

Cycling and Children and Young People

A review



Tim Gill

NCB promotes the voices, interests and well-being of all children and young people across every aspect of their lives.

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1 Summary

1.1 Aim and scope

This paper summarises and critically reviews the public policy evidence and arguments on cycling and children and young people's health, well-being and safety. A separate annex gives an extended discussion of the evidence and arguments on the contested issue of cycle helmets.

1.2 The significance of cycling for children and young people

Cycling has significance for children and young people that adults are prone to forget. Cycling has four main attractions for children. It is great fun, it has the potential to expand the territory over which children can get around on their own, it is usually a social activity and it allows for close engagement and interaction with the people, places and objects encountered en route. A child who cycles is almost certain to sustain at least slight injuries as a result of the activity, but this is not seen as a reason for prohibiting it.

1.3 Cycling rates and cycle ownership

Children aged 11 to 15 cycle more than any other age group of the population: boys on average 138 miles a year and girls 24 miles. Moreover, cycling is probably the most popular sport-related activity pursued out of school. However, only 1 per cent of primary school children and 2 per cent of secondary school children cycle to school. Children from disadvantaged backgrounds show lower levels of cycling. The last two or three decades have seen a dramatic fall in the distance cycled by children and young people under 16 years of age: around 40 per cent for boys and over 50 per cent for girls. Walking has also been in decline, at broadly comparable rates. Most households with children have bicycles, though cycle ownership is strongly linked to household income. Ownership levels have grown steadily.

1.4 How safe is cycling?

There were 25 cycling fatalities of children under 16 in 2000, compared with 107 child pedestrian fatalities and 219 child road fatalities overall. Figures show a steep and steady fall in child cycle fatalities in recent years, probably due at least in part to lower levels of cycling by children. These statistics equate to two child fatalities per year per million population on average, compared to 13 child pedestrian fatalities per year per million population. These statistics arguably suggest that cycling, contrary to popular opinion, is a comparatively safe mode of travel. Figures also suggest that child cyclists are about as safe as adults, when the greater distance travelled by children is taken into account.

1.5 Government policy

Government has consistently promoted cycling by children and young people since the launch in 1996 of the National Cycling Strategy. This support is based on the links to public policy agendas around health, transport and sustainability. Government has stated that it will set up Cycling England, a new executive body. It also proposes to set up a steering board of government departments and agencies and to improve the performance management of local authorities. One role of Cycling England will be to manage a new national cycle training standard. Around 25 to 30 per cent of children receive cycle training of some kind, typically between the ages of nine and 12.

The government's road safety strategy set a headline target to reduce child pedestrian casualties by 50 per cent by 2010, against a baseline of the 1994-8 average. Some of the interventions this prompts will also benefit child cyclists. Government supports the promotion of cycle helmets, particularly for young people. There is some caution over the promotion of cycling itself, with fears that an increase in cycling will lead to rises in numbers of casualties. However, government acknowledges evidence of a correlation between higher levels of cycling and improved cyclist safety, or 'safety in numbers'.

Government recognises cycling to be a healthy activity for people of all ages. International statistics suggest that countries with higher child cycling rates also have lower rates of childhood obesity.

The trip to school has for some years been a key issue in transport policy, and a focus for cycle promotion. Government interventions include school travel planning and support for practical measures such as cycle lanes and traffic calming, secure cycle parking and improved storage.

The government's planning policy guidance on housing, transport and open space, sport and recreation all state the need to promote cycling, and government is producing practical guidance on cycle-friendly transport infrastructure. However, there is little evidence about the impact of this guidance. Accessibility planning, which aims to address the way that journeys are generated through the location of homes, workplaces and public and retail facilities, may also have an impact on cycling levels.

Children's policy has made a start in addressing transport and the built environment. The government's inclusion of 'being healthy' and 'enjoying and achieving' as key public policy outcomes for children gives a rationale for transport and environmental interventions that has been made explicit in more recent policy statements.

1.6 Children and young people's views

Cycling is a popular activity for children and young people, and there is a large suppressed demand amongst schoolchildren for cycling to school. Children and young people are concerned about many aspects of transport, and show a strong interest in the wider impact of motorised transport alongside issues that are closer to their needs and interests as transport users. Government has

undertaken research and consultation drawing out transport needs and views of young people aged 11-19 years, but the results have yet to be made public. The Greater London Authority has included transport as a strategic theme in its children and young people's strategy and has embraced the goal of improving conditions for walking and cycling. Market research suggests that cycle helmets are not popular with children and young people.

1.7 Gaps in research

There are gaps in knowledge around how to bring new people – children or adults – to cycling. There are also gaps in knowledge of the links between cycling and social exclusion and crime and on the use of public space.

1.8 International experience and practice

Statistics show higher and broader levels of cycling in some other countries. It would be valuable to further explore international differences in policy and practice around children's cycling, to see what might be relevant to the UK.

1.9 Analysis

Road danger, fear of crime and a generalised 'retreat from the streets' are all likely reasons for the dramatic decline in cycling distances travelled by children and young people. The drop in child cycling rates has probably already had an impact on children's physical health and levels of child obesity. It may also have led to impoverished and more restricted childhoods. Assuming a link between cycling in childhood and adulthood, and between cycling by parents and by their children, this may mean that as today's children grow up they will not only avoid cycling in adulthood, they will also be unlikely to encourage any children of their own to cycle.

Public policy attention has focused on cycle training and the trip to school. There are good reasons for making this a priority, based on arguments about the requirement for children to receive an education, the growth in traffic congestion and the role and significance of the school as an institution. While headline statistics suggest that there is scope for reducing escorted car trips to school, in reality the scope may be limited due to parents' travel patterns.

By comparison with the school run, other trips by children have received almost no public policy attention. This is a missed opportunity, since these trips are just as significant as school trips in promoting healthy physical activity, and may be more significant than the school trip as a first step in taking up cycling.

There may be arguments for re-examining the law on children cycling on the pavement, which is illegal in the UK though permitted in some other countries. Looking more widely at the built environment, there are clear connections between making neighbourhoods, towns and cities more cycle-friendly and making them more child-friendly.

1.10 Conclusions

There is widespread agreement about the benefits of cycling for children and young people. There are clear drivers for action from the health, environmental, transport, sustainability and child policy arenas. Yet the level of activity remains modest, patchy and narrowly focused.

The formation of Cycling England is a good opportunity for NCB and others advocating for children to start a dialogue that could lead to advances for both the cycling movement and for children and young people's happiness, health and well-being. The lack of dialogue or collaboration between the cycling and children's sectors is a missed opportunity. There is potential for engagement and collaboration on the following issues:

- making the built environment cycle-friendly and child-friendly
- promoting cycling for fun and as a sport, and for journeys other than the school trip, including social and leisure destinations
- cycling in parks and open spaces
- cycling and social inclusion
- gender differences and promoting cycling for girls
- cycling as a lifetime travel mode: how childhood experience influences adult attitudes and choices.

Safety is the only contested territory. This paper argues that cycling is comparatively safe even for children and young people, and the annex to this paper argues that the case has not yet been convincingly made for the compulsory use or promotion of cycle helmets. Whether or not these conclusions are accepted, there is clearly a need for a consensus on the wider question of responsibility for cycle safety.

2 Aim and scope

This paper summarises and critically reviews the public policy evidence and arguments on cycling and children and young people's health, well-being and safety. The paper focuses on England, though it follows much of the published data in using relevant statistics from Great Britain or the UK as a whole.

Part of the brief was to examine the evidence and arguments on cycle helmet promotion and compulsion, in the wake of debates in Parliament in 2004. This issue is perhaps uniquely controversial in road safety, and a systematic, comprehensive review would take far more time and resources than was available for this paper. Government commissioned a recent expert review (Towner and others 2002) at a cost of over £17,000, and this was itself criticised for ignoring or under exploring key areas of evidence.

This author takes the view that the helmet debate, while important, is in some respects self-contained. However, the issues are complex and there is scope for devoting more thought to the position of children and young people than has been given to date. The extended discussion on helmets in a separate annex tries to do this, while the main body of the paper makes brief references to the issue and draws on the conclusions reached in that discussion.

3 The significance of cycling for children and young people

Cycling has a significance for children and young people that adults – even those who regularly cycle themselves – are prone to forget. Riding a bike for the first time is an enduring childhood milestone. Cycling is a complex, unnatural and challenging physical feat: a balancing act involving a very heavy object – the rider – on top of another heavy object – the bicycle – both moving at speed. The balancing points – the wheels – are in essence just two contact points on the ground. It is no wonder that learning to cycle is difficult. It demands coordination, physical effort, perseverance and not a little courage. And yet the overwhelming majority of children learn to cycle, most only a few years after they have learnt to walk and talk.

Cycling has four main attractions for children. First, it is great fun. Its combination of difficulty, self-directedness and speed give it strong appeal. Second, it has the potential to dramatically expand the territory over which children can get around. Trips too far, tiring or boring to complete on foot become straightforward, quick and fun by cycle. Third, cycling is usually a social activity, allowing children and young people to meet their friends, to travel around with them and to share the enjoyment of their activity. Fourth, cycling, like walking, allows for close engagement and interaction with the people, places and objects encountered en route – much more so than travelling by car. Cyclists are more exposed to, and generally more aware of, the world around them, and this openness to new, unexpected experiences and encounters appeals to children's curiosity and appetite for novelty and social contact. Market research on young cyclists in London confirms its attractions (ACT2 2004).

Cycling for children sometimes has a playful, exploratory character that is rarely present in adult cycling. When children are given free rein to cycle in their free time – common even today in countries with high levels of cycling and common a decade or two ago in the UK – unplanned wanderings and cycling for fun feature strongly.

A child who cycles is almost certain to sustain at least slight injuries as a result of learning and pursuing the activity. Indeed cycling is a good example of an activity where the single-minded pursuit of injury prevention at the expense of wider goals and benefits would, if taken to its logical conclusion, lead to its blanket prohibition. In practice this is not the case and policy makers follow the lead of parents and carers in taking a balanced approach to judging the risks and benefits of cycling. But as the annex to this paper explores, this balance is sometimes obscured in some of the work around injury prevention.

4 How much do children and young people cycle?

DfT statistics show that in 1993-5, boys aged 11 to 15 cycled on average 138 miles a year and girls 24 miles – the highest average of any age group in the population (in spite of the data specifically excluding off-road cycling and children's play on bicycles). In each survey period, cycle mileage was highest in the 11 to 15 and 16 to 20 age categories, and then generally declined steadily with increasing age for both sexes.

A large though not fully representative survey of schoolchildren by the independent research agency SHEU showed that in 2004 riding a bicycle was the most popular sport-related activity. Nearly 45 per cent of boys aged 11 to 12 and 36 per cent of girls cycled at least weekly outside school (SHEU 2004). Numbers declined with age, more dramatically for girls than boys: for children aged 15 to 16 the figures were 26 per cent for boys and only 8 per cent for girls.

Official figures show that 1 per cent of primary school children and 2 per cent of secondary school children cycle to school (DfT 2004b). The Young TransNet database on school travel over the last few years shows consistently that around 3 per cent of schoolchildren of all ages cycle to school. This data is based on hundreds of schools, though the divergence from official statistics suggests that these are not representative of the whole school population.

