Environmental Health and Economics:

Use of Economic Tools and Methods in Environmental Health

World Health Organization
REGIONAL OFFICE FOR Europe

Report

of the WHO Regional Office for Europe
First Expert Symposium

29–30 November 2012
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ABSTRACT

The WHO European Centre for Environment and Health (Bonn, Germany) convened a meeting of key European experts in the field of environmental health economics on the topic "A European Strategic Framework for Environmental Health Economics" on 29–30 November 2012. The Meeting aimed to provide a forum for open discussion on how to incorporate economics into evidence-based decision-making in environment and health. The objectives were to: discuss and analyse how the recent economic situation is relevant for WHO and other health agencies and how this change can benefit or hinder the environmental health agenda; identify the priority issues and goals in connection with economics and environmental health that are suitable for assisting Member States in policy-making; and develop a draft strategic framework on environmental health economics, including areas and issues that are priorities for future pilot studies. Looking ahead to the 6th European Ministerial Conference on Environment and Health in 2016, the mid-term objective was to develop a fully-fledged European WHO and partner framework and implementation plan for the next four years, and to discuss and initiate a new WHO partner network in economics and environmental health. The Meeting made conclusions and recommendations for the development of an environmental health economics network and draft strategic framework.

Keywords

ECONOMICS
ENVIRONMENTAL HEALTH
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CONTENTS

ABBREVIATIONS

ARDs	asbestos-related diseases
EC	European Commission
ECEH	European Centre for Environment and Health
EHEN	environmental health economics network
EU	European Union
GDP	gross domestic product
HEAT	health economic assessment tool
MDG	millennium development goals
NCDs	noncommunicable diseases
OECD	Organisation for Economic Co-operation and Development
UNEP	United Nations Environment Programme
VSL	value of statistical life
WTA	willingness to accept
WTP	willingness to pay

INTRODUCTION

BACKGROUND

The policy and economic environments in the WHO European Region and beyond have changed dramatically over the last few years. Against the background of the health in all policies agenda, the need to give proper consideration to the economic dimension of policies when shaping the environmental health agenda was acknowledged by Member States at the Ministerial Conferences on Environment and Health convened in Budapest and Parma (2004 and 2010).

The importance for the public and environmental health community to deal with, and sometimes challenge, current economic models and tools has become clear. The continuing economic and financial crises in a globalized world confront policy-makers with complex policy challenges on how to overcome economic weakness, debt burden and high unemployment rates. Societies are simultaneously striving to maintain health services and environmental protection and to prevent a further deepening of social and health inequalities in the short and medium term. In the long term, it is critical to make development more sustainable, greener, healthier and more inclusive.

The Organisation for Economic Co-operation and Development (OECD), the World Bank and other national and international stakeholders, including civil society organizations, research institutes and academia, are promoting the reshaping of new economic models to tackle sustainable development challenges, and to clarify whether and how established economic approaches and conventional analyses should be revisited and redefined. The United Nations Conference on Sustainable Development in 2012 and the World Economic Forum (among others) have pointed out the need to go beyond a concentration on gross domestic product (GDP) to a point where more health-relevant end-points, such as well-being, can be included and contribute to a better definition of societal welfare.

The German Ministry of Environment, Natural Conservation and Nuclear Safety generously provided funds for the Meeting and the report.

The convergence of a large number of regional and global initiatives suggests that the time is ripe to develop and implement a strategic framework to strengthen economic evidence-based public and private investments in environmental health in Europe.

SCOPE AND PURPOSE

The WHO Regional Office for Europe, with its partners, took a further step in the work of environmental health economics by organizing an expert meeting in Bonn on 29 and 30 November 2012.

The scope and purpose of the Meeting are set out in Annex 1. The specific objectives were:

- to discuss and analyse how the recent economic debate (beyond GDP, greening the economy, limits to growth) is relevant for WHO and other health-related agencies and how this change can benefit or hinder the environmental health agenda;
- to identify the priority issues and goals in economics and environmental health that are most relevant for supporting Member States in policy-making;
- to develop a strategic framework on environmental health economics, including priority areas and issues for future pilot studies, and (looking ahead to the forthcoming 6th European Ministerial Conference on Environment and Health in 2016) as a mid-term objective, to develop a fully-fledged European WHO and partners framework and implementation plan for the next four years; and
- to discuss and initiate a new WHO partnership network in economics and environmental health (EHEN).

The programme of the Meeting is in Annex 2, a summary of the strategic framework is in Annex 3, the proposal by WHO ECEH for an environmental health economics network is in Annex 4, Annex 5 contains abstracts of the presentations and Annex 6 contains the list of participants.

CRITICAL REVIEW OF ECONOMIC MODELS AND SUSTAINABLE DEVELOPMENT APPROACHES

The first session critically reviewed current economic models relevant to the environmental health context and sustainable development approaches in order to define and shape a framework in environmental health economics.

The contributions of experts from diverse areas and with different methodological approaches enabled discussions to move towards the development of a joint strategic framework in this area of work. The presentation of specific studies and sectoral policies offered examples for discussion.

The key issues presented and the main points of discussion are summarized below.

CRITICAL REVIEW OF THE CURRENT ECONOMIC MODEL

The current mainstream economic model is defined as growth-driven and the economic level is conventionally measured by GDP. GDP is often used as an indicator or proxy for the standard of living, although it has a number of shortcomings regarding the expression of wealth and well-being of nations. GDP is a neutral measure, which merely shows an economy's general ability to pay for externalities such as social and environmental concerns. It does not account for variances in incomes of demographic groups, it excludes activities that are not provided through the market (such as household production and voluntary services), and it does not reflect the sustainability of growth (for example, the overuse of natural resources or the negative effects of climate change).

In this context, some shortcomings of current economic models have been described through the four "Us":

- unsustainable – lacking sustainability with limited resources
- unfair – lacking fairness and equality

- unhappy – using resources inefficiently to achieve life satisfaction
- unstable – incurring instability in the economy if growth remains the ultimate goal.

Based on these considerations, there is a consensus that a revised economic model is desirable, focusing on the achievement of well-being and equity rather than on monetary outputs alone.

This new model would imply the creation of new assumptions, tools, indicators and practices. The Happy Planet Index developed by the New Economics Foundation is an example of an alternative which also measures the efficiency of resource utilization in generating well-being, in turn measured by life expectancy and experienced well-being.

The notion and importance of well-being is of special importance, from a health standpoint, as it is integral to the WHO definition of health as being "… a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" *(1)*. In this context, however, there is a need to define better how to measure well-being and to create relevant indicators.

LACK OF INVESTMENT IN PREVENTION: BARRIERS AND POSSIBLE SOLUTIONS

Although there is strong political commitment to tackle the growing problem of noncommunicable diseases (NCDs) (cardiovascular diseases, cancers, chronic respiratory diseases, diabetes, obesity-related diseases as well as road traffic injuries and excessive alcohol and tobacco consumption) and the identified and projected negative economic implications, only a disproportionately small amount is spent on the primary prevention of NCDs compared with their growing societal costs due to the impairment and shortening of lives and the provision of health care. On average, only about 3% of health budgets is spent on primary prevention (in the WHO European Region). This reality stresses the importance of developing and advocating the intelligent use of economic tools and arguments by the national and international health community to make a case for a higher investment in disease prevention.

The experience with NCDs suggests that the use of economic tools and arguments for health prevention can have negative consequences within and outside the health sector. Such impacts should be carefully considered in their development and implementation phase. An example is the discontinuation of the "fat tax" in Denmark barely a year after its introduction in 2011, because of its claimed impact on the food industry, the relatively small measured benefits to the health of the population and rising food prices. This is not to speak against the fat tax as an effective economic tool to be used in public health, but rather an example showing that the positive and negative side effects on other sectors (such as industry) must be assessed before new public health-focused taxes are introduced.

There are also a number of key determining factors for environmental health economics, including the considerable side effects of economic interventions beyond the health sector, the impact of technological development on the cost of interventions, the presence of complex environmental mediators and the time lag between exposure and health outcomes. The often missing communication between health, environment and finance ministries, and the absence of multisectoral, cross-cutting and overarching approaches (such as those promoted in the health in all policies agenda) are shortcomings in current prevention approaches. The true costs and benefits of health promotion and disease prevention need to be addressed and shared in simple and clear language, without too much technical detail. A horizontal approach involving different government sectors using a common language is considered an essential prerequisite for (increased) investment in health.

Emphasis has been placed on the importance of further exploring the co-benefits of investment in environmental health and maximizing the opportunity to integrate such investment in the agenda of other sectors (such as education and transport). The mitigation of greenhouse gases, for example, does not only have an outcome on energy expenditure but also on reduced adverse health exposure and, therefore, health outcomes. In addition to demonstrating the magnitude of benefits from interventions, expected future savings should be studied and provided in order to make investment decisions even more attractive. Monetary values are not, however, the sole consideration for identifying priorities. It is vital to understand what drives prioritization in resource allocation, others' priorities and potential conflicts of interest.

Intersectoral cooperation and communication should be reinforced so as to overcome the general lack of interest in using economic approaches in the area of environmental health, which may be the result of erroneous communication strategies (often targeting the wrong audience with the wrong approach and language at the wrong time). The provision of education and knowledge about economic evidence is essential to change both minds and consumption patterns, especially among the younger generation.

LESSONS LEARNT IN THE PRODUCTION OF ECONOMIC EVIDENCE

Experience in producing economic evidence (such as the influential *Stern review on the economics of climate change* in the United Kingdom *(2)*) has shown that a number of key factors lead to success in producing economic evidence in the political and scientific communities, including:

- acknowledgement by top government officials;
- support from international agencies (such as the International Energy Agency and the European Environment Agency);

- a well-resourced research team enabling a thorough review;
- timing of publication, ideally in synchronization with other key publications in the relevant field of work;
- objectivity and intellectual respect enhanced by including team members who had not shown a prior stance on the subject matter.

In this context, the neutrality of economic studies and findings is vital, as funding bodies or commissioners of studies may want, or be perceived, to have influence over the findings.

The importance of communicating study findings efficiently, demonstrated in past experience, was considered a key lesson. Broad outreach can be achieved through the intelligent and focused use of the media. Significant investment should be put into engaging with mainstream debates in the media and with politicians so as to generate awareness and contribute to the discussion of relevant ongoing issues. The Stern review, for example, was nationally and internationally influential as it was integrated into the discussions in the Group of Eight Summit and led to the enactment of the United Kingdom Climate Change Act in 2008, which created a legally binding target for United Kingdom emission reductions. It demonstrated that risk management based on evidence surrounded by substantial scientific uncertainty does not imply inaction; it also showed the importance of engaging with politicians as well as the general public in further action.

