

Environmental Health and Economics:

Strategic Framework
and
Implementation Plan
2013–2017



World Health
Organization

REGIONAL OFFICE FOR **Europe**

Report

of the First Advisory Group Meeting on
Environmental Health and Economics

23–24 May 2013
Bonn, Germany

Environmental Health and Economics: Strategic Framework and Implementation Plan 2013–2017

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ABSTRACT

The WHO European Centre for Environment and Health in Bonn convened a meeting of key European experts in the field of environmental health economics on the use of economic tools and methods in environmental health on 23 and 24 May 2013. The meeting established an advisory group on environmental health and economics, including the definition of its membership, its terms of reference and overall vision. The advisory group: (i) took note of the finalized strategic framework on environmental health and economics; (ii) discussed the proposed implementation plan for the framework for 2013–2017; (iii) agreed the topics for the second symposium on environmental health and economics to be held in October 2013; and (iv) made recommendations on the implementation of the strategic framework and how to encourage a broader approach to economic evidence use. Updates from the environmental health economics network included showcasing a climate change toolkit and a discussion on the explosion of new economic indicators with reference to the debates about “Beyond gross domestic product” and the value of statistical life.

Keywords

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ABBREVIATIONS

CBA	cost-benefit analysis
CEA	cost-effectiveness analysis
EC	European Commission
ECEH	European Centre for Environment and Health
EEA	European Environment Agency
EHEN	environmental health economics network
EU	European Union
GDP	gross domestic product
nef	new economic foundation
OECD	Organisation for Economic Co-operation and Development
Rio+20	United Nations Conference on Sustainable Development (Brazil, 2012)
UN	United Nations
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
VSL	value of a statistical life
WTA	willingness to accept
WTP	willingness to pay

INTRODUCTION

BACKGROUND

While policy and other decision-makers strive to design effective, efficient and equitable public health policies, health economic evidence is underutilized in environmental health decision-making in the WHO European Region. There have been repeated calls to increase the emphasis on the economic aspects of environmental health. The need for new economic models to capture the different dimensions of sustainable development has been widely supported by the international community at high-level meetings such as the United Nations Conference on Sustainable Development, held in Brazil in 2012 (Rio+20), and the World Economic Forum. Within the broad scope of environmental health, work has been carried out on generating and applying economic evidence in areas such as urban air pollution in the European Union (EU). However, many inconsistencies and gaps remain.

In recognition of the need for better information in environmental health decision-making, the WHO Regional Office for Europe has initiated work on environmental health economics at the European Centre for Environment and Health (ECEH). On 29 and 30 November 2012, WHO brought together experts and key stakeholders to a first technical expert meeting in Bonn, Germany, to promote discussions and progress in this area. The specific activities of that meeting were to:

- develop a common strategic framework for environmental health economics, and
- establish an environmental health economics network (EHEN) to support the implementation of the strategic framework on environmental health and economics.

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

FIRST MEETING OF NEW ADVISORY GROUP

Following the initial meeting of technical experts in November 2012, an advisory group was set up consisting of core stakeholders in this field including related United Nations agencies, the European Environment Agency (EEA), the Organisation for Economic Co-operation and Development (OECD) and representatives of academia, research bodies, nongovernmental organizations and the private sector. The role of this group will be to advise WHO on how to develop and apply economic tools in the area of environmental health. In particular, the advisory group will make recommendations on work priorities including joint projects and the development of advocacy materials, case studies and a literature database. It will also be concerned with issues of resource mobilization in this field and will seek to reach consensus views, through discussion, wherever possible.

The first meeting of the advisory group was held in Bonn on 23 and 24 May 2013. The scope and purpose of the meeting is in Annex 1, the programme is in Annex 2, a summary of the strategic framework on environmental health and economics is in Annex 3, Annex 4 contains the proposal by WHO ECEH for an environmental health economics network, Annex 5 contains abstracts of the presentations and Annex 6 contains the list of participants.

OBJECTIVES

The specific objectives of the meeting were to:

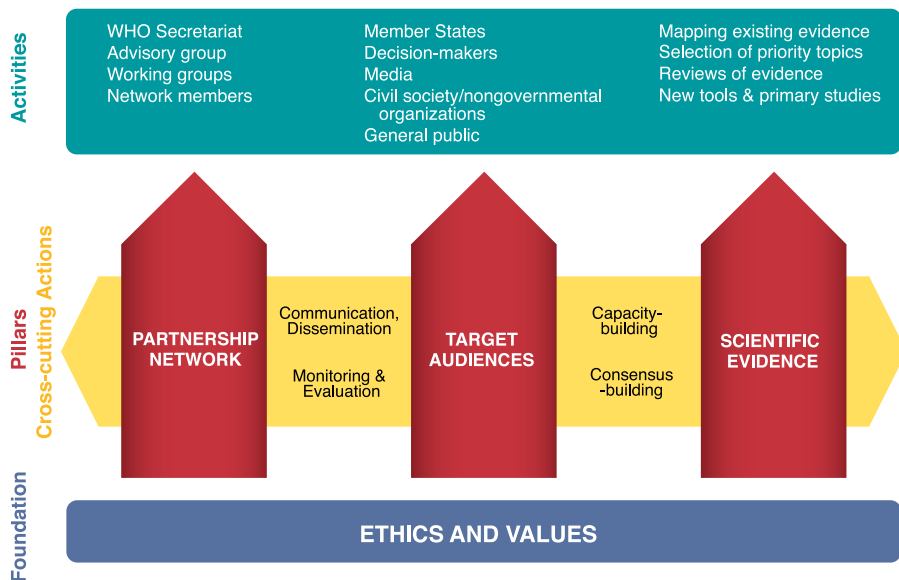
- establish and define the terms of reference for the advisory group;
- discuss and advise on proposals for the implementation of the strategic framework on environmental health and economics, which was drafted in advance of the Meeting and included the focus and structure of the EHEN and its working groups, input and support to be expected from other agencies and possible pilot projects;

- explore and, as appropriate, initiate work to identify projects, sources of funding, project partners and opportunities for country-specific studies for the EHEN;
- discuss the tasks and added value of the EHEN and how best to promote the network, its services, products and visibility;
- initiate preparations for an annual symposium on environmental health and economics, to be held on 14-15 October 2013 in Bonn (Germany), including drafting the agenda and the list of participants/speakers/chairpersons and background papers.

FINALIZATION AND DISCUSSION OF THE STRATEGIC FRAMEWORK ON ENVIRONMENTAL HEALTH AND ECONOMICS

The Meeting discussed a proposal for the implementation of a European strategic framework on environmental health and economics (the strategic framework) (Fig. 1).

Fig. 1. Elements of the strategic framework on environmental health and economics.



The three pillars of the strategic framework are: (i) developing and sustaining the EHEN; (ii) responding to the needs of and influencing the target audiences; and (iii) compiling and developing scientific evidence. The cross-cutting activities linking these pillars are: capacity-building, consensus-building, communication and dissemination, and monitoring and evaluation. When combined, these three pillars and cross-cutting activities give rise to a number of definable work flows.

Implementation of the strategic framework will only be successful if partner organizations work together. The network of partners is known as the EHEN, and it is defined by four interlinked groups: members, advisory group, thematic working groups, and a secretariat provided by WHO ECEH.

The target audiences are broadly defined as individuals and organizations making decisions that affect environmental health. The generation and provision of knowledge should start by identifying which specific decision-makers or processes need to be influenced and the process needed to achieve results. The process includes not only generating the *right* evidence but packaging it in the *right* way, delivering it at the *right* moment, giving it to the *right* people and ensuring the recipients of the information have the *right* background information and skills to use the evidence effectively. The first major challenge is to determine what the right ways of generating and targeting evidence are. Thus an initial activity is to identify the decision-makers and the type of evidence they demand and can use. Once this is understood and the evidence is compiled, decision-makers need to be helped to develop the skills necessary to use the evidence. The evidence itself needs to be packaged and disseminated and its uptake monitored.

Members of the advisory group discussed the implementation proposal for the strategic framework and gave positive feedback. All members of the advisory group expressed support for the strategic framework and the proposal for initial activities. The strategic framework should be explicitly linked to a wider environmental health policy process in Europe, and should include considerations of the EU policy cycle and timelines. This will ensure that it is in harmony with the aims and values of wider regional policies so as to maximize its influence and impact.

The advisory group discussed the importance of disseminating information to the target audience as a key component of the strategic framework. There was some discussion around the issues of playing by the rules and/or changing the rules, and getting and keeping a seat at the table, using the value of statistical life (VSL) and “Beyond GDP” as examples. It is important that information is disseminated in a manner understandable (and familiar) to the target audience. In this sense, it is appropriate to play by the rules, that is, using indicators such as gross domestic product (GDP) with which the target audience is familiar despite its limitations as an indicator. Although there is considerable scope for the advisory group to engage in debate and take a position in the debate on Beyond GDP, this was not the primary focus of the Meeting; questions of how to disseminate the group’s ideas and concepts to decision-makers comprehensibly were of more immediate importance.

Information can be disseminated via a WHO web page or the creation of a separate EHEN web page. Careful attention is required to ensure that the language used can be understood by a wide audience, and especially by decision-makers who are not necessarily economists. It would be useful to publish success stories in the field of environmental health and economics to generate interest and awareness. This could be done at future symposiums, via leaflets and the EHEN web page.

PROPOSAL FOR THE IMPLEMENTATION OF THE STRATEGIC FRAMEWORK

The advisory group gave its overall support to the implementation proposal based on the strategic framework. Fig. 1 demonstrates the complexity of the framework's overall approach. It is, therefore, important that the advisory group is clear about and focused on what problems it can solve, its roles and the added value it offers. It must also be alert to the need to ensure continued funding.

The advisory group strongly emphasized that the implementation proposal for the strategic framework should be delivered in a transparent manner.

The use of a survey to gain views and perspectives on economic evidence was discussed. Concerns were expressed over the potentially low response rate which might lead to a bias towards some extremes. In view of the many other such initiatives, by WHO and others, there should be special awareness of survey fatigue and response rate. While there are clear documented disadvantages in undertaking a survey, it has the potential to identify key bottlenecks in the use of environmental health economic evidence. This is likely to be a key issue in directing the implementation of activities under the strategic framework if barriers are to be overcome and information tailored to suit the needs of the target audience.

The specific aims of the survey would be as under.

- What would be the “game changers” in the implementation of the proposal?
- Why are some directorates and departments more difficult to engage with than others?
- What would be the key drivers to stimulate interest?
- What are the availability, utilization and relevance of economic evidence in the view of decision-makers?
- What is the need for additional knowledge, the types of knowledge, its detail/specification and its frequency of assessment?
- What is the need for sensitization and capacity-building (training, staffing)?
- How great is the need for reform in decision-making to make more effective use of economic evidence?
- How should evidence be tailored and packaged to meet specific needs?

An electronic survey (e-survey), followed by telephone and in-depth interviews where possible, is ideal and probably necessary to obtain the necessary information from decision-makers and key stakeholders. In order to encourage responses, the questionnaire should be short. To maximize the response rate and quality of answers, the survey should also be targeted at individuals with whom the EHEN has direct contact. The main target respondents of the survey should be national policy- and decision-makers, and should include those beyond the environment and health sectors,

especially those involved in public financial decisions. The EHEN's key international and regional partners, including the OECD, the European Commission (EC), the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP) and the World Bank, should also be included because of their influence in policy-making. The final prioritized list of decision-makers invited to participate in the survey remains to be determined.

ENCOURAGING A BROADER APPROACH TO EVIDENCE USE

The advisory group recognized that all economic tools have their limitations and economic evidence cannot be used alone for policy decision-making. Construct validity is a weakness – evidence can be misleading. For example, those areas where impacts are easily quantified are often emphasized while other potentially important areas where quantitative evidence is lacking can be downplayed. One outcome is that limited availability of information on a topic can act as a disincentive to researchers. It is better to have best-guess estimates to put the topics on the map, and over time the estimates would improve. Furthermore, many tools exist, often developed for specific projects and abandoned when the project has been completed. Such tools, if identified, might usefully continue to be deployed rather than having to be reinvented later. Some models have seen widespread use, such as EXTERNE in 15 European countries.

There was discussion over the tabulated information in the proposal (Annex 5, Table 5.1). This illustrates that the use of a particular type of evidence or analysis in isolation can reinforce implicit assumptions and introduce biases, for example, where particular considerations are simply omitted from the analysis. It is usually preferable to present evidence to decision-makers within a particular policy context (such as traffic or contaminated sites) than to relate the evidence to environmental compartments (such as water, air and soil) or problems (for example, climate change or agents such as toxins and infections). The (policy) context approach is more realistic and comprehensive and reflects the range and setting of environmental health issues better. Moreover, it is more readily interpreted by the relevant decision-makers. Case studies of success and failure often help people relate to, and identify, issues.

Guidance on how to choose economic tools in a specific context is useful for decision-makers. In this connection, it might be possible to produce a decision tree to simplify which economic tools are most appropriate for particular interventions.

UPDATE OF EHEN AND FUTURE DEVELOPMENTS IN RESEARCH AREAS RELATED TO ENVIRONMENTAL HEALTH ECONOMICS

A summary presentation of the first year of the WHO environmental health and economics network was given. The number of network members now reaches more than 60 different organization and individuals, reaching from international organizations such as OECD, EEA, EC, UNEP to non governmental organizations, think tanks and academia. A database of selected literature in this area of work was established and will be updated regularly with the support of the network. The WHO secretariat will inform all network members twice per year via an e-mail-newsletter about recent and future developments. The visibility of the network will be strengthened by the development of a joint vision and a new EHEN logo

The following technical sessions were selected as key examples in recent research developments in EH and economics.

Climate change toolkit

The WHO climate change toolkit to conduct health cost and cost-benefit analyses comes at a good moment politically. It can raise awareness and indicate the most efficient courses of action, but only if national governments use it. The toolkit and other resources and activities, including those generated in future by the EHEN, can support a strategy to get climate change on to national political agenda.

A key point discussed by the advisory group was the benefits of the toolkit. The following (not exhaustive) list shows some of them. The toolkit:

- strengthens the case for an intervention;
- makes it easier for policy-makers to use economic information;
- is useful for other sectors to see their inputs to the tool and makes each sector accountable;

- can show damage costs from not undertaking a particular intervention, which can provide an argument for funding;
- can show adaptation costs to allow for detailed planning;
- can include testing of sensitivity to assumptions and weak/uncertain data;
- can illustrate who gets the return from investments, which can be a key argument to get stakeholders to engage with an idea, concept or intervention.

A manual is available to explain how the user should apply the toolkit.

The toolkit has some limitations. Often, not all the economic and health data required to use it will be available. While the toolkit can be used to generate arguments in support of certain investments, it is important that particular interventions are framed in the right context. There is scope to develop the tool to allow more robust sensitivity testing. The toolkit is also able to calculate tangible and intangible costs separately. Comparative calculation (with or without intangible costs) might be useful in this context.