Children from disadvantaged backgrounds show lower levels of cycling, as this quote from DoT (1996a) states in respect of London:

Over London as a whole, children in households without cars cycled less than those in car-owning households. This is probably because children's cycling is very dependent on the area where they live, and tends to be least common in the inner city areas where car ownership is also relatively low.

The last two or three decades have seen a dramatic fall in the distance cycled by children and young people under 16 years of age, as shown in Table 1 below. A government statistical report states:

The mileage by children fell by more than 40 per cent from 1975/76 to 1993/95... The fall was similar for both boys and girls aged up to 10, but there has been an even larger fall among girls aged 11-15 (DoT 1996a).

By comparison, over the same period for those aged between 16 and 59 the distances cycled remained fairly steady, with men showing a rise and women a fall. These figures do not include off-road cycling – which has clearly become popular in the last twenty years – but they represent a sharp drop in the cycling presence of children and young people on the roads.

Table 1: Cycling rates (excludes children's play)

	1975/6	1985/6	1989/91	1993/5	% change '75/6 to '93/5
Miles per year					
Boys aged 5 – 10	32	16	20	19	-41
Boys aged 11 – 15	236	199	198	138	-41
Girls aged 5 – 10	18	14	12	10	-45
Girls aged 11 – 15	65	57	47	24	-64

Source: DoT 1996a

For comparison, Table 2 shows that the number of walks trips made by children and young people fell from 1985/86 to 1994/96, by 17 per cent for those aged 5 to 10 and by 29 per cent for those aged 11 to 15 (DoT 1996a). This suggests that for children and young people, both walking and cycling have been declining rapidly in the last two decades, and at broadly comparable rates.

Table 2: Walking rates 1994/6 (miles)

	Boys	Girls
Aged 5 – 10	177	175
Aged 11 – 15	272	265

Source: DoT 1996a

The gender difference in cycling rates, with boys cycling between two and four times as much as girls of the same age, is striking – even more so given that these differences vanish for walking. Hence the explanation is unlikely to be simply that girls are given less freedom of independent mobility than boys. Rather, it appears that girls find barriers and disincentives specific to cycling. Opinion surveys show that women and girls are significantly more frightened of cycling on busy roads than men and boys (DfT 2003a; ACT2 2004) though there may well be other factors for girls too.

4.1 Cycle ownership

Figures from DfT show that overall, 38 per cent of households owned a bicycle. Households with children are much more likely to own cycles. In 1993/95, 54 per cent of households with one child and 69 per cent of those with two or more children owned cycles, compared with only 12 per cent for pensioner households and 38 per cent for other childless households. Cycle ownership is strongly linked to household income. Overall, about a quarter of households in the lowest 40 per cent of incomes owned a cycle, compared to nearly half in the

remaining 60 per cent (DoT 1996a). Ownership levels grew steadily through the 1970s, 1980s and early 1990s. More recent figures are unavailable, since the question on cycle ownership was removed from the National Travel Survey in 2002. But two non-representative though large data sets suggest that cycle ownership levels may still be rising: the Young TransNet database suggests that around 80 per cent of schoolchildren of all ages own a bicycle, while data from SHEU shows ownership levels of around 90 per cent for children aged 11 to 12 (SHEU 2004).

5 How safe is cycling?

Statistics for Great Britain on cycle casualties involving children and young people up to 20 years of age show that in 2003, there were 20 fatalities and 760 serious injuries (DfT 2004a). Cycling fatalities account for a small proportion of overall child fatalities. The 25 cycling fatalities of children under 16 in 2000 compare with 107 child pedestrian fatalities and 219 total child road fatalities (RoSPA 2002). (This paper focuses on fatalities, for reasons outlined in the annex.) Figures show a steep and steady fall in child cycle fatalities in recent years, probably due at least in part to lower levels of cycling by children.

These statistics equate to two child fatalities per year per million population on average. This compares to 13 child pedestrian fatalities per year per million population (DfT 2004a). Amongst children aged 12 to 15 (the age group at highest risk) the figures are four for cycling and 12 for pedestrians. Another, perhaps fairer, comparison is the number of fatalities per unit of distance travelled. In 2003 there were 29 cycling fatalities and 44 pedestrian fatalities per billion km travelled amongst the whole population (DfT 2004a). Figures are not readily available for children, though this paper argues below that child and adult cyclists have comparable levels of risk. Assuming an average annual distance cycled of 65 km (DfT 2004b) this means cyclists could reckon on around 530,000 years of travel before they suffered a fatal crash. For someone who cycles actively for 50 years, this equates to lifetime odds of around 0.1 per cent, or one in a thousand. Assessments about risk and safety are not always amenable to objective judgement. But in the view of this author, these statistics suggest that cycling is a comparatively safe mode of travel.

Perhaps counter intuitively, figures also suggest that child cyclists are about as safe as adults, when the greater distance travelled by children is taken into account. Table 3 shows three sets of data for a range of age groups: population fatality rates, distance travelled and a 'relative fatality rate' – which in essence shows the risk of fatality per 100,000 persons in the age group per mile cycled, calculated by dividing the first figure by the second. It shows that children aged 12 to 15 (those most at risk) have a relative fatality rate similar to adults aged between 20 to 29, 30 to 39 and 50 to 59 and a lower relative fatality rate than adults aged 40 to 49.

Table 3: Population fatality rates, distance travelled and relative fatality rates

Age	5-7	8-11	12-15	16-19	20-29	30-39	40-49	50-59	60-69
Pop'n fatality rate	0.0	0.1	0.4	0.1	0.2	0.2	0.3	0.2	0.1
Miles per year	14.5	31	81	76	55	43.5	43.5	43.5	17.5
Relative fatality rate	0.0	.003	.005	.001	.004	.005	.007	.005	.006

Sources: DfT (2004a) and DoT (1996a)

Note: The data in Table 3 should be treated with caution. First, it does not take into account any differences in participation levels across the age groups, since the fatality rate used is per 100,000 population, not per 100,000 cyclists. So for instance if a higher proportion of children cycled than adults, the 'per child cyclist' relative fatality rate would end up higher than that for adult cyclists. Second, the data is not entirely accurate or consistent: distance figures are from 1993/5 while fatality rates are from 2003 (the most recent figures readily available) and some of the distance figures are interpolated due to differences in age groupings used by the two primary data sources.

Yet cycling, especially on roads, is perceived as dangerous, as surveys have shown. Market research commissioned by Transport for London says that safety is 'the major concern amongst schools and the chief barrier preventing more pupils from cycling to school' (ACT2 2004). And a DfT report states:

Respondents were asked whether they agreed with the statement, 'The idea of cycling on busy roads frightens me.' Overall, almost three quarters of adults agreed with this statement, and just under half (47 per cent) strongly agreed (DfT 2003a).

6 Government policy

Government has consistently promoted cycling amongst the population as a whole and by children and young people, due to its support for policy agendas around health, transport, sustainability and planning. Policy initiatives on child cycling have focused on purposeful trips, especially the trip to and from school. Cycle training has also featured, and is a prominent element of recent national developments.

6.1 Cycle promotion and development

Government supports the promotion and development of cycling for children and young people more-or-less unconditionally, with the possible and partial exception of some tensions around road safety, in particular the question of cycle helmet use (explored in section 6.2 below and in detail in the annex to this paper). Promoting cycling is recognised to address public policy goals on health, transport and sustainability. The government's position reflects the growing consensus amongst leading health, safety and transport agencies about the benefits of cycling for all age groups and children and young people in particular.

Government support for cycling took off in 1996 with the launch of the UK-wide National Cycling Strategy (NCS) by then transport minister Steven Norris (DoT 1996b). This had a headline aim of quadrupling cycling levels by 2010, and also aimed to double the number of children cycling to school in the same period. It saw the establishment of a National Cycling Forum, with a ministerial chair and membership of the main stakeholder agencies. A smaller National Cycling Strategy Board replaced this body in 2001.

In March 2005 DfT published the first review of the NCS (DfT 2005). This report proposed major changes to cycling promotion and governance, in part because of the lack of progress in achieving the original NCS targets. Cycling rates have remained more-or-less static over the period, in spite of modest increases in funding through local authorities and other sources. The review reiterated government's commitment to encouraging more cycling in England, because cycling has 'the potential to contribute to the achievement of important objectives in the fields of transport, public health and liveability.' Its key recommendations include:

- setting up Cycling England, a new executive body within DfT with a £5m annual budget
- establishing a steering board of government departments and agencies including DH, DCMS, DfES, ODPM, DEFRA and Sport England with DfT as the lead
- proposals to improve the performance management of local authorities in their role as delivery agents for cycling policy.

DfT also promotes cycling for children and young people through a £10m initiative with cycle engineering charity Sustrans that is creating cycle routes to schools and building links with the National Cycle Network. DfT's Cycle Projects Fund grant making programme has supported some 300 projects, some of which have addressed children and young people (DfT 2005).

As the DfT's NCS review makes clear, government activity that supports cycling extends beyond the direct support for cycling given by DfT and the cycling infrastructure installed by local authorities. For instance the 'Sustainable Travel Towns' initiative will see the towns of Darlington, Peterborough and Worcester receive £10m of investment in measures to promote walking, cycling and public transport over the period 2004 – 2009. Other transport measures such as traffic calming, bus lanes and home zones also support cycling even though that is not their primary aim.

Significantly, the DfT review proposed that one of the first and most important roles of Cycling England will be to manage the new national cycle training standard launched alongside it. This standard embraces three levels of training designed for adults and children, and replaces the longstanding RoSPA cycling proficiency. Where applied to children, the training ages for the different levels would typically be 7 years (level 1), 9/10 years (level 2) and 11/12 years (level 3). The report also proposed that Cycling England should promote and market cycling, have a leadership role in capital projects and identify and appraise the value for money of cycling schemes.

Around 25 to 30 per cent of all children receive cycle training of some kind, typically between the ages of nine and 12 (Spence 2005). RoSPA has summarised the findings of 14 studies of the effectiveness of cycle training. One of the largest, most recent UK studies found that:

Children who had been trained on cycling awareness courses generally performed better than those trained on an instruction-based course. The most effective courses were those which included on-road training and were conducted over several weeks rather than over one or two weeks. Multi-stage courses were especially effective. The report concludes that cycle training improves skills and knowledge, and the effects last for at least two years (RoSPA 2001a).

6.2 Road safety

Recent years have seen a growing focus on children and young people within the government's road safety initiatives. Its road safety strategy set a headline target to reduce child pedestrian casualties by 50 per cent by 2010, against a baseline of the 1994-8 average (DfT 2004c). This is a more demanding target than the 40 per cent target for traffic casualties as a whole, in recognition of the UK's poor safety record for child pedestrians. The 50 per cent target is a public service agreement performance target for DfT.

While the target focuses on child pedestrians, some of the interventions it prompts will also benefit child cyclists. This is most likely for primary prevention interventions such as traffic calming and other engineering measures. These

aim to reduce road danger at source by reducing the speed and/or volume of motor traffic on streets where children and young people walk or cycle.

