Bicycle Network Mandatory Helmet Review

Opinion of Prof Chris Rissel, University of Sydney

1. *Do you believe it should be mandatory to wear a helmet when riding a bicycle? (If you believe it should be mandatory at some times but not others please describe when.)*

NO

2. *What's your reasons for your answer to question one?*

SEE ATTACHED

3. *Do you provide consent for your opinion to be made public?*

   Yes

4. *If no, are you happy if we say you provided an opinion but didn't want it made publicly available?*

   Yes *No*

Signed: C Rissel

Date: 3/10/2017

Please send completed form to craigr@bicyclenetwork.com.au *before 5pm, Friday 13 October, 2017.*

No to compulsory helmet legislation

Summary
A significant negative impact of mandatory bicycle helmet laws has been the reduction in cycling participation from when it was introduced which has never recovered. Internationally, Australia is considered an example of what NOT to do to promote cycling participation. In this modern age of chronic disease and obesity, increasing population physical activity should be a health priority and mandatory bicycle helmet laws represent a barrier to the grown of cycling as one form of physical activity.
The evidence is at best mixed in support of any injury prevention effects of mandatory helmet legislation and the legislation clearly has negative consequences in terms of cycling participation.

Cycling has many health benefits

The literature is clear and consistent that there are many individual and societal benefits from more people cycling, and cycling more often (Table 1).

Table 1: Reports/reviews assessing health benefits of cycling.

Authors	Title	Year	Country
British Medical Association[1]	*Cycling towards health and safety*	1992	United Kingdom
Roberts I, Owen H, Lumb P, McDougall C[2]	*Pedalling health — Health benefits of a modal transport shift*	1996	Australia
Cavill N, Davis A[3]	*Cycling and health: What's the evidence?*	2007	United Kingdom
Bauman A, Rissel C, Garrard J, Kerr I, Speidel R, Fishman E[4]	Cycling: Getting Australia moving — Barriers, facilitators and interventions to get more Australians physically active through cycling	2008	Australia
Hamer M, Chida Y[5]	Active commuting and cardiovascular risk: A meta-analytic review	2008	Global
Oja P, Titze S, Bauman A, de Geus B, Krenn P, Reger-Nash B, Kohlberger T[6]	Health benefits of cycling: A systematic review	2011	Global
British Medical Association[7]	Healthy transport = Healthy lives	2012	British Medical Association
Garrard J, Rissel C, Bauman A[8]	Health benefits of cycling	2012	Global

In an effort to reduce cycling head injuries, Australia introduced mandatory helmet legislation in 1991-92 (and New Zealand followed suit in 1994). This legislation has been consistently contested since its introduction.[9-12] The rest of the world has not embraced this policy because of the negative effects on cycling participation. The main objections about laws requiring bicycle helmets to be worn by all people at all times when cycling are that the efficacy of bicycle helmets in protecting cyclists has been exaggerated;[13] the legislation has had an extremely negative effect on cycling participation;[14 15] and the evidence that such legislation has achieved any meaningful reductions in rates of brain or head injuries is weak and does not acknowledge the long-term downward trends that are evident.[16]

Two major economic modeling studies (one in Australia and one in Germany) have looked at the costs and benefits of mandatory helmet legislation.[17 18] Both studies were conservative in their assumptions of the drop in cycling and both still concluded that the costs of mandatory helmet legislation was substantially greater than the benefits. If the effects of the reduction in cycling in Australia that were observed (about 30-40%)[12] were modelled for Germany, then the negative effects of helmet legislation would be very substantial.

