

## Cycle Helmets

### THIS BRIEFING COVERS

- Headline messages
- CTC's view
- Key facts and arguments: impact of helmet promotion/laws; the low risks of cycling; the deterrent effects of helmet laws and net loss to public health; helmets and exaggerated safety claims; enforcement problems; alternative strategies and measures to make cycling conditions safer; the need for informed decisions about helmets; organisational helmet rules (employers, schools, event organisers); off-road, recreational and sports cycling.
- Further reading and references

### HEADLINE MESSAGES

*CTC is not 'anti-helmet' and we do not take sides on whether or not it is a good idea for individual cyclists to wear them.*

However:

- There is no justification for helmet laws or promotional campaigns that portray cycling as a particularly 'dangerous' activity; or that make unfounded claims about the effectiveness of helmets. Cycling has very substantial health and other benefits, whereas the risks of cycling are not especially high. By reducing cycle use even slightly, helmet laws or promotion campaigns are almost bound to cause a significant net disbenefit to public health, regardless of the effectiveness or otherwise of helmets.
- The effectiveness of helmets is in any case far from clear. They are (and can only be) designed to withstand minor knocks and falls, not serious traffic collisions. Some evidence suggests they may increase the risk of cyclists having falls or collisions in the first place, or suffering neck injuries. Whilst helmet laws have reduced cyclists' injury numbers, the evidence suggests this is wholly or mainly due to reductions in cycle use, not improvements in safety for the cyclists who remain. Reduced cycle use may itself explain why the remaining cyclists are more at risk, due to the loss of the benefits they previously gained from 'safety in numbers'.





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## CTC VIEW

- Government and other bodies concerned with health or road safety should simply aim to encourage people to cycle, regardless of whether or not they choose to wear helmets when doing so. Enforced helmet laws cause deep and enduring reductions in cycle use, undermining its very substantial health and other benefits. Given that the risks of cycling are low – they are not greatly different from those of walking or other forms of active recreation – even a very small reduction in cycle use would be counter-productive to health and other public policy objectives, regardless of the effectiveness or otherwise of helmets. In practice, this disbenefit is potentially very substantial, not least because the deterrent effect is likely to be strongest among key target groups for physical activity promotion, e.g. women, teenagers, less well-off communities and ethnic minority groups.
- Cycle helmets have in any case not been shown to be an effective way to reduce cyclists' injury risks. Indeed they might even be counter-productive, by encouraging drivers or cyclists to behave less cautiously, and/or by increasing the risks of neck and other injuries. By deterring people from cycling, they may also reduce the benefits that cyclists gain from 'safety in numbers'.
- Enforcing helmet laws would require levels of police activity that would be grossly disproportionate to any possible benefits. Conversely, unenforced helmet laws make no long-term difference to helmet use, and therefore cannot provide benefits in any case.
- Road safety policies should prioritise measures that reduce the risks that deter people from cycling – traffic speeds, hostile roads and junctions, dangerous or irresponsible driving, and lorries – and offering quality cycle training for people of all ages, to give them the confidence and skills to ride safely on the roads.
- Individuals should be free to make their own decisions about whether or not to wear helmets, with parents making these decisions in the case of younger children. Their decisions should be informed by clear information about the uncertainties over the benefits or otherwise of helmets.
- Schools, employers and the organisers of non-sporting cycling events (e.g. sponsored rides) should not seek to impose helmet rules for their pupils, staff and participants respectively. These rules are not justified in terms of health and safety, they are likely to reduce both the numbers and the diversity of people who take part in cycling, and they may in some circumstances be illegal.
- There is limited evidence on the risks involved in different types of off-road recreational cycling (from family riding to downhill mountain biking etc) and cycle sport. Likewise, evidence on the potential for helmet use to mitigate (or exacerbate) these risks is equally limited. These are in any case not matters for road safety policy.
- For sporting events, CTC recognises the right of governing bodies to require the wearing of helmets in line with their own and international regulations for these events, given the different types of risk to which sport cyclists are exposed.





