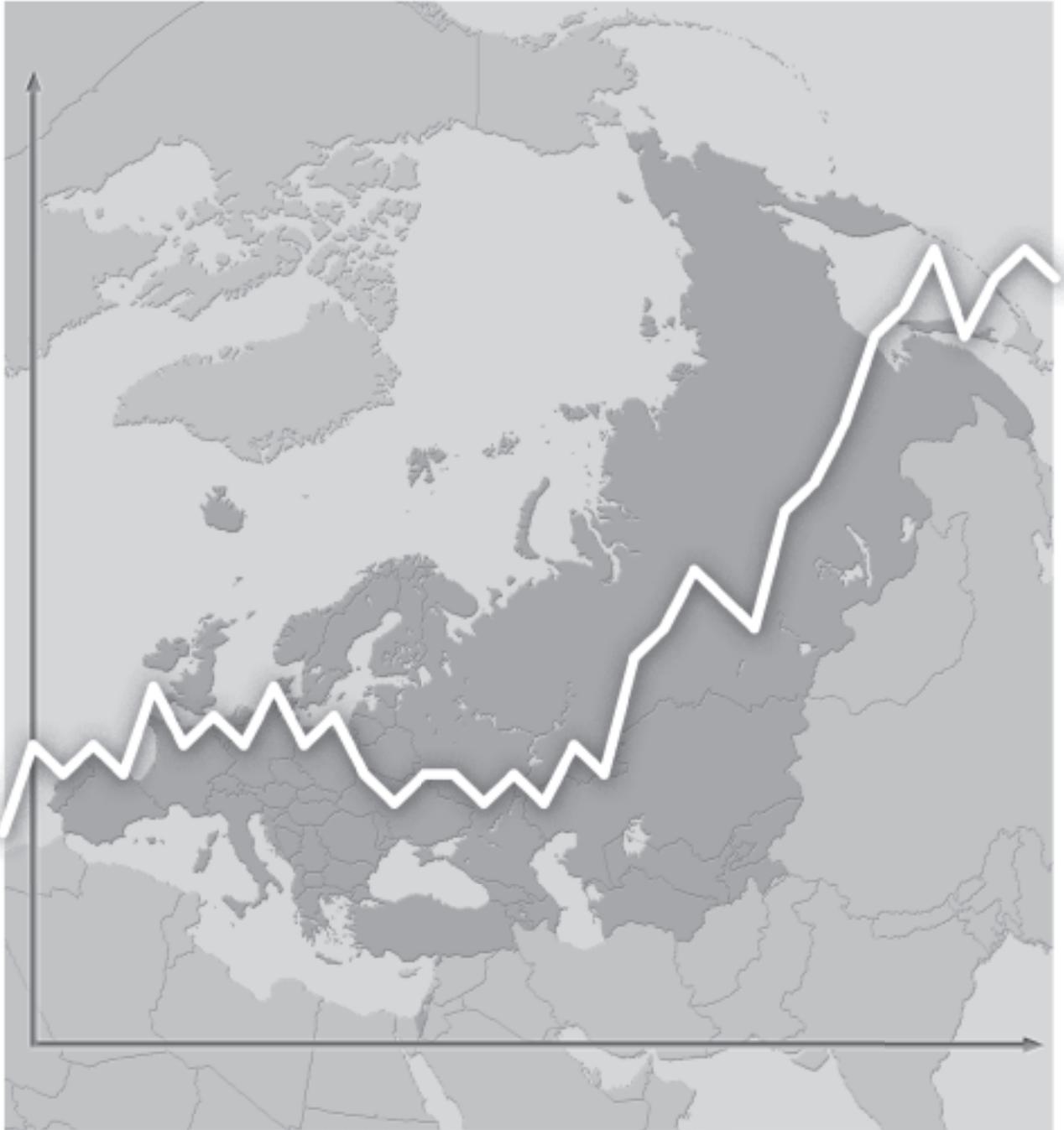


ENVIRONMENTAL HEALTH INDICATORS FOR THE WHO EUROPEAN REGION



**UPDATE OF
METHODOLOGY
MAY 2002**

**Environmental Health Indicators
for the
WHO European Region**

1

Update of methodology

May 2002

ABSTRACT

The WHO European Centre for Environment and Health is developing a system of indicators to support the monitoring of public health and environmental policies. When established the system will provide the member states with appropriate information to make comparisons and support their national policies. It will also allow tracking the progress in environment and health across Europe and contributing to the broader objective of reporting on sustainable development. The original proposal was tested in several countries of the WHO European region for feasibility and policy relevance. The process resulted in refinement of the indicators system. The WHO meeting selected the set of 'core' indicators for pilot implementation, identified priority data gaps and recommended further methodological developments. Participants also showed examples of indicator-based, policy-oriented reporting. The experts agreed on the scope and actions for the next phases of the process and adopted the protocol for the pilot survey of the EH indicators system. Updated methodology is given together with the report of the meeting. Currently the process focuses on setting up the system, to link with assessment and reporting mechanisms.

Keywords:

INFORMATION
ENVIRONMENTAL EXPOSURE
POPULATION HEALTH
INDICATORS SYSTEM
POLICY MONITORING

© World Health Organization – 2002

All rights in this document are reserved by the WHO Regional Office for Europe. The document may nevertheless be freely reviewed, abstracted, reproduced or translated into any other language (but not for sale or for use in conjunction with commercial purposes) provided that full acknowledgement is given to the source. For the use of the WHO emblem, permission must be sought from the WHO Regional Office. Any translation should include the words: *The translator of this document is responsible for the accuracy of the translation.* The Regional Office would appreciate receiving three copies of any translation. Any views expressed by named authors are solely the responsibility of those authors

TABLE OF CONTENTS

Executive summary

Part 1. Report of the WHO WG meeting 'Environmental Health Indicators System'

Introduction	1.1
Summary of Meeting Discussion	1.2
Conclusions and recommendations	1.9
Overview of the set of 'core EH indicators'	1.11
Protocol of the pilot study	1.14
Case examples for policy-oriented reporting	1.15

Part 2. Set of Core Environmental Health Indicators

Index	2.1
Updated methodology sheets	2.3

Part 3. Environmental Health Indicators Software Tool 'EuroIndy'

General description	3.1
---------------------------	-----

Annex 1

Working Group Members	A1.1
-----------------------------	------

EXECUTIVE SUMMARY

This document summarizes the progress made during the second year of implementation of the “Environmental Health Indicators – development of a methodology for the WHO European Region” project. It is based on the outcomes of two WHO expert meetings during the year and a feasibility study carried out in 14 countries of the WHO European region. The work resulted in a refinement of the original proposal, a selection of a common ‘core’ set of environmental health indicators and a protocol for their pilot testing in selected countries.

During the first year of implementation a proposal of the system was produced to address the main environmental issues of health relevance and cross cutting topics, in particular those relevant to the health of children. International experts developed the indicator definitions through intensive discussions. The commonly accepted cause-effect framework DPSEEA (Driving forces – Pressures – State – Exposure – Effect – Action) was used. We focused on the development of indicators that can provide information on exposure, health effects and actions taken in a standard and comparable format by countries. The WHO consultation (Bilthoven, 22-24 May 2000), selected a set of 51 ‘core’ indicators to be used for international assessments as well as for the analysis of environmental health situation and actions at sub-national level. In addition, an extended set of indicators is proposed for national/ local application. A number of experts contributed to this process.

To test the relevance of the proposed system for wide-scale implementation in the European Region of the WHO, a pilot study of the indicators system has been launched to evaluate their feasibility and usefulness in a (sub)-national context. Fourteen Member States have participated: Armenia, Bulgaria, Czech Republic, Estonia, Finland, Hungary, Latvia, Lithuania, The Netherlands, Poland, Romania, Slovakia, Spain, and Switzerland. It was at the planning meeting (Bilthoven, 11-13 October 2000), that a standardised protocol and questionnaires to facilitate the evaluation of the indicators both at national and multinational level was agreed upon.

Further details can be found in the document: “Environmental Health Indicators: Development of a Methodology for the WHO-European Region” (EUR/00/5026344, World Health Organisation, Regional Office for Europe, Copenhagen, 2000 <http://www.who.dk/document/e71437.pdf>).

To review the progress of the feasibility study in the participating countries, and to make a first evaluation of the indicators’ availability, quality and usefulness, a WHO meeting was convened 2-3 July in Bonn. The meeting identified the EH indicators which needed further refinement and recommended methodological work on indicator-based assessments and environment and health linkage analyses. (see report at <http://www.euro.who.int/document/ehi/bonnerepjuly2001.pdf>)

Some indicators e.g. on water and sanitation were refined and additional action indicators on food safety and water and sanitation were proposed. Parallel to the data-driven approach in the feasibility testing, we are increasingly applying the user-driven approach to support the indicators with analyses and interpretation. The WHO Working Group meeting (Bonn, 28-30 November 2001) focused on the establishment of the environmental health indicators as a system linked with assessment and reporting mechanisms. The meeting reviewed the feasibility study results and the proposals for indicators refinement. Based on these, it selected the set of ‘core’ EH indicators for pilot implementation and designed the protocol for the pilot survey. The experts identified priority data gaps and recommended further methodological developments to resolve them.

The report of the WHO meeting is presented in Part 1 of the present document. Part 2 contains the revised operational forms for the set of core environmental health indicators.

Establishing a pan-European information system to support public health and environmental policies includes:

- Analysis of the sensitivity of the proposed indicators to ongoing policies and actions on health protection and prevention;
- Establishment of a harmonised data exchange system: the software (tentatively called *EuroIndy*) is currently under testing, a brief description is given in Part 3;
- Development of methods for policy-oriented data-presentation and for communication of the EH information;
- Proposal for a survey design to allow the gathering of information on important public health issues related to the immediate living environment, e.g. indoor air, environmental tobacco smoke etc and to better address children's health.

Parallel to these, mechanisms for regular reporting will be created in collaboration with the relevant international agencies, e.g. EEA, UNECE, OECD, Eurostat, to avoid duplication of efforts and to streamline the information flow and methodology exchange.

The present document represents a step in the ongoing development. Building a pan-European system for policy-oriented reporting and assessments is a dynamic process. It requires the continued interest and commitment of Member States and the maintenance of an overall programme facility at the WHO Regional Office, which can coordinate and guide the process.

After testing feasibility, validity and usefulness in policy support in a wide range of WHO/Europe MS, the revised proposal will be submitted for endorsement by the 4th Ministerial Conference on Environment and Health in Budapest, 2004.

Information on the project is regularly published on the WHO/ Europe Web:

<http://www.euro.who.int/EHindicators>

PART 1 REPORT OF THE WHO WORKING GROUP MEETING ‘ENVIRONMENTAL HEALTH INDICATORS SYSTEM’

INTRODUCTION

The WHO - European Centre for Environment and Health is implementing an indicator system based on internationally agreed methodology and comparable data. The design objective is to improve communication on the main environmental health (EH) issues and related actions in key policy areas. Fourteen countries: Armenia, Bulgaria, Czech Republic, Estonia, Finland, Hungary, Latvia, Lithuania, the Netherlands, Poland, Romania, Russian Federation (one region), Slovakia, Spain and Switzerland tested the feasibility of the indicator system and assessed its usefulness in policy-making. This study was conducted according to the protocol adopted by previous stages of the project (<http://www.euro.who.int/EHindicators>) to evaluate:

- Availability and quality of the necessary data
- Data accessibility and levels of detail needed
- Capacity for a multi-agency (net)-working on the information
- Relevance/ usefulness of the indicator in a (sub)-national context

The first results of the study had been presented at a progress review meeting held 2-3 July 2001 in Bonn. The meeting completed the first round evaluation of the core set, identified the EH indicators which need further refinement and agreed on the follow-up actions for pilot implementation.

The WHO Working Group convened to a meeting in Bonn, 28-30 November 2001 focused on the system of indicators and analyses, which can provide decision-makers with timely, relevant and understandable information, in a format enabling intra- and inter-national comparisons. The meeting brought together national representatives of teams implementing the feasibility study, including country representatives as well as experts advising WHO on the design of the indicators system.

Objectives of the Meeting:

- To select the set of core indicators for pilot implementation based on a critical review of the feasibility study results. The core indicators should be feasible, relevant for policy and enable comparative assessments across Europe.
- To identify priority data gaps, based on the feedback from participating countries and to recommend further methodological developments to reduce them.
- To elaborate case examples (air quality and health, water and sanitation) of how the indicators can be used for policy-oriented reporting and integrated assessments on environment and health.
- To agree on the scope and actions of the pilot implementation of the indicators system, i.e. to design the protocol of a pilot survey on EH indicators system and to identify participating countries.

32 experts and WHO staff attended the meeting. (see participants list in Annex 3). Dr Bogdan Wojtyniak was elected chairman, Dr Anna Páldy acted as rapporteur.

Prior to the meeting the participants received background materials for review, containing national evaluation reports on the feasibility study and across-country summary of the results from the questionnaires as well as the proposals for refinement on selected indicators prepared by invited experts (see Annex 3-a).

SUMMARY OF THE MEETING DISCUSSION

The discussion centred on the following issues:

- a. How countries are currently applying, or planning to apply indicators to monitor the effect of policies on population health and/ or the environment. The context includes regular assessment of progress towards sustainable development, evaluation of NEHAP/ NEAP programmes as well as relevant local-scale activities.
- b. WHO initiatives on reporting schemes in surveillance of water-related diseases and food borne infections and intoxications; further developmental work on housing, noise and health. Related methodological approaches within the environmental burden of disease assessments were also presented.
- c. Pilot implementation: selection of the indicators, elaboration of examples of policy-oriented reporting on air quality and water and sanitation, design of protocol for the pilot process.

General discussions, on points a) and b) were carried out in plenary. Discussions on the selection of the indicators, proposals for presentation methods and designing the pilot study protocol took place in small working groups. Further plenary discussions included progress reports and exchanging experiences from the working groups as well as final discussions on the selected set of indicators, their potential use and the pilot study design. Peter Bosch (EEA) made a demonstration of a Web tool for exchanging and reporting of data and information.

Three **Working Groups** were created – based on experiences of workgroup members:

Working Group I:	Evaluation of the feasibility results and selection of the EH indicator set for piloting
Working Group II:	Use of the EH indicators: linkage analyses and policy-oriented presentation examples
Working Group III:	Design of the pilot study protocol: scope and methods, follow-up actions, timing and participants

Chairperson and rapporteur were identified for each group:

➤ Group I	Chair: Ingrida Zurlyte;	Rapporteur: Tibor Málnási
➤ Group II	Chair: David Kay;	Rapporteur: Alexandra Cucu
➤ Group III	Chair: Ruzena Kubínova;	Rapporteur: Vladislav Fourman

Country initiatives related to the use of health and environment indicators - EH indicators system timely and needed

Several countries (e.g. Slovakia, Czech Republic, Lithuania, Bulgaria, Romania) have established health-environment information systems to serve the public and environmental health surveillance at regional and national level. Participants confirmed that the information provided by these systems is currently not fully used by decision-makers.

All participants recognised that reporting within the public/environmental health strategic monitoring systems does not contain analyses that link environmental factors and health outcomes. For example, environmental health analyses are not included in the report of the Spanish Public Health Association for 2000. In Sweden closer links have recently been made between environmental and public health problems in for example, the Environmental Code (1999) and the national environmental quality objectives follow-up system. Nevertheless, the subsequent integrated reporting does not encompass all the relevant aspects. There are a few exceptions e.g. in the United Kingdom (UK) health impact assessment methodologies are being implemented, assuring uniformity across different sectors. The Environment Agency of England and Wales is the responsible body. The monitoring system in the Czech Republic provides information on environmental health impacts but has limitations regarding consistency across sectors and comparability.

Limited "communication power" was identified as a common problem of the existing reporting systems. The messages provided to decision-makers are not readily understood, easily interpreted and translated into policy actions. Improved communication on the health aspects of the environmental conditions and related actions requires a set of interlinked indicators. The system should have a clear structure showing how each part of the information is related to the various policy processes. Such a system enables accountability and transparency of involved agencies, programs and policies. The WHO initiative on the development of the EH indicators system is very timely and needed.

Environmental health assessments in the NEHAP process

A few countries reported experiences in environmental health assessments in the context of the NEHAP process. In Sweden health and environment information is part of the system for monitoring progress towards the national environmental quality objectives. Indicators to serve this purpose are under construction based on the regular (four-yearly) reports on environment and health. Hungary has evaluated NEHAP implementation and is interested in assessing the effects on public health on a regular basis. A government programme on environment and health is being implemented in Poland within the NEHAP process. It aims to establish a system for the effective prevention of environmental health hazards and reduction of pollution and negative health effects through integrated policies. Switzerland has examined the requirements for EH indicators when used for policy evaluation and the usefulness of the WHO proposed indicators in the case of the Swiss NEHAP evaluation. While concrete policies and programmes may require specifically adapted indicators, there is a need for "core" indicators, which support setting priorities, preparing framework policy programs on health and the environment on a European-wide scale and evaluating their implementation and associated structural changes. It was pointed out that WHO indicators can also be used in monitoring concrete action programmes within a country when they address the same policy areas and the geographical scale is appropriate.

Monitoring and evaluating local and regional initiatives

Estonia, Finland and North-Rhine Westphalia expressed a strong interest in establishing an EH indicator-based system for monitoring and evaluating local and regional initiatives within the context of LEHAP and Local Agenda 21 on sustainability. In Estonia LEHAP programmes are being implemented in approximately 70 percent of the municipalities and a system for public information on the Web is planned for the second half of 2002. It is very important to keep local perspectives in mind. Environmental health impacts appear on a local scale and many initiatives must be implemented in accordance with the national legislation and the regional/ local policies, by the local authorities. Many of the indicators can be used for reporting at local scale to demonstrate variations within the country and summarized into more highly aggregated messages. When the focus is on the local level, linkage analyses should be more detailed (more locally meaningful assessments) and the challenge is to obtain environmental data and health statistics of appropriate breakdowns and

aggregation. WHO initiatives on the development of reporting schemes summarized below contribute to improving monitoring strategies and information quality - a prerequisite for constructing environmental health indicators.

Five countries (Czech Republic, Estonia, Lithuania, Poland, Slovakia) reported their experiences on establishing a monitoring and information system for NEHAP implementation within the WHO/DEPA project. Active participation in the EH indicators feasibility study as well as the peer-review of the existing information systems conducted by WHO-ECEH were very useful in elaborating concrete plans to upgrade them. Lithuania stressed the necessity for performance indicators within the framework of the national strategic health planning; finding benchmark values for comparisons represents a challenge.

Monitoring progress towards sustainable development

Participants discussed the EH indicators in the context of global/ regional assessments – monitoring progress towards sustainable development. A lot of work has been done in many countries to define environment and sustainable development indicators for national and local application. Since the first phases of developmental work the EH indicators system has been considered as embedded within the broader context of sustainable development in particular addressing policy areas on the living environment and quality of life. Recent experience from numerous initiatives on sustainable development indicators in relation to the WSSD (Rio+10 process) has shown that the process is rather holistic. The many partially overlapping projects on living environment indicators in Western Finland are just an illustration of how challenging it is to define sustainability. Therefore, the EH indicators system should be incorporated into the on-going country initiatives on sustainable development thus assuring a better integration of health concerns in environmental policies. This will enable us to extend the target user audience.