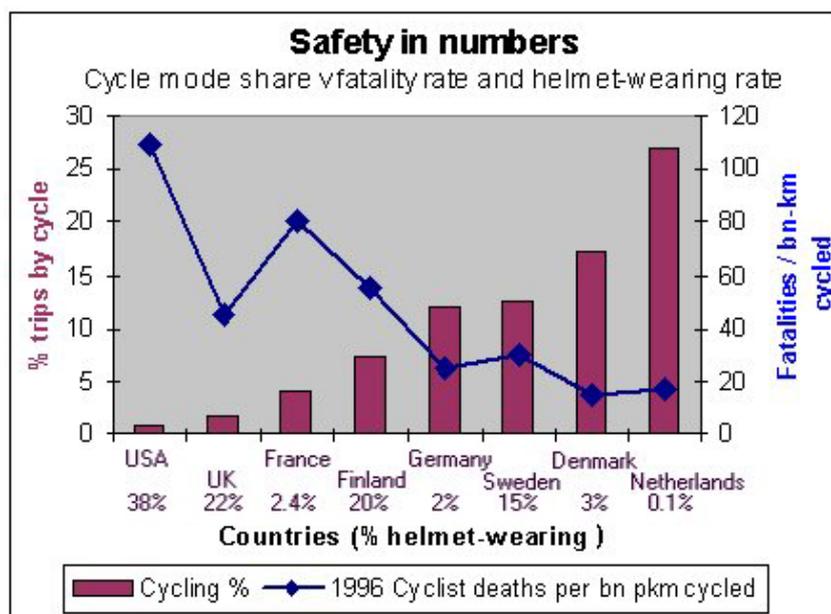
Cycle promotion raises concerns about safety within DfT. The concern is that increases in rates of cycling will lead to rises in numbers of casualties, in the absence of safety interventions. The 2004 review of road safety states:

The government remains fully committed to policies that encourage higher levels of cycling. Improving the conditions for and safety of cyclists is a central part of this. It will, however, be important to ensure that levels do not increase without commensurate safety measures (DfT 2004c).

Such concerns are absent in a recent publication endorsing cycling from the Department of Health (DH 2005).

Government supports the promotion of cycle helmets, particularly for young people, as stated most recently in the 2004 road safety review. In the same DfT report, the department acknowledges evidence from international studies that there is a correlation between higher levels of cycling and improved cyclist safety – in other words ‘safety in numbers’ – meaning that simply increasing cycling rates has the potential to make cycling safer (Jacobsen 2003). Graph 1 below uses data from a range of sources – taken from the Cyclists’ Touring Club website – that suggest that across eight countries, a greater level of cycling is associated with lower fatality rates.

Graph 1: Modal share and fatalities, an international comparison



Source: Cyclists’ Touring Club website

6.3 Public health

Cycling is widely recognised to be a healthy activity for people of all ages. A report from the British Medical Association estimated that regular adult cyclists

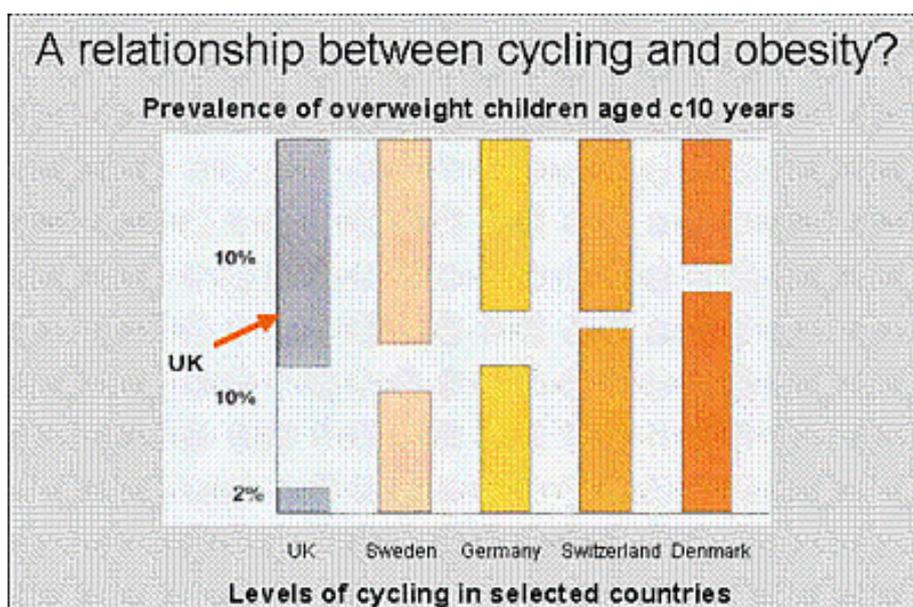
on average have a fitness level equivalent to non-cyclists aged ten years younger (Hillman/BMA 1992; see also Roberts and others 1995 and BMA 1999). More recent research on children has shown that cycling can make a significant contribution to children's physical activity (Mackett and others 2005).

The 2004 public health white paper *Choosing Health* endorses cycling as a health-promoting activity and references the DfT and DfES-led work on school transport and cycle training. The topic specific document *Choosing Activity* states:

We will need to ensure that children in children's centres through to young people in further and higher education are encouraged to build activity into their daily lives through play, Physical Education, sport and through increased walking and cycling opportunities (DH 2005).

International statistics also compiled by the Cyclists' Touring Club from a range of published sources suggest that countries with higher child cycling rates also have lower rates of childhood obesity, as shown in graph 2 below.

Graph 2: Child cycling and obesity: an international comparison



Source: Cyclists' Touring Club website

6.4 School travel

The trip to school has been a key issue in transport policy, and a focus for cycle promotion. The 1996 National Cycling Strategy set a target to double school cycling rates. School travel planning, which aims to encourage parents and children to make more sustainable transport choices, has received sustained financial support. A current joint DfES/DfT work programme around school travel promotes cycling to school as one objective. School cycling is supported through practical measures such as cycle lanes and traffic calming on routes to school, secure cycle parking within the school and improved storage for books

and bags. Market research suggests that cycle parking is effective at promoting cycling to school (ACT2 2004).

6.5 Planning policy

The government's planning policy guidance consistently states the need to promote cycling. PPG3 on housing states 'local planning authorities should... seek to reduce car dependence by facilitating more walking and cycling' (ODPM 2000). PPG 13 on transport – which makes over 75 mentions of cycling – states that its objectives are:

To integrate planning and transport at the national, regional, strategic and local level to:

1. promote more sustainable transport choices for both people and for moving freight
2. promote accessibility to jobs, shopping, leisure facilities and services by public transport, walking and cycling
3. reduce the need to travel, especially by car (ODPM 2002a).

PPG 17 on open space, sport and recreation locates its planning guidance within an overall planning framework that promotes more sustainable development 'by ensuring that open space, sports and recreational facilities (particularly in urban areas) are easily accessible by walking and cycling' (ODPM 2002b). It reinforces this message with more specific guidance. On top of this, DfT is expected to publish a revised version of the partnership publication *Cycle-friendly Infrastructure*, originally published by the Cyclists' Touring Club in 1996. Evidence is not readily available about the extent to which all of this guidance has led to the development on the ground of cycle-friendly streets, neighbourhoods and towns or to increases in cycling rates.

Alongside land use and built environment planning guidance, a key tool for transport planners is accessibility planning, which aims to address the way that journeys are generated through the location of homes, workplaces and public and retail facilities. Guidance and experience in accessibility planning is growing and its impact is likely to be seen in the larger developments being taken forward under the government's Sustainable Communities Plan, especially those in the Thames Gateway and Stansted/M11 corridor.

6.6 Child policy

The government's child policy agenda has started to address transport and the built environment in the wake of the 2004 Children Act. The inclusion of 'being healthy' as one of five key outcomes for children, with 'enjoying and achieving' as another, gives a rationale for transport and environmental interventions that aim to improve children's health and well being. A more recent document from DfES makes this explicit. This document, published in draft for consultation and aimed at local authorities, says:

Any planning documents on community safety, traffic, transport, culture, leisure, sports, open spaces, fire and rescue services and the wider public realm need to be taken into account insofar as they affect children and young people (DfES 2005).

While this statement lacks specifics, it nonetheless marks a potential new focus for policy interventions that parallels approaches being taken in public health.

7 Children and young people's views

The SHEU survey and Transport for London-funded market research already quoted show that cycling is a popular activity for children and young people (SHEU 2004 and ACT2 2004). There is a large suppressed demand for cycling amongst schoolchildren. Data from the Young TransNet database shows that across all ages, around 30 per cent would choose to cycle to school by cycle, whereas as already stated only 3 per cent actually do. For children aged 10 to 11 closer to 50 per cent of children would choose to cycle.

Children and young people are concerned about many aspects of transport, and show a strong interest in the wider impact of motorised transport alongside issues that are closer to their needs and interests as travellers. Government and other public agencies have made a start in involving children and young people. In 2003 DfT published a report into its work in involving children and young people. The report says that the department's priorities for 2003 were to:

- undertake a substantial research and consultation project entitled *Understanding Young Peoples Transport Needs* which will draw out young people's (11 to 19 years) transport needs and views as an information project to inform policy development and encourage young people to use and providers to provide appropriate transport
- create systems to support participation work across the department
- start the process of building capacity in children and young people's participation through awareness-raising of Learning to Listen, training and development for departmental staff and the provision of support and guidance
- improve departmental communications for children, young people and parents (for example, through the development of young people friendly departmental newsletters, leaflets etc)
- work more closely with the Children and Young People's Unit (CYPU) and voluntary agencies such as the Children's Society, the National Youth Agency, etc (DfT 2003b).

DfT has commissioned the report into young people's transport needs mentioned above. According to its website the work was completed in 2004, but the report has not been made available on the DfT website.

The Greater London Authority, in its 2004 State of London's Children Report (GLA 2004a) included transport as one of eight strategic themes after an extensive consultation exercise involving children and young people. The report described how children's view of a child-friendly London embraced 'more facilities for walking and cycling'. The Mayor of London's children and young people's strategy, launched in 2004, states:

Through Transport for London, the Mayor will create improved conditions for walking and cycling so that children and young people can have safer and more convenient access to schools and training facilities, leisure, sport and recreational facilities and town centres ... [and] introduce a

programme to provide facilities for cycle parking at school, as well as cycling information, training, and developing low-cost cycle helmet purchase schemes (GLA 2004b).

Cycle helmets are, perhaps not surprisingly, unpopular with children and young people. The market research commissioned by Transport for London looked specifically at children and young people's views on cycle helmets. It found that:

Cycle helmets are a problem for both teachers and pupils. While teachers recognise their importance and feel they should encourage pupils to wear them, they admit that current helmets are not sufficiently attractive or comfortable to encourage habitual use... For pupils, helmets are generally considered 'naff'. They do not convey the kind of image most children have of themselves or want to portray to their peers. Wearing a helmet gets in the way of the concept of 'cycling as fun' (ACT2 2004).

8 Gaps in research

Although data is available on cycling and children and young people – especially on cycling rates and accidents – there are gaps. In 2002 HM Treasury sponsored a review of cycling research. This identified some key gaps in knowledge around how to bring new people to cycling. There are also gaps in knowledge of the links between cycling and social exclusion and crime and on the use of public space:

There is little knowledge about how to bring new people – children or adults - to cycling... It is notable that apart from health, barely any research addresses the group of issues that originate from the wider government agenda: social exclusion, crime, the use of public space and, to a lesser extent, addressing the needs of young people. Only 21 projects altogether address these four priorities, and of these, only eight deal with topics other than young people. If the government wishes to improve the level of 'joined up thinking' between its different areas of responsibility, exploring the links between these issues and cycling needs to be given more priority. From the perspective of cycling stakeholders, too, there are important links to be explored. Many stakeholders see young people as the key to better cycling rates in the future. Finding ways of enticing children and young adults to cycle is crucial, and cycle training is one dimension of this that again has little research support. Access to public space for cyclists, and the role cycling can play in improving public space, are likewise important issues. In terms of social inclusion, most stakeholders are keen to highlight the benefits of cycling for increasing the mobility of those without access to other forms of transport. The research need here is how to promote these benefits to those for whom cycling connotes poverty (Rosen 2003).

