HEAT
Health economic assessment tool

Examples of applications of the Health Economic Assessment Tool for cycling and walking

THE PEP
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UNECE

World Health Organization
European Region

Contents

Introduction

The Health Economic Assessment Tool (HEAT) for walking and cycling, developed under the leadership of the WHO Regional Office for Europe and supported by an international group of experts and different stakeholders, is an online tool designed to facilitate evidence-based decision-making on walking and cycling as a sustainable and healthy means of transport. HEAT estimates help assess existing situations, planned projects or past investments in terms of associated health and economic impacts.

Since its launch in 2009, HEAT for walking and cycling has been extensively used to estimate the costs and benefits of transport interventions or infrastructure projects; to support the planning and evaluation of walking and cycling projects; to quantify the health and economic impacts of current and projected levels of walking and cycling; and much more.

This document presents a selection of **13 illustrative examples** of how HEAT can be used, from countries both within and outside the WHO European Region, to disseminate information about HEAT and promote its use. All examples show the benefits of active mobility for health, the environment and the economy.

The selected examples are grouped by type of HEAT application (Table 1), namely the:

- use of HEAT as part of comprehensive cost–benefit analyses of transport interventions or infrastructure projects;
- use of HEAT as a complement for comprehensive economic valuations of transport interventions, for example on emissions or congestion; and
- use of HEAT to assess the current situation, or past or future investments.

The examples date from 2011 to 2024 and concern eight European countries and the United States of America. Seven of the examples are studies published in scientific journals, three come from national (Austria) or local policies (Greater Manchester (United Kingdom), Provence-Alpes-Côte d'Azur region (France)), and three are reports on local or national assessments. While most examples refer to cycling, some are specific to walking and some look at both. Each group of examples is complemented by one or more additional references to studies carried out worldwide, including in Europe, North and South America, Asia and Africa.

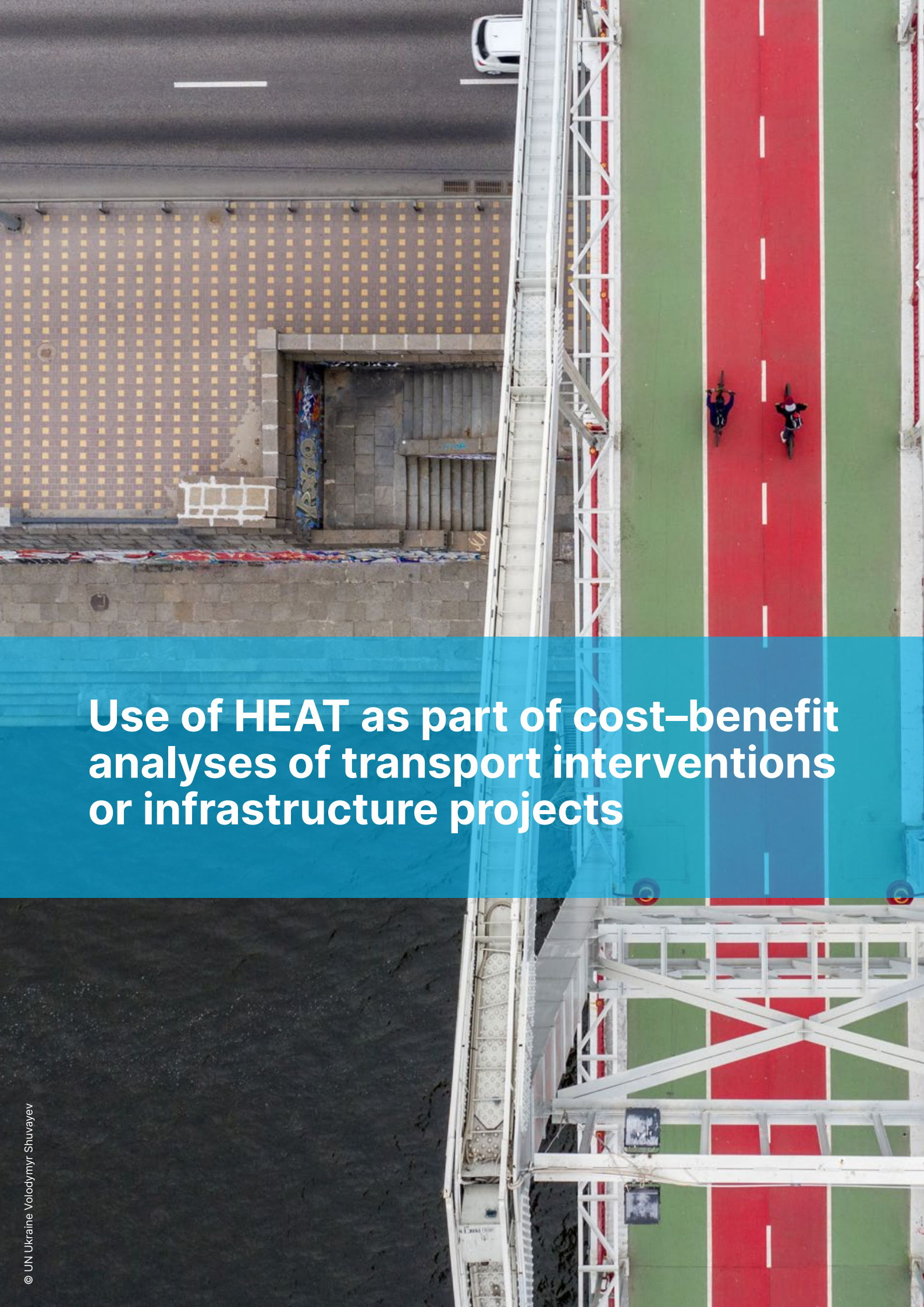
Table 1. Overview of selected examples of use of HEAT for walking and cycling

