THE PEP Workshop on working together for healthy and sustainable urban transport
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Bringing health into transport planning: unlocking the value of walking and cycling

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Often urban environments / land use planning favour motorized transport…

… and hinder walking and cycling

Why has the health sector an interest in transport and urban development policies?

Transport and the urban environment play a role in several of the leading risk factors for health

Health outcomes	Risk factor related to urban/transport policies
High blood pressure	**Physical activity / diet**
High body mass index	**Physical activity / diet**
Respiratory diseases	**Urban air pollution**
Cardiovascular diseases	**Urban air pollution, physical activity, diet, noise**
Cancer (some)	**Physical activity / diet**
Injuries	**Road traffic**

The burden

- Physical inactivity is estimated to cause:
  - 21–25% of breast and colon cancer burden
  - 27% of diabetes burden
  - 30% of ischaemic heart disease burden

The potential

- **Risk reductions for:**
  - **20-30% for CHD and CVD morbidity and mortality**
  - **Cancer risks:**
    - 30% for colon cancer
    - 20% - 40% for breast cancer
    - 20% for lung cancer
    - 30% for endometrial cancer
    - 20% for ovarian cancer
  - **30% for developing functional limitations**
  - **30% for premature all-cause mortality**

Physical Activity Guidelines Advisory Committee. Physical Activity Guidelines Advisory Committee Report, 2008. Washington, DC: U.S. Department of Health and Human Services, 2008.

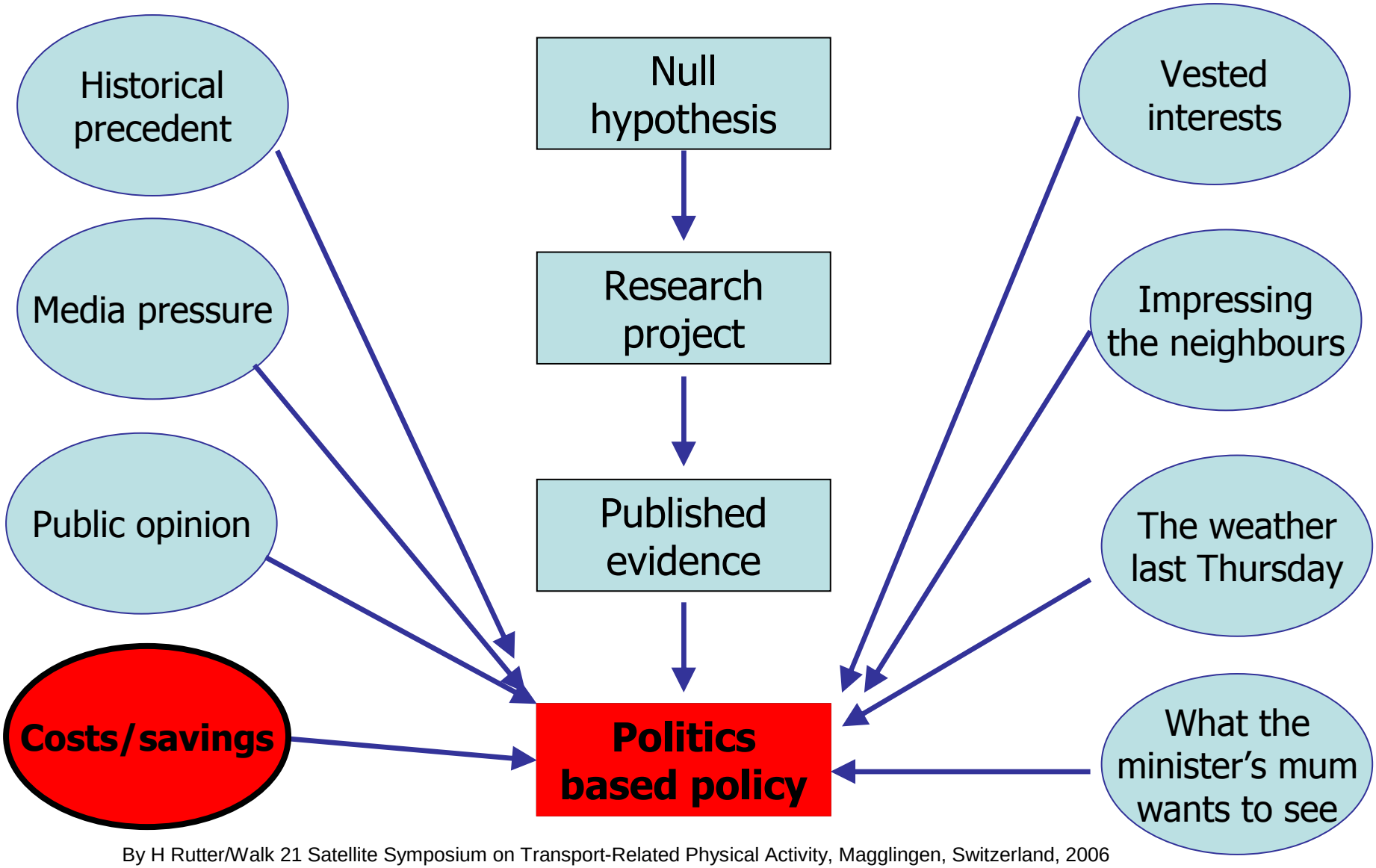
Why walking and cycling?