Repealing the legislation would mean that police and judicial resources are not wasted on a minor "offense" that causes no harm to others. In the Northern Territory it is legal to ride on footpaths and cycle paths without a helmet. Cycling injury rates in NT are similar to the national average.[19]

Mandatory helmet legislation deters people from cycling

There is general agreement that people stopped riding when the legislation was introduced. Based on census data on journey to work, cycling levels have still not recovered to 1986 levels,[20] with cycling to work representing only 1.2% of journeys in 2006.[21] That there are fewer cycling trips in Australia in 2011 than in 1985 despite population increases.[22]

The compulsion to wear a helmet has consistently been identified as one of the barriers to more people cycling in Australia, with about one in six *current cyclists* (16.5%) cite helmets as a reason for not cycling more.[23] A survey of 600 Sydney residents found that 1 in 5 (22.6%) of all respondents said that they would ride more if they did not have to wear a helmet.[24] If this increase in (even occasional) cycling were translated to the Sydney population of 4.5 million, this could represent a substantial increase in cycling levels, along with the associated health benefits.

This Sydney survey found almost half (47.6%) of respondents said they would never ride without a helmet, 14.4% said 'all the time', 30.4% said 'some of the time' and the rest were not sure. Significantly, regular riders (70%) were twice as likely to ride without a helmet compared with non-riders (36%).[24]

A number of studies have been done around the world looking at the health benefits and injury costs of cycling – see table 2. All have concluded that the health benefits outweigh the injury costs, irrespective of helmet wearing. Pucher, Dill and Handy reviewed the international literature and concluded that "the combined evidence presented in these studies [from countries without universal helmet legislation] indicates that the health benefits of bicycling far exceed the health risks from traffic injuries".[25]

Table 2: Studies comparing the health benefits of cycling with injury/pollution costs.

Authors (date)	Location(s)	Basis for comparison	Main findings	Ratio of health benefit to cost
Hillman, 1992[26]	Great Britain	Ratio of life-years gained through health benefits of cycling compared with life-years lost to cycling injuries.	Health-related life-years gained outweigh injury-related life-years lost by 20:1.	20:1
Woodcock et al., 2009[27]	London/Delhi	Various sustainable travel scenarios considered. Weighs up both mortality effects and 'disability-adjusted life-years' (DALY) effects per million of population due to increased physical activity, injuries and pollution; also the societal benefits of reduced pollution and CO_2 emissions.	Impacts per million population annually: • Physical activity benefits: 528 deaths averted, saving 5496 life-years; plus a reduction of 2245 life-years impaired by disability, a saving of 7742 DALYs. • Air pollution net benefits (note: societal benefits of reduced air pollution outweigh the pollution disbenefits for individuals who switch from car to active travel): 21 deaths averted, saving 200 life-years, plus 200 DALYs. • Traffic crashes: net loss of 11 lives and 418 life-years, plus an increase of 101 life-years impaired by disability, a cost of 519 DALYs.	Ratio for mortality: (5496:418) = 13:1 Ratio for DALYs: (7742:519) = 15:1
de Hartog, Boogaard, Nijland, &	Netherlands	Gains and losses per person per annum for adults aged 18-64 who switch from a regular car commute to cycling. Weighs	Average mortality gains/ losses:	9:1

Hoek, 2010[28]		up life-years gained per year through health benefits of cycling versus life-years lost to cycling injuries and pollution.	• Physical activity benefits: range 3-14 months (mean = 8 months or 245 days). • Injury costs: range 5-9 days (mean = 7 days). • Pollution costs: range 0.8-40 days (mean = 21 days).	
Rabl & de Nazelle, 2012[29]	Data from several EU cities	Considers annual value of mortality benefits and disbenefits for each individual who switches a regular short (5 km one-way) car commute to cycling. Weighs up life-years gained per year through health benefits of cycling, versus life-years lost to cycling injuries and pollution, and also societal benefits of reduced pollution.	Average annual value of benefits per person switching from car to cycle: • Physical activity benefits = $1310. • Public health benefits from reduced pollution = $33. • Individual disbenefits from increased pollution = $19. • Individual disbenefits from injuries = $53.	1310:53 = 24:1 Including pollution effects on individuals and society = 19:1.
Rojas-Rueda, de Nazelle, Tainio, & Nieuwenhuijsen, 2011[30]	Barcelona	Calculates the overall mortality-related impacts of Barcelona's 'BICING' cycle hire scheme in terms of life-years gained through health benefits of scheme-users switching from car travel to cycling, versus life-years lost to cycling injuries and pollution. Also considers CO_2 savings.	Life-years gained and lost annually by BICING scheme users: • Deaths averted due to physical activity: 12.46. • Deaths due to pollution: 0.13. • Deaths due to injury: 0.03.	Including pollution effects to individuals = 77:1*
Holm, Glumer, & Diderichsen, 2012[31]	Copenhagen	Modelled the health impact assessment using DALYs of policy proposals to increase cycling.	• Burden of disease from physical inactivity reduced by 76.0 DALYs. • Burden of disease from air pollution (5.4) and traffic accidents (51.2) increased by 56.5 DALYs.	Net benefit of DALYs = 19.5 DALYS