Type of application	Location and example	Type of example	Level
Cost–benefit analyses of transport interventions or infrastructure projects	Austria: The Austrian Masterplan for Cycling (2015)	Policy	Country
	Manchester, United Kingdom: Transport for Greater Manchester makes a business case for its ambitious cycling plan (2013)	Policy	City
	Netherlands (Kingdom of the): The value of cycling in one of the world's bicycle capitals (20 15)	Study	Country
	New York, United States: Exploring the health and spatial equity implications of the New York City Bike share system (2019)	Study	City
	Modena, Italy: Using HEAT to assess the health benefits of a new cycling path (2013)	Local assessment report	City
Comprehensive economic valuations of transport interventions	Provence-Alpes-Côte d'Azur region, France: Assessing the benefits of healthy mobility using HEAT (2019)	Policy	Region
	Belgium: The impact of cycling on health, climate and the economy in Belgium (2022)	National assessment report	City
	United States: Environment and health benefits from reduced car travel in the Midwestern United States (2011)	Study	Region
Assessment of current situation, or past or future investments	France: The untapped health and climate potential of cycling in France: a national assessment from individual travel data (2024)	Study	Country
	Stockholm, Sweden: Potential for reduced premature mortality by current and increased bicycle commuting (2021)	Study	City
	Netherlands (Kingdom of the): Socioeconomic and demographic differences in walking and cycling in the Netherlands: How do these translate into differences in health benefits? (2017)	Study	Country
	Wales, United Kingdom: The value of walking on the Wales Coast Path (2014)	Local assessment report	Local
	Catalonia, Spain: Health benefits from replacing short car trips with walking (2013)	Study	Region

HEAT users

HEAT users include a wide range of actors such as governments, policy-makers, researchers and academics, transport and health agencies, and nongovernmental organizations. The tool's website is visited by about 5,000 users per year. In 2020–2022, top HEAT users were in the United Kingdom and the United States, followed (in descending order) by China, Germany, France, Italy, Finland, Spain, Switzerland and Australia.

The case studies presented in this collection were developed by actors at a range of scales, from cities (for example Brussels, Manchester, Stockholm and New York) to the national level, illustrating that HEAT can be applied in many different contexts.



Use of HEAT as part of cost–benefit analyses of transport interventions or infrastructure projects

Austria:
The Austrian Masterplan for Cycling (2015)

TYPE: Policy

The Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology has been involved in the development of HEAT since the very beginning. It supported the translation of the HEAT user guide into German and made HEAT available on the Ministry's website. It also disseminated HEAT to cities, stakeholders, planners and transport experts.

The Ministry calculated the societal economic value of health effects from current levels of cycling and aspired policy goals for cycling in Austria using HEAT in 2009 and in 2014, and promoted HEAT in the National Masterplan for Cycling, recommending its integration into the Austrian Code for the Design, Construction and Maintenance of Roads cost-benefit assessments in transport. Online training sessions for HEAT users take place on a regular basis.

HEAT estimates provided strong arguments for the promotion of cycling in Austria, particularly for supporting investments into cycling infrastructure. HEAT estimates have also been used regularly in official presentations and communications, for example by the former Minister of Environment.

Data and estimates

In 2010, the cycling mode share in Austria was 7%, with an average distance covered of 2 km. HEAT was used to estimate the average annual health benefit, calculated as €725 million. This benefit would increase to 1.4 billion euros if the target of cycling mode share of 13% was achieved by 2025.

