The Health Economic Assessment Tools (HEAT) for Walking and Cycling:

Supporting the integration of active mobility in healthy and sustainable transport solutions

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Thanks to: WHO/Europe, Oxford University, London School of Hygiene and Tropical Medicine

Standard approach to transport HIAs - where are the health benefits?

Costs	**Benefits**
Construction	Congestion
Maintenance	Journey ambience
Inconvenience	CO_2
Casualties	
Environmental effect	

Standard approach to transport HIAs - where are the health benefits?

Costs	**Benefits**
Construction	Congestion
Maintenance	Journey ambience
Inconvenience	CO_2
Casualties	Prevented premature mortality
Environmental effect	Absenteeism
	Morbidity

Goal: to facilitate the integration of health in transport appraisals & planning

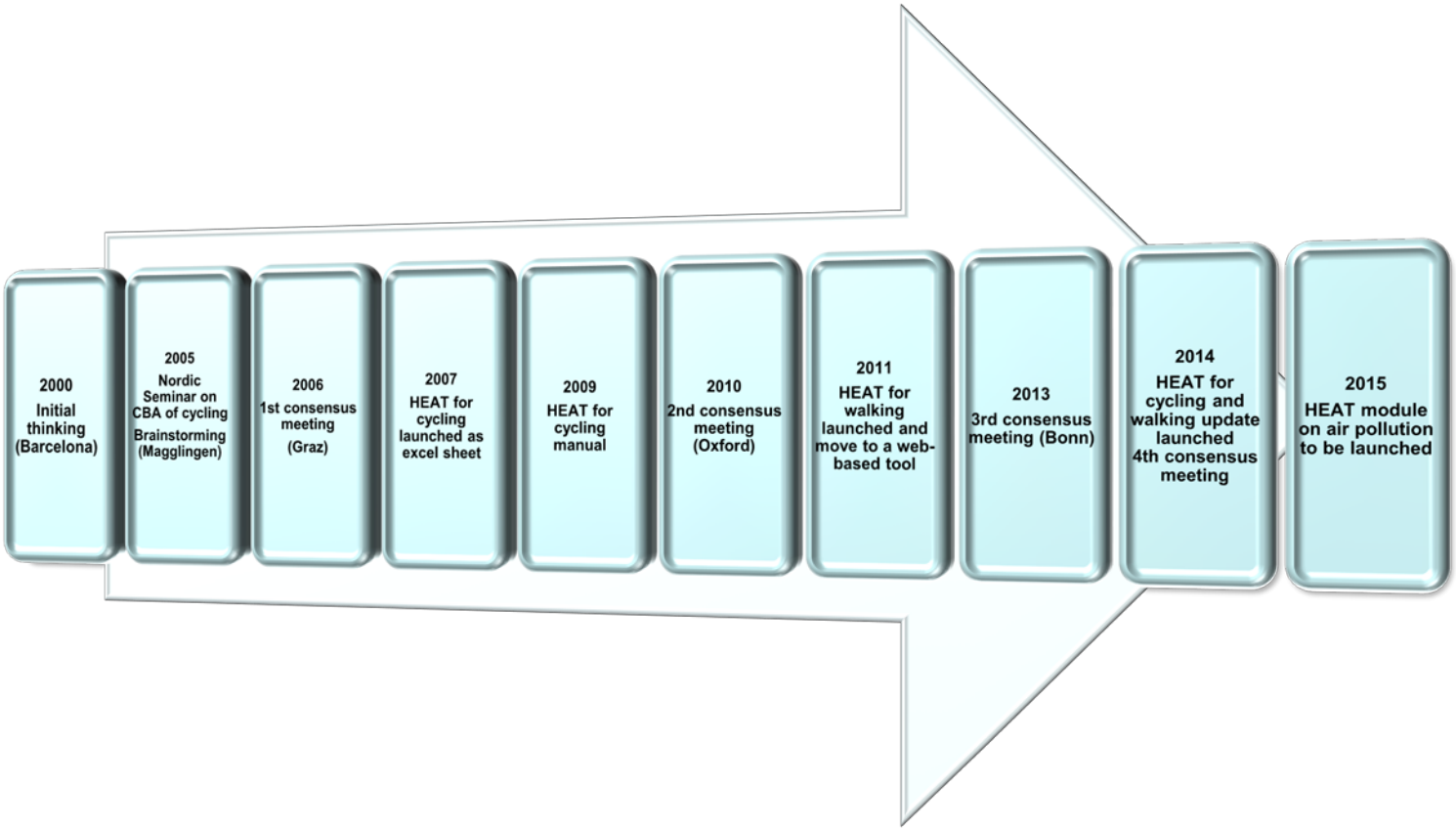
- Importance of **economic analysis** in transport planning
- Need to make health benefits of cycling and walking “visible” to **transport and urban planners**
- Need to **speak their “language”**