Similarly, the precautionary principle has been widely applied in European Union (EU) laws and regulations (on, for example, food safety and chemicals) as well as international agreements and statements (such as the Rio Declaration and the Wingspread Statement *(3,4)*). In a cost–benefit analysis, costs are generally more straightforward to calculate than benefits – although they tend to be overestimated. Imperfect information on benefits should not, however, justify inaction; for example, in estimating the risk cost of the impact of exposure to lead on intelligence quotient and of cancer risks related to nitrate in drinking-water. Early warning signs deserve attention, even though conclusive evidence could be available only decades after early warnings on the health outcomes of exposure to pollutants are expressed. Risk assessment that makes the best use of available evidence should be more rigorously included in environmental health cost–benefit analysis based on a precautionary approach. While the story of the WHO Framework Convention on Tobacco Control, with the political difficulties of banning smoking and the ensuing public health success, is well known, the case of asbestos illustrates that even though health warnings and clear evidence were available early in the 20th century, it was decades before action was taken. Most bans on asbestos were not introduced until the 1980s, and asbestos-related diseases are currently causing more than 100 000 deaths annually worldwide *(5)*.

Other lessons learnt through the production of economic evidence include: the need for a follow-up strategy to outline future directions, avoid overdependence

on one model and give greater emphasis to non-market valuations. An example of a non-market valuation approach is the value of statistical life (VSL), often used in cost–benefit analyses. This study showed that the VSL is influenced by several other factors; for example, it was lower in participants who had had more training and information. This topic is of high relevance to WHO and other international agencies dealing with public health, since giving a statistical value to people`s health (and death) raises major ethical concerns. On the other hand, translating disability-adjusted life-years and quality-adjusted life-years (which are well-established and convincing measures in the public health community but not in other political spheres) into dollar-weighted disability-adjusted life-years/quality-adjusted life-years could have a major influence on political and financial decisions in favour of public health. Participants decided to deepen and broaden the discussion of this topic in future meetings of the EHEN.

CRITICAL ANALYSIS OF APPLYING ECONOMIC TOOLS IN POLICIES

After looking at economic models and their implications on environmental health, the second session critically analysed the use of economics and economic tools in various types of policy, such as regulatory and strategic policies. The perspectives and role of civil society on economics and environmental health were also shared.

WHY INTEGRATE MARKET TOOLS IN POLICIES?

Despite a general shift from command-based policies (such as regulation of performance on emission limits) to market-based policies (such as tax) over the years, market-based policies are still quite limited in the area of chemical regulation. There are critical issues in command-based policies which relate to cost-efficiency and the fact that they do not induce changes in behaviour and consumption. On the other hand, harm could be most effectively reduced at its source rather than in remediating harmful effects where they arise. Non-point source emissions (such as from traffic or houses) are particularly difficult and expensive to control at the point of damage. Thus command-based policies aiming at control at source could be more effective. On the other hand, market-based instruments target damage reduction earlier in the production process, motivate cost-effectiveness and have higher political acceptance. Since information on the costs of damage is generally incomplete, it is common simply to tax the production or use of chemicals so that the true costs of the damage are not necessarily reflected in market-based instruments: for example, highly toxic chemicals can be very cheap. Market-based and command-based instruments should not, therefore, replace but complement each other for the best results to be achieved.

In the context of market tools, future research agenda should look into the generation of information and evidence to identify, evaluate and integrate externalities into economic models (internalizing externalities), for example, valuing externalities such as costing damages (to health, buildings, etc.) caused by pollution. This would enable policy-makers to choose the optimal design and means of applying economic tools,

such as setting tax levels to reflect the severity and costs of damage better. An example is the Norwegian chemical tax, which is associated with the level of toxicity of the chemical. Market tools, such as the EU Eurovignette Directive coming into force in 2013 to tax air pollution from heavy good vehicles, would be effective in promoting investment in prevention. They can also recover some costs of "free-riding", for example the border tax adjustment of ozone-depleting substances in the United States which taxes imported goods according to the amount of such substances released if they were produced in the United States.

ISSUES TO BE TAKEN INTO CONSIDERATION WHEN INTEGRATING ENVIRONMENTAL HEALTH ECONOMICS INTO POLICIES OR DECISION-MAKING

Wider collaboration and intersectoral approach

Environmental health interventions require intersectoral efforts, so horizontal communications and motivation for other sectors are important. Environmental health economic tools need to be user-friendly for other sectors. The health economic assessment tool (HEAT) for walking and cycling, for example, is an online resource for estimating the economic savings resulting from reductions in mortality as a consequence of regular cycling and/or walking. It involves and serves several sectors, including transport planning and urban planning. In this regard, HEAT aims to support the planning of new cycling or walking infrastructures and attaches a value to the estimated level of walking and cycling when the new infrastructure is in place. HEAT has been adopted by the United Kingdom Department for Transport and drives action at local level. It has also been applied in New Zealand and Sweden, and the development of the methodology is being encouraged in Austria. The tool is designed to provide a simple and transparent mechanism by which transport economists can assess the potential value of the health impacts of walking and cycling infrastructures. There have been concerns in some quarters relating to this simplicity, and also in terms of the specific values chosen. This highlights one of the challenges of working across sectors, where approaches and expectations may differ. Nevertheless, public health professionals and transport-related professionals underline its effectiveness in integrating health considerations into other sectors through its user-friendly design.

Current health intervention practices are considered to be mainly driven by a biomedical, linear cause and effect approach. A broader, cross-cutting approach is needed to address the diverse nature of public health issues. A middle ground needs to be found between the two approaches, in which methodological limitations, mistakes and unintended consequences should be acknowledged, addressed and corrected, allowing for methodologies to be refined and better approaches developed.

In addition to the adoption of a broader knowledge approach, the interdependence of different sectors should be further explored to identify approaches that would create a win-win situation benefiting the multiple sectors involved. The Green Economy Initiative of the United Nations Environment Programme (UNEP), for example, demonstrates that low-carbon, resource-efficient policies can simultaneously enhance productivity and improve human health. However, there can still be a lack of incentive and willingness for other sectors to consider health implications, even when health-enhancing investments have been translated into monetary terms. The effectiveness of taking up health considerations simply by providing "the numbers" to other sectors remains questionable.

It is thus not a long-term solution merely to accommodate the practices and speak the language of other sectors. It is only an ideal approach at the moment, while it initiates integration and keeps health present in these sectors. As a next step, the dialogue should be taken to other levels simultaneously with interventions proposed at these levels. In formulating a future strategy, it will be necessary to define whether it should bring systematic or individual change, and whether different short- and long-term approaches will be required to address immediate and emerging problems. To generate useful economic evidence, it is essential to identify what is known and unknown by various stakeholders. Further collaboration and future opportunities should be explored among United Nations agencies and key partners, such as civil society and the private sector.

Understanding the decision-making framework

Another key issue is the importance of understanding the decision-making framework. This has implications on the levels of action taken, key arguments (concerns) identified, tools and messengers used, and awareness or creation of opportunities. An example is the Clean Air for Europe cost–benefit analysis methodology, which is part of an integrated strategy to tackle air pollution. The methodology assesses monetary health savings of alternative EU climate policies. Its output made the case for further action to control air pollution, and contributed to an agreed new ceiling being set for the EU in 2020. This work was also cited in various papers by EU institutions and was broadly disseminated through wide media coverage at national and regional levels. This example underlines the significance of understanding the structure and dynamics of a decision-making framework on determining the uptake of economic tools.

Addressing health inequities

Health inequities for all kinds of health outcome (for example, cardiovascular diseases and cancer) are a growing problem in the Region. Socioeconomic determinants of health, such as income, are often correlated to environmental exposure too, but the link between this exposure and health impact is difficult to quantify. In addition, there are challenges in assessing the effectiveness of social determinants of health intervention and impact distribution. Thus it is difficult to provide an economic rationale for

the social determinants of health intervention policies. The options for effective intervention (for example, reducing exposure equally or targeting the worst-off) will have to be assessed in order to clarify their economic implications.

Behavioural change

Policy-makers sometimes catch up with culture and public opinion rather than leading it. Thus it is important to engage the general public as well as the private sector to induce behaviour change towards prevention, which needs to be considered in the design and integration of economic tools into policies. The private sector is powerful in shaping choices and behaviour in everyday life and making significant differences through product life cycle management, while the public sector can provide incentives to encourage action by companies. However, public and private sectors have yet to use the opportunity of linking green growth and well-being and health. The importance of governing behaviour in sustainability is highlighted by the four enablers presented in the SPREAD Sustainable Lifestyles 2050 project: policy and governance (favourable policies and a cross-sectoral approach), the economy and monetary system (new business models and consumption patterns), social and technological innovation, and behavioural change.

Limitations of the valuation approach

The limitations of the valuation approach were pointed out in, for example, the EU Integrated Assessment of Health Risks of Environmental Stressors in Europe project which the assessed monetary value of air pollution and noise effects *(6)*. Findings suggest that 10% of respondents object to the willingness to pay questions, and up to 56% cannot provide a value for the health effect studied. Not everyone seems to be able to provide a value for health effects or to accept such a concept on valuating health effects. The results may, however, also suggest that there is a need to explain the benefits of valuation approaches better. In particular, it should be stressed that valuation will be done implicitly if there is no explicit basis.

Lack of data and denial of problem

The lack of information (such as on the costs of environmental-related diseases and exposure) is another major limitation on the integration of economics into evidence based decision-making in environment and health. In this regard, the example of calculating the economic burden of diseases was given. On the other hand, it was suggested that the denial of problems at governmental and societal level was probably the biggest impediment for the recognition of serious public health concerns, such as in the context of asbestos. Without recognition of the problem, it is impossible to estimate and apply the costs and thereby reduce inequalities by making the polluters pay.

TOWARDS A EUROPEAN STRATEGY ON ECONOMICS AND ENVIRONMENTAL HEALTH

At the final session, the proposed European strategy on economics and environmental health was presented and discussed (and improved by the team of experts present), and a new WHO partner network in economics and environmental health was initiated and discussed.

The draft strategy and the network aim to support and strengthen rational decision-making in environmental health. In the light of the forthcoming 6th European Ministerial Conference on Environment and Health to be held in 2016, the mid-term objective is to develop a fully-fledged European WHO and partner framework and an implementation plan for the next four years.

THE EUROPEAN STRATEGIC FRAMEWORK ON ENVIRONMENTAL HEALTH ECONOMICS

The strategic framework is proposed as a framework for concrete future action in the area of environmental health economics. It is based on an extensive literature review relevant to this area, and was drafted by external consultants in collaboration with the Regional Office. It was prompted by several key global factors including (but not limited to) the targets in the Millennium Development Goals (MDG) and the global economic crisis. With the 2015 MDG deadline, a number of proposals for sustainable development goals for the future are being developed and are setting the post-MDG development framework. One of the targets is to make the future goals more relevant to the whole world, not just to developing countries, in all sectors, including environmental health.

Several challenges arising from environmental conditions are being faced globally, and specifically in the EU. There are also several key motivators and opportunities to be drawn from the field of environmental health, including the growing body of evidence

on environmental health in recent decades linking health to several environmental determinants. The increasing frequency of evaluations of the environment is evidenced in: (i) the increasing number of cost–benefit studies; (ii) private companies' own valuations of available natural resources (for example, in the energy and agriculture sectors) and of the effects of proposed interventions on the environment, showing that the private sector is attempting to pursue interventions that are in line with sustainable development; and (iii)) several high-level meetings carried out in past decades, such as the WHO ministerial conferences on environment and health in Europe, all of which have shaped a consistent continental agenda.