- **It can have a big impact!**
  - **In Europe, many car trips are short**
    - 10% shorter than 1km, 30% shorter than 3km and 50% shorter than 5km
  - **Shifting some of these trips to walking and cycling can help to**
    - Reduce congestion
    - Reduce energy consumption and CO2 emissions
    - Improve road safety, air quality and noise
    - Reduce need for more infrastructure for cars
    - Improved accessibility and quality of urban life
    - Complement technological improvements to vehicles and fuels

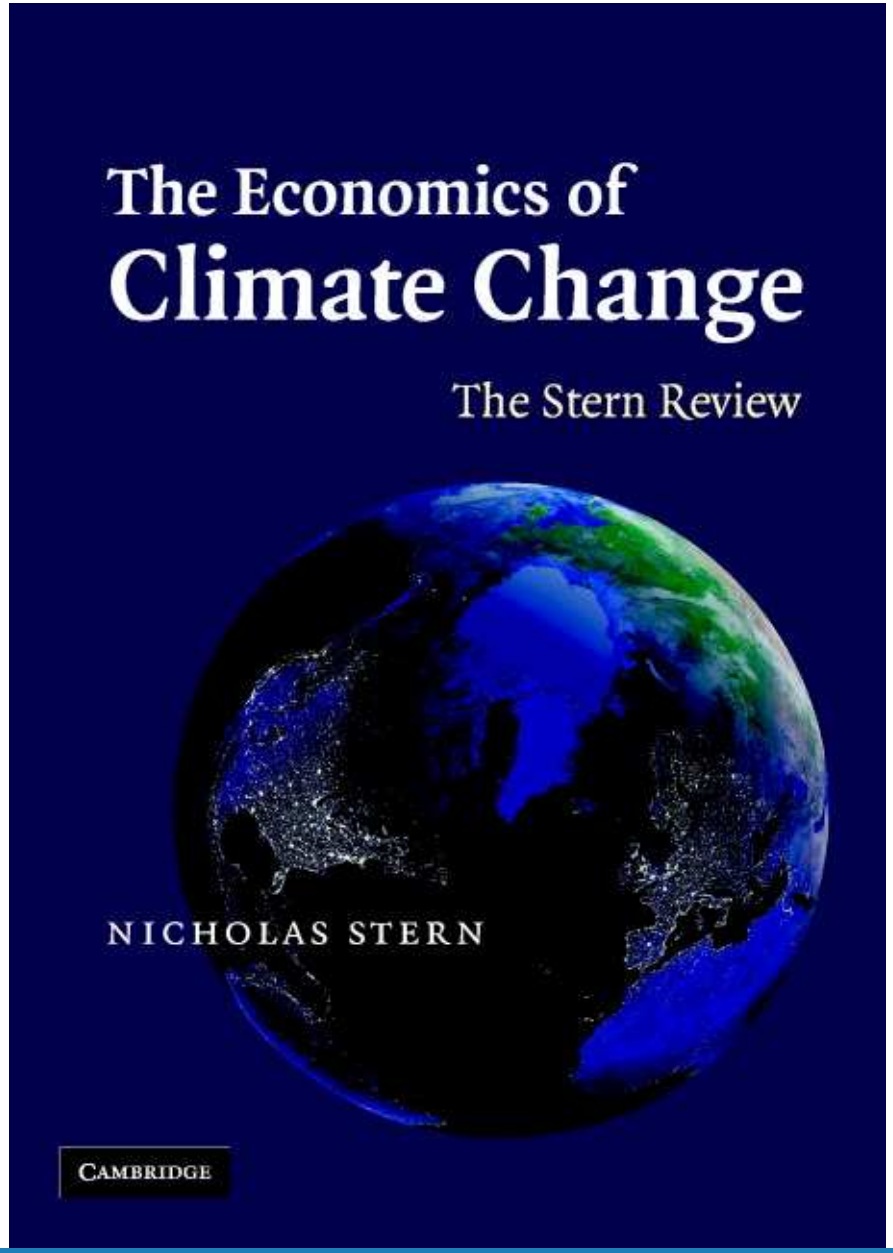
Why walking and cycling?