What is HEAT?

"For a given volume of walking or cycling within a defined population what is the economic value of the health benefits?"

- Online tool www.heatwalkingcycling.org
- Economic assessment of health benefits of walking or cycling
- Reduced premature mortality 'only'

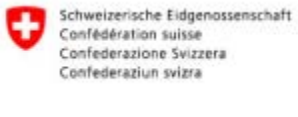
A bit of history: key milestones



The HEAT approach: key principles

- Practical tool designed for transport and urban planners
- Supports economic analysis in transport
- Evidence-based
- Transparent
- Conservative
- Adaptable
- Modular

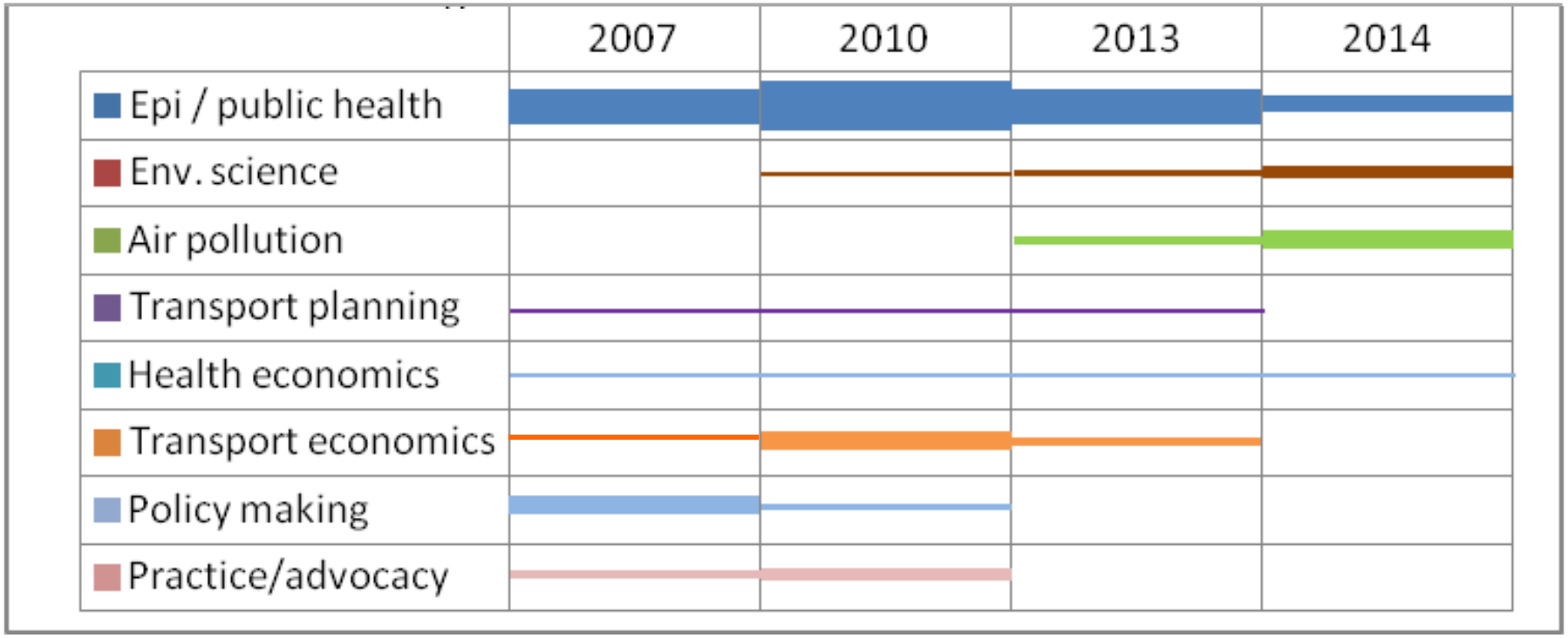
A collaborative project



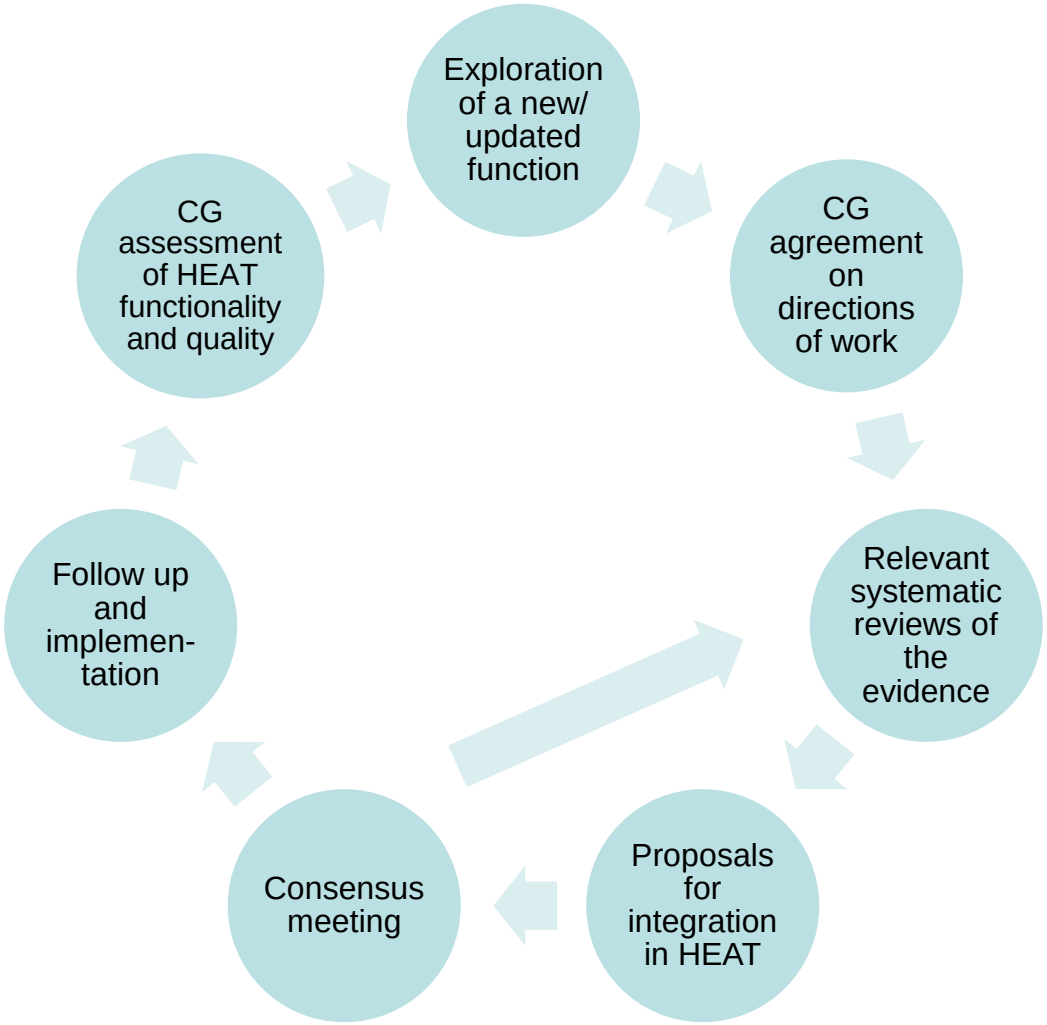
Harry Rutter, Francesca Racioppi, Sonja Kahlmeier, Nick Cavill, Pekka Oja, Heini Sommer, Hywell Dinsdale, Charlie Foster, Paul Kelly, Thomas Götschi, Christian Schweizer