Woodcock, Tainio, Cheshire, O'Brien, & Goodman, 2014[32]	London	For London cycle hire scheme uses, assesses change in lifelong DALYs modelled through medium-term changes in physical activity, road traffic injuries and exposure to air pollution.	• Men: all non-injury diseases averted = -83 DALYS. • Men: Observed cycle high-injury rate = 10 DALYS. • Women: all non-injury diseases averted = -22 DALYS. • Women: Observed cycle high-injury rate = 6 DALYS.	Total DALYs[a] = -88 DALYS [a] negative DALYs represent a health benefit.

*The Rojas-Reuda estimate of 77:1 overstates the benefits, because of incorrect assumptions that most bike trips replaced car trips[33]

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Cycling Safety

In terms of cycling safety, a drop in cycling participation leads to a decrease in safety because of the effects of the 'safety in numbers', where the more people that walk or cycle, the safer it becomes to walk or cycle.[34] Thus the introduction of mandatory helmet legislation had a negative impact on overall cycling safety. [35] This 'safety in numbers' effect has been demonstrated prospectively in a review of 10 public bike share programs in the United States.[36] The results showed that compared to the 24 months before implementation, in the 12 months post-implementation, head injuries in public bike-share cities fell by 14%, despite the increase in cycling from using public bikes and no requirement to wear helmets.

Early data from the London Bike Hire scheme (July 2011) showed there had been about 6 million trips taken without a serious injury. The Dublin scheme is the same size as Melbourne's scheme and has 10 times the daily use with no serious injuries. Helmets are not required in either the London or Dublin scheme. Helmet legislation has been identified as a barrier to the success of the Australian bicycle share programs.[37]

Bicycle helmet legislation has made minimal improvement to cycling safety, and most cycling promotion advocates would say that an investment in cycling infrastructure would achieve much greater improvements in cycling safety.[38]

Improvements in the road safety environment led to reduced cycling injuries, not helmet legislation

All the available long term data on cycling injuries and deaths in Australia show that there was a long decline in injuries among all road users prior to the helmet legislation (See 3 figures in the Appendix). This is consistent with international improvements in road safety in five countries at the same time.[39] The legislation made little difference. A NSW study[40] that argued that the legislation was effective only studied a narrow window around the time of the legislation and ignored the longer term trends.

Bicycle helmets only protect 10-15% of head injuries

Recent reviews have re-evaluated the evidence and found significant bias in previous estimates.[13] Helmets don't protect the neck and face, and may increase the risk of some injuries. The helmet legislation shows little impact on head and brain injuries, because the actual risk of such injury is very low per time or km exposure.

Australia, New Zealand & the United Arab Emirates are the only countries in the world with an all-age, enforceable bicycle helmet legislation

If it was such a good idea, why haven't other countries followed suit? For every academic paper that supports helmets or helmet legislation there is a competing academic paper that challenges the evidence.[41] With such obvious scientific

disagreement and lack of consensus, this is not the basis for good policy. Indeed, if this were a new pharmaceutical product it would be withdrawn promptly.