References: Cycling Masterplan 2015–2025. Vienna: Federal Ministry of Agriculture, Forestry, Environment and Water Management; 2015 (https://www.klimaaktiv.at/mobilitaet/radfahren/masterplan_RF_2025.html).[1]

1 All references presented in this document were accessed on 20 September 2024.

Netherlands (Kingdom of the):
The value of cycling in one of the world's bicycle capitals (2015)

TYPE: Study

The Netherlands (Kingdom of the) is famous across the world for implementing policies that have led to a high regular use of bicycles for transport. Approximately 27% of all trips in the Netherlands (Kingdom of the) are made by bicycle.

Researchers used HEAT to quantify the health benefits for the whole country population accruing from these cycling levels, in terms of (i) the annual number of deaths prevented per year and (ii) the mortality rate reduction and the deaths prevented by age groups between 20 and 90 years.

Results showed that the recorded cycling levels:

- prevent about 6500 deaths each year, valued at €19 billion per year; and
- give Dutch people a life expectancy that is 6 months higher compared to that of people who do not cycle.

In total, the health benefits from cycling correspond to more than 3% of the Dutch gross domestic product.

Additional considerations

The study also showed that investments in cycling-promoting policies, such as for improved cycling infrastructure and facilities, would likely yield a high cost–benefit ratio in the long term. In fact, the capital investments by all levels of Dutch government in road and parking infrastructure for cycling of almost €0.5 billion per year over the last decades would result in an annual benefit of €19 billion, i.e. 38 times higher than the investment.

Data

The study used data about cycling levels from a travel diary survey conducted among a nationally representative random sample of about 50 000 persons each year. The survey found that Dutch adults spent an average of 74 minutes of cycling per week.

Reference: Fishman E, Schepers P, Kamphuis CBM. Dutch Cycling: Quantifying the Health and Related Economic Benefits. Am J Public Health. 2015;105:e13–e15 (https://doi.org/10.2105/AJPH.2015.302724).

Modena, Italy:
Using HEAT to assess the health benefits of a new cycling path (2013)

TYPE: Assessment

The City of Modena, Italy, used HEAT within a project about the construction of a new cycle path. The objectives were to make an economic assessment of costs and benefits and an evaluation of the impact of the project on the population health of the potential users of this path.

HEAT was used to estimate the value of existing levels of cycling, future projected levels of cycling and the health benefits produced by the use of a new cycling path connecting the main hospital and university with the city centre. The results enabled the Modena team to make the case for investment in cycling and helped secure agreement for the new cycling path. The results also seem to have been influential on citizen opinion of the path.

Data and estimates

HEAT estimates showed that the new cycling path would increase the number of cyclists by 1091, with an associated 0.35 avoidable deaths per year. The average mortality risk would decrease by 5.1%. The current value of the annual benefit averaged across 10 years would amount to €414 000.

A manual cycle count was used to measure the number of cyclists on two main crossroads; distances were based on the length of the stretch cycled and the known total length of the path. Assumptions were made regarding the average distance cycled per person per year and the amount of cycling per person per year.

Reference: Using the health economic assessment tools (heat) for walking and cycling: lessons learnt: final report. Copenhagen: WHO Regional Office for Europe; 2013 (https://iris.who.int/handle/10665/378709).

Manchester, United Kingdom:
Transport for Greater Manchester makes a business case for its ambitious cycling plan (2013)

TYPE: Policy

Greater Manchester is a metropolitan county in north-western England, United Kingdom with a population of 2.7 million. Transport for Greater Manchester (TfGM) oversees transport and travel across the county.

In 2013, TfGM set out an ambitious plan for cycling for the period 2013–2025, aiming at a healthy, safe, sustainable city region where people want to live and work. To meet this vision, TfGM proposed a programme of investment that, "within a generation, will make cycling a mainstream, everyday, aspirational form of transport for all, regardless of age or ability." TfGM intended to invest £150–£200 million (i.e. €168–€224 million) in cycling by 2025 to build a series of strategic and largely segregated bicycle lanes that reach into the heart of the city. The bicycle lanes would connect to other off-road routes, and be supported by a programme of education, training and promotion to create a true culture of cycling.

TfGM used HEAT as part of its business case to calculate the value of reduced mortality due to increased physical activity through new cycle trips resulting from the major investment. These estimates allowed the comparison of costs and benefits and helped TfGM to win a grant of £20 million (or €22.4 million) from the United Kingdom's Department for Transport, matched by £10 million (or €11.2 million) in local funding.

