Bringing health into transport planning: unlocking the value of walking and cycling

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With acknowledgements to:
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Pekka Oja, UKK Institute for Health Promotion Research
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

<table>
<thead>
<tr>
<th>Health outcomes</th>
<th>Risk factor related to urban/transport policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>High blood pressure</td>
<td>Physical activity / diet</td>
</tr>
<tr>
<td>High body mass index</td>
<td>Physical activity / diet</td>
</tr>
<tr>
<td>Respiratory diseases</td>
<td>Urban air pollution</td>
</tr>
<tr>
<td>Cardiovascular diseases</td>
<td>Urban air pollution, physical activity, diet, noise</td>
</tr>
<tr>
<td>Cancer (some)</td>
<td>Physical activity / diet</td>
</tr>
<tr>
<td>Injuries</td>
<td>Road traffic</td>
</tr>
</tbody>
</table>

World Health Organization

Europe
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

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
The Economics of Climate Change
The Stern Review

Nicholas Stern

Cambridge
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!
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
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
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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The flowchart outlines a process to estimate the economic savings based on reduced mortality among cyclists in the study area. Here are the steps described in the flowchart:

1. **Data entered by user for study area**
   - Number of trips per day $\times$ Distance per trip

2. **Local parameters (changeable default values)**
   - Days cycled per year $\times$ Average speed

3. **Distance cycled per year in study area**

4. **Relative risk of death among cyclists =**
   \[
   1 - \left( \frac{\text{Distance cycled in study area}}{\text{Distance cycled in Copenhagen}} \times (1-RR^*) \right)
   \]

5. **Estimate of economic savings based on reduced mortality among cyclists in the study area**
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 short guess, for example,

World Health Organization Europe
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

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>The value of statistical life in your population is:</td>
<td>1,000,000 EUR</td>
</tr>
<tr>
<td>The annual benefit of this level of walking, per year, is:</td>
<td>115,789,000 EUR</td>
</tr>
<tr>
<td>The total benefits accumulated over 10 years are:</td>
<td>1,157,888,000 EUR</td>
</tr>
<tr>
<td>When future benefits are discounted by 5% per year:</td>
<td></td>
</tr>
<tr>
<td>The current value of the average annual benefit, averaged across 10 years is:</td>
<td>89,409,000 EUR</td>
</tr>
<tr>
<td>The current value of the total benefits accumulated over 10 years is:</td>
<td>894,090,000 EUR</td>
</tr>
</tbody>
</table>

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

- 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
## Table 2. Benefits and Costs of Cycling Demonstration Towns

<table>
<thead>
<tr>
<th>Impact</th>
<th>Estimate of benefits and costs over 10 year period (£m, 2007 prices and values)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced mortality</td>
<td>Benefit of £45 million</td>
</tr>
<tr>
<td>Decongestion</td>
<td>Benefit of £7 million</td>
</tr>
<tr>
<td>Reduced absenteeism</td>
<td>Benefit of £1-3 million</td>
</tr>
<tr>
<td>Amenity</td>
<td>Benefit of £9 million</td>
</tr>
<tr>
<td>Accidents</td>
<td>Disbenefit of £0-£15 million</td>
</tr>
<tr>
<td><strong>TOTAL BENEFITS</strong></td>
<td><strong>£47-64 million</strong></td>
</tr>
<tr>
<td>Costs</td>
<td>£18 million</td>
</tr>
<tr>
<td>Benefit-Cost Ratio</td>
<td>2.6 – 3.5</td>
</tr>
</tbody>
</table>
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