Beyond GDP

Participants discussed papers on the use of VSL and the “Beyond GDP” debate (Annexes 3 and 4).

The recognition and increasing impact of global environmental and economic crises has resulted in a growing demand for a more sustainable development model. Rethinking of our economic model is needed. “Beyond GDP” has become a key topic of debate, with initiatives emerging at a global level. GDP has serious shortcomings when used as the sole indicator of growth. It encourages over-exploitation, excludes other dimensions of well-being and misinforms decision-making by presenting distorted pictures of societal development. Alternative indicators have been developed to improve measurements of well-being by including the social and environmental dimensions through adjusting, complementing or replacing GDP. The use of alternative indicators will more systematically incorporate multiple dimensions of well-being, including health and health determinants, into the policy cycle and decision-making. Health is a precondition for, and an outcome of, sustainable development, and relates in a complex way with social and environmental factors as well as economic factors and performance. The direct and indirect health impact emerging from these concerns around, and critiques of, GDP must be understood and net benefits maximized. In this high-level and environmentally-oriented dialogue, WHO as one of the few representatives of health has a critical role in ensuring that links to health are made and opportunities with other dimensions for win-win outcomes are explored.

The advisory group emphasized that the EHEN should not seek to develop new indicators since there are a number of other organizations carrying out this work

(for example, OECD and the New Economic Foundation). Rather, its role should be to stress the limitations of GDP to policy-makers in a digestible form such as policy briefs. It is important that the EHEN is able to promote specific indicators that are both relevant and appropriate for reflecting environmental health issues. While the Network can clearly identify and promote new indicators, GDP is inevitably still the most widely used and established indicator for policy-makers. It seems sensible to avoid alienating them at this stage by aggressive promotion of other inevitably less familiar indicators.

VSL

The VSL approach has been used to estimate the value of avoided fatality, in order to compare the efficiency of life-saving interventions and to help integrate health costs into decision-making in other sectors. It allows public health consequences to be understandable outside the health sector and for policy-makers from disparate ministries (such as ministries of finance) to make evidence-based decisions. A number of examples of VSL application have revealed the existence of specific guidance for using this approach in specific contexts, yet no guidance has been developed for the consistent use of VSL in the broader environmental health field.

All economic tools have biases and limitations, not only VSL. Transparency is crucial in using economic tools to illustrate data and information, in order to determine which results and recommendations can be used in a specific context.

The ethical argument often posed for valuing in monetary terms how much we are willing to pay to avoid a risk (as in VSL) has shortcomings in that it requires a value to be placed on all interventions and on aspects of health to allow consistent, systematic and informed decision-making. Health is a human right and, to many, can be viewed as beyond value. Accordingly, it may not be possible for everyone to provide or accept a value to avoid or accept a risk.

There are also country variations in VSL valuations. VSL quantifies in monetary terms the value of avoided fatality. Clearly this figure will vary between countries with different GDPs. Each country will also have various cultural and behavioural differences that change the way risk is perceived, and will have different acceptable ranges of risk for a population. This makes it difficult to compare and use different VSL values across a range of countries, which raises particular concerns in international decision-making when developing countries have lower VSLs. On the other hand, adapting a common VLS across countries can also be challenging as it does not reflect local contexts and perspectives.

VSL has been used widely in the transport sector with mortality as an endpoint, and data from this sector are readily available. Using it in the health field creates an advantage in that interventions can be compared intersectorally. VSL is not, therefore, affected by the state of disease. This creates a limitation for its use in the health

field where mortality is not always the key indicator of interest. For example, in the chemical safety industry, some exposure risk will not result in death but can cause morbidity (for example, contact dermatitis).

VSL can also vary with age, which is important as ageing is a growing issue in the Region. It is difficult to quantify how the willingness to pay to reduce a risk changes by age group. Interestingly, the VSL for children is higher than for adults. Parents have been found to be willing to pay more for their children, as seen in the case of exposure to bisphenol A which, in the case of babies, can come via plastic feeding bottles with a high content of bisphenol A.

Owing to the complex data demands in deriving VSL and other indicators, less complex interventions are often favoured and adopted simply because evidence is easier to obtain.

TERMS OF REFERENCE FOR THE ADVISORY GROUP AND THE EHEN, RESOURCE MOBILIZATION AND JOINT ACTIVITIES

The objectives of the session were to present the strategic framework *Towards a European strategy on economics and environmental health*, and based on the framework, to discuss the proposed terms of reference for the advisory group and the EHEN, potential members, future meetings and external communication.

The modified terms of reference for the advisory group and the EHEN can be found in Annex 5. Additionally, participants recommended that a clear vision of the Network should be formulated and the terms of reference should be synchronized to reflect the structure of the strategic framework (Fig. 1).

Participants suggested that a set of criteria should be developed for making decisions about the potential members of the Network. Caution should be exercised in enrolling federations or the private sector and it should be ensured that EHEN members have no conflict of interest with WHO. In contrast, industries – which are key players in environmental health – should be actively engaged and economic evidence on environmental health presented to them. It was agreed that the wider Network should be open to different professions, whereas the advisory group should be limited to a size consistent with offering effective guidance to the Network. Thus, the network will combine a broad range of knowledge producers and communicators as well as end-users, such as politicians and the private sector. In contrast, the advisory group will maintain the focus of the network and help by advising WHO on strategic matters and objectives. In addition to the advisory group members who attended the Meeting, there will be some additions including from those organizations that were invited to send representatives to the Meeting but could not attend (such as the EC Directorate-General for Health & Consumers, EEA, OECD and World Bank) and, specifically, identified academic experts in this cross-cutting area. Others who had previously been proposed, including the German Bank for Reconstruction and Development, United Nations Economic Council for Europe and nongovernmental representatives, should be contacted. The need to identify individuals within organizations to permit personal contact was recognized.

COMMUNICATION

Several working areas to promote the EHEN and its visibility were discussed. The opportunity should be taken of the sixty-third session of the WHO Regional Committee for Europe in September 2013 to inform Member States about the strategic framework. Sufficient progress can be produced for presentation at the occasion. Some core information can be presented on the WHO web site and, in the longer term, an external website amenable to frequent updating can be developed which can also provide a platform for EHEN members' communication. A wiki-web site was suggested as one of the possible external web sites as it has the advantage of allowing editing by network members themselves. The web site will be an important public face of the EHEN and an inactive web site could lead to the impression of an inactive network. The initial web site should be clear and concise and active on updates: in consequence, a sophisticated layout should be avoided. Use of a LinkedIn Group was strongly supported as an appropriate starting point for internal communications. A short announcement of the Network will be published in the next newsletter of the Health Environment Alliance.¹ A logo for the Network could be designed within the next year. Other products deemed useful will be produced by the secretariat, including a bi-annual newsletter pointing to recently published literature relevant to the topic area. The newsletter will be provided to EHEN members together with a leaflet offering an overview of the EHEN for promotion outside the Network.

¹ Health and Environment Alliance [web site]. Brussels, Health and Environment Alliance, 2013 (<http://www.env-health.org/news/>, accessed 28 July 2013).

PREPARATION OF THE ANNUAL WHO SYMPOSIUM ON ENVIRONMENTAL HEALTH ECONOMICS

(BONN, 14–15 OCTOBER 2013)

The annual WHO Symposium on Environmental Health Economics will take place on 14 and 15 October 2013. The exact timeframe would be discussed in a subsequent telephone conference with the advisory group. Immediately after the Symposium, the advisory group would meet to reflect on it.

The Symposium will start with a description of the EHEN and its work so far. There will then be three or four parallel sessions. Possible topics include the following:

- overview of evidence and evidence types – what evidence for what uses;
- “Beyond GDP” and the green economy (UNEP);
- survey results, see section on Proposal for the implementation of the strategic framework (p. 3 above), with reflections on channels for communication and dissemination;
- overview of health economics methods and their use in the environmental health field;
- case study from a Member State in the eastern part of the Region;
- link to the broader European process on environment and health.²

The choice of topics and possible speakers will be discussed in the telephone conference. A combination of presentations, discussant/respondent and question and answer sessions can be used for some of the plenary sessions. To ensure effective knowledge-sharing, the results of the group sessions will be reported to all the participants at the plenary sessions. A call for abstracts may be made to showcase work done in this field. E-posters may be used in brief interventions (for example, three minutes) to allow new members to present their work. The secretariat will draft an agenda for the symposium. Forthcoming activities are presented in Table 1.

² European process on environment and health [web site]. Copenhagen, WHO Regional Office for Europe, 2013 (<http://www.euro.who.int/en/what-we-do/health-topics/environment-and-health/european-process-on-environment-and-health>, accessed 28 July 2013).

Table 1. Forthcoming activities

Activities	Action	Timeline	Responsible
Pillar 1: partnership network			
Expand membership	Invite new members	May–August and ongoing	Secretariat, members
Hold second annual symposium	Themes and programme	14–15 October 2013 and annually in autumn	Secretariat
Hold bi-annual advisory group meetings	Plan next meeting	15 or 16 October 2013 and spring 2014	Secretariat
Telephone meetings	Plan next meeting	11 July 2013	Secretariat
Constitute priority thematic working groups (see below)	Invite members of thematic working groups	To be decided	Secretariat
	Initiate first meetings	To be decided	
Secretariat duties	Email circulars	Continuing	Secretariat
	Communication platform (for example, LinkedIn group)	LinkedIn June 2013	Secretariat
	Build website and logo	To be decided – planned for end 2013	Secretariat, Luca Carra
	Secure further funding for maintenance of EHEN	To be decided – start in 2013, annual BMU (German Ministry of Environment) funding envisaged	Secretariat, members
Increase visibility	Publish information on EHEN	Ongoing	Secretariat, members, Health and Environment Alliance
Pillar 2: target audiences			
Identify main knowledge users per environmental health topic	Conduct listing and survey	July 2013	Secretariat, members (to be decided)
	Circulate to members		
Conduct surveys of target audiences	Send e-survey	August–September	Secretariat, members (to be decided)
	Conduct interviews		
Identify priority types of evidence and topic. Triangulate with evidence reviews (Pillar 3)	Analyse survey results. Present to symposium	September–October	Secretariat, members (to be decided)
Design guideline to decision-makers on how to use evidence	Agree priorities and terms of reference	To be decided	Consultants, members (to be decided)
Design guideline to researchers on how to present evidence	Agree partners to lead and provide support and identify additional experts	To be decided	Consultants, members (to be decided)
Package evidence – initial case studies from selected environmental health and economics topic(s)	Conduct work, share preliminary draft with EHEN partners	To be decided	Consultants, members (to be decided)
Disseminate evidence	Finalize products and disseminate	To be decided	Secretariat, members (to be decided)

Table 1. (concluded)

Activities	Action	Timeline	Responsible
Design training materials (from guidelines above) and conduct training		To be decided	Secretariat, consultants
Use evidence to tell stories for more effective communication		To be decided	Media expert
Monitor and evaluate how evidence is utilized and its impact		To be decided	Secretariat, consultants
Pillar 3: scientific evidence			
Agree on priority topics and on which ones are worthy of thematic working groups	Finalize mapping/gaps	September–November 2013	Secretariat, advisory group, consultant
	Agree priority list of topics		
Agree workplan, products, responsibilities, collaboration and timelines for each topic and thematic working group	Thematic working groups meet, terms of reference, workplan	December and after	Secretariat, members (to be decided)
	Work commences		
Submit funding proposals for funding gaps	Identify funding sources	Continuing	Secretariat, members (to be decided)
	Submit proposal		

ANNEX 1

SCOPE AND PURPOSE

While decision-makers strive to design both efficient and equitable public health policies, health economic evidence seems to be underutilized in environmental health decision-making in the Region. There have been repeated calls to increase the emphasis on the economic aspects of environmental health. The need for new economic models to capture the different dimensions of sustainable development has been widely supported by the international community at high-level meetings such as Rio+20 and the World Economic Forum. Within the broad scope of environmental health, work has been carried out on generating and applying economic evidence in some areas. However, some inconsistencies and gaps remain.

In the light of the need to inform environmental health decision-making better, the Regional Office initiated a line of work dedicated to environmental health economics in 2012. Experts and key stakeholders were brought together for the first technical expert meeting in Bonn, Germany, on 29 and 30 November 2012. This work involved a series of activities to promote discussions and progress in this area by:

- developing a common framework strategy for environmental health economics, and
- establishing an EHEN to support the implementation of the European environmental health and economics framework.

A further Meeting is now being held to constitute an advisory group to the WHO environmental health economic programme. This international expert group will make recommendations to WHO as to how to develop and apply economic tools in the area of environmental health. Priority work including joint projects, advocacy materials, case studies, a literature database and resource mobilization in this field will be discussed and, where possible and feasible, agreed.

The specific objectives of this Meeting are to:

- establish an ad hoc advisory group consisting of core stakeholders in this field (such as the EC, EEA, OECD, other related United Nations agencies, academia and research bodies, nongovernmental organizations and the private sector) and define its membership and terms of reference;
- discuss and advise on the implementation approach of the environmental health and economics framework, including the structure of working groups, with input and support from other agencies and possible pilot projects;
- explore and initiate preparation on forthcoming opportunities for projects, such as funding, initiatives, project partners and country studies;
- discuss the terms of reference, added value and promotion of the EHEN, its services, products and visibility;
- initiate preparations for the annual Symposium on Environmental Health and Economics, scheduled to be held this year on 14–15 October in Bonn (Germany), including the draft agenda, list of participants/speakers/ chairpersons and background papers.