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Appendix. Reductions in head injuries BEFORE helmet legislation

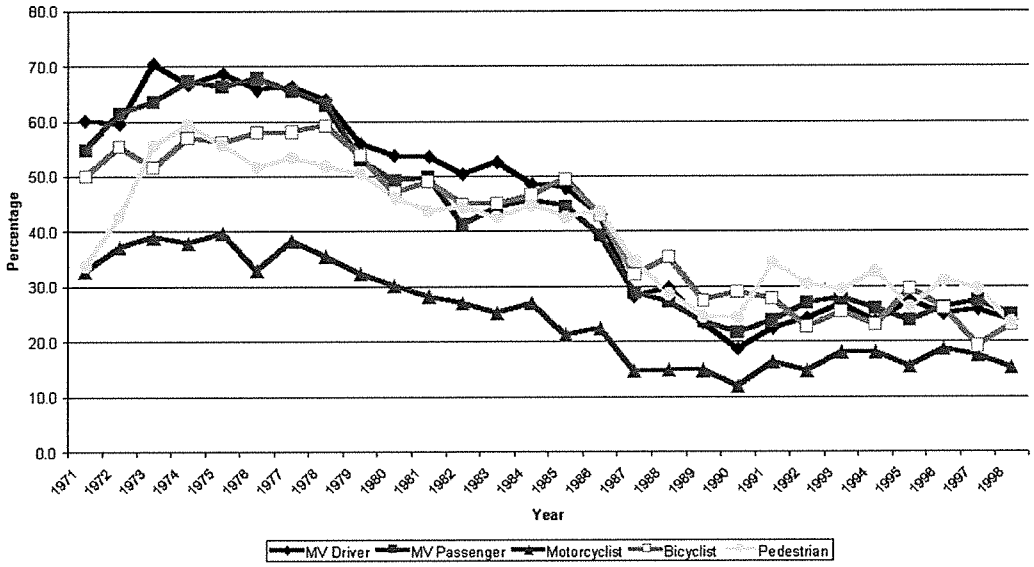

Figure 1: Percentage of injuries that are head injuries by road users, Western Australia, 1971 to 1998

Hendrie D, Legge M, Rosman D, Kirov C. **An economic evaluation of the mandatory bicycle helmet legislation in Western Australia.** Road Accident Prevention Research Unit, 1999. http://www.biketas.org.au/2008/20080404-3.pdf

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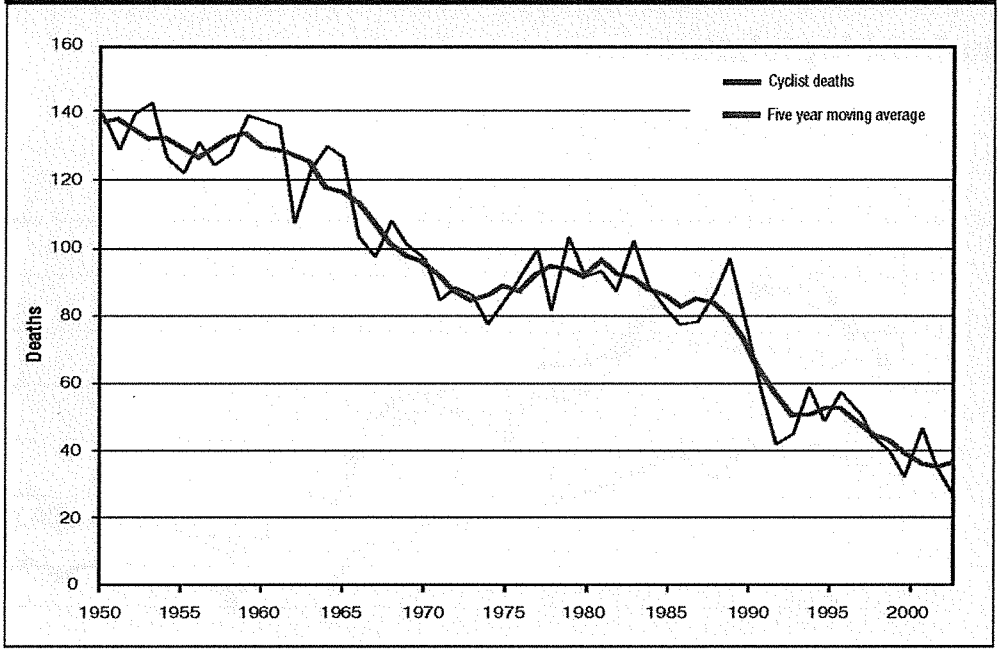
Figure 2: Number of cyclist deaths, Australia, 1950 to 2003



Australian Transport Safety Bureau. Monograph 17 *Cycle Safety*. 2004.