These funds were used from 2013 to 2018 for several improvements in cycling infrastructure, education, training and promotion, including:

- 60 km of largely segregated bicycle lanes built since 2013
- free adult bike training sessions for around 9000 people
- projects with 11 schools and colleges to promote cycling to pupils and staff
- the opening of cycle hubs across the city region.

Data and estimates

The estimated health benefits amounted to £7.3 million (or €7.8 million) per year, with 228 tonnes of carbon emissions avoided per year. These fewer emissions were added to the wider economic benefits, feeding into a calculation of the cost–benefit ratio.

Additional considerations

Significant building of cycling and walking infrastructure took place across the city region from 2013. The flagship scheme was a transformational re-design of a major urban commuter corridor popular with students, between Manchester city centre and the suburban

village Didsbury. The Oxford Road section of the commuter corridor is one of the largest road space transformation schemes in England. Initial monitoring on one section showed an increase of 86% in cycle trips and by 2023, a million journeys had been recorded on the route, with 6980 people using the route on a single day in October. Dame Sarah Storey, Active Travel Commissioner, said: "*These record-breaking numbers show that if you build high-quality, safe active travel infrastructure, people will use it or, to put it simply: it works!*"

TfGM continued to use HEAT, including for the evaluation of its proposed city-wide bike hire scheme. In 2023, TfGM announced that Greater Manchester is to invest a further £40.7m in infrastructure for active transport to deliver their ambition to create the largest cycling and walking network in the United Kingdom.

References:

Vélocity 2025. A cycling plan for 2025 and beyond. Manchester: Greater Manchester Combined Authority and Transport for Greater Manchester Committee; 2013 (http://media.ontheplatform.org.uk/sites/default/files/Velocity2025_vision_0.pdf).

Active travel solutions for changing cities. Leeds: Urban Transport Group; 2018 (https://www.urbantransportgroup.org/system/files/general-docs/UTG%20%E2%80%93%20Active%20travel%20solutions%20for%20changing%20cities_WEB%20READY.pdf).

Cycling in Manchester is booming as one million journey record is smashed one month early. Manchester: Manchester City Council; 2023 (https://www.manchester.gov.uk/news/article/9359/cycling_in_manchester_is_booming_as_one_million_journey_record_is_smashed_one_month_early).

Greater Manchester to invest a further £40.7m in walking, wheeling and cycling infrastructure. In: Greater Manchester Moving [website]. Manchester: Greater Manchester Moving (https://www.gmmoving.co.uk/news/greater-manchester-to-invest-a-further-407m-in-walking-wheeling-and-cycling-infrastructure).

New York, United States:
Exploring the health and spatial equity implications of the New York City bike share system (2019)

TYPE: Study

This study assessed the effect of active mobility in a socioeconomic context, using HEAT to estimate the health impact of Citi Bike, New York City's existing bike sharing system, in two separate development stages (at launch and after its 2015 expansion).

HEAT estimates showed that Citi Bike use was associated with two premature deaths prevented per year after launch and three after the 2015 expansion, with a substantial related increased annual economic benefit of US$ 18 800 000 and US$ 28 300 000, respectively. Bike sharing stations, however, are disproportionately located in wealthier neighbourhoods, and the proportion of higher-poverty neighbourhoods with Citi Bike stations did not significantly increase during the expansion examined in this study. This demonstrates the potential for even greater benefits by increasing the number of bike sharing stations located in higher-poverty neighbourhoods and communities of colour.

Additional considerations

This study highlighted the importance of the built environment in shaping health, and the need for a health equity lens to consider the social and political processes that perpetuate inequities. In fact, integrating socioeconomic considerations when implementing new measures could further increase the health benefits of this bike share system through achieving inclusive health benefits by targeting the areas and demographic groups that would benefit most from new resources and infrastructure, and increased physical activity.

This study can be used to support planning and expansion for bike share systems, including dockless bike share programmes, as well as complete street infrastructure, such as bike lanes. Collaboration between community partners, city agencies (transportation, planning and health), and bike share operators is needed to expand bike share to higher-poverty neighbourhoods and communities and to address other barriers to bike share access, as well as cycling safety in general.

Reference: Babagoli MA, Kaufman TK, Noyes P, Sheffield PE. Exploring the Health and Spatial Equity Implications of the New York City Bike Share System. J Transp Health. 2019 Jun;13:200-209. doi: 10.1016/j.jth.2019.04.003 (https://doi.org/10.1016/j.jth.2019.04.003).