Karim Abu-Omar, Lars Bo Andersen, Hugh Ross Anderson, Finn Berggren , Tegan Boehmer, Nils-Axel Braathen, Dushy Clarke, Andy Cope, Audrey de Nazelle, Mark Fenton, Jonas Finger, Francesco Forastiere, Richard Fordham, Eszter Füzeki, Frank George, Regine Gerike, Mark Hamer, Max Herry, Marie-Eve Heroux, Gerard Hoek, Luc Int Panis, Michal Krzyzanowski, I-Min Lee, Christoph Lieb, Brian Martin, Markus Maybach, Christoph Schreyer, Marie Murphy, Nanette Mutrie, Mark Nieuwenhuijsen, Laura Perez, Gabe Rousseau, David Rojas Rueda, Candace Rutt, Tom Schmid, Elin Sandberg, Mulugeta Yilma, Daniel Sauter, Peter Schantz, Peter Schnohr, Dave Stone, Jan Sørensen, Gregor Starc, Marko Tainio, James Woodcock, Wanda Wendel Vos, Paul Wilkinson

Expertise involved – advisory groups



The process of developing and updating HEAT



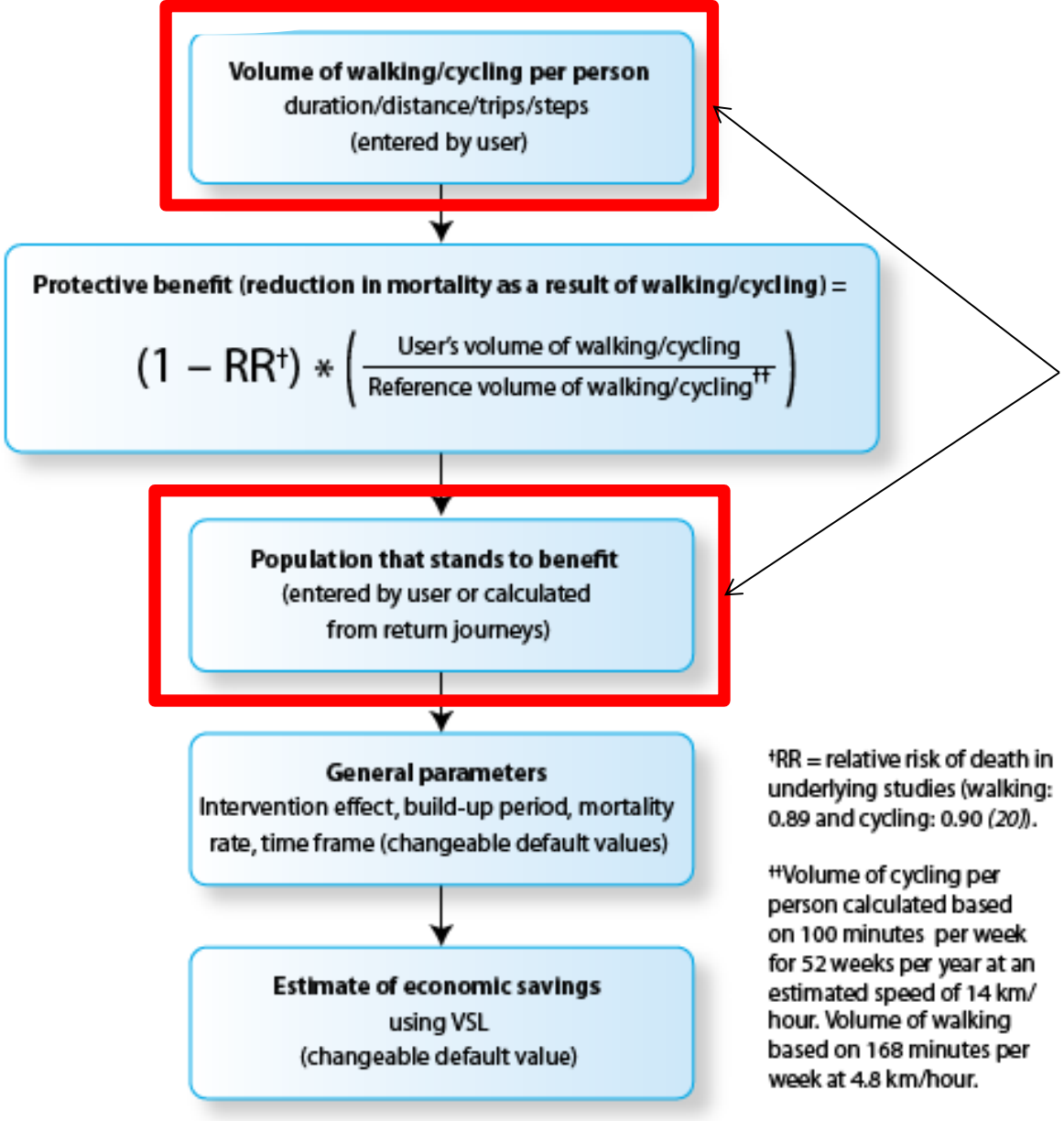
CG = core group

HEAT's potential uses

- Planning new projects
  - Value the estimated use of the scheme
- Evaluating past projects
  - Value of health benefits of increased use
- Modelling
  - Projections of future levels
- Assessments of current use
  - Eg how much is walking or cycling worth in my city?

The HEAT approach:
minimal requirement of input data from the users

1. Number of people affected by the intervention under evaluation
2. Volume of walking/cycling per person (duration / distance / trips / steps)



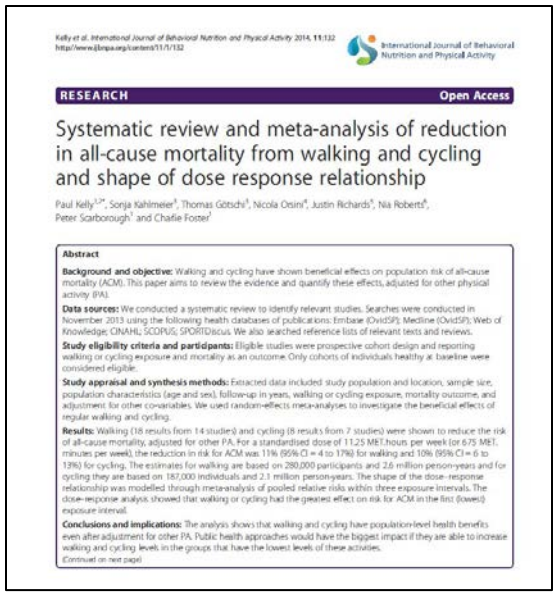
Required user input

†RR = relative risk of death in underlying studies (walking: 0.89 and cycling: 0.90 *(20)*).