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## KEY FACTS AND ARGUMENTS

### 1) Impact of helmet promotion/laws

#### CTC view

- Government and other bodies concerned with health or road safety should simply aim to encourage people to cycle, regardless of whether or not they choose to wear helmets when doing so. Enforced helmet laws cause deep and enduring reductions in cycle use, undermining its very substantial health and other benefits. Given that the risks of cycling are low – they are not greatly different from those of walking or other forms of active recreation – even a very small reduction in cycle use would be counter-productive to health and other public policy objectives, regardless of the effectiveness or otherwise of helmets. In practice, this disbenefit is potentially very substantial, not least because the deterrent effect is likely to be strongest among key target groups for physical activity promotion, e.g. women, teenagers, less well-off communities and ethnic minority groups.
- Cycle helmets have in any case not been shown to be an effective way to reduce cyclists' injury risks. Indeed they might even be counter-productive, by encouraging drivers or cyclists to behave less cautiously, and/or by increasing the risks of neck and other injuries. By deterring people from cycling, they may also reduce the benefits that cyclists gain from 'safety in numbers'.

#### a. The health and other benefits of cycling

Laws and measures that affect cycling should be sure to encourage and not undermine it, in order to maximise its full range of benefits. The health benefits are particularly substantial – for example, someone cycling in mid-adulthood typically has a level of fitness equivalent to being 10 years younger, and a life expectancy 2 years above the average.<sup>1 2</sup>

- For more facts on cycling and health, see CTC's briefing at [www.ctc.org.uk/campaignsbriefings](http://www.ctc.org.uk/campaignsbriefings)
- Cycling's wider benefits for the environment, economy, equality of opportunity and quality of life are outlined in CTC's *New Vision for Cycling* (see [www.ctc.org.uk/campaigns](http://www.ctc.org.uk/campaigns)).

#### b. The low risks of cycling

There is no justification for picking out cycling as a particularly high risk activity that warrants mandatory head protection, or promotional campaigns warning of its dangers:

- **Cyclists aren't especially prone to head injuries.** Despite cycling being the second most common form of physical activity for children<sup>3</sup>, it typically accounts for just 7-8% of the head injuries for which children are admitted to English hospitals.<sup>4</sup> Of these injuries, it is estimated that just a quarter were to parts of the head which might be protected by a helmet<sup>5</sup> – and it is likely that some of these injuries were suffered by children who were wearing helmets anyway.
- On average, 1 cyclist is killed on Britain's roads for every 30 million miles travelled by cycle.<sup>6</sup>
- CTC calculates that the general risk of injury from cycling in Great Britain is just 0.057 injuries per 1000 hours of cycling.<sup>7</sup>
- Mile for mile, the chances of being killed if you choose to cycle are about the same as if you choose to walk.<sup>8</sup>
- You are more likely to be injured in an hour of gardening than in an hour of cycling.<sup>9</sup>

- For more, see CTC's briefing on *Cycling and Road Safety* at [www.ctc.org.uk/campaignsbriefings](http://www.ctc.org.uk/campaignsbriefings)



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### c. Helmet laws: the deterrent effect

Helmet laws, where enforced, have consistently led to substantial reductions in cycle use, especially amongst target groups for physical activity promotion (e.g. women, teenagers and children):<sup>10</sup>

- Western Australia's helmet law reduced cycling in Perth by 30-40%<sup>11</sup>, and helmet laws elsewhere have had similar results.<sup>12</sup>
- Reductions among child and teenage cyclists have been even larger: down by 46% for children in Melbourne<sup>13</sup> and by as much as 90% among female secondary school pupils in Sydney.<sup>14</sup>
- Some countries or states have seen recoveries of mainly adult recreational cycling. However, in all these cases, there was little or no enforcement, or enforcement was relaxed.<sup>15</sup> Conversely, where helmet law enforcement is maintained, cycle use remains low, particularly among children and/or for day to day journeys (e.g. for school or commuter travel). Cycling trips in New Zealand initially fell by 26% following that country's helmet law in 1994, but continued falling to 51% below their pre-law levels by 2006.<sup>16</sup>

