1.3.1 Bicycle helmet use

Australia was the first country to introduce compulsory bicycle helmet use legislation, beginning in Victoria on 1 July 1990 (Cameron et al. 1992) and implemented nationally by the end of 1992. The impact of the legislation was closely monitored to identify any changes in the injury profile of cyclists. In the years before and after the introduction of the legislation, there were numerous reports that addressed the use, effectiveness and performance of bicycle helmets (Finch et al. 1993, Cameron et al. 1994, Finch et al. 1994, Newstead et al. 1994, Carr et al. 1995).

The use of bicycle helmets by cyclists is widely supported amongst the injury prevention and health promotion communities. Health care professionals and the World Health Organisation are emphatic in their support for increased helmet use to reduce the severity of cyclist head injuries (Runyan and Runyan 1991, Liller 2000, Heng et al. 2006, World Health Organisation 2006). Even in countries with high cycling participation, where helmets are not mandatory, such as Sweden, Germany and Belgium, there is increasing support for helmet use (Oström et al. 1993, Ekman and Welander 1998, Zentner et al. 1998, Depreitere et al. 2004, Richter et al. 2007).

Numerous review articles have been published on the efficacy of bicycle helmets. In Australia, a meta-analysis by Attewell, Glase and McFadden of 16 articles concluded that ‘the evidence is clear that bicycle helmets prevent serious injury and even death’ (Attewell et al. 2001:345). A Cochrane review article by Australian researchers of 5 studies reported that compulsory bicycle helmet use legislation is effective in increasing helmet use and decreasing head injuries (Macpherson and Spinks 2007). A separate Cochrane review of 5 case-control studies found that helmets provide a 63-88 per cent reduction in head injury and severe brain injury for all cyclists and are protective against cyclist head injuries in vehicle and non-vehicle crashes (Thompson et al. 2009). The need for legislation to increase helmet use was reported in research conducted in Canada (Karkhaneh et al. 2006), Singapore (Wong et al. 2002) and the US (Haileyesus et al. 2007).

Despite the extensive evidence of the efficacy of helmets in reducing serious head injuries, anti-helmet proponents argue that compulsory helmet use legislation causes a reduction in the number of people cycling, as cycling will be perceived as dangerous (Robinson 2006). This in turn, Robinson argued, reduces the overall health benefits of cycling and the safety in numbers effect (Robinson 2005). However, a systematic review by Karkhaneh and colleagues (2006) of 11 studies concluded that there was insufficient detail available to support the claim that helmet legislation resulted in reduced participation (Karkhaneh et al. 2006). Similarly, Macpherson and Spinks (2007) concluded that there is no evidence to support or refute the claim that helmet legislation leads to a reduction in cycling participation.

Controversy about helmet use and legislation is likely to continue and further discussion is outside the scope of this doctoral thesis. There is extensive research that addresses the efficacy of helmets in reducing the severity of head injuries and several researchers who dispute the need or efficacy of helmets. A summary of selected helmet-related publications is included in Table 1-1.
### Summary of selected bicycle helmet related research

<table>
<thead>
<tr>
<th>Author(s) &amp; Year</th>
<th>Location</th>
<th>Methods/participants</th>
<th>Key outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waters, 1986</td>
<td>UK</td>
<td>Hospital data n = 506 cyclists</td>
<td>Cyclist helmets recommended to improve survival rates from head injuries</td>
</tr>
<tr>
<td>Dorsch, Woodward &amp; Somers, 1987</td>
<td>South Australia, Australia</td>
<td>Questionnaire n = 894 cyclists</td>
<td>Helmets determined to be protective in a crash involving a head strike ▪ 197 cyclists crash had head injury (62%) wore a helmet, estimated 90% of deaths due to head injuries would have been prevented with hard helmets</td>
</tr>
<tr>
<td>Wood &amp; Milne, 1988</td>
<td>Victoria, Australia</td>
<td>Review of helmet campaigns, injuries, helmet use surveys</td>
<td>Cyclist-driver crashes, 1982/83 to 1984: helmets attributed to 20% reduction in cyclist head injuries ▪ Design standard is important, commuter helmet use ↑ 1983 (26%) to 1986 (44%)</td>
</tr>
</tbody>
</table>