††Volume of cycling per person calculated based on 100 minutes per week for 52 weeks per year at an estimated speed of 14 km/hour. Volume of walking based on 168 minutes per week at 4.8 km/hour.

New version launched in August 2014

- Updated based on latest scientific evidence
  - Relative risk functions for cycling and walking and all cause mortality (systematic review)



Kelly et al. International Journal of Behavioral Nutrition and Physical Activity 2014, 11:132
http://www.ijbnpa.org/content/11/1/132

International Journal of Behavioral Nutrition and Physical Activity

RESEARCH Open Access

Systematic review and meta-analysis of reduction in all-cause mortality from walking and cycling and shape of dose response relationship

Paul Kelly[1,2*], Sonja Kahlmeier[3], Thomas Götschi[3], Nicola Orsini[4], Justin Richards[5], Nia Roberts[6], Peter Scarborough[7] and Charlie Foster[7]

Abstract

Background and objective: Walking and cycling have shown beneficial effects on population risk of all-cause mortality (ACM). This paper aims to review the evidence and quantify these effects, adjusted for other physical activity (PA).

Data sources: We conducted a systematic review to identify relevant studies. Searches were conducted in November 2013 using the following health databases of publications: Embase (Ovid:SP); Medline (Ovid:SP); Web of Knowledge; CINAHL; SCOPUS; SPORTDiscus. We also searched reference lists of relevant texts and reviews.