### d. Helmet laws: net loss to public health

- One study has used mathematical modelling to show that helmet laws are almost bound to have a net disbenefit to public health. A positive health benefit could arise only under really extreme assumptions, requiring not only that helmets must be highly effective, but also that a law must cause only a very small percentage reduction in cycle use, in a country or state where cycling is a particularly high-risk activity (i.e. relative to the health benefits that would be lost as a result of the law).<sup>17</sup> In fact, as discussed in this briefing, none of these assumptions is realistic. Using a set of more widely recognised (but still questionable) assumptions, the study's author has also estimated that a UK helmet law would have a net annual health disbenefit of \$400m (or c£260m).<sup>18</sup>
- The Government has long endorsed estimates suggesting that the life years gained due to cycling's health benefits outweigh the life-years lost through injuries on UK roads by around 20:1.<sup>19</sup> From this, the above mathematical model shows that there would be a net public health disbenefit from telling people to wear helmets if this resulted in more than one person being deterred from cycling for every 20 who continue, even if helmets were 100% effective at preventing ALL cycling injuries (i.e. not just head-only injuries) for these remaining cyclists. This gives a theoretical threshold of 4.7% as the maximum permissible reduction in cycle use to avoid a net public health disbenefit, under these (impossible) assumptions. Allowing for a reasonable estimate of the proportion of cycling's injury disbenefits which are due to non-head injuries, this maximum threshold falls to c2% even for the most optimistic estimates of the protective effect of helmets against head injuries. In practice, the threshold is likely to be much closer to, or possibly below, 0%, under more realistic assumptions of helmet effectiveness.





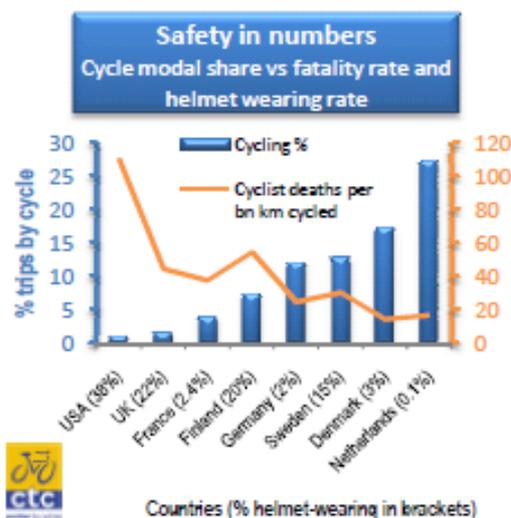
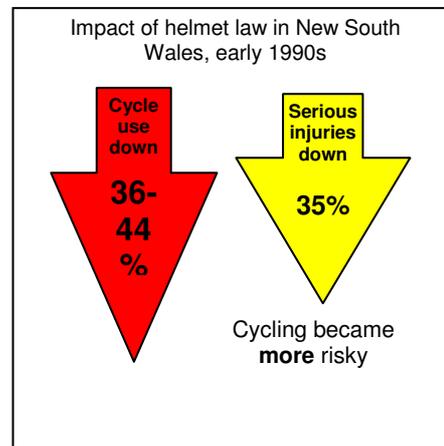
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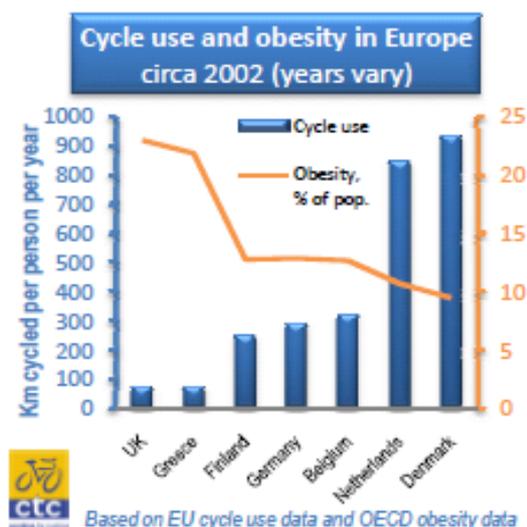
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### e. Doubts over the safety case for helmet use

