ECONOMIC VALUATION OF TRANSPORT-RELATED HEALTH EFFECTS:

Review of methods and development of guidance, with a special focus on children

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With acknowledgments to:
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Outline

- Aims and work steps of the project
- The general framework
- Results and guidance for:
  - Air pollution
  - Noise
  - Road traffic crashes
  - Transport-related lack of cycling and walking
- Conclusions
- A glimpse on the benefit side…

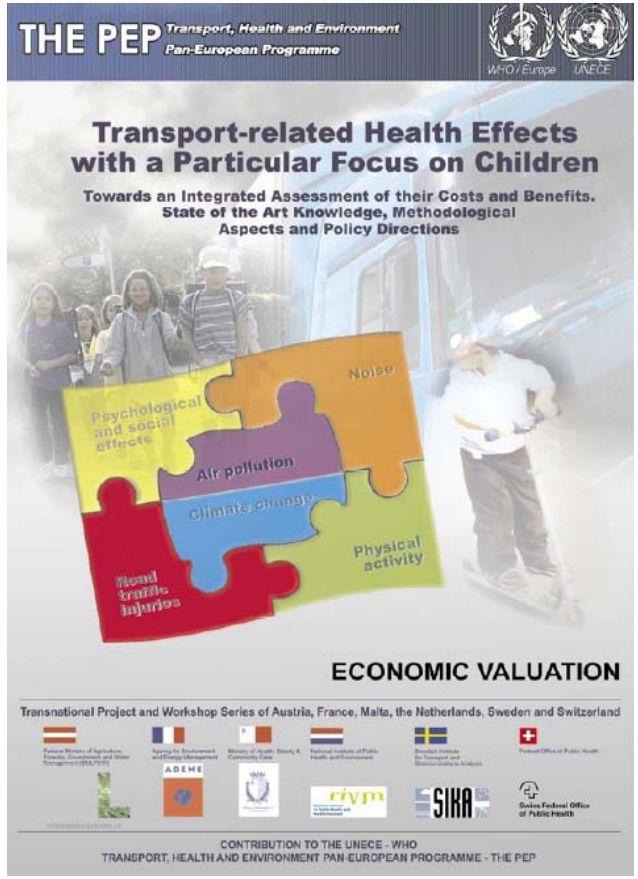
Partnerships

- Main partners:
  - Ecoplan (Switzerland) – economic aspects
  - RIVM (Netherlands) and contributors – epidemiological aspects
- Supported by:
  - USEPA, ADEME (France), Austria, RIVM, PRONET, UIC
- Seeking synergy with key related initiatives:
  - OECD/EC VERHI project
  - THE PEP/HEPA Europe project on cost/benefit analysis of cycling and walking
  - PRONET
  - INTARESE
  - ENHIS/WHO guidelines for HIA air pollution, noise

