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Parliamentary Advisory Council for Transport Safety

PACTS Parliamentary Briefing

Cycle Helmet Use and Effectiveness

Introduction

The Protective Headgear for Young Cyclists Bill, a Private Member's Bill introduced by Eric Martlew MP (Lab, Carlisle), has its second reading debate on Friday 23 April 2004. The Bill would make cycle helmets mandatory for all children under 16. The Bill proposes a new offence of 'causing or permitting a child under 16 to ride a cycle on a road without protective headgear'. The offence covers all public roads and parks, and applies to parents or guardians of the children and to the owner of the bicycle, if the owner is older than 15.

This Parliamentary Briefing summarises some of the key facts about cycle helmet use and effectiveness and the likely impact that a mandatory helmet law would have.

The issue of mandatory cycle helmet wearing is a particularly emotive and controversial one within road safety, and debates on the issue are often characterised by entrenched positions. It should be noted that much of the research on cycle helmets has been challenged by those involved in the debate. In this context – and given the complexity of the debate – it would be advisable to follow up some of the references and further reading listed below before reaching a decision on the issue.

Cyclist casualties

As Table 1 shows below, police recorded 130 fatalities, 2,320 serious injuries and 14,657 slight injuries among cyclists in 2002 (National Statistics/DfT 2002). Due to underreporting, the number of slight injuries among cyclists may be significantly higher (Towner et al. 2002). The casualty rate for cyclists in 2001 was 33 fatalities per billion passenger kilometres, compared to 3 for car occupants, 48 for pedestrians and 112 for two-wheeled motor vehicles (National Statistics/DfT 2002).

Out of the total of 2,450 cyclist killed and seriously injured casualties, 594 were children under 16 (ibid). Four fifths of KSI casualties are male. Hospital studies have indicated that between 30 and 50% of admissions for cycle-related injuries of all severities are head injuries (Towner et al. 2002).

Cyclist casualties have fallen significantly over the past few years. The 30% reduction in cycle casualties since the 1994-1998 baseline average has been an important area of success in progress towards the 2010 road safety targets. This has occurred at the same time as a 9% increase in cycling rates, which is consistent with a growing body of evidence that suggests a correlation between higher levels of cycling

Table 1k: Pedal cyclist casualties : GB 2002

	Number				2002: Percentage change over	
	1994-98 average	2000	2001	2002	2001	1994-98 average
Fatal	186	127	138	**130**	*-6*	*-30*
Serious	3,546	2,643	2,540	**2,320**	*-9*	*-35*
Slight	20,653	17,842	16,436	**14,657**	*-11*	*-29*
Total	24,385	20,612	19,114	**17,107**	*-11*	*-30*
Pedal cycle Traffic[1]	40	41	42	**44**	*5*	*10*
Casualty Rate [2]						
KSI	92	68	64	**56**	*-13*	*-40*
Slight	511	435	391	**333**	*-15*	*-35*
All	604	503	455	**389**	*-15*	*-36*

1 100 million vehicle kilometres. Figures are subject to revision
2 Rate per 100 million vehicle kilometres

Source: National Statistics/DfT 2003

and improved cyclist safety (DfT 2004).

Helmet wearing rates

Helmet wearing rates have increased among adults in recent years, as Table 2 indicates, but wearing rates among children have remained static. The likelihood of wearing helmets is influenced by a number of factors, including: age and sex of cyclist; type of road; time of day; ethnicity; and local cycling levels (Gregory et al 2003).

Table 2 Wearing rates by age group and sex

	Children		*Adult*	
	Wearing rate	*Sample size*	*Wearing rate*	*Sample size*
2002 survey				
Males	12.3%	1183	25.2%	17738
Females	24.4%	383	27.0%	6868
1999 survey				
Males	12.7%	1,122	22.2%	17,794
Females	20.9%	426	22.2%	6,794
1996 survey				
Males	13.3%	1,326	16.7%	17,545
Females	17.6%	415	17.5%	7,328
1994 survey				
Males	16.0%	1,036	15.5%	18,624
Females	21.9%	389	17.0%	7,368

Source: Gregory et al 2003

Helmet effectiveness

Helmets offer protection from injury in three main ways:

- They absorb energy so that the energy remaining to be absorbed by the head is reduced;
- They distribute the forces of the impact over a wider surface area; and
- They protect the head from abrasion.

Although some benefit could be expected in other types of accident, cycle helmets are designed to protect from injury most effectively at low impact speeds (i.e. approximately 13 mph or less), such as when a cyclist falls from a cycle when no other vehicle is involved (BMA 1999). 89% of cyclist fatalities and 94% of serious injuries reported to the police in 2002 involved collisions with motorised vehicles, a significant number of which will have occurred at impact speeds for which helmets are not primarily designed. Bike-alone accidents may be more common, however, among children and in accidents resulting in minor injuries (Towner et al 2002).

