

*Scand J Med Sci Sports* 2011  
 doi: 10.1111/j.1365-0538.2011.01299.x

© 2011 John Wiley & Sons AB  
 SCANDINAVIAN JOURNAL OF  
 MEDICINE & SCIENCE  
 IN SPORTS

### Review

#### Health benefits of cycling: a systematic review

P. Oja<sup>1</sup>, S. Titze<sup>2</sup>, A. Bauman<sup>3</sup>, B. de Geus<sup>4</sup>, P. Krenn<sup>5</sup>, B. Reger-Nash<sup>6</sup>, T. Kohlberger<sup>7</sup>

These studies suggest that there is a clear positive dose-response relationship between the amount of cycling and health outcomes: fitness improvement increases and the risk of all-cause mortality, CVD and colon cancer morbidity, and incidence of overweight and obesity decrease with increasing amount of daily cycling.

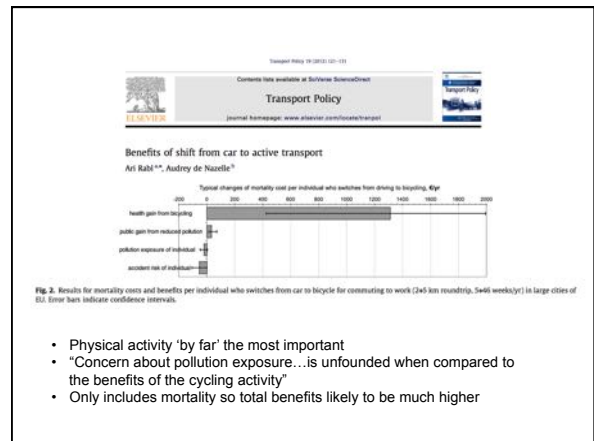
# EPIDEMIOLOGY

De Hartog et al, 2011

Epidemiology:  
 January 2011 - Volume 22 - Issue 1 - pp 576-577  
 doi: 10.1097/EDE.0b013e318199718320.16  
 Abstracts: ISBE 22nd Annual Conference, Seoul, Korea, 28 August-1 September 2010: Travel-time Air Pollution Exposure, Energy Expenditure, and Health Outcomes: Use of New Technologies and Results

Conclusion:

The health benefits of cycling are 11 times larger than the risks relative to car driving for the individual subjects shifting mode of transport. Societal benefits are even larger due to a modest reduction in air pollution emissions and traffic accidents.



BMJ

BMJ 2011;343:e9821 doi:10.1136/bmj.e9821

### The health risks and benefits of cycling in urban environments compared with car use: health impact assessment study

David Rojas-Rueda, predocctoral researcher<sup>1</sup>, Audrey de Nazelle researcher<sup>2</sup>, Marko Tainio researcher<sup>3</sup>, Mark J. Nuwenhuisen research professor<sup>4</sup>

Table 1: Main results from health impact assessment of Bicing Initiative in Barcelona

Variables	Relative risk*	AF <sub>pop</sub> †	Deaths/year
Road traffic injury	1.0007	0.0007	0.03
Air pollution (particulate matter <2.5 µm)	1.002	0.002	0.13
Physical activity	0.80	-0.23	-12.46
Carbon dioxide emissions saved (kg/year)‡	—	—	9 062 344

\*Relative risk of death during cycling compared with travel by car.  
 †Attributable fraction of mortality among exposed (Bicing users).  
 ‡Calculated for Barcelona vehicle fleet, reported in 2008 by Spanish traffic department.

