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"Health in All Policies" in Practice: Guidance and Tools to Quantifying the Health Effects of Cycling and Walking

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Background: There is growing interest in "Health in All Policies" approaches, aiming at promoting health through policies which are under the control of nonhealth sectors. While economic appraisal is an established practice in transport planning, health effects are rarely taken into account. An international project was carried out to develop guidance and tools for practitioners for quantifying the health effects of cycling and walking, supporting their full appraisal. ***Development process:*** A systematic review of existing approaches was carried out. Then, the products were developed with an international expert panel through an extensive consensus finding process. ***Products and applications:*** Methodological guidance was developed which addresses the main challenges practitioners encounter in the quantification of health effects from cycling and walking. A "Health Economic Assessment Tool (HEAT) for cycling" was developed which is being used in several countries. ***Conclusions:*** There is a need for a more consistent approach to the quantification of health benefits from cycling and walking. This project is providing guidance and an illustrative tool for cycling for practical application. Results show that substantial savings can be expected. Such tools illustrate the importance of considering health in transport policy and infrastructure planning, putting "Health in All Policies" into practice.

Keywords: economic assessment, transport, physical activity, Europe

In recent years, the so-called "Health in All Policies" approach[1,2] has emerged as a means to promote and protect health through policy decisions taken outside the health sector and its immediate area of responsibility. The approach requires an increased capacity of health systems to effectively engage other sectors in adopting policies that maximize possible health gains. This entails not only greater advocacy skills, but, more importantly, the capacity of identifying win-win situations that allow the target sectors to achieve their own goals while at the same time protecting and promoting health. One way of supporting this engagement is through the provision of user-friendly tools that facilitate the inclusion of health considerations by nonhealth experts. The use of economic arguments to advocate investments into policies that have a comparatively greater potential to result in health benefits is a promising strategy to win the support of other sectors.

Transport is an essential component of life, providing access to services, goods, and activities. Different modes of transport are associated with specific effects on society, one being health effects. Fully appraising these effects is an important basis for evidence-based policy making. Economic appraisal is an established practice in transport planning. However, the health effects of transport interventions are rarely taken into account in such analyses. Valuing health effects is a complex undertaking, and transport planners are often not well equipped to fully address the methodological complexities involved. With regard to including health effects from active transport modes such as walking and cycling, issues to be addressed include the selection of health endpoints to be considered, the form of the relationship between physical activity and health, activity substitution, which costs to include, and which time lag periods to apply before benefits occur. To address these questions, close collaboration between transport and health sectors is necessary. However, such intersectoral exchange is often not yet well established and can pose considerable challenges.[3]

In addition, health effects of road transport involve a diverse range of outcomes and integrating them is a challenging task. One method that facilitates aggregation is the use of health indicators such as disability-adjusted life-years (DALYs) or quality-adjusted life-years (QALYs).[4] To derive for example DALYs, the health-related quality of life of different conditions, as rated by expert panels on a scale from 0.0 (death) to 1.0 (perfect health) is multiplied by life expectancy, leading to one common measurement unit. One DALY is equal to 1 year of healthy life lost. However, it has been shown that decision makers may find these concepts difficult

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to understand.[5] Health effects can also be expressed in monetary terms. This requires expressing loss of life, life-years or burden of disease in monetary units. However, using monetary units offers the advantage of comparing costs and benefits directly and assessing whether a proposed policy is worth its costs. Economic quantification of health effects also allows the results to be integrated into broader economic assessment (for example, of transport infrastructure) that does not use indicators such as DALYs or QALYs. Although economic arguments should not be the sole basis for decisions, monetary terms enhance understanding of the results of such assessments by decision-makers and can be a tool to foster intersectoral policy making.

In recent years, a few countries in Europe, such as those working through the Nordic Council in Europe (including Denmark, Finland, Iceland, Norway, and Sweden), have carried out pioneering work in trying to assess the overall costs and benefits of transport infrastructures taking health effects into account, and guidance for carrying out these assessments has been developed.[6,7] However, important questions have remained regarding the type and extent of health benefits which might be attained through investments in policies and initiatives to promote cycling and walking, as well as regarding a number of methodological issues, including a frequent lack of transparency.[8] Addressing these questions is important to 1) support countries in their assessments of the health and environmental impacts and potential savings from alternative transport policy options, 2) promote the use of scientifically robust methodologies to carry out these assessments, and 3) provide a sound basis for advocating for investment in sustainable transport options. Therefore, an international project was carried out to develop guidance and tools for practitioners for quantifying the health impacts of cycling and walking, translating the best available research evidence and knowledge into practice. Since there is already significant experience in calculating the costs of interventions, this project focused on approaches to the economic valuation of potential health effects. The project aimed to

- develop a review of approaches to including health effects in economic analyses of interventions related to cycling and walking (eg, development of infrastructures for cyclists and pedestrians)
- critically discuss the identified indicators, health effects, relative risks, and applied methodological approaches, taking into account scientific accuracy and relevance as well as aspects of feasibility
- formulate suggestions for options for further developing a harmonized methodology for including health effects in impact assessments and economic valuations of interventions, as well as suggestions for data sources and methods to be used for these analyses
- facilitate, through an international consensus meeting, the achievement of scientific consensus on these options
- publish a report on the meeting's outcome, including operational guidance and practical tools for practitioners.