Several countries expressed their strong willingness to join the pilot project on either national (e.g. Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia) or regional level (e.g. Finland, Germany, Russia). The feasibility study has provided a good overview of the underlying data quality and availability, identifying priority data gaps and possible approaches. There is a shift from the data-driven to the user-driven approach. Methodological work is focusing on using indicators for policy-oriented reporting. The WHO project has been receiving growing attention from the Member States as well as from other international agencies e.g. the European Environment Agency, and the statistical division of the United Nations Economic Commission for Europe. This will lead in turn to better inter-agency cooperation. All this creates the necessary basis for preparing an indicator-based assessment of the environmental health status and progress in the WHO European region as a background for the Fourth Ministerial Conference on Environment and Health in Budapest, 2004.

Some participants expressed concern about lack of resources (Albania, Armenia), and the relatively high cost of collecting data and statistics (Russia). The strong ‘federalistic’ structure in some countries e.g. Switzerland may pose difficulties in establishing a uniform EH information system.

WHO initiatives on development of reporting schemes

The WHO Collaborating Centre on Health Promoting Water Management and Risk Communication (Institute of Hygiene and Public Health, University of Bonn) presented their results on the development of a reporting scheme for water-borne diseases (WBD). Many countries report on WBD but usually in a passive way - by notification, as a part of other reporting on infectious diseases, hence the disease burden is in most cases underestimated. The initiative aims to improve the surveillance system of waterborne diseases across Europe to implement more effectively the Protocol on Water

and Health. So far the process has identified the priority water-related diseases for surveillance, and the water supply data and monitoring parameters needed to assess the risk. Work is now going in to develop a comprehensive system for risk categorisation and risk factors clustering. When implemented, the surveillance system will assure quality information on the EH indicators for WBD outbreaks (WatSan_E1) and drinking water microbiological safety (WatSan_S2). Furthermore, it will provide more possibilities in terms of coverage, aggregation, and geographical breakdowns for linkage of the databases.

Participants from the Food and Agriculture Organization /WHO Collaborating Centre for research and training in food hygiene and zoonoses (Federal Institute for Health Protection of Consumers and Veterinary Medicine, Berlin) shared their experience from the surveillance of food-borne infections and intoxications in Europe. For several years a database (of good country coverage) is maintained on new cases of food-borne diseases and incidence rates from the main infectious agents subject to mandatory reporting. Results of epidemiological investigation of outbreaks are also reported, although less harmonised. Concern was expressed about duplicating of efforts in the newly established monitoring system on food-borne outbreaks (the amended Directive 92117/EC): The meeting recommended that WHO approaches the respective bodies to achieve coordination in reporting and reduce the burden on Member States due to reporting the same data to different programmes.

The WHO programmes on housing and noise presented their planned activities which can contribute to the EH indicators system. The choice of noise pollution metrics such as the average equivalent level L_{den} predetermines the noise and health indicators cluster. Defining “substandard housing” is essential for indicators reflecting the complex impact of the immediate living environment on health. Furthermore, as the information is strongly interlinked with socio-economic factors, the definition should enable flexibility for highly developed countries in setting their “reference levels” and at the same time ensuring between-country comparability. Data on the relevant housing aspects are not readily available: the existing statistics do not serve population health assessments. Therefore, it remains a priority to develop methods to collect this data as a part of a coherent set of indicators through comprehensive population surveys and work with countries in testing and implementing the methods, thus contributing to the EH indicators system.

Annette Pruess summarised the ongoing activities related to assessment of the burden of disease. Many countries all over the world develop their national burden of disease study to estimate the burden of ill health on the population. This aggregate public health measure combining morbidity and mortality is expressed as disability-adjusted life year (DALYs). This measure serves to identify the key health policy areas where improvements and interventions are needed. It also guides the selection of health topic areas and indicators to monitor the progress of intervention effects. WHO Headquarters has analysed the burden of disease for 20 risk factors at international level, based on comparative risk assessment. This approach requires the definition of discrete risk categories according to a known and quantifiable exposure-risk relationships and careful matching population and health data. The Environmental Burden of Disease (EBD) is an estimate of the proportion of the total burden of disease attributed to environmental risk factors. Within the EBD concept environmental health indicators introduce a common language across health topics as well as facilitate the comparability and consistency across risk factors and diseases. A practical guide for EBD assessment by the countries is under preparation; however the challenges are greater when applying the methodology at national level.

Selection of the EH indicators set for piloting

Participants agreed that the main determinants for selection of indicators for piloting is the feasibility of the indicators and the extent to which they can be used in multinational analyses linking environment and health information. The feasibility study was used as a background and the following approach was applied.

The feasibility questionnaires completed by the MS were collated and analysed across countries. For each indicator a summary sheet was prepared indicating: the degree of harmonisation in the data collection; the time-period of data completeness; the overall quality and accessibility of the data; the spatial resolution (smallest area); and use of the indicator by other international agencies. The summary sheet also includes information on how the indicator can be used for EH analyses, problems/limitations with the data and prospects for future data collection. This background document serves as a basis to decide on data availability and comparability over time and space. National evaluation of the feasibility and usefulness has enabled countries to identify how much effort it will take to gather the relevant data and the rough estimate of ‘cost-benefit’ was also taken into account.

The refinements and the newly proposed indicators on water and sanitation and food safety were evaluated. The indicators for which further developmental work on data collection methods remains a priority were also identified. Table 1 shows the selected core set. The updated methodology sheets for the indicators are given in Part 2 of the present document.

The result can be summarized as follows.

The following indicators were selected for piloting:

- **Air Quality:** all, except “Consumption of leaded gasoline” and “Participation in international agreements and environmental initiatives”
- **Housing and settlements:** all
- **Traffic Accidents:** all
- **Noise:** “Application of regulations, restrictions and noise abatement measures” only
- **Waste and Contaminated Lands:** all except “Blood lead level in children” and “Municipal waste collection”
- **Radiation:** “Incidence of skin cancer”; “Effective environmental monitoring of radiation”
- **Water and Sanitation:** “Waste water treatment coverage”, “Access to safe drinking water” (new proposal), “Access to adequate sanitation”, “Outbreaks of water-borne diseases”, “Effective monitoring of recreational water” (new proposal)
- **Food safety:** “Food-borne illness” and the two newly proposed action indicators
- **Chemical emergencies:** All except “Mortality from chemical incidents”
- **Workplace:** “Occupational fatality rate” and “Statutory reports of occupational diseases” (transformed into an action indicator)

A few indicators, mostly on action have been amended and scoring – simplified.

The following indicators are identified as priority data gaps:

- **Noise:** the two effect indicators
- **Water and sanitation:** “Diarrhoea morbidity in small children”

A well-designed population representative survey combining several data items and a development of methodology is required for the purpose. This will also improve the quality of indicators on housing.

The following indicators are retained for future application since they depend strongly on the regulatory framework and require major harmonisation:

- **Water and Sanitation:** “Exceedance of recreational water limit values for microbiological parameters”; “Exceedance of WHO drinking water guidelines for microbiological parameters”; “Exceedance of WHO drinking water guidelines for chemical parameters”
- **Food safety:** “Monitoring chemical hazards in food: potential exposure”
- **Workplace:** “Rates of injuries”; “Sickness absence rate”
- **Chemical emergencies:** “Mortality from chemical accidents” Currently this data is no longer collected by the OECD. The MARS – Major Accident Reporting System database is of limited use as it covers only the EU member states and does not cover all cases of chemical incidents. WHO was requested to develop an international framework for generation of this data.

Use of indicators for policy-oriented reporting: case examples

Case examples of indicator-based, policy-oriented reporting on air quality and water and sanitation were elaborated. The indicator-based assessments should allow monitoring trends in exposure and effects. The focus is on the integration of environment and health information: wherever possible, it should be converted into a health impact. Examples were elaborated focusing on air quality indicators and water and sanitation ones: illustrations are given in Annex 2. In respect to the health impacts of air pollution, a quantified effect estimate accepted by all countries is needed in order to calculate the attributable fractions of disease burden. Currently, PM10 is used in most cases as an indicator of air pollution. However, data are not available in many countries, therefore the total suspended particles (TSP) must be used instead. It is more relevant to consider morbidity as an effect indicator than mortality. Morbidity indicators should be considered for inclusion in the core set in the next phase of the process. Within-country comparisons were suggested to facilitate policy-relevant reporting on water and sanitation e.g. between regions in addition to time-trends since water problems are well localised.

As with the development of indicators, the reporting should also be a dynamic process. It should be possible to adjust the reporting to new tools (e.g. DALYs) or to new evidence. Based on this experience and the results of the feasibility study, documented guidance should be produced on the approaches for producing integrated assessments on health and the environment, and the conditions for application of the EH impact assessment methodology (see for example the WHO report on quantification of health effects of exposure to air pollution EUR/01/5026342, 2001).

On the follow-up actions

The process focuses currently on the establishment of EH indicators as a system linked with assessment and reporting mechanisms. Therefore, a pilot study has to be started with the main purpose to prove that the proposed system works for the support of policy development, implementation and assessment. The time frame was agreed as one and a half years, starting from early 2002, thus the pilot indicator-based report together with a guideline document on the methodology will be submitted to the EEHC in October 2003. The scope was decided as a pilot data collection exercise and producing the pilot indicator-based report. The focus is on the core set recommended for piloting for the years 1996 – 2000 or the last five years of available data. The indicators that have been retained for future implementation can be included for (sub)-national use when the underlying data systems are in place. In addition, participating countries may also include some specific national indicators. The protocol for the process of implementation of pilot study on EH indicators is given in Table 2.

The need for development of common software for data collection was pointed out. Participants requested WHO to assure the development of the appropriate tool to enable a uniform data collection across geographical levels and easy data access/ exchange both within the countries as well as between the countries and WHO-ECEH. The tool should be flexible: it should be possible to include new indicators as well as information from surveys carried out within a country. It will also serve a basis for development of a pan-European database on health and environment.

Parallel to the pilot data collection, further developmental work on the use of indicators for policy-oriented reporting and assessments is needed, taken from the demonstrative examples prepared by WG II. The meeting requested WHO to coordinate this work and to prepare background documents on policy-oriented data presentation methods, in collaboration with national experts. The next meeting on environmental health indicators (in the week 21-25 October 2002) will focus on this topic. The EH indicators discussion forum on the Web established by P. Bosch (European Environment Agency) provides good opportunities to exchange documents and datasets which facilitates the development of reporting mechanisms. It should actively be used by the WG during the process.

Regarding the critical data gaps identified, participants recommended further work on designing special data collection systems (surveys) to supplement the existing monitoring systems on public health, environmental conditions and basic statistics. Combination of survey tools in one and the same survey will increase the ‘sensitivity’ of the EH indicators system – a better focus on the ‘living environment’. WHO should co-ordinate the multidisciplinary collaboration in order to benefit from relevant experience in the countries.

A better inter-agency co-operation is of crucial importance to the implementation of the EH indicators system. Improved co-ordination in international reporting will minimize the burden of reporting by the Member States, and at the same time, enabling them to focus on the most efficient data collection mechanism. In particular, application of the relevant data systems maintained by the European Environment Agency will expand the EH indicators system. It was recommended that WHO approach the relevant agencies and agrees on ways to co-operate.

CONCLUSIONS AND RECOMMENDATIONS

➤ Participating countries expressed their commitment to setting up coherent environmental health indicator systems. The existing environment and health data collection systems in all countries work in parallel and the linkage of the data is very limited. In addition the systems lack environmental health policy-oriented analysis, reporting and communication.

➤ Fourteen countries completed the feasibility study. The study identified the national data sources, provided a critical overview of the existing information systems and provided the thorough characteristics of each indicator. The majority of countries participating in the feasibility study expressed their willingness to continue with the pilot study.

➤ The revision of the indicators by Working Group I was accepted. The selected set of core environmental health indicators is summarized in Table 1, the revised indicators’ operational forms are given in detail in Part 2. Many of the critical data gaps identified (e.g. related to noise and living conditions) can be eliminated by a well-designed population survey. It is recommended that WHO proposes a survey methodology based on the experience of those Member States where studies are carried out regularly.

➤ Working Group II has elaborated demonstrative examples of policy-oriented reporting. It is recommended that WHO coordinates further developmental work on the presentation methods. The follow-up meeting will be convened in the week 21-25 October 2002. Background documents for this meeting should be prepared in collaboration with national experts. The meeting requests Member States to endorse the active involvement of the relevant institutions in the development of guidelines for policy-oriented reporting.

➤ The general outline and timetable of the pilot project prepared by Working Group III (Table 2) were approved. It is recommended that WHO assures the development of appropriate tools for data collection, processing and exchange. These tools should enable the WHO Regional Office for Europe to develop and maintain an international database of environmental health indicators.

➤ The meeting noted some duplication in reporting to international organizations: an example is the monitoring system of outbreaks of food-borne diseases planned for establishment in the framework of the amended Directive 92117/EC. It is recommended that WHO approaches the services of the European Commission and other organizations and finds a way to cooperate in order to avoid the unnecessary burden on member states of reporting the same data to different programmes.

➤ The project participants strongly supported the establishment of the Web group with the European Environment Agency.

Table 1. OVERVIEW OF THE SELECTED SET OF CORE ENVIRONMENTAL HEALTH INDICATORS

Issue	Driving Force	Pressure	State	Exposure	Effect	Action
Air Quality (Ambient and Indoor)	<ul style="list-style-type: none"> Annual passengers-kilometres travelled by mode of transport Annual average consumption of fuel by type from road transport 	<ul style="list-style-type: none"> Annual emissions of SO₂, PM10, secondary PM10, NO_x, VOC: total and by economic sector 		<ul style="list-style-type: none"> Population-weighted exceedance of the reference concentration of NO₂, PM10 (or BS or TSP) and SO₂; 8h average O₃. 	<ul style="list-style-type: none"> Mortality due to respiratory diseases in children > one month and < one year of age ICD-10 code J00-J99 Mortality due to respiratory diseases all ages ICD-10 code J00-J99 Mortality rate due to diseases of circulatory system -all ages ICD-10 code I00-I99 	<ul style="list-style-type: none"> Capability for implementing and enforcing policies on Environmental Tobacco Smoke Exposure
Housing and Settlements			<ul style="list-style-type: none"> Average living floor area per person 	<ul style="list-style-type: none"> Percentage of the population living in substandard housing 	<ul style="list-style-type: none"> Mortality due to external causes (domestic accidents, poisoning) in children < 5 years ICD-10 code W00-Y34 	<ul style="list-style-type: none"> Scope and application of building regulations for housing Scope and application of regulations for land use planning in human settlements
Traffic Accidents					<ul style="list-style-type: none"> Mortality due to transport accidents ICD-10 code V01-V99 Annual injury due to transport accidents ICD-10 code V01-V99 	
Noise					<ul style="list-style-type: none"> Percentage of population annoyed by certain sources of noise* Percentage of population with sleep disturbance due to noise* 	<ul style="list-style-type: none"> Capability to implement noise regulations and abatement measures

Issue	Driving Force	Pressure	State	Exposure	Effect	Action
Waste and Contaminated Land		<ul style="list-style-type: none"> Annual amount of hazardous waste generated and imported 	<ul style="list-style-type: none"> Contaminated land sites 			<ul style="list-style-type: none"> Scope and application of hazardous waste policies
Radiation					<ul style="list-style-type: none"> Annual incidence rate of skin cancer ICD-10 code C43-C44 	<ul style="list-style-type: none"> Existence of effective environmental monitoring of radiation activity in compliance with national and international QA programmes
Water (Recreational and Drinking) and Sanitation		<ul style="list-style-type: none"> Wastewater treatment coverage 	<ul style="list-style-type: none"> Exceedance of limit values recreational: microbiological * Exceedance of WHO guideline values for drinking water: microbiological * Exceedance of WHO guideline values for drinking water: chemical * 	<ul style="list-style-type: none"> Percentage of the population with access to safe drinking water Percentage of the population with access to adequate sanitation 	<ul style="list-style-type: none"> Outbreaks of water-borne diseases: number of outbreaks and total number of cases involved Diarrhoea morbidity in children under five years of age as reported to the national PH surveillance * 	<ul style="list-style-type: none"> Effective monitoring of recreational water
Food safety				<ul style="list-style-type: none"> Exposure to potentially hazardous chemicals monitored in food (GEMS/FOOD) * 	<ul style="list-style-type: none"> Outbreaks of food-borne diseases: number of outbreaks and total number of cases involved Incidence of food-borne diseases 	<ul style="list-style-type: none"> General food safety policy Effectiveness of food safety controls

Issue	Driving Force	Pressure	State	Exposure	Effect	Action
Chemical Emergencies		<ul style="list-style-type: none"> Number of sites containing large amounts of chemicals 			<ul style="list-style-type: none"> Mortality rate from chemical incidents * 	<ul style="list-style-type: none"> Regulatory requirements for land-use planning around upper tier establishments containing large amounts of chemicals Medical treatment guidelines Existence of poison centres service Government preparedness Chemical incidents register
Workplace					<ul style="list-style-type: none"> Occupational injury fatality rate Annual incidence rate of occupational injury and illness * Sickness absence rates * 	<ul style="list-style-type: none"> Statutory reports of occupational disease

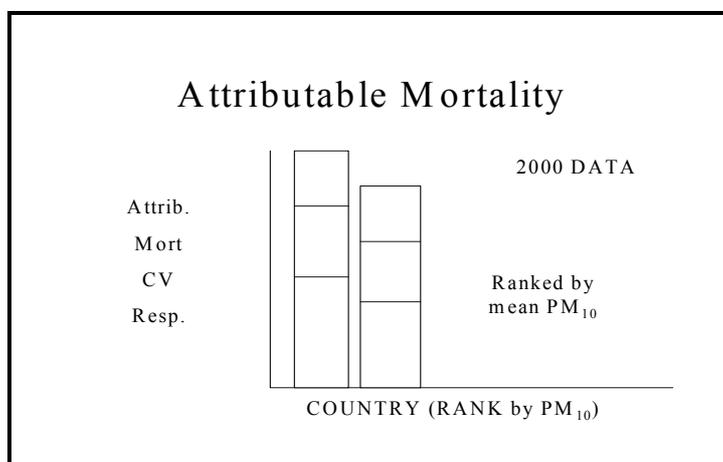
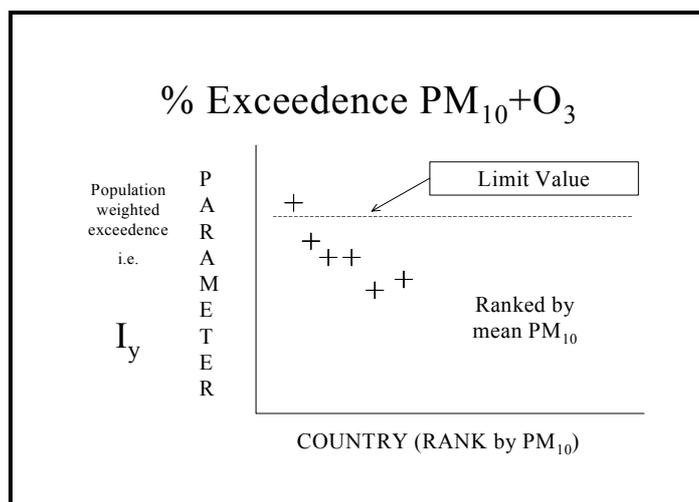
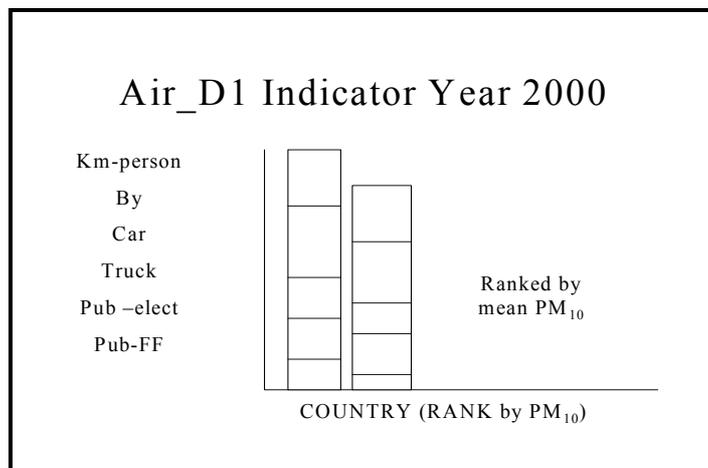
NOTE: The indicators marked with * are for future implementation across Europe since they require major harmonization