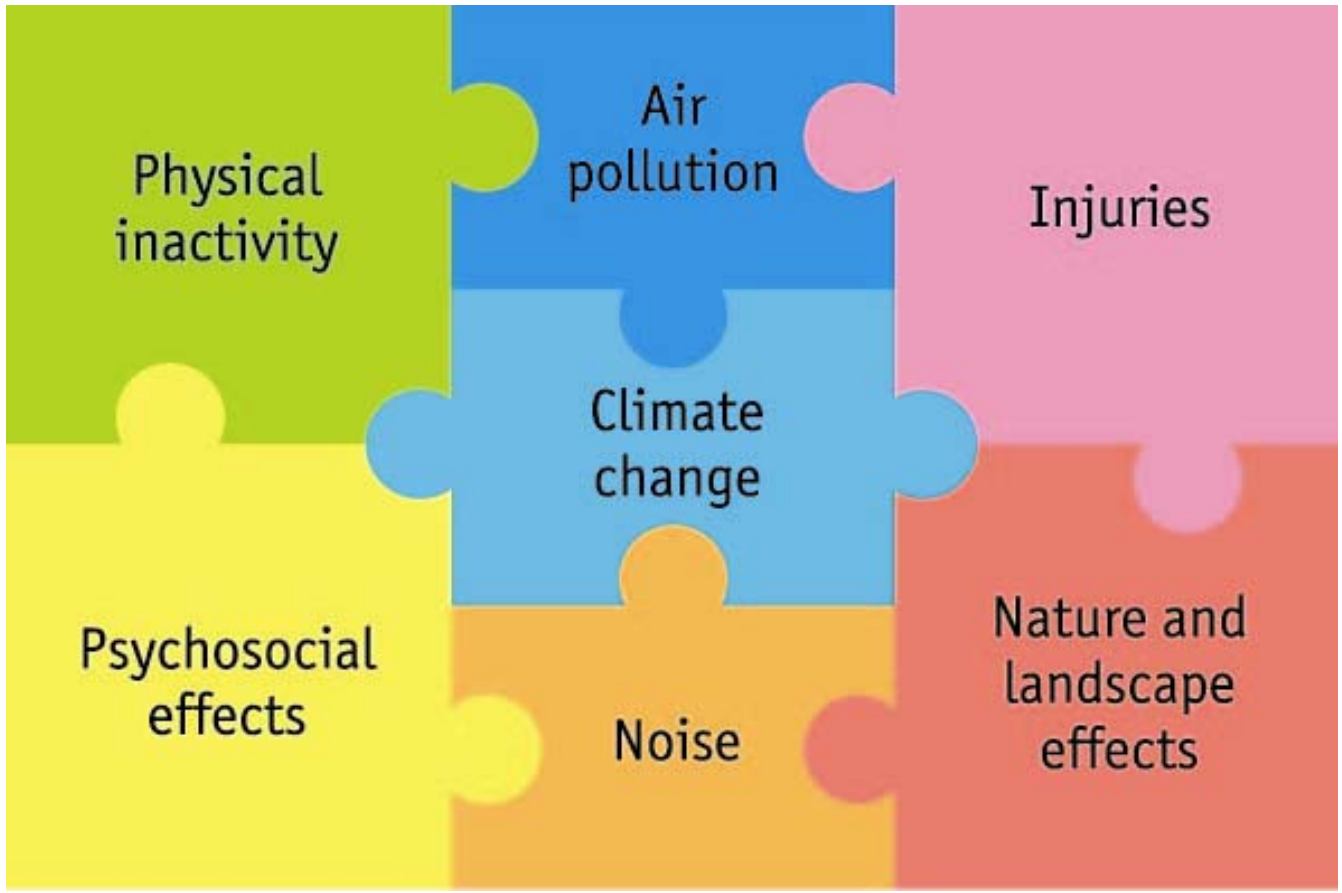
Aims of the project

To follow-up areas for further work identified by the THE PEP project *Transport-related health effects with a particular focus on children (2004):*

- Selection of health effects in adults and children
- Estimated relationships between exposure and health effect (dose-response relationships)
- Estimated fraction of exposure coming from transport
- Practical guidance for measurement and monetary valuation of health effects with views of achieving a more harmonized approach
- Particular focus on children (but not only)