- **It's easy!**
  - Avoids dependence on facilities for physical activity
  - Most people can do it: equitable and easily accessible
  - Does not require much extra time
  - Minimal investment of household income

- **It can make transport a lot healthier!**
  - Most of these trips could be done by walking or cycling
  - Contributing to the recommended daily dose of at least 30 minutes of moderate-intensity physical activity



By H Rutter/Walk 21 Satellite Symposium on Transport-Related Physical Activity, Magglingen, Switzerland, 2006



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Health Dividends from Green Growth

- Much greater health gains from shifting to rapid transit/public transport and walking and cycling
- than from improving fuel and vehicle efficiency
- Consider all costs and benefits of Green Growth strategies!

Health in the green economy

Co-benefits to health of climate change mitigation

TRANSPORT SECTOR *Preliminary findings – initial review*

Key messages

Health gains/risks

- **A shift to active transport (walking and cycling) and rapid transit/public transport combined with improved land use** can yield much greater immediate health "co-benefits" compared with improving fuel and vehicle efficiency, yet the latter has been the mitigation strategy most emphasized by the Intergovernmental Panel on Climate Change (IPCC).[1]
- **Potential health gains of a shift from private motorized transport to walking, cycling and rapid transit/public transport** include reduced respiratory and cardiovascular disease from air pollution and less exposure to traffic injury risks and noise stress. In addition, large benefits are expected from increased physical activity leading to the prevention of obesity, diabetes, heart disease and cancer, as well as greater health equity achieved by better access to goods and services among groups without private motor vehicles.[2-4]
- **Shifting from gasoline- to diesel-powered engines to lower CO_2 emissions could increase emissions of health-damaging small particulates (PM_{10}, $PM_{2.5}$) per unit of travel.**[5] IPCC's review of diesel technology's potential does not consider potential health impacts; yet large shifts to diesel fuels in European cities in the last decade are considered to be a cause of stable (not lower) PM_{10} levels in European cities in the last decade and no decline in the health impacts of air pollution – despite the introduction of cleaner diesel technologies.[6]
- **Transport-related health risks currently affect millions of people.** For example, urban air pollution (much of it transport-generated) and traffic injuries together kill about 2.5 million people every year, mostly in low- and middle-income countries. Active transport can help prevent the 3.2 million deaths annually attributable to physical inactivity.[7,8]

About Health in the Green Economy

Many strategies to reduce climate change have large, immediate health benefits. Others may pose health risks or tradeoffs. Examined systematically, a powerful new dimension of measures to address climate change emerges.

WHO's *Health in the Green Economy* series, to be published in spring 2011, is reviewing the evidence about expected health impacts of greenhouse gas mitigation strategies in light of mitigation options for key economic sectors considered in the *Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007* (IPCC).[9]

The aim is to propose important health co-benefits for sector and health policy-makers, and for consideration in the next round of IPCC mitigation reviews (*Working Group III – Fifth Assessment Report* [AR5]). Opportunities for potential health and environment synergies are identified here for key economic sectors, including transport.

The climate footprint of transport

Global transport emissions comprised an estimated 23% of direct CO_2 emissions in 2008, with land transport accounting for the largest share (16%). Under "business as usual" scenarios, emissions are projected to rise rapidly in absolute terms.[1]

"Win-win" health and transport mitigation strategies

- **Health co-benefits (and potential risks) of transport mitigation strategies have not received systematic analysis,** as reflected in IPCC's Fourth Assessment Report on mitigation options for the transport sector.[1]
- **Improved active transport, rapid transit/public transport and land use strategies can be cost-effective in many settings, including rapidly developing cities.** For instance, relocating educational facilities in proportion to residential locations in Santiago, Chile, was estimated to potentially reduce transport emissions by 12% at a cost of only US$ 2 per ton of carbon reduction over 20 years.[10]

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Integration of health effects in transport assessments: challenges

- Complex methodological questions for transport planners:
  - which health endpoints to include?
  - form of the relationship between exposure and effect?
  - activity substitution
  - which costs to include?
  - how to calculate costs?
  - which time lag periods to apply before benefits/costs occur?