Study eligibility criteria and participants: Eligible studies were prospective cohort design and reporting walking or cycling exposure and mortality as an outcome. Only cohorts of individuals healthy at baseline were considered eligible.

Study appraisal and synthesis methods: Extracted data included: study population and location, sample size, population characteristics (age and sex), follow-up in years, walking or cycling exposure, mortality outcome, and adjustment for other covariables. We used random-effects meta-analyses to investigate the beneficial effects of regular walking and cycling.

Results: Walking (18 results from 14 studies) and cycling (8 results from 7 studies) were shown to reduce the risk of all-cause mortality, adjusted for other PA. For a standardised dose of 11.25 MET.hours per week (or 675 MET. minutes per week), the reduction in risk for ACM was 11% (95% CI = 4 to 17%) for walking and 10% (95% CI = 6 to 13%) for cycling. The estimates for walking are based on 280,000 participants and 2.6 million person-years and for cycling they are based on 187,000 individuals and 2.1 million person-years. The shape of the dose–response relationship was modelled through meta-analysis of pooled relative risks within three exposure intervals. The dose–response analysis showed that walking or cycling had the greatest effect on risk for ACM in the first (lowest) exposure interval.

Conclusions and implications: The analysis shows that walking and cycling have population-level health benefits even after adjustment for other PA. Public health approaches would have the biggest impact if they are able to increase walking and cycling level, in the groups that have the lowest levels of these activities.

(Continued on next page)

Session “Health Benefits of Active Travel”

Tuesday, 10:30-12:15

(concurrent with HEAT workshop!)

New version launched in August 2014

- Updated based on latest scientific evidence
  - Relative risk functions for cycling and walking and all cause mortality (systematic review)
- Updated Value of a Statistical Life (VSL)
  - Based on OECD study
  - Country-specific values in local currency
- Updated mortality rates
- Bug fixes
- User interface improvements

Promotion: meetings and conferences

- Transport

1. International Transport Forum, Leipzig, May 2011 (official launch web-version)
2. Conference on Transport research, October 2011, Vienna
3. Walk 21 conference, 2011
4. Polis annual conference, Brussels, 2011
5. European Transport Conference 2012, 8-10 October 2012, Glasgow
6. Sunday without cars, 22 April 2012, Modena
7. Launch of the Active Travel Forum, 18 June 2012, Brighton and Hove
8. European Mobility Week, 13 -22 September 2012, Modena
9. Italian national cycling conference, Milan, 2012
10. Launch event for national Italian walking day, Bologna, 2012
11. European Conference on Mobility Management, Gävle, May 2013
12. Green Social Festival 3rd May 2013, Bologna
13. VeloCity conference, 11-14 June 2013, Vienna
14. Network on European Communications and Transport Activities Research 2013 conference
15. Transport Research Arena 2014, 16 April 2014, Paris
16. TRB-ACSM conference Moving Active Transportation to Higher Ground: Opportunities for Accelerating the Assessment of Health Impacts, 13-14 April 2015, Washington D.C