Transport-related health and environmental effects – conceptual framework



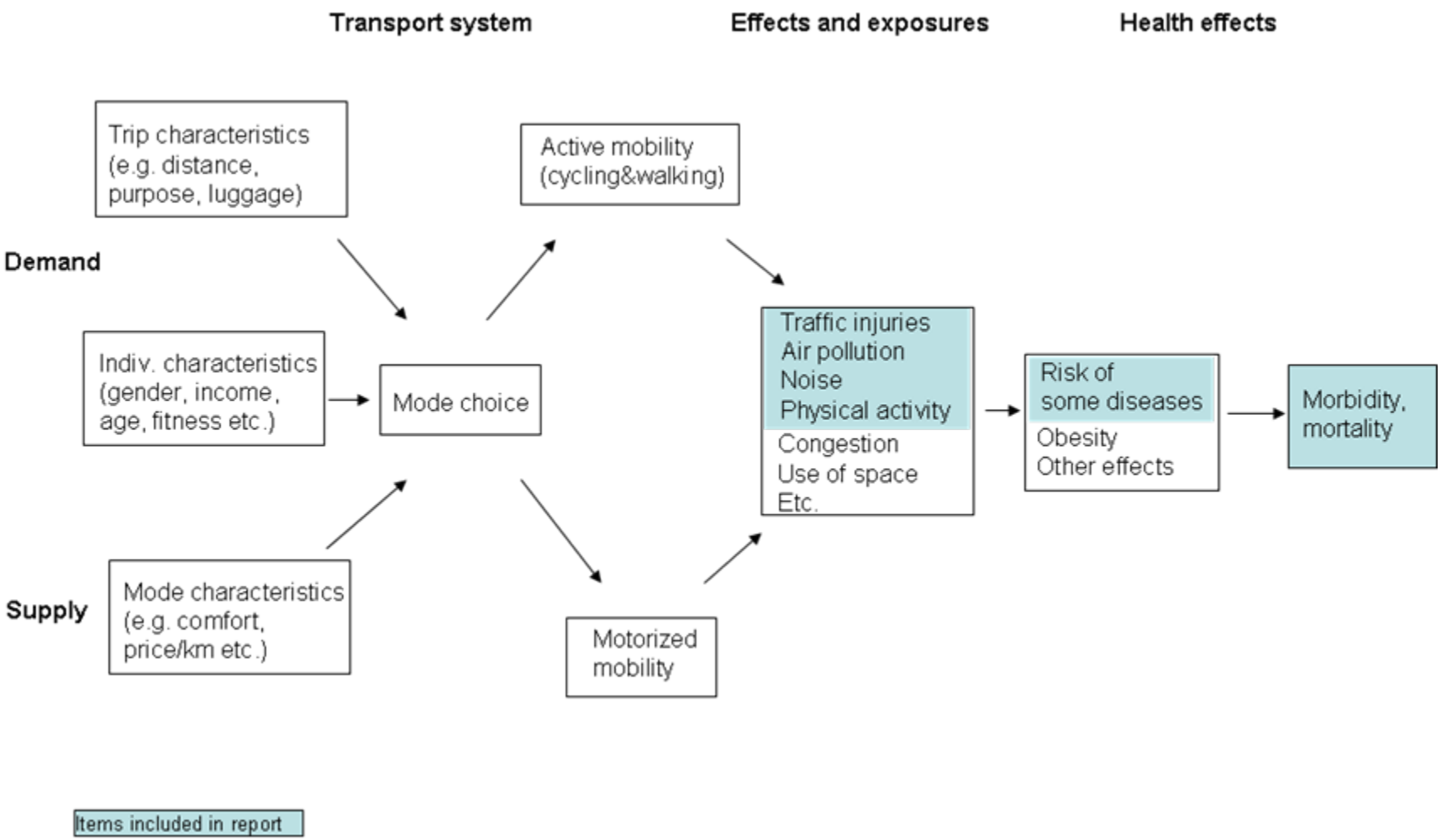
Key features of the guidance

- Scope of the guidance: for non-experts, practitioners
- Pragmatic approach
  - Point out which factors are contributing the majority of the costs and which can be neglected in situations of limited resources
- Based on existing approaches, combining health and economic evidence
- Focus on the health part of cost evaluation
- Guidance can be used in a modular or combined approach

Work steps

Collection and review of existing methodologies and major studies and initiatives
Identification of: • relevant health effects for which sufficient epidemiological evidence is available to be included in the economic valuation • key criteria to be applied in making an economic valuation of these effects
Development of a proposed methodological approach
International workshop to discuss and achieve consensus on the proposed methodology (November 2008, Düsseldorf)
Integration of feedback, report for final review, Finalization of report