- Unreliable evidence.** It is unclear whether or not helmets are effective in reducing the (limited) risks of cycling. While some older studies report substantial safety benefits from helmet-wearing,<sup>20</sup> most of these use a 'case-control' methodology, which is prone to yield spurious outcomes. Studies into hormone replacement therapy, vitamin supplements and the MMR vaccine, using this same methodology, yielded what are now known to be false outcomes.<sup>21</sup>
- No link between increased helmet wearing and improved cyclist safety.** Meanwhile the 'real world' histories from places with helmet laws (e.g. New Zealand and Australia) show no link between increases in helmet-wearing and improvement in cyclists' safety.<sup>22</sup> If anything, the available data suggest that reductions in cycle use have typically been greater than the reduction in cyclist casualties. For instance in New South Wales, a 36-44% reduction in children cycling was measured, but only a 35% decline in serious injuries.<sup>23</sup> This suggests that the risks faced by the remaining cyclists had actually worsened, even though most of them were now wearing helmets. This is not surprising, as there is good evidence that cyclists gain from 'safety in numbers', with cycle safety being poorest in places with low cycle use.<sup>24</sup>



Low cycle use (e.g. USA, UK) is linked with poor cycle safety, despite high helmet use



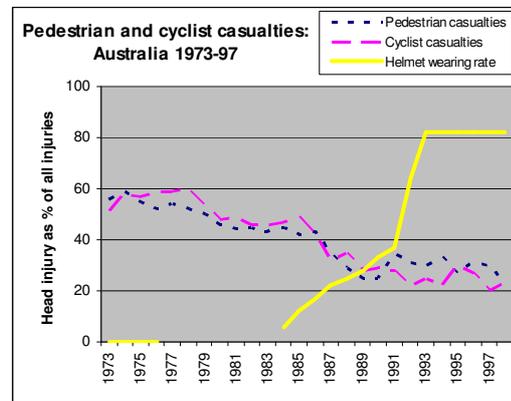
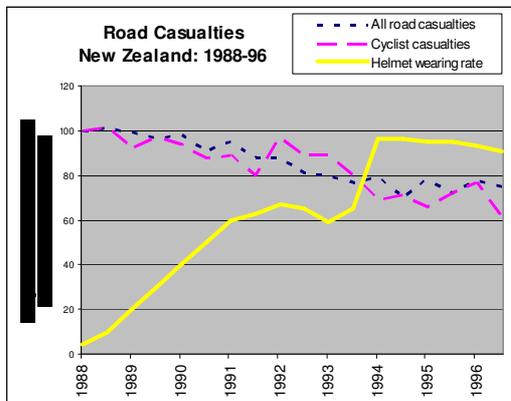
Low cycle use is also linked with high rates of obesity



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Helmet laws in New Zealand and Australia substantially increased helmet use (yellow line), but with no detectable effect on cyclist casualties (purple) relative to other road users (blue). Reduced cycle use (26% in New Zealand and c30% in Australia) merely undermined cycling's environmental and other benefits, while the risks increased for those cyclists who remained.

- **Cycle helmets are (and can only be) designed for minor falls, not collisions with moving traffic.**<sup>25</sup> As mentioned, the standards that apply to cycle helmets (Euro standard EN1078) require them to withstand the sort of impact that a rider is likely to suffer if they fall from their cycle from a stationary position (about 12 mph). In fact, the tests that cycle helmets currently go through mean that they should offer similar protection to a pedestrian who trips and falls to the ground. The impact of a collision with a moving car, especially if it is speeding, is much greater than this. A cycle helmet manufactured to provide this level of protection would be virtually un-wearable because of its bulk and inadequate ventilation (an important consideration given the physical activity involved in cycling).

For a full discussion of standards, and the science behind cycle helmets as protective equipment, see *Heads Up*, by Brian Walker of the helmet-testing lab Head Protection Evaluations, [www.cyclehelmets.org/papers/c2023.pdf](http://www.cyclehelmets.org/papers/c2023.pdf) (article in *Cycle*, June/July 2005).