**July 1990 – compulsory bicycle helmet use legislation introduced in Victoria**

| Cameron, 1992 | Melbourne, Victoria, Australia | Observations, cyclist injury data | ▪ Helmet use ↑ pre-leg’n 1982/83: 5%; 1989/90: 31%; 1 yr post-leg’n ↑ 75% ▪ Cyclist participation changes: children ↑ 36%, adults ↑ 58% ▪ 1989 to 1991 = significant ↑ head injuries due to legislation and ↑ helmets |

**December 1992 – compulsory bicycle helmet use legislation introduced in all Australian jurisdictions**

<p>| Hillman, 1993 | UK | Review of cycling policy and health promotion | Landmark article, ‘benefits gained from regular cycling outweigh the loss of life in years in cycling fatalities by a factor of around 20 to 1’ (p55) The statement does not specifically relate to helmet use or non-use, however is subsequently used as evidence to reject helmet use |
| Carr, Skalova &amp; Cameron, 1995 | Victoria, Australia | Analysis of hospital injury data | Four years post-legislation ▪ Hospital admissions in the 4 years post-legislation were 40% below the number expected based on the pre-legislation trends |
| Robinson, 1996 | New South Wales, Australia | Analysis of previous cyclist helmet studies | Helmets discourage cycling; draws causal link between helmet use and reduced cycling/societal levels of obesity. No evidence of causation is provided. Claims helmet injury risk similar for unhelmeted cyclists and drivers |
| Scuffham, Alsop, New Zealand | Survey helmet use, analysis | Three years post-legislation in New Zealand | |</p>
<table>
<thead>
<tr>
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<th>Key outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cryer &amp; Langley, 2000</td>
<td></td>
<td>of hospital data</td>
<td>Helmet use attributed to 19% reduction in cyclist head injury</td>
</tr>
<tr>
<td>Attewell, Glase &amp; McFadden, 2001</td>
<td>Australia</td>
<td>Meta analysis, 16 articles</td>
<td>Conservative risk reduction estimates for helmet use to reduce the risk of: head injury, 45%; brain injury, 33%; facial injury, 27%, and; fatal injury by 29% Cyclist helmet use analogous to car occupant seat belt use</td>
</tr>
<tr>
<td>Nolén &amp; Lindqvist, 2002</td>
<td>Sweden</td>
<td>Evaluation of helmet use</td>
<td>Caution against child-focused helmet uses programs, helmets needed for all cyclists Aim of Swedish National Road Administration = 80% helmet use for all cyclists, usage rates were: children 50%, adults 10-15%</td>
</tr>
<tr>
<td>Hamilton &amp; Stott, 2004</td>
<td>UK</td>
<td>Review of cyclist injury data and cycling risks</td>
<td>British Medical Association recommendation for helmet use by all cyclists Broader cyclist safety considerations needed, e.g. traffic calming, end of trip facilities</td>
</tr>
<tr>
<td>Macpherson &amp; Spinks, 2007</td>
<td>Australia</td>
<td>Cochrane review</td>
<td>Legislation is effective in increasing helmet use and decreasing head injuries Insufficient evidence to support or negate claims that bicycle helmet law leads to a reduction in cycling participation</td>
</tr>
<tr>
<td>Curnow, 2003, 2005, 2006, 2007</td>
<td>Australia</td>
<td>Brief communications etc.</td>
<td>Anti-helmet use papers, disputes previous research. Claims: 1) researchers don’t account for mechanism of brain injury; 2) case-control studies inadequate</td>
</tr>
<tr>
<td>National Highway Traffic Safety Administration (NHTSA), 2008</td>
<td>US</td>
<td>Fact sheet</td>
<td>Majority (70%) of all fatal cyclist crashes involved head injuries Estimates helmet use (4-15 yrs) would ↓ 39,000-45,000 head injuries annually At 2008 US state helmet laws, 14 states = no law, other states = child only</td>
</tr>
<tr>
<td>Thompson, Rivara and Thompson, 2009</td>
<td>US</td>
<td>Cochrane review article 5 articles</td>
<td>Helmets provide 63-88% reduction in head severe brain injury for all cyclists Helmets are protective for cyclists in vehicle and non-vehicle crashes</td>
</tr>
</tbody>
</table>
References


Thompson, D. C., Rivara, F. P. and Thompson, R. (2009). "Helmets for preventing head and facial injuries in bicyclists (Review)." Cochrane Database of Systematic Reviews(4).