Dissemination of the methodology through report, papers, and electronic means (e.g. THE PEP Clearing House and Toolbox, WHO, PRONET web site)

The general framework



Health-related input to economic valuation **adults**

Summary of selected health end points to be considered for economic valuations of transport-related interventions and policies in adults

Transport-related exposure	Selected health end-point
Road traffic noise	Severe annoyance Severe sleep disturbance *Myocardial infarction**
Traffic-related air pollution	Mortality: all-cause, cardiovascular and respiratory Morbidity: hospital admissions (cardiovascular and respiratory)*, lower respiratory symptoms*, chronic bronchitis*, bronchodilator use*, restricted activity days*, working loss days*
Traffic safety	Mortality Injury
Transport-related physical activity	Mortality: all-cause CHD, stroke, type II diabetes, colon/breast cancer* Morbidity: CHD, stroke, type II diabetes, colon/breast cancer*

* for indicative estimates only

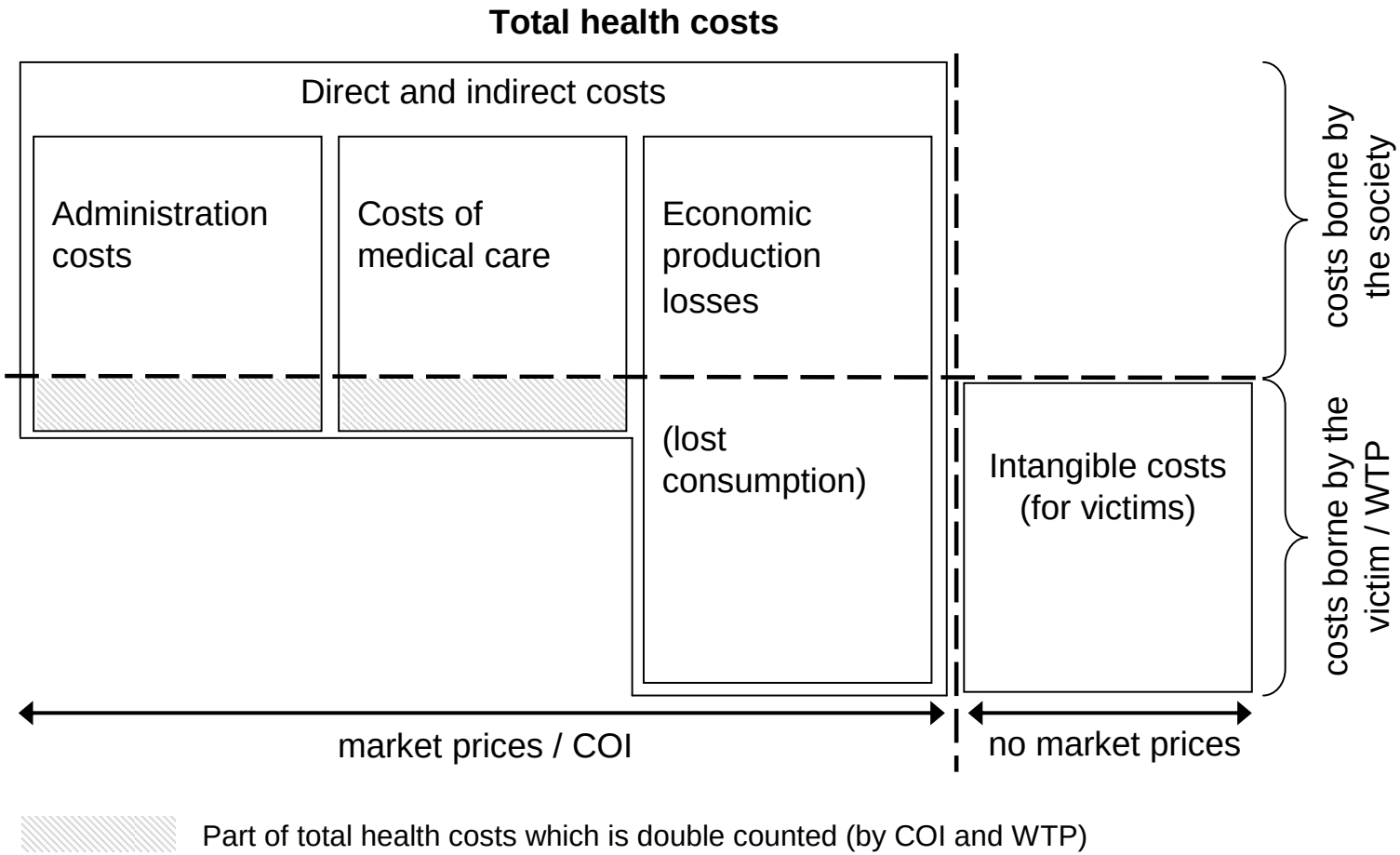
Health-related input to economic valuation **children**