A good way to strengthen evidence-based decision-making is to incorporate the economic dimension. To make this relevant, the economic methods used should be broadened and new ones developed – at the right time, at the right place, in the right language. In addition, it should be clearly stated why and how these methods can be useful despite these challenges, especially in the current economic crisis. The discussion of the reasons for the success of the Stern review as well as the studies and policy recommendations prepared by the New Economics Foundation, other research institutes and some civil society organizations, are good examples for improving the acceptance, use and convincing benefits of economic models and tools.

There is a clear need for a European strategic framework on environmental health economics. The main arguments focus on economic evidence in environmental health, the development of a strategic framework and the fact that priority-setting and policy development in environmental health do not yet make sufficient use of cost–benefit analyses. This is generally felt to be due to both lack of demand (lack of interest, motivation and understanding) and lack of information (evidence base lacking in some environmental health areas, evidence not robust, accessible, trusted or credible).

Based on the above needs, the main elements of a new strategy include the need to:

- assemble strategic partners to support the initiative
- involve the target audience in the process, and
- generate evidence in an appropriate format.

STRATEGIC PARTNERS – THE EHEN

The Meeting concluded that the systematic identification of partners and formation of a partners' network, with priority given to environmental health and economic issues, would be an essential ingredient for the development and implementation of a strategic framework. Participants agreed on the constitution of the EHEN.

Networks have important added value in that they can: (i) facilitate as a focal point the exchange of information and discussions and offer an economic and environmental health platform; (ii) establish professional contacts and promote collaboration; (iii) disseminate information about new research, publications and

projects in this area; (iv) jointly explore funding opportunities and draft joint proposals; (v) develop common guidelines and tools; and (vi) advocate in partnership for better health environments and offer evidence-based policy support.

With WHO as secretariat, the EHEN should include an extensive expert pool outside and within WHO and other networks and partners. The network should:

- ensure it is functions well and meets partners' needs
- have both short-term objectives and long-term goals
- be specific in nature
- keep a well-maintained membership registry
- establish working groups for selected environmental health priorities
- convene regular meetings, and
- create and maintain a web-based platform for communication and dissemination.

The key features for the success of the EHEN are described below.

Intersectoral approach. To be relevant to several stakeholders, the EHEN is encouraged to use an intersectoral approach by liaising with existing networks (such as the WHO Observatory) and incorporating issues relevant on the global and European scale into their agendas. This can be done through discussions with partners globally, regionally and nationally, engagement with different communities and civil society and integration into mainstream European agenda.

Uniqueness. There are several networks already in place, so EHEN needs to be unique, focused and not too ambitious so as not to raise expectations too highly. In addition, the communications strategy on the network's tasks and functioning should be clear and persuasive so as to reach a high number of relevant stakeholders.

Clear product. The EHEN should produce a clear document to be presented at the forthcoming 6th WHO Ministerial Conference on Environment and Health. This document should have key messages and present win-win possibilities for the health, environment and other sectors. For example, there is sufficient evidence of the health effects of indoor air pollution which could be used to calculate the economic impact of indoor air pollution on communities.

Transparency. Transparency needs to be ensured in the identification of participating stakeholders, communication and advocacy as well as for data collection and dissemination. This ensures the uniformity and replicability of all processes.

Advisory group. A core group of people should be identified to spearhead the project. Their tasks would include the creation of a shared vision and developing draft terms of reference and the practical programmes to be achieved. Its main objectives would be to steer the EHEN and to ensure the network focused on specified topics.

The following suggestions were made for possible working themes for the network:

- climate change
- disaster risk management and disaster response
- water and sanitation
- green economy
- air pollution, including transport and energy production
- agriculture and food safety
- chemical safety
- synthesis: overview with lessons learned from review of above topics.

The sequence of implementation would be subject to factors such as policies, available expertise and funds. For continuity and sustainability, it was suggested that annual symposia should be held to continue the initiative established at this Meeting. It was encouraging to note that some professionals had already been contacted and had expressed interest in joining the network.

INVOLVEMENT OF THE TARGET AUDIENCE IN THE PROCESS

The target audience for the strategic framework should encompass a broad range of organizations and individuals. Surveys (questionnaire and selected interviews) should be conducted with national policy-makers and experts with the aim of serving the needs of different audiences better and identifying the evidence and tools needed. Such surveys could inform the EHEN about the type of evidence needed (when and in which form) by policy-makers to improve the decision process and outcome, that is, they would identify the knowledge gaps. Specific and adapted communication tools to exchange information with the stakeholders should be developed and maintained. A web-based portal containing up-to-date information on economics and environmental health, and especially regarding the specific topics of interest, could be set up, depending on the funding situation. Training events should be held to build the capacity of the stakeholders as well as occasional high-level meetings to put environmental health economics on the political agenda.

EVIDENCE BASE

Terms such as sound evidence, and key conceptual issues such as intergenerational equity and distributional justice should be clearly defined to avoid future discrepancies.

Subject to funding and voluntary investments by the network, the following activities should be carried out by WHO and its partners:

- available evidence on the use of economics in environmental health should be reviewed and new evidence generated based on pre-set priority areas to inform decision-making;
- online databases and web portals should be maintained and updated regularly to equip decision-makers with the most recent evidence available;
- clear guidelines for collection and management of data should be provided, with manuals in a user-friendly format;
- case studies on successful interventions, tools, etc. should be shared and updated regularly so that the EHEN can assist policy-makers in identifying what will help them in the policy process and why these issues are important.

To ensure the sustainability of these tools, the partners need to have clear roles and ownership of the process. Guidelines and boundaries for data collection and analysis should be clearly stated to promote uniformity, transparency and reliability of the information generated as well as to guide quality control.

The tools developed should be based on a common standard of operation/practice. There should be specific guidelines for each sub-group of the network working on different environmental health issues and priorities defined by the network.

The key aspects to success of the evidence base are output and uptake. The presentation of evidence needs to be well-disseminated and adapted to relevant audiences. It should be used in decision-making and in training decision-makers to increase their understanding, and ways should be found to integrate it better into decision-making. The uptake of evidence should be monitored and evaluated to provide feedback in real time to other ongoing initiatives and to identify the need for new evidence.

The decision-making framework developed to guide this process needs to strike a balance between usability and robustness and be able to incorporate qualitative aspects (such as attitudes and values) which are missing in many economic analyses. The tools and processes used to gather information need to be easy to use and understand and adapted for use in varying projects to give desired, replicable and comparable results.

CONCLUSIONS

The current mainstream growth-driven economic model has a number of shortcomings in addressing the multidimensional nature of well-being. Methodological limitations of economic evaluation in environmental health, such as issues with the valuation of externalities and difficulties in addressing health inequities, can undermine confidence in the use of economic evidence in decision-making. The production, use and communication of economic evidence on health-related issues has traditionally been limited to an audience within the health sector, yet such issues are highly relevant to a wider community such as the finance, transport, agriculture, housing and energy sectors. It is clear that a horizontal, multisectoral approach is needed, given the various aspects of economic evaluation (such as evidence research, development of tools, dissemination) and decision-making. Strategic and coordinated efforts are, therefore, necessary to address these constraints, to reflect the true costs and benefits of environmental health interventions better, and to improve decision-making related to environmental health.

The proposed strategic framework acknowledges the challenges and current limitations of economic valuation and aims to address these issues by taking the following action:

- formation of a network of strategic partners (the EHEN) to support and direct the work, implement identified projects and facilitate communications to promote development in this area;
- involvement of a target audience, stakeholders and policy-makers in the process so as to understand their needs and produce evidence that is useful and acceptable;
- generation of evidence in a consistent and understandable format, and provision of training in the utilization of evidence.

In addition, a number of cross-cutting elements are incorporated in the strategic framework to ensure current constraints are effectively tackled, including:

- consensus-building at a broad level
- capacity-building
- communication
- monitoring and evaluation.

The first step will be to establish the EHEN with the aim of gathering and including experts and relevant professionals in the field. This will stimulate further discussion to start implementation of key elements of the framework, especially in priority work areas, and to explore potential opportunities for projects and resources for activities outlined in the framework. An implementation plan and a timeline should also be developed to organize the EHEN activities.

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ANNEX 1
SCOPE AND PURPOSE

The policy and economic environment in the WHO European Region and beyond has changed dramatically over the last few years. In the light of the health in all policies agenda, the need to consider properly the economic dimension of policies when shaping the environmental health agenda was acknowledged by Member States at the Ministerial Conferences on Environment and Health, convened in Budapest and Parma (2004 and 2010).

The importance for the public and environmental health community to deal with, and sometimes challenge, current economic models and tools has clearly emerged. The ongoing economic and financial crisis in a globalized world confronts policy-makers with complex policy challenges on how to overcome economic weakness, debt burden and high unemployment rates.

Simultaneously, societies are striving to preserve health services and environmental protection and to prevent a further deepening of social and health inequalities in the short and medium term. In the long term, it is critical to make development more sustainable, greener, healthier and more inclusive.

The OECD, the World Bank and other international and national stakeholders and academia are promoting the shaping of new economic models to tackle sustainable development challenges and to clarify whether and how established economic approaches and conventional analyses have to be revisited and redefined. The 2012 United Nations Conference on Sustainable Development, the World Economic Forum in Davos and many others have repeatedly pointed out the need for an era beyond GDP, where more health-relevant end-points, such as well-being, contribute to define societal welfare.

WHO has been engaged in this dialogue and in the conceptual thinking needed to provide relevant policy advice and foster effective and efficient implementation for the benefit of a more environmentally friendly and sustainable economic system for better health for all. In the light of the escalating challenges in the environmental

domain, the Regional Office, with its partners, intends to take a further step in the work on economics and environmental health by holding this meeting.

The specific objectives of this workshop are to:

- discuss and analyse how the recent economic debate (beyond GDP, greening the economy, limits to growth) is relevant for WHO and other health agencies and how this change can benefit or hinder the environmental health agenda;
- identify the priority issues and goals to be pursued in connection with economics and environmental health that are suitable for assisting Member States in policy-making;
- develop a strategy on economics and environmental health, including areas and issues that are priorities for future pilot studies; in the light of the forthcoming 6th European Ministerial Conference on Environment and Health in 2016, the mid-term objective is to develop a fully-fledged European WHO and partner strategy and implementation plan for the coming four years;
- discuss and initiate (if deemed appropriate) a new WHO partner network in economics and environmental health in order to:
  - share information;
  - explore consensus-based and diverging positions and findings, including analysis of plausibility of existing economic tools such as cost–benefit analysis, cost-effectiveness analysis and combined health impact/cost–benefit analysis;
  - undertake collaborative research, analysis and forecasting of activities and projects;
  - identify and discuss application of new tools;
  - identify knowledge/evidence gaps and promote further research;
  - join forces for fund raising for this area of work;
  - identify future needs for guidelines and training modules;
  - discuss and establish a roster of experts and consultants.

