

The Case for Cycling: Health

Further evidence (1986-2017)

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Notes:

Later research is covered on our main webpage: [The Case for Cycling: health.](#)

All documents with hyperlinks accessed 19.10.2022

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1. The health and well-being benefits of cycling/active travel

2017: research, published in the BMJ, found that cycling to work is linked with a 45% lower risk of developing cancer, and a 46% lower risk of cardiovascular disease (CVD), compared to commuting by car or public transport. This was a large study involving 264,337 people in the UK.¹

2017: a study from Canada found that employees who cycled to work were less stressed when they arrived than their car-driving counterparts.²

2017: research into six different types of sport/exercise found significant reductions in all-cause mortality for cycling, swimming, racquet sports and aerobics (but not for football and running). This was a large cohort study of over 80,000 British adults.³

2016: a large study in Denmark concluded that “Commuter and recreational cycling was consistently associated with lower risk of T2D [type 2 diabetes] in Danish adults. Our results also provide evidence that late-in-life initiation of or continued engagement in cycling lowers risk of T2D”.⁴

2016: data from 73,000 men and 83,000 women in the UK suggested that mixed public and active transport commuters had significantly lower BMI and body fat than their car-only counterparts.⁵

2015: academics calculated that cycling prevents about 6,500 deaths each year and adds half a year to life expectancy in the Netherlands. These health benefits correspond to more than 3% of the Dutch gross domestic product.⁶

2014: UK research found that: “Men and women who commuted to work by active and public modes of transport had significantly lower BMI and percentage body fat than their counterparts who used private transport. These associations were not attenuated by adjustment for a range of hypothesised confounding factors.”⁷

2014: health economists found significant associations between overall psychological wellbeing and active travel compared to car travel. For instance, car commuters were at least 13% more likely to feel constantly under strain or unable to concentrate than those

¹ Celis-Morales, Carlos A. (et al.). [Association between active commuting and incident cardiovascular disease, cancer, and mortality: prospective cohort study](#). April 2017. BMJ 2017;357:j1456

² Brutus, S. (et al.) [Cycling, car or public transit: a study of stress and mood upon arrival at work](#). Published in the International Journal of Workplace Health Management, Vol. 10 Issue: 1, pp.13-24. 2017.

³ Oja, P. (et al.) [Associations of specific types of sports and exercise with all-cause and cardiovascular-disease mortality: a cohort study of 80,306 British adults](#). Published in the British Journal of Sports Medicine. Vol 51, Issue 10. May 2017.

⁴ Rasmussen, Martin G (et al.). [Associations between Recreational and Commuter Cycling, Changes in Cycling, and Type 2 Diabetes Risk: A Cohort Study of Danish Men and Women](#). 2016. Published in PLOS.

⁵ Flint, E. & Cummins, S. [Active commuting and obesity in mid-life: cross-sectional, observational evidence from UK Biobank](#). March 2016. Published in The Lancet: Diabetes & Endocrinology.

⁶ Fishman, Elliot (et al.). [Dutch Cycling: Quantifying the Health and Related Economic Benefits](#). 2015. Published in the American Journal of Public Health.

⁷ Flint, E (et al.). [Associations between active commuting, body fat, and body mass index: population based, cross sectional study in the United Kingdom](#). 2014. BMJ 2014;349:g4887.

who cycled or walked to work, and the longer drivers spent on their daily commute, the worse they felt in psychological terms.⁸

2012: research that looked at the benefits of a shift from car to active transport concluded that the health benefit due to physical activity is by far the biggest positive and that: “the benefits of bicycling completely overwhelm any concern over pollution exposure of bicyclists.”⁹

2010: an examination of data for 14 countries, all 50 US states and 50 of the largest US cities, found that walking and cycling help tackle physical inactivity, obesity and diabetes.¹⁰

2009: a study from the US concluded that: “Active commuting was positively associated with fitness in men and women and inversely associated with BMI, obesity, triglyceride levels, blood pressure, and insulin level in men. Active commuting should be investigated as a modality for maintaining or improving health.”¹¹

2009: a Dutch study found that employees who cycle regularly to work are less frequently ill, with on average more than one day per year less absenteeism than colleagues who do not cycle to work. The authors calculated that between them employers in the Netherlands could save around 27 million Euros in terms of absenteeism if they encouraged more people to cycle.¹²

2000: a population-wide study in Copenhagen found that, compared with those who cycled regularly to work, people who did not had a 39% higher mortality rate, regardless of whether or not they sometimes took part in other physical activities at other times.¹³

1998: UK research found that people who took up cycling as a new activity gained the greatest benefits at the outset, but fitness continued to improve as they increased their cycle use. Reduced body fat was also noted, particularly among those who were overweight or obese at the outset of the trial.¹⁴

1990: over a period of nine years, a study of male civil servants found that those who cycled for at least an hour a week (or 25 miles in a single week) experienced less than half the non-fatal and fatal coronary heart disease of the others.¹⁵

1986: an examination of 1,394 male factory workers, aged 35-60, led academics to conclude that cycling had “...the greatest effect on fitness of any of the lifestyle variables.