ANNEX 2

PROGRAMME

Thursday, 23 May 2013

Chairperson: Erik Lebret, National Institute of Public Health and the Environment (RIVM)

- 09:15–09:45 Welcoming remarks, adoption of agenda and programme
Marco Martuzzi, WHO
Briefing on progress, objectives and expected outcomes
Frank George, WHO
- 09:45–10:30 **Session I: Finalization of the environmental health economics framework**
Recap of developments and open issues concerning the environmental health economics framework with input from the expert meeting in November 2012
Brief Summary of WHO Meeting Report 29–30 November 2012 (Gabrielle Chan, WHO consultant and rapporteur)
Further reflections by Guy Hutton, Caroline Rudisill, Mike Holland, Frank George
Discussion on: overall feedback, strength and weaknesses, gaps
- 11:00–12:30 **Session II: Network update on recent and future developments in research areas related to environmental health economics**
Presentation to EHEN partners on recent and planned developments and research – tour de table. Formal presentations on:
Climate change: toolkit to conduct health cost and cost-benefit analyses (*Guy Hutton, WHO consultant*)
Overview of VSL debate (*Gabrielle Chan, WHO consultant*)

13:30–15:30 **Session III: Implementation proposal**

Implementation proposal and draft environmental health economics decision-making framework

Guy Hutton

Open discussion on:

Completeness and relevance of the proposal and framework

Selection and membership of proposed working

Information gaps and opportunities/priorities for pilot projects

Dissemination and communication strategies (target audience)

Funding of activities

16:00–17:30 Beyond GDP – reflections on alternative indicators for health and wealth, well-being and happiness (*Gabrielle Chan, WHO consultant*)

Friday, 24 May 2013

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

09:30–11:00 **Session IV: Terms of reference for the advisory group and the EHEN, resource mobilization and joint activities**

Facilitated by: Frank George, Guy Hutton, Gabrielle Chan

Open discussions on

Terms of reference advisory group, network, expert symposium

Promotion of network and visibility, links to other related networks

Division of tasks and responsibilities, joint activities

Actual and potential members

Future meetings (topics, place, time)

11:30–13:00 **Session V: Preparation of annual WHO Symposium on Environmental Health Economics (Bonn, 14–15 October 2013)**

Facilitated by: Frank George, Guy Hutton, Gabrielle Chan

Open discussion on:

Scope and purpose

Draft agenda

List of participants

Proposed key topics and speakers

Proposed dates and location

Proposed background documents, research papers

13:00–13:30 Next meeting of advisory group (proposed dates and location) and closure
Marco Martuzzi and Frank George, WHO

ANNEX 3

OVERVIEW OF VSL AND THE DEBATE

Abstract

To allocate limited resource, governments and ministries have to make decisions and prioritize the different needs of society. The VSL approach has been used to estimate the value of avoided fatality, in order to compare and integrate health costs into other sectors. It makes public health consequences understandable outside the health sector and for policy-makers from other ministries (such as ministries of finance) to make evidence-based decisions. Even though the VSL approach is criticized as unethical and having serious mechanical weaknesses, it has been applied by the EC, OECD and World Bank and, to a growing extent, by WHO. A number of examples of VSL application have shown that specific guidance exists for the use of VSL in specific contexts, yet no guidance has been developed for its consistent use in the broader environmental health field. Guidance and studies to develop a robust and consistent approach to apply the existing VSL will be essential for the confident use and interpretation of economic evidence, together with a comprehensive consultation process and specific attention for Member States with limited data.

Introduction

This paper aims to present a brief overview of the VSL by providing examples of its application and highlights of the debate concerning it. The paper does not intend to provide a thorough review of work carried out in this area, rather to contribute to the discussion at the advisory group meeting as well as to stimulate proposals for action to be taken.

VSL

As society has limited resources to spend, governments have to make decisions on how much is spent on what. Governments, and specifically ministries of finance, compare all spending options by the return on investment in financial as well as political terms (that is, re-election). Public health spending (on average 9% (unweighted) of GDP in the EU in 2010 (1)) is often perceived by ministries of finance as a pure cost factor rather than as an investment with returns on better health and well-being in addition to economic returns. In order to reflect the positive returns on public health spending better and make it politically attractive, ministries of health, WHO and other key players (including private investors) must translate evidence in health terms (such as disability-adjusted life-years and quality-adjusted life-years) into monetary terms. Over the last decade OECD, WHO, the World Bank and others have been applying the VSL method.

The cost of ill health in monetary terms is necessary when decisions are taken on spending. However, this cost includes the costs of illness (for example: medical care, decreased productivity, etc.) which have a market price, and intangible costs such as pain and suffering which have no market price. Good health is also a public good which has an implicit market value but without an open and transparent market. In addition, the preservation of life itself has significant value to humans, but it does not have a market price as such. Indeed, life could be said to be of *fundamental* value, given that without life no object has value (except bequest value). The VSL approach can capture intangible costs through methods that are explained below. Its name is often misinterpreted as the value of a human life. The VSL is NOT about valuing a human life both because many people would not trade their lives at any price and for ethical reasons. Instead, VSL is about understanding the trade-off between risks and money, by quantifying the relationship between monetary value and the risk of fatality or disability. The VSL can have a huge range - from US\$ 2660 (around €2050) in Bangladesh to US\$ 20 million (around €15.5 million) in Taiwan (2). A meta-analysis by Biaisque in 2012 identified that national wealth (per capita GDP) and magnitude of risk reduction are the key factors studied that affect VSL. Other factors identified include the nature of risk, whether it involves public or private goods, and methodological factors (for example, the level of information provided). There is considered to be insufficient evidence relating to factors such as age, risk preference, baseline health and voluntariness of risk (3).

In general, there are two main approaches to estimating the value of avoided death: (i) willingness to pay (WTP)/willingness to accept (WTA), which includes a stated preference/contingent valuation³ and a revealed preference/hedonic approach;⁴ and (ii) cost of illness/human capital.⁵ This paper aims to discuss VSL, which includes

3 The stated preference/contingent valuation refers to VSL estimation through asking people directly the extent to which they would accept being exposed, or how much they would pay to avoid a higher specific risk of death or disability.

4 The revealed preference/hedonic approach refers to VSL estimation by comparing two jobs or products and determining how the pay or price differences stem from the differences in risk.

5 The cost of illness/human capital approach broadly refers to summing the loss of productivity from death or ill health and includes direct and indirect costs such as medical care and administration.

intangible costs and is estimated by the WTP/WTA approach. It does not discuss the cost of illness approach.

The value of a statistical life-year (VSLY) is sometimes used, such as when remaining life expectancy is very short (for example, when old people are most seriously affected) or when morbidity is the key concern (such as noise pollution). In the absence of empirical data on VSLY, it can be derived from VSL using a formula that requires the input of a discount rate, age of the person and life expectancy. Like other cost calculations that involve future costs, the choice of discount rate often leads to discussion, as it needs to take into account risks, time preference and expected productivity gains (4). The discount rate has a more significant effect on impacts that are longer-lasting, such as chronic disease or long-term impact from climate change. Generally speaking, a discount rate of 3% is used and up to 7% for elderly by the United States Environmental Protection Agency (5).

The VSL approach has various sources of uncertainty, including: (i) approach-specific uncertainty, such as the biases related to interview methodology in the stated preference approach; (ii) differences in the nature of health problems, risks and underlying population characteristics if a standard VSL is applied across populations; and (iii) the parameters used, such as the discount rate (6).

Application of VSL

VSL is mainly used in demonstrating the economic burden of diseases in the transport, environment and health sectors, especially in cost-benefit analysis (CBA) that is increasingly used in project evaluations by the EC, World Bank and regional development banks (7). The four examples used in this paper give some insight into the application of VSL in various sectors and on various health focuses. These are:

- (i) UNification of accounts and marginal costs for Transport Efficiency (UNITE);⁶
- (ii) CBA of air quality-related issues, in the Clean Air for Europe (CAFE) programme;⁷
- (iii) World Economic Forum and Harvard study of the global economic burden of noncommunicable diseases;⁸ and
- (iv) the Regional Office's economic valuation of transport-related health effects.⁹

⁶ The UNITE project is commissioned by the EC, to support policy-makers in setting charges for use of the transport infrastructure (8,9).

⁷ The CAFE programme, commissioned by the EC Directorate-General of the Environment, aimed to establish the capability to assess costs and benefits of air pollution policies and to conduct analyses of scenarios generated in the CAFE programme (5,10,11).

⁸ The World Economic Forum and Harvard study aims to inform and stimulate discussions on new estimates of global economic burden of noncommunicable diseases in 2010, and projects the size of the burden through 2030 (12).

⁹ This Regional Office economic valuation of transport-related health effects has the objective of developing practical approaches to the economic valuation of transport-related health effects, including a focus on children (6).

All these examples have adopted VSL derived from the WTP approach. Choices or recommended ways of using VSL vary despite the use of an overall common approach. For example, country-specific VSL is recommended in UNITE, whereas a standard VSL for Europe is used in CAFE. Hedonic wage-generated VSL is used in the World Economic Forum and Harvard study but all the other three studies have used VSL from the stated preference approach. These differences reflect differences in the specific aim of each study, availability of data and level of decision-making (national or regional). On the other hand, these examples show similar choices of adjustment factors when translating VSL to another context. Adjustment to income (GDP and purchasing power parity) is almost a standard practice and VSL is usually not adjusted by age since evidence is inconclusive as to its effect. Choices that are more influenced by evidence alone seem to be more consistent.

Some values and studies are popular and referenced in several other studies, such as the €1.5 million European VSL from Nelthorp, Sansom & Peter (8). Some projects offer detailed and specific guidance on the use of VSL and other related values, which is usually specific for a particular setting or sector, for example, the UNITE project on transport infrastructure in Europe. Overall, however, there is no standard approach. Thus guidelines that can be applied across sectors, and the applicability of VSL estimates across sectors, are essential in the context of environmental health. There is also much variability in the transparency of methodology, as shown in the reporting in these studies. Choices of numbers are generally provided, but the rationales are not always justified or referenced. This missing information probably exists but has not been made available to the public, particularly in the case of sources of uncertainty and sensitivity analyses.

The UNITE, CAFE and Regional Office projects show that specific sources of uncertainty can arise when VSL is applied in environmental health contexts. These include uncertainty regarding the epidemiology from environmental exposure (for example, causality and health effects, dose-response function and lag time) as well as when children are involved since they can be disproportionately affected by environmental exposure. Parents are found to be willing to pay more for reducing risks to their children, and therefore VSL for children has to be adjusted accordingly, adding uncertainty to the valuation (6).

The lack of national VSL data is noted in the examples studied. National VSLs are only available in a few developed countries, and they are often adjusted (as described above) to other countries. The data limitation issue in central and eastern Europe has also been highlighted in an OECD study (13). The translation of VSL among countries has led to much debate on uncertainty, comparability and equity, which are discussed in the next section.

The debate

VSL has become more common in policy and project valuation carried out by governments, regional and international bodies. The main reason is that VSL provides a value on the trade-off of risk and health, in monetary units, to allow direct comparison with other sectors. This is essential as health is predominantly a public good which is characterized by a non-existent perfect market. Giving health a price thus offers a more comparable picture, especially for decision-makers outside the health sector, to understand the magnitude of a health issue or effectiveness of an intervention and, therefore, to be able to evaluate it against spending in other sectors.

This cross-sectoral comparability is highly relevant in decision-making on environmental health, as exposures and interventions in environmental health are often related to other sectors such as energy and transport. Apart from justifying spending on environmental health, this comparability is also essential to allow the impact on health to be integrated into valuations in other sectors. Theoretically it provides a more accurate cost estimation of the overall impacts of action or inaction. For example, the UNITE project (which advises on setting charges for the use of transport infrastructure) includes the health costs of injuries, morbidities and mortalities together with operating, user, accident and other environmental costs .

Moreover, VSL with a WTP/WTA approach captures the element of intangible cost (such as pain and suffering) which is otherwise not accounted for in most other cost estimation techniques, resulting in underestimations.

Despite the advantages, the use of VSL in economic valuation has been controversial, for a number of reasons. First, VSL offers cross-sectoral comparability yet when the same VSL is applied across populations and countries (adjusted for income), its comparability remains questionable. Income is not the sole determining factor of VSL, WTP and WTA; they are also determined by individuals' perceptions of health and risk, which can differ across cultures or geographic areas. Applying a standard VSL adjusted only by income may, therefore, introduce significant uncertainty. Second, this approach leads to ethical concern that the health of people on lower incomes is worth less than that of those on higher incomes. This is a fundamental consideration in environmental health since many of these issues (air pollution and climate change) are transboundary or have global effects. It has been suggested that when VSL adjusted by countries' differing wealth was used in the Intergovernmental Panel on Climate Change Second Assessment Report, governments from developing countries rejected the methodology as it was considered "ethically unacceptable" (14). Another ethical concern is that since health is considered by many as a human right, as described in the WHO Constitution ("the enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being ..."), for some people it is not ethically acceptable to put a value on health. This may lead to survey respondents giving a zero or extremely high value as a protest vote or an inability to provide a number when asked about WTP/WTA.

Finally, methodological issues in the WTP/WTA approach raise questions on its validity. VSL can vary by population as well as by nature of risk and context as perception of each risk may differ. For example, the United States Environmental Protection Agency uses a VSL of US\$ 7.4 million (around €5.7 million) (15) and the United States Department of Transportation uses US\$ 5.8 million (around €4.5 million). This adds further uncertainty to the uncertainties about adjustment across countries. Other methodological criticisms are mostly related to the weaknesses of each VSL approach. Besides the general VSL methodology, specific issues arise when it is applied in the context of environmental health. Environmental risks (such as pollution) and interventions related to them can have implications for both the wider community than just the individual as well as the ecological system, or have intergenerational effects. Thus WTP/WTA can be contaminated by these considerations and include costs beyond the scope of an individual's health. The lack of consistent transparency in methodology and reference values makes it difficult to assess the impact of this contamination and to adjust or address it in sensitivity analysis.

The way forward

The increasing use of VSL is a trend in valuation of health both within and beyond the health sector in the international organizations, academia and research organizations as well as national governments' strategies and planning documents. Significant research has already been conducted to determine VSL estimates in different contexts, mainly in Australia, Europe and the United States. Specific guidance has been developed for VSL to be applied for specific sectors individually or for specific health outcomes or population groups (as shown in the examples of application), yet no guidance has been developed for the consistent use of VSL broadly for health or environmental health. A robust and common VSL approach is essential in the environmental health context, to enable its confident application to the integration of health into other sectors' consideration and, most importantly, to allow comparisons by reducing variability of approach. However, the concerns over methodological as well as ethical issues raise questions about the validity and suitability of using VSL.

General guidance on applying available VSL in environmental health is necessary for quality and consistent use in this field. However, a one size fits all VSL approach is inappropriate for valuation of health in view of the diversity of health issues, exposure and other risk or health characteristics in environmental health. The general guidance should offer clear advice on choice of approach, values (for example, discount rates) and adjustment factors when translating VSL in other contexts, with consideration of the interested health outcomes and characteristics of the environmental exposure (such as time). This can be complemented with a study that adjusts and interprets primary data and provides detailed recommendations on its application in different contexts (for example, age groups, health risks and countries).

The guidance should also make recommendations on approaches to uncertainty and sensitivity analysis. From the user's point of view, guidance on interpretation and comparison of results would be most useful, such as at various levels of decision-making or comparisons within or between sectors.

Apart from methodological issues, the guidance should highlight the ethical concerns and limitations of VSL in addressing these issues. It may not be possible to recommend a solution, but acknowledging these ethical concerns allows them to be considered in decision-making and may encourage users to address them in a more culturally acceptable manner in the local context.

Finally, standards or formats of reporting should be established, to ensure sufficient transparency in reporting which, in turn, will facilitate understanding and comparison and allow results to be communicated more easily.