Table 2: PROTOCOL FOR THE PROCESS OF PILOT IMPLEMENTATION OF EHI**Time frame of the pilot study: March 2002 – October 2003**

	ACTIVITY	DURATION (WEEKS)	ENDS MONTH
1	A letter from WHO to the Minister of Health (Environment) about the pilot implementation (can be in connection with EEHC)	3	4
2	Development of software tool(s) for data collection, data access/ exchange and indicator calculation for use within the countries as well as between them and WHO-ECEH <i>WHO responsibility for funding, defining (in collaboration with the countries) the ToR for the task and building a team</i>	16	5
3	Nomination of national (study area-specific) interagency, intersectorial Steering Committee for the pilot project	2	4
4	Appointment of a unit to coordinate the implementation of the pilot study (<i>e.g. the one involved in monitoring NEHAP implementation</i>)	2	4
5	Determination of the content of the EH indicators system subject to the pilot study in the country (<i>indicators from the core set and country-specific</i>)	4	5
6	Meeting of Steering Committee for approval of the final list of EH indicators for piloting	1	5
7	Adaptation of tools for country implementation: ◆ Translation of methodological documents ◆ Translation of the electronic data collection forms (optional)	4	6
7	Collection of data for the last 5 years: 1996 – 2000 (<i>check data for errors, report on data quality</i>)	20	11
8	WHO WG Meeting on data analyses and presentation methods ◆ WHO prepares the background in advance	0.5 8	10
9	Data analysis	9	13
10	Data and indicator report. Submitting country report to WHO	4	14
11	International data analyses	14	17
12	Meeting of participating countries on finalization of methodology	0.5	18
13	Finalized methodology delivered Approval of the methodology	12	21
		4	22
14	Budapest Conference preparation process		

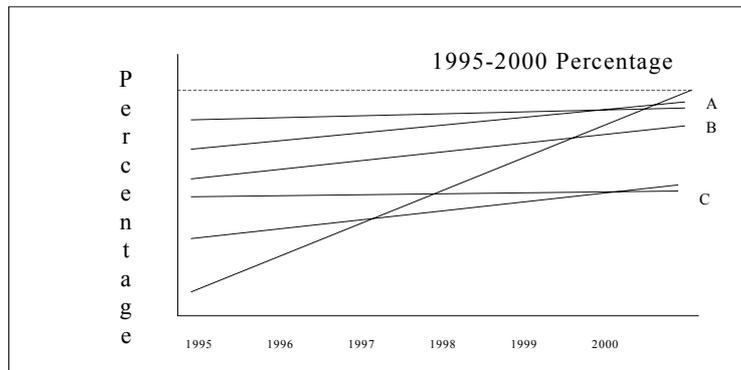
CASE EXAMPLES FOR POLICY-ORIENTED REPORTING USING EHI

Air Quality

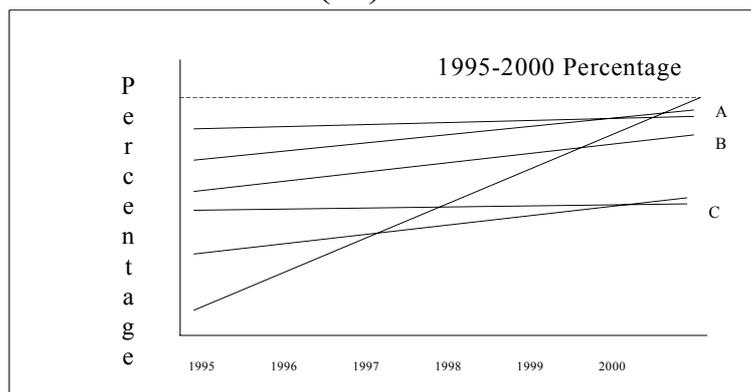


Water and Sanitation (e.g. countries/ regions)

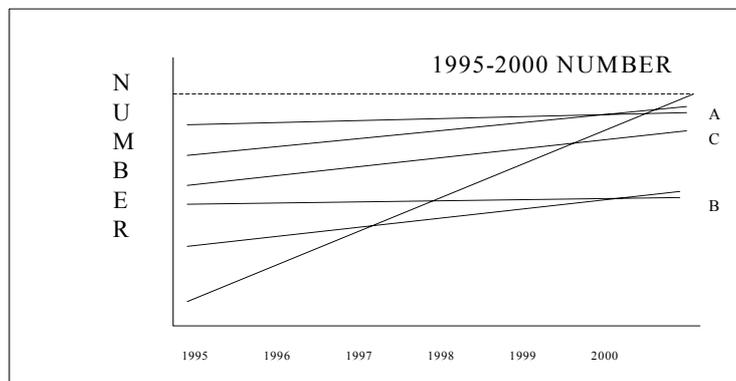
P_1 Percentage population served by adequate waste water treatment



Ex_1 Access to safe drinking water
 $P - (N)/P * 100$



E_1 number of outbreaks



**PART 2 SET OF CORE ENVIRONMENTAL HEALTH INDICATORS:
 UPDATED METHODOLOGY SHEETS**

Air Quality

Air_D1	Passenger transport demand by mode of transport	1
Air_D2	Road transport fuel consumption.....	2
Air_P1	Emissions of air pollutants.....	3
Air_Ex1	Exposure to ambient air pollutants (urban).....	5
Air_E1	Infant mortality due to respiratory diseases.....	7
Air_E2	Mortality due to respiratory diseases.....	8
Air_E3	Mortality due to diseases of the circulatory system.....	10
Air_A1	Policies to reduce environmental tobacco smoke exposure.....	11

Housing and Settlements

Hous_S1	Living floor area per person	12
Hous_Ex1	Population living in substandard housing.....	13
Hous_E1	Mortality due to external causes in children under 5 years of age.....	14
Hous_A1	Scope and application of building regulations for housing	15
Hous_A2	Land use and urban planning regulations	16

Traffic Accidents

Traf_E1	Mortality from traffic accidents.....	17
Traf_E2	Rate of injuries by traffic accidents	18

Noise

Noise_E1	Population annoyance by certain sources of noise	19
Noise_E2	Sleep disturbance by noise.....	21
Noise_A1	Application of regulations, restrictions and noise abatement measures	23

Waste and Contaminated Lands

Waste_P1	Hazardous waste generation	24
Waste_S1	Contaminated land sites.....	25
Waste_A1	Hazardous waste policies.....	26

Radiation

Rad_E1	Incidence of skin cancer	28
Rad_A1	Effective environmental monitoring of radiation activity	29

Water and Sanitation

WatSan_P1	Waste water treatment coverage.....	30
WatSan_S1	Exceedance of recreational water limit values for microbiological parameters	31
WatSan_S2	Exceedance of WHO drinking water guidelines for microbiological parameters	33
WatSan_S3	Exceedance of WHO drinking water guidelines for chemical parameters	34
WatSan_Ex1	Access to safe drinking water	35
WatSan_Ex2	Access to adequate sanitation	37
WatSan_E1	Outbreaks of water-borne diseases	38
WatSan_E2	Diarrhoea morbidity in children	39
WatSan_A1	Effective monitoring of recreational water	40

Food Safety

Food_Ex1	Monitoring chemical hazards in food: potential exposure.....	41
Food_E1	Outbreaks of food-borne illness.....	43
Food_E2	Incidence of food-borne illness	43

Food_A1	General food safety policy.....	45
Food_A2	Effectiveness of food safety controls.....	47
Chemical Emergencies		
Chem_P1	Sites containing large quantities of chemicals.....	48
Chem_E1	Mortality from chemical incidents.....	49
Chem_A1	Regulatory requirements for land-use planning.....	50
Chem_A2	Chemical incidents register.....	52
Chem_A3	Poison centre service	53
Chem_A4	Medical treatment guidelines.....	54
Chem_A5	Government preparedness	55
Workplace		
Work_E1	Occupational fatality rate.....	57
Work_E2	Rates of injuries	58
Work_E3	Sickness absence rate.....	59
Work_A1	Statutory reports of occupational diseases.....	60

Note: The present methodology sheets are an update of the original indicators proposed in the document: Environmental Health Indicators: Development of a Methodology for the WHO European Region Interim report 6 November 2000 (EUR/00/5026344) World Health Organisation, Regional Office for Europe <http://www.who.dk/document/e71437.pdf>

Air_D1	Passenger transport demand by mode of transport	DPSEEA
<i>Issue</i>	Air Quality, Transport and Noise	
<i>Definition of indicator</i>	Number of passenger-kilometres travelled per year by the following modes of transport: personal cars, motorbikes, bus/coach, tram/ metro, train, human powered (walking, bicycling)	
<i>Underlying definitions and concepts</i>	<p>The indicator is based on the assumption that the amount of transport vehicles and the amount of kilometres driven by them represent a significant source for air pollution and noise</p> <p>Underlying definitions are:</p> <p>Number of passenger-kilometres by vehicle [type] = total amount of passenger-kilometres driven per vehicle [type] over a time period (e.g. one year)</p> <p>Passenger-kilometres: a unit of measure representing the transport of one passenger over a distance of 1 km</p> <p>Summaries can be given: in passenger-km [type] per inhabitant, or as percentage of the total number of passenger-kilometres driven by all types of vehicles</p>	
<i>Specification of data needed</i>	Amount of passenger-kilometres per transport type vehicle per year Total resident population	
<i>Data sources, availability and quality</i>	National inventories on transport are usually available from national statistical bureaux. At international scale Eurostat database is for the EU and CEC countries, UNECE - for all the countries in the European region. On a local scale, a system of traffic counts or traffic flow models is required. If this is not available, use can be made from a vehicle registry system. Data on the total resident population should be available from national censuses	
<i>Computation</i>	See definition	
<i>Units of measurement</i>	Passenger-km [type] / inhabitant; or as percentage	
<i>Scale of application</i>	Usually national. Local (urban) to regional (sub-national) is good, however more effort may be required	
<i>Interpretation</i>	The success of policies targeted at reducing the traffic as significant source of air pollution and noise can be assessed. Trends in passenger-kilometres can be coupled to economy (e.g. relation between the economic development as expressed by the GDP and transport needs) as well as to atmospheric emissions. A shift towards more environmentally friendly transport modes will result in a more sustainable situation	
<i>Linkage with the other indicators</i>	<p>Driving force: <i>Passenger transport demand by mode of transport; Road transport fuel consumption</i></p> <p>Pressure: <i>Emissions of air pollutants</i></p> <p>Exposure: <i>Ambient concentrations of air pollutants (urban): population-based exposure</i></p> <p>Effect: <i>Mortality due to respiratory diseases; Mortality due to diseases of the circulatory system; Annoyance by noise due to traffic; Sleep disturbance by noise due to traffic</i></p> <p>Action: <i>Application of regulations, restrictions and noise abatement measures</i></p>	
<i>Related data, indicators</i>	<p>UN Indicators of sustainable development: http://www.un.org/esa/sustdev/isd.htm</p> <p>For updated Guidelines and Methodologies (2001) see: http://www.un.org/esa/sustdev/indisd/indisd-mg2001.pdf</p> <p>Related documents: Declaration of the 3rd Min. Conference on Environment and Health, London, 1999 http://www.euro.who.int/Document/E69046.pdf</p> <p>Glossary of transport statistics http://www.unece.org/trans/main/wp6/pdfdocs/glossen2.pdf</p> <p>EEA (2000) Are we moving into the right direction. Indicators on transport and environment integration in the EU (TERM 2000) http://reports.eea.eu.int/TEC18</p>	

Air_D2	Road transport fuel consumption	DPSEEA
<i>Issue</i>	Air Quality	
<i>Definition of indicator</i>	Average consumption of fuel by type from road transport per year	
<i>Underlying definitions and concepts</i>	<p>The indicator is based on the assumption that the use of fossil fuel represents a significant source of exposure to ambient air pollutants and health risk. Underlying definitions are:</p> <p>Fossil fuel consumption: total annual sales of each type of fossil fuel (e.g. gasoline, diesel, LPG) by volume multiplied by the average energy content for the respective fuel</p> <p>Total population: total resident population</p> <p>Summaries can be given: in MJ [type of fuel]/ inhabitant, or as percentage of the total consumption by all types</p>	
<i>Specification of data needed</i>	Amount of sales of fossil fuel consumption by type in a country/ region and total Total population	
<i>Data sources, availability and quality</i>	<p>Data on the amounts of energy used by fuel type are usually available from national statistics, and are typically derived either from the trade data, taxation registries, or the sales data of the energy companies. These data are reasonably reliable at the national level; at the regional/ local level, however, they may be difficult to acquire (for the reasons of commercial confidentiality) and may be less accurate. At international level IEA http://www.iea.org produces data for fuel consumption by the transport sector</p> <p>Data on the total resident population should be available from national censuses</p>	
<i>Computation</i>	<p>The indicator can be expressed as:</p> $(E_{mj} \times U) / P,$ <p>where U is the total volume of the respective type of fuel sold ($[m^3]$ or $[kt]$) and E_{mj} is the average energy content ($[MJ/m^3]$ or $[MJ/kt]$) of that fuel and P is the total population in the area under consideration.</p>	
<i>Units of measurement</i>	MJ [type of fuel]/inhabitant; or as percentage	
<i>Scale of application</i>	Regional to international	
<i>Interpretation</i>	<p>The indicator can be interpreted in terms of a measure of potential emission of air pollutants. Depending on the state of technology used (e.g. three-way catalyst) emission of various pollutants can be expected.</p> <p>An interpretation of the state of energy efficiency and pollution control can be made based on a comparison with emission indicator. Therefore changes in fuels consumption (with the likely exception of the CO₂) should not necessarily be seen as direct evidence of a change in emissions.</p>	
<i>Linkage with the other indicators</i>	<p>Driving force: Road transport fuel consumption; <i>Passenger transport demand per mode of transport</i></p> <p>Pressure: <i>Emissions of air pollutants</i></p> <p>Exposure: <i>Exposure to ambient air pollutants (urban)</i></p> <p>Effect: <i>Mortality due to respiratory diseases; Mortality due to diseases of the circulatory system; Annoyance by noise due to traffic; Sleep disturbance by noise due to traffic</i></p> <p>Action:</p>	
<i>Related data, indicators</i>	<p>Related documents: Declaration of the 3rd Min. Conference on Environment and Health, London, 1999 http://www.euro.who.int/Document/E69046.pdf</p> <p>Towards a transport and environment reporting mechanism for the EU: technical report N. 18 (EEA and Eurostat) http://reports.eea.eu.int/TEC18</p> <p>See also Core Set of Environmental Indicators http://ceroi.net/ind/matrix.asp</p>	

Air_P1	Emissions of air pollutants	DPSEEA
<i>Issue</i>	Air Quality	
<i>Definition of indicator</i>	Annual emissions of SO ₂ , PM ₁₀ , secondary PM ₁₀ , NO _x , VOC total and by the following economic sectors: industry-process and energy, energy industry, domestic and services, transport, agriculture. Secondary PM ₁₀ and ozone precursors are calculated.	
<i>Underlying definitions and concepts</i>	<p>The indicator describes emissions of pollutants involved in trans-boundary air pollution, which forms a potential risk to the population. Part of the pollution is directly emitted into the atmosphere (primary emissions), other is formed photo-chemically (secondary PM₁₀, ozone). In this case, precursor emissions are aggregated using appropriate weight factors.</p> <p>Sectors are according to the UNECE SNAP-16 as follows:</p> <ul style="list-style-type: none"> - Industry-process and energy: combustion in manufacturing industry (3.), production processes (4.), extraction and distribution of fossil fuels (5.), solvent and other product use (6.), waste treatment and disposal (9.) - Energy industry: combustion in energy and transformation industry (1.) - Domestic and services: non-industrial combustion plants (2.) - Transport: road transport (7.), other mobile sources and machinery (8.) - Agriculture (10.) 	
<i>Specification of data needed</i>	National total and sectoral emissions for SO ₂ , primary PM ₁₀ , NO _x . National total and sectoral emissions for CH ₄ , CO, NMVOC and NH ₃ are needed for evaluating emissions of secondary PM ₁₀ and ozone precursors.	
<i>Data sources, availability and quality</i>	<p>Data on national emissions including a sectoral breakdown of SO₂, NO_x, VOC, CO, NH₃, and CH₄ can be obtained from EEA/ETC-AE (CORINAIR project), from UNECE/CLRTAP/EMEP http://www.emep.int/index.html for total. For sectoral (SNAP): http://www.emep.int/areas/index.html</p> <p>For PM₁₀ emissions http://www.mep.tno.nl/wie_we_zijn_eng/organisatie/kenniscentra/centre_expertise_emissions_assessment.html</p> <p>Primary PM₁₀ emissions data for the EU countries are available from the Auto Oil II programme (http://europa.eu.int/comm/environment/autooil/auto-oil_en.pdf)</p> <p>For PM₁₀ precursors http://www.emep.int/areas/index.html</p>	
<i>Computation</i>	<p>The pressure indicator of SO₂, primary PM₁₀, NO_x is directly obtained from the reported national total and/or sectoral emissions.</p> <p>The secondary PM₁₀ emissions are based on the emissions of SO₂, NO_x and NH₃ using weighting factors (SO₂ 0.54, NO_x 0.88, NH₃ 0.64). These weighting factors represent the fractions of primary emission that is in-situ converted to the secondary aerosol and the difference in molar mass of primary and secondary pollutant. Secondary PM₁₀ emissions are calculated as:</p> $E(\text{sec PM}_{10}) = F_{\text{SO}_2} \times E(\text{SO}_2) + F_{\text{NO}_2} \times E(\text{NO}_2) + F_{\text{NH}_3} \times E(\text{NH}_3)$ <p>where weight factor F_y are given above, and E(y) is the emission of pollutant y.</p> <p>The emission of ozone precursors is based on the emissions of NO_x, NMVOC, CO and CH₄ using their Tropospheric Ozone Formation Potential (TOFP) as weighting factors (NO_x 1.22, VOC 1.0, CO 0.11, CH₄ 0.014). These weighting factors represent the formation potential of the ozone for each of the precursors. Ozone precursor emissions (expressed in TOFP equivalents) are calculated as:</p> $E(\text{ozone precursors}) = \text{TOFP}_{\text{NO}_2} \times E(\text{NO}_2) + \text{TOFP}_{\text{VOC}} \times E(\text{NMVOC}) + \text{TOFP}_{\text{CO}} \times E(\text{CO}) + \text{TOFP}_{\text{CH}_4} \times E(\text{CH}_4)$ <p>where TOFP values are given above, and E(y) is the emission of pollutant y.</p> <p>For more details, see De Leeuw F.A.A.M. (2002) A set of emission indicators for long-range trans-boundary air pollution. Environmental Science and Policy, 5, 135-145</p>	
<i>Units of measurement</i>	Gg or ktons/yr; ozone precursor emissions are expressed in TOFP-equivalents (in Gg or ktons/year)	
<i>Scale of application</i>	National	
<i>Interpretation</i>	This indicator can be used to interpret temporal trends in air pollution emissions. In general terms, an increase in emissions may be taken to suggest an increase in concentrations, exposures and health risk of the urban population. The pollutants described in this indicator are typical examples of trans-boundary air pollution. It might well be a discrepancy between	