9 International research, policies and practice

This paper does not examine international experience in detail. This is because of limits on time and resources, not because the experience of other countries is not relevant. On the contrary, as the graphs above on health and safety issues show, it is very relevant. Statistics of cycling rates in countries like Denmark, the Netherlands, Germany and Sweden confirm what anyone visiting these countries can see with their own eyes: that lots of people cycle, and that cyclists come in both genders and all shapes, ages, colours and sizes. Sustrans has drawn lessons from towns like Odense in Denmark, organising exchanges and visits with both children and adults. The history of the introduction of home zones into the UK shows the potential for learning and inspiration from approaches overseas. It would be valuable to further explore international differences in policy and practice around children's cycling, to see what might be relevant to the UK.

10 Analysis

10.1 Trends in cycling by children and young people

Bicycle ownership amongst children today remains high (DoT 1996a) and most children still have the opportunity to experience the activity. But there has been a dramatic decline in cycling distances travelled by children and young people in recent decades: a drop of over 40 per cent for boys and over 50 per cent for girls between the 1970s and 1990s (DoT 1996a). There is no hard evidence to explain this drop. The DoT report speculates that the fall may be due to 'the greater traffic volumes on roads and the declining popularity of cycling to school.' Fear of crime and a more general 'retreat from the streets' could sit alongside road danger as factors that have led many parents and carers to decide that it is too dangerous to allow children to cycle around their neighbourhood on their own.

The drop in child cycling rates has probably already had an impact on children's physical health, contributing to the growing problem of child obesity. It may also have led to impoverished and more restricted childhoods, with possible consequences for the development of resilience and life skills. Much more worrying is what might happen in the future. It is reasonable to assume a link between cycling during childhood and in adulthood, and a link between cycling by parents and by their children. On this assumption, the decline in cycling as an everyday activity by children is likely to strike not once but twice at the long-term goal of increasing cycling. As today's children grow up they will not only avoid cycling in adulthood, they will also be unlikely to encourage any children of their own to cycle.

10.2 Public policy activity on cycling and children and young people

For children and young people, cycling is a key life skill, a milestone for independent mobility and a fun, healthy outdoor activity. Moreover, cycling is a travel mode that helps reduce car use and hence contributes to sustainability, reduced congestion and liveability. All these benefits have the potential to accrue over much of an adult life. Given these obvious benefits, it is not surprising that the government has recently taken an interest in helping children and young people to learn to cycle.

But public policy has had a narrow focus. As noted above, cycle training is the first initiative to come under the wing of the newly created body Cycling England. It is too early to say how the agency will approach the task, but one priority is likely to be to extend the reach of cycle training to reach significantly more than the current 25 to 30 per cent of children who receive it.

Apart from cycle training, public policy attention has focused overwhelmingly on the trip to school, starting with the 1996 National Cycling Strategy with its target to double school cycling rates. There are good reasons for the state to have a

particular interest in the trip to school. The state imposes on parents a duty to ensure the education of children, and the vast majority choose to discharge it through their children attending school. Given that most children in effect have to go to school, is it reasonable for the state to take an interest in how they get there. On top of this, the start of the school day coincides with peak travel time for adults. Rising traffic congestion, combined with rising numbers of children being driven to school, have led to the school run being one of the main focuses of policies that aim to persuade people out of their cars and onto other transport modes. Moreover, the fact that the school is a major travel destination and a key community institution for families makes it easier to plan and carry out interventions than with other travel by children.

Headline statistics suggest that there is great scope for reducing escorted car trips to school. DfT statistics state that at 8.50am (the peak time for school travel) nearly 1 car in 5 is on the school run (DfT 2004b). However, a closer look suggests that there is more limited scope for modal shift than these figures suggest. The reality of many parents' travel patterns means that much of that 20 per cent would be on the roads anyway, as parents often 'double up' their journeys to work or other destinations with the school run. Figures from the Greater London Authority suggest that over half of parents driving children to school go straight on to work (GLA 2004b).

By comparison with the school run, other trips by children have received almost no public policy attention. The National Travel Survey (DfT 2004b) gives no information on non-school travel by children. This author knows of only one travel project that has focused on non-school trips, the London Borough of Ealing's SALSA (Safe Access to Leisure Sites and Amenities) project. This initiative ran between 1998 and 2000 and implemented a programme of upgrading walking and cycling routes to leisure facilities, such as swimming pools, parks and libraries. The aim was to increase the proportion of non-car journeys to these facilities and in particular to promote the independent mobility of children. The project was not formally evaluated, but a DfT report states that it led to the addition of 'a new prime objective for Ealing's Leisure Services: improving access to leisure facilities and reducing the need to travel to them by car.' This report also states:

A key lesson has been that changing travel behaviour requires a long-term approach that continuously educates users and upgrades facilities. With every new user of a library or swimming pool and every new class at a school, a new effort is required.

This moral could usefully be applied to all initiatives aimed at promoting cycling.

The exclusive focus on school travel by cycle also speaks to our adult perspectives about the priorities in children's lives. A 2002 House of Commons Committee report on speed took this focus to the point where it recommended 20 mph speed limits around schools, but only during term time (Transport, Local Government and the Regions Committee 2002). Though surely not intentional, the implication of this recommendation is that children only have a claim to protection from road danger while travelling to or from school, and that on other journeys they have to take their chances.

The arguments for public policy to engage in promoting non-school cycle travel by children and young people are not as strong as for the school trip, for all the reasons considered above. But they are still strong. Many journeys are made to friends, out-of-school activities and leisure destinations. Given this – and also the amount of recreational cycling by children and young people in parks and open spaces, in woodlands, on cycleways and elsewhere – the invisibility of these trips compared to the school run is a missed opportunity. While non-school trips may have less potential to reduce peak-hour congestion, they are just as significant as school trips in promoting healthy physical activity. They may be even more significant than the school run as a first step in taking up cycling as a travel mode. The issue of cycling in parks and open spaces may be worthy of further examination. These public spaces offer children the chance to learn to cycle and to develop their skills in a traffic-free setting. But there is also potential for conflict between cyclists and other user groups. In many parks this has led to bans or severe restrictions on cycling, limiting their potential as a safe venue for child cycling. Sport-related cycling may be another area worth giving focused policy attention to, given the growing popularity of off-road cycling and other forms of competition.

Pavement cycling by children is one legislative issue that could be examined further. In the UK it is illegal for anyone, including children, to cycle on the pavement, and in 1999 the police were given new powers to issue fixed fines for the offence. Pavements are not appropriate for experienced cyclists. However, some countries such as Germany have made it legal for children to cycle on pavements. The impact of this and how it works practically is worthy of further examination.

Looking more widely at the built environment, there are clear links between promoting cycling and making neighbourhoods, towns and cities more child-friendly. As the work in London shows, child-focused policies can address the impact on children and young people of policies and practice in leisure and planning, especially around transport, open spaces and the wider public realm. Initiatives that make the built environment more cycle-friendly will also make it more child-friendly, given the significance of cycling as a leisure activity and transport mode to children and young people.

11 Conclusions

There is widespread and growing agreement about the benefits of cycling for all sections of the population, and especially for children and young people. Children themselves remain the most active and enthusiastic age group of cyclists, in spite of the large decline in child cycling over the last thirty years or more. There are clear drivers for action from the health, environmental, transport, sustainability and child policy arenas. And yet the level of activity remains modest, patchy and narrowly focused.

Most significantly for the National Children's Bureau (NCB) there is little evidence of engagement in cycling debates from the leading children's sector agencies involved in children's policy or child health. The formation of Cycling England marks a milestone in the development of cycling policy. It is also a good opportunity for NCB and others advocating for children to start a dialogue that could lead to advances for both the cycling movement and for children and young people's happiness, health and well-being. Child cycling has for some years been a policy priority for those concerned with cycle promotion. More recently, cycling has also come into the frame for those concerned with children's health and well-being. A look at their shared agendas suggests the potential for engagement and collaboration on the following issues:

- making the built environment cycle-friendly and child-friendly
- promoting cycling for fun and as a sport, and for journeys other than the school trip, including social and leisure destinations
- cycling in parks and open spaces
- cycling and social inclusion
- gender differences and promoting cycling for girls
- cycling as a lifetime travel mode: how childhood experience influences adult attitudes and choices.

As the ambivalent quote on cycling from the 2004 DfT road safety review shows, safety remains the contested territory in debates about cycling. There is little consensus about whether cycling, as an activity is 'safe' or not. There is little consensus about how the responsibility for ensuring acceptable levels of cycling safety is shared between the state, other road users and cyclists (and in the case of child cyclists, their parents and carers). Limitations of scope mean these issues cannot be explored in detail here, though this paper argues that cycling is comparatively safe even for children and young people, and the annex to this paper argues that the case has not yet been convincingly made for the compulsory use or promotion of cycle helmets. Whether or not these conclusions are accepted, there is clearly a need for a consensus on the wider question of responsibility for cycle safety.

A final, speculative thought on cycle safety: cycle advocates claim that one reason why cycling is perceived to be unsafe is precisely because of the dominance of the cycle helmet debate. They maintain that the strong focus on helmet wearing in official material reinforces the image of cycling as an inherently dangerous activity. It is beyond the scope of this paper to look at this

argument. But another reason for the perception that cycling is unsafe could be that cycling is an activity that has the potential to induce feelings of danger in many people even if they are comparatively safe. Low adult cycling participation rates mean that many adults probably feel nervous and unconfident about even the physical act of cycling, a state of mind which is likely to heighten their fear of other dangers. Cycling feels dangerous partly because it involves speed and skill: unlike walking, cycling does not come naturally, and learning to cycle involves significant risk of accidents and injuries. Moreover in road environments, cycling puts riders in close proximity to motor vehicles, which are obvious hazards and may feel especially threatening to inexperienced cyclists (that is, the overwhelming majority of the adult UK population). The wider moral is that recognising the reasons why cycling is seen to be dangerous may help policy makers to engage more fully with the evidence and arguments around cycle safety.

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Annex: the cycle helmet debate

A1 Introduction

This annex explores the material on cycle helmets and their benefits or otherwise, with something of a focus on issues relevant to children and young people. It is not a systematic or comprehensive review of the literature. Rather it outlines a route through some of the key evidence and arguments. One aim is to critically examine the thinking behind injury prevention interventions that target children, and to argue for a balanced approach to risk and safety that better recognises the benefits as well as the disbenefits of managed exposure to real-world hazards.