ANNEX 2
PROGRAMME

Thursday, 29 November 2012

09:30–10:30 **Session I. Economics: a critical review – beyond GDP – greening the economy – sustainable development.**

Chairperson: George Morris, independent adviser

Environment and health vision and links to economics
Srdan Matic, WHO

What is wrong about economics? Beyond GDP – greening the economy
Aniol Esteban, New Economic Foundation

Mortality risk valuation in environment, health and transport policies; meta-analysis of VSL estimates
Nils Axel Braathen, OECD

Discussion

11:00–12:30 Videoconference with WHO Brussels office: economics of prevention – Health 2020
Roberto Bertollini, WHO

The Stern review and after: shaping politics with economic arguments for better health, sustainable development and the environment
Alex Bowen, London School of Economics

The economics of precaution: implications for future research
Mikael Skou Andersen, European Environment Agency

Review of economic tools used in the field of chemicals regulation policy – benefits and shortcomings
Radmilo Pesic, University of Belgrade

Discussion

14:00–15:30 **Session II. How economic tools and policy arguments are applied by WHO and partners – a critical analysis.**

Chairperson: Radmilo Pesic, University of Belgrade

Health co-benefits of green policies in the built environment: urban design and planning, buildings, transport and water supply and sanitation
Ronal Gainza-Carmenates, UNEP

Other people's shoes - the health economic assessment tool (HEAT) for walking and cycling
Harry Rutter, London School of Hygiene and Tropical Medicine

Economic assessment for clean air. Clean Air for Europe project results and United Nations Economic Commission for Europe Convention on Long-Range Transboundary Air Pollution
Mike Holland, independent adviser

EU Integrated Assessment of Health Risks of Environmental Stressors in Europe project - traffic-related air pollution and noise. Willingness to pay, willingness to accept, risk perception and acceptability
Erik Lebret, National Institute of Public Health and the Environment (Netherlands)

The economic costs of asbestos
Andrew Watterson, University of Stirling

Discussion

16:00–17:30 SPREAD Sustainable Lifestyles 2050 project – the four enablers
Caroline Costongs, EuroHealthNet

Monetary health savings of alternative EU climate policies, application of Clean Air for Europe methodologies
Julia Huscher, Health and Environment Alliance

Perspectives on green growth and behaviour change from other sectors
Fiona Adshead, consultant, British Telecom

Social health inequities: lessons from Europe
Erio Ziglio/Matthias Braubach, WHO
Marc Suhrcke, University of East Anglia

Discussion

Friday, 30 November 2012

09:00–10:30 **Session III. Towards a European strategy on economics and environmental health**

Chairperson: Harry Rutter, London School of Hygiene and Tropical Medicine

	Towards a European strategy on economics and environmental health *Guy Hutton, WHO consultant*
	Remarks by reviewers: *Mike Holland, Caroline Rudisill*
	Notes from WHO: *Srdan Matic, Marco Martuzzi, Frank George*
	Open discussion: general feedback on draft, knowledge gaps, economic schools of thought, strengths and limitations of economics in environmental health
	Future development of the framework – further topics for discussion: (i) what convinces policy-makers – short-term political versus long-term environmental health horizon; (ii) implementation of framework with partners; (iii) opportunities and other relevant works on economics and environmental health
11:00–12:30	Strategic WHO partners' reflections on the draft of T*owards a European strategy on economics and environmental health*
	EC/European Environment Agency
	Nongovernmental organizations
	Private sector
	OECD
	UNEP
	Universities
13:30–14:45	**Session IV. Discussion of the new WHO partnership network in economics and environmental health**
	Chairperson: Caroline Rudisill, London School of Economics
	Launching of the new partnership network on economics and environmental health *Frank George, WHO*
	Open discussion on the partnership network proposal
	One partnership example – 7th EU Framework Programme for Research and Technological Development research project on obstacles and prospects for sustainable lifestyles and green economy in Europe. Presentation of draft plans and exploration of potential links and partners' interest *Caroline Costongs, EuroHealthNet*
	Open discussion of the overall topics, open questions, findings and way forward

ANNEX 3

TOWARDS A EUROPEAN STRATEGY ON ECONOMICS AND ENVIRONMENTAL HEALTH – DISCUSSION PAPER

INTRODUCTION

While public decision-makers strive to design both efficient and equitable health policies, health economic evidence is currently underutilized in environmental health decision-making in the WHO European Region.[1] The European Ministerial Conferences on Environment and Health have strongly emphasized the importance of economic evidence to improve decision-making and priority-setting for environmental and public health. A large number of converging initiatives at regional and global levels suggest that the time is ripe to discuss and develop a strategy to strengthen economic evidence-based public and private investments in environmental health in Europe. Key challenges in generating and using economic evidence need to be addressed, in particular the generation of relevant and high quality evidence to fill current gaps, the availability and appropriate interpretation of economic evidence, and the motivation for and capacity of decision-makers to better use of economic evidence.

The target audiences of a new strategy are twofold: primarily, the Member States of the WHO European Region and regional bodies[2] as the ultimate users of evidence; and, secondly, those who will be involved in the implementation and financing of the strategy.[3]

1 Economic evidence is not only underutilized but often used inefficiently and in a non-harmonized way regarding publications in the same area. The full potential of economic arguments is not fully exploited due to a lack of transparency of why and which economic method was applied, the reasoning for the underlying assumptions, the lack of (recent and comparable) data, different discount rates used, vague and/or disputable pricing methods of internalizing externalities, evidence gap between who invests (pays) and who receives (return of investment), and other scientific shortcomings.

2 These include ministries such as health, environment, transport and finance, and global and regional bodies such as development banks, the EC, OECD, United Nations Children's Fund, UNEP and WHO.

3 These include agencies proposed in the partnership network (see separate proposal), which includes United Nations organizations, academia, research institutes and nongovernmental organizations.

The aims of this document are to:

- set out the broader context in which environmental health decisions are made, and the relevance of economic evidence within that context;
- outline the current knowledge base;
- propose elements of a new strategy for the economics of environmental health, based on the identified gaps;
- advocate a more harmonized, transparent and effective set of economic arguments to support the implementation of health in all policies.[4]

The WHO ECEH, established by the Regional Office in 1989, has been supporting the European process on environment and health. This discussion paper is in line with the current activities of WHO ECEH following up the Fifth Ministerial Conference on Environment and Health, held in Parma, Italy, in 2010. The purpose of bringing together experts and key stakeholders in Bonn on 29 and 30 November 2012 is to review and discuss the findings and proposals of this discussion paper and to agree upon the next steps in its finalization for setting up a new partnership network and for initiation of joint activities.

THE CURRENT GLOBAL ECONOMIC AND POLICY CONTEXTS

Recent decades have witnessed an unparalleled process of democratic transformation in Europe, with deepening and expanding economic and political ties across the 27 member states of the EU and, to a lesser extent, the 53 Member States of the WHO European Region. Through this enabling environment, increasingly rigorous and harmonized environmental health policies have flourished on subjects such as water, air, energy, agriculture, housing, occupational health, chemical hazards, food safety and tobacco control.

The global economic crisis, which began in 2008, has brought some of the inconsistencies in EU enlargement and financial systems, in particular the single European currency, to the forefront. Recession coupled with rising social welfare costs and increasingly unserviceable debts at all levels of government have greatly reduced the availability of funds for public projects and social policies. These economic woes have already had a major impact on public financing in most European countries. Increased pressure to cut expenditure has led to a de-prioritization of environment and health issues.

A second, more silent but equally serious crisis, is in the making, in the area of the environment, through its multiple dimensions of energy, material flows and climate

4 Health in all policies [web site]. Brussels, European Commission, 2013 (http://ec.europa.eu/health/health_policies/policy/index_en.htm, accessed 13 July 2013).

change. In fact, the environmental crisis could ultimately be more serious than the current economic crisis. Even if not immediately, current levels and patterns of resource consumption, environmental pollution and climate trends could make a significant impact on the more distant welfare of humankind. To avoid these risks, society will need to change its approach towards sustainable means of production and consumption. This transition is already in process, but given the fundamental shifts needed it is only partial so far, and many challenges remain.

A number of initiatives and movements have formed in the past decade, such as the MDGs, the UNEP's Green Economy Initiative, the rising trend in corporate social responsibility, improved environmental statistics, alternative approaches to measuring national welfare and a multitude of grassroots movements. The Earth Summit in 2012 provided an opportunity to consider alternative approaches among a diverse range of stakeholders, and to kickstart a new process for a global development framework, including the sustainable development goals that are planned to replace the MDGs in 2015. The process under way to agree on a set of sustainable development goals suggests that a broader set of goals than the eight MDGs will be proposed to the United Nations General Assembly. Initiatives linking health and the environment should stand to benefit from these broader developments, given the multiple levers that can be pulled on topics such as climate change, sustainability, links with poverty reduction, efficient use of resources and social justice.

In response, the Regional Office has created a new programme on economics and environmental health at WHO ECEH and is initiating a new call to highlight this increasingly important interdisciplinary area. These efforts will enhance the creation, dissemination, understanding and use of scientific findings, data and statistics through translating a range of evidence into actionable recommendations for environmental health decision-makers.

ADEQUACY OF EXISTING ECONOMIC TOOLS AND METHODS TO INFLUENCE DECISIONS

In formulating a strategy for economics and environmental health, it is important to be clear about what kind of information and evidence decision-makers need, and when, how and through which channels they will apply it. Economic research studies in environment and health do not always achieve their aim of influencing sector policies and resource allocations, for a number of reasons. These include the limited number of robust economic studies conducted in each environmental health field, and the fact that robust studies alone do not always provide policy advice, as they need to be skilfully combined with other scientific and contextual data to decisively influence decision-making. Properly utilizing economic studies in policy decisions is challenging and requires multidisciplinary efforts. There are not enough mechanisms to present up-to-date, harmonized, transparent and relevant compiled evidence,

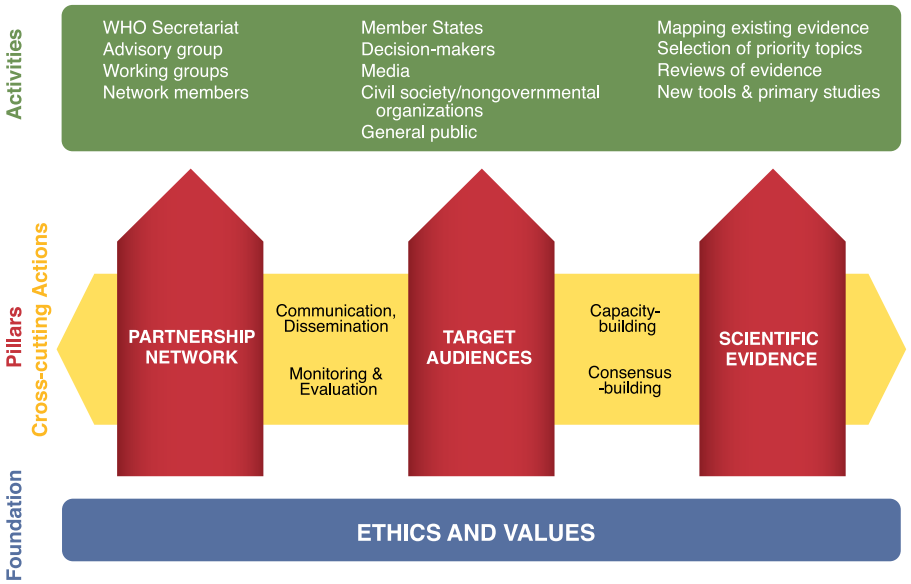
ideally agreed by the majority and/or leading environmental health economists, in a digestible format for decision-makers at the right time and in the right place.