Additional examples

China: Jiang H, Song S, Zou X, Lu L. How dockless bike-sharing changes lives: an analysis of Chinese cities. Washington: WRI Publications; 2020 (https://doi.org/10.46830/wrirpt.18.00124).

Use of HEAT as a complement for comprehensive economic valuations of transport interventions

Provence-Alpes-Côte d'Azur region, France: Assessing the benefits of healthy mobility using HEAT (2019)

TYPE: Policy

The French region of Provence Alpes-Côte-D'Azur promoted the use of HEAT as a lever for integrating health considerations into mobility policies for three metropolitan areas in its territory: Aix-Marseille-Provence, Nice Côte d'Azur, Toulon Provence Méditerranée. This initiative aimed at promoting a cross-cutting approach to opportunities for health, integrating vision, practice and considerations of behaviours. For example, integrating health issues into mobility policies requires raising awareness among communities for the benefits of active mobility to offset the harmful effects of, for example, air pollution and improving the health of citizens.

The policy document produced for the initiative is a roadmap for communities, based on applying HEAT to the mobility policies of these areas in the Region, taking into account the specific needs of the areas concerned. The document also provides a framework applicable in other metropolitan areas.

HEAT was used to produce estimates of impact for different scenarios, with increasing ambitions in terms of cycling levels. The results related to the objectives of urban mobility plans of two of the Regions are summarized below.

Aix-Marseille-Provence

HEAT estimated that current levels of active mobility (walking and cycling, with a mode share of 31% and 1% respectively) prevented 266 premature deaths each year in the Aix-Marseille-Provence area, corresponding to a value of €854 million. The related reduction in morbidity translated to local socioeconomic savings of around €92 million (e.g. lower health-care costs for hospitalization and treatment, and less time spent within the health-care system, together with reduced absenteeism and increasing productivity).

Achieving the objectives of the Urban Mobility Plan (increasing the mode share of walking and cycling to 33% and 5%, respectively) would result in approximately 100 000 additional people regularly practicing active mobility and thus improving their quality of life. This would in turn avoid 349 deaths per year: 83 additional lives compared to the current situation or a 30% relative increase.

The value of 349 avoided deaths would be at €1120 million, and the savings from the related reduction in morbidity would be €25 million compared to the current scenario, amounting to a total of €117 million.

Nice Côte d'Azur

For the Nice Côte d'Azur metropolitan area, HEAT estimated that current levels of active mobility (walking and cycling, with a mode share of 38% and 1% respectively) prevented 89 premature deaths each year, corresponding to a value of €287 million. The related reduction in morbidity translated into local socioeconomic savings of around €32 million.

Achieving the objectives of the Urban Mobility Plan (the same walking levels, but an increased share of cycling mobility to 4%) would avoid 101 deaths per year, that is saving 12 additional lives compared to the current situation: an increase in lives saved by about 15% each year.

The value of the 101 avoided deaths would be of €324 million, and the savings from the related reduction in morbidity would increase by €3 million compared to the current scenario, amounting to total amount of €35 million.

Data

Available data, mainly from local household travel surveys were used to assess the current (baseline) cycling levels and to define the objectives of the Urban Mobility Plan. The proportion of the population that could reasonably carry out their commute by bike was estimated through a correlation between the cycling modal share and a set of local data, including the proportion of bike-friendly roads, the capacity for bike parking, the cycling culture, the terrain and the proportion of home-to-work trips less than 10 km. The correlation was calculated using a multiple linear regression on a consistent and homogeneous data set taking into account the 53 most important French urban districts, which also allowed the determination of the relative importance of chosen criteria in the practice of cycling. With walking, in the absence of precise local data, the average distance associated with trips made by walking was used.

Reference: Évaluer les bénéfices en santé des mobilités actives grâce à l'outil HEAT. Cahier technique n°2. Feuille de route à destination des collectivités et recommandations 2019-2021 [Assessing the health benefits of active mobility using the HEAT tool. Technical notebook no. 2. Roadmap for communities and recommendations 2019–2021]. Marseille: Agence régionale de santé Provence-Alpes-Côte d'Azur; 2019 (https://www.paca.ars.sante.fr/media/93219/download?inline) (in French).

Belgium:
The impact of cycling on health, climate and the economy in Belgium (2022)

TYPE: Assessment

Using HEAT methodology, this study examined the impact of cycling on the economy, public health and climate, based on the latest available statistics. It was also calculated how much achieving the goals of the national cycling policy in Belgium (i.e. achieving a modal shift) would yield in terms of prevented premature deaths, avoided carbon emissions and the total societal economic value.