Part 2: Environmental Health Indicators Core Set: Update of Methodology

	the temporal trends in national emissions and countrywide averaged concentrations. Long-range transport over the European continent may lessen or may enhance the impact of a national emission trend.
<i>Linkage with the other indicators</i>	Driving force: <i>Road transport fuel consumption; Passengers transport demand per mode of transport</i> Pressure: <i>Emissions of air pollutants</i> Exposure: <i>Exposure to ambient air pollutants (urban)</i> Effect: <i>Mortality due to respiratory diseases; Mortality due to diseases of the circulatory system</i>
<i>Related data, indicators</i>	Towards Environmental Pressure Indicators for the EU http://esl.jrc.it/envind/hm_me_en.htm Environmental signals 2001: Environmental assessment report no 8 (a series of regular indicator-based reports) http://reports.eea.eu.int/signals-2001 EMEP/CORINAIR Atmospheric Emission Inventory Guidebook (Second edition) http://themes.eea.eu.int/toc.php/state/air?doc=39186&l=en See also Core Set of Environmental Indicators http://ceroi.net/ind/matrix.asp See Clear The Air web: http://www.cta.policy.net/

Air_Ex1	Exposure to ambient air pollutants (urban)	DPSEEA
<i>Issue</i>	Air Quality	
<i>Definition of indicator</i>	<p>Population – weighted exceedance of reference concentration of selected air pollutants The indicator consists of seven sub-indicators, representing population-weighted mean exceedance of the reference concentrations for air pollution in urban settings: Reference values (RV) NO₂ (annual average): 40 µg.m⁻³ PM₁₀ (annual average): 40 µg.m⁻³ SO₂ (daily average): 125 µg.m⁻³ PM₁₀ (daily average): 50 µg.m⁻³ TSP (daily average): 230 µg.m⁻³ Black smoke (daily average): 150 µg.m⁻³ O₃ (8 hourly moving average): 120 µg.m⁻³</p>	
<i>Underlying definitions and concepts</i>	<p>This indicator is based on the assumption that outdoor levels of air pollution in urban areas represent a significant source of exposure and health risk. The four selected pollutants (NO₂, PM₁₀, SO₂, O₃) give a good picture of ambient concentrations in cities and are related to health effects. The formula for each sub-indicator is based on the assumption that an increase of the incidence of health outcomes to exposure in a given population is linearly proportional to the pollutant concentration over the selected RV and to the size of the exposed population. The indicators relate to the calendar year. Underlying definitions are: Mean annual concentration: mean concentration of the pollutant of concern, averaged over all hours of the year. Population weighting: based on measurements at city background measurements sites or other assessment techniques the exceedance area in a city is calculated by a modelling. The percentage/number of the city population living in this area is the required number and is, ideally, based on the actual number of people living there. If this number is not available (e.g. due to insufficient spatial resolution in the population data), the fraction of the urban built-up area in exceedance is taken as the estimate of the fraction of the population in a city living in an exceedance area. Urban (cities) area: The built-up area of a municipality. There is no international agreement on the minimum size required. In international studies urban areas with a population above 100.000 inhabitants are usually included, sometimes extended with a representative sample of urban areas with 20.000 to 100.000 inhabitants.</p>	
<i>Specification of data needed</i>	<p>Mean annual concentration for PM₁₀, (TSP, Black smoke as alternatives:), NO₂ and measured over the calendar year Mean 24-hour concentration of SO₂, PM₁₀ (TSP, Black smoke as alternatives:) Number of days with daily 8-h moving average for O₃ greater than RV = 120 µg.m⁻³ Number of residents of an urban area for which the aforementioned estimate of air pollution concentration is relevant Total population in urban area/city/ agglomeration</p>	
<i>Data sources, availability and quality</i>	<p>Data on ambient air pollution concentrations can be obtained from national or local monitoring networks, using either continuous (fixed-site) monitors or passive samplers. The number of people living in a certain urban area/city/ agglomeration is usually obtained from the national/local bureau's of statistics.</p>	
<i>Computation</i>	<p>Exposure to a pollutant y (reference value RV_y) and population P, the indicator is calculated as:</p> $Exp_y = SUM \{ (P_i / P) * (C_{yi} - RV_y) \}, \text{ where:}$ <p>C_{yi} – RV_y – exceedance of the reference concentration of pollutant y in sub-population i, P = SUM (P_i) – total population in urban area/ city/ agglomeration</p> <p>When C_{yi} < RV_y, a zero value is assigned to the $\{ (P_i / P) * (C_{yi} - RV_y) \}$</p> <p>For the daily pollution data, the sum is calculated over all separate days with the data in the calendar year, and all sub-populations.</p> <p>For Ozone the calculation is as follows:</p> $Expo_3 = SUM \{ (P_i / P) * NDo_{3i} \}, \text{ where:}$ <p>NDo_{3i} – number of days with O₃ exceeding the RV in sub-population i, P = SUM (P_i) – total population in urban area/ city/ agglomeration</p>	

<i>Units of measurement</i>	$\mu\text{g} / \text{m}^3$
<i>Scale of application</i>	Mainly local to regional; application at broader scales can be limited by the spatial non-representativeness of monitoring stations. Application of pollution concentration models may increase the scale to the areas with a limited monitoring only.
<i>Interpretation</i>	<p>This indicator can be used to interpret both spatial patterns and temporal trends in exposure to air pollution. In general terms, an increase in pollutant concentrations may be taken to suggest an increase in exposures and raised health risk; a reduction in pollution levels implies a decrease in exposures and a reduction in health risk. SO₂ could be considered as a proxy of industrial pollution and NO₂ – as an indicator for traffic exposures. Although PM₁₀ data may not be available for many countries, preference should be given to it. TSP, that's mostly available, may be not comparable between the countries. With respect to the Black Smoke it is a good indicator for long-term traffic exposure.</p> <p>Several factors nevertheless need to be taken into account in interpretation. One of the most important is the siting of the monitors. As a measure of exposure, data is generally most relevant where monitoring sites are located in residential or densely populated areas. Allowance also needs to be made for the detection limits, accuracy and comparability of the measurement methods. In particular, care needs to be taken when comparing data from different monitoring networks, due to the possibility of differences in sampling or measurement techniques. When used as a basis for assessing exposure, it is also important to recognise that actual exposures depend fundamentally upon indoor concentrations and time activity patterns of individuals.</p> <p>When used for impact calculations, possible representation of one pollution mix by several correlated pollutants must be considered.</p>
<i>Linkage with the other indicators</i>	<p>Driving force: <i>Road transport fuel consumption; Passengers transport demand per mode of transport</i></p> <p>Pressure: <i>Emissions of air pollutants</i></p> <p>Exposure: <i>Exposure to ambient air pollutants (urban)</i></p> <p>Effect: <i>Mortality due to respiratory diseases; Mortality due to diseases of the circulatory system</i></p>
<i>Related data, indicators</i>	<p>EEA/ETC-AQ AirBase, The European Air Quality Information system - a pan-European database of raw AQ data and statistics http://etc-acc.eionet.eu.int/databases/airbase.html</p> <p>WHO 2000 <i>Air Quality Guidelines for Europe</i>. WHO Regional Publications, European Series No. 91. http://www.euro.who.int/document/e71922.pdf</p> <p>WHO 1998 Healthy cities Air Management Information System AMIS 2.0 WHO: Geneva http://www.who.int/peh/air/amis.html</p> <p>See UN Indicators for Sustainable Development CSD Theme Indicator Framework at: http://www.un.org/esa/sustdev/indisd/isdms2001/table_4.htm</p> <p>For more information on monitoring ambient air quality for health impact assessment read online the WHO publication (WHO Regional Publications European Series No. 85, 1999) at http://www.euro.who.int/eprise/main/WHO/InformationSources/Publications/Catalogue/20010910_3 Available also in Russian</p> <p>For the software tool AirQ contact info@ecehbonn.euro.who.int</p>

Air_E1	Infant mortality due to respiratory diseases	DPSEEA
<i>Issue</i>	Air Quality	
<i>Definition of indicator</i>	Annual mortality rate due to respiratory diseases in children older than one month and under one year of age	
<i>Underlying definitions and concepts</i>	<p>The indicator is based on the following definitions:</p> <p>Respiratory disease: an acute or chronic illness affecting the respiratory system; includes acute respiratory infections, bronchitis, pneumonia, influenza, chronic obstructive pulmonary diseases</p> <p>Mortality due to respiratory diseases: death for which the primary cause is defined as respiratory disease ICD-10 codes J00 - J99</p> <p>Infants: children less than one year of age and older than one month of age.</p> <p>Total population of infants: number of live births in the year.</p>	
<i>Specification of data needed</i>	Annual number of deaths of children under 1-12 months of age due to respiratory diseases. Total number of live births in the survey year.	
<i>Data sources, availability and quality</i>	<p>In most European countries, national statistics are collated, based on death certification. However, some differences in reporting mechanisms and – more importantly in many cases – in diagnosis may exist. In other cases, data may be provided by national demographic surveillance systems: in a number of countries, these have included a verbal autopsy module aimed at collecting information on the cause of death in children.</p> <p>Data on the total population of infants are obtainable from national censuses. For inter-censal years, estimates may need to be made using vital registration data or demographic models</p>	
<i>Computation</i>	<p>This indicator can be computed as: $1000 * (M_i / P_i)$</p> <p>where M_i is the number of deaths due to respiratory diseases in children 1-12 months of age, and P_i is the total number of live births in the survey year</p>	
<i>Units of measurement</i>	Number of deaths per thousand live births	
<i>Scale of application</i>	National and international, though at international scales problems of data consistency and differences in the range of respiratory illnesses may create difficulties for interpretation.	
<i>Interpretation</i>	<p>This indicator may be interpreted to show trends or patterns in post-neonatal infant mortality as a result of respiratory diseases. According to available epidemiological studies, infant mortality may be correlated with level of air pollution in the place of residence. However numerous other factors play a role in determining this mortality as well. Many forms of respiratory illness occur, relating to a wide range of causes including exposures not only to ambient air pollution but also to pollutants and allergens (e.g. tobacco smoke, dust mite, fur) in the home and exposures to infectious agents. Diet and other lifestyle, environmental and social factors may also be important. In developing countries, for example, HIV and malaria are extremely important factors in either causing lower respiratory infection, or presenting as LRI. These may thus have a substantial effect on observed death rates. Mortality is also highly dependent upon the effectiveness of the health care system and availability of treatment.</p> <p>The indicator is a necessary input to estimation of the burden of disease attributable to indoor air pollution.</p>	
<i>Linkage with the other indicators</i>	<p>Effect: Infant mortality rate due to respiratory diseases;</p> <p>Action: <i>Policies to reduce environmental tobacco smoke exposure</i></p>	
<i>Related data, indicators</i>	<p>See WHO-HQ for list of indicators on children's environmental health http://www.who.int/peh/ceh/activities_indicators.htm</p> <p>US EPA Office of Children's Health Protection http://www.epa.gov/children/</p>	

Air_E2	Mortality due to respiratory diseases	DPSEEA
<i>Issue</i>	Air quality	
<i>Definition of indicator</i>	Annual mortality rate due to respiratory diseases	
<i>Underlying definitions and concepts</i>	<p>The indicator is based on the following definitions:</p> <p>Respiratory disease: an acute or chronic illness affecting the respiratory system ICD – 10 codes J00 – J99</p> <p>Mortality due to respiratory diseases: death for which the underlying cause is defined as respiratory disease.</p> <p>Total population: number of resident people at the midpoint of the year</p>	
<i>Specification of data needed</i>	<p>Annual number of deaths due to respiratory diseases.</p> <p>Total population at the mid-point in the survey year.</p>	
<i>Data sources, availability and quality</i>	<p>In most European countries, national statistics are collated, based on death certification. However, some differences in reporting mechanisms and – more importantly in many cases – in diagnosis may exist. Where national statistics on death due to respiratory illness are not available, it may be necessary to collect data directly from hospitals or health authorities (e.g. by sample surveys).</p> <p>Data on the total population are obtainable from national censuses. For inter-censal years, estimates may need to be made using vital registration data or demographic models.</p>	
<i>Computation</i>	<p>This indicator can be computed as:</p> $100000 * (M_{rt} / P_t)$ <p>where M_{rt} is the total number of deaths due to respiratory diseases, and P_t is the total population.</p>	
<i>Units of measurement</i>	Number of deaths per hundred thousand population	
<i>Scale of application</i>	National or international, though at international scales problems of data consistency and differences in the range of respiratory illnesses and age structure may create difficulties for interpretation.	
<i>Interpretation</i>	<p>This indicator may be interpreted to show trends or patterns in mortality as a result of respiratory diseases. A small part of respiratory mortality can be attributed to exposure to air pollution. Mortality rate is a necessary input to the assessment of burden of disease attributable to air pollution, estimated using the information on population exposure and dose-response functions from epidemiological studies.</p> <p>Many other factors than air pollution may cause respiratory diseases, including exposures to pollutants and allergens in the home (e.g. smoking, dust mite, pets) or at work, and exposures to infectious agents.</p> <p>Mortality is also highly dependent upon the effectiveness of the health care system and availability of treatment. In many developed countries, mortality rates due to respiratory diseases have remained broadly stable over recent decades, or have even declined, despite a large increase in morbidity.</p> <p>Differences in age structure may also make direct comparisons between different countries or periods difficult; age- and gender-standardised rates may then need to be computed.</p>	
<i>Linkage with the other indicators</i>	<p>Driving force: <i>Road transport fuel consumption; Passengers transport demand per mode of transport</i></p> <p>Pressure: <i>Emissions of air pollutants;</i></p> <p>Exposure: <i>Exposure to ambient air pollutants (urban)</i></p> <p>Effect: Mortality due to respiratory diseases; Mortality due to diseases of the circulatory system;</p> <p>Action: <i>Policies to reduce environmental tobacco smoke exposure</i></p>	
<i>Related data, indicators</i>	<p>Download the European Health for All (HFA) Database http://www.euro.who.int/hfadb and related products HFA - Mortality Database by leading causes of death, age and sex (HFA-MDB)</p> <p>Or for on-line access via European Public Health Information Network for Eastern Europe (EUPHIN – East) http://www.euphin.dk/hfa/Phfa.asp</p> <p>See also Core Set of Environmental Indicators: http://ceroi.net/ind/matrix.asp</p> <p>National Morbidity, Mortality and Air Pollution Study. HEI Research Report N. 94 Part 1, May 2000 at: http://www.healtheffects.org/Pubs/Samet.pdf</p>	

	<p>“Death, disease and dirty power” Mortality and health damage due to air pollution from power plants. Clean Air Task Force, Boston, MA, October 2000 http://www.cta.policy.net Environmental Burden of Disease http://www.who.int/peh/burden/burdenindex.htm</p>
--	--

Air_E3	Mortality due to diseases of the circulatory system	DPSEEA
<i>Issue</i>	Air Quality	
<i>Definition of indicator</i>	Annual mortality rate due to cardio- or cerebro-vascular diseases all ages ICD –10 codes I00 – I99	
<i>Underlying definitions and concepts</i>	The indicator is based on the following definitions: Diseases of the circulatory system: ICD – 10 codes I00 – I99 Mortality due to diseases of the circulatory system: death for which cardio- or cerebro-vascular illness is identified as the primary cause. Total population: number of resident people at the midpoint of the year.	
<i>Specification of data needed</i>	Annual number of deaths due to circulatory system diseases Total resident population	
<i>Data sources, availability and quality</i>	In most European countries, national statistics are collated, based on death certification. However, some differences in reporting mechanisms and – more importantly in many cases – in diagnosis may exist. Where national data are not available, it may be necessary to collate information from more local sources (e.g. hospitals or health authorities), for example through sample surveys. Data on the total population are obtainable from national censuses. For inter-censal years, estimates may need to be made using vital registration data or demographic models.	
<i>Computation</i>	This indicator can be computed as: $100000 * (M_{ct} / P_t)$ where M_{ct} is the total number of deaths due to diseases of the circulatory system, and P_t is the total population.	
<i>Units of measurement</i>	Number of deaths per hundred thousand population	
<i>Scale of application</i>	National and international, though at broader scales problems of data consistency and differences in the specific causes of death may make interpretation difficult.	
<i>Interpretation</i>	This indicator may be interpreted to show trends or patterns in mortality as a result of circulatory system diseases. A small part of it can be attributed to exposure to air pollution. Mortality rate is a necessary input to the assessment of burden of disease attributable to air pollution, estimated using the information on population exposure and dose-response functions from epidemiological studies. Many other factors than air pollution cause cardio- or cerebro-vascular diseases, such as diet and lifestyle factors (e.g. exercise, tobacco smoking). Many of the effects of these risk factors have long latency periods, so that death may be separated by many years from the period of exposure. Mortality is also highly dependent upon the effectiveness of the health care system and availability of treatment. Differences in age structure may also make direct comparisons between different countries or periods difficult; age- and gender-standardised rates may then need to be computed.	
<i>Linkage with the other indicators</i>	Driving force: <i>Road transport fuel consumption; Passengers transport demand per mode of transport</i> Pressure: <i>Emissions of air pollutants</i> Exposure: <i>Exposure to ambient air pollutants (urban)</i> Effect: <i>Mortality due to respiratory diseases; Mortality due to diseases of the circulatory system;</i> Action: <i>Policies to reduce environmental tobacco smoke exposure</i>	
<i>Related data, indicators</i>	Download the European Health for All (HFA) Database http://www.euro.who.int/hfadb and related products HFA - Mortality Database by leading causes of death, age and sex (HFA-MDB) Or for on-line access via European Public Health Information Network for Eastern Europe (EUPHIN – East) http://www.euphin.dk/hfa/Phfa.asp Environmental Burden of Disease http://www.who.int/peh/burden/burdenindex.htm	