Based on the analysis of the evidence available and the ways in which evidence is or is not used, the elements of a new strategy are elaborated below.

ELEMENTS OF A NEW STRATEGY ON ECONOMICS AND ENVIRONMENTAL HEALTH

The proposed elements of a strategy encompass three elements: strategic partnerships, target audiences and generation of economic evidence. These are founded on underlying principles, ethics and values emanating from the strategy's partners and various accords, declarations and policy documents. These three elements are supported by four cross-cutting aspects that cover capacity-building, consensus-building, communication and dissemination, and monitoring and evaluation (Fig. 3.1).

Fig. 3.1. Elements of a European strategy on economics and environmental health



Strategic partners. Contributing to the workplan will be WHO and a diverse range of organizations and individuals. The first step will be to identify and approach potential network partners, and define working groups for priority environmental health themes. These working groups will help oversee and contribute to the implementation of the workplan.

Target audiences. A strategy must be clear about which decisions can and should be changed as a result of improved evidence, and if so, how. Therefore, the diverse range of potential users of evidence needs to be identified and their needs for evidence understood. It should also be made clear who the beneficiaries of improved environmental health policies are and how they are affected.

Evidence. Existing evidence needs to be collected, reviewed and collated; evidence gaps identified and prioritized; and new evidence generated. To support generation of evidence, economic guidelines and tools are needed, as well as training in economic techniques.

A diverse set of products will be generated from the implementation of the strategy. These include, but are not limited to:

(i) a partnership network with regular meetings, working groups for environmental health topics, a web platform for communication, and a pool of experts;

(ii) communication with decision-makers, including initially a survey to understand their needs for evidence, timing of when they need support, and constraints such as pressure groups, political cycles and budgets;

(iii) development of a generic technical decision-making framework for incorporating a range of economic and other evidence to guide decision-makers;

(iv) review, analysis and compilation of economic evidence on discrete environmental health topics, with identification and prioritization of gaps in economic evidence;

(v) economic guidelines, tools, training materials and events, including pilot testing before scaling up;

(vi) generation of new high quality economic evidence and conduct of new economic studies to fill key evidence gaps identified in (iv) above;

(vii) evaluation of dissemination and utilization: evidence outputs are provided in various forms and levels of detail, as informed by the survey (see (ii) above), for incorporation into decision-making, supported by a web portal, and including monitoring and evaluation of evidence uptake by decision-makers to provide feedback to earlier steps.

The next steps are to discuss these proposals with stakeholders, invite contributions and agree the best way for the strategy to be carried further and which activities to implement. At the next Ministerial Conference on Health and the Environment in 2016, considerable progress can be reported on the development and partial implementation of the proposed strategy.

ANNEX 4

DRAFT PROPOSAL BY **WHO ECEH** FOR AN ENVIRONMENTAL HEALTH ECONOMICS NETWORK

INTRODUCTION

Changes in the policy and economic environment in the European Region and beyond have revealed the growing importance of economic evaluation in environmental health policies.

To effectively link knowledge and information in this relatively new area, the WHO ECEH proposes the formation of an EHEN. This partnership network will be the focal point of information and discussions. It will also establish professional contacts and facilitate collaboration in work in this field.

Members of the network will be the most important resource for their voluntary contributions in exchanging the latest information, opportunities and professional opinions in this area. Such contributions will be vital to the network's added value and sustainability. The network will comprise individuals from academia and research institutes as well as other organizations such as other United Nations agencies, the EC and its institutions (including the European Environment Agency), OECD, regional development banks, nongovernmental organizations and the private sector. WHO ECEH will be the secretariat to foster communications and development, collate environmental economics research in a sustainable and integrated manner, and encourage the initiation of further research to close existing knowledge gaps.

The participants in the meeting on economics and environmental health on 29 and 30 November 2012 in Bonn, Germany, will be invited to discuss and refine the terms of reference for a partnership network, as proposed here, and to join this new network.

OBJECTIVES OF THE NETWORK/TERMS OF REFERENCE

The objectives of the network and its terms of reference are as follows.

- The secretariat and members will:
  - collate and share research and information in environmental health economics;
  - facilitate development and research by identifying research gaps, guidelines and training needs;
  - explore funding opportunities with partners and communicate opportunities for fund raising in this area with the eventual aim of making proposals for joint projects;
  - advocate to partners, donors and the public the adoption of academic research results and recommendations in the area of economics and environmental health;
  - form a network to connect experts and institutions, establish contacts and promote discussions.
- The secretariat and members will carry out annual evaluation and expert meetings to be held by the secretariat, some of which (subject to funding) will be web-based. The timing of meetings will be decided, with the next one to be held in mid-2013 after the initial start in November 2012.
- The secretariat will:
  - maintain an online inventory of key literature as recommended by members of the network, to be updated twice a year with updates communicated to all network partners and subscribers;
  - provide a web-based platform for members to discuss the latest developments, such as application of new tools and important research updates, and to share experiences, case studies or problems for discussion;
  - establish and maintain a roster of experts and consultants by areas of expertise, topics and geographical regions;
  - explore the interest in, and possibility of, expanding the network to include, for example, two or three new WHO collaborating centres in the area of economics and environmental health.

MEMBERSHIP

All participants in the meeting on 29 and 30 November 2012 in Bonn are invited to join the launch of this network. The secretariat and network members can invite new members to join the network, the only precondition being that they sign the declaration of no conflict of interest.

Target members of the network are those who are: (i) technically relevant, for example, they are carrying out academic research and have published in this area, and/or (ii) professionally relevant, that is, they are working in this field in the public or private sectors, international organizations or civil society.

The secretariat will maintain the registry of members.

All outputs and articles/publications will acknowledge either the collaboration partners or the specific author/agency.

The length of this network is open-ended. Any developments or changes will be decided at the network's annual evaluations of its activities.

SECRETARIAT

WHO ECEH will be the secretariat of the network and will cooperate closely with members and other partners, such as other United Nations agencies, EC and EU institutions, OECD, development banks, nongovernmental organizations, think tanks, academia and the private sector.

ANNEX 5
ABSTRACTS OF PRESENTATIONS

MORTALITY RISK VALUATION IN ENVIRONMENT, HEALTH AND TRANSPORT POLICIES[5]

Nils Axel Braathen
OECD

The presentation focused on a new OECD book, *Mortality risk valuation in environment, health and transport policies*, which was based on a meta-analysis that was carried out on VSL estimates derived from stated preferences surveys in environmental, health and traffic risk contexts across the world.

There is – and should be – increasing focus on cost-benefit analyses in public policy-making. The outcome of such analyses of environmental and climate, transport and health policies often depend heavily on the number used for the VSL. However, VSL numbers vary greatly across countries, and even between sectors in the same country. The project therefore included, to our knowledge, the first global meta-analysis of stated preference surveys of mortality risk valuation. These surveys ask adults their WTP for small reductions in mortality risks, deriving estimates of sample mean VSL for environmental, health and transport policies. The variation in VSL estimates were explained by differences in characteristics of the stated preferences methodologies applied, the population affected and characteristics of the mortality risks valued, including the magnitude of the risk change.

The most important variables explaining the variation in VSL are GDP per capita and the magnitude of the risk change valued. According to theory, however, VSL should be independent of the risk change. The book discusses and tests a range of quality

5 This project was carried out by Vincent Biausque, National Institute of Statistics and Economic Studies, Paris, France; Nils Axel Braathen, OECD Environment Directorate, Paris, France; Henrik Lindhjem, Norwegian Institute for Nature Research, Oslo, Norway, and Ståle Navrud, Department of Economics and Resource Management, Norwegian University of Life Sciences, Ås, Norway.

screening criteria, including the size and representativeness of the samples surveyed. The authors of the original studies were contacted to get their judgments of which of their estimates should be used in the meta-analysis, in order to investigate the effect of limiting the meta-analysis to high quality studies.

When limiting the meta-analysis to studies that find statistically significant differences in WTP using external or internal scope tests, without requiring strict proportionality, it was found that mean VSL from studies that pass both tests tend to be less sensitive to the magnitude of the risk change.

To establish VSL numbers in individual countries, the book suggests benefit transfer in terms of a simple meta-analysis function with GDP per capita, or unit value transfer of a VSL estimate from a neighbouring country with income adjustments. In both cases it is suggested to apply an income elasticity of VSL equal to 0.7–0.9, with a sensitivity analysis for 0.3–0.4 for some subsets of the data that satisfy scope tests or use the same high quality survey.

Using these assumptions, the presentation gives examples of the calculation of basic VSL values for Germany and Poland, and makes suggestions as regards modifications that could be made to these values, based on a number of criteria.

THE STERN REVIEW AND AFTER

Alex Bowen
Grantham Research Institute on Climate Change and the Environment

According to the *Stern review of the economics of climate change*,[6] human-induced climate change is a "market failure on the greatest scale the world has seen." In the United Kingdom, and perhaps more widely, this assertion and the review's estimates of the costs of inaction grabbed the attention of politicians and the media. It reframed climate change as an economic issue of the first order. In that respect, its preparation, arguments and presentation may provide some useful lessons for everyone making the case that environmental health is important for economic reasons as well as for its intrinsic merits.

The United Kingdom government (specifically, the then Chancellor of the Exchequer) commissioned the review in 2005. The government was already aware that anthropogenic climate change would become more and more important as a political issue, especially in international relations. Climate change policies, such as the United Kingdom climate change levy and the EU emissions trading scheme, had already been designed and implemented. The United Kingdom Royal Commission on Environmental Pollution had advocated strong action in 2000. The government had worked hard to get climate change on to the agenda at the Group

6 Stern N. *Stern review on the economics of climate change*. London, HM Treasury, 2006.

of Eight summit in Gleneagles, Scotland, in July 2005. But the Chancellor wanted to know how strong a case could be made for immediate action to mitigate climate change – and he needed ammunition if he was to press the case domestically and internationally for more comprehensive policies.

The review's terms of reference made it clear that it would be an ambitious undertaking. The Stern team, assembled from the civil service, academia and elsewhere, were to examine the evidence on:

- the implications for energy demand and emissions of the prospects for economic growth;
- the economic, social and environmental consequences of climate change in both developed and developing countries;
- the costs and benefits of actions to reduce greenhouse gas emissions from energy use and other sources; and
- the impact and effectiveness of national and international policies and arrangements in reducing net emissions in a cost-effective way and promoting a dynamic, equitable and sustainable global economy.