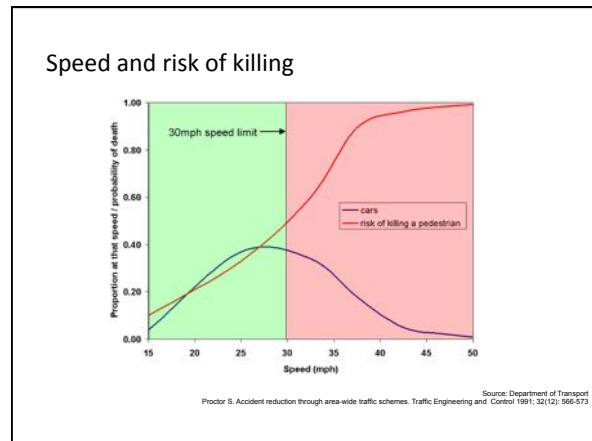
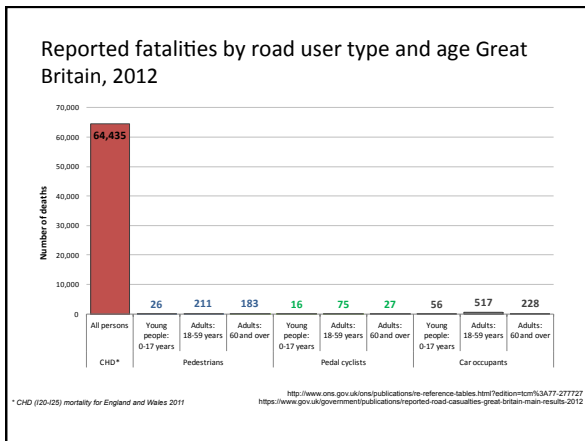
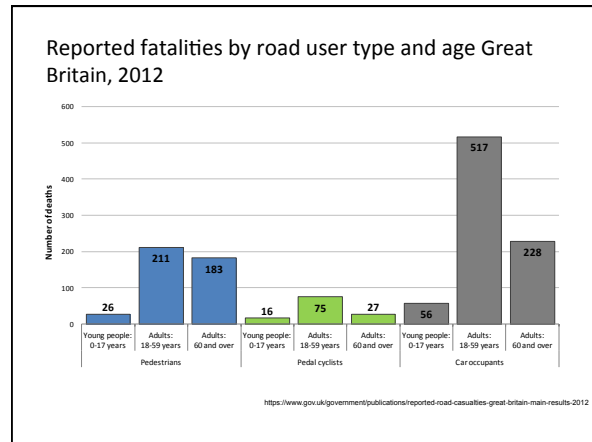
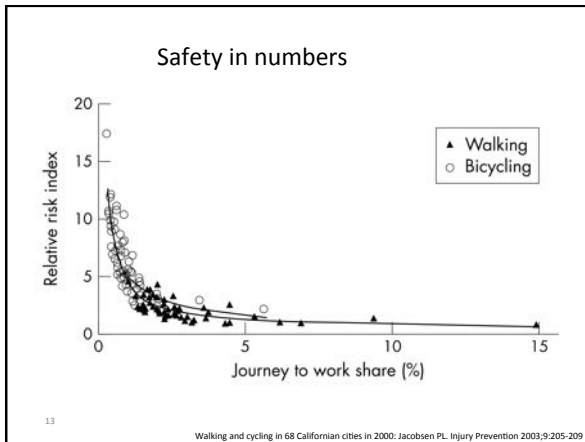
# THE LANCET

## Energy and Health 3

### Energy and transport

James Woodcock, David Banister, Phil Edwards, Andrew M Prentice, Ian Roberts

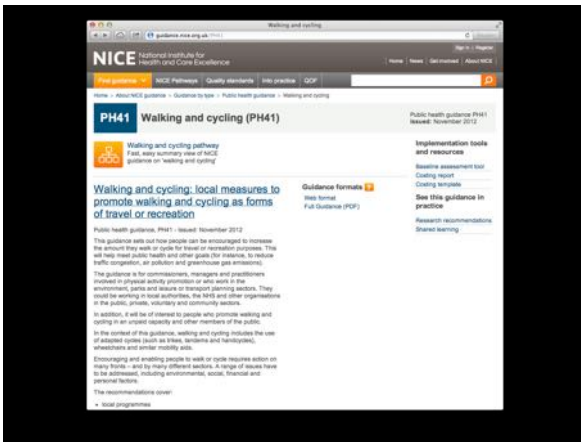
- There exists the potential of a modal shift from oil-based car transport to food-based active transport, to yield important health benefits for car users and wider society, through reductions in air pollution, physical inactivity, and opportunity costs. Future research should quantify these effects under alternative scenarios.
- The greatest potential for health gain is by improving the walking environment and supporting the most energy efficient form of transport—the bicycle.
- The necessary changes are achievable and affordable and essential for sustainable development across settings. Levels of cycling can be used as a measure of progress towards a healthier sustainable future in both the developed and the developing world. The main obstacles to progress are not technological but political, in particular the financial interests of stakeholders.