The literature on cycle helmets is vast. A September 2004 World Health Organisation bibliography listed 447 peer-reviewed journal articles. A 2002 DfT-sponsored review on the effectiveness of cycle helmets (Towner and others 2002 – henceforth the Towner review) included 16 observational studies, mainly using hospital injury data, 19 studies of the effectiveness of helmet promotion, 13 studies of legislation and 26 studies on helmet use. The Towner review also looked at a selection of 67 opinion pieces on the issue – a tiny fraction of the total. The Towner review aimed to be ‘a critical review of research and literature on the efficacy of bicycle helmets... [to] provide a valuable reference source in formulating future policy and research decisions.’ It has been criticised in some detail, though at the time of writing this criticism has not reached peer-reviewed journals or other mainstream sources.

People unfamiliar with debates on cycle helmets may be surprised that so much research and discussion is warranted. It may seem obvious that cycling exposes riders – especially young riders – to the risk of death or injury due to head impacts, and that wearing a cycle helmet will protect against these. But as even a brief look at the literature shows, the arguments are anything but obvious. In the words of one ‘neutral’ agency, the Parliamentary Advisory Committee on Transport Safety, ‘much of the research on cycle helmets has been challenged by those involved in the debate’ (PACTS 2004).

The task of getting to grips with this literature is made more difficult by the tone of the debate, which as PACTS also notes, is ‘a particularly emotive and controversial one within road safety,’ where ‘debates on the issue are often characterised by entrenched positions’ (PACTS 2004). In an effort to maintain some transparency and quality control in exploring the literature, this annex restricts itself almost entirely to articles and letters in peer-reviewed journals, statements in legislatures and publications that have been published by mainstream publishers. It does not examine grey literature or self-published papers. The sole exceptions are Walker (2005), a recent magazine article by a leading helmet testing expert which comments on cycle helmet safety standards, and Robinson (2003b) which is referenced for its development of some lines of argument, not its treatment of the evidence.

One final introductory remark: this author, like most of those involved in the discussion, is no mere bystander. He is a reasonably active commuter and recreational cyclist, a longstanding though passive member of the Cyclists' Touring Club, who wears a cycle helmet and insists that his seven-year-old daughter does the same.

A2 A focus on fatalities

This paper largely focuses its discussion on fatalities as the most helpful way to understand and discuss the casualty data. This is partly to do with the reliability of the data and partly because of the significance of fatalities as against other forms of injury, particularly for children and young people. This is not to downplay the importance of life-threatening or permanently disabling injuries. Indeed it would be helpful if casualty statistics gave more information about these injuries, which clearly rank alongside fatalities in their gravity. Nor does it deny that sometimes less severe injuries can be significant in accident prevention contexts because they may indicate a risk that warrants further attention.

Casualty statistics as a whole are not reliable. Not all casualties are reported to the authorities, and when they are they are not always reported in the same way. For instance, the Towner review estimates that only 20 to 30 per cent of all child injuries are reported. However, statistics on fatalities are far more reliable than those on serious injuries or all injuries. As the introduction to the main official source of road casualty statistics explains:

While very few, if any, fatal accidents do not become known to the police, there is evidence that an appreciable proportion of non-fatal injury accidents are not reported to the police (DfT 2004a).

On top of this, the method of grouping the severity of accidents throws up important issues. Accident statistics typically divide casualties into three groups: fatalities, serious injuries and slight injuries. But the definition of serious injury used is wide, covering:

An injury for which a person is detained in hospital as an 'in-patient', or any of the following injuries whether or not they are detained in hospital: fractures, concussion, internal injuries, crushings, burns (excluding friction burns), severe cuts and lacerations, severe general shock requiring medical treatment and injuries causing death 30 or more days after the accident' (DfT 2004a).

This definition combines three different types of injury: injuries that are usually relatively minor and easily-healed like cuts and shock; more serious injuries which nonetheless typically allow for full recovery like concussion and fractures, and potentially permanently disabling or life-threatening injuries. Fatalities have a singular gravity that is lost when figures are combined through the use of 'killed or seriously injured' (KSI) statistics – even more so when a single statistic covering injuries of all severities is used.

Use of statistics for children and young people that include slight injuries is particularly problematic. In UK culture and society, there is a strong impetus to protect children from injury or harm. However, there is a growing appreciation that an uncritical and unbalanced focus on injury prevention across all severity levels is not helpful in developing policies and practices that aim to help children and young people to encounter and learn to manage physical risks (CEN 2004, Ball 2002). In the words of the leading European safety standards agency:

It is not possible to prevent all injuries to children. Except in relation to deaths and serious injuries it is not even realistic to expect to reduce children's risks of accident to the prevailing level for adults... An essential part of the process of a child becoming an adult is the need, and desire, to explore limits and to try new experiences. Minor injuries are part of every child's learning process and are a far more normal part of their lives than is the case for adults (CEN 2004).

The 2004 BMA statement announcing its decision to support compulsory cycle helmets shows how the uncritical use of accident statistics can lead to poor conclusions. It says in support of its position that:

Significantly, with child cyclists, 85 per cent of accidents occur off road where primary prevention measures such as cycle lanes, vehicle speed reduction and driver education are ineffective.

But in 2003 all 18 child cycling *fatalities* were on road, where primary measures – especially traffic calming – have been shown to be very effective (Millward and others 2003).

Proposing a focus on fatalities is controversial within accident prevention, and is not without its problems. There is a connection between the occurrence of injuries of differing severities, captured in the notion of the 'injury pyramid,' a model for the way that, in a given accident situation, there are many more slight injuries than serious ones and in turn many more serious injuries than fatalities. This notion is used to support interventions that aim to reduce injuries across the severity spectrum. However, as the on/off road child cycling example shows, the causal history of injuries of different severities can vary, so an intervention that reduces slight injuries may have a different effect on serious ones or on fatalities. This is especially likely with children and young people.

Taking a more balanced approach to risk and safety throws up real challenges for those demanding evidence. As Ball (2002) argues, injuries are relatively easy to measure, the benefits of managed exposure to risk much less so. Once an accident has happened it is usually easy to spot the event, and then to reconstruct a convincing causal path leading up to it. It is difficult to point to occasions where a child or adult has successfully managed a real-world hazard and even more difficult to claim that they did so as a result of managed exposure earlier in life. And to gather the population data that might provide quantitative evidence for such a claim would be a big research challenge.

A3 A closer look at fatality statistics

DfT statistics, shown in Table 4, show that in 2003 there were 20 fatalities of child cyclists under the age of 20 in Great Britain (DfT 2004a). The majority of these involved children aged 12 – 15.

Table 4: Child cycling fatalities in Great Britain in 2003

Age range	0-4	5-7	8-11	12-15	16-19
Deaths	1	1	3	13	2

Source: DfT (2004a)

Cycling fatalities account for a small proportion of overall child fatalities. The 25 cycling fatalities of children under 16 in 2000 compare with 107 child pedestrian fatalities and 219 total child road fatalities (RoSPA 2002). For more comparisons, though with a slightly different age group, table 5 gives statistics for other accidental and violent deaths and suicides involving children under 15 in the UK in 2000.

Table 5: Child mortality stats in the UK in 2000

	<1	1-4	5-9	10-14	Total <15
All accidents/violence	81	121	106	183	491
Total road transport	7	31	48	88	174
Drowning/choking/suffocation	25	41	10	18	94
Open verdict	27	7	7	17	58
Homicide	14	12	13	11	50
Fire/flames	2	15	12	9	38
Other accidents	4	6	12	15	37
Cycling (GB, 2003)	1	1	3	13	18
Falls	2	6	3	6	17
Suicide	0	0	0	12	12
Poisonings	0	3	1	6	10

Source: RoSPA (2002)

Perhaps a more helpful comparison is between cycling and walking. Casualty rates for different travel modes are sometimes given per unit of distance travelled, to give an indication of the relative risk. In 2003 the fatality rate per

billion kilometres travelled was 29 for cycling and 44 for walking, suggesting that cycling and walking are roughly equally safe modes of travel, for adults at least (statistics are not easily available for children and young people).

Statistics show a rapid fall in child cycling fatalities over the last 20 years or so, from a 1981-5 average of 98 to 18 in 2003 (DfT 2004a). It is highly likely that this fall is due at least in part to lower exposure, thanks to falling child cycling rates. Gaps in the published statistics do not make for easy comparisons between fatality rates and distance travelled. However, the fall in fatalities between 1981-5 and 1994-8 was about 56 per cent. The fall in distance travelled over the period of 1975/6 to 1989/91 was about 40 per cent, suggesting the majority of the fall in fatalities may be largely, though possibly not entirely, due to falling child cycling rates.

Table 6: Child cyclist fatalities GB: trends over time

	1981-5 average	1994-8 average	2003
0-4	2	1	1
5-7	8	5	1
8-11	30	13	3
12-15	58	24	13
Total <16	98	43	18

Source: DfT (2004a)

Statistics for all cycle casualties (not just children) show that around half involve head injuries, while 70 per cent of child cycling fatalities involve head injuries (Kennedy 1996).

A4 The effectiveness of cycle helmets: navigating the issue

Behind the apparently simple question about the worth of helmets there lie three more complex questions:

- Do helmets reduce the likelihood of injury or death in the event of an impact? If so, by how much and in what circumstances?
- Does helmet-wearing lead to changes in behaviour, or other changes, that might increase the risk of injury or death?
- Are the safety benefits enough to justify compulsion or promotion, bearing in mind their possible adverse consequences?

The following sections will look at each of these questions in turn.

Do helmets reduce the likelihood of injury or death in the event of an impact? If so, by how much and in what circumstances?

Most experts on all sides of the debate agree that properly fitted helmets do offer some protection against head injuries in the event of a crash. Some claim that helmets may offer better protection to children than to adults (Thompson and others 1989; Jacobson and others 1998), a claim endorsed by the Towner review. However there is little agreement about the degree of protection, the types of injury for which helmets protect or the circumstances in which protection might diminish or even disappear.

As the Towner review argues, the strongest evidence in favour of helmets comes from case-control studies. These studies typically 'work backwards' from hospital admissions, comparing those cyclists that were wearing a helmet with those that were not, in order to find differences in the likelihood of injury between helmet- and non-helmet wearers. Some researchers claim that these studies show dramatic reductions in injuries: in one well-known study, as high as 85 per cent (Thompson and others 1989) – though the researchers do not state any conclusions about reductions in fatalities.

The main problem with this method is that, as Robinson (1998) says:

Case-control studies must adjust both for trends and differences in attitudes and riding styles of those choosing to feel safe and wear helmets compared to those deciding otherwise.'

Put simply, if riders who tend to wear helmets cycle more cautiously than those who do not, they will have less serious crashes and sustain less serious injuries, but this may have no direct causal link with helmet-wearing. A recent pilot study suggests that children who wear helmets may indeed be more cautious as a group than those who do not (Mok and others 2004).

Problems with case-control studies have led one recent author to say of a major literature review conducted by some of the main proponents of cycle helmets:

The review takes no account of scientific knowledge of types and mechanisms of brain injury. It provides, at best, evidence that hard-shell helmets, now rarely used, protect the brain from injury consequent upon damage to the skull. The review therefore is not a reliable guide to the efficacy of helmets and to interventions concerning their use (Curnow 2005, commenting on Thompson and others 2002).