They were to consult with key stakeholders, internationally and domestically, to understand their views and inform the analysis. Then, based on all the evidence they were to provide a report to the Prime Minister and Chancellor by autumn 2006 giving an assessment of the economics of moving to a low-carbon global economy, focusing on the medium- to long-term perspective, and drawing implications for the timescales for action and choices of policy and institution. They were also to offer an assessment of the potential of different approaches for adaptation to changes in the climate.

In some respects, this exercise had much in common with the royal commissions that are set up in the United Kingdom to examine difficult policy questions where cross-party consensus appeared possible. According to the BBC, "Royal commissions are advisory committees established by the government to investigate a matter of public concern on an ad-hoc basis. The government may set up a royal commission if it wishes to be seen as addressing the investigation in a non-party political way. A government is not bound to accept the advice of any royal commission." But in this case, the government wanted a report speedily and it wanted to take action – it just did not know how much. As the BBC says, "In practice, royal commissions have sometimes been established to deal with issues that a government feels may be too controversial to be seen tackling itself." This was different – the government wanted to enhance its authority to tackle the problem of climate change.

The gambit worked. Why? First, the Chancellor chose someone to lead the review who was a well-respected academic and policy-maker, with practical experience in government and development banks, who had excellent academic contacts and who at the time was not identified with any strong established position on the economics of climate change. Second, the review team reached out to other governments

and academics, drawing on their knowledge and alerting them to the importance of the exercise in the eyes of the United Kingdom government. Third, the review was thorough (692 pages) and well-resourced. Fourth, time and effort were spent explaining its findings to the media in a user-friendly way. Fifth, the team worked with other organizations, such as the International Energy Agency and European Environment Agency, which were also trying to raise the profile of climate change. The review's timing with respect to the 2007 International Panel on Climate Change Fourth assessment Report was helpful, too. Sixth, it was part of a bigger, lengthier process stretching from the 2005 Gleneagles summit to the 2009 United Nations Framework Convention on Climate Change Conference of the Parties in Copenhagen. When the domestic success of the review became clear, the United Kingdom government established a team to work with other countries on policy portfolios for low-carbon growth.

What impacts did the review have? Domestically, it provided the intellectual underpinnings for the United Kingdom Climate Change Act of 2008, which enshrined the United Kingdom's decarbonization targets in law and established an independent expert body to advise the government and assess its progress towards climate change policy goals. There were only three votes against in the House of Commons and the emissions target was tougher than initially proposed. Internationally, it helped to change the terms of the debate on climate change policies in several countries and enhanced the United Kingdom government's influence in international forums. In the academic world, it provoked fierce debate, which has further advanced the economic analysis of the subject. The slides allude to some of the controversies. But the impact should not be exaggerated. There is no global deal yet and will not be until at least 2015. Carbon pricing is not widespread and extensive energy subsidies remain. That is a salutary sign that exercises like the Stern review work slowly and only as part of a sustained and broad campaign.

SOCIAL HEALTH INEQUITIES: LESSONS FROM EUROPE. CONSEQUENCES OF ECONOMIC DISADVANTAGE

Matthias Braubach
WHO ECEH

Studies and datasets from international organizations show the impact of economic disadvantage on environmental conditions and health. There is, for example, evidence that the economic crisis has had a strong effect on households and their budgets, with 70% of European households indicating that they reduced their spending on health and food items.

Environmental conditions are one of the relevant dimensions of poverty, social exclusion and deprivation. Evidence shows that environmental disadvantage is associated with social disadvantage, making population subgroups with low

socioeconomic status more exposed to environmental threats. Taking housing conditions as an example, European statistics show that low-income households suffer:

- almost three times as often from dampness problems than high income households
- three times as often from budgetary constraints in heating the dwelling adequately
- more than 10 times as often from a lack of sanitary equipment such as a bath or shower.

A specific problem identified for the environmental effects of social exclusion and disadvantage is the increase of inequality with multiple disadvantages. Many socially disadvantaged population subgroups are disadvantaged by more than one dimension, which leads to the identification of extreme inequity in the most deprived population groups. For example, in 2009 the percentage of households reporting problems with residential crowding was 10% of all households in the countries that belonged to the EU before May 2004 and 18% for the whole EU, but in the 12 countries that joined the EU after 2004 it was as high as 77% in low-income single-parent households with children.

Overall, the data indicate that socioeconomic determinants (most often income) have a very strong impact on differences in environmental exposure, and that the average exposure levels for the total population are by no means a good indicator for the magnitude of inequalities. In that context, noting that especially income-related inequalities produce gradients of exposure across the income categories, a major challenge arises for the interventions tackling these inequalities and making choices on what should be prioritized: improving environmental and health conditions for all, or targeting the most exposed population groups? While the answer to this question has to be made case by case, there is a strong need for further evidence on the equity impact of interventions designed to improve environmental conditions and reduce social inequalities in environmental risk.

ACHIEVING HEALTHY AND SUSTAINABLE LIFESTYLES BY 2050

Caroline Costongs
EuroHealthNet

The European Network of Public Health and Health Promotion agencies (EuroHealthNet) based in Brussels is involved in the SPREAD Sustainable Lifestyles 2050 project. This project represents a new type of research being tested by the EC under the 7th Framework Programme for Research and Technological Development, Socio-economic Sciences and the Humanities thematic area. It developed the knowledge base on sustainable lifestyles in the area of living, moving and consuming. Health, well-being and social equity have been integrated as cross-cutting themes. Stakeholders from business, research, policy and civil society and from different

sectors (such as health, transport, housing, urban planning and economics) collaborated to design future scenarios, as well as a research agenda and a roadmap for sustainable living in 2050.

It is important to bring the perspective of sustainable and healthy lifestyles into the proposed WHO network. Current patterns of economic growth influence our lifestyles and levels of chronic disease and inequality and damage the environment, undermining economic development over the long term. What is healthy and sustainable living? What is unhealthy and unsustainable today? The SPREAD Sustainable Lifestyles 2050 project calculated that EU citizens have lifestyles that lead to an annual material footprint of, on average, 40 000 kg. It has also identified that by 2050 the impact of our lifestyles must decrease to an average of 8000 kg of material resource consumption per year per person in order to remain within the planetary limits of natural resources. The purpose of setting such a quantitative target is to capture the change required in visual terms and to facilitate debate.

How can we make our lifestyles more sustainable? Change requires political leadership as well as collective action and responsive citizens. This will only happen if bottom up and top down approaches come together. We identified four enablers for sustainable and healthy lifestyles: policy and governance, economy and monetary system, social and technological innovation, and behaviour change.

Progress in our economies is currently measured in terms of levels of production and consumption, and our aspirations are intrinsically linked to current patterns of economic growth. Recent studies have shown that while GDP growth continued across Europe in recent years, levels of well-being have either stagnated or fallen, and health inequalities between and within countries have increased. Economic growth up to a certain GDP threshold leads to improvements in people's lives. But once that threshold is passed, there is evidence that economic growth and subjective well-being are no longer linked.

We need to explore alternative economic models that take into consideration the limited natural resources, environment, quality of life, health equity and well-being, and that balance growth, profits and consumption. The promising practices identified in the SPREAD Sustainable Lifestyles 2050 project demonstrate positive trends and solutions, relating to complementary currencies, new approaches and business models and new ways of working. The Time Bank in Helsinki for example, where services (such as babysitting or cooking) are exchanged on the basis of time credits rather than cash is an effective model that also increases social capital and involves unemployed and/or older people in society.

Green and sustainability marketing is a growing field. The influence of the media on lifestyles is huge. However, all relevant actors such as policy-makers, consumer groups, media companies and industry itself should regulate issues such as false green claims on products ("green washing") and the confusingly high number of eco and other sustainability labels. Another example of positive trends towards a

sustainable economy is the emergence of green jobs, with an estimate of 2.3 million people employed in the renewable sector alone worldwide.

Lifestyles and behaviour are determined by a complexity of factors and conditions such as people's feelings, norms, values and beliefs, as well as their living and working conditions. behaviour change cannot, however, be achieved without addressing underlying socioeconomic factors. Sustainable and healthy lifestyles must become the easy and attractive default choice. It is important to consider how to adapt macro-economic policies as well as societal infrastructures to make that shift towards sustainable and healthy lifestyles by 2050. Multifaceted approaches are needed, from information campaigns to legal frameworks, including taxation, subsidies and other financial incentives.

The health, sustainable development and climate change policy sectors must join forces and adopt common approaches. Health promotion and public health decision-makers and professionals must also:

- look ahead and anticipate how societies may develop in the future and aim to change the prevailing emphasis on short-term visions and solutions by emphasizing the long-term impacts of current lifestyles;
- work alongside, and provide strong arguments and appropriate evidence to a large panel of actors and stakeholders, including business and industry, of these long-term impacts and possible solutions;
- highlight the social equity and health impacts of emerging solutions;
- work out the trade-offs (not all sustainable lifestyles are healthy lifestyles);
- recognize and foster promising practices and movements;
- develop new and innovative mechanisms, tools, and methodologies and build capacities to enable sustainable change and alternatives that will preserve and improve health and well-being for all.

MONETARY HEALTH SAVINGS OF ALTERNATIVE EU CLIMATE POLICIES

Julia Huscher
Health and Environment Alliance

The Health and Environment Alliance is a leading European not-for-profit organization addressing how the environment affects health in the EU. We demonstrate how policy changes can help protect health and enhance people's quality of life. With the support of over 70 member organizations representing health professionals, not-for-profit health insurers, patients, citizens, women, youth, and environmental experts, the Alliance brings independent expertise and evidence from the health community to different decision-making processes.

Our work on climate change and health focuses on the health co-benefits that will be reaped by climate change mitigation. Many measures to cut greenhouse gas emissions also reduce air pollution as a side-effect, which has the potential to reap substantial health co-benefits. We are thus contributing to efforts to raise the climate targets of the EU to -30% or more by 2020. It is clear from past assessments that the highest health co-benefits can be gained if early and ambitious action is taken, as health savings accumulate over time.

From the beginning of our work on climate and health co-benefits we have used economic valuations of these benefits to support our arguments. The main piece of work we have been doing in the previous years was the report entitled *Acting NOW for better health (1)* (published in 2010, but based on a Health and Environment Alliance report from 2008 *(2)*) in which we detail findings from an assessment of the 30% carbon emission reduction climate target. The move in the EU to a reduction of 30% instead of 20% by itself would reap additional health benefits through reduced mortality and morbidity of up to €30.5 billion per year. In particular, the rates of chronic respiratory and cardiovascular diseases are expected to decline.

Our report has received wide media attention at both European and national levels and has been taken up by decision-makers in the European institutions. A European Parliament report on higher greenhouse gas reduction targets took up the health economic figures *(3)*.