WHO has been involved with and carried out valuation or studies of VSL on various health issues, but at present there is no clearly consistent approach to the use of VSL in WHO. With its current effort to promote the use of economic evidence in environmental health decision-making, the development of guidance on economic valuation in environmental health, and specifically on VSL (as suggested above), should naturally be a component of its products. Special attention should also be paid to Member States that only have limited data availability or use of VSL, to address their methodological limitations and to understand the practical constraints on them in the application of VSL other than data limitations. Given the multidisciplinary nature of environment health issues, the current use of VSL in other sectors and the vast geographic coverage of the Regional Office's audience, a broad and comprehensive consultation would be valuable in producing guidance that is widely accepted and used.

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ANNEX 4

HEALTH IN “BEYOND GDP”: REFLECTION PAPER

Abstract

The recognition and increasing impact of the global environmental and economic crises has resulted in a growing demand for development to be more sustainable. Rethinking for the economic model is needed and “Beyond GDP” has been one of the key topics with initiatives taking place globally. GDP has serious shortcomings when used as the sole indicator of growth. It encourages over-exploitation, excludes other dimensions of well-being and misinforms decision-making by presenting distorted pictures of societal development. Alternative indicators have been developed to improve measurements of well-being, by including the social and environmental dimensions through adjusting, complementing or replacing GDP. The use of alternative indicators will more systematically incorporate multiple dimensions of well-being, including health and health determinants, into the policy cycle and decision-making. Health is a precondition for and an outcome of sustainable development, with complex relations with social, environmental and economic factors and performance. The direct and indirect health impact through this movement should, therefore, be studied and net benefits be maximized. In this high-level and environmentally-oriented dialogue, WHO (as one of the few representatives of the health sector) has a critical role in ensuring that links to health are made and opportunities with other dimensions for win-win outcomes are explored.

Introduction

This paper provides a summary of the Beyond GDP debate but does not intend to discuss and analyse GDP and the alternative indicators in depth, as considerable work has already been done on that. The purpose of this paper is to contribute to the discussion at the Meeting on the wider implications of the Beyond GDP movement for public health as well as the potential role(s) and positioning of WHO in this global reform process.

There has been a growing demand for more sustainable development, which has directed attention towards the ways in which development is driven and measured. The recent global commitment on sustainable development, Rio+20, highlighted the need to integrate economic, social and environmental aspects to achieve sustainable development and, specifically, recognized the need to complement GDP to reflect other dimensions of sustainable development (1).

We recognize the need for broader measures of progress to complement gross domestic product in order to better inform policy decisions, and in this regard we request the United Nations Statistical Commission, in consultation with relevant United Nations system entities and other relevant organizations, to launch a programme of work in this area building on existing initiatives. (1, paragraph 38).

GDP is the most widely used economic performance indicator globally and is also regarded by many as a wealth or development indicator. In order to perform well in terms of GDP, countries are encouraged to exploit, produce and consume as much as possible. Since this type of growth is clearly unsustainable, the idea of limits to growth was publicized in the 1970s (2). GDP is also single-faceted and does not reflect societal welfare in social and environmental dimensions, such as health, education, equity and pollution. With the growing threats of global environmental crisis, such as global recognition of climate change in the 1990s and the social impact it brings, it is clear that these dimensions should be measured and reflected in indicators used to inform and evaluate policy decisions. The use of GDP as the key economic performance indicator has been increasingly criticized for giving a distorted picture of societal well-being and thus misinforming decisions. Moreover, the global economic crisis and the resulting austerity measures have resulted in budget cuts in a number of European countries, often in sectors that directly affect well-being such as education, social and health services. This has also led to the rethinking of the current growth model, its sustainability and contribution to societal welfare.

The rethinking of performance measurement has not only attracted attention in the public sector; there are also global initiatives to improve measurements in the private sector, commonly known as corporate social responsibility and the environment, and social and corporate governance. Sustainability measurements (including social and environmental dimensions) are increasingly taken into consideration together with profit maximization when evaluating corporate performance. For example, the Financial Times Stock Exchange 4Good index rates companies based on their environmental footprint and health and safety performance, and some investment funds, such as ImpactAssets, make investments based on environment, social and corporate governance criteria (3).

A number of alternative ways to measure welfare have been developed and proposed to either adjust, complement or replace GDP. The OECD has launched the Better Life Initiative and developed the Better Life Index and guidelines on measuring subjective well-being (4), and the EC released a Beyond GDP roadmap in 2009 (5) and has created more than 100 sustainable development indicators to monitor the progress of

the EU sustainable development strategy (6). Health has also been included in these alternative measures, as a precondition and outcome of sustainable development and an important determinant of well-being (1,7). As far as WHO is concerned, the Regional Office is in the process of developing well-being indicators to measure the targets of Health 2020, a policy framework that supports intersectoral action towards health and well-being (8,9). This Beyond GDP movement has, therefore, direct and indirect implications on health and well-being, and it also presents opportunities to integrate health better in sustainable development.

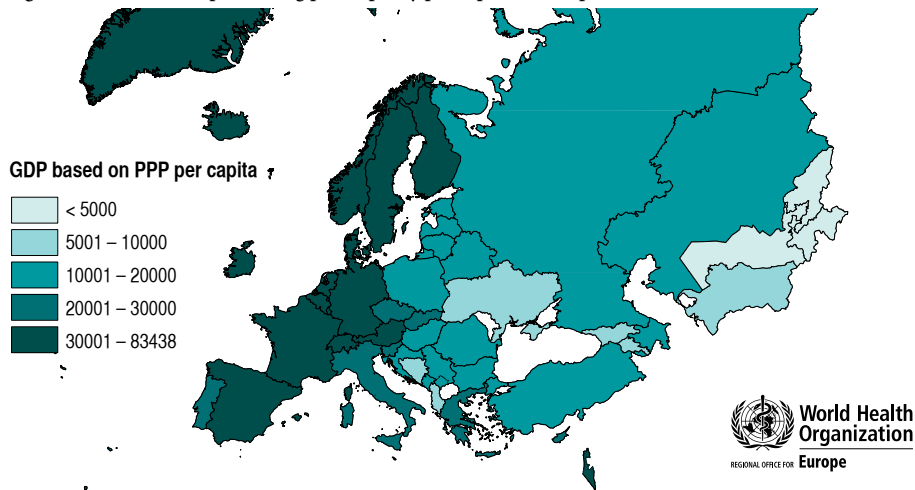
GDP: why and why not?

GDP measures the market value of goods and services produced within a geographical entity within a given period of time. It was devised in the 1930s by Simon Kuznets for the United States national accounts as a way of measuring economic transactions and indicating economic performance in terms of production and consumption. Kuznets had long recognized that there were various aspects of growth that needed to be measured. He also realized that GDP can only indicate one aspect of growth and, therefore, it needs to be supplemented when used as a wealth and growth indicator: “Distinctions must be kept in mind between quantity and quality of growth, between its costs and return, and between the short and the long run. Goals for more growth should specify more growth of what and for what” (10).

Despite its limitations, GDP has been widely used to monitor, compare and forecast growth in society, as well as in various EU and international policies, including the GDP-based eligibility for the European Regional Development Fund and the European Social Fund (10). Historically, GDP has been an important indicator, given that increasing production and consumption was the main goal during the great depression (1929-1939) when GDP was created to measure national economic activity. It gained in popularity because it is easy to understand and comparable between countries. It is objective (guided by market price) and it gives the economic picture in one number, yet it can be disaggregated by sector, product or jurisdiction for different needs and analyses. Since then GDP has been extensively used by governments worldwide, with much interest and attention from public and private sectors.

GDP figures — often based on purchasing power parity per capita (see Fig 4.1) — correlate with some components of welfare, such as life expectancy (see Fig 4.2), and has often been interpreted as a proxy measure of welfare and development progress. This, however, has serious shortcomings since GDP does not measure the quality of growth and the non-economic dimensions of societal development. As Robert Kennedy said in a speech at the University of Kansas on 18 March 1968, “GDP does not allow for the health of our children, the quality of their education, or the joy of their play”.

Fig. 4.1. GDP based on purchasing power parity per capita in Europe and central Asia



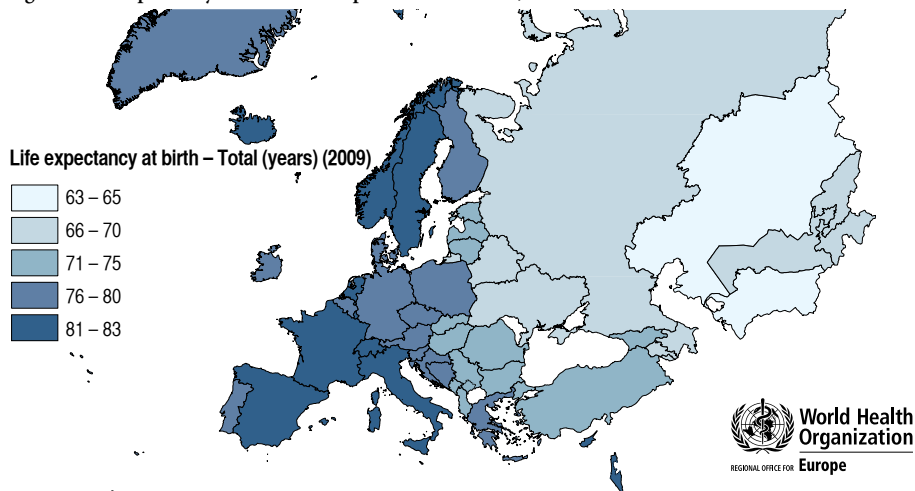
The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data source: IMF (2011) (11)

Map production: Geographic Information System (GIS) World Health Organization

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Fig. 4.2. Life expectancy at birth in Europe and central Asia, 2009



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data source: WHO (2011:46-53) (12)

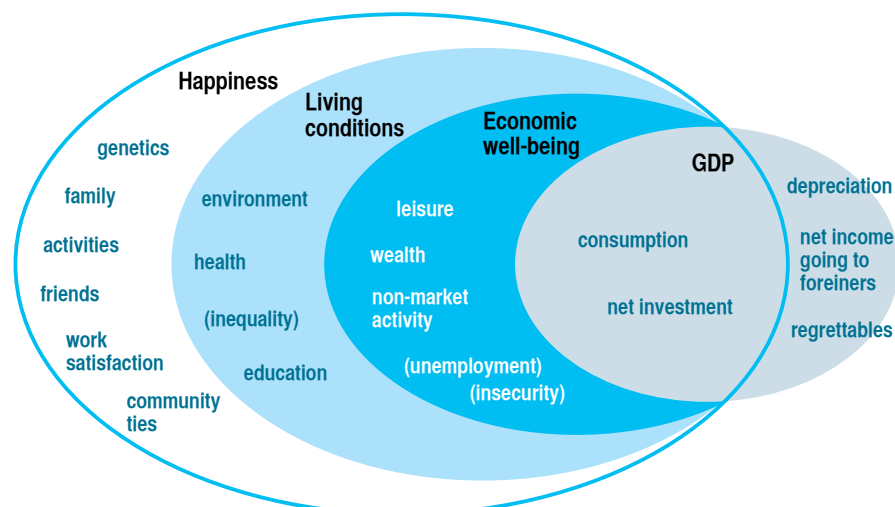
Map production: Geographic Information System (GIS) World Health Organization

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Fig. 4.3 shows what GDP does and does not measure in the context of well-being. GDP is designed as an instrument to measure economic performance, yet real problems occur when it is used to reflect society's overall well-being.

- The use of GDP alone to measure growth promotes production and consumption and does not take into account externalities such as pollution. In addition, natural resources are usually underpriced or used free as a public good, which causes overexploitation as GDP only captures transactions but not depletion of the natural capital (10).
- Informal economic activities and non-market production such as housework and child care are not accounted for since GDP only captures transactions in formal markets.
- GDP measures the quantity of growth and production but not its quality. Sitting in a traffic jam is more productive (in the GDP sense) than swimming in the sea, because fuel is consumed by the vehicle on the road but no transaction occurs from the swim. It can also provide a false impression of growth. For example, deterioration in health generates more transactions in health services which may exceed the lost labour productivity, resulting in a net increase in GDP and suggesting growth. Areas with high crime rates that need additional security measures (such as guards and alarms) also generate transactions and growth.
- GDP per capita is an average that does not show the distribution of growth across societies. Social well-being through, for example, life satisfaction, happiness, health and social coherence is not reflected by GDP alone. Other indicators have, therefore, been developed and used to complement GDP, such as the GINI coefficient which measures inequality of income and wealth.

Fig. 4.3. GDP and elements of well-being



Note: Brackets indicate negative impact.

Source: Bergheim S (2006:3) (10). Reproduced with permission.

GDP fails to include the social and environmental dimensions of well-being and the dependence of the growth model on GDP promotes unsustainable consumption, or growth at all costs. Change in the growth model and indicators to take into account human, social and environmental capital is critical to achieving sustainable development and enhancing overall well-being.

The alternatives to GDP

To move beyond GDP, it has been suggested that the current economic indicator needs to be improved, including a focus on income and consumption instead of production, and to address issues of wealth distribution (13). On the other hand, the examples below illustrate the many alternative indicators that have been developed by international organizations, governments, nongovernmental organizations, research bodies, private corporations and academic institutions.

- The better life index (OECD) is an interactive tool with 11 topics which users can assign how much each topic contributes towards well-being in their opinion, and countries are ranked in that perspective (14). It is a subjective indicator that aims to involve the public in the debate and engage them in the policy-making process.
- The human development index (HDI) (UNDP) is a new way to measure development by combining life expectancy, education and gross national income per capita together as one indicator, expressed in a value from 0 to 1 (15).
- The happy planet index (new economics foundation) uses data on life expectancy, experienced well-being and ecological footprint, ranking countries on how many long and happy lives they produce per unit of environmental input (16).
- The sustainable economic development assessment (Boston Consulting Group) is a methodology to produce a coefficient to measure how well a country translates its wealth into the overall well-being of its population (17). It provides a basis for countries to benchmark themselves in the efficiency of translating wealth into well-being.

A number of studies and reports have carried out in-depth analyses (including strengths, weaknesses, opportunities and threats analysis) of a range of alternative indicators (10, 18–21). Details of indicators are not, therefore, discussed again in this paper. This section aims to introduce and highlight the key issues related to indicators, and to feed into the later discussions of the implications for public health and WHO.

Most of the alternative indicators, in various ways and scope, measure the missing dimensions of well-being in GDP. They generally have three approaches (20).

- (i) GDP is adjusted by the monetizing of the environmental and social factors to be included in the measurement, such as the index of sustainable economic welfare.¹ Such an approach gives clear, quantitative signals and

¹ The index of sustainable economic welfare was first posited by Daly and Cobb in their book *For the common good: redirecting the economy toward community, the environment, and a sustainable future* (22). It is an adjusted economic indicator which incorporates the costs and benefits of a range of economic, social and environmental issues into one analytical framework (23).

incorporates dimensions that do not necessarily have an objective market price such as life satisfaction, healthy lives and ecological services.