The project contributed to implementation of the Transport, Health, and Environment Pan-European Program (THE PEP).[9] THE PEP was initiated in 2002 and is jointly led by the WHO Regional Office for Europe and the United Nations Economic Commission for Europe (UNECE). Activities are coordinated and implemented by THE PEP Steering Committee, which is composed of representatives of UNECE and WHO European Member States from the transport, environment and health sectors, who work in close cooperation. Therefore, THE PEP is a unique policy framework that brings together representatives of all 3 sectors to promote policy integration. The work was also carried out in close collaboration with HEPA Europe, the European network for the promotion of health-enhancing physical activity.[10,11]

Development Process

The products were developed through a systematic review of the relevant published literature and a comprehensive consensus building process. The implementation of the project was steered by a core project group consisting of the authors, which was coordinated by the WHO Regional Office for Europe and worked in close collaboration with an advisory group of 21 international professionals from 11 countries and 1 nongovernmental organization, including economists, experts in health and physical activity and experts in transport from science as well as practice (see Appendix).

First, a systematic review of economic valuations of transport projects including a physical activity element was carried out.[8] It concluded that there is a wide variation in the approaches taken to including health effects of physical activity in economic analyses of transport projects. It also noted a frequent lack of transparency of methods. The review identified critical issues to address and approaches warranting further development toward a more unified methodology. Based on the results, draft guidance on the identified key methodological questions and a draft Health Economic Assessment Tool (HEAT) for cycling was developed by the project core group and selected members of the advisory group. This tool estimates the economic savings resulting from reduced mortality due to regular physical activity from cycling, i.e.: if x people cycle y distance on most days, what is the economic value of the improvements in their mortality rate? The calculations are based on the results of a prospective cohort study[12] which allowed deriving a relative risk for reduced mortality from regular commuter cycling. Both products were discussed in depth at a consensus workshop attended by the members of the international advisory group. Other health outcomes related to physical activity were also considered.[13] While there is evidence that physical activity has positive effects on many aspects of morbidity related to conditions, as of now, evidence on morbidity is still less strong than that on

mortality. Therefore, including the impact of morbidity in an economic appraisal would lead to a larger extent of uncertainty. One pragmatic option might be to include the notion that morbidity benefits represent an agreed proportion of the calculated mortality benefits, and to attach an appropriate monetary value. However, the consensus meeting recommended taking a more conservative approach with a focus only on all-cause mortality for the time being.[14] The products were finalized taking into account the feedback from the consensus workshop; particularly challenging questions were followed up in several telephone conferences. The methodology underlying HEAT for cycling is discussed elsewhere in more detail.[13,15]

Products and Applications

The results of this project include different products: the systematic review,[8] guidance to quantify the positive health effects of cycling and walking,[13] the HEAT for cycling[16] and its user guide[15] as well as a summary booklet.[17] The results of the application of HEAT for cycling are primarily intended to be integrated into comprehensive economic analyses of transport interventions or infrastructure projects, but can also serve to assess the current situation or investments made in the past. An initial version of HEAT for cycling was informally launched in fall 2007 at a scientific conference; the official public launch of the current version took place in the framework of the Third High-level Meeting on Transport, Environment, and Health of THE PEP in January 2009.[18] Since fall 2007, the products have found a wide audience. The project website[19] has been visited over 5700 times; the products have been downloaded over 600 times. In several countries within and outside the European Region, the tool has already been taken up by practitioners or found its way into the political decision making process through consideration or inclusion into the official toolbox for economic valuation of transport infrastructure. Different examples are summarized below; more practical applications are available at WHO.[19]

Austria. The Federal Ministry of Agriculture, Forestry, Environment, and Water Management used HEAT for cycling to calculate the savings through the current modal share of cycling in Austria which is currently 5%, with an average length of trips of 2km. This level of cycling saves every year 412 lives in terms of reduced mortality from being regularly physically active. The corresponding average savings for Austria from this reduced mortality are estimated to amount to 405 million Euros (about US$ 560 million) per year.[20] Achieving the goal of 10% cycling share would double these savings, reaching 810 million Euros (about USD 1.12 billion) per year.

