Head injury prevention for bicyclists — helmets make a difference

While we can't compete with the Dutch in terms of infrastructure for safe bicycling, maximising uptake of head protection will benefit Australians

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Bicycling as a mode of transport is being promoted for its health benefits, and more than four million Australians participate in bicycling at some level.[1] Unfortunately, with increasing participation there has been a concurrent increase in injury, with 10 552 bicyclists admitted to hospital in Victoria between July 2001 and June 2006.[2] Of these patients, 298 had life-threatening trauma and there were 47 fatalities overall. This trend has continued in the 5 years from July 2007 to June 2012, according to Victorian registry and National Coroner's data, with 615 life-threatening injuries and 50 deaths. Most of the injured bicyclists were male and aged less than 35 years, and crashes were commonly road-related (data accessed by PAC, Sep 2013). Collisions with motor vehicles result in the most severe injuries;[3] and head injuries are the most frequent cause of death and long-term disability from bicycle injury.[2,4]

In Australia, the initial focus on prevention was related to the risk of head injury. During the 1980s, a sustained campaign spearheaded by the Victorian Road Trauma Committee (VRTC) of the Royal Australasian College of Surgeons increased the voluntary helmet-wearing rate to about one-third.[5] A prospective study of 1710 Victorian helmeted and unhelmeted casualties showed that the risk of head injury, including serious injury, was reduced by at least 39% by wearing a helmet.[6] The VRTC pursued a robust campaign for legislation to make helmet wearing mandatory.[5] The 1990 legislation in Victoria was the first in the world. It was followed by decreases in non-fatal and fatal head injuries.[6,7] Other Australian states have subsequently implemented similar legislation. Despite this success, opponents of helmet wearing have sought to have the legislation repealed.

In Western Europe, where the community participation rate for bicycling is much higher, the value of wearing helmets is still debated and injury prevention strategies have largely focused on the construction of extensive

networks of bicycle paths. In the Netherlands, bicycle riders are more frequently separated from motorised vehicles, and speed limits for motor vehicles have been lowered on roads shared with bicycles. Improved protective clothing and added front and back lighting have improved safety, as has education about bicycling in traffic. In Australia, unlike the Netherlands, motor vehicle drivers have generally not been exposed from a young age to bicyclists in traffic and may be less aware of bicyclist vulnerability. Despite these differences, in 2009, 185 bicyclist fatalities occurred in the Netherlands (population 17 million)[8] and 31 in Australia (population 22.7 million).[9]

Given the known differences in rates of helmet wearing, bicycle infrastructure and culture, the patterns of injury among adult bicyclists admitted with serious trauma (Injury Severity Score [ISS] > 15) to major trauma centres in Rotterdam, the Netherlands, and Melbourne, Australia, were recently compared.[10] From July 2001 to June 2009, 194 such patients were managed at The Alfred, Melbourne, and 187 at Erasmus Medical Centre (EMC), Rotterdam. Bicyclists dying at the crash scene or on arrival at hospital were not included in the databases. Both hospitals reported that the main mechanism of injury was collision of a bicycle with a motorised vehicle. Patients admitted to EMC were older and a higher proportion were female. Seventy-two per cent of The Alfred patients reportedly had been wearing a helmet, but only 5% of those admitted to EMC. While the median ISS was identical in both populations, patients at EMC had sustained more serious (Abbreviated Injury Scale [AIS] score ≥ 3) head injuries than patients at The Alfred (165 [88.2%] v 121 [62.4%], respectively; $P < 0.001$). More patients at The Alfred did not sustain a head injury compared with those at EMC. Serious injuries of the chest, abdomen, and extremities were more common among the Alfred group, and neck injuries less common. There were more inhospital deaths at EMC (45 [24.1%] v 13 [6.7%]; $P < 0.001$). The highest mortality rate was among patients with serious head injury. These findings support the view that helmet wearing appreciably lessens the risk of serious head injury and death in bicycle crashes and are supported by studies using different analytical techniques.[11,12]

There is good evidence that preventing head injuries in cyclists will prevent most major morbidity and mortality. Helmets are associated with a much lower level of serious head injuries, and legislation along with education programs have resulted in high levels of acceptance by the community. Further improvements in prevention require better injury surveillance and exposure data as well as a comprehensive prevention program involving strategies such as driver education and development of adequate cycling infrastructure.

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