- (ii) GDP is replaced by more direct measures of well-being, such as asking people about happiness. This type of indicator can be used to increase public awareness and it encourages participation. It does not, however, take into account the underlying determinants of well-being (such as are provided by GDP), thus it is not always seen as a realistic tool.
- (iii) GDP is supplemented through the provision of additional environmental or social information. This is the most realistic approach, providing the widespread use of GDP in current decision-making systems and the balance of methodological issues and ease of adoption. It is not, however, always easily understood by the public, and interpretation skills and adjustment of the decision-making framework are required for these changes to be adopted.

Alternative indicators can also be distinguished by: level of impact (international, national and local), domains (environmental, social and economic), assessment approach (objective or subjective), indicator type (set, single, compound) and envisaged users (Table 4.1). The differences between these features give the indicators their function for their intended use but also with limitations, as illustrated through contrasting indicators. For instance, the HDI ranks countries by combining information on life expectancy, education and income. This compound indicator packages complex information into a single number; it can be easily understood and communicated and is comparable, and is therefore more appealing to the public and high-level political leaders. However, if dimensions need to be disaggregated to identify priorities, a set of individual indicators is preferred, such as the EU sustainable development indicators, that are flexible enough to enable countries to fine-tune the indicator set to their own needs.

The weight of each component in a compound indicator can significantly change the picture, as seen in the OECD better life index. This is an interactive tool that allows the public to assess countries' performances according to their personal preferences, by allocating different weights to the 11 better life topics, and thus to see how the overall performance changes accordingly. This can also be observed in the HDI: if the weight of income is reduced from 33% to 20% of the HDI, Sweden stays at the top of the list in both weighting mix but Luxembourg would rise from 26th to 2nd in the global HDI ranking (Table 4.2). The weight of each measured component reflects its relative importance in society's well-being, and this can be heavily influenced by subjective opinion. It is difficult for the setting of a standard weighting method for comparability reasons to be widely accepted, yet allocating equal weight cannot reflect the components relative contributions to well-being. Apart from weighting, the resolution of indicators on the level of details they present can also produce very different pictures. The HDI uses national averages and allows countries to benchmark their overall performances internationally. It does not reflect variations within countries in the way that Bhutan's gross national happiness index does (24). This index is a multidimensional measure built from data drawn from periodic surveys of nine domains of happiness throughout the country, which allows differences across districts to be identified. Domestic comparisons are particularly important in large countries or where inequality is significant.

Table 4.1. Categorization of alternative indicators

Indicator / Initiative	Level of impact			Domains			Dominant Assessment Approach		Type of indicator	
	International	National	Local	Environmental	Social	Economic	Objective	Subjective	Set of indicators / Dashboard	Single indicator
Better Life Index (OECD)	x			x	x	x	x		x	
United Kingdom Department for Environment, Food and Rural Affairs (DEFRA) sustainable development indicators		x		x	x	x	x	x	x	
Domestic Material Consumption	x			x		x	x			
Ecological Footprint	x			x		x	x			
Eurostat set of sustainability indicators	x			x	x	x	x		x	
Eurostat set of well-being indicators	x				x		x	x	x	
Gallup-Healthways Well-being Index		x			x			x		
Genuine Progress Index / Index of Sustainable Economic Welfare	x			x	x	x	x			
Gross Domestic Product	x					x	x			
Gross National Happiness		x			x		x	x	x	
Happy Life Years	x				x		x	x		
Human Development Index	x				x	x	x			
Jacksonville Community Indicators			x	x	x	x	x		x	
United Kingdom Measuring National Well-being Programme		x		x	x	x	x	x	x	
OECD Handbook of Subjective Well-being	x				x			x	x	
Regional Index on Alternative quality of Life Indicators (QUARS)		x		x	x	x	x			
Societal Progress Indicators and Responsibilities for All (SPIRAL)	x				x		x	x	x	
United Nations Commission on Sustainable Development (CSD) indicators	x			x	x	x	x		x	

Source: adapted from Hák et al. (2012:30) (21). Reproduced with permission.

Type of indicator			Envisaged users			Link to GDP			Indicator / Initiative
Compound indicators			Politicians / Policy-makers	Public	Experts	Adjusting GDP	"Replacing" GDP	Supplementing GDP	
Aggregated Indicator	Composite indicator	Index							
			x	x	x		x		Better Life Index (OECD)
			x	x	x			x	United Kingdom Department for Environment, Food and Rural Affairs (DEFRA) sustainable development indicators
x			x	x	x			x	Domestic Material Consumption
	x		x	x	x			x	Ecological Footprint
			x	x	x			x	Eurostat set of sustainability indicators
			x		x			x	Eurostat set of well-being indicators
		x	x					x	Gallup-Healthways Well-being Index
x			x	x	x	x			Genuine Progress Index / Index of Sustainable Economic Welfare
x			x	x	x				Gross Domestic Product
			x	x			x		Gross National Happiness
	x		x	x			x		Happy Life Years
		x	x	x	x		x		Human Development Index
			x	x	x			x	Jacksonville Community Indicators
			x	x				x	United Kingdom Measuring National Well-being Programme
			x		x			x	OECD Handbook of Subjective Well-being
		x	x	x			x		Regional Index on Alternative quality of Life Indicators (QUARS)
			x	x	x			x	Societal Progress Indicators and Responsibilities for All (SPIRAL)
			x		x			x	United Nations Commission on Sustainable Development (CSD) indicators

Table 4.2. Default HDI ranking (HDI rank) with equal weight of each component, and HDI ranking with adjusted weighting (income 20%, life expectancy 40% and education 40%) ('Your Rank')

Country	Your Rank	Your Index	HDI Rank	HDI Index
Norway	1	0.813	1	0.955
Luxembourg	2	0.788	26	0.876
United States	3	0.786	2	0.938
Singapore	4	0.767	19	0.895
Australia	5	0.766	3	0.937
Ireland	6	0.759	8	0.916
Netherlands	7	0.756	4	0.921
China, Hong Kong SAR	8	0.756	14	0.906
Switzerland	9	0.748	9	0.914
Germany	10	0.747	5	0.920
Sweden	11	0.745	7	0.916
Canada	12	0.744	11	0.911
Iceland	13	0.740	13	0.906
Qatar	14	0.734	36	0.833
Austria	15	0.728	18	0.895
Japan	16	0.727	10	0.912
Denmark	17	0.724	15	0.902
Belgium	18	0.722	17	0.897
New Zealand	19	0.719	6	0.919
Republic of Korea	20	0.715	12	0.908
Finland	21	0.715	21	0.892
Brunei Darussalam	22	0.710	30	0.855
France	23	0.709	20	0.893
Israel	24	0.707	16	0.900
United Kingdom	25	0.699	27	0.875
Slovenia	26	0.695	22	0.892
Spain	27	0.695	23	0.885
Italy	28	0.691	25	0.881
Czech Republic	29	0.675	28	0.872
United Arab Emirates	30	0.667	40	0.819
Cyprus	31	0.660	31	0.849
Greece	32	0.659	29	0.859
Malta	33	0.648	33	0.846
Kuwait	34	0.646	54	0.791
Slovakia	35	0.633	35	0.840
Estonia	36	0.626	34	0.846
Bahamas	37	0.614	49	0.795

Table 4.2. (concluded)

Country	Your Rank	Your Index	HDI Rank	HDI Index
Portugal	38	0.613	43	0.816
Hungary	39	0.612	37	0.831
Seychelles	40	0.608	46	0.806
Poland	41	0.605	39	0.823
Barbados	42	0.604	38	0.824
Bahrain	43	0.597	48	0.796
Lithuania	44	0.595	42	0.817
Chile	45	0.590	41	0.819
Argentina	46	0.585	45	0.812
Croatia	47	0.583	47	0.805
Saudi Arabia	48	0.578	57	0.783
Latvia	49	0.576	44	0.815
Trinidad and Tobago	50	0.566	67	0.760

Source: table generated from International Human Development Indicators [web site]. New York, United Nations Development Programme, 2013 (<http://hdr.undp.org/en/data/build/>, accessed 16 September 2013).

Alternative indicators are younger and a number are still being developed, yet policy changes that related to the change of indicators have already been reported. For instance, schemes have been implemented to improve the habitat for farmland birds after changes to the United Kingdom Department for Environment, Food and Rural Affairs sustainable development indicator set (22). Promoting the uptake of alternative indicators is key to ensuring that policies and decisions are influenced and oriented towards better well-being. Hák et al have identified factors that contribute to higher uptake and greater influence, including: real relevance for policy-makers; salience for a broader audience (simplicity, understandability and good communication); credibility and legitimacy (for example, quality data and neutrality); targeted audiences and encouragement of participation; and identification of barriers to success (22).

Public health and WHO in the Beyond GDP movement

Indicators represent the goal(s) collectively striven for and what are considered as pathways to achieve these goals. In practice, indicators are used throughout the policy cycle to establish baselines, identify issues, monitor implementation and evaluate outcome. Using ill-designed indicators has, therefore, serious consequences at all stages of policy-making and, most importantly, alters the outcome from what is truly wanted. The current GDP-based measurement of growth has been referred to as “like pilots trying to steer a course without a reliable compass” (13).

The Beyond GDP movement is bringing changes in metrics. Despite the variety of approaches, they have a common aim to integrate environmental and/or social dimensions

into the measurements. Given that indicators have an increasing importance in policy-making, this movement is an opportunity to incorporate social and environmental considerations more systematically into wider and higher-level decision-making. It is reasonable to expect that more efforts will be made to improve the performance of these new indicators, which will have direct and indirect impacts on health. Health is not always a stand-alone component in these proposed indicators. Health indicators are often embedded within the social component such as life expectancy in HDI and the happy planet index. Direct health indicators in a number of selected alternative indicators are shown in Table 4.3. Investment targeted at these health indicators will have a direct impact on health. Since many of the environmental and social indicators are related to identified determinants of health, such as equity and pollution (25–27), measures to improve these indicators can have a significant impact on health. This indirect impact is especially relevant to environmental health, as it is difficult to justify investment in intervention for some impacts on environmental health owing to long lag-times or small relative risks. Measures to address environmental and social issues will have positive impacts on the related health determinants, thus unintentionally enhancing the prevention of diseases.

Table 4.3. Direct health indicators in selected alternative indicators

Indicator	Creator	Dimensions and components measured	Direct health indicators
Better life index	OECD	Housing, income, jobs, community, education, environment, civic engagement, health, life satisfaction, safety, work-life balance	<ul style="list-style-type: none"> – Life expectancy – Self-reported health^a
Happy planet index	nef	Experienced well-being, life expectancy, ecological footprint	<ul style="list-style-type: none"> – Life expectancy
Gross national happiness	Bhutan	Psychological well-being, health, education, culture, good governance, community vitality, ecological diversity and resilience, living standards, time use	Psychological well-being: <ul style="list-style-type: none"> – satisfaction with health – positive and negative emotion (frequency of feelings of contentment/generosity, fear, jealousy and so on) Health: <ul style="list-style-type: none"> – self-reported health status (general health status) – number of healthy days – disability (long-term disability and health/mental problems, disability that restricts activities) – general mental health
EU sustainable development indicators	EuroStats	Headline indicators: socioeconomic development, sustainable consumption and production, social inclusion, demographic changes, public health, climate change and energy, sustainable transport, natural resources, global partnership, good governance	Headline health indicators: <ul style="list-style-type: none"> – healthy life years^b – life expectancy at birth In the complete set of indicators (in addition to the above headline health indicators): <ul style="list-style-type: none"> – <i>health and health inequalities</i> (death rate due to chronic diseases, healthy life years and life expectancy at age 65 years, suicide death rate by sex, and self-reported unmet need for medical examination or treatment by income quintile) – <i>determinants of health</i> (production of toxic chemicals, urban population exposure to air pollution, proportion of population living in households considering that they suffer from noise, serious accidents at work)

Table 4.3. (concluded)

Indicator	Creator	Dimensions and components measured	Direct health indicators
Human development index	UNDP	Health, education, living standard	– Life expectancy at birth
Sustainable economic development assessment	Boston Consulting Group	Income, economic stability, employment, income equality, civil society, governance, education, health, environment, infrastructure	<ul style="list-style-type: none"> – Life expectancy at birth – Mortality rate, under 5 years – Prevalence of HIV, undernourishment – Incidence of TB – Population obesity – Immunization (diphtheria, measles) – Physician density – Hospital beds
Social progress index	Social Progress Imperative	<p>Basic human needs (nutrition and basic medical care; air, water and sanitation; shelter; and personal safety)</p> <p>Foundations of wellbeing (access to basic knowledge; access to information and communications; health and wellness; ecosystem sustainability)</p> <p>Opportunity (personal rights; access to higher education; personal freedom and choice; equity and inclusion)</p>	<p>Nutrition and basic medical care:</p> <ul style="list-style-type: none"> – undernourishment – maternal mortality rate – stillbirth rate – child mortality rate – prevalence of TB <p>Air, water and sanitation:</p> <ul style="list-style-type: none"> – indoor air pollution-attributable deaths – outdoor air pollution-attributable deaths <p>Health and wellness:</p> <ul style="list-style-type: none"> – life expectancy – obesity – cancer death rate – deaths from cardiovascular diseases and diabetes – deaths from HIV – availability of quality health care

^a Percentage of people reporting their health to be good or very good from the question “How is your health?” in the OECD regular health surveys (27).

^b Healthy life-years measure the number of years that a person at birth is expected to live in a healthy condition (also called disability-free life expectancy) (6).

Health is not only a beneficiary of the Beyond GDP movement. It has been recognized as a “precondition for and an outcome and indicator for all three dimensions of sustainable development” in the Rio+20 Outcome document (1). Health, social, economic and environmental factors and outcomes are interrelated, with complex, sometimes casual, relations. The movement therefore drives the intersectoral collaboration necessary to promote performance in various dimensions as measured by the alternative indicators. The integration of health into other sectors will not only generate health benefits but will also enhance performance in other indicators, giving a win-win outcome. For instance, promoting active transport can give health benefits together with a reduction in air pollution and time spent in traffic congestion.

The transition towards a more comprehensive assessment of societal development will bring greater emphasis on health and its determinants in policies. It has undoubtedly become a global movement and is led by key international and regional bodies (EU, OECD and UNDP). The Regional Office has already initiated action in

the same direction. Its most recent work stemmed from its Health 2020 policy framework which aims to enhance well-being, reduce inequalities and ensure the right to the highest attainable level of health (8). Currently it is in the process of developing a set of well-being indicators for the Health 2020 targets and intends to work together with the EU and OECD on their indicators as a shared approach (9). While developing new indicators, the relationship of other sustainability indicators with health should be explored to maximize the potential health benefits or to identify any health risks if these indicators are to be promoted. For example, although there will be motivation to increase areas of natural habitat if this is an indicator, the potential health impact may be positive (better air quality) or negative (greater exposure to wild animals or disease vectors). The health impact of these indicators should, therefore, be studied and the net health benefits maximized.