  ⇨ easy to use tools needed!

The question

- If *x* people walk/cycle a distance of *y* kilometers on most days, what is the economic value of the health benefits that occur as a result of the reduction in mortality due to their physical activity?

The answer

http://www.euro.who.int/HEAT

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HEAT
Health economic assessment tool

Introduction
- HEAT for cycling
- HEAT for walking
- Current Assessment
- Previous Assessments
- Acknowledgements

HEAT ▸ Introduction

Welcome to the WHO/Europe Health Economic Assessment Tools (HEAT) for walking and for cycling.

This tool is designed to help you conduct an economic assessment of the health benefits of walking or cycling by estimating the value of reduced mortality that results from specified amounts of walking or cycling.

The tool can be used in a number of different situations, for example:

1. When planning a new piece of cycling or walking infrastructure.

HEAT attaches a value to the estimated level of cycling or walking when the new infrastructure is in place. This can be compared to the costs of implementing different interventions to produce a benefit:cost ratio (and help to make the case for investment), or as an input into a more comprehensive economic appraisal exercise.

2. To value the reduced mortality from current levels of cycling or walking, such as to a specific workplace, across a city or in a country. It can also be used to illustrate economic consequences from a potential future change in levels of cycling or walking.

3. To provide input into more comprehensive economic appraisal exercises, or prospective health impact assessments. For example, to estimate the mortality benefits from achieving targets to increase cycling or walking.

More information is available at http://www.euro.who.int/HEAT

Next step

- Start using HEAT for walking
- Start using HEAT for cycling

More information

What data do I need?
To produce an assessment, you need to provide data on the number of people walking or cycling, and the amount of walking they are doing (or are projected to do).

more...

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The Health Economic Assessment Tool for walking and cycling (HEAT)

- Easy tool to calculate the economic value of the health benefits of regular walking and cycling
- Recognises importance of economic analysis in transport: benefit-cost ratio is king
- New and updated version just launched end of May 2011 at the International Transport Forum in Leipzig

The Health Economic Assessment Tool for walking and cycling (HEAT)

- Effective public health:
  - action outside as well as within the health sector
  - identify levers
  - working upstream
  - Helps efficient use of public resources
- Evidence-based, transparent and adaptable
- Conservative

Collaborative project

Core group

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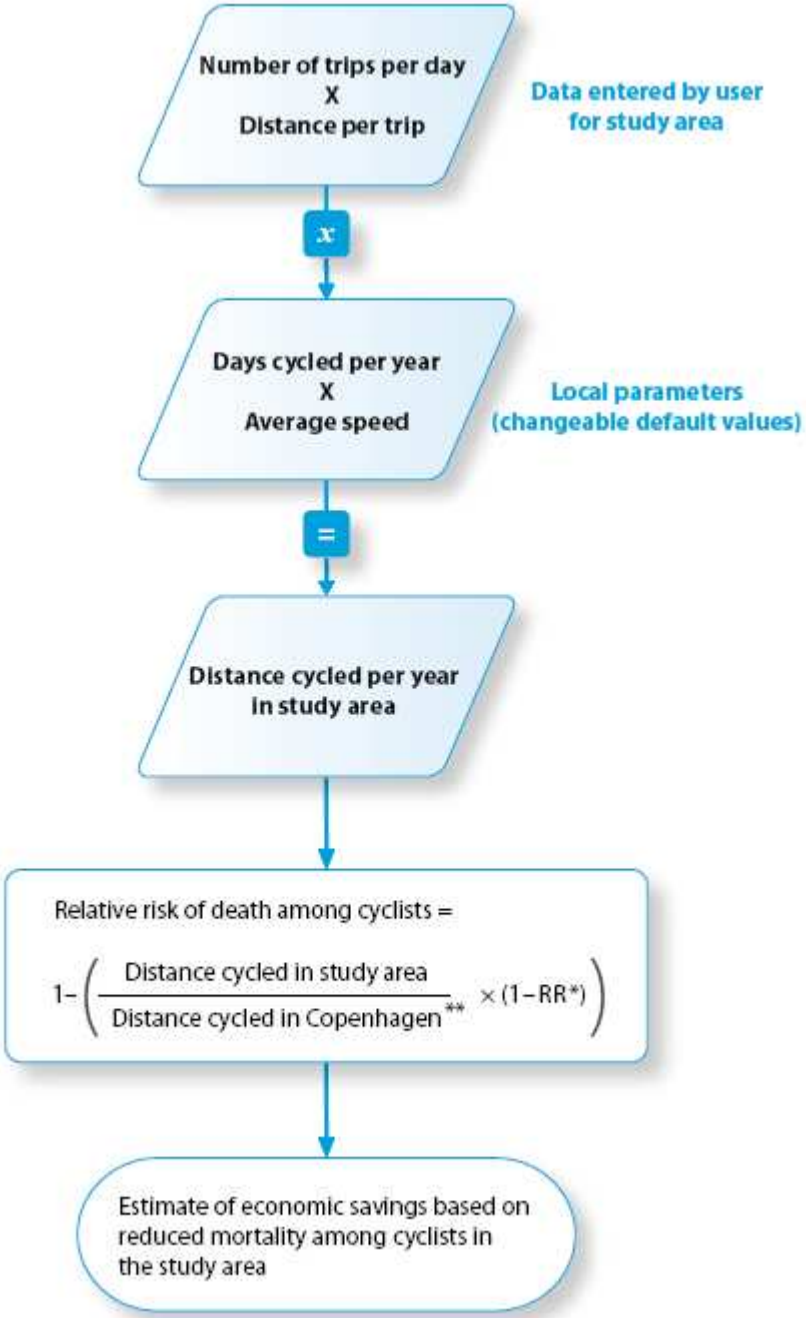

