Health benefits of active mobility

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Why people die in Europe

Source: The European health report 2012: charting the way to well-being, WHO/Europe, 2013
Health and environment challenges in transport

- Physical inactivity
- Air pollution
- Injuries
- Psychosocial effects
- Climate change
- Noise
- Nature and landscape effects
Air pollution

- Air pollution causes premature death, chronic cardio-vascular diseases, acute health problems, e.g. myocardial infarction
- over 1.4 mio years of healthy life lost each year due to urban air pollution
- Proximity to source very important
- Contribution of transport to PM2.5 emissions in Europe is 27%
Physical inactivity

• A lack of adequate physical activity causes:
  – Ischaemic heart disease
  – Hypertension
  – Diabetes type 2
  – Cancer (e.g. breast and colon)
  – Stress, anxiety, depression, loneliness

• A leading risk factor for health in Europe: nearly 1 million deaths/year
Walk!

- 5.4 million adults in England (20%) would take vigorous exercise by walking at a speed of 3mph\(^1\).
- Walking at 3mph demonstrates minimum fitness of 6 METS.
- Australian men\(^2\) age >70 measured walking speed at usual pace.
- Walking speed of 2 mph was most predictive mortality among men.
- No men walking at speeds of 3 mph were caught by Grim Reaper.

When you have your population walking at 3mph then move on to Badminton!

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1. Estimates of the number of people in England who attain or exceed vigorous intensity exercise by walking at 3 mph
Road safety

- 90,000 deaths per year
- Biggest killer for 5-29 year olds
- Costs up to 3.9% of GDP
- Pedestrians and cyclists most at risk
Noise from transport

Up to 1.6 million healthy life years are lost every year from transport noise in EU cities due to sleep disturbance, annoyance, ischaemic heart disease, cognitive impairment and tinnitus.
Let’s look at the potential for improving health through transport!
WHO Global recommendations on physical activity for health

Adults (aged 18-64)

• **At least 150 minutes** of Moderate intensity PA spread throughout the week

OR

• **at least 75 minutes** of Vigorous PA spread throughout the week

OR

• **an equivalent combination** of those two

• Bouts of at least **10 minutes**.
Healft benefits from reaching minimum recommendations for physical activity

- 30 minutes of moderate to vigorous physical activity per day (e.g. cycling) could lead to risk reductions of:
  - 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 developing functional limitations
    - 30% for premature all-cause mortality

Health potential from cleaner air in Europe

Gain in life expectancy (months) in 25 Aphekom cities expected with a decrease in PM$_{2.5}$ to WHO AQG (10 µg/m$^3$) for ages $\geq$ 30 years

<table>
<thead>
<tr>
<th>City</th>
<th>Average PM$_{2.5}$ (µg/m$^3$)</th>
<th>Gain in Life Expectancy (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bucharest</td>
<td>33.7</td>
<td>38.2</td>
</tr>
<tr>
<td>Athens</td>
<td>27.0</td>
<td>29.4</td>
</tr>
<tr>
<td>Barcelona</td>
<td>28.4</td>
<td>26.9</td>
</tr>
<tr>
<td>Rome</td>
<td>22.0</td>
<td>21.4</td>
</tr>
<tr>
<td>Sofia</td>
<td>23.0</td>
<td>21.6</td>
</tr>
<tr>
<td>Valenica</td>
<td>23.0</td>
<td></td>
</tr>
<tr>
<td>Granada</td>
<td>21.6</td>
<td></td>
</tr>
<tr>
<td>Vienna</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marseille</td>
<td>19.0</td>
<td></td>
</tr>
<tr>
<td>Brussels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lille</td>
<td>16.6</td>
<td></td>
</tr>
<tr>
<td>Paris</td>
<td>16.4</td>
<td></td>
</tr>
<tr>
<td>Lyon</td>
<td>16.5</td>
<td></td>
</tr>
<tr>
<td>Strasbourg</td>
<td>15.6</td>
<td></td>
</tr>
<tr>
<td>Bordeaux</td>
<td>15.7</td>
<td></td>
</tr>
<tr>
<td>Rilie</td>
<td>16.7</td>
<td></td>
</tr>
<tr>
<td>Rouen</td>
<td>15.3</td>
<td></td>
</tr>
<tr>
<td>Lec Hesper</td>
<td>14.5</td>
<td></td>
</tr>
<tr>
<td>Toulouse</td>
<td>14.2</td>
<td></td>
</tr>
<tr>
<td>Limoges</td>
<td>13.1</td>
<td></td>
</tr>
<tr>
<td>Malaga</td>
<td>12.9</td>
<td></td>
</tr>
<tr>
<td>Dublin</td>
<td>10.5</td>
<td></td>
</tr>
<tr>
<td>Stockholm</td>
<td>9.4</td>
<td></td>
</tr>
</tbody>
</table>

How to realize this health potential? - Walk and cycle!

• It can have a big impact!
  • Big potential for replacing car trips
  • Reduce congestion, energy consumption and CO2 emissions
  • Improve road safety, air quality and noise
  • Reduce need for more expensive infrastructure for cars
  • Improved accessibility and quality of urban life

• It’s easy and fair!
  • Equitable and easily accessible
  • Does not require much extra time
  • Minimal investment of household income
What about the balance of benefits vs. risks?