Promotion: meetings and conferences

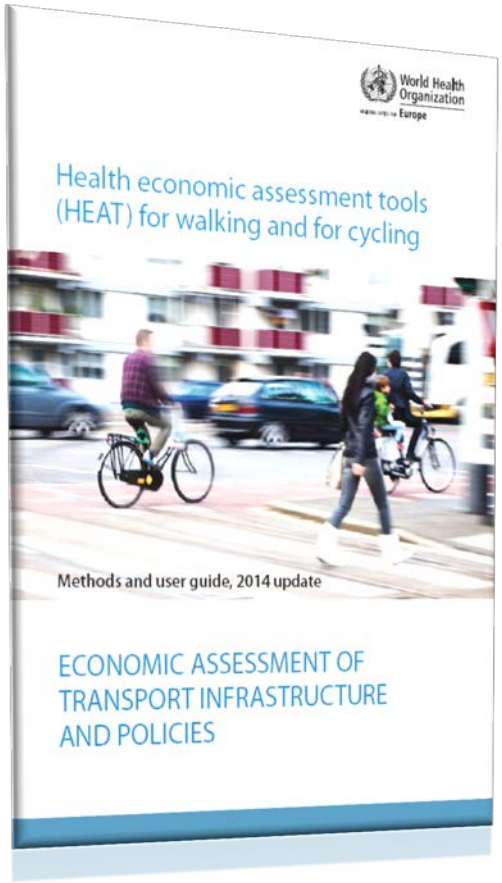
- Health

1. Swiss Public Health Conference 2010, 9-10 September 2010, Nottwil
2. International Society for Environmental Epidemiology Conference, 13-16 September 2011, Barcelona
3. 7th Annual HEPA Europe meeting, October 2011, Olomouc
4. EASO meeting, February 2011
5. National Meeting of Italian Healthy Cities Network, 10-11 May 2012, Venice
6. Health Festival, 28-20 September 2012, Pietrasanta
7. ECO2012, 19th European Congress on Obesity, Lyon, May 2012
8. Italian national conference of Healthy Cities, Venice, 2012
9. Annual Conference of the Healthy Cities Network, 14-16 June 2012, St Petersburg
10. Italian national health conference, Tuscany, 2012
11. International Society of Physical Activity and Public Health (Sydney Australia), November 2012
12. Corso Girolamo Mercuriale on Healthy Physical Activity, 9-10 April 2013, Bologna
13. Public health conference Glasgow, May 2013
14. Public Health England conference, May 2013

Promotion: meetings and conferences

- Cross-cutting
  - WHO - UNECE Transport Health and Environment Pan-European Programme (THE PEP) Steering Committee Sessions 2009, 2010, 2011, 2012, 2013 and 2014
  - THE PEP workshops in Prohunice (2009), Skopje (2010), Batumi (2010), Kyiv (2011), Moscow (2012), Almaty (2013) and Kaunas (2014)

Promotion: method and user guide



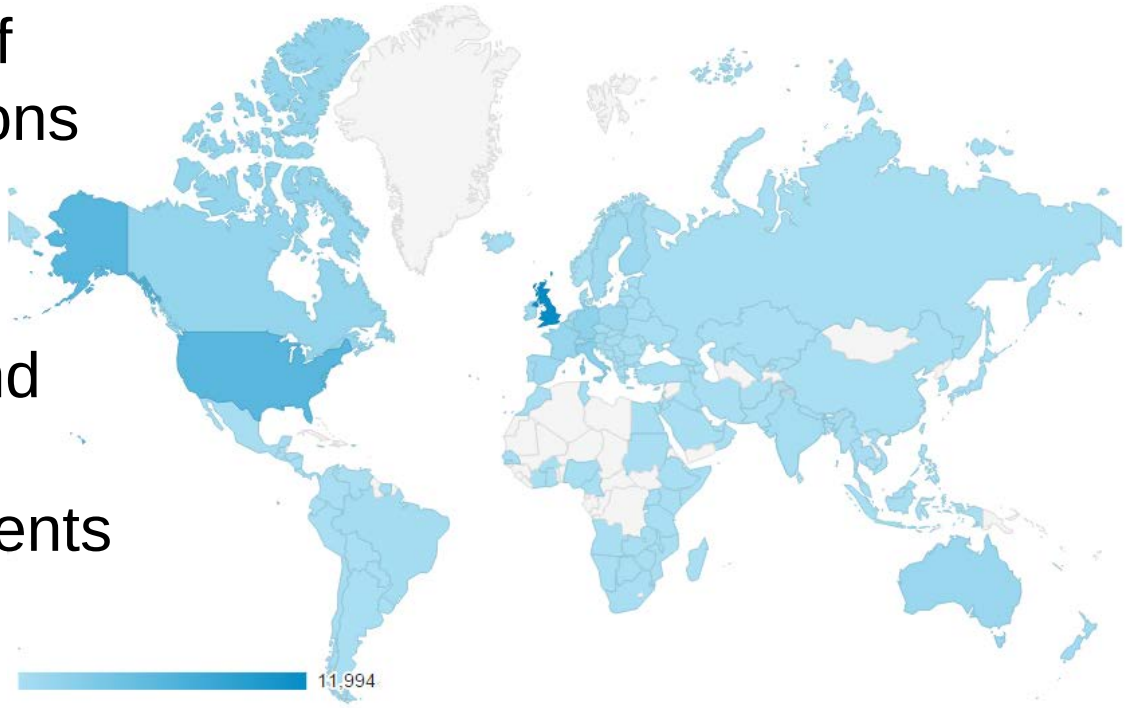
- Electronic and printed (English only)
- English, German, French, Spanish, Finnish, Polish
- Updated in August 2014 (English only)