The other main source of evidence in favour of helmets comes from laboratory tests. Helmets are designed to reduce the effect of impacts, typically by collapsing and absorbing some of the force of impact. Their impact absorption performance is measured in a laboratory. The degree of protection they offer in real-life situations is, like so much else, a matter of debate. Even helmets that meet the most demanding safety standards are not designed to give complete protection against all head impacts (McIntosh and Dowdell 1992). The original British standard for cycle helmets stated that helmets were 'intended to give protection in the kind of accident in which the rider falls onto the road without

other vehicles being involved' (British Standards Institute 1987). In the view of a Canadian neurosurgeon and helmet expert, helmets are:

likely [to be] effective if the person falls from the height the head is at when a person is cycling. If a cyclist is accelerated by a car, swept up on the hood of the vehicle, to a speed of, say, 40 or 50 kilometres per hour, then the helmet will not work and will not prevent a severe or even fatal head injury (Schwartz 1991).

A further design constraint is that for helmets to be effective the point of impact needs to be a part of the head that is typically covered by helmet, which with nearly all current designs means on the top half of the skull – a restriction that means helmets may be ineffective in up to 50 per cent of head injury crashes (Worrel 1987).

Safety standards for helmets sold in the UK are declining (Walker 2005). Not all helmets that are sold meet accepted safety standards (Consumers' Association 1998). Not all are properly fitted. Helmets need to fit tightly to be effective, a requirement that is for obvious reasons more problematic with children. One study found that 96 per cent of child helmet wearers aged 4 to 18 were not wearing their helmets correctly (Parkinson and Hike 2003).

The methodological problems involved in case-control studies, along with the difficulty in interpreting laboratory data and the impossibility of conducting randomised control trials, have led researchers to look at evidence from population casualty data. They are particularly interested in circumstances where there have been significant changes in helmet wearing rates. Interpreting these statistics requires care. Helmet promotion and legislation are apt to reduce cycling rates, which will clearly also reduce casualty rates (other things being equal). There is evidence of reductions in cycling rates following both promotion (Bryan-Brown and Taylor 1997) and legislation (Robinson 1998). As discussed below, one of the main arguments against helmet promotion or legislation is that they lead to reductions in cycling and hence in the health, transport and environmental benefits that arise through it. Therefore it is essential that studies of the effects of these interventions control for cycling rates by gathering good data on cycling levels. One prominent opponent of helmet legislation claims of Australian legislation that 'the law didn't so much encourage helmet wearing as discourage cycling' and goes on to say that cycle helmet laws 'have not produced any noticeable reduction in head injury rates. But, by discouraging cycling, they deprived many of healthy exercise and pollution free transport' (Robinson 1998).

The Towner review gives details of two case studies involving helmet legislation: Victoria, Australia and British Columbia, Canada. In both cases the authors found evidence of a drop in casualties, but also of a drop in levels of cycling, particularly amongst teenage children.

Overall, the balance of evidence suggests modest safety benefits for helmet wearers, but not of the order suggested by the leading proponents of helmet use. The main report of the Towner review does not offer estimates of the degree of protection offered, though there are technical estimates in an annex.

Does helmet-wearing lead to changes in behaviour, or other changes, that might increase the risk of injury or death?

There are at least two ways in which helmet use might actually increase the risk of injury or death. The first, risk compensation, is where a person responds to the safety measure by changing his or her behaviour in the light of it, resulting in a reduction in safety benefits or even an overall increase in adverse outcomes. The second is that helmets themselves can cause injuries and even fatalities that would not otherwise have happened, for instance through increasing the risk of rotational impacts or strangulation.

The phenomenon of risk compensation is widely discussed and researched within accident prevention and risk management. In the case of cycle helmets, the risk compensation hypothesis suggests that a helmeted rider may take more risks when wearing a helmet and thus may compromise any possible safety benefits.

Adams and Hillman (2001) discuss four hypothetical questions from Hedlund (2000) to assess the likelihood of risk compensation with cycle helmets:

1. *If I don't know it's there I won't compensate for a safety measure.* Bicycle helmets manifestly fail this test.
2. *If it doesn't affect me, I won't compensate for a safety measure.* [Hedlund] poses the question 'Do I feel safer wearing a bicycle helmet?' and suggests that if the answer is yes compensation is likely to occur.
3. *If I have no reason to change my behaviour, I won't compensate for a safety measure.* Only if the behaviour of cyclists is completely unmotivated by concern for safety are they unlikely to compensate for a safety measure such as a helmet.
4. *If my behaviour is tightly controlled I won't compensate for a safety measure.* [Hedlund] singles out driving as an activity that offers very considerable freedom to compensate. Cycling offers at least as much.'

The protection cycle helmets offer is partial and highly dependant on factors such as impact speed, which is likely to increase with a greater subjective feeling of safety. This suggests that risk compensation could be a significant factor in compromising the safety benefits of cycle helmets, particularly for children and young people. This is because they may be more prone than adults to compensate for obvious safety measures like cycle helmets, since they may find it harder than adults to understand the subtleties of the degree and nature of the protection on offer, and harder still to put that understanding into action.

Not surprisingly, there is little agreement about the extent to which risk compensation may or may not be happening. However the pilot study discussed above shows that children may indeed be inclined to take more risks if they are wearing a helmet (Mok and others 2004). As mentioned above, this study also suggests that those children who voluntarily wear helmets are more cautious than those who do not. It may appear that this study has found two

contradictory (or at least confusing) findings: that wearing helmets leads to both greater and less risky behaviour. But there is no contradiction. The study suggests that children who wear helmets *as a group* are on average more cautious than those who do not, and it suggests that when *an individual child* wears a helmet he or she feels safer and is more likely to take risks. The picture that emerges is exactly what an appreciation of human nature in general and risk compensation in particular would predict – though it should be added that the study had a small number of subjects and was partly intended to test research methodologies.

Helmets can also be a cause of injuries or even fatalities that would not have happened otherwise. Helmets have resulted in a number of child fatalities through strangulation, typically when a child wearing a helmet has caught his or her head on playground equipment or another object. The risk of strangulation is great enough that one standard, the European standard for child cycle helmets, was modified and now specifies a buckle that releases under load (Towner and others 2002). Some argue that helmets may also increase the risk of injury through rotational forces. Two studies mentioned by the Towner review found evidence of an increased likelihood of neck injuries with helmet use, though other studies did not.

Are the safety benefits enough to justify compulsion or promotion, bearing in mind the possible adverse consequences?

This question outlines an archetypal risk management problem. Answering it needs clarity about both the benefits and the disbenefits of introducing the safety measure under consideration. The evidence and arguments about benefits and disbenefits of helmet-wearing as an individual act have been discussed above. This section looks at the disbenefits of promotion or compulsion, and how this might affect the arguments.

All sides in the debate agree that the main obstacle to cycle helmet promotion or compulsion is its possible impact on cycling rates. Fewer people cycling would certainly lessen the wider health, transport and environmental benefits of cycling. Falls in cycling rates could also, through the 'safety in numbers' effect (Jacobsen 2003) lead to an increased risk to those who carry on cycling.

There is evidence from both promotion campaigns and helmet legislation that each has led to drops in cycling rates. Government-funded research by the Transport Research Laboratory found that cycle promotion campaigns were 'strongly linked to a decrease in the number of cyclists observed' (Bryan-Brown and Taylor 1997), presumably because they heightened fears about the risk of injury. Research on the experience of legislation in different countries has also shown a drop in cycling rates (Robinson 1996, Robinson 2003a). Again, the evidence is disputed: one study in Ontario found no evidence of a drop in cycling rates (Macpherson and others 2001), though that finding has itself been challenged (Robinson 2003a).

Evidence suggests that children in particular will be put off cycling by making helmet use compulsory. Finch (1996) found negative attitudes towards helmets amongst teenagers in Melbourne, Australia. A survey of 1210 secondary

schoolchildren questioned in Blacktown, Sydney, found helmet restriction was the most common reason (33.8 per cent) for not having ridden last week. Other reasons were not owning a bike (33.4 per cent) and safety fears (11.8 per cent) (Robinson 1998).

Aside from the impact on cycle rates, helmet compulsion may have other adverse outcomes. Enforcement – generally agreed as essential to increasing use – is certain to place extra burdens on the police and criminal justice system. Public education campaigns – also essential – will add to the cost to the public purse. Enforcement will lead to the fining and criminalisation of some children and their parents, and is likely to have a disproportionate effect on poorer families who find it harder to meet the costs of a helmet. Legislation, especially if enforced, is also likely to lead to conflict and confusion between children and their parents, teachers and other carers.

Legislation may also lead to a shift in the perceptions of responsibility for cycle safety away from the driver and the highway authorities and towards the cyclist (Braithwaite 1999). This could in turn lead insurers and the legal system to hold non-helmeted cyclists partly responsible for their injuries. Indeed this has already happened in the UK on at least two occasions (as reported in press releases from the Cyclists' Touring Club and as discussed in the Towner review). In one case from 2001 an insurer acting for a driver who collided with a non-helmeted child cyclist, resulting in permanent brain damage, counter-sued the parents and childminder (the claim was subsequently withdrawn and the courts found the driver liable). In another case from 2002 an insurance company offered reduced compensation to a non-helmeted adult cyclist on the grounds of contributory negligence.

Several researchers have tried to assess the compulsion case through weighing up the evidence in different ways. Some have applied cost-benefit analyses (Taylor and Scuffham 2002; Hendrie and others 1999). Taylor and Scuffham concluded that the New Zealand legislation introduced in 1994 was 'cost saving in the youngest age group but large costs from the law were imposed on adult cyclists.' They state that 87 per cent of the youngest age group (five to 12 year olds) wore helmets before legislation, reducing the cost of legislation on this group and hence increasing the cost-benefit analysis. For 13 to 18 year olds and those over 18, the net costs outweighed the benefits. Hendrie and others (1999) concluded that:

The study provided no clear answer as to whether the helmet wearing legislation had been an effective countermeasure in an economic sense. There are no established thresholds against which to measure the value of a cost-effectiveness ratio in the range of \$NZ 70,300 per head-injured cyclist prevented to \$NZ 150,917 per head-injured cyclist prevented, and a decision about its net worth must be made by social agreement between policy makers and the community. In monetary terms, it is unlikely that the helmet wearing legislation would have achieved net savings of any sizeable magnitude.

These analyses offer one route through the debate, not least because they enable helmet use to be compared with other road safety measures. However, they are highly technical and arguably raise as many questions as they answer.

The two cited use different methodologies: Taylor and Scuffham (2002) try to take into account the cost of lower cycling rates. Hendrie and others (1999) include costs to the public purse. Both are highly influenced by assumptions about the effectiveness of helmets and by baseline data about helmet wearing rates before legislation, amongst other variables.

Others have used biomedical ethics to look at the pros and cons of legislation (Unwin 1996, Sheikh and others 2004). This approach looks at the goals, efficiency and effectiveness of health interventions, and also whether they work in a manner consistent with the values and liberties of the target population. Sheikh and others (2004) conclude, 'there is a strong case for making the wearing of cycle helmets legally compulsory.' This conclusion is perhaps not surprising given that it is based in part on the evidence from case-control studies and observational studies of the impact of legislation, which the authors see as supporting the case for helmet use.

The Towner review discusses four criteria, put forward by Unwin (1996), which need to be met before cycling helmet wearing is enforced, in the context of the British legislative system. These criteria are:

1. There must be a high level of scientific evidence that bicycle helmets are effective in reducing the rate of head injury to bicyclists.
2. The benefits to society and others of mandatory bicycle helmets must be convincingly demonstrated, mandatory bicycle helmets cannot be justified simply to protect individual adult bicyclists.
3. There must be widespread agreement, ideally by a large majority, that the potential benefits of compulsory bicycle helmets outweigh the infringement of personal liberty and other disbenefits.
4. There must be good evidence to suggest that compulsory helmet wearing would not make the public health benefits of increased levels of bicycling significantly harder to obtain.