Taking into account the higher risk of crashes and the increased exposure to air pollution for cyclists, Every year, cycle use in Belgium prevents 1294 premature deaths, avoids 137 717 tonnes of carbon dioxide (CO2) emissions and saves €8.44 billion per year. If the predicted 17.5% increase in the distance travelled by cycle in Belgium by 2030 is reached, both by people who already cycle regularly and will cycle more, and by new cyclists, 89 fewer people would die prematurely each year compared to in 2019 and an annual societal cost of €584 million would be saved.

The main three regions of Belgium have also set regional policy goals: namely, in Flanders an increase of the share of cycling trips from 11% in 2021 to 20% in 2025, which would prevent an additional 583 premature deaths per year; in the Brussels-Capital region, increasing cycling trips from 5% in 2018 to 15% in 2033, which would prevent 112 premature deaths per year; and in the Wallonia region, increase the modal share of cycling from 1% in 2019 to 5% in 2030, which would prevent 140 premature deaths per year.

Additional considerations

Women experience specific cycling barriers for short trips. Future policy should focus on removing these barriers, because getting women to cycle pays off: if women in Belgium would cycle as much as men, 466 premature deaths and 53 484 tonnes of CO emissions could be avoided each year, corresponding to a saved societal value of €3.04 billion. In addition, the case assessment study looked at the cycling-related economy, estimating that there are 5175 full-time jobs in Belgium related to cycle sales, production, infrastructure and tourism, with the job intensity (i.e. the number of jobs per million-euro turnover), higher in the cycling sector than in other transport sectors. Furthermore, the report specifies the health, climate and economic impacts of different hypothetical scenarios, such as if 20% of the active population were to cycle 10 minutes more per day or if people in the Brussels Capital Region and Wallonia were to cycle as much as they do in the Flanders region.

Reference: Bouwen L, Dons E, Schoeters A. L'impact du vélo sur la santé, le climat et l'économie en Belgique. Revue de la littérature et analyse coût-avantage d'une augmentation de l'utilisation du vélo en Belgique [The impact of cycling on health, climate and the economy in Belgium. Literature review and cost-benefit analysis of increased cycling use in Belgium]. Bruxelles: Institut Vias ; 2022 (https://www.vias.be/publications/Impact%20van%20fietsen%20op%20gezondheid,%20klimaat%20en%20economie%20in%20Belgi%C3%AB/impact_du_v%C3%A9lo_sur_la_sant%C3%A9_le_climat_et_l'economie.pdf) (in French).

United States:
Environment and health benefits from reduced car travel in the midwestern United States (2011)

TYPE: Study

This study used HEAT to quantity the benefits for health and the environment from reducing automobile usage for short urban and suburban trips (≤ 4 km one way) and replacing half of them with travel by bicycle in the 11 largest midwestern metropolitan statistical areas: Chicago, Illinois; Cincinnati, Cleveland, Columbus, and Dayton, Ohio; Detroit and Grand Rapids, Michigan; Indianapolis, Indiana; Madison and Milwaukee, Wisconsin; and Minneapolis/St. Paul, Minnesota. The study region had a population of 31.3 million.

This shift would result in average annual savings of more than US$ 3.8 billion in benefits across an estimated population of 2 million people (US$ 2.5 billion for short suburban and nearly US$ 1.3 billion for short urban bicycle trips), and a reduction of almost 700 premature deaths /year.

Additional considerations

The study also estimated that changes in particulate matter (< 2.5 μm) and ozone from this increased cycling would result in net health benefits of US$ 4.9 billion/year, and that the combined benefit from improved air quality and physical fitness for the region would exceed US$ 8.7 billion/year. This was equivalent to about 2.5% of the total cost of health care for the five included midwestern states in 2004.

Reference: Grabow ML, Spak SN, Holloway T, Stone B, Mednick AC, Patz JA. Air quality and exercise-related health benefits from reduced car travel in the midwestern United States. Environ Health Perspect. 2012 Jan;120(1):68–76 (https://doi.org/10.1289/ehp.110344).

Additional examples

Vienna, Austria: Meschik M. Reshaping city traffic towards sustainability. Why transport policy should favor the bicycle instead of car traffic. Procedia Soc Behav Sci. 2012; 104112 (https://doi.org/10.1016/j.sbspro.2012.06.1028).