As well as creating and deciding on indicators, this global movement will also require political commitment, consensus and leadership, which is likely to take more time. Given the potentially large and positive health impact as well as the importance of political acceptance, it is worth while to focus efforts on how indicators can be incorporated into decision-making. This includes the application of indicators to different stages of the policy or project cycle, interpretation of indicators, how to decide on or prioritize indicators, and assessment of any potentially conflicting messages that result. Factors contributing to successful uptake (as previously discussed) should also be taken into account to ensure that these tools are used and policies are influenced. Such work will need to involve a broad range of partners. This type of discussion usually involves high-level leaders who are more environmentally-oriented; health ministers and the health sector tend to have a smaller presence. As a key representative of health in the discussion, WHO's active contribution is critical in emphasizing health and making links to other dimensions.

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ANNEX 5

IMPLEMENTATION PLAN FOR THE STRATEGIC FRAMEWORK ON ENVIRONMENTAL HEALTH AND ECONOMICS

1. Abstract

The three key pillars of the strategic framework on environmental health and economics are:

- developing and sustaining the partnership network
- responding to the needs of and influencing the target audiences
- compiling and developing scientific evidence.

The following are cross-cutting activities linking these pillars:

- capacity-building
- consensus-building
- communication and dissemination
- monitoring and evaluation.

When combined, these three pillars and the cross-cutting activities give rise to a number of definable workstreams.

Implementation of the strategic framework is an ambitious undertaking that will only succeed if partner organizations work together, providing mutual support and motivation and synchronizing and coordinating their workplans. The partner network is called the environmental health economics network (EHEN). Four interlinked groups define the network: the members, the advisory group, thematic working groups (to advance the priority environmental health topics and technical themes) and a secretariat, provided by WHO ECEH.

The target audiences are broadly defined as individuals and organizations making decisions that affect environmental health. The generation and provision of knowledge should start from identifying which specific decision-makers or processes need to be influenced, and the process needed to achieve the result. The process includes not only generating the right evidence, but packaging it in the right way, delivering it at the right moment, giving it to the right person, and ensuring the recipients of the information have the right background information and skills to use the evidence effectively. The challenge lies in determining which are the right ways to generate and target evidence. Thus a first activity is to identify these decision-makers and the types of evidence they demand and can use. Once this is understood and evidence is compiled, decision-makers need to be trained in how to use the evidence, and the evidence itself needs to be packaged and disseminated and its uptake monitored.

In producing scientific evidence, four steps are proposed:

- to map existing evidence and tools, and any gaps
- to prioritize topics in need of further technical review and evidence
- to generate evidence summaries (based on desk studies)
- to conduct new primary research to fill key gaps.

Evidence needs to be both of an economic nature (such as CBA) and to include other criteria that decision-makers should consider. Formalized decision-making approaches, such as multi-criteria decision analysis, can be applied to ensure decisions follow an explicit process. Partners should weigh priority environmental health topics, taking into account their importance and the existing evidence base, so as to decide which ones to focus on in the early phase of the EHEN. Among the most promising topics are: the green economy and greenhouse gas abatement, indoor air pollution, chemical safety, adaptation to climate change and extreme weather events, water and sanitation, and noise pollution.

Of the many activities proposed for the EHEN, among the most urgent are to:

- hold meetings (advisory group, annual symposium) and expand the EHEN
- conduct surveys of target audiences
- agree on priority topics and evidence and constitute thematic working groups
- draft guidelines for decision-makers and evidence producers
- assess further funding needs and submit funding proposals.

The secretariat carries out its duties to support all of the above.

2. Background

Changes in the policy and economic environments in the Region and beyond have revealed the growing importance of economic evaluation in environmental health policies. Recent initiatives, such as UNEP's Global Green New Deal, the

expanding practice of environment, social and corporate governance in the private sector, The United Nations Economics of Ecosystems and Biodiversity (TEEB) study, the “Beyond GDP” movement, and the Post-2015 Sustainable Development Goals, indicate that change is in the air, but the lack of monitoring frameworks and a supporting evidence base constrain their implementation (1). The time is, therefore, ripe to promote the use of economic evidence to improve both the volume and efficiency of funds allocated to environmental health measures, thus simultaneously addressing the twin economic and environmental crises.

At a stakeholder meeting hosted by WHO ECEH in Bonn in November 2012, a draft document entitled Towards a European strategy on economics and environmental health was endorsed as a promising step to achieve more efficient environmental health policies and programmes, leading to the birth of the EHEN (1). The document proposed three inter-related paths of action: establishing a network of strategic partners to support the initiative; working closely with target audiences as users of evidence; and improving the scientific evidence base. A diverse set of outputs is expected from the implementation of the strategic framework.

Since it is impossible to generate exhaustive economic evidence in all areas of environmental health, the EHEN partners need to focus on compiling and generating the economic evidence that will have the greatest uptake and eventual impact, and working with those decision-makers that have the greatest influence on environmental (health) policies and programmes. This proposal for the implementation of the strategic framework therefore addresses the following questions.

- On which environmental health and related economic topics should the focus be?
- In which countries or groups of countries should work be undertaken?
- Which decisions, and which decision-makers, should be engaged, and how can they be reached and influenced?
- Which types of evidence and product are most cost-effective, relevant and understandable for target audiences (such as policy-makers) in influencing political/financial/public health decisions?
- Which other partners should be brought into the EHEN?
- Which other networks should be worked with?
- Which structures and mechanisms are most sustainable and effective for this initiative: the network, the advisory group, technical working groups, collaborating centres?
- How can funds be secured to deepen and expand the network in a sustainable manner, to carry out advocacy and communication (for example, to create a web site and related communication products) and to implement the EHEN’s activities and products?

3. Overview of EHEN strategic framework

The strategic framework, and its basis, are described more fully elsewhere (1). At the centre of the framework are three linked tracks, or pillars, and associated activities as described below and in **Error! Reference source not found.** in the main text.

Pillar 1. Partnership network. WHO and a diverse range of organizations and individuals will contribute to the workplan. Over 20 strategic partners have already joined the network. The next steps are to identify further strategic partners, define working groups for priority environmental health themes, hold meetings and develop communication channels for the functioning of the network.

Pillar 2. Target audiences. A strategy must be clear about which decisions can and should be influenced as a result of improved evidence, and how influence is achieved. The diverse range of potential users of evidence therefore need to be identified and their needs for evidence understood.

The partners of Pillar 1 are largely distinct from the audiences in Pillar 2. The prime movers of the network are in Pillar 1, while the ultimate decision-makers are in Pillar 2. These are dealt with in workstreams 1 and 2, respectively. There may be some overlap between these, as decision-makers will participate actively in the network.

Pillar 3. Scientific evidence. Existing evidence needs to be collected, reviewed and collated, evidence gaps identified and prioritized, and new evidence generated. Guidelines, tools and training are needed to support generation of economic evidence.

The entire strategic framework is founded on underlying principles, ethics and values emanating from the partners and the various accords, declarations and policy documents they are party to. As key determinants of success, the cross-cutting activities linking the three pillars are: capacity-building; consensus-building; communication and dissemination; and monitoring and evaluation. When combined, these three pillars and the cross-cutting activities will give rise to a number of definable workstreams, covered in the rest of this paper.

4. Partnership network

Implementation of the strategic framework is an ambitious undertaking that will only work if partner organizations work together, providing mutual support and motivation, and synchronizing and coordinating their workplans. While the proposal for the EHEN was initiated by the Regional Office, strong support for the network is needed from academic institutions, other United Nations and multilateral agencies, civil society organizations and related networks. The first meeting in November 2012 brought together a critical mass of key organizations and technical experts, and since then others have been invited. So far, the partners approached have been

predominantly region-wide institutions. Depending on the priority actions and topics chosen, WHO focal points for environment and health as well as other most relevant organizations and technical experts will be brought on board, including the private sector, national agencies¹¹ and country-level institutions (including WHO country offices), to ensure that the network has the opportunity to influence national dialogues.

The aims of the network are as follows:

- to interlink knowledge producers and communicators effectively with the end-users of knowledge at various levels (regional, subregional,¹² national, subnational) including, for example, translating public health and environmental health findings from ministries of health and environment to other relevant ministries such as transport, energy, agriculture and finance;
- to provide a platform and focal point for professional contacts, facilitate collaboration, and exchange the latest information and research, opportunities and professional opinions;
- to identify gaps in knowledge and the needs for guidelines and training, and provide a platform for agreeing how to best fill those gaps, including identifying funding opportunities and experts or researchers;
- to improve the use of available economic tools in promoting efficient and effective public health decisions and ultimately the most appropriate interventions;
- to advocate to partners, donors and the public the adoption of academic research results and recommendations in the area of economics and environmental health.

The following four interlinked bodies define the EHEN (Pillar 1):

- the members – a critical mass of organizations and individuals who are committed to the EHEN;
- an advisory group consisting of selected key members of the EHEN and specifically selected experts;
- thematic working groups for the priority environmental health topics and technical themes selected;
- a secretariat hosted by and based in the WHO ECEH.

4.1. EHEN members

The members of the network should be united by a common understanding of the importance of economic evidence in environmental health decision-making,

¹¹ There are two focal points from ministries in each country in the European Region.

¹² For example, sub-sets of the 53 countries that make up the WHO European Region, such as the countries belonging to the EU after January 2007.

and possess a capacity to contribute among peer members. Target members of the network are, therefore, those who are either: (i) technically relevant, for example, carrying out academic research and have published in this area, and/or (ii) professionally relevant, for example, working in this field in the public or private sectors, international organizations, research institutes or the civil society, and/or (iii) politically relevant, such as working in a ministry of finance or prime minister's office; and (iv) regional and/or country relevant, such as working in the EC, United Nations, World Bank country offices, WHO, or as official environment and health focal points of WHO and national nongovernmental organizations.

The network is open and no formal accreditation is envisaged, although a declaration of interest is required. It is expected to grow as the workplan is implemented. Institutions so far invited to join the network, with their representatives, are listed in Table 5.1.

Membership of the network does not legally commit the institutions or individuals to undertake any specific work. Contributions to the activities of the network are voluntary, and should fit with each institution's interests and workplan. At a minimum, members should actively contribute to the network either through providing evidence or advice or being present at relevant meetings. In exchange, they will be invited to participate in physical meetings or conference calls, and receive occasional e-mails informing them of forthcoming events and collaborative opportunities. An annual symposium of the network is planned, open to both members and non-members.

4.2. Advisory group

The advisory group is a subgroup of EHEN members, consisting of approximately 10–15 institutions or agencies (excluding the secretariat) with an interest and core expertise in environmental health and economics and demonstrating commitment to the network. It will contain a mixture of United Nations, civil society, private sector and academic organizations and (at a later stage) official WHO national focal points for environment and health and WHO and partner country representatives.

The advisory group is expected to meet once or twice a year to steer the EHEN and to advise the secretariat on priority activities. These include how to: identify the most appropriate and supportive individuals and agencies, expand the membership, support country outreach, propose topics and speakers for the annual symposium and priority themes for working groups, and identify opportunities for funding. The current members of the advisory group are shown in Table 5.2.

4.3. Thematic working groups

Thematic working groups will be set up to take forward a particular environmental health topic or to examine in depth a methodological or technical issue that cuts across several environmental health topics, such as economic valuation techniques.

Table 5.1. Members of the EHEN

Organization	Individual/contact
Begutachtung der Entwicklung im Gesundheitswesen, German Federal Ministry of Health	Viola Henke
EuroHealthNet	Caroline Costongs/Clive Needle
EEA	Mikael Skou Andersen
European Environment and Health Youth Coalition	Jovana Dodos
German Federal Environment Agency	Andre Conrad
German Federal Ministry for Economic Cooperation and Development	Dirk Gehl
Government of Malta	Neville Calleja
Health & Environment Alliance	Julia Huscher
Independent	Fiona Adshead
Independent	Luca Carra
Independent	Michael Holland
Independent	Guy Hutton
Independent	George Morris
International Agency for Research on Cancer	Kurt Straif
London School of Economics and Political Science	Alex Bowen
London School of Economics and Political Science	Caroline Rudisill
London School of Hygiene and Tropical Medicine	Harry Rutter
National Institute of Public Health and the Environment, Netherlands	Erik Lebret
New Economics Foundation	Aniol Esteban
OECD	Nils Axel Braathen
UNEP	Ronal Gainza-Carmenates
University of Belgrade	Radmilo Pesic
University of Bielefeld	Claudia Hornberg
University of East Anglia	Marc Suhrcke
University of Stirling	Andrew Watterson
University of Warsaw	Olga Kiulla
WHO	Roberto Bertollini
WHO	Matthias Braubach
WHO	Carlos Dora
WHO	Frank George
WHO	Srdan Matic
WHO	Marco Martuzzi
WHO	Bettina Menne
WHO	Mariam Otmami del Barrio
WHO	Elizabet Paunovic
WHO	Gerardo Sanchez
WHO	Oliver Schmoll
WHO	Erio Ziglio
World Youth Alliance Europe	Krisztina Szalachy
Vienna University of Economics and Business	Clive Laurence Spash
Board of Norwegian Forum for Global Health Research	Harald Siem
Centro Mario Molina para Estudios Estratégicos sobre Energía y Medio Ambiente	Juan Carlos
EC	Dirk Van den Steen

Table 5.1. (concluded)

Organization	Individual/contact
Financial Times Germany	Thomas Fricke
Health and Environment Alliance	Anne Stauffer
Independent	Frank Ackerman
Noragric, Norwegian University of Life Sciences	Arild Vatn
Oslo Centre for Interdisciplinary Environmental and Social Science Research	Henrik Lindjem
Queen's University Belfast	Matthias Beck
Slovenia	Gordana Beltram
Università luav di Venezia	Margherita Turvani
University College of London	Sir Michael Marmot
University of Maryland	Anna Alberini
University of Maryland	Maureen Cropper
University of Stirling	Frans De Vries

Table 5.2. Proposed advisory group members and prospective members

Organization	Individual/contact
Begutachtung der Entwicklung im Gesundheitswesen, German Federal Ministry of Health	Viola Henke
EuroHealthNet	Caroline Costongs/Clive Needle
EEA	Mikael Skou Andersen (replacement needed due to change of post)
German Federal Environment Agency	Andre Conrad
Independent	Fiona Adshead
Independent	Luca Carra
Independent	Michael Holland
Independent	Guy Hutton (replacement needed)
Independent	George Morris
London School of Economics and Political Science	Caroline Rudisill
London School of Hygiene and Tropical Medicine	Harry Rutter
National Institute of Public Health and the Environment, Netherlands	Erik Lebreit
new economics foundation	Aniol Esteban
OECD	Nils Axel Braathen
UNEP	Ronal Gainza-Carmenates
WHO	Roberto Bertollini
WHO	Frank George
WHO	Srdan Matic
WHO	Marco Martuzzi
WHO	Mariam Otmani del Barrio
Prospective members	
EC	Stephen White/Andre Zuber
Private sector	
Nongovernmental organizations	EPHA
WHO European national environmental health focal points	
WHO heads of country offices	
World Bank	

Thematic working groups are to be set up to deal with either filling substantive gaps in evidence and/or stimulating the uptake of research by decision-makers. The thematic working groups should have clear achievable objectives, and should be time-bound, that is, they should close after their objectives have been met.