- **Helmets may increase the risk of falls or collisions happening in the first place.** One study found that cyclists with helmets had a 14% higher injury risk per mile travelled than non-wearers.<sup>26</sup> There are many possible explanations for this. To give just a few examples:
  - It is known that some cyclists ride less cautiously when wearing a helmet.<sup>27 28</sup> This is an example of 'risk-compensation'<sup>29</sup>, also observed in young children with helmets.<sup>30</sup>
  - Drivers may also 'risk-compensate', as they have been found to leave less space when overtaking helmeted than unhelmeted cyclists.<sup>31</sup>
  - The increased size, weight or even the temperature of the head may also be factors. For instance it has been suggested that glancing blows to an effectively enlarged head could lead to the most serious brain or spinal injuries in situations where an unhelmeted head would have suffered a mere glancing blow or not been hit at all.<sup>32</sup>
  - Children have been strangled by their helmet straps.<sup>33</sup>
  - Finally, the erosion of 'safety in numbers' benefits mentioned above could also be a significant factor.



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### 2) Enforcement

**CTC view:** Enforcing helmet laws would require levels of police activity that would be grossly disproportionate to any possible benefits. Conversely, unenforced helmet laws make no long-term difference to helmet use, and therefore cannot provide benefits in any case.

To increase helmet-wearing rates, countries have needed to invest heavily in promoting and then enforcing their helmet laws. In Queensland, cyclists were 3 times more likely per mile travelled to receive a penalty for not wearing a helmet than all other road users for all other traffic offences put together.<sup>34</sup>

Attempting to enforce a helmet law against child cyclists or their parents is not, arguably, a good use of already overstretched police resources. Alternatively, where helmet laws are not enforced (e.g. the widely quoted example of Ontario), this may avoid undermining cycle use<sup>35</sup>, but such laws have no detectable impact on helmet-use either<sup>36</sup>, and therefore serve no practical purpose.

### 3) Alternative strategies and measures

**CTC view:** Road safety policies should prioritise measures that reduce the risks which deter people from cycling – traffic speeds, hostile roads and junctions, dangerous or irresponsible driving, and lorries – and offering quality cycle training for people of all ages, to give them the confidence and skills to ride safely on the roads.

As discussed above, taking the view that promoting cycle helmet wearing and/or making it mandatory is the solution to improved road safety for cyclists, is mistaken. Rather than placing faith in what is at best limited protection to one part of the body only, the focus should be on measures that will prevent cyclist collisions occurring in the first place. These are outlined in CTC's briefing: *Cycling and Road Safety*, available at [www.ctc.org.uk/campaigns](http://www.ctc.org.uk/campaigns).

### 4) Informed decisions

**CTC view:** Individuals should be free to make their own decisions about whether or not to wear helmets, with parents making these decisions in the case of younger children. Their decisions should be informed by clear information about the uncertainties over the benefits or otherwise of helmets.

Everyone who cycles, or wishes to take up cycling, should be left to make their own, well-informed decisions about whether or not to wear a helmet themselves, or require a child for whom they are responsible to wear one. These individual decisions should certainly not be based on the exaggerated claims discussed above, but on clear, unbiased information, as should public policy. Some people prefer to cycle with a helmet (indeed some say they feel nervous without one), and CTC would support their decision.



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### 5) Organisational helmet rules

**CTC view:** Schools, employers and the organisers of non-sporting cycling events (e.g. sponsored rides) should not seek to impose helmet rules for their pupils, staff and participants respectively. These rules are not justified in terms of health and safety, they are likely to reduce both the numbers and the diversity of people who take part in cycling, and they may in some circumstances be illegal.

Schools, employers and organisers of non-sporting cycling events often specify that all riders must wear a cycle helmet in order, for instance, to cycle to and from the premises, cycle on business using their own or pool bikes, or to participate in an organised ride.

Such helmet rules usually derive from fears over liability should the cycling activity with which the organisation is directly associated and/or promotes results in injury. Some also believe that making sure that people are wearing head protection helps fulfil their duty of care. Likewise, event insurers often insist that the organisers make helmets an entry requirement.

However, it is important not to put any barriers in the way of anyone who may wish to take up cycling or simply wants to try it out for the first time by casually participating in an event.