⁸ Martin, A (et al.). [Does active commuting improve psychological wellbeing?](#) The research was based on data on 17,985 adult commuters in eighteen waves of the British Household Panel Survey (1991/2–2008/9). It took into account feelings of worthlessness, unhappiness, sleepless nights, being unable to face problems, plus facts like income, having children, moving house or job, and relationship changes. Preventive Medicine.

⁹Rabl, A. [Benefits of shift from car to active transport](#). Published in Transport Policy, 19 (2012) 121–131.

¹⁰ Pucher, J & Buehler, R. (et al.). [Walking and Cycling to Health: A Comparative Analysis of City, State, and International Data](#). 2010.

¹¹ Gorden-Larsen, P (et al.) [Active Commuting and Cardiovascular Disease Risk \(The CARDIA Study\)](#). Arc Intern Med. 2009; 169(13):1216-1223. July 2009.

¹² TNO Quality of Life. [Reduced sickness absence in regular commuter cyclists can save employers 27 million euros](#). Feb 2009.

¹³ Andersen, L (et al.), [All-cause mortality associated with physical activity during leisure time, work, sports and cycling to work](#). Archives of Internal Medicine, 160: 1621-1628, 2000.

¹⁴ Boyd, H, Hillman, M. (et al). Health-related effects of regular cycling on a sample of previous non-exercisers: resume of main findings. Bike for Your Life Project and Cycling UK (then CTC), 1998. Findings summarised in DETR (1999), [Cycling for better health, Traffic Advisory Leaflet 12/99, DETR](#).

¹⁵ Morris, J (et al.). [Exercise in leisure time: coronary attack and death rates](#). British Heart Journal vol. 63, pp325-334, 1990.

The order of the difference in fitness in favour of cyclists is equivalent to that enjoyed by being five years younger (cyclists in general) or up to 10 years younger (for regular cyclists).”¹⁶

1986: research into nearly 17,000 Harvard alumni, aged 35-74, discovered that “By the age of 80, the amount of additional life attributable to adequate exercise, as compared with sedentariness, was one to more than two years.” (The researchers investigated their subjects’ levels of exercise - walking, stair climbing and sports - and accounted for other life-style characteristics (e.g. cigarette smoking, weight etc.).¹⁷

2. The benefits of physical activity/cycling for children

2017: according to a survey from Public Health England, parents felt that being active made most 5- to 11-year-olds feel happier (79%), more confident (72%), and more sociable (74%); nearly all children said they liked being active (93%), and were mainly motivated by having friends to join in and more activities to choose from.¹⁸

2010: an English study found that boys aged 10-16 who cycle regularly to school are 30% more likely to meet recommended fitness levels, while girls who cycle are seven times more likely to do so.¹⁹

2009: research found that bouts of physical activity may help children pay more attention at school.²⁰

2003: academics discovered a significant positive relationship between physical activity, improved cognitive performance and academic achievement among children.²¹

3. Risks v benefits

1992: in its report, ‘Cycling: Towards Health and Safety’, the British Medical Association concluded: “Even in the current hostile traffic environment, the benefits gained from regular cycling are likely to outweigh the loss of life through cycling accidents for the current population of regular cyclists.”²² The author, Mayer Hillman, subsequently estimated that the life years gained due to the health and fitness benefits of cycling in

¹⁶ 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.

¹⁷ 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.

¹⁸ Public Health England. [Number of children getting enough physical activity drops by 40%](#). Press release. 17.7.2017. The release also says: “The number of children meeting the recommended amount of physical activity for healthy development and to maintain a healthy weight, which is 60 minutes a day, drops by 40% as they move through primary school.”

¹⁹ Voss, C & Sandercock, G. [Aerobic Fitness and Mode of Travel to School in English Schoolchildren](#). Medicine & Science in Sports & Exercise: Feb 2010 - Volume 42 - Issue 2 - pp 281-287.

²⁰ University of Illinois at Urbana-Champaign [Physical Activity May Strengthen Children's Ability To Pay Attention](#). ScienceDaily. 2009.

²¹ Sibley, B & Etnier, J. [The relationship between physical activity and cognition in children: A meta-analysis](#). Pediatric Exercise Science, 15: 243-256. 2003.

