



Briefing for legislators

For a number of years there has been much controversy about cycle helmets, particularly whether or not helmet use should be compulsory. As the debate has intensified, observed helmet use has increased and some countries have passed helmet legislation. This briefing reviews the issue.

Cycling as transport

Cycling is a low-risk activity akin to walking or driving, not a high risk activity like motorcycling. Risk analysis for various EU countries reveals no evidence that cycling is systematically more dangerous than driving; the relative outcome varies from country to country. The level of cycle use is the principal factor in cycling risk - the more cyclists, the lower the risk. (Wardlaw, 2002; Krag, 2005)

In Britain, where cycle use is fairly low, the long term risks faced by active cyclists are still comparable to or less than for driving populations in a number of EU countries. Long-term data collected by the British government show that:

- on average, cyclists face lower risks per mile travelled than pedestrians;
- cycling is not a leading cause of head injury in any age group;
- an estimated 0.7% of hospital admissions for head injury are due to cyclists in road traffic accidents;
- amongst children, 7% of serious head injuries are due to cycling accidents of any type.

(RAGB; Boyak, 2004; HES, 2001/2)

Note: Of typically 3,000 serious cycling casualties in road accidents per year, an estimated 40% suffer serious head injuries (1,200 cases). The total number of all causes head injury admissions annually is estimated at 190,000. See for instance: *Thornhill et al, 2000.*

Reasons to encourage cycling

Public Health

"If the government were to achieve its target of trebling cycle use in the period 2000-2010, that might achieve more in the fight against obesity than any other individual measure".

From the report (HoCHC, 2004) of the UK Commons Health Committee, 2004. Cycling is a very healthy activity. It has repeatedly been shown that the health benefits greatly exceed the risks (Rutter).

Road Safety

Edinburgh, York and London have boosted cycle use substantially without an increase in reported casualties. More cycling leads to safer cycling (Jacobsen, 2003). Countries with the lowest levels of cycle use have the poorest cyclist safety records. Cyclists also pose negligible risk to pedestrians. Conversely, the proportion of UK road deaths in cars or on motorcycles increased from 62% in 1994-98 to 69% in 2003, and these modes impose a great risk to pedestrians (RAGB).

Traffic congestion

In London, the Congestion Charge aided the approx. 40% increase in cycle use from 2002 to 2004 (TfL, 2004).

Effect of helmet legislation

Non-enforced legislation



From October 1995, helmets became compulsory for child cyclists in the province of Ontario, Canada. The law was not enforced. No Toronto child has been ticketed for cycling without a helmet. After an initial increase, helmet use fell back to pre-law levels (Macpherson, 2004). Non-enforced legislation is of doubtful efficacy, except perhaps to teach children that laws need not be obeyed.

Enforced legislation

Cycle helmets became compulsory in New Zealand from 1st January 1994. The law was enforced with vigour, driving adult helmet use up from 40% to 90%+ where it has remained. However, there was no reduction in the severity of serious head injuries (Povey, Frith and Graham, 1999; Robinson, 2001). Cycle use fell by 22% between 1993 and 1997 (LTSA).

In the state of Victoria, Australia, where cycle helmets also became compulsory, the number of cyclists hospitalised with head injuries, after road accidents, fell by 48% and 70% in the first and second years of the helmet law, respectively (). However, the helmet law was introduced alongside campaigns against drink driving and speeding, and this also contributed to fewer accidents. For instance, pedestrian deaths also fell by 42% in the first year of the cycle helmet law (Powles and Gifford, 1993). Road casualty data provide no evidence of death or serious head injury prevented by the helmet law (TACV). Cycle use fell by about one third as the law was enforced (Robinson, 1996).

For Australia as a whole, head injury deaths in road accidents fell by less for cyclists than for other road users in the years when cycle helmet laws came into force. This is revealed by data from the Fatality File of the Australian Transport Safety Bureau. Between 1988 and 1994, the decline for cyclists was 30%, but it was 40% for pedestrians and car occupants. Given that walking and driving were not deterred by helmet laws, it would appear that cyclists faced higher than expected risk of death by head injury, not lower. The possible reasons are considered below.