Number of trips per day
X
Distance per trip
Data entered by user
for study area
x
Days cycled per year
X
Average speed
Local parameters
(changeable default values)
=
Distance cycled per year
in study area
Relative risk of death among cyclists =
1 − (Distance cycled in study area / Distance cycled in Copenhagen** × (1 − RR*))
Estimate of economic savings based on
reduced mortality among cyclists in
the study area

HEAT ▸ for cycling ▸ Result

HEAT
Health economic assessment tool

- HEAT for cycling
  - Q1: Single or before / after
  - Q2: Cycling data type
  - Q4: Distance
  - Q7: Population
  - Cycling Summary
  - Q8: All current walking or change
  - Q11: Mortality rate
  - Q12: Value of life
  - Q13: Time period for averaging
  - Q14: Benefit–cost ratio
  - Q16: Discount rate
  - **Result**

HEAT estimate

Reduced mortality as a result of changes in cycling behaviour

The cycling data you have entered corresponds to an average of **450** km per person per year.

This level of cycling provides **an estimated** protective benefit of: **9.31 %** (compared to persons not cycling regularly)

From the data you have entered, the number of individuals who benefit from this level of cycling is: **60000**

Out of this many individuals, the number who would be expected to die if they were not cycling regularly would be: **436.27**

The number of deaths per year that are prevented by this level of cycling is: **40.64**

Financial savings as a result of cycling

Currency: EUR

The value of statistical life applied is: **1,000,000 EUR**	
The annual benefit of this level of cycling, per year, is:	40,635,000 EUR
The total benefits accumulated over **10** years are:	406,353,000 EUR
When future benefits are discounted by **5 %** per year;	
The current value of the average annual benefit, averaged across 10 years is:	31,377,000 EUR
The current value of the total benefits accumulated over 10 years is:	313,775,000 EUR

It is important to remember that many of the variables used within this HEAT calculation are liable to be estimates, and therefore liable to some degree of error.

In order to be sure of the validity of the figures outlined above, you are advised to rerun the model entering slightly different values for variables where you have provided a 'best guess', for example

HEAT Health economic assessment tool

- HEAT for walking
  - Q1: Single or before / after
  - Q2: Walking data type
  - Q4: Distance
  - Q7: Population
  - Walking Summary
  - Q8: All current walking or change
  - Q11: Mortality rate
  - Q12: Value of life
  - Q13: Time period for averaging
  - Q14: Benefit–cost ratio
  - Q16: Discount rate
  - **Result**

HEAT ▸ for walking ▸ Result

HEAT estimate

Reduced mortality as a result of changes in cycling behaviour

The walking data you have entered corresponds to an average of **3** km per person per day.