In the Communication on the EC Directorate-General for Climate Action's roadmap to a low-carbon economy by 2050 *(4)* there is a full paragraph detailing health economic savings from greenhouse gas reductions, and health benefits are mentioned frequently throughout the document. Also, in its most recent analysis on climate policy options to go beyond 20%, a working paper by the EC includes health in the analysis of costs and benefits *(5)*. The working paper draws the overall conclusion that higher climate targets would cost much less than expected and had the potential to reap higher benefits than previously thought.

The assessment undertaken for our report was based on the Clean Air for Europe cost–benefit analysis and was carried out by Michael Holland. The results included lower and upper bound estimates for mortality (VSL and value of life year lost) as well as morbidity. An important success factor for the dissemination of the report, and especially its uptake by decision-makers, was the preparation of briefing papers as well as the development of supportive materials such as postcards and country profiles. The level of decision-making was clearly defined and matched with the scope of the economic analysis. This was complemented by a thorough analysis of the relevant policy cycles, for example, when the European Parliament was planning a report. Part of the success had to do with getting the right messenger to deliver the findings, which is often a question of establishing relationships of trust with politicians. Furthermore, the economic figures needed framing by a matching narrative to attract the attention of decision-makers, and in this regard, the ability to link the economic figures to actual impacts on health budgets (such as through hospital admissions, treatment of chronic disease or sick leave) mattered most.

Strategic questions for the way ahead are how to make the best use of existing EU-funded research projects on health economics or which entail elements of monetary valuation, how best to raise health economic arguments to decision-makers in charge of budgets so that they trust these figures, and how to link health economic assessments to a single policy such as a new EU directive or a new limit value.

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ECONOMIC VALUATION OF ROAD TRAFFIC-RELATED AIR POLLUTION AND NOISE IN FINLAND, GERMANY, THE NETHERLANDS, SPAIN AND THE UNITED KINGDOM (ENGLAND)

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Background and aim

Original data on WTP for and WTA traffic-related air pollution and noise are scarce and stem from different sources and methodologies. Information on WTP for air pollution is often derived from existing literature on VSL or value of a life-year lost

or cost of illness. Pricing for effects of noise are mainly from hedonic pricing, that is, property values in relation to noise levels. These differences hamper comparison and prioritization, but also combination of costs, for example, to value traffic policies such as the benefits of congestion charging.

A multi-country questionnaire survey was developed in the EU-funded Integrated Assessment of Health Risks of Environmental Stressors in Europe project. The overall aim was to assess the monetary value of air pollution and noise effects using the same instrument, to compare within and between country differences and to study the determinants of WTP and WTA. In addition to known determinants from the economic and health literature, we were also interested in factors from the social sciences such as environmental concern and perceived sensitivity.

The following were some specific research questions.

- What is the proportion of protest votes and what are the main motives and determinants?
- What is the proportion of don't know answers and what are the main determinants?
- What are the differences in the valuation of health effects presented separately to the respondents or in combination, for example, in evaluating different policy scenarios?

As far as is known, this is the first study simultaneously to address the health effects of traffic-related air pollution and noise.

Method

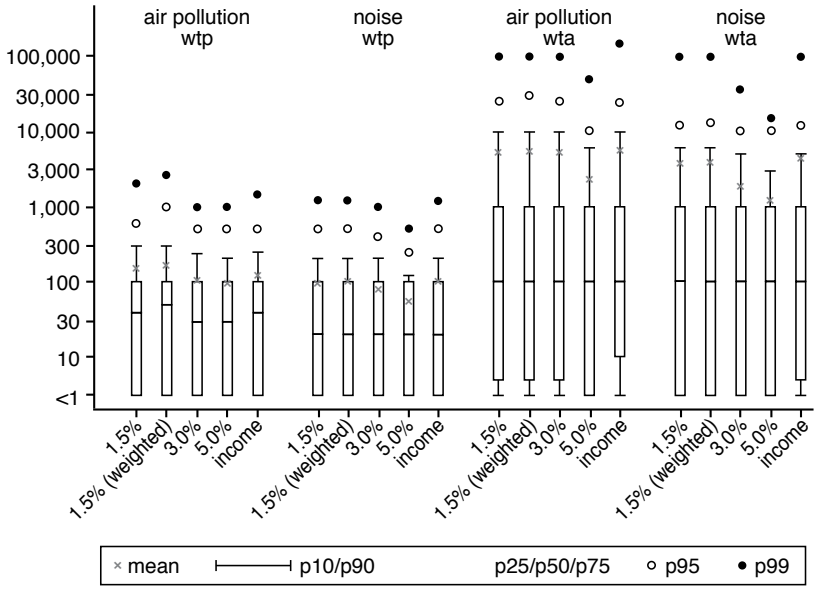
A web-based survey was carried out in Finland, Germany, the Netherlands, Spain and the United Kingdom (England). An open-ended questionnaire approach was used to avoid anchoring bias, given the diversity of health effects of the pollutants involved. Two versions of the questionnaire were prepared to limit the burden on the respondent, one focusing on air pollution and the other on noise. The aim was to reach 2000 respondents aged 18–64 years in each country. Respondents randomly received one of the two versions of the survey with a random sequence of the WTP and WTA questions to prevent bias.

Results

Overall, 10 494 questionnaires were obtained: 5243 for air pollution and 5251 for noise (Fig. 5.1). About 10% of respondents were unwilling to express monetary values (protest votes) and about 45% had difficulties answering WTP/WTA questions (don't know answers). The main motives for protest votes were that: (i) costs should

be included in transportation prices (30%); (ii) governments should pay all costs to reduce air pollution (30%); (iii) mainly, that a monetary value should not be placed on health (20%). Factors related to risk perception (such as concern about the environment, awareness of increased health risks and sensitivity to pollutants and attitudes towards the environment) contributed significantly to the inability to express WTP and WTA.

Fig. 5.1. Distribution WTP and WTA estimates (€/person/year) for road traffic-related air pollution and noise[a]



[a] With cut-off points of 1.5% (with and without weighting for don't know answers), 3%, 5% and an annual WTP maximum of €3000, based on income.

Source: Institute for Risk Assessment Sciences, Utrecht University, and National Institute for Public Health and the Environment, Netherlands, 2012. Reproduced with permission.

The results indicate that the distributions are relatively robust against (arbitrary) cut-off points to exclude unrealistic high values, based on data distribution (the 1.5, 3 and 5 top percentiles) and on maximum expendable income of €3000. As a sensitivity analysis to assess the effects of don't know responses, the distribution for determinants of don't know answers were weighed from logistic regression analysis.

The yearly WTP medians for air pollution in Finland, Germany, the Netherlands, Spain and the United Kingdom (England) were, respectively €50, €50, €20, €50 and €20. For noise, these were, respectively, €50, €50, €10, €20 and €10.

The yearly WTA medians for air pollution in Finland, Germany, the Netherlands, Spain and the United Kingdom (England) were, respectively, €230, €100, €50, €100 and €200, and for noise, respectively, €500, €100, €20, €100 and €100.

Some conclusions

The following are some conclusions:

- some 10% of respondents objected to the WTP questions (this is in line with other studies);
- some 40% (WTP) to 60% (WTA) could not provide a value for the health effects of air pollution or noise; although there is little direct comparative material in the literature about don't know answers, this does not seem unrealistic nor an artefact of the method;
- concern about the environment, awareness of increased health risks and sensitivity to pollutants, and attitudes towards the environment were associated with WTP and WTA;
- median WTA values are a factor 2–2.5 higher than median WTP values;
- in addition to known economic and health determinants, factors know from the social sciences on risk perception and acceptability are associated with protest votes, don't know answers and value of WTP and WTA;
- there were marked differences in the attitude- and perception-related variables between countries; differences in WTP and WTA between countries changed when these factors were taken into account.

ECONOMIC TOOLS IN CHEMICAL POLICY – BENEFITS AND SHORTCOMINGS

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During the 1970s, environmental policy was mainly based on direct regulation and command-and control instruments, such as firm-specific emission limits and mandatory technology requirements. Since the late 1980s, policy-makers have paid increased attention to market-based policy instruments, such as environmental taxes and charges, tradable permit schemes and deposit refund systems. In chemicals policy, however, the use of incentive-based policy instruments is still limited. Economic instruments targeted at chemical compounds and products are often perceived as controversial, and traditionally the use of chemicals has mainly been subject to command-and-control regulations (including bans) and information-based policy instruments.

In Europe, about 6–7% of total tax revenues are environmentally related, and over 90% of the environmentally-related taxes are applied in the energy and transport sectors *(1)*. Less than 5% of total environmental tax revenues come from taxes on chemical substances, products, waste, emissions and virgin natural resources *(2)*.

In environmental policy literature it is well known that the existence of uncertainties about reduction /abatement costs is crucial for the choice between different

environmental policy instruments. Policy-makers are, therefore, more oriented towards controlling quantities rather than prices, especially if the environmental damage rises steeply compared to reduction costs. This implies that command-and-control regulations, and even bans, could be more attractive *(2)*. However, with direct regulation firms have little (or no) incentive to implement cost-efficient ways of pollution control (such as technology regulation).

The use of economic instruments is typically motivated by the desire to reduce downstream externalities in the form of harmful impacts on nature and humans. From an economic efficiency point of view, it is desirable to target the damage as closely as possible *(2)*. The optimal solution is to tax the damage. In most cases, however, it is difficult (sometimes impossible) to regulate the damage at the point where it arises. Non-point source emissions are often very difficult and expensive to control, particularly if the environmental damage is affected by geographical location and by the other characteristics of the reception space.

Taxes on chemical inputs or on the production of chemicals are considered as good second-best alternatives. Emission taxes or emission allowance schemes are considered the right instruments if the marginal reduction cost curve is known to be steep and the environmental damage curve is not so steep. However, regulators generally do not have complete information about the marginal reduction costs, and particularly about the damage curves. Thus it may be more efficient to simply tax the production or the use of chemical compounds upstream in the product chain.

According to the literature *(2–4)*, earmarking of tax revenues is a good way of gaining overall acceptance for a policy, and funding research and/or clean-up activities is also considered a good policy option. The following are examples of good earmarking practice:

- Superfund in the USA, enacted by the US Congress in December 1980, which authorizes a tax on the petroleum and chemical industries; the funds are used to clean up hazardous substances that threaten public health (US$ 1845 million in 2005);
- environmental protection funds in Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Poland, Slovakia, Slovenia proved their rationale (focusing on the normal standard dose priorities and professional evaluation of projects).

Experiences from the Nordic and other countries *(2)* also speak in favour of taxation of chemicals:

- *taxation of fertilizers*: Austria 1986–1996, Denmark 1998 to date, Finland 1976–1995, Netherlands 1998–2006, Norway 1988–2000, Sweden 1984 to date;
- *taxation of pesticides*: Denmark 1996, Finland 1990, Norway 1988, Sweden 1984;
- *taxation of hazardous chemicals* (tetrachlorethylene, dichloromethane and trichloroethylene): Denmark 1996, Norway 2000, Sweden 2001 (proposition to tax trichloroethylene and tetrachlorethylene).