City cyclists are at increased risk of lung injury from inhaled soot

Sunday 25 September 2011

People who cycle through London and other major cities have higher levels of black carbon in their airway cells, according to research from Queen Mary, University of London.

The research, which will be presented at the European Respiratory Society’s Annual Congress in Amsterdam, suggests that cyclists inhale more black carbon than pedestrians, which may cause damage to the lungs.

The combustion of fossil fuels results in the generation of large numbers of inhalable particles of soot. There is increasing evidence that inhalation of these black particles is associated with a wide range of health effects - including heart attacks and reduced lung function.
What about the balance of benefits vs. risks? Recent new evidence

<table>
<thead>
<tr>
<th>Variables</th>
<th>Relative risk*</th>
<th>$\text{AF}_{\exp}$ †</th>
<th>Deaths/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road traffic injury</td>
<td>1.0007</td>
<td>0.0007</td>
<td>0.03</td>
</tr>
<tr>
<td>Air pollution (particulate matter &lt;2.5 µm)</td>
<td>1.002</td>
<td>0.002</td>
<td>0.13</td>
</tr>
<tr>
<td>Physical activity</td>
<td>0.80</td>
<td>-0.23</td>
<td>-12.46</td>
</tr>
<tr>
<td>Carbon dioxide emissions saved (kg/year)‡</td>
<td>—</td>
<td>—</td>
<td>9 002 344</td>
</tr>
</tbody>
</table>

*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.

Source: Rojac-Rueda, D et al. „The health risks and benefits of cycling in urban environments compared with car use: health impact assessment study” BMJ 2011; 343: d4521 doi: 10.1136/bmj.d4521
Walking and cycling: an option that helps different sectors achieving *their own* goals

<table>
<thead>
<tr>
<th>Goals</th>
<th>Interest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce emissions of air pollutants, greenhouse gases and noise</td>
<td>Environment, Health</td>
</tr>
<tr>
<td>Reduce congestion</td>
<td>Transport</td>
</tr>
<tr>
<td>Reduce road traffic injuries</td>
<td>Transport, Health</td>
</tr>
<tr>
<td>Reduce investments in infrastructure for more cars</td>
<td>Transport</td>
</tr>
<tr>
<td>Improve accessibility and quality of urban life</td>
<td>Transport, Health</td>
</tr>
<tr>
<td>Complement improvements to vehicles and fuels</td>
<td>Transport</td>
</tr>
<tr>
<td>Increase physical activity</td>
<td>Health</td>
</tr>
<tr>
<td>Promote tourism</td>
<td>Tourism and leisure industry</td>
</tr>
<tr>
<td>Creation of new jobs</td>
<td>Economy, welfare, labour</td>
</tr>
</tbody>
</table>
Health Dividends from Green Growth

Much greater health gains from shifting to rapid transit/public transport walking and cycling than from improving fuel and vehicle efficiency

Consider all costs and benefits of Green Growth strategies!
But how can we integrate health considerations in transport planning?
Integration of health in transport planning

• Recognition of the importance of economic analysis in transport planning

• Easy-to-use tool needed to estimate the economic value of the health benefits of regular walking and cycling

• Evidence-based, transparent and adaptable

• Conservative
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 PEP partnership to answer this question

Sonja Kahlmeier, Nick Cavill, Hywell Dinsdale, Harry Rutter, Thomas Götschi, Charlie Foster, Paul Kelly, Dushy Clarke, Pekka Oja, Richard Fordham, Dave Stone, Christian Schweizer, Francesca Racioppi, Lars Bo Andersen, Andy Cope, Mark Fenton, Mark Hamer, Max Herry, I-Min Lee, Brian Martin, Markus Maybach / Christoph Schreyer, Marie Murphy, Gabe Rousseau, Candace Rutt / Tom Schmid, Elin Sandberg/ Mulugeta Yilma, Daniel Sauter, Peter Schantz, Peter Schnohr, Heini Sommer, Jan Sørensen, Gregor Starc, Wanda Wendel Vos, Paul Wilkinson
The answer: Health Economic Assessment Tool (HEAT) for walking and cycling

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

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
HEAT estimate

Reduced mortality as a result of changes in walking behaviour

The walking data you have entered corresponds to an average of 5 km per person per day. This level of walking provides an estimated protective benefit of: 40% (compared to persons not walking regularly).

From the data you have entered, the number of individuals who benefit from this level of walking is: 300.

Out of this many individuals, the number who would be expected to die if they were not walking regularly would be: 1.37

The number of deaths per year that are prevented by this level of walking is: 0.55

Financial savings as a result of walking

Currency: EUR, rounded to 1000

The value of statistical life in your population is: 1,574,000 EUR
The annual benefit of this level of walking, per year, is: 867,000 EUR
The total benefits accumulated over 10 years are: 8,668,000 EUR

When future benefits are discounted by 5% per year:
the current value of the average annual benefit, averaged across 10 years is: 669,000 EUR
the current value of the total benefits accumulated over 10 years is: 6,694,000 EUR
Use of HEAT worldwide
“I thought of that while riding my bicycle.”

Albert Einstein, on the theory of relativity
Contact details

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