The Towner review concludes:

The first of these criteria has been met. There is now a considerable amount of scientific evidence that bicycle helmets have been found to be effective at reducing head, brain and upper facial injury in bicyclists. Such health gains are apparent for all ages, though particularly for child populations... Criterion 2 is less easy to demonstrate and must relate to a broader debate about the whole bicycling environment: bicycle helmet promotion and legislation needs to be seen as one part of a broader package of measures which enhances bicycling safety. The experience of countries such as Australia and New Zealand suggests that this process takes time. Barriers to helmet use can be overcome (Criterion 3). An infrastructure which promotes bicycling and provision for bicycle helmet is needed (for example employers, schools providing facilities for bicycle helmet storage). In relation to Criterion 4 there is some evidence that legislation may have resulted in decreased levels of bicycling (for example in Victoria, Australia) but there are confounding factors and no clear long-

term trends. Attention needs to be paid to enhancing the bicycling environment generally rather than concentrating solely on the individual approach of wearing helmets.

The Unwin (1996) framework has received endorsement from those on the other side of the helmet debate. Robinson (2003b) develops the criteria, adding two more that argue that cyclists should not be treated in isolation from other road users who may also benefit from helmet legislation. There are arguments that helmet use would be just as justified in the case of car occupants or pedestrians, though there is not scope to explore these arguments here. Perhaps unsurprisingly, Robinson in this (unpublished) paper disagrees with the Towner review's assessment of the extent to which Unwin's criteria have been met. The arguments above support that view.

Helmet wearing rates

Helmet wearing rates in the UK are low, and have been for some years, although rates are improving slowly. The Towner review states:

In 1994, 27,417 bicyclists were observed at 79 busy sites across Great Britain. 16 per cent ... were wearing a helmet. The survey was repeated in 1996 with similar numbers of observations at the same sites and the wearing rate was found to increase to 17.6 per cent, a small but significant increase. When the survey was again conducted in 1999 on built-up roads, the wearing rate had increased to 21.8 per cent. This was due to an increase in adult bicyclists wearing helmets; there was no change in wearing rates amongst children.

Helmet wearing rates are important for those who argue for them. Helmet proponents not only have strong reasons for seeing more people wearing them. They also recognise that the case for legislation is made easier if significant numbers of people are already wearing helmets, since some of the disbenefits mentioned above are reduced.

A5 Reduction in child fatalities from helmet use: a best case scenario

The statistical exercise below gives a crude estimate of the absolute upper limit in the reduction in child fatalities that might arise from universal helmet use, given current rates of cycling and cycling fatalities. It suggests that, at most, the measure would save the lives of three children aged 0 to 15 each year.

The exercise is included to show the maximum impact on fatalities that helmet laws could have in the best of all possible worlds. It is included for three reasons: as an indication of the scale of the benefits the intervention might achieve, as a contribution to debates about the costs and benefits of helmet legislation, and as a methodology that others may wish to refine. It is most certainly not an estimate of the expected reduction. It assumes universal and correct use of helmets, it assumes that risk compensation does not occur and it assumes that no children die as a result of strangulation or other injuries caused by helmet use. These assumptions are most unlikely to be correct in the real world.

Annual number of fatalities of child cyclists aged 0 – 15 in GB in 2003: 18
Proportion of deaths due to head injury: 70 per cent (source: Kennedy 1996) Number left: 13 (to nearest whole number)
Proportion for whom impact speed was too great for protection: 50 per cent (source: McIntosh and Dowdell 1992) Number left: 6 (nearest whole number)
Proportion for whom point of impact on head was outside helmet area: 50 per cent (source: Worrel 1987) Number left: 3 (nearest whole number)

A6 Views of government and key agencies

This section outlines the position on helmets of the government, British Medical Association (BMA), Child Accident Prevention Trust (CAPT), Cyclists' Touring Club (CTC - the UK's largest cycle membership organisation with around 50,000 members), National Cycling Strategy Board (NCSB, soon to evolve into Cycling England), Parliamentary Advisory Committee on Transport Safety (PACTS) and Royal Society for the Prevention of Accidents (RoSPA). Of these key stakeholder agencies, the BMA is the only organisation that is in favour of compulsion. This position was adopted in November 2004 and reversed the position it took in 1999. All other agencies apart from CTC and NCSB are in favour of promoting helmet use; these two are neutral as to the benefits of helmets. The quotes below spell out these organisations' positions in more detail.

Government: pro-promotion, anti-compulsion

The government promotes the use of cycle helmets but rejects compulsion. This position is largely based on the Towner review. The 2004 Road Safety review states:

The Government is aware that some people believe that wearing helmets discourages cycling. However, it believes that the important point is to strike a sensible balance between encouraging cycling, which has immense health benefits, and making sure that safety is not unnecessarily compromised. The Department therefore continues actively to promote the wearing of cycle helmets, particularly for teenage boys where latest surveys show that the wearing rate has fallen from 16 per cent to 12 per cent (DfT 2004c).

British Medical Association: pro-promotion, pro-compulsion

The BMA has strongly supported the advice that all cyclists should wear properly fitted helmets but has not supported the proposal that this be

made compulsory. This ... followed a recommendation made in the Cycle helmets (1999) report.

In the past year we have received correspondence from a number of BMA members, in particular those treating injured victims of cycle related accidents on a daily basis, requesting that the BMA reconsider its existing policy on this issue. In our 1999 report significant emphasis was placed on the BMA's wish not to discourage cycling by making helmets compulsory.

This advice was based on evidence from Australia indicating that cycling levels decreased following the introduction of legislation. This evidence is now outdated and contains distortions from variables including a reduction in the legal age of driving that meant more teenagers travelled in motor vehicles. A study from Ontario, Canada has demonstrated that introduction of helmet legislation did not reduce numbers of children cycling.

...the BMA supports the introduction of legislation making the wearing of cycle helmets compulsory for both children and adults. Further, as stated in the 1999 report we strongly recommend that all cyclists wear proper fitting helmets (BMA 2004).

Child Accident Prevention Trust: pro-promotion, stance on compulsion unclear

Having the right safety gear is important. Children should never be allowed out on their bikes without a helmet – not just on the roads but in gardens, parks or playgrounds as well. Seventy per cent of all cycling deaths and over half of all cycling injuries involve a head injury. Cycle helmets are known to be very effective in reducing the risk of head injury but less than a fifth of children under 15 wear helmets (CAPT 2004).

Cyclists' Touring Club: anti-promotion, anti-compulsion

CTC is not 'anti-helmet'. However there is a good deal of evidence that helmet laws deter cycle use – particularly among teenagers – and that this would seriously erode cycling's health and other benefits. As to the effectiveness of helmets, the evidence currently available is complex and full of contradictions, providing at least as much support for those who are sceptical as for those who swear by them.

CTC therefore remains entirely neutral on the pros and cons of helmet-wearing *per se*, and believes that public policy should do likewise. The protection provided by helmets is at best limited, whereas making cyclists wear helmets could drastically reduce cycle use, causing far more harm to public health in the process. At a time of growing concern about obesity and physical inactivity, the last thing we should be doing is legislating people into car-dependent sedentary lifestyles (CTC undated)

National Cycling Strategy Board: neutral on promotion, anti-compulsion

Arguments that appear to disavow the efficacy or utility of cycle helmet wearing, or on the other hand claim it as the major influence in reducing injury to cyclists, are both wide of the mark. In particular, campaigns seeking to present cycling as an inevitably dangerous or hazardous activity, or which suggest that helmet wearing should be made compulsory, risk prejudicing the delivery of those very benefits to health and environment which cycling can deliver: they also serve to confuse the general public about the wider social and economic advantages of cycling. As a result, the NCS Board is anxious that the question of wearing helmets is placed in its proper context.

The NCS Board has a clear view on this issue, which is that it must remain a decision for individuals as to whether to wear a helmet for some or all of their various cycle activities. Parents will need to take this decision on behalf of their children, bearing in mind all the particular circumstances. But any mandatory requirement to wear helmets on all occasions would greatly dilute the benefits which safe cycling can offer our society as a whole (NCSB 2004).

PACTS: pro-promotion, anti-compulsion

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 per cent and child cyclist casualties by 50 per cent... 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 (PACTS 2004).

RoSPA: pro-promotion, anti-compulsion

RoSPA recommends that all cyclists wear a cycle helmet that meets a recognised safety standard. Cycle helmets, when correctly worn, are effective in reducing the risk of receiving major head or brain injuries in an accident.

It is recognised that helmets do not guarantee protection for the wearer, nor prevent accidents from happening in the first place. The most effective ways of reducing cyclist accidents and casualties are to improve the behaviour of drivers, improve the behaviour of cyclists and to provide safer cycling environments. However, wearing a cycle helmet is a simple, low cost and effective way that individual cyclists can protect themselves.

Surveys in 2000, showed that only 22 per cent of cyclists on major built-up roads wear helmets. Education and publicity measures to promote the use of cycle helmets should continue.

RoSPA does not believe that it is practical to make the use of cycle helmets mandatory because voluntary wearing rates are too low. Should compulsory cycle helmet legislation be considered in the future, it should be based on evidence that cycle helmets are effective in reducing cyclist casualties, and on evidence that voluntary use is sufficiently high for enforcement of the law to be practical. There may be stronger arguments for limiting mandatory cycle helmet use to child (rather than all) cyclists. As cycling provides health and environmental benefits, the likely effect of such legislation on cycle use should also be assessed (RoSPA 2001b).

A7 Conclusions

The conclusion from the arguments outlined above is that the case for cycle helmets is far from sound. The strong claims of injury reduction made by helmet proponents have not been borne out for fatalities (which this paper argues is the most methodologically sound test of effectiveness) in real-life settings with large populations. Technical and operational limitations on the effectiveness of helmets support this conclusion, and arguments from the way humans respond to risk give it further support. Two key arguments against helmet promotion – strong criticism of the key case-control studies and the first empirical evidence of risk compensation – have both recently appeared in peer-reviewed journals (Curnow 2005 and Mok and others 2004). The case of cycle helmets is arguably an example of a wider phenomenon in childhood accident prevention noted a decade ago by Dr Elizabeth Towner, first author of the Towner review: 'Very few of our present interventions, intended to prevent these injuries, are actually known to work' (Jarvis, Towner, & Walsh 1995).

As the quotes above show in respect of RoSPA, some agencies support helmet promotion but reject compulsion on the basis that helmet-wearing rates are too low. The government's position appears to be similar. The implication is that raising helmet-wearing rates is a legitimate goal and a likely first step to legislation. The arguments above suggest that the benefits of helmets need further investigation before even a policy supporting promotion can be unequivocally supported. The experience of London since the introduction of the congestion charge in 2002, where cycle helmet wearing rates are comparatively high and cycling is growing, may provide useful further evidence and insights into the issues.

But what is also needed is for all parties in the debate to appreciate better each other's positions and assumptions. As well as gathering good evidence, we need a different kind of discussion: one that accepts that different people have different, sometimes incompatible but arguably equally valid world-views about risks and how to manage them (Adams and Thompson 2002).