The following lessons should be learned.

- Economic instruments in chemical policy, motivated by the desire to target downstream external costs, are considered cost-effective and politically acceptable.
- Because of the high costs of monitoring and control, most of the taxes implemented in practice are second-best instruments as they focus not on the damage, but on consumption or sales of the chemicals. Although ad valorem taxes are expected not to signal a good correspondence with the damage done (damage is unrelated to the price level) they are easy to implement and do not have to be adjusted to account for inflation.
- Experience from the EU indicates that some kind of earmarking of tax revenues (or revenues from auctioning tradable allowances) can be effective. The disadvantages of earmarking may be a relatively cheap price to pay for gaining political support and providing funds for research and clean-up activities.
- In practice, a mix of regulations could be the best way to control the use of chemicals. Deposit refund systems for used chemicals could be considered. There is a growing need to combine the use of economic and informative policy instruments.
- The potential for increased use of economic instruments ought to be significant. However, this does not imply that taxes and fees ought to replace existing policies, but rather that economic instruments are complementary to existing measures.

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HEALTH CO-BENEFITS OF GREEN POLICIES IN THE BUILT ENVIRONMENT

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Summary

UNEP defines a green economy as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcity. UNEP has made the economic case for investing 2% of global GDP in greening 10 sectors of the economy. With this in mind, the overall objective of this paper is to examine the inter-linkages between green economy polices and health benefits. The paper makes the health case for showing the rationale for green economy investments in the built environment. More specifically, it examines policies in the built environment (land management, transportation and buildings and construction) that have the potential to yield significant health benefits. This study tries to compile evidence about the impacts that unsustainable policies can have on health, shows which green policies can make population healthier, and identifies green economy tools that have been successfully implemented in the past.

OTHER PEOPLE'S SHOES: THE HEALTH ECONOMIC ASSESSMENT TOOL (HEAT) FOR CYCLING AND WALKING

Harry Rutter
on behalf of the HEAT core group

Increasing regular physical activity is a key public health goal. One strategy is to change the physical environment to encourage walking and cycling, requiring partnerships with the transport and urban planning sectors. Economic evaluation is an important factor in the decision to fund any new transport scheme, but techniques for assessing the economic value of the health benefits of cycling and walking have tended to be less sophisticated than the approaches used for assessing other benefits.

A small group co-ordinated by WHO ECEH therefore aimed to produce a practical tool for estimating the economic impact of reduced mortality due to increased cycling. It was intended to be transparent, easy to use, reliable, and based on conservative assumptions and default values which can be used in the absence of local data. It addressed the question "For a given volume of cycling within a defined population what is the economic value of the health benefits?" Published estimates of relative risk of all-cause mortality among regular cyclists were used and applied to levels of cycling defined by the user to produce an estimate of the number of deaths

potentially averted due to regular cycling. The tool then calculates the economic value of the deaths averted using the VSL.

The HEAT is now a fully functional online tool[7] that integrates cycling and walking calculations into one easy to use interface. The HEAT tool allows different input options which are converted to average minutes of walking and cycling per person. It then applies relative risks determined from a meta-analysis (for walking) and a large cohort study (for cycling), to calculate risk reduction for all-cause mortality. Avoided deaths are further valued applying VSL, a standard measure used by transport planners. The new tools provide interactive user guidance and links to further materials, as appropriate.

The outputs of the tool support decision-making on cycle infrastructure or policies, or can be used as part of an integrated economic appraisal. The tool's unique contribution is that is takes a public health approach to a transport problem, addresses it in epidemiological terms, and places the results back into the transport context. Examples of its use include its adoption as the recommended methodological approach for estimating the health impact of walking and cycling by the departments of transport in Sweden and the United Kingdom (England).

THE ECONOMIC COSTS OF ASBESTOS USE: AN ENVIRONMENTAL HEALTH CATASTROPHE

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Asbestos is a mineral fibre that comes in several forms and has been heavily mined globally on an industrial scale since the 1940s because of its insulation and fire-proofing properties. It has been used in textiles, cars, engineering, building materials and pipe lagging and has had many other uses. It was called the magic mineral but is now recognized as the cause of a global epidemic of work and wider environmental cancers and respiratory diseases that will not peak in several countries for decades to come. Although all forms of asbestos are recognized as carcinogens by WHO and its International Agency for Research on Cancer and it is banned in most countries, its mining and use continue in China, India and the Russian Federation, and mines remain open in Canada.

Fully costing the extraction, manufacture, use, remediation and disposal of asbestos with regard to environmental health impacts globally or nationally has not yet been done. Some life-cycle analyses of the economic costs of asbestos in buildings have been undertaken. Each stage presents threats, primarily to workers, but also to people living nearby in areas where tailings (mine waste) occur or who work in buildings

7 Welcome to the WHO/Europe Health economic assessment tool (HEAT) [web site]. Copenhagen, WHO Regional Office for Europe, 2011 (www.heatwalkingcycling.org, accessed 13 July 2013).

where asbestos contamination exists. Cost-benefit analyses have been produced in the past on the fire prevention uses of asbestos, but these did not factor in the occupational and environmental disease costs of the material.

WHO has started to assess the health, social care and support costs related to major asbestos-related diseases (ARDs) in Europe drawing on more detailed models of the disease burden due to ARDs and the work of Park et al (2011).[8] Costs include medical and related costs, social insurance and worker compensation costs and the economic losses resulting from employee illnesses linked to such things as declining productivity and associated administrative, training and replacement costs. European countries often have different social insurance systems and health care treatment systems and even recognize different ARDs, so extrapolating and gathering data on the economic costs of ARDs may present many challenges.

Nevertheless, some crude cost estimates are possible, except perhaps for the costs to production. This is because the standardization of medical treatment of ARDs across western Europe is beginning (albeit not yet in central and eastern Europe), with guidelines on mesothelioma treatment from the European Society of Medical Oncologists and the European Respiratory Physicians' groups. With asbestos cancers, too, it is possible to draw on some occupational and environmental cost estimates produced by regulatory impact assessments of registration, evaluation, authorization and restriction of chemical substances and the Alberta Health department in Canada. These again provide rough and ready estimates that have some applicability to ARDs.

Using French, German and United Kingdom data, it has been possible to begin tentatively to estimate the economic costs of particular ARDs, such as mesothelioma, that are relatively accurately recorded (Table 5.1). It should be noted that there is gross under-reporting of ARDs in central and eastern Europe.

In addition, WHO's work on the global burden of disease will shortly be published providing country-specific data on the main ARDs that can be used to calculate the economic costs of diseases. Work on person-years of life lost due to ARDs and disability-adjusted life years lost can also be factored in to provide an even more complete estimate of these disease costs and economic consequences.

A complete picture is still lacking of the economic costs of the potential environmental health damage done by asbestos in terms of its remediation, removal and disposal costs. For example, in the United Kingdom (Scotland) in 2004/2005, some municipal authorities costed the removal of asbestos in 10 schools as ranging from £15 000 up to £3 million. The combined costs of removing and safely disposing of asbestos in the 10 schools (that varied greatly in terms of size and use of asbestos materials) was £8 million pounds, or €11 821 147 at 2012 prices. Normally, the costs of asbestos management and asbestos removal can be identified. Organizations do not, however, systematically record other asbestos-related

8 Park EK et al. Global magnitude of reported and unreported mesothelioma. *Environmental Health Perspectives*, 2011, 119(4):514–518.

expenditure. This may include replacement costs, waste removal costs, removal of pupils and teachers to alternative places of learning, removal of tenants, or loss of revenue through closure of leisure facilities caused by an asbestos incident or removal project.

Table 5.1. Economic costs of cases of mesothelioma (2009) and lung cancer (2012), selected European countries

Country	Mesothelioma cases	Costs in million € (2009)[a]	Estimated lung cancer cases[b]	Estimated costs in million € (2012)[c]
Austria	80	10	160	487
Belgium	156	20	312	950
Denmark	71	9	142	432
Finland	75	9	150	457
France	826	103	1 652	5 028
Germany	1 063	133	2 126	6471
Italy	1 235	154	2 470	7518
Netherlands	395	49	790	2 405
Norway	54	7	108	329
Poland	96	12	192	584
Portugal	19	2	38	116
Romania	58	7	116	353
Spain	263	33	526	1 601
Sweden	123	15	246	749
United Kingdom	1 891	236	3 782	11 511

[a] French costs estimated at €0.125 million per case.
[b] Ratio 2:1 mesothelioma cases.
[c] Based on €3.04 million euros per case (REACH).

Source: Watterson A, University of Stirling, 2013. Reproduced with permission.

The economic costs of the use of asbestos in terms of ARDs or through remedial and removal measures to protect public and environmental health across Europe will, therefore, be enormous but have not as yet been properly estimated.

TACKLING SOCIAL HEALTH INEQUITIES: LESSONS FROM EUROPE

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At the time of writing, the direct impacts of the present Europe-wide economic and social crises are becoming more apparent. Due to economic difficulties more and more European are pushed into or trapped in poverty and long-term unemployment.

The impact of the current economic crisis on health could potentially erode hard-won population health gains, with the most vulnerable groups in our societies at the highest risk.

In this economic context, health systems, and particularly their public health component, face the prospects of decreased government expenditure. Such expenditure cuts usually manifest themselves in decreased development aid for health, service delivery hindered by lack of resources, increased population health needs and pressure on social protection mechanisms. These challenges add to existing ones, such as the out-of-pocket health expenditure that in many countries push economically vulnerable individuals into financial catastrophe.

It is against this backdrop that public health needs to address health and development issues. Policies and interventions at both national and subnational levels, to tackle socially and economically determined health inequities, are an urgent priority everywhere in Europe. Promoting health and reducing health inequities must be pursued within a strategy that addresses both health and development issues. This is the rationale of the new European health policy put forward by the Regional Office known as Health 2020.

ANNEX 6
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The WHO European Centre for Environment and Health (Bonn, Germany) convened a meeting of key European experts in the field of environmental health economics on the topic “A European Strategic Framework for Environmental Health Economics” on 29–30 November 2012. The Meeting aimed to provide a forum for open discussion on how to incorporate economics into evidence-based decision-making in environment and health. The objectives were to: discuss and analyse how the recent economic situation is relevant for WHO and other health agencies and how this change can benefit or hinder the environmental health agenda; identify the priority issues and goals in connection with economics and environmental health that are suitable for assisting Member States in policy-making; and develop a draft strategic framework on environmental health economics, including areas and issues that are priorities for future pilot studies. Looking ahead to the 6th European Ministerial Conference on Environment and Health in 2016, the mid-term objective was to develop a fully-fledged European WHO and partner framework and implementation plan for the next four years, and to discuss and initiate a new WHO partner network in economics and environmental health. The Meeting made conclusions and recommendations for the development of an environmental health economics network and draft strategic framework.

The German Ministry of Environment, Natural Conservation and Nuclear Safety financially supported the meeting and the preparation of the report.

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