BICYCLE NETWORK

International trends (1970-2008) in cycling fatalities

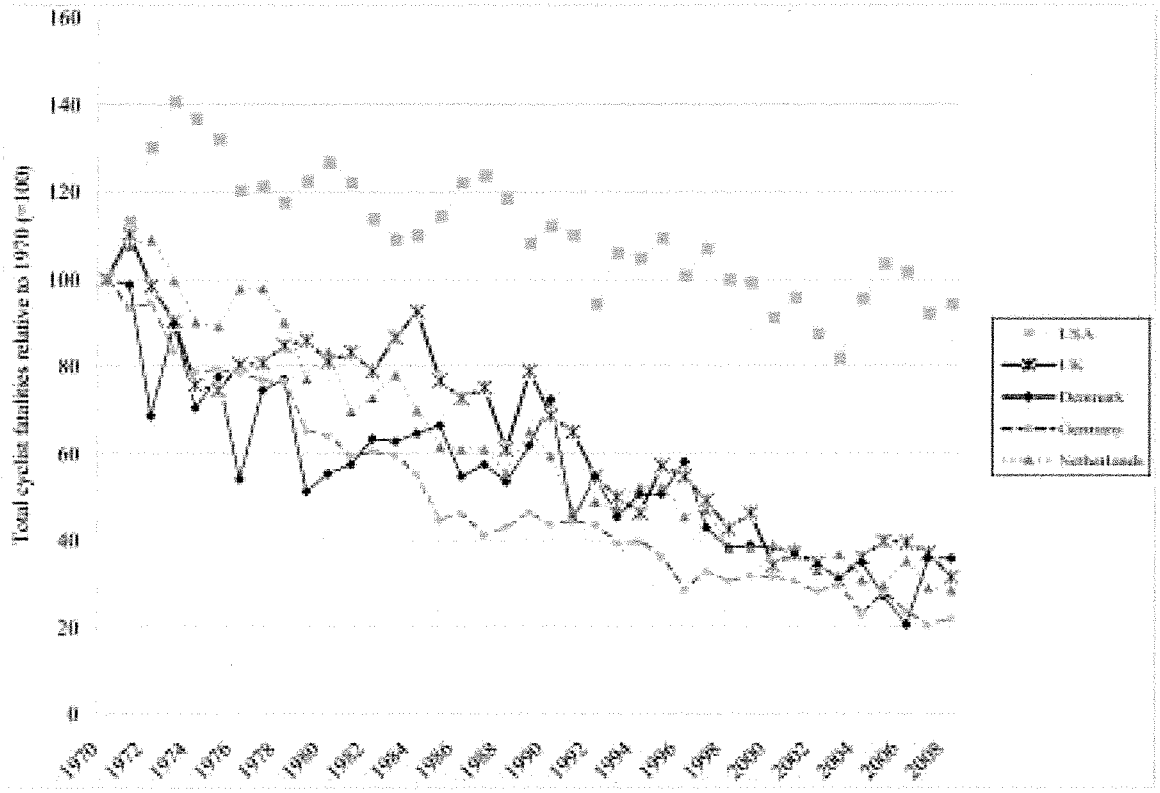


Figure 6. Trend in cycling fatalities in The Netherlands, Denmark, Germany, the United Kingdom and the USA, 1970–2008 (Percent relative to 1970 level). (*Sources: IRTAD, 2010; Pucher and Dijkstra, 2000.*