Bogota, Colombia: Wilches-Mogollon MA, Sarmiento OL, Medaglia AL, Montes F, Guzman LA, Sánchez-Silva M, et al. Impact assessment of an active transport intervention via systems analytics. Transport Res D-Tr E. 2024;128: (https://doi.org/10.1016/j.trd.2024.104112)

Use of HEAT to assess the current situation, or past or future investments

France:
The untapped health and climate potential of cycling in France: a national assessment from individual travel data (2024)

TYPE: Study

Promoting active modes of transportation such as cycling may generate important public health, economic and climate mitigation benefits. This study, published in *The Lancet*, aimed to demonstrate how cycling can contribute to health promotion in a western European country with relatively low cycling rates such as France, documenting both the medical and the societal costs prevented by cycling.

HEAT was used to calculate the economic benefits related to reduced mortality. Specifically, the study assessed:

- the benefits associated with current cycling levels in France in terms of prevented mortality and morbidity;
- the potential additional benefits of shifting a portion (25%) of short (< 5 km) car trips to cycling, including projected greenhouse gas emissions savings; and
- the direct (tangible) medical cost savings related to five chronic diseases and the intangible costs prevented (societal costs based on the value of a statistical life year, representing the value society is ready to pay for a reduction in mortality risk).

The study found that in a country of low- to moderate-cycling culture, such as France, cycling already generates important public health and health-related economic benefits, with nearly 2000 deaths and €5 billion of intangible costs averted every year. This corresponds to an approximate €1 prevented for every km cycled. Currently, males are the main beneficiaries of cycling health benefits in France because they represent the larger proportion of the cyclists. Simulations based on individual transportation data shows that shifting only a quarter of short (< 5 km) car trips to bicycle trips would approximately double the number of preventable premature deaths, while also contributing to more balanced health benefits across genders and sizeably reducing CO2 emission.

Data

The study used individual data from a nationally representative mobility survey to describe the cycling levels in 2019 in France by age and sex. Based on national incidence and mortality data, and dose–response relationships from meta-analyses (including the analysis on all-cause mortality from HEAT), a burden of disease analysis was conducted to assess the incidence of five chronic diseases (breast cancer, colon cancer, cardiovascular diseases, dementia and type-2 diabetes) and the number of deaths prevented by cycling.

Additional considerations

This study contributes to highlighting the public health and climate mitigation benefits expected from the development of active transportation. Results demonstrate that public investments to encourage a modal shift toward cycling may translate into important climate, health and related economic benefits, which are likely to exceed the costs implied.

Reference: Schwarz E, Leroutier M, De Nazelle A, Quirion P, Jean K. The untapped health and climate potential of cycling in France: a national assessment from individual travel data. Lancet Reg Health Eur. 2024;39:100874 (https://doi.org/10.1016/j.lanepe.2024.100874).

Stockholm, Sweden:
Potential for reduced premature mortality by current and increased bicycle commuting (2021)

TYPE: Study

This study, published in the British Medical Journal, aimed to estimate the health and economic benefits obtained if all residents in a population that are able to commute to work using active transport would shift from motorized to active transport. Individual data were used to estimate the impact on premature mortality due to both existing commuter cycling and the potential impact due to increased physical activity through shifting transport mode from car to bicycle.

This study used the HEAT relative risk function for all-cause mortality in relation to cycling to calculate the reduced number of yearly premature deaths associated with increased physical activity.

Transferring commuting from cars to bicycles brings estimated large health benefits due to increased physical activity.

- On average, the mortality risk among current bicycle commuters is reduced by 16%, corresponding to 11.3 avoided premature deaths per year.
- The mortality risk would be reduced by 12% among potential bicycle commuters if they opted to change their commuting mode from car to bike, corresponding to 16.2 avoided premature deaths per year.

Data

The study used travel survey-data and registry-data on home and work addresses to identify 53 000 actual commuting trips currently made by bicycle, with 20 min estimated average bicycle duration. It also used empirical time–distance relationships among current commuters in the same population to identify an additional 111 000 current car commuters with the estimated physical capacity to cycle to work within 30 min, with an estimated average bicycle duration of 15min.

Additional considerations

The study suggests that the estimated large health impact by reducing premature mortality within this and previous health impact assessments supports interventions and policies to increase active commuting. In addition, it found that “the amounts of physical activity through bicycle commuting observed in this study among current, and also estimated among potential additional bicyclists, indicate that bicycle commuting could be a way to reach the 150 min/week physical activity level recommended by WHO”.

Reference: Sommar JN, Schantz P, Strömgren M, Forsberg B. Potential for reduced premature mortality by current and increased bicycle commuting: a health impact assessment using registry data on home and work addresses in Stockholm, Sweden. BMJ Open Sport Exerc Med. 2021;7(1):e000980 (https://doi.org/10.1136/bmjsem-2020-000980).