Reviews of studies of cycle helmet effectiveness (Royles 1994, Hillman 1993, BMA 1999, Towner et al 2002) have generally concluded that cycle helmets afford some level of protection to cyclists, although the conclusions of such studies are frequently based on certain unproven assumptions; the conditions which would ideally be met in a study of effectiveness are in practice very difficult to achieve (i.e. it is difficult to obtain 'real world evidence' one way or the other). Nonetheless, a number of observational hospital-based studies in various countries report significantly fewer head injuries among helmeted cyclists than non-helmeted cyclists. As the studies vary substantially in context, scope and results, it is not possible to predict accurately expected injury reduction from increased rates of helmet use; estimates range between 0 and 85%. It should also be noted that two of the reviews (BMA 1999 and Hillman 1993) point to studies that indicate that more significant casualty reductions could be gained by helmet use among pedestrians and vehicle occupants than among cyclists.

Impact of mandatory helmet laws

A number of countries have introduced mandatory cycle helmet laws, either for children or for all cyclists. While in general these have substantially reduced cyclists head injury hospital admissions, this has often come at the expense of cycling levels. Countries that have enacted mandatory cycle laws include Australia (Victoria, South Australia, Queensland and Western Australia), Canada (Nova Scotia, Ontario and British Columbia), Czech Republic, Iceland, New Zealand, Spain and USA (20 state laws and 85 local laws). Studies on the effectiveness of legislation have been far from comprehensive, as there are often confounding factors and a lack of accurate data on cycling and injury levels.

In the Australian state of Victoria - one of the first places to introduce a

mandatory helmet law – helmet use increased from 30 to 75% and head injuries among cyclists fell by around 70% after two years; however non-head injuries also decreased (Towner et al 2003). Post-law cycling levels fell by 46% among teenage cyclists and by 10% among children under 12.

In Nova Scotia, observed helmet-wearing rose from 38% before the mandatory cycle helmet law to 84% two years subsequently (LeBlanc et al 2002). Cycle-related head injuries dropped by approximately 50%, but due to the small numbers involved this figure is not statistically significant. However, observed cycling rates dropped by half over the same period, indicating that the reduction in head injuries may be partially attributable to reduced exposure (Chipman 2002).

Studies from other countries with mandatory helmet laws also indicate that laws increase helmet rates and may reduce head injuries, but (where this is assessed) may have negative impacts on cycling levels (Towner et al 2003).

Conclusion

Cycle helmets are effective in reducing the severity of head injuries in certain types of cycle accident, but they are only designed to withstand low energy impacts. It is important that helmet users are aware of the limitations of helmets, and this would be enabled by mandatory labelling and incorporating education on the correct fitment and wearing of helmets into cycle training. Other road users should also appreciate the continued vulnerability of cyclists, despite their wearing helmets. While the encouragement of wearing of helmets would be appropriate, imposing a mandatory requirement may bring about a reduction in the number of people cycling with consequential counter-productive public health results.

Finally, it must be remembered that the wearing of cycle helmets is a secondary safety measure which only aims at reducing injury in the event of a collision. Crashes can be prevented in the first instance by encouraging better road behaviour by all road users, by making the cycling environment safer and by enforcing existing traffic law. Speed management can be particularly effective in reducing casualties: in Hull, for example, 20 mph zones have reduced cyclist casualties by 38% and child cyclist casualties by 50% (Kirby 2004). PACTS believes that these measures to prevent accidents must not be set aside in favour of the limited level of protection to be offered by helmets.

References and Further Reading

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See also:

Bicycle Helmet Initiative Trust: charity promoting cycle helmets. http://www.bhit.org/

CTC. 2004. '7 Reasons to oppose a child helmet law'. www.ctc.org.uk/working/HELMETS.aspx.

Cyclehelmets.org: a review of international research on cycle helmets; anti-compulsion. http://www.cyclehelmets.org/

RoSPA. 2003. The effectiveness of cycle helmets: A synopsis of selected research papers and medical articles. http://www.rospa.com/

PACTS is an associate parliamentary group and registered charity advising and informing Members of Parliament on road, rail and air safety issues. It brings together technical expertise from the public, private, academic and professional sectors to promote research-based solutions to transport safety problems. Its charitable objective is to promote transport safety legislation to protect human life.

Parliamentary Advisory Council for Transport Safety
3rd Floor • Clutha House • 10 Storey's Gate
London • SW1P 3AY
tel: 020 7222 7732
email: mail@pacts.org.uk • web: www.pacts.org.uk

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