Air_A1	Policies to reduce environmental tobacco smoke exposure	DPSEEA
<i>Issue</i>	Indoor Air	
<i>Definition of indicator</i>	Composite index of capability for implementing policies to reduce environmental tobacco smoke exposure and promoting smoke free areas	
<i>Underlying definitions and concepts</i>	The existence, implementation and enforcement of instruments and measures to prohibit smoking in indoor environment (facility, room, etc.) The existence of instruments to restrict smoking in designated areas with separate exhaust ventilation	
<i>Specification of data needed</i>	Evidence of existence and enforcement of regulations to reduce ETS exposure	
<i>Data sources, availability and quality</i>	Information on the existence and scope of the legislation and abided by population	
<i>Computation</i>	<p>The index is computed as a sum of 10 subset variables $SUM(C_i)$ where C_i is the score for component i.</p> <p>For each component the following scoring is accepted: 0 – Not existing, not clearly stated 1 – Clearly stated, partly (not) implemented or enforced 2 – Clearly stated and obeyed, implemented and enforced</p> <p>The full list of components (C_i) is as follows:</p> <ol style="list-style-type: none"> 1. Smoking prohibited/restricted in schools 2. Smoking prohibited/ restricted in day-care centres 3. Smoking prohibited/ restricted in governmental offices and other public buildings 4. Smoking prohibited/restricted in public traffic vehicles in urban areas 5. Smoking prohibited/restricted in public traffic vehicles – long distance 6. Smoking prohibited/restricted in hospitals 7. Smoking prohibited/restricted in work places 8. Smoking prohibited/restricted in cinemas, theatres, museums etc 9. Smoking prohibited/ restricted in bars, restaurants 10. Advertisement of cigarettes prohibited 	
<i>Units of measurement</i>	Ordinal score (0-20)	
<i>Scale of application</i>	Regional, national to international	
<i>Interpretation</i>	<p>This indicator provides a general measure of the capability to implement policies for reducing environmental tobacco smoke exposure and promoting smoke free areas: an increase in the score should be taken as a broad indication of increased capability, a reduction the reverse. Like all compound indicators, however, this one needs to be interpreted with care for the final score is the sum of many different components: areas with the same indicator score, therefore, do not necessarily have the same capability profile. It is equally important to examine the indicator components before drawing conclusions.</p>	
<i>Linkage with the other indicators</i>	<p>Effect: <i>Infant mortality due to respiratory diseases; Mortality due to respiratory diseases; Mortality due to diseases of the circulatory system;</i></p> <p>Action: Policies to reduce environmental tobacco smoke exposure</p>	
<i>Related data, indicators</i>	<p>International data available in WHO Tobacco control database http://cisid.who.dk/tobacco/ US EPA Indoor Environments Division. Introduction to IAQ: http://www.epa.gov/iaq/ia-intro.html US EPA Second Hand Smoke (SHS) also known as: Environmental Tobacco Smoke (ETS) http://www.epa.gov/iaq/ets/index.html See WHO Publication E70610 Policies to reduce exposure to environmental tobacco smoke: report on a WHO working group meeting, Lisbon, Portugal 29-30 May 2000 http://www.who.dk/document/e70610.pdf</p>	

Hous_S1	Living floor area per person	DPSEEA
<i>Issue</i>	Housing and Settlements	
<i>Definition of indicator</i>	Mean habitable floor area per person NB Median should be used in the future instead of mean	
<i>Underlying definitions and concepts</i>	<p>Habitable floor area: total surface area of housing units including the kitchen but not the circulation space, bathroom, toilet, laundry and other service areas</p> <p>Population: the resident population in a housing unit or a residential building (including those living in informal settlements)</p> <p>Breakdowns: Urban/rural</p>	
<i>Specification of data needed</i>	Habitable floor area Resident population	
<i>Data sources, availability and quality</i>	Data on habitable floor area can be derived from national censuses. Alternatively data could be derived from building plans or from household surveys. Data on resident population are usually available from the national censuses and are generally reliable	
<i>Computation</i>	The indicator can be computed as: Mean value of A_i / P_i Where A_i is the habitable floor area of a housing unit and P_i is the total residential population in it	
<i>Units of measurement</i>	Square metres (m ²)	
<i>Scale of application</i>	Local to national	
<i>Interpretation</i>	This indicator is one of ten “key” housing indicators approved by the UN Commission on Human Settlements to be collected in all countries and in a number of cities in each country to measure the progress towards meeting the objectives of the Global Shelter Strategy. Although a low level of the indicator is a sign of overcrowding it should be interpreted with caution. The relation between the magnitude of the living area and health status depends on many factors such as the quality of the housing unit and residential building and its immediate environment (including ambient air quality, water quality, noise etc.) Where these conditions are inadequate, the overcrowding may be taken as a measure of an increased risk for health.	
<i>Linkage with the other indicators</i>	<p>State: Living area per person</p> <p>Exposure: <i>Population living in substandard housing</i></p> <p>Effect: <i>Mortality due to external causes (domestic accidents, poisoning) in children</i></p> <p>Action: <i>Housing standards and building regulations; Land-use and urban planning regulations</i></p>	
<i>Related data, indicators</i>	<p>UN Human Settlements Programme: list of key urban indicators and database http://www.unhabitat.org/guo/index1.asp</p> <p>UN Indicators of sustainable development: http://www.un.org/esa/sustdev/isd.htm</p> <p>For updated Guidelines and Methodologies (2001) see also: http://www.un.org/esa/sustdev/indisd/indisd-mg2001.pdf</p> <p>UN Economic Commission for Europe Annual Bulletin on Housing and Building Statistics for Europe and North America, 1998 http://www.unece.org/env/hs/bulletin/cnt2_e98.htm</p>	

Hous_ Ex1	Population living in substandard housing	DPSEEA
<i>Issue</i>	Housing and Settlements	
<i>Definition of indicator</i>	Percentage of the population living in substandard housing, that is without the exclusive use of a toilet, shower or bath and private cooking facilities.	
<i>Underlying definitions and concepts</i>	<p>The indicator requires the ability to identify, and measure the extent of substandard housing. These are to a large extent both environmentally and culturally dependent, and thus are liable to vary from one area (or one time) to another.</p> <p>Substandard housing: housing units without the exclusive use of a toilet, shower or bath and private cooking facilities</p> <p>Alternative definitions of substandard housing may also include housing units which:</p> <ul style="list-style-type: none"> • are physically unsound and likely to be dangerous to occupants because of poor construction, or inadequately maintained services (e.g. electricity or gas), or • are located in a physically hazardous area (e.g. an area of flood or earthquake risk) or constructed on contaminated land (e.g. by chemical wastes, radioactivity), or • provide serious risks of exposures to indoor pollution (e.g. air pollutants) or pathogens (e.g. moulds, ticks, fleas), or • provide inadequate amenities (e.g. lack of a private shower or bath, toilet, cooking facilities, central heating). <p>Total population: the total resident population.</p>	
<i>Specification of data needed</i>	<p>Number of people living in substandard housing</p> <p>Total resident population</p>	
<i>Data sources, availability and quality</i>	<p>Data on the quality of the housing stock, and the number of people living in substandard housing is rarely available from routine sources. In some countries, an approximation to this may be available from the census statistics (e.g. housing lacking basic amenities). Generally, however, <u>data will need to be obtained by household surveys</u>. Further developmental work is needed to harmonise the definitions and survey methodology.</p> <p>Data on the total resident population should be available from national censuses and should be reliable.</p>	
<i>Computation</i>	<p>The indicator can be computed as:</p> $100 * (U / P)$ <p>where U is the number of people living in substandard housing and P is the total resident population.</p>	
<i>Units of measurement</i>	Percentage	
<i>Scale of application</i>	Mainly local	
<i>Interpretation</i>	<p>This is a housing indicator, which has wide-ranging significance for policy. In providing a measure of the condition of the housing stock, it also acts as an indicator of health risks associated with basic sanitation, poor sanitation, exposures to indoor air pollution, and access to safe water. It can therefore help to interpret a range of other issues and indicators.</p> <p>Like all general-purpose indicators, this one needs to be interpreted carefully. The driving forces, which render a housing substandard may clearly vary as they are strongly interlinked with socio-economic factors. The definition therefore should enable flexibility for highly developed countries in setting their “reference levels” and at the same time ensuring between-country comparability</p>	
<i>Linkage with the other indicators</i>	<p>State: <i>Living area per person</i></p> <p>Exposure: Population living in substandard housing</p> <p>Effect: <i>Mortality due to external causes (domestic accidents, poisoning) in children</i></p> <p>Action: <i>Housing standards and building regulations; Land-use and urban planning regulations</i></p>	
<i>Related data, indicators</i>	<p>UN Human Settlements Programme: list of key urban indicators and database http://www.unhabitat.org/guo/index1.asp</p> <p>UN Economic Commission for Europe Annual Bulletin on Housing and Building Statistics for Europe and North America, 1998 http://www.unece.org/env/hs/bulletin/cnt2_e98.htm</p>	

Hous_E1	Mortality due to external causes in children under 5 years of age	DPSEEA
<i>Issue</i>	Housing and Settlements	
<i>Definition of indicator</i>	Annual mortality rate due to the external causes: domestic accidents, poisoning in children under five years of age (ICD 10 codes W00.0 or W00.1 – Y34.0 or Y34.1)	
<i>Underlying definitions and concepts</i>	<p>The indicator is based on the following definitions:</p> <p>Domestic accidents: an accident, taking place inside the housing unit, which leads to physical injury and to death. Common domestic accidents include falling downstairs, electrocution, scalding and accidents with kitchen utensils and equipment</p> <p>Poisoning: the deliberate, accidental, short- or long-term exposure to a substance of natural or anthropogenic origin at levels sufficient to cause illness and death.</p> <p>Total number of children less than 5 years of age: total resident population of children less than 5 years.</p>	
<i>Specification of data needed</i>	<p>Annual number of deaths of children under five years of age due to domestic accidents and poisoning (ICD 10 codes W00 – Y34 with fourth digit either 0 for accident or poisoning occurred at home, or 1 for accident or poisoning occurred at the institutional place of residence)</p> <p>Total number of children less than 5 years of age.</p>	
<i>Data sources, availability and quality</i>	<p>Data on children's deaths due to external causes – domestic accidents and poisoning may need to be obtained from a variety of different sources e.g. national poison centres, emergency medical services etc In most European countries, national statistics are collated, based on death certification. However, some differences in reporting mechanisms and – more importantly in many cases – in diagnosis may exist. In other cases, data may be provided by national demographic surveillance systems: in a number of countries, these have included a verbal autopsy module aimed at collecting information on the cause of death in children. Data on the total number of children aged less than 5 years should usually be available from national censuses and should be reliable.</p>	
<i>Computation</i>	$100000 * (M_{ec} / N_c)$ <p>where M_{ec} is the number of deaths due to domestic accidents and poisoning in children under 5 years of age, and N_c is the total number of children less than 5 years at the time of survey.</p>	
<i>Units of measurement</i>	Number per hundred thousand children under 5 years of age	
<i>Scale of application</i>	Local to international though problems of data consistency and availability may limit interpretations at broader scales	
<i>Interpretation</i>	Where reliable data exist, the indicator can be interpreted as a direct measure to the hazardousness of the home environment. Nevertheless, care is needed in making comparisons between different areas or countries, or over long periods of time. Data are likely to be affected also by the ease of access to the medical services, and by differences in reporting procedures.	
<i>Linkage with the other indicators</i>	<p>Exposure: <i>Population living in substandard housing</i></p> <p>Effect: <i>Mortality due to external causes (domestic accidents and poisoning) in children less than 5 years of age</i></p> <p>Action: <i>Scope and application of building regulations for housing</i></p>	
<i>Related data, indicators</i>	<p>See WHO-HQ for list of indicators on children's environmental health http://www.who.int/peh/ceh/activities_indicators.htm Agency for Toxic Substances and Disease Registry Office of Children's Health http://www.atsdr.cdc.gov/child/</p>	

Hous_A1	Scope and application of building regulations for housing	DPSEEA
<i>Issue</i>	Housing and Settlements	
<i>Definition of indicator</i>	Composite index for the scope and application of building regulations for housing	
<i>Underlying definitions and concepts</i>	<p>This indicator is based on the assumption that housing and building regulations can help to reduce health risks by controlling new housing construction on unsuitable sites and by providing adequate standards for building construction and design. Underlying definitions are:</p> <p>Building regulations: legally defined standards and norms for new buildings, which must be met by the developer. Building regulations may cover issues such as the amount of space per occupant, construction materials and methods and safety standards.</p> <p>Housing standards: formal procedures for the design, layout and amenities provided in new residential buildings. These procedures usually require formal consent from municipal or national authorities before construction can begin. Requirements for the site location and orientation of residential buildings, car parking and access to public transport may also be included.</p>	
<i>Specification of data needed</i>	Evidence of the existence, implementation and enforcement of building regulations and housing standards for new housing.	
<i>Data sources, availability and quality</i>	Evidence can normally best be obtained by reading relevant legislation and guidelines for architects, builders and other professionals.	
<i>Computation</i>	<p>The index is computed as</p> $SUM(C_i)$ <p>where C_i is the score for component i, $i = 1 - 6$</p> <p>For each component C_i the following scoring is accepted:</p> <p>0 – Not existing, not clearly stated 1 – Clearly stated, partly (not) implemented or enforced; 2 – Clearly stated and obeyed, implemented and enforced</p> <p>The full list of components (C_i) is as follows:</p> <ul style="list-style-type: none"> • Formal planning consent required for all new housing construction • Strict requirement for urban infrastructure provision and connection to sites of new residential buildings (e.g. piped water, drainage, sewerage, electricity, gas) • Housing standards exist which define minimum requirements and living conditions (e.g. amenities, lighting, thermal insulation, ventilation) for new residential buildings • Building regulations exist which control building construction methods • Building regulations exist which control non-toxic materials for residential buildings • Building regulations exist which define safety standards for housing units. 	
<i>Units of measurement</i>	Ordinal score (0-12)	
<i>Scale of application</i>	Local, national to international	
<i>Interpretation</i>	This indicator provides a general measure of the scope and application of housing standards and building regulations, including the requirement for formal approval prior to construction. The simple scoring system means that this indicator should be interpreted with caution because the existence of the various standards, regulations and control instruments does not necessarily mean that they are effectively implemented and enforced.	
<i>Linkage with the other indicators</i>	<p>State: <i>Living area per person</i></p> <p>Exposure: <i>Population living in substandard housing</i></p> <p>Effect: <i>Mortality due to external causes (domestic accidents, poisoning) in children</i></p> <p>Action: Housing standards and building regulations; <i>Land-use and urban planning regulations</i></p>	
<i>Related data, indicators</i>	<p>The Global Urban Observatory Databases: http://www.unhabitat.org/guo/index1.asp</p> <p>UN Economic Commission for Europe Annual Bulletin on Housing and Building Statistics for Europe and North America, 1998 http://www.unece.org/env/hs/bulletin/cnt2_e98.htm</p>	

Hous_A2	Land use and urban planning regulations	DPSEEA
<i>Issue</i>	Housing and Settlements	
<i>Definition of indicator</i>	Composite index for the scope and application of regulations for land use and urban planning in human settlements	
<i>Underlying definitions and concepts</i>	<p>This indicator is based on the assumption that land use and urban can help to reduce health risks by controlling new development on unsuitable sites and by providing adequate standards for industrial, commercial and housing construction and design. Underlying definitions are:</p> <p>Land use regulations: formal procedures for controlling where, and under what conditions, land is developed for industrial, commercial and housing purposes. These procedures usually require formal consent before development and construction can occur. Land may also be zoned, with specific areas designated for prescribed functions.</p> <p>Urban planning regulations: legally defined standards and norms for urban development, which must be met. Regulations may cover issues such as accessibility to public transport and community services, proximity of different kinds of activities to each other and specific requirements for discharges and waste disposal from industrial and commercial buildings.</p>	
<i>Specification of data needed</i>	Evidence of the existence, implementation and enforcement of land use and urban planning regulations.	
<i>Data sources, availability and quality</i>	Evidence can normally best be obtained by reading relevant legislation and guidelines for professionals.	
<i>Computation</i>	<p>The index is computed as</p> $SUM(C_i)$ <p>where C_i is the score for component i.</p> <p>For each component C_i the following scoring is accepted:</p> <p>0 – Not existing, not clearly stated 1 – Clearly stated, partly (not) implemented or enforced; 2 – Clearly stated and obeyed, implemented and enforced</p> <p>The full list of components (C_i) is as follows:</p> <ul style="list-style-type: none"> • Formal planning consent required for all new site development • Prescribed land use zoning indicating sites for industrial, commercial and housing development • Regulations exist which define minimum for the collection and treatment of discharges and waste disposal from industrial and commercial buildings • Regulations exist which control safety standards in industrial and commercial buildings • Regulations exist which define minimum requirements for the provision of community services (e.g. public transport; medical and educational services) in residential neighbourhoods 	
<i>Units of measurement</i>	Ordinal score (0-10)	
<i>Scale of application</i>	Local, national to international	
<i>Interpretation</i>	This indicator provides a general measure of the scope and application of land use and urban planning regulations. It indicates the level of commitment to ensuring safe living environment in human settlements. The simple scoring system means that this indicator should be interpreted with caution because the existence of the various regulations and planning instruments does not necessarily mean that they are effectively implemented and enforced.	
<i>Linkage with the other indicators</i>	<p>State: <i>Living area per person</i></p> <p>Exposure: <i>Population living in substandard housing</i></p> <p>Effect: <i>Mortality due to external causes (domestic accidents, poisoning) in children</i></p> <p>Action: <i>Housing standards and building regulations; Land-use and urban planning regulations</i></p>	
<i>Related data, indicators</i>	The Global Urban Observatory Databases: http://www.unhabitat.org/guo/index1.asp	

Traf_E1	Mortality from traffic accidents	DPSEEA
<i>Issue</i>	Transport, housing and human settlements	
<i>Definition of indicator</i>	Death rate due to transport accidents ICD 10 codes V01 – V99	
<i>Underlying definitions and concepts</i>	<p>The indicator is based on the following definitions:</p> <p>Deaths due to road traffic accidents: all deaths directly or indirectly attributable to involvement in a vehicle traffic accident however caused. This includes deaths of vehicle drivers, passengers and pedestrians/cyclists. It also includes both immediate and delayed deaths (though the latency period is rarely clearly defined). This definition is based on the assumption that data on cause of death defines the source of the injury.</p> <p>Total population: total resident and visiting population. (Note: for this indicator the total resident and visiting population is more appropriate as denominator, since many deaths in road accidents occur to tourists or other visitors.)</p>	
<i>Specification of data needed</i>	Total number of deaths due to road traffic accidents ICD 10 codes V01 – V99 Total resident and visiting population	
<i>Data sources, availability and quality</i>	<p>Data on deaths due to road traffic accidents should be available at the national level from official statistics, and at the regional/local level from either registrations of cause of death or from police statistics. These statistics have a number of weaknesses, including the way in which cause of death is defined (reference may be made only to the nature of the injury causing death, not its source), the method of geo-coding (individuals will usually be defined by place of residence, not the location of the accident), and lack of distinction between deaths of pedestrians and vehicle users.</p> <p>Data on total resident population should be available from national censuses and should be reliable. Some census statistics also provide a measure of the number of temporary residents (i.e. visitors) at the time of survey, though definitions tend to vary between countries, and the data may not be representative of the number of visitors at other times in the year. Where appropriate, separate estimates of the number of visitors may be obtained from tourist statistics.</p>	
<i>Computation</i>	<p>The indicator can be computed as:</p> $100000 * (M_t / P)$ <p>where M_t is the total number of deaths due to traffic accidents and P is the total population.</p>	
<i>Units of measurement</i>	Number per hundred thousand population	
<i>Scale of application</i>	Local to international, though problems of data consistency and availability may limit interpretations at broader scales	
<i>Interpretation</i>	<p>This indicator is in general relatively easy to interpret, in that the link between cause and health effect is explicit. Changes in the indicator may nevertheless imply different processes. For example, a reduction in the mortality rate may be due, <i>inter alia</i>, to: a reduction in total traffic volume, reduced traffic speeds (e.g. due to increased congestion), an improvement in road design, improved traffic management, improvements in vehicle safety, improvements in driver behaviour, improved environmental conditions (e.g. weather), fewer pedestrians or cyclists, greater segregation of pedestrians from road traffic, improved emergency services, or improved health services.</p> <p>Problems inherent in the data also need to be considered, especially where different countries or regions, with different reporting systems, are being compared. Difficulty also exists in allowing for the number of visitors (especially in transit), which may be significant in some areas.</p>	
<i>Linkage with the other indicators</i>	<p>Driving force: <i>Passenger transport demand per mode of transport</i></p> <p>Effect: Mortality from traffic accidents; Rate of injuries by traffic accidents</p> <p>Action: <i>Land-use and urban planning regulations</i></p>	
<i>Related data, indicators</i>	<p>The EUPHIN-EAST database: http://www.euphin.dk/hfa/Phfa.asp</p> <p>Health for All (HFA) database: http://www.who.dk/hfadb</p> <p>OECD Road transport and research programme: The International Transport Research Documentation (ITRD) and the International Road Traffic Accident Database (IRTAD) http://www.oecd.org/dsti/sti/transport/road/index.htm</p> <p>Institute for road safety research http://www.swov.nl</p>	