Netherlands (Kingdom of the):
Socioeconomic and demographic differences in walking and cycling in the Netherlands: How do these translate into differences in health benefits? (2017)

TYPE: Study

This study looked at how differences in walking and cycling translate into inequalities in health benefits at population level and quantified these health benefits for demographic and socioeconomic groups in the Netherlands (Kingdom of the). It applied HEAT to estimate how the health benefits of walking and cycling in the country differ for subgroups stratified by age, gender, education, income and ethnicity (native versus non-native Dutch populations).

HEAT estimates showed that the proportion of health benefits was greater among the native Dutch population, because their walking and cycling levels as well as their population size were higher than among non-native groups. The study also suggested that policies to increase walking and cycling among lower socioeconomic groups could induce further health benefits and thus help mitigate socioeconomic health inequalities.

Data

The study used population-representative data on walking and cycling among adults (aged 20–90 years) for the period 2010–2014.

Reference: Gao J, Helbich M, Dijst M, Kamphuis CBM. Socioeconomic and demographic differences in walking and cycling in the Netherlands: How do these translate into differences in health benefits? J Trans Health. 2017;6:358–365 (https://doi.org/10.1016/j.jth.2017.06.001).

Wales, United Kingdom:
The value of walking on the Wales Coast Path (2014)

TYPE: Assessment

Natural Resources Wales (NRW) manages the Wales Coast Path (WCP), stretching for 1400 km around the coast of Wales. A report on the economic impact of spending by visitors to the WCP (2013) concluded that the WCP generated approximately £16 million (or €18 million) of gross added value to the Welsh economy in 2013.

To make a more comprehensive assessment of the value of the path, including its health benefits, NRW commissioned an analysis using HEAT. It also wanted to investigate the extent to which HEAT could be applied to a leisure setting.

Data and estimates

Using data from counters on the path and user surveys for walkers, NRW estimated that 23 688 people walked on the path every week. On average, people walked 7 km per week spread over a mean of 1.6 visits per week.

HEAT estimated that this level of walking prevented 7 deaths per year among the WCP walkers. The economic value of the health benefits of walking on the WCP was estimated at £18.3 million (or approximately €20 million) per year.

The user surveys of walkers also asked what they would have been doing had they not been able to walk on the path. 19% of respondents said that, without the path, they would not have walked at all. Therefore, £3.5 million (or approximately €4 million) of health-related societal benefits per year can be directly attributed to the existence of the WCP.

Reference: Cavill N, Rutter H, Gower R. Economic assessment of the Health benefits of walking on the Wales Coast Path. Cardiff: Natural Resources Wales; 2014 (https://www.walescoastpath.gov.uk/media/1321/economic-assessment-of-the-health-benefits-of-walking-on-the-wales-coast-path.pdf).

Catalonia, Spain:
Health benefits from replacing short car trips with walking (2013)

TYPE: Study

Walking as a means of transport is considered a moderate physical activity, suitable for achieving activity levels recommended by WHO. The study aimed to quantify the number of women and men in Catalonia, Spain, among those not achieving physical activity recommendations, that could replace daily short motorized trips with walking, and used HEAT to estimate the annual economic benefit associated with resulting reduced mortality.

The study demonstrated the potential of walking trips as a source of physical activity and their benefits for population health. Estimates from HEAT showed the huge economic benefit that could be gained through measures supporting active mobility such as walking.

Data and estimates

In Catalonia, Spain, about half of men and women who travel on a working day did not make any journey on foot. Moreover, only 23% of men and 32% of women > 17 years achieved recommended levels of physical activity through walking.

About 16% of men and 14% of women of those not meeting WHO recommendations on physical activity would meet them by replacing at least one short, motorized trip per day by walking. As a result, the reduction in mortality gained from increased walking over one year would lead to saving about €250 million (€124 million among men and €85 million among women).

Mobility data came from more than 80 000 individuals > 17 years who reported, in the 2006 Daily Mobility Survey, having travelled on the referred working day.

Reference: Olabarria M, Pérez K, Santamariña-Rubio E, Novoa AM, Racioppi F, Health impact of motorised trips that could be replaced by walking. Eur J Public Health. 2013;23(2):217–222 (https://doi.org/10.1093/eurpub/cks015).

Additional examples

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Boston, United States: James P, Ito K, Buonocore JJ, Levy JI, Arcaya MC. A health impact assessment of proposed public transportation service cuts and fare increases in Boston, Massachusetts (U.S.A.). Int J Environ Res Public Health. 2014;11(8):8010–24 (https://doi.org/10.3390/ijerph110808010).