These population-level outcomes are not consistent with documented hospital-based case-control studies (Towner et al, 2002; BHSI, 1), which have predicted that helmet use reduces the risk of serious head injury in a crash by 50-80%. This literature has been widely cited to establish a case for the compulsory wearing of cycle helmets. One would expect that mass helmet use should give an obvious reduction in the proportion of cycling injuries that are to the head, yet such a reduction is not observed in reality. In epidemiology, it is now recognised that case-control studies are prone to erroneous results when applied to self-selected behaviour (Smith, 2004; Lawlor, Smith and Ebrahim, 2004). This is due to confounding by social factors - "selective recruitment". It is hard to evaluate what protection a cycle helmet may provide at the individual level, but the effect of mass helmet use cannot be discerned at the population level (Scottish Parliament). This counter-intuitive result is not widely appreciated.

Enforced helmet legislation drives cycle use down. In Australia, cycle use was generally growing before the helmet laws of the early 1990s (Robinson, 1996). Since then it has declined steadily in most states. In New South Wales, child cycle use had fallen by 44% by the second year of the helmet law (Smith and Milthorpe, 1993). In Sydney, cycle use was still 48% down on pre-law levels five years after legislation (Smith and Milthorpe, 1993). The state of Western Australia has made considerable efforts to promote cycling, yet per-capita cycle use has barely recovered to pre-law levels ten years after legislation, in contrast to big increases in the decade preceding the law.

NB: The population of the state of Western Australia has increased by 33% since the passing of the helmet law, whereas cycling levels as measured at a major strategic point in the city of Perth have only exceeded pre-law levels in the last few years. Other cycle count data, though poor, confirm this general picture.

In Nova Scotia, Canada, cycle use dropped by 40%+ after legislation (LeBlanc, Beattie and Culligan, 2002). In British Columbia, Canada, cycle use fell by an estimated 28% following legislation.

NB: The figure of 28% is estimated from Traffic Collision Statistics British Columbia. Between 1995 and 1997, police-attended cyclist collisions with motor vehicles declined by 35%, but for pedestrians by only 7%. Given



the short time period, a direct link between pedestrian and cyclist casualties can be assumed. The 7% indicates safer roads through a crackdown on speeding, leaving a 28% shortfall in cyclist casualties due to less cycling.

Possible Undesired Results of Helmets

Risk compensation by cyclists

Safety equipment can change behaviour under certain circumstances (Hedlund, 2000). This may "use up" some of the benefit or even increase the risk. Risk compensation has been formally observed amongst risk-averse child cyclists (Mok et al, 2004). Measured adult helmet use is highest on busy roads and at peak times (Bryan-Brown and Christie, 2001). One analysis has warned: "Don't over-predict benefits. Unduly optimistic predictions will hamper injury prevention efforts in the long run". (Hedlund, 2000)

Risk compensation by drivers

Some drivers may be less careful towards cyclists if they feel them to be protected by helmets. A cycle helmet is intended to protect in a simple fall at low speed, not in a collision with a motor vehicle. There is no known case of a UK court accepting that a cycle helmet would have reduced the severity of head injury suffered in a serious crash with a motor vehicle (Fulbrook, 2004). Fortunately such incidents are rare.

Slower thinking

In other activities, it has been observed that helmets may slow reaction times by heating the brain (Neave et al, 2004). If this is true of cycle helmets, it could lead to increased risk.

Discouragement of cycling

Enforced helmet laws drive cycle use down, thereby increasing the risk for those who still cycle and negatively impacting public health. There is also evidence that child cycling levels have fallen after local helmet promotion campaigns (Bryan-Brown and Taylor, 1997). Insensitive helmet promotion labels cycling, incorrectly, as a dangerous activity. Some kinds of cycling do incur higher risks of head injury, such as stunt riding, mountain biking, and competition. Informed helmet use in specific activities is unlikely to deter cycle use overall. The perceived attitude that cycling is "inevitably dangerous" is a major obstacle to raising mass cycle use as daily transport. On-road cycling is a low-risk mode of travel that gets safer when it gets more popular.

