

Australian Health Protection Principal Committee

STATEMENT

Mandatory Bicycle Helmet Laws in Australia

The Australian Health Protection Principal Committee (AHPPC) supports Australia's Mandatory Bicycle Helmet Laws (MBHLs) as an appropriate and proportionate injury prevention measure. The laws contribute to safe participation in recreational, transport or sport cycling for riders of all ages and capabilities.

MBHLs are enshrined in Australia's national set of road rules (s256), which have been adopted with minor variation by all jurisdictions. The stewardship of these laws resides with road safety agencies in each jurisdiction, while the effects of the laws benefit the public health domain and beyond. In a road safety context, the laws are consistent with the Safe System philosophy that underpins Australia's approach to protecting all road users. The laws also reflect principles that generally inform public health practice, such as shared responsibility, proportionality and inter-sectoral cooperation.

Brain injury caused by bicycle falls and crashes can result in death or catastrophic physical and cognitive disability. Bicycle helmets reduce the amount of kinetic energy transferred to the brain in the event of a fall or a crash. The efficacy of bicycle helmets in preventing or reducing the severity of brain injury has been well established through extensive engineering and impact studies and through a number of peer-reviewed injury studies. The costs associated with brain injury are accrued from the point of first response by emergency services, through to rehabilitation and on-going care costs. The per incident lifetime cost of a traumatic brain injury has been estimated at \$2.5 million for moderate brain injury and up to \$4.8 million for severe brain injury. Some costs are far more difficult to quantify, including the impact on families and communities.

Decades of road safety research have demonstrated that crashes are rarely predicted and that people make mistakes. One of the greatest deterrents to bicycle riding is concern for safety, and AHPPC encourages ongoing efforts to improve cycling safety through environmental and engineering measures such as designated cycle paths and cycling safety awareness campaigns, in addition to mandated wearing of helmets.

Arguments against mandatory bicycle helmet laws are difficult to sustain based on research evidence or community norms. The efficacy of bicycle helmets in protecting against brain injury is not overstated. Arguments that mandatory bicycle helmet laws impinge on personal liberty are incongruent with the accepted responsibility of all road users to protect others and themselves when using shared spaces and facilities.

The AHPPC affirms the importance of mandatory bicycle helmet laws for all ages to help ensure a flow-on effect of high helmet wearing rates among children and adolescents, who take their cues from the behaviours of adults and the broader cultural context.

Mandatory bicycle helmet laws are an important public health and road safety measure that should be maintained and their protective benefits communicated with the community.

Mandatory Bicycle Helmet Laws in Australia

Background paper

Purpose

This paper has been developed to inform the position of the Australian Health Protection Principal Committee in regards to the mandatory bicycle helmet laws (MBHLs) contained within the Australian Road Rules 2012 (s256). Recently, there has been public discussion regarding the MBHLs in various fora, including the media and during the Senate Inquiry into Personal Choice and Community Impacts (Senate Standing Committees on Economics, 2016). The Australian Health Protection Principal Committee support the MBHLs, as a proportionate and appropriate injury prevention measure which benefits the whole community. The laws contribute to safe participation in recreational, transport or sport cycling for riders of all ages and capabilities.

Introduction

MBHLs are enshrined in Australia's national set of road rules (s256), which, with minor variation, have been adopted by all jurisdictions.

256 Bicycle helmets

- (1) The rider of a bicycle must wear an approved bicycle helmet securely fitted and fastened on the rider's head, unless the rider is exempt from wearing a bicycle helmet under another law of this jurisdiction.

Offence provision.

Note **Approved bicycle helmet** is defined in the dictionary.

- (2) A passenger on a bicycle that is moving, or is stationary but not parked, must wear an approved bicycle helmet securely fitted and fastened on the passenger's head, unless the passenger is:
 - (a) a paying passenger on a three or four-wheeled bicycle;
or
 - (b) exempt from wearing a bicycle helmet under another law of this jurisdiction.

Offence provision.

(3) The rider of a bicycle must not ride with a passenger on the bicycle unless the passenger complies with subrule (2).

Offence provision.

The stewardship of these laws resides with road safety agencies in each jurisdiction, while the effects of the laws benefit the public health domain and beyond.

In a road safety context, the laws are consistent with the Safe System philosophy (Australian Transport Council, 2011; Transport Accident Commission, 2016) that underpins Australia's approach to protecting all road users. The laws also reflect principles that generally inform public health practice, such as shared responsibility, proportionality and intersectoral cooperation.

Peer-reviewed injury and engineering research into the effectiveness of bicycle helmets have been conducted for over a decade with findings repeatedly indicating that helmets reduce the severity and rate of head trauma in the event of an impact.