Organisational helmet rules are unjustified because:

- The effectiveness of helmets is often exaggerated (see above);
- People are much more likely to benefit from cycling than not cycling (see above);
- It is unlikely that an injury will occur, given that cycling is not an unduly risk activity (see above);
- Barring individuals from an activity simply because they do not own, wish to borrow or purchase a relatively costly item of personal safety equipment discriminates against them;
- Unlike motorised vehicles, cycles cause little harm to other road users; making cycling as accessible as possible is, arguably, the responsible thing to do. On the other hand, facilitating car travel contributes to the source of danger for all road users.
- Workplace bans are likely to be unlawful (unless based on a valid risk assessment related to the specific work that cycling employees are expected to undertake). Correspondence received by CTC from the Health and Safety Executive says that cycle helmets are not defined in law as 'Personal Protective Equipment' (PPE), and attempts to impose helmet rules as work uniform may breach European Human Rights law.





### 6) Off-road, recreational cycling and cycle sport

#### CTC view:

- There is limited evidence on the risks involved in different types of off-road recreational cycling (from family riding to downhill mountain biking etc) and cycle sport. Likewise, evidence on the potential for helmet use to mitigate (or exacerbate) these risks is equally limited. These are in any case not matters for road safety policy.
- For sporting events CTC recognises the right of governing bodies to require the wearing of helmets in line with their own and international regulations for these events, given the different types of risk to which sport cyclists are exposed.

Helmet use is typically high amongst those voluntarily engaging in the more challenging and risky types of cycling (e.g. mountain biking), but there is limited evidence on how much effect helmet wearing has on the risks involved. Road safety policy, however, has no relevance here.

**Cycle sport:** British Cycling, the governing body for cycling racing in the UK, requires participants to wear a cycle helmet:

*“A rider whilst racing or training in any cycling discipline, with the exception of training on the open road shall wear properly affixed protective headgear which must be of a hard/soft shell construction.”* (Technical Regulations General & for Road, Track & Roller Racing, Rule 8.6, British Cycling).

In 2003, the International Cycling Union (UCI), the world governing body for sports cycling, made helmet wearing mandatory for riders in all endorsed events. Originally riders were permitted to remove their helmets for final climbs, but this allowance was subsequently revoked.

It has been argued that all cyclists should follow the lead of racers and wear cycle helmets too. However, this is similar to suggesting that ordinary, everyday motorists should wear helmets just because Formula 1 drivers do so. This would clearly be an unreasonable, disproportionate expectation.

In fact, before 2003 most professional riders chose not to wear a helmet whilst racing and, moreover, no studies have yet been published to indicate that injuries have reduced since the protection became compulsory. Indeed, racers are probably more willing to wear helmets now that modern designs give them aerodynamic advantage over remaining bare-headed.





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## FURTHER READING

[www.cyclehelmets.org](http://www.cyclehelmets.org) offers a comprehensive collection of papers, studies and articles about cycle helmets.