This level of walking provides **an estimated** protective benefit of: **26.54 %** (compared to persons not walking regularly)

From the data you have entered, the number of individuals who benefit from this level of walking is: **60,000**

Out of this many individuals, the number who would be expected to die if they were not walking regularly would be: **436.27**

The number of deaths per year that are prevented by this level of walking is: **115.79**

Financial savings as a result of walking

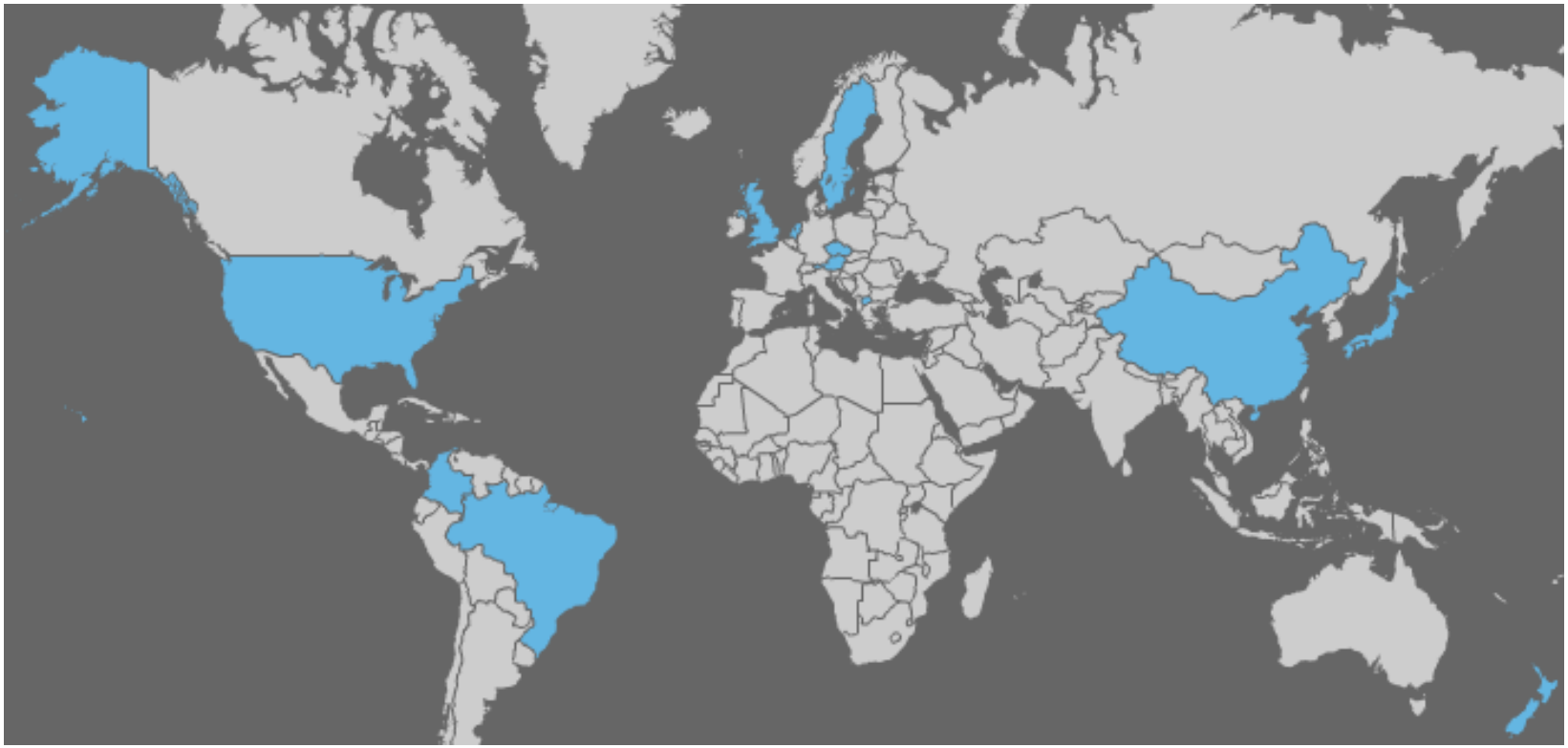
Currency: EUR

The value of statistical life in your population is:	**1,000,000 EUR**
The annual benefit of this level of walking, per year, is:	**115,789,000 EUR**
The total benefits accumulated over **10** years are:	**1,157,888,000 EUR**
When future benefits are discounted by **5 %** per year;	
The current value of the average annual benefit, averaged across 10 years is:	**89,409,000 EUR**
The current value of the total benefits accumulated over 10 years is:	**894,090,000 EUR**

It is important to remember that many of the variables used within this HEAT calculation are liable to be estimates, and therefore liable to some degree of error.