In its initial stages, the EHEN should focus on a small number of working groups to ensure that the secretariat's resources are not too thinly spread and to allow the focus needed to maximize the chances of early success. Themes for the working groups will initially be proposed by the advisory group and, on the basis of its proposals, the groups will be set up based on the following three main criteria:

- importance and priority of topic;
- critical mass of interest from EHEN member organizations; and
- additional resource or funding availability for identified activities: most of a thematic working group's work could be conducted with no explicit budget or funding proposal, if partner organizations offer their staff time and internal resources to contribute to the workplan.

In order to remain administratively light, a thematic working group does not necessarily have to be set up to undertake a piece of work. Some evidence gaps can be filled by, for example, hiring a consultant or asking one EHEN member to study an issue. Indeed, the secretariat is likely to commission discrete pieces of work without the need for a thematic working group. The EHEN should, however, aim to offer collaborative opportunities where possible and to share the workload.

An assessment of the options and proposals for priority thematic working groups are in section 5.2.

4.4. Secretariat

WHO ECEH (EHI economics) will be the secretariat of the EHEN and will cooperate closely with members and other partners offering stable support. The secretariat will:

- maintain the database of EHEN members, advisory groups and thematic working groups;
- monitor the network's activities;
- organize, or assist with the organization of, EHEN meetings (symposia, thematic working group meetings, advisory group meetings, web meetings); funding contributions for meetings will be made by the secretariat as available and where necessary;
- 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 discussions;
- 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;

- establish and maintain a roster of experts and consultants by area of expertise, topic and geographical region;
- explore the interest in, and possibilities for, expanding the network, such as the setting up of new WHO collaborating centres in the area of economics and environmental health.

The following three sections explore the activities of the remaining two pillars. Section 5 examines one aspect of the target audience pillar – that of ensuring the alignment between the needs of the decision-maker and the provision of technical information. Section 6 details the various issues related to the development of the evidence base and decisions that need to be made about it. Section 7 returns to the target audience, examining how to best influence the different audiences via dissemination and communication activities.

5. Orienting evidence

5.1. Introduction

The generation and provision of knowledge should start from the result desired – which specific decision-makers or processes need to be influenced – and the process needed to achieve the result. The process includes not only generating the right evidence, but packaging it in the right way, delivering it at the right moment, giving it to the right person, and ensuring the recipients of the information have the right background information and skills to use the evidence effectively. The challenge lies in determining what are the right ways of generating and targeting evidence. Unfortunately, there is usually at least one critical step that is missing between the producers and the users of knowledge.

First, the users of knowledge often do not systematically assess all the types of evidence available, decide which they would like access to, and act on that decision. Research users themselves need to be clear what it is they want – the variables and specification, the robustness and acceptable levels of uncertainty, the degree of disaggregation and the frequency – and how it will be used – in which decision-making processes. They also need to be open to (and informed about) new developments in evidence and approaches to using it that will change the way they make decisions.

Second, while many providers of knowledge carry out their work with no real knowledge of how it might be used, they often have the conviction that it is useful and that if it is good enough, it will be used. To make knowledge more useful, therefore, research providers need to understand the needs of the research users better, and the specific decisions the evidence will potentially influence. They need to understand the opportunities available to, and constraints upon, decision-makers and to provide evidence in a digestible format, with different layers of evidence according to the understanding and needs of the research users.

Ideally, these processes run in parallel and interlinked: producers and users of knowledge speak and listen to each other. For example, when a government research council commissions research, the aim of that research should be to answer specific questions from government ministries rather than conducting research for the sake of it. Thus to define its knowledge priorities, the EHEN needs to connect with the range of potential users of the various types of economic evidence available.

5.2. Understanding the decision-maker

Environmental health cuts across many development themes and institutional interests, as defined by traditional sector categories and line ministries or government departments. For each environmental health topic there are many potential knowledge users. It is proposed, therefore, that the EHEN should carry out the following activities.

- It should identify the main knowledge users of each environmental health topic, covering supra-national agencies such as the EC, OECD, UNDP, UNEP, World Bank, professional networks and nongovernmental organizations; national agencies such as government departments; the media and social media; and the private sector. Note that some of these agencies are both knowledge producers as well as knowledge users.
- It should select a sample of these agencies to gain their views and perspectives on economic evidence via an e-survey (large sample) supplemented with telephone interviews (smaller sample). The main target audience is national decision-makers who consider national policies, but other decision-makers should be considered, such as those advising groups of countries as well as decision-makers at regional and subnational level. It will be important in the first instance to pick high potential decision-makers and to learn how to work with them before the network is expanded. Existing networks and alliances that can be tapped into should be explored. The survey of knowledge users includes identifying:
 - their understanding of economic evidence, its availability, how it is used, and how relevant and useful it is;
 - their needs for additional knowledge, the types of knowledge, its detail/specification and its frequency;
 - their needs for sensitization and capacity-building (training, staffing);
 - the need for reform in decision-making to make it more effective;
 - the need for tailoring and packaging of evidence to meet specific purposes.
- It should summarize the results and identify the types of evidence and the environmental health topics that have the greatest potential to serve as initial case study (-ies). This feeds into the knowledge production and selection of themes for working groups (section 6), and links with the packaging, dissemination and targeting of knowledge products (section 7). The survey can also help to identify potential partners and countries for the case studies.

A robust framework that considers both the needs for and the limitations of evidence is critical in the taking of decisions as to which evidence should be invested in to influence a decision. A balance needs to be struck between the two extremes of demand-led evidence and supply-driven evidence.

- With demand-led evidence, only the decision-makers' viewpoint and potential are considered, which may be biased towards their experience and preferences. Hence, the framework should help to push the boundaries of current and imperfect practices in relation to the use of evidence for decision-making.
- With supply-driven evidence, the decision does not consider the unidentified or unquantified factors that motivate a decision-maker and hence drive a decision. Furthermore, when data are of poor quality or there is high uncertainty, decisions are unlikely to be optimal; when new evidence is produced, policies are likely to fluctuate.

5.3. Encouraging a broad approach to evidence use

Given that many factors influence the taking of a decision, if the partners in the EHEN only disseminate economic evidence, it may not have a high uptake. Economic analysis techniques need to be set within a broader framework of other linked methodological techniques for policy decisions, such as policy analysis, planning studies and multi-criteria analysis. In the face of many different types of evidence, which ones should a decision-maker consider first? Which techniques encompass other techniques? On what basis should priorities be set?

As noted previously by WHO:

Economic studies alone do not, and should not, provide the sole basis for decisions on which health or environmental interventions to promote or finance. Some factors or variables cannot simply be inserted into the cost or benefit side of the equation. Decision-makers need a range of scientific evidence and to consider contextual factors that affect uptake and intervention efficacy, such as underlying risks, health behaviour, whether an intervention may improve adherence by a better side effect profile or improved mechanisms of delivery, what other treatment options are available and whether health gains come at the end of life or are for children. Attitudes to risk, such as risk aversion, also have to be incorporated into the decision. Hence, ideally economic evidence will feed into a rational and structured decision-making process that considers different evidence and stakeholders' views. (1)

It is, therefore, important to be clear about what evidence decision-makers need. In the real world, this need varies depending on the decision-maker. Hence, the analysis in this section examines the case of a hypothetical decision-maker where technical, as opposed to political, considerations dominate the policy decision. A typified sequence of technical information needs may be as follows.

- Problem analysis: in order to understand the issue, a decision-maker will first seek evidence that sheds light on the problem and whether he/she should be concerned by it. What is the problem? Why is it a problem? Who specifically is affected by the problem? What is the cost of waiting or of ignoring the problem?
- Intervention options: the decision-maker may then seek to understand what actions are possible. What interventions exist? How do they work? Over what period they must be applied? Which options are feasible?
- Performance of intervention options: to make a decision, it is necessary to understand more deeply the various implications of implementing the interventions. What is the cost? What is the impact? Do the benefits of action outweigh the costs? Who is impacted, both positively and negatively? Who can implement the intervention efficiently? Who could pay for the intervention, and how will it be financed?
- Risk analysis and broader concerns: related to the options evaluated above, the decision-maker will need additional information to be sure he/she is making the right decision. What is the degree of confidence in the evidence presented? What are the risks and what are the uncertainties? What are the intervention risks and what might go wrong? What are the trade-offs of implementing the intervention? How can unexpected outcomes and unintended consequences be managed? What is the scale of impact if things go wrong?

Clearly, this is a simplified but long list of information needs. Few decision-makers will systematically seek information and evidence on all these questions, although there may be elements of most of these in their deliberations.

The earlier framework paper identifies different decision-making approaches and evidence available for various environmental health topics (1). The presentation of certain types of evidence alone contains implicit understandings and there are several biases that may result. Table 5.3 illustrates this with the implicit guidance or bias in the results of different types of analysis, and considerations that are omitted.

The question of paramount importance to the EHEN is whether it can improve the use of economic evidence in decision-making by moving it from the traditional presentation of efficiency rankings based on quantitative evidence alone, to taking into account all the important variables that could or do affect a decision – and thus becoming a more applicable tool for different approaches to decision-making. This is feasible. To achieve this, however, a technical framework is needed to classify different types of information and their uses and propose a comprehensive way of assessing evidence that does not unduly burden the decision-making process.

Table 5.3. Main purposes, guidance and gaps of alternative evidence types

Evidence	Implicit guidance and bias	Considerations omitted
Health impact assessment (burden of disease)	The higher health impacts should gain more attention.	Does not consider the costs and efficiency of reducing different disease burdens.
Health impact evaluations	Higher effectiveness interventions are more deserving than lower effectiveness interventions.	Does not consider costs and efficiency of interventions
Damage cost analysis	Higher economic impacts should gain more attention	Does not consider the costs of reducing different disease burdens
Cost (or budget) analysis	Considers only the budget impacts or intervention costs, but not the efficiency of interventions.	Budgets tend to be historical; takes considerable evidence to change course
Financing analysis	Identifies mechanisms by which resources can be raised to ensure intervention is implemented	Benefits, alternative interventions
Benefit–incidence analysis	Considers who receives the benefit of the intervention, also in relation to how it was financed (equity angle)	
Environmental impact assessment	Assesses positive or negative impacts that a proposed project may have on the environment	
Cost–benefit analysis (economic evaluation)	Compares the costs versus economic returns of less than one intervention (efficiency ratios such as benefit–cost ratio, internal rate of return, net present value and payback period)	Non-monetized benefits
Cost-effectiveness analysis (economic evaluation)	Compares the costs versus health returns of less than one intervention (for example, cost per death or case averted)	Non-health benefits
Cost-utility analysis (economic evaluation)	Compares the costs versus generic health returns of less than one intervention (for example, cost per disability-adjusted life-year averted)	Non-health benefits
Policy analysis	Analyses the pros and cons of different policy options	Gives a lower profile to scientific evidence
Stakeholder analysis	Assesses the different interests and influences of each stakeholder affected by or influencing a decision	Gives a lower profile to scientific evidence on costs and impacts; greater attention to perceptions
Multi-criteria decision analysis	Compares different policy options using scoring and rating rules, based on key decision criteria	

Multi-criteria decision analysis is one approach to this, although it has rarely incorporated so many different types of evidence as those in Table 5.1. It provides a way for decision-makers to overcome difficulties in handling large amounts of complex information about many different factors influencing a decision in a consistent way. It establishes preferences between options by referencing an explicit set of objectives that the decision-making body has identified, and for which it has established measurable criteria to assess the extent to which the objectives have been achieved. The evidence is presented in a performance matrix, where intervention options are cross-tabulated with selected evaluation criteria. Criteria used in a

multi-criteria analysis may include the severity of the disease, priority populations, impact on budget, cost-effectiveness and ease of implementation (2). Results can provide recommendations for further types of analysis. However, multi-criteria decision analysis is not a panacea – it is still quantitative and suffers from data and methodological weaknesses as well as being highly subjective and dependent on who is included in the process.

Guidance needs to be provided, therefore, to assist decision-makers on how to consider each element and each type of evidence in a decision, in much the same way as economic evaluation guidelines have helped the conduct of cost-benefit analysis and cost-effectiveness analysis studies (CEA) (3).

6. Producing evidence

Given the inadequate evidence base on environmental health economics in the Region, the EHEN needs to have as a core aim to support the production of more, and more harmonized, knowledge. Given that decision-makers need to draw on a range of types of information, the broader term knowledge is adopted rather than data, evidence or research. The production of knowledge includes summarizing existing research results, reanalysing them, exploiting both routine and non-routine statistical databases, and conducting new primary research to fill major gaps in knowledge. Indeed, many developments in knowledge can be gained in the short term and at low cost by collecting, reviewing, analysing and compiling existing evidence in the Region, as well as extrapolating good quality evidence from similar contexts outside the Region.

Four steps are proposed:

- (i) mapping existing evidence and tools
- (ii) prioritizing the topics in need of further technical review and evidence
- (iii) selecting topics for conducting desk studies, and
- (iv) generating new primary research.

6.1. Mapping existing evidence and tools

There is a considerable amount of evidence and number of tools in the field of economic evaluation and health interventions, including in some environmental health topics. Previous publications of WHO and others review and present this work (1,4). For selection of priority topics, it is important to have a general appreciation of what evidence exists in the main environmental health topics, what form it is in, and what knowledge gaps remain. Table 5.4 provides an overview of the existing evidence and tools, with a focus on European studies. It is by no means complete, but contains most of the studies identified in the review conducted for the previous WHO paper (1).