Putting the pieces together

### Impacts of transport interventions

	Deaths and injuries	Air pollution	Noise pollution	Physical activity	Social impacts	Greenhouse gases
Particulate traps, cleaner fuels	-	+	-	-	-	-
Increased vehicle efficiency	-	+	-	-	-	+
Reduced travel demand	+	+	+	-	-	+
Urban design promoting public transport, walking and cycling	+	+	+	+	+	+



**Department for Transport** **Cycling Demonstration Towns**  
**Development of Benefit-Cost Ratios**  
 February 2010

**Table 2. Benefits and Costs of Cycling Demonstration Towns**

Impact	Estimate of benefits and costs over 10 year period (£m, 2007 prices and values)
Reduced mortality	Benefit of £45 million
Decongestion	Benefit of £7 million
Reduced absenteeism	Benefit of £1.3 million
Amenity	Benefit of £9 million
Accidents	Disbenefit of £0.£15 million
<b>TOTAL BENEFITS</b>	<b>£47.64 million</b>
Costs	£18 million
Benefit-Cost Ratio	2.6 – 3.5

- For every £1 spent in the Cycling Demonstration Towns the value of reduced mortality was £2.50
- Physical activity accounted for >70% of benefits

**Economic Impact of Reduced Mortality Due to Increased Cycling**

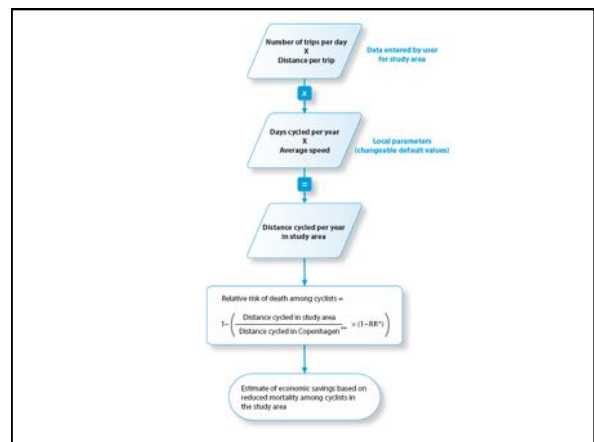
Henry Butler, MA, MEd, BEd, MSc, Nick Cook, BA, MEd, PhD, Professor Paul Ridd, BA, ScD, Robert D. Smith, BA, MEd, PhD, PhD, Scott Robinson, PhD, MEd, EdD, EdS, EdD, EdS, EdC, EdD