Summary of selected health end points to be considered for economic valuations of transport-related interventions and policies in children

Transport-related exposure	Selected health end-point
Road traffic noise	n.a.
Traffic-related air pollution	Mortality: all-cause
	Morbidity:
	*Cough**
	*Medication use**
Traffic safety	Mortality
	Injury
Transport-related physical activity	n.a.

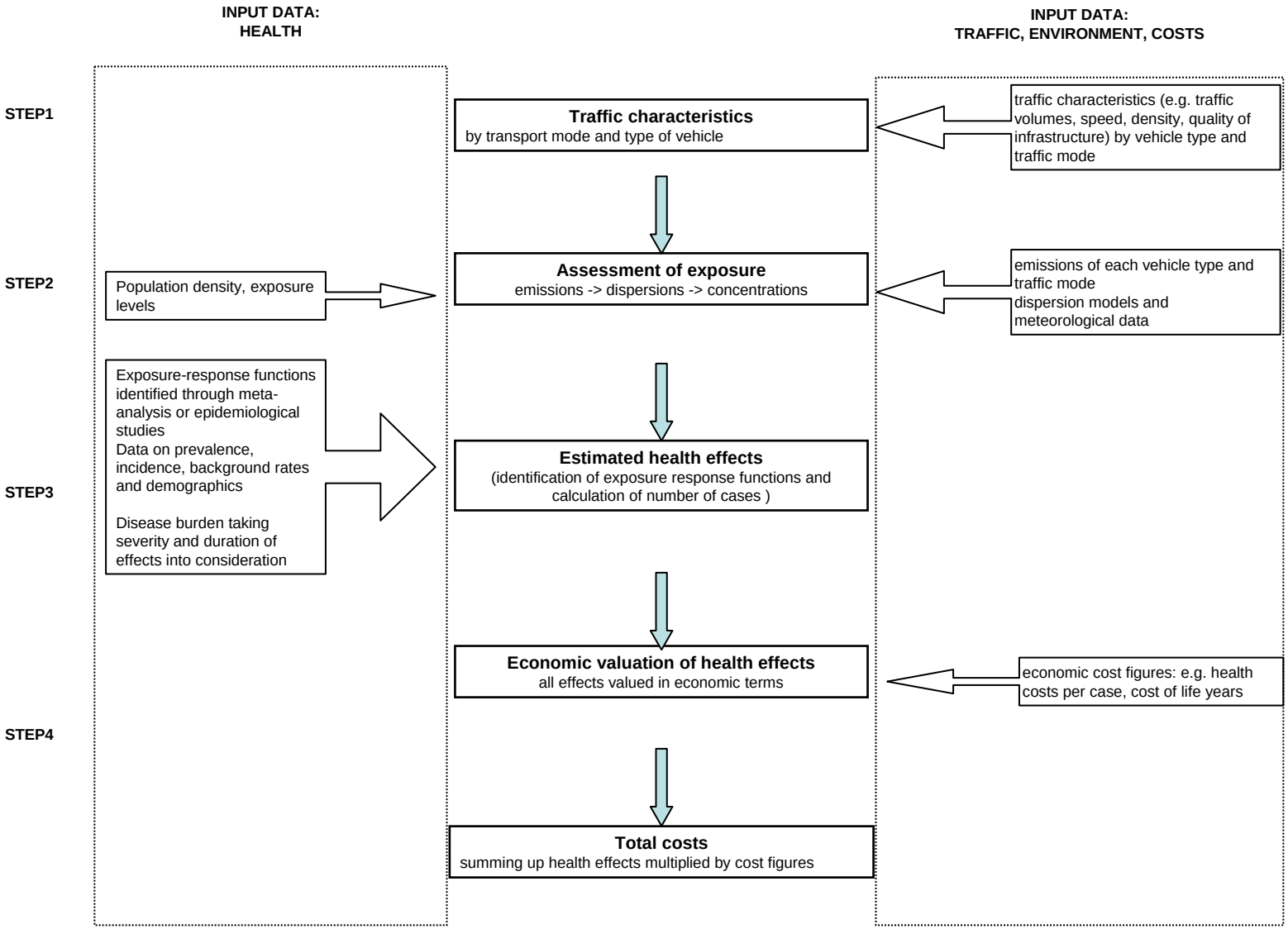
* *for indicative estimates only*

Costing approach: COI & WTP

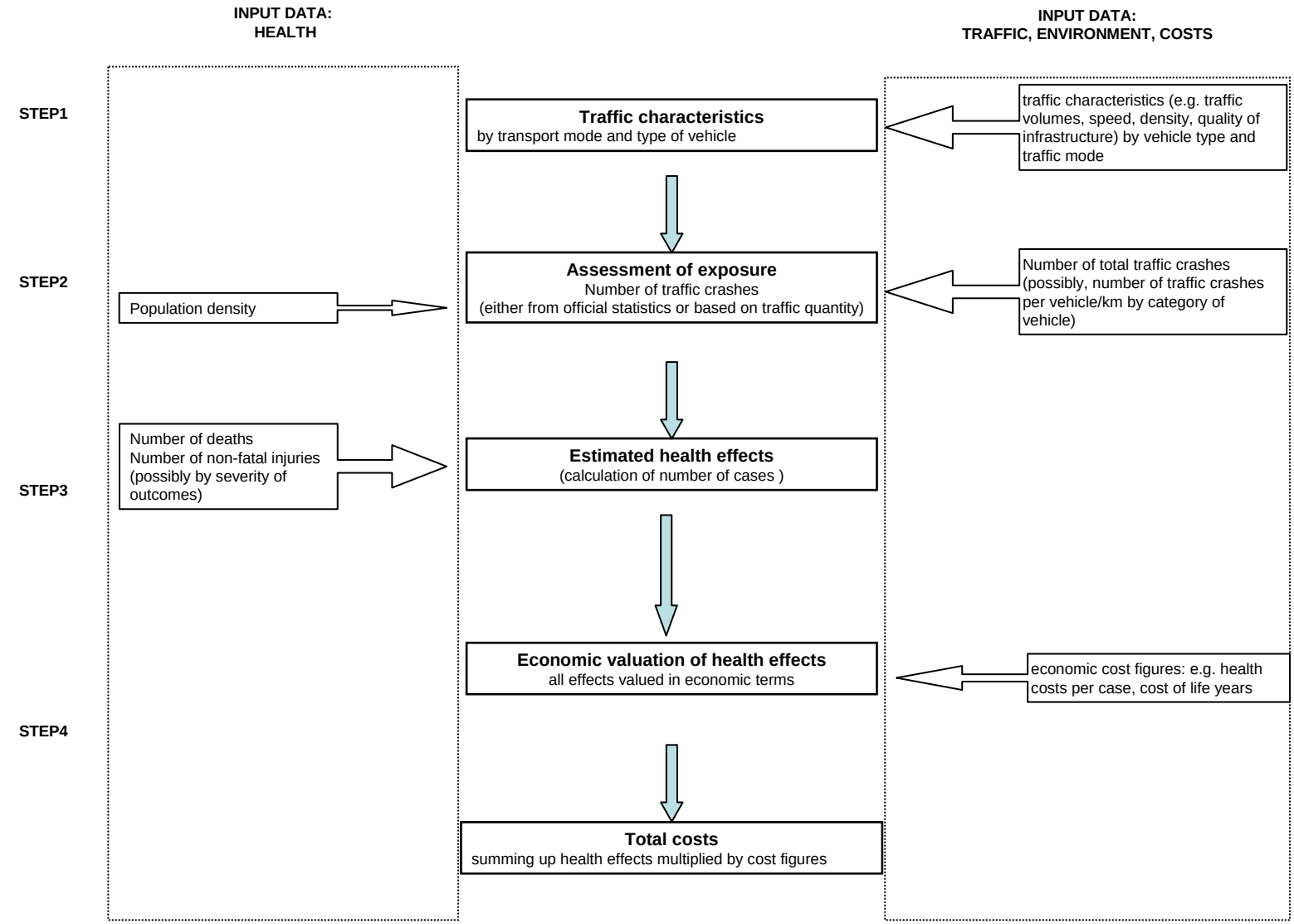


COI method with only net economic production losses (lost (future) consumption will be subtracted)
-> double counting of small part of the costs of medical care and of the administration costs