In order to be sure of the validity of the figures outlined above, you are advised to rerun the model

HEAT for cycling: selected applications



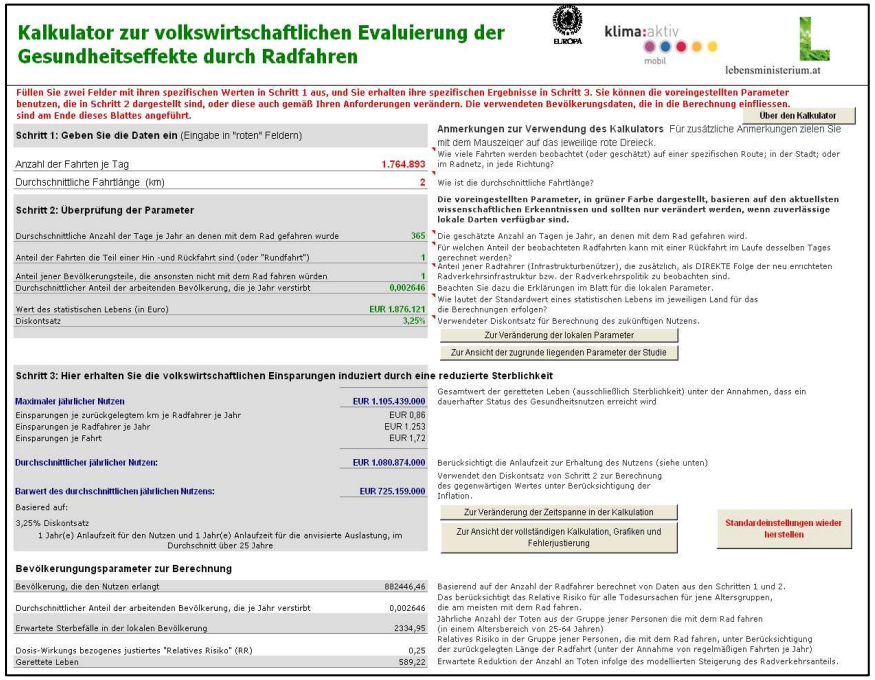
Austrian Masterplan Cycling 2006
National strategy to promote cycling

- Goal: doubling of the Austrian cycling modal share from 5% to 10% by 2015
- Large potential
- Positive effects for the environment
- Positive effects for the economy
- Mid-term evaluation:
  - First success: increase of cycling modal share from 5% to 7% (2010)
  - New measure “Cycling as health promotion” as a result of applying HEAT for Cycling

Applying HEAT for Cycling Austria

- 2008 HEAT for Cycling used to calculate the economic benefits of 10% cycling modal share in 2015
- Input data:
  - 2.5 Mio. daily cycling trips in Austria
  - 2 kilometres mean trip length
- Set of Austrian parameter:
  - Value of Life: EUR 1,876,121 (UNITE)
  - Discount rate: 3.25% (gov bonds)
  - 7 year build-up of uptake and benefit (2008-2015)

Applying HEAT for Cycling Austrian results



Kalkulator zur volkswirtschaftlichen Evaluierung der Gesundheitseffekte durch Radfahren

klima:aktiv mobil

lebensministerium.at

Füllen Sie zwei Felder mit ihren spezifischen Werten in Schritt 1 aus, und Sie erhalten ihre spezifischen Ergebnisse in Schritt 3. Sie können die voreingestellten Parameter benutzen, die in Schritt 2 dargestellt sind, oder diese auch gemäß Ihren Anforderungen verändern. Die verwendeten Bevölkerungsdaten, die in die Berechnung einfliessen, sind am Ende dieses Blattes angeführt.

Über den Kalkulator

Schritt 1: Geben Sie die Daten ein (Eingabe in "roten" Feldern)

Anzahl der Fahrten je Tag	1.764.893
Durchschnittliche Fahrtlänge (km)	2

Anmerkungen zur Verwendung des Kalkulators Für zusätzliche Anmerkungen zielen Sie mit dem Mauszeiger auf das jeweilige rote Dreieck.

Wie viele Fahrten werden beobachtet (oder geschätzt) auf einer spezifischen Route; in der Stadt; oder im Radnetz, in jede Richtung?

Wie ist die durchschnittliche Fahrtlänge?

Schritt 2: Überprüfung der Parameter

Die voreingestellten Parameter, in grüner Farbe dargestellt, basieren auf den aktuellsten wissenschaftlichen Erkenntnissen und sollten nur verändert werden, wenn zuverlässige lokale Darten verfügbar sind.

Durschschnittliche Anzahl der Tage je Jahr an denen mit dem Rad gefahren wurde	365
Anteil der Fahrten die Teil einer Hin -und Rückfahrt sind (oder "Rundfahrt")	1
Anteil jener Bevölkerungsteile, die ansonsten nicht mit dem Rad fahren würden	1
Durchschnittlicher Anteil der arbeitenden Bevölkerung, die je Jahr verstirbt	0,002646
Wert des statistischen Lebens (in Euro)	EUR 1.876.121
Diskontsatz	3,25%

Die geschätzte Anzahl an Tagen je Jahr, an denen mit dem Rad gefahren wird.