Traf_E2	Rate of injuries by traffic accidents	DPSEEA
<i>Issue</i>	Transport, housing and human settlements	
<i>Definition of indicator</i>	Injury rate due to traffic accidents ICD 10 codes V01 – V99	
<i>Underlying definitions and concepts</i>	<p>The indicator is based on the following definitions:</p> <p>Injuries due to road traffic accidents: injuries directly or indirectly attributable to involvement in a motor vehicle traffic accident. This includes injuries of vehicle drivers, passengers and pedestrians/cyclists. It also includes from both one or more slight injuries – secondary injuries such as sprains or bruises, to serious injuries such as fractures, concussion, internal lesions, crushing, severe cuts and laceration, severe general shock requiring medical treatment and any other serious lesions entailing detention in hospital.</p> <p>Total population: total resident and visiting population. (Note: for this indicator the total resident and visiting population is more appropriate as denominator, since many road accidents occur to tourists or other visitors.)</p>	
<i>Specification of data needed</i>	Total number of injured ICD 10 codes V01 – V99. Total resident and visiting population	
<i>Data sources, availability and quality</i>	<p>Data on injuries due to road traffic accidents should be available at the national level from official statistics, and at the regional/local level from either registrations of medical (emergency) care facilities or from police statistics. These statistics have a number of weaknesses, including the way in which cause of injury is defined (reference may be made only to the nature of the injury, not its source), the method of geo-coding (individuals will usually be defined by place of residence, not the location of the accident), and lack of distinction between deaths of pedestrians and vehicle users. Overall, the joint use of official statistics from police and statistics from medical institutions (services) gives the possibility to reveal over 90% of real number of accident casualties</p> <p>Data on total resident population should be available from national censuses and should be reliable. Some census statistics also provide a measure of the number of temporary residents (i.e. visitors) at the time of survey, though definitions tend to vary between countries, and the data may not be representative of the number of visitors at other times in the year. Where appropriate, separate estimates of the number of visitors may be obtained from tourist statistics.</p>	
<i>Computation</i>	<p>The indicator can be computed as:</p> $100000 * (I_t / P)$ <p>where I_t is the total number of injured due to traffic accidents and P is the total population</p>	
<i>Units of measurement</i>	Number per hundred thousand population	
<i>Scale of application</i>	Regional to national	
<i>Interpretation</i>	<p>This indicator is in general relatively easy to interpret, in that the link between cause and health effect is explicit. Changes in the indicator may nevertheless imply different processes. For example, a reduction in the injury rate may be due, inter alia, to: a reduction in total traffic volume, reduced traffic speeds (e.g. due to increased congestion), an improvement in road design, improved traffic management, improvements in vehicle safety, improvements in driver behaviour, improved environmental conditions (e.g. weather), fewer pedestrians or cyclists, greater segregation of pedestrians from road traffic, improved emergency services, or improved health services.</p> <p>Problems inherent in the data also need to be considered, especially where different countries or regions, with different reporting systems, are being compared. Difficulty also exists in allowing for the number of visitors, which may be significant in some areas</p>	
<i>Linkage with the other indicators</i>	<p>Driving forces: <i>Passenger transport demand per mode of transport</i></p> <p>Effects: <i>Mortality from traffic accidents; Rate of injuries by traffic accidents</i></p> <p>Actions: <i>Land-use and urban planning regulations</i></p>	
<i>Related data, indicators</i>	<p>OECD Road transport and research programme: The International Transport Research Documentation (ITRD) and the International Road Traffic Accident Database (IRTAD)</p> <p>http://www.oecd.org/dsti/sti/transport/road/index.htm</p> <p>Institute for Road Safety Research http://www.swov.nl</p>	

Noise_E1	Population annoyance by certain sources of noise	DPSEEA
<i>Issue</i>	Noise	
<i>Definition of indicator</i>	Percentage of the population annoyed by certain sources of environmental noise	
<i>Underlying definitions and concepts</i>	<p>The indicator is based on the assumption that exposure to high levels of noise originated from different sources, e.g. traffic (road, railway and air), industry, entertainment facilities, induce general annoyance and sleep disturbance. Underlying definitions are:</p> <p>Annoyance: “a feeling of displeasure associated with any agent or condition, known or believed by an individual or group to adversely affect them” (cf. Guidelines for Community Noise: B. Berglund, T. Lindvall, D. Schwela Ed, WHO, Geneva, 1999). It can be assessed by standardised questionnaires.</p> <p>Population: total population surveyed</p>	
<i>Specification of data needed</i>	<p>Self-assessment of the extent of annoyance on a standardised questionnaire by certain sources</p> <p>The subdivision of the source type can be the following:</p> <p>Road traffic:</p> <ul style="list-style-type: none"> ▪ highway ▪ urban road ▪ vans ▪ heavy trucks ▪ motor bikes ▪ mopeds/ scooters <p>Air traffic:</p> <ul style="list-style-type: none"> ▪ civil aviation ▪ military flight ▪ general aviation <p>Railway traffic:</p> <ul style="list-style-type: none"> ▪ passenger trains ▪ freight trains ▪ metro <p>Industry:</p> <ul style="list-style-type: none"> ▪ factories and manufacturers ▪ building equipment ▪ load/ unload facilities <p>Entertainment:</p> <ul style="list-style-type: none"> ▪ bars/ disco’s ▪ luna-parks etc ▪ noisy sports (shooting, motorcycling) <p>Neighbours</p> <p>Total population of the sample surveyed</p>	
<i>Data sources, availability and quality</i>	<p>Data are collected by surveillance of a representative sample of the population, preferably by trained interviewers, although in some circumstances a telephone survey is a viable alternative. Postal surveys are not recommended.</p> <p>The sample should be randomly selected from a collection of national addresses of habitations (non-inhabited addresses excluded). With large samples, the time for travelling of the interviewers can be reduced by generating multiple addresses in the same area. Care has to be taken to select persons per address according to a chosen scheme; otherwise bias may result. Preferably only persons living longer than one year on the address are selected.</p> <p>A questionnaire is administered which contains the core questions on noise annoyance, and limited information about the person (age, gender, education, main occupation) and about the dwelling (building year, type of insulation, quiet side(s)). Some additional questions may be helpful to interpret results: noise sensitivity and anxiety with respect to the source.</p> <p>When at the same time noise levels are determined at the address, this can serve to relate the results to, as well as to construct a distribution of noise levels over houses. If little data are available (e.g. traffic flows, industrial activity, flight patterns), this can prove to be a difficult accomplishment.</p>	

	<p>Annoyance questionnaire:</p> <p>The annoyance question will usually be part of a general household survey, so other relevant data are obtained as well. For an example of questionnaire see: http://www.xs4all.nl/~rigolett/ENGELS/quest/questionnairenoise.htm</p> <p><i>Next is a zero- to- ten scale on how much (...source...) noise bothers, disturbs or annoys you when you are here at home. If you are not at all annoyed choose zero, if you are extremely annoyed choose ten, if you are somewhere in between, choose a number between zero and ten. Thinking about the last 12 months or so, what number from zero to ten best shows how much you are bothered or annoyed by (...source...) noise?</i></p> <p>Both questions should be accompanied by visual answer, that display the words or numbers at equally spaced intervals cards in face-to-face interviews. A question about “hearing” a noise can be informative but must not be used as a filter.</p> <p>Sample sizes may vary, but a minimum of 1000 respondents is felt to be necessary in a homogenous population. Further developmental work is needed to harmonise the definitions and survey methodology.</p>
<i>Computation</i>	<p>The indicator can be computed for each source of noise as: $100 * (N_a / N_t)$ where N_a is the number of annoyed people and N_t is the total number of surveyed population The number of annoyed people is counted by adding the subjects scoring 6, 7, 8, 9 and 10. The number of highly annoyed people is counted by adding the subjects scoring 8, 9 and 10. Information on annoyance should be supplied with description on grouping of the noise sources</p>
<i>Units of measurement</i>	Percentage
<i>Scale of application</i>	National as well as local – residential settings
<i>Interpretation</i>	<p>The indicator provides a measure of the long-term health effects related to exposure to high levels of environmental noise by some sources when the survey is carefully designed and the above methodology is used. It can serve as a basis for adjusting policy options and regulations on reducing noise and undertaking noise abatement measures.</p> <p><u>Data will need to be obtained by household surveys.</u> A well-designed population representative survey combining several data items and a development of methodology is required.</p>
<i>Linkage with the other indicators</i>	<p>Driving force: <i>Passenger transport demand by mode of transport</i> Effect: Population annoyance by certain sources of noise; <i>Sleep disturbance by noise</i> Action: <i>Application of regulations, restrictions and noise abatement measures</i></p>
<i>Related data, indicators</i>	<p>Health effects of noise: http://www.xs4all.nl/~rigolett/ENGELS/index.htm EEA EIONET Noise Newsletter http://themes.eea.eu.int/theme.php/issues/noise Guidelines for Community Noise (B. Berglund, T. Lindvall, D. Schwela Ed), WHO, Geneva, 1999 http://www.who.int/peh/noise/guidelines2.html</p>

Noise_E2	Sleep disturbance by noise	DPSEEA
<i>Issue</i>	Noise	
<i>Definition of indicator</i>	Percentage of the population with self-reported sleep disturbance by environmental noise	
<i>Underlying definitions and concepts</i>	<p>The indicator is based on the assumption that exposure to high levels of noise originated from different sources, e.g. traffic (road, railway and air), industry, entertainment facilities, neighbours induce general annoyance and sleep disturbance. Underlying definitions are:</p> <p>Sleep disturbance: self-reported noise-induced sleep disturbance and increase of noise-induced awakenings during the habitual sleeping time. Sleep disturbance is seen as a health effect on its own, but may cause also after effects like mood changes, fatigue (and therewith related accidents) and other impaired functions.</p> <p>Population: total population surveyed</p>	
<i>Specification of data needed</i>	<p>Self-report of the extent of sleep disturbance on a standardised questionnaire by certain source The subdivision of the source type can be the following:</p> <p>Road traffic:</p> <ul style="list-style-type: none"> ▪ highway ▪ urban road ▪ vans ▪ heavy trucks ▪ motor bikes ▪ mopeds/ scooters <p>Air traffic:</p> <ul style="list-style-type: none"> ▪ civil aviation ▪ military flight ▪ general aviation <p>Railway traffic:</p> <ul style="list-style-type: none"> ▪ passenger trains ▪ freight trains ▪ metro <p>Industry:</p> <ul style="list-style-type: none"> ▪ factories and manufacturers ▪ building equipment ▪ load/ unload facilities <p>Entertainment:</p> <ul style="list-style-type: none"> ▪ bars/ disco's ▪ luna-parks etc ▪ noisy sports (shooting, motorcycling) <p>Neighbours</p> <p>Total population of the sample surveyed</p>	
<i>Data sources, availability and quality</i>	<p>Data are collected by surveillance of a representative sample of the population, preferably by trained interviewers, although in some circumstances a telephone survey is a viable alternative. Postal surveys are not recommended.</p> <p>The sample should be randomly selected from a collection of national addresses of habitations (non-inhabited addresses excluded). With large samples, the time for travelling of the interviewers can be reduced by generating multiple addresses in the same area. Care has to be taken to select persons per address according to a chosen scheme; otherwise bias may result. Preferably only persons living longer than one year on the address are selected.</p> <p>A questionnaire is administered which contains the core questions on noise annoyance, and limited information about the person (age, gender, education, main occupation) and about the dwelling (building year, type of insulation, quiet side(s)). Some additional questions may be helpful to interpret results: noise sensitivity and anxiety with respect to the source.</p> <p>When at the same time noise levels are determined at the address, this can serve to relate the results to, as well as to construct a distribution of noise levels over houses. If little data are available (e.g. traffic flows, industrial activity, flight patterns), this can prove to be a difficult accomplishment.</p>	

	<p>Sleep disturbance questionnaire: Two questions are recommended:</p> <p>1. Sleeping behaviour:</p> <p><i>-At what time usually you go to sleep at working days/weekends?</i> <i>-At what time usually you wake up at working days/weekends?</i> <i>-Do you usually sleep (nap) at other times during the day?</i> <i>If yes: between ... and ... hour</i></p> <p>2. Disturbance: <i>Next is a zero- to- ten scale on how much (...source...) noise disturbs your sleep when you are at home. If you are not at all annoyed choose zero, if you are extremely annoyed choose ten, if you are somewhere in between, choose a number between zero and ten that best reflects the extent to which your sleep is disturbed. Thinking about the last 12 months or so, what number from zero to ten best shows how much your sleep is disturbed by (...source...) noise?</i></p> <p>For an example of questionnaire see: http://www.xs4all.nl/~rigolett/ENGELS/quest/questionnairenoise.htm</p> <p>Sample sizes may vary, but a minimum of 1000 respondents is felt to be necessary in a homogenous population Further developmental work is needed to harmonise the definitions and survey methodology.</p>
<i>Computation</i>	<p>The indicator can be computed for each source of noise as:</p> $100 * (N_{sd} / N_t)$ <p>where N_{sd} is the number of sleep disturbed people and N_t is the total number of surveyed population The number of sleep-disturbed people is counted by adding the subjects scoring 6, 7, 8, 9 and 10. The number of highly sleep-disturbed people is counted by adding the subjects scoring 8, 9 and 10. Information on sleep disturbance should be supplied with description on grouping of the noise sources</p>
<i>Units of measurement</i>	Percentage
<i>Scale of application</i>	National as well as local – residential settings
<i>Interpretation</i>	<p>The indicator provides a measure of the long-term health effects related to exposure to high levels of environmental noise by some sources when the survey is carefully designed and the above methodology is used. It can serve as a basis for adjusting policy options and regulations on reducing noise and undertaking noise abatement measures.</p> <p><u>Data will need to be obtained by household surveys.</u> A well-designed population representative survey combining several data items and a development of methodology is required.</p>
<i>Linkage with the other indicators</i>	<p>Effect: <i>Population annoyance by certain sources of noise; Sleep disturbance by noise</i> Action: <i>Application of regulations, restrictions and noise abatement measures</i></p>
<i>Related data, indicators</i>	<p>Health effects of noise: http://www.xs4all.nl/~rigolett/ENGELS/index.htm EEA EIONET Noise Newsletter http://themes.eea.eu.int/theme.php/issues/noise Guidelines for Community Noise (B. Berglund, T. Lindvall, D. Schwela Ed), WHO, Geneva, 1999 http://www.who.int/peh/noise/guidelines2.html</p>

Noise_A1	Application of regulations, restrictions and noise abatement measures	DPSEEA
<i>Issue</i>	Noise	
<i>Definition of indicator</i>	Composite index of capability to implement regulations, restrictions and noise abatement measures	
<i>Underlying definitions and concepts</i>	<p>The existence, implementation and enforcement of instruments and measures aimed at controlling or reducing noise level in the environment.</p> <p>The existence, implementation and enforcement of legally specified noise metrics and limits for noise per certain type of source.</p> <p>The existence and implementation and enforcement of restrictions on night traffic/ flights and administrative measures.</p> <p>The existence of noise abatement measures: insulations, barriers.</p>	
<i>Specification of data needed</i>	<p>Evidence of existence and enforcement of regulations to reduce noise levels</p> <p>Evidence of existence of noise abatement measures</p>	
<i>Data sources, availability and quality</i>	Information on the existence and scope of the legislation and abided by population	
<i>Computation</i>	<p>The index is computed as a sum of 7 subset variables</p> $SUM(C_i)$ <p>where C_i is the score for component i</p> <p>For each component C_i the following scoring is accepted:</p> <p>0 – Not existing, not clearly stated</p> <p>1 – Clearly stated, partly (not) implemented or enforced;</p> <p>2 – Clearly stated and obeyed, implemented and enforced</p> <p>The full list of components (C_i) is as follows:</p> <ol style="list-style-type: none"> 1 Legislation for noise prevention for new roads 2 Legislation for noise prevention for new railways 3 Legislation for noise prevention for new airports 4 Local authorities required to deal with nuisance complaints 5 Building regulations require insulation between houses 6 Improvement grants for existing dwellings with high noise loads 7 Noise levels or annoyance are monitored on a regular basis 	
<i>Units of measurement</i>	Ordinal score (0 – 14)	
<i>Scale of application</i>	National to international	
<i>Interpretation</i>	<p>This indicator provides a general measure of the capability to implement policies for reducing environmental noise: an increase in the score should be taken as a broad indication of increased capability, a reduction the reverse. Like all compound indicators, however, this one needs to be interpreted with care for the final score is the sum of many different components: areas with the same indicator score, therefore, do not necessarily have the same capability profile. It is equally important to examine the components of the indicator and handle appropriately the lack of data before drawing conclusions.</p>	
<i>Linkage with the other indicators</i>	<p>Effect: <i>Population annoyance by certain sources of noise; Sleep disturbance by noise</i></p> <p>Action: Application of regulations, restrictions and noise abatement measures</p>	
<i>Related data, indicators</i>	<p>Airport information database http://www.boeing.com/assocproducts/noise/list.html</p> <p>Review of the statutory limits in the Netherlands http://www.xs4all.nl/~rigolett/ENGELS/normeng.htm</p> <p>Noise Control for Licensed Bars, Hotels and Restaurants http://www.xs4all.nl/~rigolett/ENGELS/horeca/horecafr.htm</p> <p>Noise control at the source: noise levels for outdoor equipment; noise levels for motor vehicles: http://www.xs4all.nl/~rigolett/ENGELS/equipment/equipfr.htm</p> <p>http://www.xs4all.nl/~rigolett/ENGELS/typetest/typfr.htm</p> <p>Guidelines for Community Noise (B. Berglund, T. Lindvall, D. Schwela Ed), WHO, Geneva, 1999 http://www.who.int/peh/noise/guidelines2.html</p>	