Czech Republic. The Charles University Environment Centre, Czech Republic, calculated potential benefits from an increased level of cycling in the city of Pilsen. The calculation was based on a representative study on travel behavior[21] in 764 subjects including questions on willingness to change travel means, provided certain improvements in the transport infrastructure would be undertaken. The current level of cycling in Pilsen is low, but the study showed that 2% of participants would be ready to take up regular cycling if the infrastructure was improved.[22] Assuming an average of 2 cycling trips per day, the savings from such an increase in cycling would result in discounted annual savings of EUR882.000 (about US$ 1.2 million).[23]

Sweden. The Swedish Road Administration has adopted HEAT for cycling for their official toolbox for economic assessment of cycling infrastructure.[24,25]

New Zealand. Commissioned by the New Zealand Transport Authority, a recent report discussed different approaches to valuing health benefits of active transport modes, including HEAT for cycling.[26] Combining different approaches, the authors calculated an average annual value of a person being active of about NZD2500 to NZD3300 (about US$ 1400 to US$ 1900), including mortality and morbidity. The authors also suggested a model to value savings from walking and they calculated weighted per-kilometer savings for different active transport modes. The report contains a draft section on active transport for consideration for the "Economic evaluation manual (EMM2)" of New Zealand.

HEAT for cycling was also used to estimate health cost savings in urban adults associated with modal shift of short urban trips of less than 7 kilometers to cycling. Annual health cost savings for a share of cycling vehicle kilometers from 1% to 30% were estimated to amount from NZD1.1 million (about USD335.000) to NZD3.3 million (about USD1.9 million), respectively.[27]

United Kingdom (England). The Department for Transport adopted the HEAT for cycling approach as part of its comprehensive online guidance on the appraisal of transport projects and wider advice on scoping and carrying out transport studies.[28] HEAT for cycling is suggested as the tool to estimate the health benefits of new cycling facilities. Based on the HEAT for cycling approach and a number of assumptions, an indicative approach to evaluate the monetary value of interventions for walking promotion has also been developed.

United Kingdom (Scotland). A Scottish alliance for sustainable transport used HEAT for cycling to estimate the benefits from both a 20% target and a more ambitious 40% target of journeys of less than 5 miles being undertaken by bicycle.[29] This represents a cycle rate for all distances of 13% and 27%, respectively, as they exists in some European countries. Savings from reduced mortality in the Scottish working-age population due to regular cycling would amount to GBP 1 to 2 billion (about US$ 1.5 to 3 billion) per year if the cycle share reached 13%, or GBP 2 to 4 billion (about US4 3–6 billion) per year if it could raise to 27%, from the current 1%.

A recommendation was also made that the Scottish Transport Appraisal Guidance (STAG) include the direct economic benefits from improved health due to increased cycling and walking. It was suggested this could make use of the HEAT for cycling tool, but should also incorporate walking and other health benefits than reduced mortality.

While the current version of HEAT for cycling is confined to estimating the savings from reduced mortality as the most robustly quantifiable health outcome,[13,15] all of the above presented examples also discuss approaches to include morbidity-related savings as well as outcomes such as productivity costs, road traffic safety, or air pollution.

Conclusions

While cycling and walking are still often neglected in transport planning, in the last decade these active travel modes have received more attention, often related to political discussions on transport sustainability and more recently, climate change[30–32] as well as the obesity crisis and the prevention of other noncommunicable diseases.[33,34] Including economic savings from health effects of active travel into standard economic assessments of transport interventions is paramount for a full recognition of these travel modes and to make the potential co-benefits for health and the environment resulting from active travel modes explicit. However, there is a need for a more methodologically consistent approach to the quantification of health benefits from cycling and walking. This project provided guidance on walking and cycling and an illustrative tool for cycling for practical application. The strength of this approach lies in its use of all-cause mortality which is the health outcome on which the strongest evidence and most robust data are available, and the use of a relative risk that is directly applicable to (regular) commuter cycling, and not extrapolated from studies of general physical activity. The main weaknesses are that no benefits related to morbidity are considered, as did previous approaches,[6,7] and that walking was only considered in the methodological guidance report.[13] It is foreseen to develop the HEAT for cycling further to include morbidity-related benefits and to apply the same process to develop a HEAT for walking. A special focus was put in this project on discussing in detail all data sources, assumptions, and calculations as this was one of the main weaknesses identified in the systematic review of previous approaches.[8]

While in most of the existing literature benefits from active travel were calculated as part of research projects, often developed in small project groups or by single authors, the WHO products were developed in an applied process including a large group of experts, with the aim of being used in the assessment of proposed projects or policy development, thus also including a practical calculation tool rather than only theoretical guidance or a single calculation example. The products of this project have seen a fast take-up by countries both within and outside of the WHO European Region. The ease of use of HEAT for cycling may have facilitated this: while it is based on a robust methodology, users need no background on physiology, epidemiology or economics and the tool requires only minimal data input. The tool includes best evidence default values which can be replaced by local data and it can be applied to different geographic scales. Furthermore, the close link to practitioners and policy makers through THE PEP may have supported the fast take-up of the tool. Results show that substantial health cost savings can be expected from promoting active transport. Such tools can foster using health considerations as a powerful argument in transport policy and infrastructure planning, putting the "Health in All Policy" approach into practice. Thereby, they can support intersectoral policy making and hopefully ultimately the necessary shift to more sustainable and healthy transport systems.

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The views expressed in this paper are the authors' and do not necessarily reflect those of the World Health Organization.

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