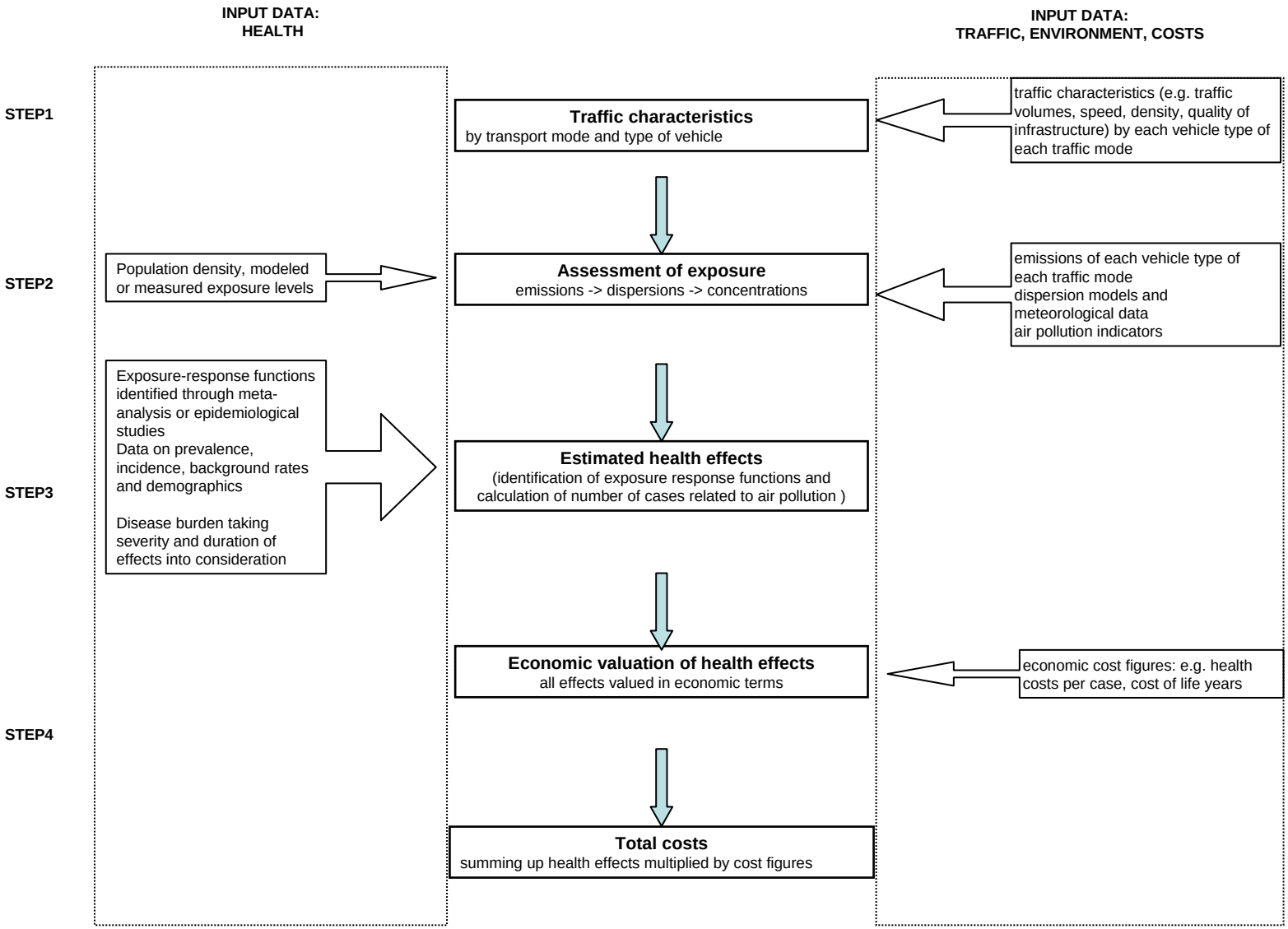
Guidance – basic structure



Guidance: road traffic crashes



Guidance: air pollution



Guidance: t-r lack of physical activity

Methodological challenges:

- Which fraction of physical inactivity is attributable to “traffic”?
- Which approaches can be proposed to calculate this attributable fraction?
- Which assumptions can be made regarding morbidity costs related to cycling and walking?

3 possible approaches to apportionment:

1. Effectiveness of interventions for cycling/walking
2. Comparisons between levels of cycling/walking achieved in cities (cities with highest levels representing the highest potential)
3. Modelling approaches

Guidance: t-r lack of physical activity

Morbidity-related costs: an alternative approach

multiply costs from all-cause mortality with agreed multiplication factor: possible ratio: 1:1?

years of life lost (YLL) / disability adjusted life years due to morbidity/mortality
(Public Health Group, Vicotoria, 2005), selected causes with association to physical activity, Tables 10 and 11)

	Morbidity	Mortality	Factor
Causes	YLD	YLL	
Ischemic heart disease	60,790	52,986	**1.2**
Stroke	13,141	20,618	**0.6**
Road traffic accidents	11,505	9,306	**1.2**
Diabetes	29,183	8,565	**3.4**
Mental (Alzheimer's/other dementia, depression)	53,436	6,048	**8.8**
Hypertensive heart disease	na	1,436	**-**
Breast cancer	16,182	9,797	**1.7**
Totals	184,237	108,756	**1.7**