## REFERENCES

- <sup>1</sup> Tuxworth W et al. *Health, fitness, physical activity and morbidity of middle aged male factory workers*. British Journal of Industrial Medicine, vol 43. pp 733-753, 1986.
- <sup>2</sup> Paffenbarger R et al. *Physical activity, all-cause mortality and longevity of college alumni*. New England Journal of Medicine, vol. 314(10) pp 605-613, 1986 (abstract: [www.ncbi.nlm.nih.gov/pubmed/3945246](http://www.ncbi.nlm.nih.gov/pubmed/3945246)).
- <sup>3</sup> Sport England. *Young people and sport in England: trends in participation 1994-2002*. 2003. [www.sportengland.org/research/idoc.ashx?docid=bd500823-2714-44c8-86cf-6e8290cb6ac3&version=2](http://www.sportengland.org/research/idoc.ashx?docid=bd500823-2714-44c8-86cf-6e8290cb6ac3&version=2).
- <sup>4</sup> Franklin JA & Chapman G. *Quantifying the risk of head injury to child cyclists in England: an analysis of hospital admissions data*. Bicycle Helmet Research Foundation 2005. [www.cyclehelmets.org/1148.html](http://www.cyclehelmets.org/1148.html).
- <sup>5</sup> See reference 4.
- <sup>6</sup> Calculation based on billion vehicle miles travelled by pedal cycle (3.1 in 2009) and number of cyclist fatalities (104 in 2009). Figures from the DfT (*Road Statistics 2009: Traffic, Speeds and Congestion, and Reported Road Casualties Great Britain 2009*). [www.dft.gov.uk](http://www.dft.gov.uk) (statistics)
- <sup>7</sup> The *National Travel Survey* ([www.dft.gov.uk/statistics/tables/nts0310/](http://www.dft.gov.uk/statistics/tables/nts0310/), Table NTS0310), says that on average, people in Great Britain cycle for 5 hours p.a. The GB population is estimated to be about 60.5 million people ([www.ons.gov.uk](http://www.ons.gov.uk)), which means that there are around 302,500,000 hours cycled in GB p.a. There were 17,185 injuries (all severities) to cyclists in 2010 (*Reported Road Casualties, Great Britain*, [www.dft.gov.uk/statistics/tables/ras30010](http://www.dft.gov.uk/statistics/tables/ras30010), Table RAS30010), = 0.057 injuries per 1000 hours cycled.
- <sup>8</sup> Calculated from DfT 2010 figures for: pedestrians and pedal cyclists fatalities (*Reported Road Casualties in GB*, DfT (2011), [www.dft.gov.uk/statistics/releases/road-accidents-and-safety-annual-report-2010](http://www.dft.gov.uk/statistics/releases/road-accidents-and-safety-annual-report-2010), Table RAS30010); average distance walked and cycled (*National Travel Survey* (2011) [www.dft.gov.uk/statistics/series/national-travel-survey](http://www.dft.gov.uk/statistics/series/national-travel-survey), Table NTS0305).
- <sup>9</sup> Powell KE, Heath GW, Kresnow MJ, Sacks JJ, Branche CM. *Injury rates from walking, gardening, weightlifting, outdoor bicycling, & aerobics* [http://journals.lww.com/acsm-mss/Abstract/1998/08000/Injury\\_rates\\_from\\_walking\\_gardening\\_10.aspx](http://journals.lww.com/acsm-mss/Abstract/1998/08000/Injury_rates_from_walking_gardening_10.aspx)
- <sup>10</sup> Robinson D. *Do enforced bicycle helmet laws improve public health?* BMJ vol. 332, p722. 2006. [www.cycle-helmets.com/robinson-bmj.pdf](http://www.cycle-helmets.com/robinson-bmj.pdf).
- <sup>11</sup> Electronic count data from Main Roads Western Australia, reproduced at [http://www.cycle-helmets.com/bicycle\\_numbers.html](http://www.cycle-helmets.com/bicycle_numbers.html). See also [www.cyclehelmets.org/1113.html](http://www.cyclehelmets.org/1113.html).
- <sup>12</sup> See [www.cyclehelmets.org/1122.html](http://www.cyclehelmets.org/1122.html) and <http://www.cyclehelmets.org/1194.html>
- <sup>13</sup> Finch CF et al. *Bicycle use and helmet wearing rates in Melbourne, 1987 to 1992: the influence of the helmet wearing law*. Monash University, Accident Research Centre report no. 45, February 1993, pp. 35, 36, 43.
- <sup>14</sup> Smith NC & Milthorpe MW. *An Observational Survey of Law Compliance and Helmet Wearing by Bicyclists in New South Wales - 1993 (4th survey)*. 1993 NSW Roads & Traffic Authority ISBN0-7305-9110-7.
- <sup>15</sup> See *Cycle Helmets: An overview of the evidence*, section 2. CTC. April 2012. [www.ctc.org.uk/campaigns](http://www.ctc.org.uk/campaigns)
- <sup>16</sup> Land Transport Safety Authority data summarised at [www.cycle-helmets.com/zealand\\_helmets.html](http://www.cycle-helmets.com/zealand_helmets.html).
- <sup>17</sup> De Jong P. *The health impact of mandatory bicycle helmet laws* (as published in *Risk Analysis*, March 2012). <http://onlinelibrary.wiley.com/doi/10.1111/j.1539-6924.2011.01785.x/abstract>
- <sup>18</sup> De Jong P. *The health benefit of bicycle helmet laws*. Social Sciences Research Network, 2009.
- <sup>19</sup> Hillman M. *Cycling and the promotion of health*. Policy Studies vol. 14 pp49-58, 1993.
- <sup>20</sup> The best known is Thompson RS et al. *A case control study of the effectiveness of bicycle safety helmets*. New England Journal of Medicine, 1989 v320 n21 p1361-7. 1989 (see [www.cyclehelmets.org/1068.html](http://www.cyclehelmets.org/1068.html)). Other studies indicating positive results for the protective effect of helmets are listed at [www.cyclehelmets.org/1147.html](http://www.cyclehelmets.org/1147.html).
- <sup>21</sup> See [www.cyclehelmets.org/1134.html](http://www.cyclehelmets.org/1134.html) for commentary.
- <sup>22</sup> See reference 10.
- <sup>23</sup> Smith NC & Milthorpe MW. *An Observational Survey of Law Compliance and Helmet Wearing by Bicyclists in New South Wales - 1993 (4th survey)*. 1993 NSW Roads & Traffic Authority ISBN0-7305-9110-7.
- <sup>24</sup> See for instance Jacobsen PL. *Safety in numbers: more walkers and bicyclists, safer walking and bicycling*. Injury Prevention vol. 9 pp205-209. 2003. <http://injuryprevention.bmj.com/content/9/3/205>. CTC's evidence of the 'safety in numbers' effect in England and the EU is at [www.ctc.org.uk/safetyinnumbers](http://www.ctc.org.uk/safetyinnumbers). More examples are at [www.cyclehelmets.org/1186.html](http://www.cyclehelmets.org/1186.html).