Opponents of the MBHLs argue that the laws deter cycling participation and are therefore having a detrimental effect on public health. Additional arguments proffered in opposition to the laws include the denial of personal liberty and the argument that the population wide benefit of the mandatory laws is overstated. The case regarding participation and overall public health benefit has not been substantiated by peer-reviewed evidence, as these issues are difficult to quantify in the absence of consistent longitudinal exposure data.

The known protective benefits of helmets indicate that any diminution of the laws will result in increased risk of brain injury and death; a position that cannot be justified from a road safety perspective.

Principles

This paper affirms the following principles:

- Australia's road safety agencies play an important role in promoting and protecting the safety of road users.
- Shared responsibility is a fundamental principle of both road safety and public health
- The application of regulatory responses should be informed by public health principles, such as;
 - the primacy of prevention
 - the principle of proportionality
 - the principle of collaboration

- The application of the Safe System (Australian Transport Council, 2011; Transport Accident Commission, 2016) philosophy is appropriate and beneficial in developing and implementing road safety strategies and interventions to protect all road users.
- The Safe System recognises that as human beings,
 - o we make mistakes
 - o we have a limited tolerance to external force before severe injury or death occurs
 - o that life and health must not be traded off for other benefits of the transport system
 - o that road safety is a shared responsibility
- The Safe System approach mitigates the consequences of human error through safer roads, safer roadsides, safer vehicles, safer speeds and safer people.

Role of bicycle helmets

The bicycle helmet is like a seat belt, it is a safety device. The helmet's effectiveness is assessed by its capacity to reduce the severity of injury at the point of impact. Bicycle helmets reduce the amount of kinetic energy transferred to the brain in the event of a fall or a crash. The efficacy of bicycle helmets has been established through extensive engineering and impact studies (Benz, McIntosh, Kallieris, & Daum, 1993; Cripton, Dressler, Stuart, Dennison, & Richards, 2014; A. S. McIntosh, 2014; Andrew S. McIntosh, Lai, & Schilter, 2013) and through a number of peer-reviewed injury studies (Dinh et al., 2015; Sethi et al., 2015). A bicycle helmet is one of the few personal protection devices (along with high visibility clothing and lights) available to people who ride for transport, sport or recreation. Protective technologies such as seat belts, vehicle safety systems and bike helmets each form a vital part of the overall safe system philosophy.

The Safe System Philosophy

The National Road Safety Strategy 2011-2022 (Australian Transport Council, 2011) represents a shared commitment by the Commonwealth, states and territories to improve Australia's road safety record. This strategy is underpinned by the Safe System approach, an internationally recognised philosophy that informs road safety interventions. When it comes to cycling, Safe System interventions include the provision of designated and separated bicycle infrastructure, reduced vehicle speeds and regulation to promote safe behaviour by road users. In this context, a bicycle helmet is the last line of defence in protecting the human brain from a potentially catastrophic injury.

Brain injury

The immediate and long-term effects of brain injury are potentially life threatening and debilitating. In the most severe cases, brain injury can result in death or catastrophic physical and cognitive disability. At the point of impact, the sudden movement of the brain within the skull can cause bleeding and swelling. Depending on the severity of the impact, this in turn can result in the death of brain tissue that is essential to the regulation of bodily functions such as breathing, vision, speech and motor-skills. The longer-term effects of brain injury may include impaired cognitive and motor skill functions, mood disorders and on-going pain.

The costs associated with brain injury accrue from the point of first response by emergency services, through to rehabilitation and on-going care costs. The per incident lifetime cost of a traumatic brain injury has been estimated by Access Economics (2009) at \$2.5 million for moderate brain injury and \$4.8 million for severe brain injury. Public hospital and health budgets, insurance schemes and communities shoulder the cost of treatment, rehabilitation and loss productivity. Some costs are far more difficult to quantify, including the impact on families and communities.

Research and evidence

Peer-reviewed studies conducted in Australia and overseas have repeatedly found that bicycle helmet use to be associated with a significant decrease in brain injury and brain injury severity (Dinh et al., 2015; A. S. McIntosh et al., 2013; Olivier, Walter, & Grzebieta, 2013; Otte & Wiese, 2014; Sethi et al., 2015; Yilmaz et al., 2013). A large Australian case-control study published in 2013 (n=6745 cyclist collisions), found a reduced risk of head injury for cyclists wearing a helmet was as high as 74% (Bambach, Mitchell, Grzebieta, & Olivier, 2013). The magnitude of the protective benefits of helmets has recently been measured by a comprehensive systematic review and meta-analysis presented at the 2015 Australasian Injury Prevention Network conference (Olivier & Creighton, 2015). This review found bicycle helmet use associated with a 35% odds reduction in head injury, a 64% odds reduction in serious head injury and 66% odds reduction for fatal head injury. Randomised control trials into bicycle helmet efficacy are not undertaken, because in addition to existing legal and practical constraints research ethics committees are likely to reject any group being exposed to the risks associated with riding without a helmet (National Health and Medical Research Council, Australian Research Council, & Universities Australia, 2007)