The cycle helmet debate shows the dramatic power of real life events in shaping our understanding of causality. Tragedies happen; child cyclists are killed or left disabled for life; and we cannot let go of the belief that something could and should have been done to stop that particular event from happening – especially when that something is so simple as wearing a helmet. We find it hard to accept that the helmet may have made no difference. We find it harder to accept that encouraging or forcing children to wear helmets might also encourage them to ride in a more dangerous way and paradoxically to increase the risk that they will suffer an accident. And we find it much harder to accept that compulsory helmet use might put children off cycling altogether, leaving them less physically active, and – many years later – more likely to die of heart disease. Think of all the uncertainty behind that line of argument, compared with the seeming rock-solid conviction that a helmet could have saved that particular child's life, at that particular time. And of course the fact that we are talking about children, who have a claim on our protection and who are still getting to grips with the world, makes it so much more difficult to accept the limitations on our ability to prevent them coming to harm. We cannot ignore the human suffering, pain and loss that lie behind the research and statistics. But our response to it demands reflection and perspective as well as sympathy and conviction.

Postscript

This author's personal view is that helmet wearing is a sensible measure for adults and children. I will continue to wear a helmet, and will continue to tell (and eventually, to ask) my daughter to do the same, partly to reduce the damage and distress caused by the comparatively minor mishaps that are most likely to befall cyclists, and partly (if I am honest) because of the power of the 'what if...' question, were anything more serious to befall her or me. But those of us who cycle should be under no illusion that helmets offer reliable protection in crash situations where our lives may be in danger. Neither should we believe that widespread adoption of helmet wearing would see many fewer cyclists killed or permanently disabled. The evidence so far suggests otherwise.

References

- ACT2 (2004) *Transport for London Schools Cycle Parking Initiative 2004 Research with Children and Teachers: Overview report*. Transport for London. <http://www.tfl.gov.uk/cycles/downloads/reports/school-parking-overview-report.pdf> (accessed 21 September 2005).
- Adams J and Hillman M (2001) 'Risk Compensation and Helmet Wearing', *Injury Prevention*, 7, 89 – 91.
- Adams J and Thompson M (2002) *Taking into Account Societal Concerns about Risk: Framing the Problem*. Sudbury: Health and Safety Executive.
- Ball D (2002) *Playgrounds: Risks, benefits and choices*. Sudbury: Health and Safety Executive.
- Braithwaite W (1999) 'Cycling Helmets and Contributory Negligence', *Solicitors Journal*, 3 Dec, 1144.
- British Medical Association (1999) *Cycle Helmets*. London: British Medical Association.
- British Medical Association (2004) *Legislation for the compulsory wearing of cycle helmets* [statement from Board of Science and Education]. <http://www.bma.org.uk/ap.nsf/Content/cyclehelmetslegis> (accessed 21 September 2005).
- British Standards Institute (1987) *BSI 6863: British Standard Specification for Pedal Cyclists Helmets*. London: British Standards Institute.
- Bryan-Brown K and Taylor S (1997) *Cycle Helmet Wearing in 1996*. Crowthorne: Transport Research Laboratory.
- CEN [European Committee for Standardization] (2004) *Child Safety: Guidance for its inclusion in standards*. <http://www.cenorm.be/BOSS/supporting/reference+documents/cenguide120503.pdf> (accessed 21 September 2005).
- Child Accident Prevention Trust (2004) *Cycle safety factsheet*. <http://www.capt.org.uk/pdfs/factsheet%20cycle.pdf> (accessed 21 September 2005).
- Consumers' Association (1998) 'Get a Head Start', *Which? Journal of the Consumers' Association*, October, 28–31.
- Curnow W (2005) 'The Cochrane Collaboration and bicycle helmets', *Accident Analysis and Prevention*, 37, 3, 569–73.
- CTC (undated) *Helmets: the BMA and cycle helmets*. <http://www.ctc.org.uk/DesktopDefault.aspx?TabID=3910> (accessed 21 September 2005).

- DfES (2005) *Regulation and Guidance on the Children and Young People Plan* (consultation draft). London: DfES.
- DfT (2003a) *Attitudes to Walking and Cycling*. London: DfT.
- DfT (2003b) *Involving Children and Young People Action Plan 2003-4*. London: DfT.
- DfT (2004a) *Road Casualties Great Britain*. London: DfT.
- DfT (2004b) *National Travel Survey: 2002* (revised 2004). London: DfT.
- DfT (2004c) *Tomorrow's roads – safer for everyone: The first three-year review*. London: DfT.
- DfT (2005) *National Cycling Strategy Review*. London: DfT.
- DH (2005) *Choosing Activity: A physical activity action plan*. London: DH.
- DoT (1996a) *Cycling in Great Britain*. London: DoT.
- DoT (1996b) *National Cycling Strategy*. London: DoT.
- Finch C (1996) 'Teenagers attitudes towards bicycle helmets. Three years after the introduction of mandatory wearing', *Injury Prevention*, 2, 2, 126–130.
- Greater London Authority (2004a) *The State of London's Children Report*. London: Greater London Authority.
- Greater London Authority (2004b) *Making London Better for All Children and Young People: The Mayor's Children and Young People's Strategy*. London: Greater London Authority.
- Hedlund J (2000) 'Risky business: safety regulations, risk compensation, and individual behavior', *Injury Prevention*, 6, 82-90.
- Hendrie D, Legge M, Rosman D and Kirov C (1999) *An economic evaluation of the mandatory bicycle helmet legislation in Western Australia*. http://www.officeofroadsafety.wa.gov.au/Facts/papers/bicycle_helmet_legislation.html (accessed 21 September 2005).
- Hillman M / British Medical Association (1992) *Cycling: towards health and safety*. London: British Medical Association.
- Jacobson G, Blizzard L and Dwyer T (1998) 'Bicycle Injuries: Road Trauma Is Not the Only Concern', *Australian and New Zealand Journal of Public Health*, Vol 22, 4, 451-55.
- Jacobsen P (2003) 'Safety in numbers; more walkers and bicyclists, safer walking and bicycling', *Injury Prevention*, 9, 205–209.
- Jarvis S, Towner E and Walsh S (1995) 'Accidents' In Botting B (ed) *The health of our children, decennial supplement*. London: HMSO.

Kennedy A (1996) 'The pattern of injury in fatal cycle accidents and the possible benefits of cycle helmets', *British Journal of Sports Medicine*, Vol, 30, 130–133.

McIntosh A and Dowdell B (1992) *A field and laboratory study of the performance of pedal cycle helmets in real accidents*, Proceedings, International Research Council on the Biomechanics of Impact (IRCOBI), pp 51–60. Bron, France: IRCOBI.

Mackett R, Lucas L, Paskins J and Turbin J (2005) 'The therapeutic value of children's everyday travel', *Transportation Research Part A: Policy and Practice*, 39, 2–3, 205–219.

Macpherson A, Parkin P and To T (2001) 'Mandatory helmet legislation and children's exposure to cycling', *Injury Prevention*, 7, 3, 228–230.

Millward L, Morgan A and Kelly M (2003) *Prevention and reduction of accidental injury in children and older people: Evidence briefing*. London: Health Development Agency.

Mok D, Gore G, Hagel B, Mok E, Magdalinos H and Pless B (2004) 'Risk Compensation in children's activities: A pilot study', *Paediatrics and Child Health*, 9, 5, 327–330.

National Cycling Strategy Board (2004) *Statement of policy: cycle helmet wearing*.
<http://www.nationalcyclingstrategy.org.uk/vbulletin229/upload/showthread.php?t=hreadid=328> (accessed 21 September 2005).

ODPM (2000) Planning Policy Guidance 3: Housing. London: ODPM.

ODPM (2002a) Planning Policy Guidance 13: Transport. London: ODPM.

ODPM (2002b) Planning Policy Guidance 17: Planning for Open Space, Sport and Recreation. London: ODPM.

Parkinson G and Hike K (2003) 'Bicycle Helmet Assessment During Well Visits Reveals Severe Shortcomings in Condition and Fit', *Paediatrics*, 112, 2, 320–323.

Parliamentary Advisory Committee on Transport Safety (2004) *Parliamentary Briefing: Cycle Helmet Use and Effectiveness*. London: Parliamentary Advisory Committee on Transport Safety.

Roberts I, Owen H, Lumb P and MacDougall C (1995) *Peddalling Health – Health Benefits of a Modal Transport Shift*. Adelaide: South Australia Department of Transport.

Robinson D (1996) 'Head injuries and bicycle helmet laws', *Accident Analysis and Prevention*, 28, 4, 463–475.

Robinson D (1998) 'Helmet laws and health', *Injury Prevention*, 4, 170–172.

Robinson D (2003a) 'Helmet laws and cycle use', *Injury Prevention*, 9, 4, 380.

Robinson D (2003b) 'Comments on Road Safety Research Report 30 (RSRR30) by Towner *et al.*' <http://www.cyclehelmets.org/papers/c2004.pdf> (accessed 21 September 2005).

Rosen P (2003) *How Can Research into Cycling Help Implement the National Cycling Strategy? Review of Cycling Research Findings and Needs.* <http://www.york.ac.uk/org/satsu/Projects/whitehall/> (accessed 21 September 2005).

RoSPA (2001) *Effectiveness of cyclist training.* http://www.rospa.com/roadsafety/advice/cycling/cyclist_training_effectiveness.htm (accessed 21 September 2005).

RoSPA (2001b) *Cycling Policy Statements – February 2001: Cycling helmets.* <http://www.rospa.com/roadsafety/advice/cycling/policy.htm> (accessed 21 September 2005).

RoSPA (2002) *Child Accident Statistics.* http://www.rospa.com/factsheets/child_accidents.pdf (accessed 21 September 2005).

Schwartz M (1991) statement to Ontario Legislative Assembly, 11 December 1991. www.ontla.on.ca/hansard/committee_debates/35_parl/session1/resdev/r034.htm (accessed 21 September 2005).

Sheikh A, Cook A and Ashcroft R (2004) 'Making cycle helmets compulsory: ethical arguments for legislation', *Journal of the Royal Society of Medicine*, 97, 262–265.

SHEU (2004) *Young People in 2004.* Exeter: SHEU.

Spence, K (2005) 'Developing a National Standard for Child Cyclist Training' paper presented at Velo-city, Dublin.

Taylor M and Scuffham P (2002) 'New Zealand bicycle helmet law – do the costs outweigh the benefits?' *Injury Prevention*, 8, 317–320.

Thompson D C, Rivara F P and Thompson R (2002) *Cochrane Review: Helmets for preventing head and facial injuries in bicyclists.* Chichester: John Wiley & Sons.

Towner E, Dowswell T, Burkes M, Dickinson D, Towner J and Hayes M (2002) *Bicycle Helmets: Review of Effectiveness.* London: DfT.

Transport, Local Government and the Regions Committee (2002) *Ninth Report, Road Traffic Speed.* London: Hansard.

Unwin N (1996) 'Cycle Helmets: When Is Legislation Justified?' *Journal of Medical Ethics*, 22, 41–45.

Walker B (2005) 'Heads up', *Cycle magazine of the CTC*, June/July, 42–45.

Worrel J, (1987) 'Head Injuries in Pedal Cyclists: How Much Will Protection Help?' *Injury* Vol,18, 5–6.