Recommendations

1. Cycle helmets should not be made compulsory. It would be arbitrary to impose legislation on cyclists, who do not face clearly higher risks than pedestrians or drivers. Enforced helmet laws drive cycle use down, thereby increasing the risk per cyclist and harming public health. Enforced helmet laws have not effected material prevention of serious head injury at the population level.
2. A large increase in cycle use should have political and social priority. Increasing cycle use is one of the most effective measures to reduce the risk of death or injury per cyclist, due to the "safety in numbers" effect. It is also "probably the most effective measure" to tackle obesity and lack of physical exercise in general..
3. Helmet guidelines should be realistic. "Don't over-predict benefits. Unduly optimistic predictions will hamper injury prevention efforts in the long run".

Based on a paper prepared for Cycling Scotland



References

BHSI, 1

[Bicycle Helmet Safety Institute.](#) **External Link**

<http://www.bhsi.org/>

Boyak, 2004

Data from the Registrar General for Scotland as requested by Sarah Boyak MSP from the Scottish Executive 9/3/2004. The average number of head injury deaths during 1999-2002 was 1.5 per year. .

Bryan-Brown and Christie, 2001

Bryan-Brown K, Christie N, 2001. Cycle helmet wearing in 1999. Transport Research Laboratory Report 487.

Bryan-Brown and Taylor, 1997

Bryan-Brown K, Taylor S, 1997. Cycle helmet wearing in 1996. Transport Research Laboratory Report 286.

Cameron, Vulcan, Finch and Newstead, 1994

Cameron MH, Vulcan AP, Finch CF, Newstead SV, 1994. Mandatory bicycle helmet use following a decade of helmet promotion in Victoria, Australia - an evaluation. *Accident Analysis & Prevention* 1994;26(3):325-337.

Fulbrook, 2004

Fulbrook J, 2004. Cycle helmets and contributory negligence. *Journal of Personal Injury Law* 2004:171-191.

Hedlund, 2000

Hedlund J, 2000. [Risky business: safety regulations, risks compensation, and individual behavior.](#) *Injury Prevention* 2000 Jun;6(2):82-90. **External Link**

<http://ip.bmjournals.com/cgi/content/full/6/2/82>

HES, 2001/2

Hospital Episodes Statistics for England 2001/2. 30,816 children were admitted to hospital with serious head injuries, of which 2,183 were during cycling.

HoCHC, 2004

[Obesity.](#) Third report of House of Commons Health Committee. May 2004. **External Link**

<http://www.publications.parliament.uk/pa/cm200304/cmselect/cmhealth/23/2302.htm>

Jacobsen, 2003

Jacobsen PL, 2003. [Safety in numbers: more walkers and bicyclists, safer walking and bicycling.](#) *Injury Prevention* 2003;9:205-209.

<http://www.cyclehelmets.org/1186.html>

Krag, 2005

Krag T, . [Cycling, safety and health.](#) European Cyclists Federation. **External Link**

http://www.ecf.com/publications/Download/050113_Cyling_safety_ecf_Thomas%20Krag.pdf



Lawlor, Smith and Ebrahim, 2004

Lawlor DA, Smith GD, Ebrahim S, 2004. [The hormone replacement - coronary heart disease conundrum: is this the death of observational epidemiology?.](#) Int Journal of epidemiology 2004;33:464-467. **External Link**
<http://ije.oxfordjournals.org/cgi/content/full/33/3/464>

LeBlanc, Beattie and Culligan, 2002

LeBlanc JC, Beattie TL, Culligan C, 2002. [Effect of legislation on the use of bicycle helmets.](#) Canadian Medical Association Journal CMAJ 2002;166(5): p592-5. [Link includes commentary](#)
<http://www.cyclehelmets.org/1094.html>

LTSA

Land Transport Safety Authority, New Zealand, data. .

Macpherson, 2004

Communication concerning unpublished research by Dr A. Macpherson et al, School of Kinesiology and Health Science, York University, Toronto, Ontario, and M J Wardlaw in April 2004. .

Mok et al, 2004

Mok D, Gore G, Hagel B, Mok E, Magdalinos H, Pless IB, 2004. [Risk compensation in children's activities: A pilot study.](#) Paediatr Child Health 2004;9(5):327-330.
<http://www.cyclehelmets.org/1146.html>

Neave et al, 2004

Neave N, Emmett J, Moss M, Scholey A, Wesnes K, 2004. The effects of wearing protective helmets on attentional processes in young cricketers. Northumbria University Cognitive Science Unit.