Waste_P1	Hazardous waste generation	DPSEEA
<i>Issue</i>	Waste and Contaminated Lands	
<i>Definition of indicator</i>	Amount of hazardous waste generated and imported by country per year irrespective of source	
<i>Underlying definitions and concepts</i>	<p>Hazardous waste: waste (i.e. materials which are considered no longer to have value or utility and which are thus to be disposed of), which pose dangers to human health in the event of either long-or short-term exposures either to the wastes themselves or their decay products. Exposure may occur either directly (e.g. through contact with the waste) or indirectly e.g. via seepage into soil, groundwater or surface water, release into the atmosphere or accumulation in the food chain.</p> <p>Import/export of hazardous waste: total quantity of hazardous waste per year, subject to trans-boundary movement, which takes place in accordance to the Basel Convention.</p>	
<i>Specification of data needed</i>	Amount of hazardous waste generated by category and/or amount of that, which is subject to trans-boundary movement (imports) within a time period (e.g. year)	
<i>Data sources, availability and quality</i>	At international level data may be obtained from the secretariat of the Basel convention. Eurostat holds data for the EU countries; the source of which is the joint OECD/ Eurostat questionnaire. At national level - by the respective agencies. For some countries it may be difficult to obtain data	
<i>Computation</i>	<p>Sum of all quantities of hazardous waste categories produced and/or subject to trans-boundary movement per year:</p> $HW_M = HW_G + HW_I$ <p>where HW_M – total amount of hazardous waste to be managed in a country; HW_G – total amount of hazardous waste generated within the country; HW_I – total amount of hazardous waste imported</p>	
<i>Units of measurement</i>	ktonnes	
<i>Scale of application</i>	National to international	
<i>Interpretation</i>	Differences of definitions of hazardous waste point out to some limitations. Another limitation is in the availability and accuracy of the data	
<i>Linkage with the other indicators</i>	<p>Pressure: Hazardous waste generation</p> <p>State: <i>Contaminated land sites</i></p> <p>Action: <i>Hazardous waste policies</i></p>	
<i>Related data, indicators</i>	<p>UN Indicators of sustainable development: http://www.un.org/esa/sustdev/isd.htm</p> <p>For updated Guidelines and Methodologies (2001) see: http://www.un.org/esa/sustdev/indisd/indisd-mg2001.pdf</p> <p>OECD Core List of hazardous waste http://www1.oecd.org/ehs/ehsmono/C8890FNL.pdf</p> <p>For the OECD control system of trans-frontier movement of waste see http://www1.oecd.org/ehs/Waste</p> <p>Secretariat of the Basel Convention on Control of Trans-boundary Movements of Hazardous Wastes and their Disposal administered by the United Nations Environment Programme (UNEP) http://www.unep.ch/basel/index.html</p> <p>See also the US EPA web-page on Solid Waste: http://www.epa.gov/osw/index.htm</p> <p>EU Directive on Hazardous Waste http://europa.eu.int/eur-lex/en/lif/dat/1991/en_391L0689.html</p>	

Waste_S1	Contaminated land sites	DPSEEA
<i>Issue</i>	Waste and Contaminated Lands	
<i>Definition of indicator</i>	Estimated number of contaminated and potentially contaminated sites as a result of pollution or dumping of hazardous waste in unsuitable sites/land areas, where no measures are taken to prevent harm to human health and environment due to exposure to hazardous waste.	
<i>Underlying definitions and concepts</i>	<p>The indicator is based on the following definitions:</p> <p>Hazardous waste: waste materials (i.e. materials which are considered no longer to have value or utility and which are thus to be disposed of), which pose dangers to human health in the event of either long- or short-term exposures either to the wastes themselves or their decay products. Exposure may occur either directly (e.g. through contact with the waste) or indirectly e.g. via seepage into soil, groundwater or surface water, release into the atmosphere or accumulation in the food chain.</p> <p>Contaminated site: land which has been affected, either on the surface or at depth, by pollutants due to inappropriate management or dumping of hazardous waste (e.g. organic or inorganic chemicals, radioactive). The pollution is likely to persist (i.e. for periods of several years or decades) and may have adverse effects on the environment and human health.</p>	
<i>Specification of data needed</i>	Total number of contaminated and potentially contaminated sites	
<i>Data sources, availability and quality</i>	<p>For many developed countries data are available. EEA (ETC/ Terrestrial environment) is currently establishing a database.</p> <p>For developing countries difficulties may be encountered to obtain data</p>	
<i>Computation</i>	See definition	
<i>Units of measurement</i>	Number of sites	
<i>Scale of application</i>	National to international	
<i>Interpretation</i>	The indicator needs further elaboration in terms of ranking of the contaminated lands. Radioactive contamination is an important consideration in the case of mixed contamination of soil relevant to military sites	
<i>Linkage with the other indicators</i>	<p>Pressure: <i>Hazardous waste generation</i></p> <p>State: Contaminated land sites</p> <p>Action: <i>Hazardous waste policies</i></p>	
<i>Related data, indicators</i>	<p>UN Indicators of sustainable development: http://www.un.org/esa/sustdev/isd.htm</p> <p>For updated Guidelines and Methodologies (2001) see: http://www.un.org/esa/sustdev/indisd/indisd-mg2001.pdf</p> <p>OECD Waste management programme: http://www1.oecd.org/ehs/Waste</p> <p>See also the US EPA Programme on Land Disposal Restrictions http://www.epa.gov/epaoswer/hazwaste/ldr</p> <p>See also Urban Indicators – compilations from international lists: http://www.ceroi.net</p>	

Waste_A1	Hazardous waste policies	DPSEEA
<i>Issue</i>	Waste and Contaminated Lands	
<i>Definition of indicator</i>	Composite index on the levels of hazardous waste policies and regulations	
<i>Underlying definitions and concepts</i>	<p>Hazardous waste: waste materials (i.e. materials which are considered no longer to have value or utility and which are thus to be disposed of), which pose dangers to human health in the event of either long- or short-term exposures either to the wastes themselves or their decay products. Exposure may occur either directly (e.g. through contact with the waste) or indirectly e.g. via seepage into soil, groundwater or surface water, release into the atmosphere or accumulation in the food chain.</p> <p>Hazardous waste policy and regulations: formal legislation, acts of parliament or stated government intentions aimed at reducing the production of hazardous wastes (waste minimisation), at controlling the storage, transport, import/export and disposal of hazardous wastes (waste management).</p>	
<i>Specification of data needed</i>	Evidence for existence of effective policies and measures for hazardous waste minimisation and management.	
<i>Data sources, availability and quality</i>	Information on the existence, scope and rigour of hazardous waste policies can best be obtained by scrutiny of the relevant legislation.	
<i>Computation</i>	<p>The indicator can be computed by ranking the strength and scope of the legislation as follows:</p> <p>Consistency of the national definition and list of hazardous wastes with the EU Council Directive 91/689/EEC of 12 December, 1991 (Annexes IA, IB, II) <i>0- Partly compliant or not compliant</i></p> <p>Guidance/voluntary procedures for hazardous waste production, storage, transport, export/import and disposal, for some hazardous wastes <i>1 – if the condition is clearly stated for some aspects;</i> <i>2 – if the condition is clearly stated for most aspects;</i></p> <p>Guidance/voluntary procedures for hazardous waste production, storage, transport, export/import and disposal, covering most hazardous waste: <i>3 – if the condition is clearly stated for some aspects;</i> <i>4 – if the condition is clearly stated for most aspects;</i></p> <p>Mandatory controls on some aspects of hazardous waste production, storage, transport, export/import and disposal, covering a limited range of hazardous wastes; clearly stated voluntary agreements or guidelines on most other hazardous wastes <i>5 – clearly stated, partly/ not implemented or enforced;</i> <i>6 – implemented and enforced</i></p> <p>Mandatory controls on all aspects of hazardous waste production, storage, transport, export/import and disposal, covering a limited range of hazardous wastes; clearly stated voluntary agreements or guidelines on most other hazardous wastes <i>7 – if the mandatory condition is clearly stated, partly/ not implemented or enforced;</i> <i>8 – if the mandatory condition is implemented and enforced</i></p> <p>Mandatory controls on all aspects of hazardous waste production, storage, transport, export/import and disposal, covering a wide range of hazardous wastes <i>9 – if the condition is clearly stated, partly/ not implemented or enforced;</i> <i>10 – if the condition is implemented and enforced</i></p> <p><i>Note:</i> as with all such scoring systems, qualitative judgements need to be made about which category is the most appropriate in any given situation, since the classes are not wholly exclusive or all-encompassing.</p>	
<i>Units of measurement</i>	Ordinal scale (0-10)	

<i>Scale of application</i>	National to international.
<i>Interpretation</i>	This indicator provides a simple, yet reasonable robust measure of the scope, strength and effectiveness of policies and legislation on hazardous wastes. In general, the higher the score achieved, the more effective are the policies. In interpreting the indicator, however, it is important to bear in mind both the multivariate nature of hazardous waste policies (the nature of the policy instruments, their scope and the range of pollutants covered) and the simple, qualitative character of the indicator. The existence of legislation, also, does not necessarily translate into effective action: policies also need to be applied and enforced.
<i>Linkage with the other indicators</i>	Pressure: <i>Hazardous waste generation</i> State: <i>Contaminated Land sites, Exceedance of WHO drinking water guidelines for chemical parameters</i> Exposure: <i>Access to safe drinking water</i> Action: <i>Hazardous waste policies</i>
<i>Related data, indicators</i>	UN Indicators of sustainable development: http://www.un.org/esa/sustdev/isd.htm For updated Guidelines and Methodologies (2001) see: http://www.un.org/esa/sustdev/indisd/indisd-mg2001.pdf OECD Waste Management Programme: http://www1.oecd.org/ehs/Waste/achieve.htm EU Directive on Hazardous Waste: http://europa.eu.int/eur-lex/en/lif/dat/1991/en_391L0689.html

Rad_E1	Incidence of skin cancer	DPSEEA
<i>Issue</i>	Radiation	
<i>Definition of indicator</i>	Annual incidence rate of skin cancer	
<i>Underlying definitions and concepts</i>	The indicator is based on the following definitions: Skin cancer: a malignant neoplasm ICD 10 code C43 – C44 Total population: total resident population	
<i>Specification of data needed</i>	Annual number of skin cancer cases ICD10 code C43 – C44 Total population	
<i>Data sources, availability and quality</i>	Data on skin cancer cases should be available from the national cancer registries or from specialised medical services Data on total population are usually available from national censuses and should be reliable	
<i>Computation</i>	$100000 * (I_{sc} / P_t)$ where I_{sc} is the annual number of skin cancer cases and P_t is the total population	
<i>Units of measurement</i>	Number of cases per hundred thousand of population	
<i>Scale of application</i>	Regional to national	
<i>Interpretation</i>	This indicator can be interpreted very cautiously as indirect health effect to exposure to UV radiation. The relationship is however rather complex: it is fundamentally affected by lifestyle and behavioural factors, such as time spent outdoor, choice of clothing and use of UV protection. Skin colour and nevus are also important.	
<i>Linkage with the other indicators</i>		
<i>Related data, indicators</i>	International data available at WHO-IARC Cancer Mortality database for ICD 10 code C43 only: http://www-depdb.iarc.fr/who/menu.htm GLOBAL SOLAR UV INDEX http://www.who.int/inf-pr-1998/en/pr98-53.html http://www.who.int/inf-fs/en/fact133.html INTERSUN The Global UV Project http://www.who.int/peh-uv/ See also Health for All (HFA) Indicators for monitoring and evaluation of Health 21 http://www.who.dk/hfadb	

Rad_A1	Effective environmental monitoring of radiation activity	DPSEEA
<i>Issue</i>	Radiation	
<i>Definition of indicator</i>	Existence of effective environmental monitoring of radiation activity in compliance with national and international quality assurance programs	
<i>Underlying definitions and concepts</i>	<p>QA programmes on environmental monitoring will among others set criteria with respect to set-up of the system, monitoring frequency, density and sensitivity. As an example – or, if desired, as a reference system – the criteria of the EC draft recommendation on monitoring of the levels of radioactivity in the environment are given.</p> <p>Density: The EC recommends a sparse and a dense network with different sampling frequency for each media, among others ‘representative for various geographical regions and taking population distribution into account’</p> <p>Frequency: dense network: ≤quarterly; sparse: ≤monthly; ambient dose: continuously.</p> <p>Sensitivity: detection limit < reporting level</p>	
<i>Specification of data needed</i>	<p>Accurate information on the density of monitoring networks and their operation (monitoring frequency and sensitivity in relation to reporting levels, etc)</p> <p>One may score for each of the following media (N=5):</p> <ul style="list-style-type: none"> – airborne particles – ambient dose rate – mixed diet and milk (i.e. a representative food package) – surface water – drinking water <p>And on various aspects (N=5):</p> <ul style="list-style-type: none"> – density of the network – frequency of measurements – sensitivity in comparison with reporting levels – monitoring on a routine basis and not only in case of an accident – successful participation in international inter-comparisons <p>One may score each of these aspects for the sparse and the dense network (N=2)</p>	
<i>Data sources, availability and quality</i>	The organisations (national or otherwise) responsible for environmental surveillance. Doing the survey may be hampered when different organisations are responsible for each of the sampling media.	
<i>Computation</i>	Sum of scores	
<i>Units of measurement</i>	Ordinal score (0 – 25; and 0 – 50 when two networks with different density are distinguished)	
<i>Scale of application</i>	Mainly national	
<i>Interpretation</i>	<p>This indicator provides a useful measure of the attention given to monitoring of radiation levels, and as such shows how seriously this issue is being taken. The presence of enhancements is not a condition for the existence of a monitoring programme given the fact it has to be considered an early warning and follow-up system in case of accidents (which may have a trans-boundary effect).</p> <p>The indicator does not describe the actual radiation risk but the level of compliance with standards.</p>	
<i>Linkage with the other indicators</i>	Whereas this one deals with efforts spent on controlling exposure the complementary one is on controlling the sources.	
<i>Related data, indicators</i>	<p>Commission Recommendation on the application of Article 36 of the Euratom Treaty concerning the monitoring of the levels of radioactivity in the environment for the purpose of assessing the exposure of the population as a whole:</p> <p>http://europa.eu.int/comm/environment/radprot/legislation/00473.pdf</p>	

WatSan_P1	Waste water treatment coverage	DPSEEA
<i>Issue</i>	Water and Sanitation	
<i>Definition of indicator</i>	Percentage of the population served by sewerage connected to a waste water treatment facility of at least biological (secondary) grade or whose waste water is safely disposed of locally	
<i>Underlying definitions and concepts</i>	<p>Waste water: fluid waste originating from household activities associated with daily human life, e.g. bathing, washing, cleaning, nutrition, food preparation, laundering, personal hygiene</p> <p>Household: a single housing unit (e.g. a house or apartment) intended for permanent residence</p> <p>Waste water treatment: any process that reduces the amount of the suspended solids, and dissolved compounds and micro-organisms harmful to the environment and/or the human health in a waste water. Only treatment in facilities operating with the approval of environmental and/or health authorities will be considered.</p> <p>Secondary (biological) treatment: procedure applying forced aeration/oxygenation or biological processes for enhanced biodegradation of organic compounds and other oxidizable compounds (e.g. ammonium).</p> <p>Safe supplementary/local waste water disposal: any authorised disposal of waste water into soil or treatment ponds that does not result in the prolonged accumulation of materials harmful to the environment/human health</p>	
<i>Specification of data needed</i>	<p>The number of population served by sewerage connected to a secondary waste water treatment facility or a safe local waste water disposal system</p> <p>The total number of population in a community or region considered</p>	
<i>Data sources, availability and quality</i>	<p>Data may be available from relevant administrative authorities, both national and local. In case only household based data are available, it can be converted to population using the average number of people living in a household in the relevant region.</p> <p>In international level data are available from OECD and Eurostat (for the EU and accession countries with exception of Latvia and Romania).</p>	
<i>Computation</i>	<p>The indicator W can be computed as: $W = 100 * P_w / P$ where:</p> <p>P = the total number of population in the community or area under consideration</p> <p>P_w = the number of population served by sewerage connected to a secondary (biological) waste water treatment facility or a safe local waste water disposal system</p>	
<i>Units of measurement</i>	Percentage	
<i>Scale of application</i>	Local (urban) to national, international	
<i>Interpretation</i>	High percentage => lower environmental load and direct or indirect health risk from exposure to untreated or partially treated wastewater. Compared to national targets => progress to achieve them	
<i>Linkage with the other indicators</i>	<p>Pressure: Waste water treatment coverage</p> <p>State: <i>Exceedance of recreational water limits for microbiological parameters; Exceedance of WHO guidelines for microbiological parameters</i></p> <p>Exposure: <i>Access to adequate sanitation; Access to safe drinking water</i></p> <p>Effect: <i>Diarrhoea morbidity in children; Outbreaks of water-borne diseases</i></p> <p>Action: <i>Effective monitoring of recreational water</i></p>	
<i>Related data, indicators, legislation</i>	<p>Water Supply and Sanitation Sector Questionnaire WHO/UNICEF Global Assessment 2000: http://www.who.int/water_sanitation_health/Globassessment/GlobalTOC.htm</p> <p>UN Centre for Human Settlements The Global Urban Observatory Database: http://www.unhabitat.org/guo/index1.asp</p> <p>See also Core Set of Environmental Indicators http://ceroi.net/ind/matrix.asp</p> <p>The EEA indicators: http://themes.eea.eu.int/Specific_media/water/indicators</p> <p>WHO-UNECE Protocol on Water and Health, Article 6: http://www.internationalwaterlaw.org/RegionalDocs/UN_ECE_Protocol.htm (or http://www.euro.who.int/Document/Peh-ehp/ProtocolWater.pdf)</p> <p>EU Directive on Urban Wastewater Treatment: http://europa.eu.int/comm/environment/water/water-urbanwaste/amendment.html</p> <p>OECD Environmental indicators http://www.oecd.org/pdf/M00019000/M00019613.pdf</p>	

