

## Preventing bicycle-related injuries: next steps

With the remarkable increase in the prevalence of obesity in the USA and most high-income countries of the world over the last 20 years, there is an urgent need to promote an increase in physical activity by persons of all ages. One of the methods to do so is the use of bicycling for both commuting and recreation. Bicycles were introduced in the 19th century and now number about 1 billion worldwide, twice as many as automobiles.<sup>1</sup> It is the sharing of the road that can be problematic. About 900 deaths occur annually for cyclists, and most deaths from bicycle-related injuries are caused by collisions with motor vehicles.<sup>2 3</sup> Head injury is by far the greatest risk posed to bicyclists, comprising one-third of emergency department visits, two-thirds of hospital admissions, and three-quarters of deaths.<sup>4</sup> Since 1999, in the USA, the number and rate of bicycle-related deaths has decreased for those aged 16 years or less from 213 (0.31 per 100 000) to 118 (0.17 per 100 000) in 2007.<sup>2</sup> The number and rate of cycle-related deaths for those aged 17 or more, however, has increased during that same period from 586 (0.28 per 100 000) to 700 (0.30 per 100 000).<sup>2</sup> Among those aged 16 or less, the number of non-fatal bicycle-related injuries in the USA decreased from about 316 000 in 2001 to 261 000 in 2009, whereas for those older than 16, the number of injuries increased from about 202 000 in 2001 to 258 000 in 2009.<sup>2</sup> It is telling that the decrease in deaths and injuries among those aged 16 or less coincides with the ages required to wear helmets in most states with bicycle helmet laws in the USA. However, there is also clearly a need for further steps in research to reduce the number of both deaths and injuries among persons of all ages in the USA and worldwide.

How can the injury research field contribute to promoting physical activity, such as cycling, while simultaneously working to minimise the risk of injury from this activity? Parents are reluctant to let their children ride their bikes to school because of fear of injury. Adult cyclists are fearful of being 'buzzed' or sideswiped, or hit by motor vehicles while travelling on public roads. These fears are important since they may prevent more widespread use of cycling, both for commuting and for fitness.

Bicycle paths have been promoted as a means of decreasing risk of crashes, by physically separating bicycles from motor vehicles. Not all bicyclists, however, are equal in ability. The speed, skill, and needs of the 10-year-old child riding her bike to school are very different from those of an adult commuter or serious recreational cyclist. The characteristics and use patterns of bicycle paths need to be evaluated to determine which designs encourage their use and decrease the risk of injury. Bike lanes are far less expensive than separate bicycle paths. We need to understand how they can be best used to minimise the risk of injury; how they can be maintained and kept free of debris so as to encourage cyclists to continue to use them; whether they should be restricted to certain type of riders, for example adult commuters; and whether they should have accompanying separate traffic control signals, such as those used in countries like the Netherlands. What other factors, such as clothing, lighting, and cyclist and motorist behaviour, alter the risk of injury to cyclists on public roads?

Another popular form of recreational cycling is off road/mountain biking. It may be unlikely that trails can be substantially altered to reduce hazards; the hazards are part of the attraction of the sport. Determining whether changes can be made to the bike, or designing new types of protective devices and clothing for the rider would be useful to reduce the risk of crash and to prevent an injury if a crash occurs. It would be useful to determine whether training programmes can make the rider better able to handle these hazards and decrease the risk of injury.

Now that schools in the USA are out for the summer, we need to make sure that our children wear helmets and learn how to bicycle safely. A bicycle helmet is the most effective means of preventing head injuries, with an estimated effectiveness of about 85% in reducing the effects of head and brain injury.<sup>5</sup> Unfortunately, only about 20–25% of all cyclists wear helmets,<sup>5</sup> and 91% of cyclists killed in 2008 in the USA were reportedly not wearing them.<sup>3</sup> Interest in helmet use seems to have peaked, but unlike seat belt use, there has never been a national effort to track observed helmet use. Reported helmet use is probably a poor proxy of actual helmet use and is an inadequate method of surveillance. Understanding how to reinvigorate the interest in the use of helmets, including the use of social media, is clearly needed to achieve high use rates for this effective intervention.

The burst of research during the 1980s and 1990s on bicycle related injuries has made a difference in decreasing the injury toll. However, the magnitude of the injury problem remains sizeable and is likely to increase, with a greater emphasis on promotion of physical activity. New research, different approaches, and better implementation of findings are clearly needed to address this important cause of the injury burden across the world.

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