Promotion: free online training

- Regular online trainings since November 2012 (English and German)
- One hour; slides and discussion
- About 500 people trained to date

Success: worldwide use

- Project website visited over 38,000 times by over 25,000 visitors
- Variety of applications
- Method adopted by UK and Swedish governments



1. United Kingdom
2. United States
3. Italy
4. Germany
5. Canada
6. France
7. Australia
8. Finland
9. Poland
0. Spain
1. Belgium
2. Sweden
3. Netherlands
4. Switzerland
5. Denmark

Success: awards

- Swiss Public Health award 2010 (won)
- Chief Medical Officer's Public Health award 2010 (finalist)
- UK National Transport Awards 2011
  (highly commended)
- Travelwise innovation of the year 2011
  (highly commended)

Success: case studies

- Set of case study applications on HEAT website
  - Austria, Sweden, UK, Sustrans, Kuopio, Finland, Parnu, Estonia, Florence, Italy, Modena, Italy, Central Europe BICY, Glasgow, UK, Brighton and Hove, UK, Boston, USA
- Recent sucesses
  - HEAT results instrumental in winning bids of UK 'Cycling City' status
  - Transport for London announced in February 2014 that HEAT would be used for all new business cases for transport in London

Feedback: the positives

- Overall positively received, little criticism from the primary target audience
- Website is easy to use
- Much use for advocacy (uptake among campaigners); some evidence of policy input
- Few issues or objections to methods
- Training reaches new users and clarifies use
- Varied applications

Feedback: the negatives

- Uptake remains relatively low
- Few case studies available that show direct impact on policy / transport planning decision
- Methodological concerns (mainly from health experts):
  - other risk factors
  - morbidity
  - VSL (ethics, methods, assumptions)
- Input data challenging to obtain
- Results difficult to interpret

Potential refinements

- Continue to review the scientific evidence base
- Include air pollution, injuries (and CO_2)
- Explore the inclusion of morbidities
- Review use of main outcome measure (alternative to VSL?) vis-a-vis target audience(s)
- Identify policy barriers and address them
- More documented applications

Next steps

- Air pollution module forthcoming (July 2015)
  - Health impact in travellers
  - PM 2.5 (or converted PM10)
  - Ventilation rates
  - Change in the intake of $PM_{2.5}$ related to cycling/walking, compared with not travelling
- Discussion of approach to injury module
- HEAT workshop: Tuesday, 10:30-12:15

HEAT estimate

Reduced mortality as a result of changes in cycling behaviour

The cycling data you have entered corresponds to an average of **1,240** km per person per year.

This level of cycling provides **an estimated** protective benefit of: **24 %** (compared to persons not cycling regularly)

From the data you have entered, the number of individuals who benefit from this level of cycling is: **2000**

Out of this many individuals, the number who would be expected to die if they were not cycling regularly would be: **9.13**

The number of deaths per year that are prevented by this level of cycling is: 2.16

Financial savings as a result of cycling

Currency: EUR, rounded to 1000

The value of statistical life applied is: **1,574,000 EUR**	
The annual benefit of this level of cycling, per year, is:	**3,396,000 EUR**
The total benefits accumulated over **10** years are:	**33,956,000 EUR**
When future benefits are discounted by **5 %** per year:	
the current value of the average annual benefit, averaged across 10 years is:	**2,622,000 EUR**
the current value of the total benefits accumulated over 10 years is:	**26,220,000 EUR**