–14; Melbourne. <http://arsrpe.acrs.org.au/index.cfm?action=main.paper&id=2934> (accessed Apr 2016). ■