Povey, Frith and Graham, 1999

Povey LJ, Frith WJ, Graham PG, 1999. [Cycle helmet effectiveness in New Zealand.](#) Accident Analysis & Prevention 1999 Nov;31(6):763-70.
<http://www.cyclehelmets.org/1095.html>

Powles and Gifford, 1993

Powles JW, Gifford S, 1993. Health of nations: lessons from Victoria, Australia. BMJ 1993 Jan 9;306(6870):125-7.

RAGB

Road Accidents in Great Britain: the casualty report. Department for Transport, London. Various years..

Robinson, 1996

Robinson DL, 1996. [Head injuries and bicycle helmet laws.](#) Accident Analysis & Prevention 1996 Jul;28(4):463-75.
<http://www.cyclehelmets.org/1146.html>

Robinson, 2001

Robinson DL, 2001. [Changes in head injury with the New Zealand bicycle helmet law.](#) Accident Analysis & Prevention 2001 Sep;33(5):687-91.



<http://www.cyclehelmets.org/1146.html>

Rutter

Rutter H, . [Transport and public health fact sheet.](#) **External Link**

<http://www.modalsift.org/presentations/fphmasm02/southportposter.pdf>

Scottish Parliament

[Commentary on follow-up studies in New Zealand and the state of Western Australia after helmet laws were passed.](#) Scottish Parliament. **External Link**

<http://www.scottish.parliament.uk/msp/crossPartyGroups/groups/cycle-docs/helmet-legis-commentary.pdf>

Smith and Milthorpe, 1993

Smith NC, Milthorpe MW, 1993. An Observational Survey of Law Compliance and Helmet Wearing by Bicyclists in New South Wales - 1993 (4th survey). NSW Roads & Traffic Authority ISBN 0-7305-9110-7.

Smith, 2004

Smith GD. 2004. [Classics in epidemiology: should they get it right?.](#) Int Journal Epidemiology 2004;33:441-442. Commentary

<http://ije.oxfordjournals.org/cgi/content/extract/33/3/441>

TACV

Transport Accident Commission of Victoria . Data for average numbers of deaths and serious head injuries (DSHI) and all serious injuries (ASI) per year pre-law and post-law..

TfL , 2004

Cyclist numbers soar to record high. Transport for London press release 22/7/2004.

Thornhill et al, 2000

Thornhill S, Teasdale GM, Murray GD, McEwen J, Roy CW, Penny KI, 2000. [Disability in young people and adults one year after head injury: prospective cohort study.](#) BMJ 2000;320:1631-5. **External Link**

<http://bmj.bmjournals.com/cgi/content/full/320/7250/1631>

Towner et al, 2002

Towner E, Dowswell T, Burkes M, Dickinson H, Towner J, Hayes M, 2002. [Bicycle helmets - a review of their effectiveness: a critical review of the literature.](#) Department for Transport Road Safety Research Report 30. Link includes commentary

<http://www.cyclehelmets.org/1067.html>

Wardlaw, 2002

Wardlaw M J, 2002. [Assessing the actual risks faced by cyclists.](#) Traffic Engineering + Control Dec 2002 p352-356. papers/2014.pdf

The Bicycle Helmet Research Foundation (BHRF), an incorporated body with an international membership, exists to undertake, encourage and spread the scientific study of the use of bicycle helmets. Also to consider the effect of the promotion and use of helmets on the perception of cycling in terms of risk and the achievement of wider public health and societal goals.

BHRF strives to provide a resource of best-available factual information to assist the understanding of a complex subject, and one where



some of the reasoning may conflict with received opinion. In particular BHRF seeks to provide access to a wider range of information than is commonly made available by those that take a strong helmet promotion stance. It is hoped that this will assist informed judgements about the pros and cons of cycle helmets.

For more information, please visit www.cyclehelmets.org.

Document downloaded 25 Jul 2017. The copyright in this document is owned by the Bicycle Helmet Research Foundation, but it may be reproduced or distributed freely so long as the content is not modified in any way.