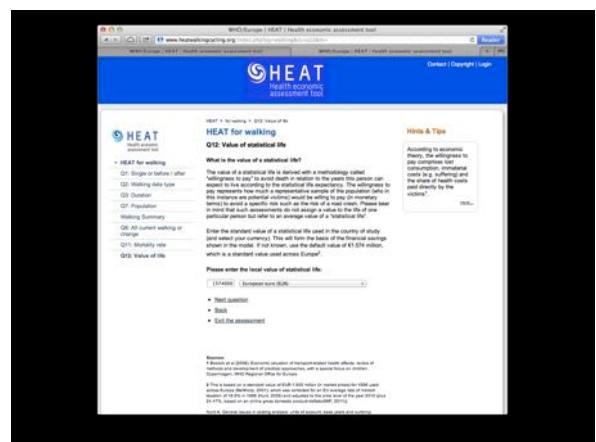
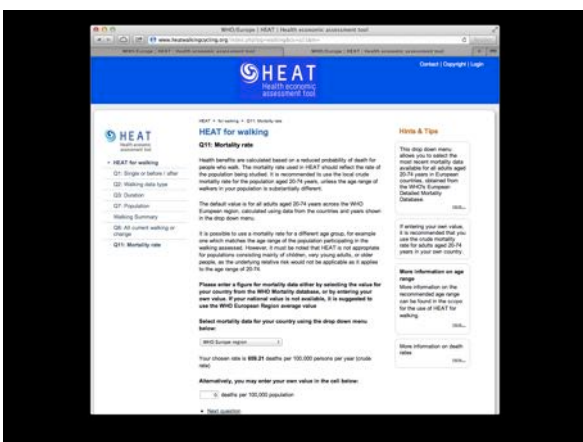
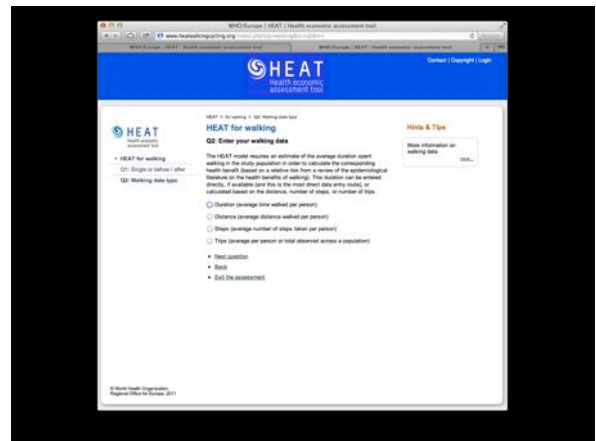
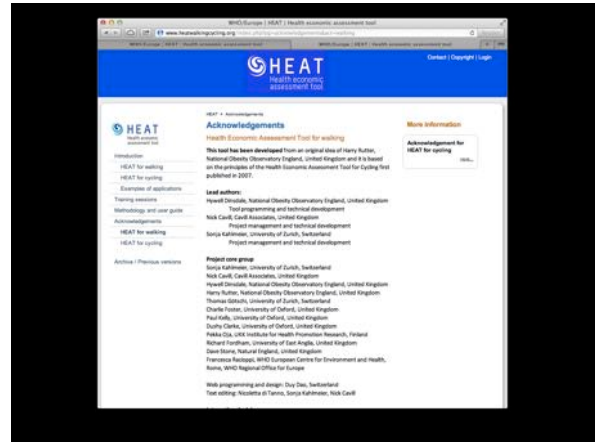
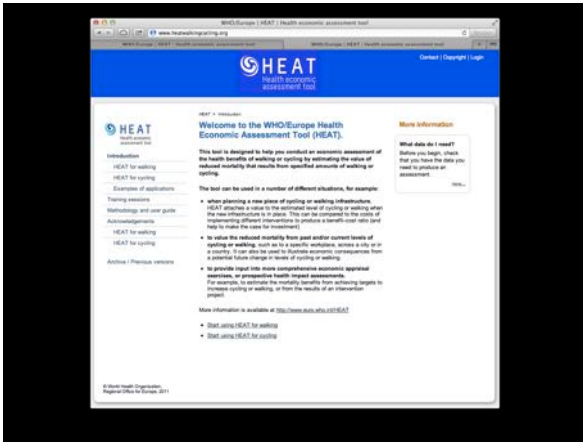
**Abstract** Increasing regular physical activity is a key public health goal. One strategy to change the physical environment to encourage walking and cycling, increasing participation with the least cost and the greatest benefit, is to increase the number of people who walk and cycle to work. This paper examines the economic impact of increased walking and cycling to work. The authors estimate the economic value of the health benefits of walking and cycling to work. The authors estimate the economic value of the health benefits of walking and cycling to work. The authors estimate the economic value of the health benefits of walking and cycling to work.

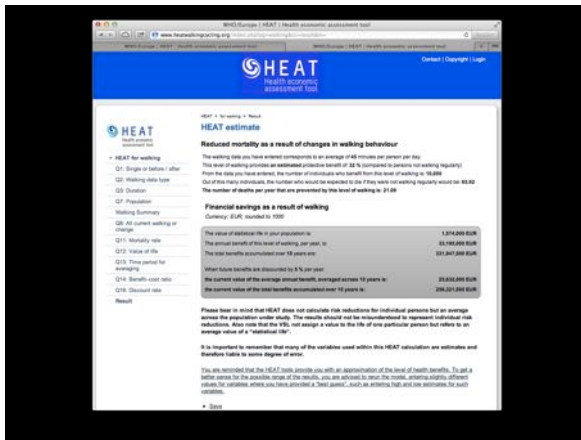
**Introduction** Regular physical activity is a major contributor to physical and mental health, and reduces the risk of heart disease, diabetes, obesity, and many other chronic diseases. It also has been shown to reduce the risk of falls, improve cognitive function, and reduce the risk of depression. It is also a key component of public health. One strategy for increasing physical activity is to change the physical environment to encourage and support walking and cycling. This paper examines the economic impact of increased walking and cycling to work. The authors estimate the economic value of the health benefits of walking and cycling to work.

**World Health Organization**  
 REGIONAL OFFICE FOR EUROPE

**Health economic assessment tools (HEAT) for walking and for cycling**







## Conclusions

- Transport has many impacts on health
- Cars dominate the roads and impose major health costs
- The more cycling there is the safer it becomes
- Important co-benefits tying together sustainability, liveability, and health
- Strong economic case for active travel
- Recent NICE guidance