Injury prevention and regulation

Regulation is a traditional public health tool applied in circumstances to protect and promote health; and the mandating of bicycle helmets is one such regulatory response. Many years of road safety and public health research and practice has established that achieving population wide behaviour change requires a combination of strategies, including environmental, economic and regulatory measures. The introduction of MBHLs in the early 1990s followed a campaign to voluntarily increase helmet-wearing rates across the population, particularly among children and adolescents. After the introduction of the laws, wearing rates increased from approximately 37% (1990) to 83% (1992). Rates for children increased from 27% to 71% in that period (Federal Office of Road Safety, 1997).

Opposition to the Mandatory Bicycle Helmet Laws

Arguments to rescind the MBHLs include:

- wearing bicycle helmets infringe on personal liberty,
- the protective benefits of bicycle helmets are overstated, and
- MBHLs deter participation in physical activity.

Personal liberty

The capacity of individuals to fully assess the risks associated with riding without a helmet will vary depending on a person's age, cognitive ability and comprehension of the seriousness of head injury. Many years of road safety research has demonstrated that crashes are rarely predicted and that people make mistakes. The concept of personal choice and freedom is complex and must be balanced against the primacy of prevention, proportionality and shared responsibility.

MBHLs are consistent with the principle of primacy of prevention; brain injury may result in death or disability and treatment and rehabilitation are costly. Complete recovery from a brain injury may never be achieved. Similarly, the principle of proportionality prioritises the small daily inconvenience of wearing a helmet over the substantial lifetime cost of brain injury to individuals, families and to public budgets.

The concept of personal liberty must be assessed against the broader public health context in which it is invoked. Shared responsibility is a concept integral to public health and road safety approaches. This is applicable when considering the cost incurred for the treatment of head trauma and the influence of adult behaviour on children and young people. MBHLs assist to normalise helmet wearing in children and young people. Younger people look to the behaviour of adults, their peers and the wider cultural context in which they grow and develop. Studies have concluded that bicycle helmet wearing in children is highly

protective in the reduction of brain injury severity (Finvers, Strother, & Mohtadi, 1996).

Overstating the effectiveness of bicycle helmets

Opposition to the laws is often framed in the broader public health context with the anticipated increase in physical activity presented as offsetting the burden of injury. There is significant peer-reviewed evidence that has found wearing a bicycle helmet is protective of head injury in the event of a fall or crash. There is little corresponding evidence to quantify the magnitude of physical activity and associated public health gain. These arguments suggest that the community will need to decide if it is willing to accept increased deaths and disability as a trade-off for eliminating the requirement to wear a bicycle helmet. In a road safety context, with campaigns underway to eliminate deaths and serious injuries, this position becomes indefensible¹.

Physical activity deterrence

Participation in physical activity is vitally important to the health and wellbeing of Australians, and encouraging more sustainable forms of active transport is also a major public and environmental health strategy. However, the implied causative link between MBHLs and decreasing physical activity participation is problematic. Physical activity participation is influenced by a multitude of individual, social, environmental and economic factors. Factors that have been linked to decreasing physical activity participation include car dependent urban design, increasing hours spent in sedentary occupations, and concerns for safety (National Heart Foundation of Australia, 2014). Market research survey data has repeatedly shown that concern regarding safety and the limited availability of cycle paths are the greater deterrent to cycling (Cycling Promotion Fund & National Heart Foundation of Australia, 2012; National Heart Foundation of Australia, 2013). Characteristics of the built environment strongly influence cycling and walking participation (Heesch et al., 2015; Sallis et al., 2009; Transportation Research Board, 2005). The popularity of cycling as transport in European cities has been attributed to urban density, restricted car use, safe facilities for cyclists and regulatory functions that prioritise access to key urban areas for cyclists and pedestrians ahead of cars.

Conclusion

Mandatory bicycle helmet laws are consistent with road safety and with public health principles. Proposals to rescind or relax the laws are difficult to justify against the established risk of death and disability. The principle of mutual responsibility resonates across road safety and public health and is consistent with the wearing of bicycle helmets; the per incident lifetime cost of brain injury is paid for by taxpayers, individuals and communities. In addition to the

¹ *Towards Zero* is a vision for a future free of deaths and serious injuries on our roads.

economic and psycho-social burden, weakening of the laws would potentially have a flow-on effect to helmet wearing rates among children and adolescents who take their cues from the behaviours of adults and the broader cultural context. Mandatory bicycle helmet laws are a public health and road safety measure that should be maintained and the benefits communicated to the community.

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