Table 5.4. Overview of economic evidence and tools on environmental health topics

Disease burden area	Damage cost evidence	Intervention cost evidence	Economic evaluation evidence	Reviews of economic evidence	Guidelines and tools
General	Germany (6), OECD (7)	See below	See below	Reviews of global evidence (8)	Australian CBA guidelines, United States Environmental Protection Agency (19)
Agriculture and nutrition	Lead exposure in EU (10) and France (11, 12), pesticides in EU (13)	Limited studies	Nutrition (14)	Limited studies	World Bank agriculture CBA (15), United States nutrition CEA (16)
Chemical safety (see also Agriculture, Air Pollution)	UNEP (17)	Ongoing work by UNEP	(Ongoing work by UNEP)	UNEP (17)	CBA guideline (18)
Climate change adaptation, extreme weather events	Climate cost (19, 20), Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis (PESETA) (21, 22)	Europe adaptation (23), greenhouse gas cost curves (24), World Bank (5)	Limited studies (related to health outcomes)	Climate, Environment and Health Action Plan and Information System (25), Global review (26)	WHO damage and adaptation cost toolkit (27)
Disaster risk management	World Bank (28, 29)	Limited studies	Limited studies (related to health outcomes)	Reviews (30, 31), World Bank (32, 33), United States (34)	Economic guidelines - ECLAC (35), World Bank (36)
Ecosystems	No known studies	No known studies	No known studies (health-related)	No known studies	Valuation methods, the economics of ecosystems and biodiversity (37)
Green economy, greenhouse gas mitigation	Energy production (38), EU (39)	Limited studies	Global (40–43)	Economic policy (44–46)	WHO health economic assessment tool for cycling/walking (47–49)
Housing	No known studies	No known studies	No known studies (related to health outcomes)	No known studies	No specific economic evaluation guidance or tools

Table 5.4. (concluded)

Disease burden area	Damage cost evidence	Intervention cost evidence	Economic evaluation evidence	Reviews of economic evidence	Guidelines and tools
Indoor air pollution	Mould in Finland (50), asbestos in Germany and the United Kingdom, and as part of CBA studies	As part of CBA studies	WHO global CBA (51) and CEA (52), Copenhagen Consensus (53,54), radon in Germany (55)	No known studies	WHO CBA guideline (56)
Noise pollution	Integrated Assessment of Health Risks of Environmental Stressors in Europe in five EU countries	Limited studies	Limited studies	Limited studies	No specific economic evaluation guidance or tools
Outdoor air pollution, including transport	Multicountry (67), global (42,58–62), Stern review (41), EU level (63–65), European countries (66–70), Barcelona (71), Madrid (72), three United Kingdom cities (73), global ozone (74), mercury (75)	As part of CBA studies	Clean Air for Europe (69,76,77), WTP (78), United Kingdom (67), industry (68,79–82), energy (79,81–83), vehicles (84–88), cycling (89), electric cars (90), road planning (91,92), Convention on Long-Range Transboundary Air Pollution (76)	Reviews (8,54,93–97)	Clean Air for Europe CBA guidelines (98)
Vector control	No specific European damage cost studies	Limited studies	No European studies	No European studies	WHO vector costing toolkit (99)
Water and sanitation	As part of CBA studies No specific European damage cost studies	Costing studies (100–103), cost curve analysis (104)	WHO global CBA (105) and CEA (106,107), some country studies from Europe		CBA Asian Development Bank (108), World Bank (109), costing – WASHCost water, sanitation and hygiene cost project (110,111), diarrhoea control (112), International Water Association (113), OECD (114)

Gaps in economic evidence

While it is clear that in many environmental health topics there are a considerable number of studies, it should also be noted that many of these are country-specific and the majority are already several years old and potentially out of date. The majority of these studies have been published as full research papers. Only in a few cases have briefings for policy-makers been identified, or else it was not possible to identify all the materials that have been produced under the many research initiatives.

In general, the most complete type of economic information is damage cost – either damage cost studies done on their own, or as part of broader CBA studies. Damage cost studies have not been identified in malnutrition, except in the context of climate change (5) and studies are not available for the health economic costs of disasters, degraded ecosystems, poor or lack of housing and vector-borne diseases in Europe. These topics are also the weakest for all types of economic evidence (also costs, cost-efficiency analysis and CBA). Only limited economic studies have been conducted on indoor air pollution, water and sanitation in Europe, with most global evidence for these topics coming from outside Europe. Economic evidence about early warning systems is weak globally. There are gaps in the understanding of the externalities of the health sector about health itself, such as medical waste generation and disposal and energy use. Economic evidence about the health impact of chemicals has recently been made available from an ongoing UNEP initiative, and on climate change from WHO and partners. Outdoor air pollution has the most significant amount of economic evidence, with Europe-wide, national and city level studies.

Gaps in guidelines and tools

A handful of economic guidelines for environmental health already exist, focusing mainly on CBA, but also for conducting cost and cost-efficiency analysis studies. Most of the guidelines are global in nature but largely relevant for Europe. No health economic guidelines exist on housing and noise pollution. For vector control, only a costing toolkit exists. Hence, gaps in guidelines need to be filled to improve the practice of economic analysis, with the following points noted.

- The guidelines should be simplified for a range of users by the use of a hierarchy of evidence and methods to assist the researcher to select the appropriate valuation approach for their specific setting.
- Further develop and advise on techniques to value hard-to-measure impacts covering both improvements to health and the environment (as related to a health intervention).
- Standardized approaches or values should be developed for major economic items, such as value of life, to increase the robustness of studies and reduce variability between studies. Given the importance of mortality value in economic analyses, the uncertainty surrounding the appropriate VSL to use in any given context is worthy of further exploration to improve the robustness

and standardize the values used. There is a similar issue in the valuation of generic health measures such as healthy life-year, quality-adjusted life-year or disability-adjusted life-year in economic terms.

- The distributional issue should be considered in values used (including discount rates), covering intergenerational, intra-generational and spatial equity. Where equity issues cannot be reflected in the outcome measures, this should be explicitly stated.

Conflicts can, however, arise in the application of generic tools. Such tools are usually biased towards the lowest common denominator in selecting variables and proposing data sources, and hence a skilled analyst may achieve a better result through independent application of economic methods. At all times, peer review mechanisms need to be applied.

Gaps in applying the evidence

The previous review of issues by WHO identified priorities for improving the uptake of economic evidence (1, *Table 1*). The review concluded that economic evidence should be properly interpreted based on the policy context and the underlying assumptions; that other relevant evidence should be presented alongside economic evidence, potentially drawing on decision-making procedures such as multi-criteria analysis; that results should be presented in a layered fashion, with differing levels of complexity available for different users; and that training and capacity-building should be provided to research users.

6.2. Prioritizing topics

In consultation with health decision-makers, partner organizations of the new strategic framework should identify priority environmental health topics for application of economics to environmental health decision-making, based on the following key criteria:

- importance (overall size), nature (severity levels) and distribution of the environmental disease burden (current and future);
- related economic impacts of the health burden;
- time horizon of impacts, under both intervention and non-intervention scenarios;
- potential for implementing cost-effective interventions;
- risks and uncertainty (for example, tipping points, irreversibility of impacts and consequences);
- specific demand and initiatives from Member States and EHEN members;
- availability of existing evidence, tools and guidelines (in particular, for considering new primary research).

Realistically, priority work areas will also be influenced by what other organizations are working on and the priorities of funding agencies.

The main environmental health topics for consideration as areas of work, including selection as a thematic working group, include the following, starting with the most important:

- (i) green economy and greenhouse gas abatement – this topic has high topical interest and the potential for win-win interventions, it links with air pollution topics and it (eventually) reduces the impacts of climate change;
- (ii) adaption to climate change, including extreme weather events and vector-borne diseases – these topics are under-researched and have a high priority in Europe;
- (iii) indoor air pollution – this topic is under-researched from an economic policy angle and has a high priority, especially in eastern Europe and central Asia;
- (iv) outdoor air pollution – this topic is well researched, but still has a high disease impact in Europe;
- (v) chemical safety – this topic is under-researched and is highly topical;
- (vi) water and sanitation – this topic is under-researched from an economic policy angle and has a high priority, especially in non-EU countries;
- (vii) noise – this topic is under-researched from an economic policy angle;
- (viii) ecosystems – this topic is under-researched from an economic policy angle;
- (ix) housing – this topic is under-researched from an economic policy angle.

Specific proposals for technical work include the following:

- (i) guidelines for appropriate presentation and use of available evidence, with decision-making guidelines (for both producers and users of knowledge);
- (ii) training materials;
- (iii) development of guidelines and tools specific to priority environmental health topics (gaps in the green economy, early warning systems, vector-borne diseases, water and sanitation, chemical safety, noise, housing and ecosystems);
- (iv) externality valuation guide – how to identify, value and present externalities;
- (v) guidance on valuation of life and life-years (VSL, healthy life-years, quality-adjusted life-years or disability-adjusted life-years); and
- (vi) a review of how to handle distributional issues in economic analysis.

To support these six proposals, the following are required:

- a pool of experts to conduct the technical work;
- provision of training and capacity-building for researchers, including national researchers, especially in less economically advanced countries;
- active members of the network, including experts to provide a quality peer review network;

- coordination, monitoring and reporting; and
- adequate funding.

Once the priority products have been agreed, collaboration agreements will need to be reached with other organizations to ensure complementarity of action, sharing of experience, and avoidance of duplication. For example, for early warning systems collaboration will be needed between the agencies involved such as UNDP, UNEP, WHO and the World Meteorological Organization. The opportunity for drawing up a single, combined economic evaluation guideline for environmental health topics should be examined, as it could lead to considerable efficiencies.

After the tools and guidelines have been drafted, they will need to be: field-tested to ensure their applicability, relevance and ease of application; finalized for application; translated; published and launched, in downloadable format (such as Excel); and training conducted for the researchers who will apply the guidelines. Where guidelines already exist (such as for urban air pollution), further capacity-building may be needed for researchers. Training for the users of the evidence is covered under 'Dissemination' below [see Uptake of evidence].

6.3. Selecting topics for conducting desk studies

It is recommended that there should be a series of review reports, following a standard template, giving comprehensive coverage of economic evidence in Europe and non-European evidence relevant for Europe, presentation of data in a user-friendly format, identification of knowledge gaps, and proposals for a workplan, in the following areas:

- green economy and greenhouse gas abatement
- indoor air pollution
- chemical safety
- climate change and extreme weather events
- water and sanitation
- noise.

For the green economy and greenhouse gas abatement, a review should be conducted of appropriate health economic indicators to link with Beyond GDP. Two important elements of these reviews should be highlighted.

- (i) A process should be established to ensure the regular updating of reviews. New publications should be incorporated into the reviews as they become available. Current best practice examples of research updating should be examined, such as the Cochrane Library.
- (ii) A process should be formulated for synthesizing evidence to ensure large data sets and a multitude of research findings that can be made accessible to decision-makers and the public. A web-based application should be considered, with a printer-friendly version of text and tables.

6.4. Generation of new primary research

The strategic framework should support the generation of new evidence where there are major gaps in specified environmental health themes and geographical contexts. The implementation of research needs a strong system of written guidance and training in methodology, continuing research support and peer review. Once it is generated, new evidence will need to be integrated into the existing evidence base.

The types of study to be conducted depend on the importance of the data gap and the costs and specific benefits of generating new data sets. If new data sets can be generated by conducting a modelling exercise, this may be the best approach to use. If such analyses do not produce sufficiently robust results for large or long-term investment decisions, it may be necessary to implement primary studies involving field data collection. These naturally have to be justified and decided on a case-by-case basis. The studies need a strong system of technical guidance, continuing research support and peer review at the design and publication stages (see above). Collaboration agreements need to be reached with other organizations, based on the resources available to WHO and partners, and the availability of interested partners (refer to Pillar 1).

Consistency in the application of economic analysis will be needed between different health fields (including environmental health topics), such as discount rate and value of life. The most relevant and up-to-date economic guidelines should be followed. The knowledge producer should select the appropriate scope, boundaries and outcome measures for analysis, be systematic and comprehensive, and ensure that all available data are appropriately used. It should be clearly stated if any variables are omitted due to data or methodological challenges. Methods and assumptions should be explicitly stated, and results should be provided under different assumptions. Ideally, the knowledge user should be provided with access to the data tool to enter different inputs. The quality of life and well-being aspects in health statistics should be explicitly considered through measurement instruments and participatory approaches that appropriately capture the environmental burden of disease from the beneficiaries' perspectives.

The environmental health topics and technical issues for the subject of primary research will become evident from the initial work of the thematic working groups. The evidence base will be built as follows:

- identification from the evidence reviews (see section 6.3) and decision-maker surveys (see section 5.2) of the environmental health topics where the largest gaps occur and where future decisions would benefit from improved data sets; search for research funding on the basis of this assessment;
- decision as to the best way of carrying out these reviews and surveys: through regional research partners, country partners or WHO directly;
- conduct of studies in focus countries (to be decided), bearing in mind the generalizability of results between similar European countries;
- integration of new evidence into the existing evidence base, and production of summaries of the compiled evidence that are easy to interpret and use.

7. Uptake of evidence

Based on the dialogue and surveys of decision-makers, the types and forms of evidence required by decision-makers will be better understood. The needs for introducing and strengthening decision-making frameworks and processes, as well as developing capacity, will be highlighted and identified. The following activities are recommended to facilitate the integration of new and existing economic evidence into decision-making, as informed by the surveys.

- Research results should be packaged for specific decision-making uses, with pre-testing to ensure that the evidence is effectively communicated. If syntheses of evidence have not been conducted, the evidence base will need to be reviewed and the evidence prioritized, as it cannot all be used.
- Messages should be disseminated (publication of policy briefs, placement of knowledge in papers/journals, and use of traditional and social media).
- Evidence-users should be trained in evidence-based decision-making, in particular how to incorporate economic evidence into the decision-making process. Most evidence users will not be economists or experienced in using scientific evidence. Hence practical training for decision-makers and providers, such as WHO and other agencies' country staff, will be an essential component of the release and dissemination of evidence.
- Evidence should be used to tell stories for the more effective communication of messages, and storylines explored that have win-win-win solutions for society.
- Monitoring and evaluation should be carried out of the utilization of evidence and its impact, with feedback to earlier points so as to adjust or fine-tune the approach.

Economic evidence can be used to make decisions as well as in the form of material for advocacy in various ways and by diverse groups. For example, citizens' groups or the media may wish to use economic or burden of disease evidence to raise the attention of public decision-makers about specific environmental health issue. These groups may need training in how best to interpret and use such evidence. Evidence may also be used by some decision-makers (such as in a sector ministry or department) to influence other decision-makers (such as in the finance ministry) to raise awareness of a specific problem, to offer solutions and to convince decision-makers to allocate more resources to a particular environmental health issue. Specific training needs for these various purposes will be considered.

8. Consolidated workplan

The work in the foregoing sections is briefly drawn together in Table 1 in the main text, which provides an overview of the activities proposed for the EHEN during the rest of 2013 and later.

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ANNEX 6

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The WHO European Centre for Environment and Health in Bonn convened a meeting of key European experts in the field of environmental health economics on the use of economic tools and methods in environmental health on 23 and 24 May 2013. The meeting established an advisory group on environmental health and economics, including the definition of its membership, its terms of reference and overall vision. The advisory group: (i) took note of the finalized strategic framework on environmental health and economics; (ii) discussed the proposed implementation plan for the framework for 2013–2017; (iii) agreed the topics for the second symposium on environmental health and economics to be held in October 2013; and (iv) made recommendations on the implementation of the strategic framework and how to encourage a broader approach to economic evidence use. Updates from the environmental health economics network included showcasing a climate change toolkit and a discussion on the explosion of new economic indicators with reference to the debates about “Beyond gross domestic product” and the value of statistical life.

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

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