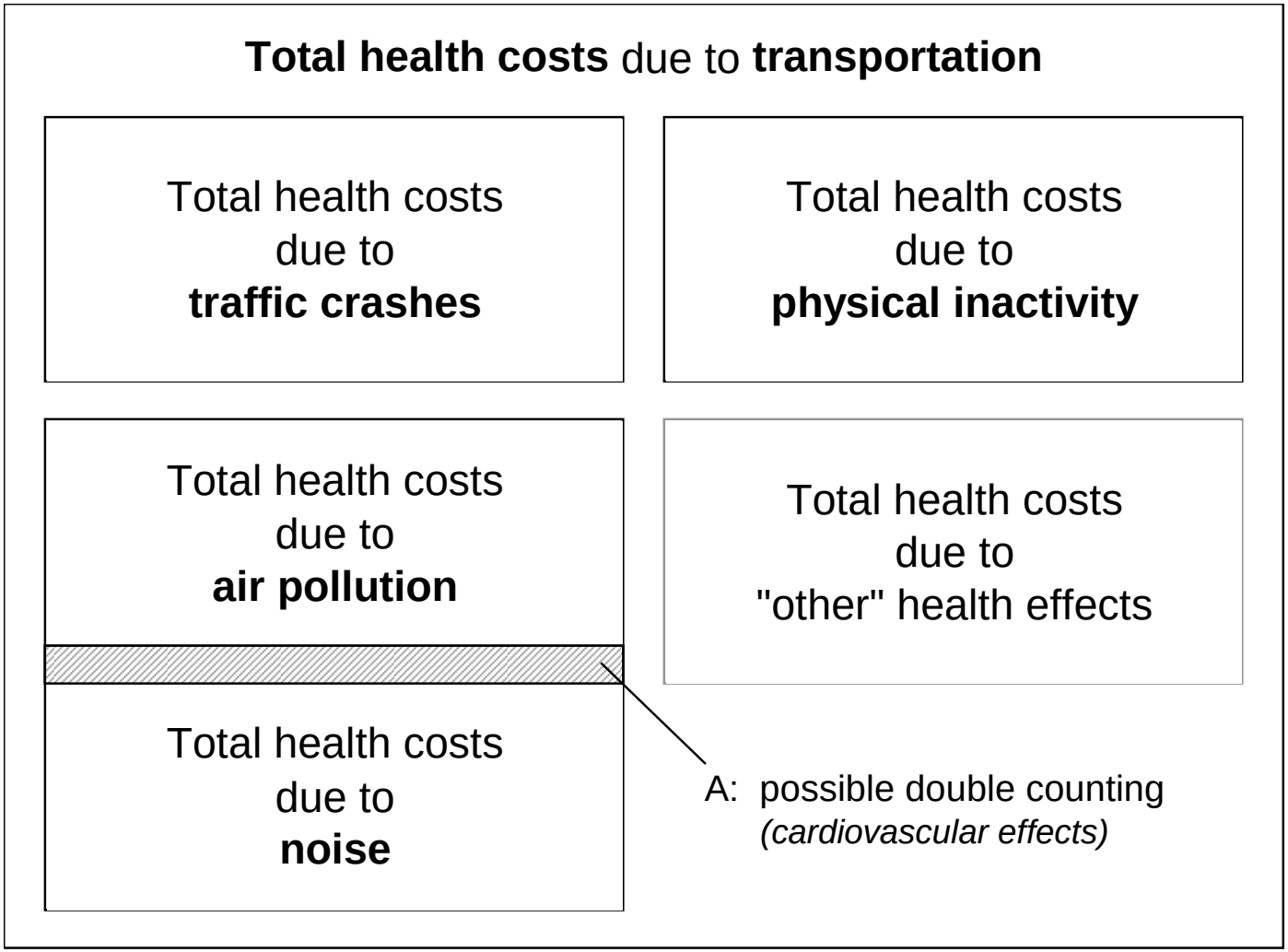
Interactions between exposures

Physical activity and air pollution

- No systematic review available
- Evidence from singles studies:

  O'Donoghue et al. 2007; Rank et al., 2001; Chertok et al., 2004, van Wijnen et al., 1995; Kingham et al., 1998; Adams et al., 2001; Kingham et al., 1998
- Particulates, hydrocarbons: exposures/uptakes seem to be comparable
- NO2: indication of higher uptake for cyclists
- Significant influence from wind speed and between route-variation
- Short peak exposures vs. long-term exposure?
- Caveat: short-term exposures to high ozone levels

Bringing it all together



Conclusions

- Sufficient evidence available for a range of health endpoints related to road traffic crashes, air pollution, noise and insufficient physical activity
- Still lack of specific estimates for children for many health endpoints -> further research needed
- Other, non-monetizable effects should be acknowledged
- Uncertainties and assumptions should be clearly stated / sensitivity analysis
- Harmonized method for economic valuation developed (modular or in combination) based on best available evidence that provides dimension of costs related to transport-related health effects

Thank you very much!

