The new WHO Health Economic Assessment Tool for Walking and Cycling - an introduction

Francesca Racioppi, WHO Regional Office for Europe
Sonja Kahlmeier, University of Zurich, EBPI, Physical Activity and Health Unit
A collaborative project


Software development and design: Tomasz Szreniawski, Alberto Castro Fernandez, Ali Abbas, Vicki Copley, Duy Dao

Expertise involved:

- Epidemiology / Public Health
- Environmental Science
- Air pollution
- Health Economics
- Transport Economics
- Transport Planning
- Policy making
- Practice / Advocacy
For whom was HEAT originally developed?

53 Member States:
- Civil servants
- Staff supporting policy makers,
- Officers/experts locally responsible for transport and urban planning
HEAT “core principles”

• Scientific robustness
• Usability
  – Minimal data input requirements
  – Availability of default values
  – Clarity of prompts/questions
  – Design and flow of the tool
• Transparency
  – Approach and assumptions
• Conservative
• Adaptable
• Modular
What is the HEAT?

- Online tool [www.heatwalkingcycling.org](http://www.heatwalkingcycling.org)
- Designed for transport planners
- Economic assessment of health benefits of walking or cycling
- Effects on mortality ‘only’
- Evidence-based
- Transparent
- Adaptable
What can you use it for?

• Assessing current (or past) levels of cycling/walking
  – What is walking/cycling worth now in my city, region, country?

• Assessing changes over time
  – E.g. before – after, scenario A vs. scenario B

• Evaluating new or existing projects,
  – Value of health benefits of investments and benefit–cost ratios
The question

If \( x \) people walk/cycle an amount of \( y \) 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?

New HEAT options

- How much do air pollution or crashes affect these results?
- What are the carbon effects?
Basic functioning of the new HEAT 4.0

User inputs

What do you want to assess?
• Walking and/or cycling
• Impacts (Physical activity, air pollution, crash risk, carbon emissions -> motorized modes)
• Time and spatial scale

Data inputs
• Volumes of travel
  Duration/distance/trips/steps
  New: Frequency / Mode share/shift
• Population size

Adjustment of data inputs
• New vs. reassigned
• Shifted from other modes (carbon)
• For transport or recreation (AP, carbon)
• In traffic vs. away from traffic (AP)

Calculation parameters
• Changeable default values
  (Uptake period, trip/step length, speeds, mortality rate, air pollution level)
• Other background values

Physical activity benefit
Reduced mortality risk from walking and/or cycling

\[(1 - RR) \times \left( \frac{\text{Local vol. of active mode}}{\text{Reference vol. of active mode}} \right)\]

Air pollution risk
Mortality risk when walking and/or cycling

\[(1 - RR') \times \left( \frac{\text{AP exposure of active mode users}}{\text{Reference AP exposure}} \right)\]

Crash risk
Mortality risk when cycling§.

\[\left( \frac{\text{Countrywide fatal crashes}}{\text{Countrywide vol. of active mode}} \right) \times \left( \frac{\text{Local vol. of active mode}}{\text{carbon emission factors}} \right)\]

Carbon
Reduction in emissions from substituting motorized modes

Local vol. of active modes shifted from motorized modes
\times carbon emission factors

Reduced mortality/carbon emissions
Aggregated
Mode and pathway specific

Monetization
Value of statistical life (VSL) or Social costs of carbon. (SCC)

\[\text{Monetization} = \text{Value of statistical life (VSL) or Social costs of carbon. (SCC)}\]

† RR = relative risk of death in underlying studies (walking: 0.89 and cycling: 0.90).
†† Relative risk of death per 10 µg/m3 increase in PM2.5 in underlying studies (1.07)
§ walking module work in progress
This project has received funding from the European Union’s Seventh Framework Programme for research; technological development and demonstration under grant agreement no 602624-2.
Demo: the question

If the adult population of Geneva cycled on average 10 minutes per day more, what is the economic value of the health benefits as a result of the reduction in mortality due to their physical activity (and increase in mortality due to air pollution and crash risk)?

And what are the related carbon effects?