²² British Medical Association. Cycling: towards health and safety. Oxford University Press, 1992.

Britain outweighed the life-years lost through injuries by a factor of around 20:1,²³ a figure subsequently cited by the Government.^{24 25}

Later studies also weighed up the health costs and benefits of cycling. Unlike Hillman's calculation, some of these take account of pollution, as well as injury risks. Depending on the factors taken into account, these studies suggest that the health benefits outweigh the injury risks by between 13:1 and 415:1 (see table overleaf).

²³ Hillman M, Cycling and the promotion of health. Policy Studies vol. 14 pp49-58, 1993.

²⁴ DfT. [Active Travel Strategy](#). p41. 2010.

²⁵ Parliamentary answer (Earl Atlee). [House of Lords Debates](#) 13/10/2010.

Estimates of the health benefits of cycling : injury reduction disbenefit (early studies, 1992-2012)

Authors (date)	Location(s)	Basis for comparison	Headline findings	Benefit : disbenefit
Mayer Hillman (1992/93, not online) ²⁶	Great Britain	Ratio of life-years gained through health benefits of cycling v life years lost to cycling injuries	Health related life-years gained outweigh injury-related life-years lost by 20:1	20:1
Woodcock et al (2009)	London (the study also considers Delhi)	Various sustainable travel scenarios, one of which (“increased active travel”) is a doubling of walking and an 8-fold increase in cycling, with corresponding reductions in car use. Weighs up both mortality effects and “disability adjusted life years” (DALY) effects per million of population due to increased physical activity, injuries and pollution; also the societal benefits of reduced pollution and CO2 emissions.	Impacts per million population annually under the “increased active travel” scenario in London: <ul style="list-style-type: none"> • Physical activity benefits: 528 deaths averted, saving 5,496 life-years; plus a reduction of 2,245 life-years impaired by disability, a saving of 7,742 DALYs. • Air pollution net benefits (n.b. societal benefits of reduced air pollution outweigh the pollution disbenefits for individuals who switch from car to active travel): 21 deaths averted, saving 200 life-years, plus 200 DALYs. • Traffic crashes: net loss of 11 lives and 418 life-years, plus an increase of 101 life-years impaired by disability, a cost of 519 DALYs. 	Ratio for mortality: 5496 : 418 = 13:1 Ratio for DALYs: 7742 : 519 = 15:1 (N.B. Including pollution effects to individuals and society makes little difference to these ratios).

²⁶ Hillman M, Cycling and the promotion of health. Policy Studies vol. 14 pp49-58, 1993.

Authors (date)	Location(s)	Basis for comparison	Headline findings	Benefit : disbenefit
De Hartog et al (2010) Summary	Netherlands	Gains and losses per person per annum for adults aged 18-64 who switch a regular car commute to cycling. Weighs up life-years gained per year through health benefits of cycling, versus life years lost to cycling injuries and pollution.	Average mortality gains/ losses: <ul style="list-style-type: none"> Physical activity benefits: range 3-14 months, av. 8 months (c245 days) Injury disbenefits: range 5-9 days (av.. 7 days) Pollution disbenefits: range 0.8-40 days, av. 21 days). 	245:7= 35:1 N.B. with pollution disbenefits to individuals, = c9:1, but this omits pollution benefits to society.
Rojas-Ruede et al (2011) Summary	Barcelona	Calculates the overall mortality-related impacts of Barcelona's "BICING" hire-bike scheme in terms of life-years gained through health benefits of scheme-users switching from car travel to cycling, versus life years lost to cycling injuries and pollution. Also considers CO2 savings.	Life years gained and lost annually by BICING scheme users: <ul style="list-style-type: none"> Deaths averted due to physical activity, 12.46 Deaths due to pollution: 0.13 Deaths due to injury: 0.03. 	12.46 : 0.03 = 415:1 (N.B. ratio including pollution effects to individuals is 77:1. Pollutant effects to society not assessed).
Rabl & de Nazelle (2012)	Data from several EU cities	Considers annual value of mortality benefits and disbenefits for each individual who switches a regular short (5km one-way) car commute to cycling. Weighs up life-years gained per year through health benefits of cycling, versus life years lost to cycling injuries and pollution, also societal benefits of reduced pollution.	Average annual value of benefits per person switching from car to cycle: <ul style="list-style-type: none"> Physical activity benefits, \$1,310 Public health benefits from reduced pollution, \$33 Individual disbenefits from increased pollution, \$19 Individual disbenefits from injuries, \$53. See Table 5 of report.	1310 : 53 = 24:1 (N.B. ratio including pollution effects to individuals and society is c19:1).