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- <sup>25</sup> Glanville H & Harrison N. *Cycle helmets*. British Medical Association, 1999.
- <sup>26</sup> Erke A & Elvik R. *Making Vision Zero real: preventing pedestrian accidents and making them less severe*. TØI (Institute for Transport Economics) report 889/2007. Oslo, 2007. [www.toi.no/article19378-29.html](http://www.toi.no/article19378-29.html).
- <sup>27</sup> Taylor S & Halliday M. *Cycle helmet wearing in Britain*. TRL report 156, 1996 (see [www.trl.co.uk](http://www.trl.co.uk))
- <sup>28</sup> Halliday M et al. *Attitudes to cycle helmets – a qualitative study*. TRL report 154, 1996 ([www.trl.co.uk](http://www.trl.co.uk))
- <sup>29</sup> Adams J. *Risk*. UCL Press, London 1995.
- <sup>30</sup> Morongiello B et al. *Understanding children's injury risk behaviour: wearing safety gear can lead to increased risk taking*. Accident Analysis and Prevention vol.39(3) pp619-23. 2007. <http://linkinghub.elsevier.com/retrieve/pii/S0001457506001825>.
- <sup>31</sup> Walker I. *Drivers overtaking bicyclists: Objective data on the effects of riding position, helmet use, vehicle type and apparent gender*. Accident Analysis & Prevention vol. 39, Issue 2, 2007, pp 417-425. <http://linkinghub.elsevier.com/retrieve/pii/S0001457506001540>.
- <sup>32</sup> Curnow WJ. *The efficacy of bicycle helmets against brain injury*. Accident Analysis and Prevention vol. 35 pp287-292, 2003. <http://dx.doi.org/10.1016/S0001-4575%2802%2900012-X>.
- <sup>33</sup> Byard RW et al. *Bicycle helmets and accidental asphyxia in childhood*. Medical Journal of Australia, MJA 2011;194(1):49. 2011. See also [www.cyclehelmets.org/1227.html](http://www.cyclehelmets.org/1227.html).
- <sup>34</sup> King M & Fraine G. *Bicycle helmet legislation and enforcement in Queensland 1991-3: Effects on helmet wearing and crashes*. Road User Behaviour Section, Queensland Transport, June 1993.
- <sup>35</sup> Macpherson AK et al. *Mandatory helmet legislation and children's exposure to cycling*. Injury Prevention vol. 7 pp228-230, 2001. <http://injuryprevention.bmj.com/content/7/3/228.abstract>.
- <sup>36</sup> See [http://injuryprevention.bmj.com/content/12/4/231.abstract/reply#injuryprev\\_el\\_1667](http://injuryprevention.bmj.com/content/12/4/231.abstract/reply#injuryprev_el_1667)