Für welchen Anteil der beobachteten Radfahrten kann mit einer Rückfahrt im Laufe desselben Tages gerechnet werden?

Anteil jener Radfahrer (Infrastrukturbenützer), die zusätzlich, als DIREKTE Folge der neu errichteten Radverkehrsinfrastruktur bzw. der Radverkehrspolitik zu beobachten sind.

Beachten Sie dazu die Erklärungen im Blatt für die lokalen Parameter.

Wie lautet der Standardwert eines statistischen Lebens im jeweiligen Land für das die Berechnungen erfolgen?

Verwendeter Diskontsatz für Berechnung des zukünftigen Nutzens.

Zur Veränderung der lokalen Parameter

Zur Ansicht der zugrunde liegenden Parameter der Studie

Schritt 3: Hier erhalten Sie die volkswirtschaftlichen Einsparungen induziert durch eine reduzierte Sterblichkeit

Maximaler jährlicher Nutzen	**EUR 1.105.439.000**
Einsparungen je zurückgelegtem km je Radfahrer je Jahr	EUR 0,86
Einsparungen je Radfahrer je Jahr	EUR 1.253
Einsparungen je Fahrt	EUR 1,72
Durchschnittlicher jährlicher Nutzen:	**EUR 1.080.874.000**
Barwert des durchschnittlichen jährlichen Nutzens:	**EUR 725.159.000**

Gesamtwert der geretteten Leben (ausschließlich Sterblichkeit) unter der Annahmen, dass ein dauerhafter Status des Gesundheitsnutzen erreicht wird

Berücksichtigt die Anlaufzeit zur Erhaltung des Nutzens (siehe unten)

Verwendet den Diskontsatz von Schritt 2 zur Berechnung des gegenwärtigen Wertes unter Berücksichtigung der Inflation.

Basiered auf:

3,25% Diskontsatz

1 Jahr(e) Anlaufzeit für den Nutzen und 1 Jahr(e) Anlaufzeit für die anvisierte Auslastung, im Durchschnitt über 25 Jahre

Zur Veränderung der Zeitspanne in der Kalkulation

Zur Ansicht der vollständigen Kalkulation, Grafiken und Fehlerjustierung

Standardeinstellungen wieder herstellen

Bevölkerungungsparameter zur Berechnung

Bevölkerung, die den Nutzen erlangt	882446,46
Durchschnittlicher Anteil der arbeitenden Bevölkerung, die je Jahr verstirbt	0,002646
Erwartete Sterbefälle in der lokalen Bevölkerung	2334,95
Dosis-Wirkungs bezogenes justiertes "Relatives Risiko" (RR)	0,25
Gerettete Leben	589,22

Basierend auf der Anzahl der Radfahrer berechnet von Daten aus den Schritten 1 und 2.

Das berücksichtigt das Relative Risiko für alle Todesursachen für jene Altersgruppen, die am meisten mit dem Rad fahren.

Jährliche Anzahl der Toten aus der Gruppe jener Personen die mit dem Rad fahren (in einem Altersbereich von 25-64 Jahren)

Relatives Risiko in der Gruppe jener Personen, die mit dem Rad fahren, unter Berücksichtigung der zurückgelegten Länge der Radfahrt (unter der Annahme von regelmäßigen Fahrten je Jahr)

Erwartete Reduktion der Anzahl an Toten infolge des modellierten Steigerung des Radverkehrsanteils.

- 811 Mio. Euro mean annual benefit
- 824 ‘saved lifes’ per year
- 1253 Euro annual savings per cyclists
- Strong arguments for the promotion of cycling in particular for investments in cycling infrastructure

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
TOTAL BENEFITS	**£47-64 million**
Costs	£18 million
Benefit-Cost Ratio	2.6 – 3.5

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HEAT in Russian

- Complete HEAT website to be available in English and Russian by end 2011
- HEAT for cycling is now available also in Russian thanks to the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

Conclusions

- Identifies a major public health issue and uses effective lever to promote it
- Works outside traditional health care paradigm to achieve health gain
- Uses language of the target sector, not health
- Highly influential
- Cheap and sustainable
- Effective demonstration of using evidence to drive practice

“I thought of that while riding my bicycle.”

Albert Einstein
on the theory of relativity