Contributors

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European network for the promotion of health-enhancing physical activity

Transport, Health and Environment Pan-European Programme THE PEP

THE PEP Transport, Health and Environment Pan-European Programme
United Nations Economic Commission for Europe (UNECE)
World Health Organization Regional Office for Europe (WHO / Europe)
WHO / Europe United Nations

Pollution reductions options network

PRONET

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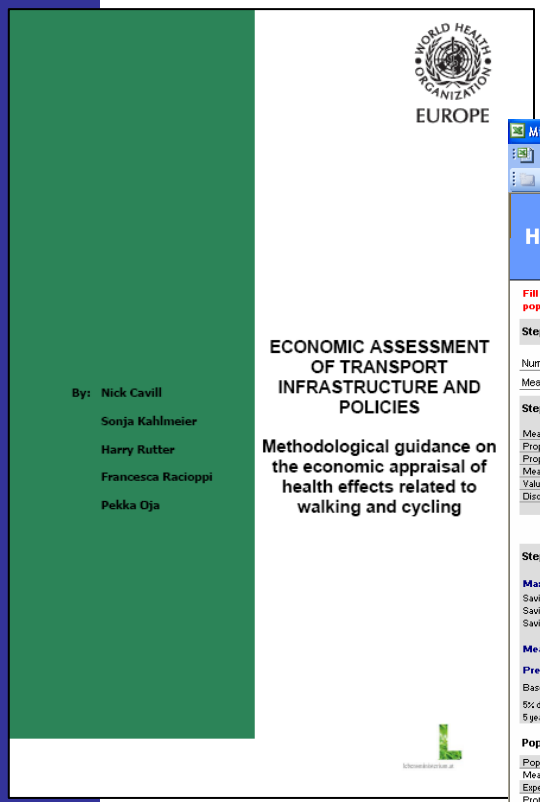
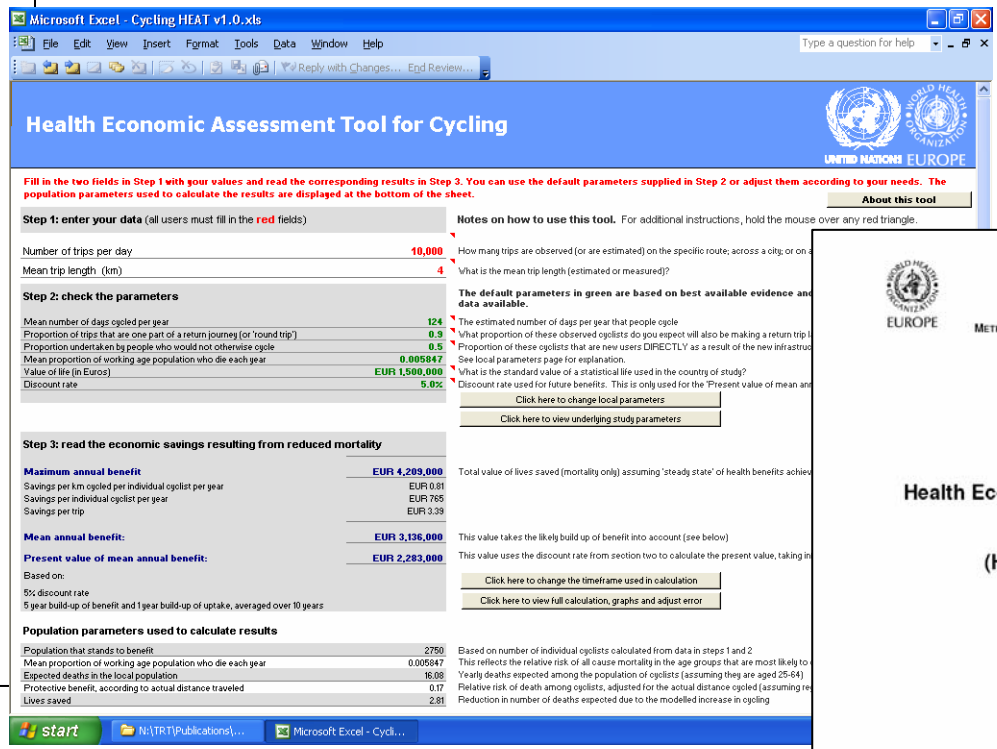
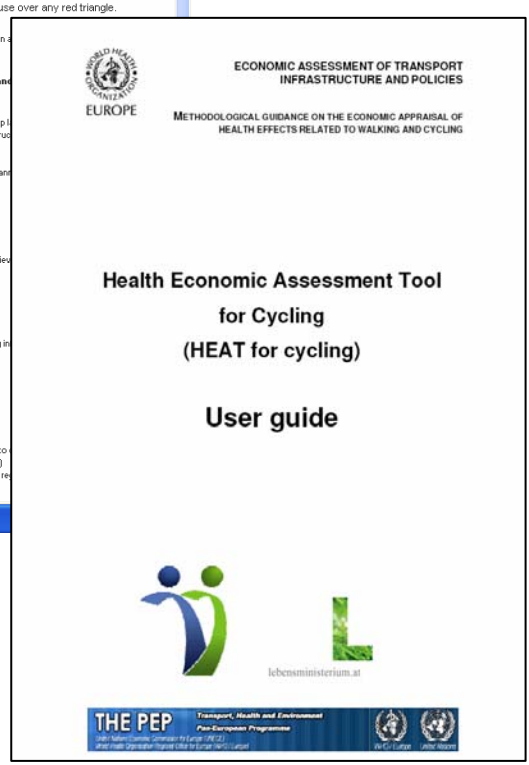
WHO/UNECE guidance and tool for economic assessment of health benefits from cycling and walking







Download the guidance document, HEAT for cycling and user guide from www.euro.who.int/transport/policy/20070503_11