WatSan_S1	Exceedance of recreational water limit values for microbiological parameters	DPSEEA
<i>Issue</i>	Safe recreation water environment: does NOT include enclosed water i.e. swimming pools	
<i>Definition of indicator</i>	<p>Proportion of the bathing water analyses exceeding the current imperative and guideline values specified by the European Commission under the bathing water Directive (76/160/EEC) or the US EPA over the bathing season. These are:</p> <p>For the EC: Total coliforms: Guide 80%<500 per 100 ml Imperative 95%<10,000 per 100 ml</p> <p>Faecal coliforms Guide 80%<100 per 100 ml Imperative 95%<2000 per 100 ml</p> <p>Faecal streptococci Guide 100 per 100 ml No imperative standard</p> <p>For the US EPA: Enterococci 35 per 100 ml (marine, logarithmic average for a period of 30 days of at least 5 samples) 33 per 100 ml (freshwater, logarithmic average for a period of 30 days of at least 5 samples) Reported separately for (a) freshwater and (b) marine water</p>	
<i>Underlying definitions and concepts</i>	<p>Number of bathing water samples exceeding the EC standards or US EPA standards for the parameters: <i>total coliforms, faecal coliforms, faecal streptococci, enterococci per 100 ml</i></p> <p>Total number of samples made by an official monitoring agency over a given time period (one bathing season) at a specified point.</p> <p>Frequency of monitoring defined into the following categories: none, minimum (fortnightly), above minimum (more frequent than fortnightly). The EC requirements are samples to be taken fortnightly.</p> <p>The monitoring of water quality by official agencies implies: The provision of relevant data, and its use for policy and management purposes by the agencies concerned Selection of the number and location of sampling points, and minimum sampling frequency per designated bathing site are uniform across the whole scale of application of monitoring The implementation of quality assurance system in the monitoring laboratories</p>	
<i>Specification of data needed</i>	<p>Number of valid (a) freshwater and (b) marine water bathing measurements taken from a specified point of a designated bathing site per bathing season</p> <p>Number of analyses with presence of <i>faecal coliforms and / or faecal streptococci, (total coliforms, enterococci)</i> for (a) freshwater and (b) marine water sites</p> <p>Category of frequency of monitoring</p>	
<i>Data sources, availability and quality</i>	<p>Accurate information on the number of valid bathing water measurements taken from a specified point of a designated bathing site and the results should be available from the relevant monitoring agency and should be reliable given the above mentioned assumptions</p>	
<i>Computation</i>	<p>The indicator can be computed as:</p> $(E / T) * 100$ <p>where E is the number of analyses exceeding the EC or US EPA standards for <i>faecal coliforms and / or faecal streptococci</i>, and T is the total number of the samples analysed per bathing season</p>	
<i>Units of measurement</i>	Percentage	
<i>Scale of application</i>	Mainly local, though at broader scales considerable problems with data comparability	
<i>Interpretation</i>	<p>It is a measure of the microbiological quality of bathing waters. Data on exceedances may be subject to large margins of error due to inconsistencies in reporting, sampling practices.</p> <p><i>NB</i> The WHO guideline values follow a risk management approach and should be interpreted in light of regional and or local factors. It is up to regulatory authorities to define “acceptable” or tolerable excess disease and for national authorities to apply these principles for risk management under their specific conditions.</p>	

<p><i>Linkage with the other indicators</i></p>	<p>Pressure: <i>Waste water treatment coverage</i> State: <i>Exceedance of recreational water limits for microbiological parameters; Exceedance of WHO guidelines for microbiological parameters</i> Effect: <i>Outbreaks of water-borne diseases, Diarrhoea morbidity in children</i> Action: <i>Effective monitoring of recreational water</i></p>
<p><i>Related data, indicators, legislation</i></p>	<p>See the EU bathing water quality report for 2000 (annually) at http://www.europa.eu.int/water/water-bathing/report.html Monitoring Bathing Waters (J. Bartram, G. Rees Eds), WHO Geneva, 1999 abstract at: http://www.who.int/water_sanitation_health/Water_quality/bathing.pdf WHO 1999 Health-based monitoring of recreational waters: the feasibility of a new approach (the Annapolis Protocol). Outcome of an expert consultation, Annapolis, USA, co-sponsored by USEPA: http://www.who.int/water_sanitation_health/Water_quality/recreat.htm or the report at: http://www.who.int/water_sanitation_health/Recreational_water/Annapolis.pdf WHO 1998 Guidelines for safe recreational water environment: Vol. Coastal and Freshwaters. Geneva, WHO (Unpublished document EOS/Draft/98.14) at: http://www.who.int/water_sanitation_health/Recreational_water/eosdraft9814.htm Bathing water quality in the EU Directive 76/160/EEC at: http://www.europa.eu.int/water/water-bathing/directiv.html</p>

WatSan_S2	Exceedance of WHO drinking water guidelines for microbiological parameters	DPSEEA
<i>Issue</i>	Water and sanitation	
<i>Definition of indicator</i>	Proportion of drinking water samples with <i>E coli</i> or <i>faecal streptococci</i> exceeding the guideline value of 0 / 100 ml water over a given time period	
<i>Underlying definitions and concepts</i>	<p>Number of drinking water samples exceeding the limit value (0 / 100 ml) for the parameters <i>E coli</i> or <i>faecal streptococci</i></p> <p>Total number of samples analysed for microbiological parameters specified above by an official monitoring agency and/or producer over a given time period (one year) at a specified point of the supply chain</p> <p>A single sample with one microbiological parameter not in compliance with WHO guidelines is reported as a sample not in compliance</p> <p>The monitoring of water quality by official agencies implies:</p> <p>The provision of relevant data, and its use for policy and management purposes by the agencies concerned</p> <p>Selection of the water supplies liable to reporting, and minimum sampling frequency are uniform across the whole scale of application of monitoring</p> <p>The implementation of the international standards for <i>E. coli</i> and <i>faecal streptococci</i> (ISO 9308-1 and ISO 7899-1-2) in the monitoring laboratories</p> <p>Summaries can be given such as type of supply (public, individual) or category (number of population supplied), type of source (ground, surface water)</p>	
<i>Specification of data needed</i>	<p>Total number of samples for microbiological parameters taken from a specified point of the supply chain over the previous year</p> <p>Number of samples with presence of <i>E coli</i> or <i>faecal streptococci</i></p>	
<i>Data sources, availability and quality</i>	Accurate information on the number of drinking water samples taken from a specified point of the supply chain and the results should be available from the relevant monitoring agency or from the producer and should be reliable given the above mentioned assumptions	
<i>Computation</i>	<p>The indicator can be computed as:</p> $(E / T) * 100$ <p>where E is the number of samples with presence of <i>E coli</i> or <i>faecal streptococci</i>, and T is the total number of the samples analysed for EC/FS per year</p>	
<i>Units of measurement</i>	Percentage	
<i>Scale of application</i>	Local to regional, at broader scales some problems with data comparability may occur	
<i>Interpretation</i>	<p>It is a measure of the state of drinking water microbiological safety, especially under conditions of inadequate water, hygiene and basic sanitation. Data on exceedances may be subject to large margins of error due to inconsistencies in reporting, sampling practices, analytical methods used, etc.</p> <p>Interpretation of the indicator can be assisted by (dis)/aggregating the data by type of supply (public, individual), type of source (ground, surface water); point of taking the measurements, category (number of population supplied).</p>	
<i>Linkage with the other indicators</i>	<p>Pressure: <i>Waste water treatment coverage</i></p> <p>State: Exceedance of WHO drinking water guidelines for microbiological parameters; <i>Exceedance of WHO drinking water guidelines for chemical parameters</i></p> <p>Exposure: <i>Access to safe drinking water; Access to adequate sanitation;</i></p> <p>Effect: <i>Diarrhoea morbidity in children; Outbreaks of water-borne diseases</i></p> <p>Action: <i>Effective monitoring of recreational water</i></p>	
<i>Related data, indicators, legislation</i>	<p>WHO 1993-1997 Guidelines for drinking water quality. Vol. 1-3. Geneva: WHO: http://www.who.int/water_sanitation_health/Water_quality/drinkwat.htm</p> <p>For Council Directive 98/83/EC on the quality of water intended for human consumption, see http://europa.eu.int/comm/environment/water/water-drink/index_en.html</p> <p>Implementing the Protocol on Water and Health: http://www.euro.who.int/eprise/main/who/progs/wsn/MainActs/20020114_2 and http://www.euro.who.int/document/e74602.pdf</p>	

WatSan_S3	Exceedance of WHO drinking water guidelines for chemical parameters	DPSEEA
<i>Issue</i>	Water and Sanitation	
<i>Definition of indicator</i>	Proportion of the drinking water analyses with chemical parameters exceeding the respective WHO guideline values over a given time period	
<i>Underlying definitions and concepts</i>	<p>Number of drinking water analyses exceeding the corresponding limit value for the enlisted chemical parameters: <u>inorganics</u> – arsenic, lead, fluoride, nitrates, nitrites, and <u>organics</u> – benzene, organochlorine pesticides, VOCs, trihalomethanes.</p> <p>Total number of analyses for chemical parameters made by an official monitoring agency and/or producer over a given time period (one year) at a specified point of the supply chain</p> <p>The monitoring of water quality by official agencies implies: The provision of relevant data, and its use for policy and management purposes by the agencies concerned Selection of the water supplies liable to reporting, and minimum sampling frequency are uniform across the whole scale of application of the monitoring The implementation of quality assurance system in the monitoring laboratories and fulfilment of the requirements for analytical methods e.g. GLP Summaries can be given such as type of supply (public, individual) or category (number of population supplied), type of source (ground, surface water)</p>	
<i>Specification of data needed</i>	Number of analyses with parameters from the inorganics and organics list exceeding the respective WHO drinking water guidelines Total number of analyses for the respective listed chemical parameter taken from a specified point of the supply chain over the previous year	
<i>Data sources, availability and quality</i>	Accurate information on the number of valid drinking water measurements taken from a specified point of the supply chain and the results should be available from the relevant monitoring agency or from the producer and should be reliable given the above mentioned assumptions	
<i>Computation</i>	The indicator can be computed as: $(E / T) * 100$ where E is the number of analyses in which the respective guideline value was exceeded, and T is the total number of the samples analysed per year	
<i>Units of measurement</i>	Percentage	
<i>Scale of application</i>	Local to international	
<i>Interpretation</i>	It is a potential measure of the state of the drinking water contamination, especially under conditions of inadequate water source protection, water hygiene and basic sanitation. Data on exceedances may be subject to large margins of error due to inconsistencies in reporting, sampling practices, analytical techniques (especially for organics).	
<i>Linkage with the other indicators</i>	Pressure: <i>Waste water treatment coverage</i> State: <i>Exceedance of WHO drinking water guidelines for microbiological parameters; Exceedance of WHO drinking water guidelines for chemical parameters</i> Exposure: <i>Access to safe drinking water; Supply from public drinking water supplies; Access to drinking water complying with WHO guideline values; Access to adequate sanitation</i> Effect: <i>Diarrhoea morbidity in children; Outbreaks of water-borne diseases</i> Action: <i>Effective monitoring of recreational water</i>	
<i>Related data, indicators, legislation</i>	WHO 1993-1997 Guidelines for drinking water quality. Vol. 1-3. Geneva: WHO http://www.who.int/water_sanitation_health/Water_quality/drinkwat.htm For Council Directive 98/83/EC on the quality of water intended for human consumption, see http://europa.eu.int/comm/environment/water/water-drink/index_en.html	

WatSan_Ex1	Access to safe drinking water	DPSEEA
<i>Issue</i>	Water and Sanitation	
<i>Definition of indicator</i>	Percentage of the population with continuous access to adequate amount of safe drinking water in the home. Supplementary indicators for various classes of incomplete access can also be inferred.	
<i>Underlying definitions and concepts</i>	<p>Safe drinking water: water which either naturally, or as a result of treatment, is free from any micro-organisms, parasites and substances which, owing to their numbers or concentration, constitute a potential danger to human health (Protocol on Water and Health, Article 4). The safety of drinking water is presumed to hold if its quality complies with the WHO (or equivalent) guideline values in the course of systematic monitoring and is under control of the supplier. Compliance is referred to as in the requirements of Council Directive 98/83/EC on the quality of water intended for human consumption, i.e. water complies with given limit(s) if any non-compliance found has occurred for not more than 30 days on aggregate during the year evaluated and poses no risk to human health. WHO (and equivalent) guidelines consider minimum requirements of monitoring and a number of parameters to be tested: microbiological, operational and aesthetic, chemical including natural physical-chemical features, a range of chemical and radiological contaminants. (see <i>WHO 1993-1997 Guidelines for drinking water quality Vol. 1-3. Geneva: WHO</i>).</p> <p>Access to drinking water in or near the home: access inside the dwelling or in a convenient distance to it defined as a maximum of 15 minutes walking distance each way or < 1000 metres.</p> <p>Continuous access: a supply which operates, without interruption, 24 hours per day</p> <p>Intermittent access: a supply, which operates on a discontinuous basis, e.g. regularly for less than 24 h/day or access outside the ground plot of the dwelling</p> <p>Adequate amount of water: an amount of water, sufficient to meet the needs of the user for drinking and hygiene: the minimum volume required is 20 litres per person per day</p> <p>Total population: total resident population</p>	
<i>Specification of data needed</i>	<p>Number of people without access to adequate amount of drinking water</p> <p>Number of people with intermittent access to drinking water</p> <p>Number of people with continuous access in the home to drinking water the quality of which is not systematically monitored or not complying with the WHO (or other equivalent) guideline values</p> <p>Total population</p>	
<i>Data sources, availability and quality</i>	<p>Data on number of people living in households receiving continuously or intermittently drinking water that is monitored and complying or not complying with WHO (or other equivalent) guideline values or not acceptably monitored may be available from water companies, in some countries also from regional and/or national water or health authorities. Data on the total population should be available through national census statistics</p>	
<i>Computation</i>	<p>The indicator can be computed as:</p> $[P - (N_1 + N_2 + N_3)] / P * 100$ <p>where</p> <p>N_1 is the number of people without access to adequate amount of drinking water;</p> <p>N_2 is the number of people with only intermittent access to drinking water;</p> <p>N_3 is the number of people with continuous access in the home to drinking water the quality of which is not systematically monitored or not complying with the WHO (or other equivalent) guideline values;</p> <p>P is the total population</p> <p>Supplementary indicators for the proportion of various categories without continuous access to adequate amount of safe drinking water in or near the home can be computed individually from the above data as $N_i / P * 100$, where $i = 1$ to 3.</p>	
<i>Units of measurement</i>	Percentage	
<i>Scale of application</i>	Local; sub-national e.g. regions to international	
<i>Interpretation</i>	High percentage => reduced exposure and health risk.	

<p><i>Linkage with the other indicators</i></p>	<p>Pressure: <i>Waste water treatment coverage</i> State: <i>Exceedance of WHO drinking water guidelines for microbiological parameters; Exceedance of WHO drinking water guidelines for chemical parameters</i> Exposure: Access to safe drinking water; <i>Access to adequate sanitation</i> Effect: <i>Diarrhoea morbidity in children; Outbreaks of water-borne diseases</i> Action: <i>Effective monitoring of recreational water</i></p>
<p><i>Related data, indicators, legislation</i></p>	<p>Water Supply and Sanitation Sector Questionnaire WHO/UNICEF Global Assessment 2000: http://www.who.int/water_sanitation_health/Globassessment/GlobalTOC.htm UN Indicators of sustainable development: http://www.un.org/esa/sustdev/isd.htm The Global Urban Observatory Databases: http://www.unhabitat.org/guo/index1.asp Protocol on Water and Health: http://www.unece.org/env/water/text/text_protocol.htm WHO 1993-1997 Guidelines for drinking water quality. Vol. 1-3. Geneva: WHO: http://www.who.int/water_sanitation_health/Water_quality/drinkwat.htm For Council Directive 98/83/EC on the quality of water intended for human consumption, see http://www.europa.eu.int/comm/environment/water/water-drink/index_en.html</p>

WatSan_ Ex2	Access to adequate sanitation	DPSEEA
<i>Issue</i>	Water and Sanitation	
<i>Definition of indicator</i>	Percentage of the population with access to an adequate excreta disposal facilities	
<i>Underlying definitions and concepts</i>	<p>Adequate excreta disposal facilities: a private or shared satisfactory sanitary means providing for the controlled disposal of human excreta in ways which avoid direct human exposure to faeces, or contamination of food and local water supply by raw faeces.</p> <p>Access to adequate excreta disposal facilities: excreta disposal facility either in their dwelling or located within a convenient distance (< 50 metres) from the user's dwelling. This thus includes the urban and rural populations served by connections to conventional public sewers; household systems (pit privies, pour-flush latrines, septic tank, etc); communal toilets; etc.</p> <p>Total population: total resident population</p>	
<i>Specification of data needed</i>	Number of people living in dwellings with access to adequate excreta disposal facilities Total population	
<i>Data sources, availability and quality</i>	Data on excreta disposal facilities may be available from relevant administrative authorities (e.g. public works, sanitary works or housing departments). In some countries, data are also available via national censuses. Where such sources do not exist or are inadequate, special surveys will be necessary. Data on total population are available from national censuses	
<i>Computation</i>	The indicator can be computed as: $100 * (P_e / P_t)$ where P_e is the number of people living in dwellings with access to adequate excreta disposal facilities, and P_t is the total population	
<i>Units of measurement</i>	Percentage	
<i>Scale of application</i>	Regional to international	
<i>Interpretation</i>	High percentage => low risks to health from exposures to infectious agents. Compared to national targets => progress to achieving them. The availability of a facility does not always translate into their proper utilisation and improved hygiene!	
<i>Linkage with the other indicators</i>	<p>Pressure: <i>Wastewater treatment coverage</i></p> <p>State: <i>Exceedance of recreational water limits for microbiological parameters; Exceedance of WHO guideline values for microbiological parameters; Exceedance of WHO guideline values for chemical parameters</i></p> <p>Exposure: <i>Access to safe drinking water; Access to adequate sanitation</i></p> <p>Effect: <i>Diarrhoea morbidity in children; Outbreaks of water-borne diseases</i></p> <p>Action: <i>Effective monitoring of recreational water</i></p>	
<i>Related data, indicators, legislation</i>	Water Supply and Sanitation Sector Questionnaire WHO/UNICEF Global Assessment 2000: http://www.who.int/water_sanitation_health/Globassessment/GlobalTOC.htm Protocol on Water and Health: http://www.unece.org/env/water/text/text_protocol.htm UN Indicators of sustainable development: http://www.un.org/esa/sustdev/isd.htm See the UNICEF programme on Water, Environment and Sanitation Technical Guidelines: http://www.unicef.org/programme/wes/pubs/glines/water.htm	

WatSan_E1	Outbreaks of water-borne diseases	DPSEEA
<i>Issue</i>	Water and Sanitation	
<i>Definition of indicator</i>	Number of outbreaks of water-borne diseases and total number of cases reported separately for drinking water and recreational waters	
<i>Underlying definitions and concepts</i>	<p>Water-borne diseases - diseases which arise from the contamination of water by human or animal faeces or urine infected by pathogenic viruses, bacteria or protozoa, or from the contamination of water by chemical substances, and which are directly transmitted when the water is drunk or used in the preparation of food, or for recreational purposes.</p> <p>Water-borne diseases may be separated from several other categories of diseases, e.g.:</p> <ul style="list-style-type: none"> - Water-washed diseases - caused by poor personal hygiene and skin or eye contact with contaminated water; include scabies, trachoma and flea, lice and tick-borne diseases. - Water-based diseases: caused by parasites found in intermediate organisms living in water; include dracunculiasis, schistosomiasis and other helminths. - Water-related diseases - caused by insect vectors which breed in water; include dengue, filariasis, malaria, onchocerciasis, trypanosomiasis and yellow fever. - Water-dispersed diseases - infections whose agents proliferate in fresh water and enter the human body through the respiratory tract (e.g. Legionella) <p>Outbreak: an occurrence of two or more linked cases of the same illness, or an increase in the number of observed cases over the respected number.</p> <p>Total number of cases: total number of people affected during the survey period</p>	
<i>Specification of data needed</i>	<p>Number of outbreaks of water-borne diseases within a specified period (e.g. a year)</p> <p>Total number of people affected by water-borne diseases</p> <p>NB: Sometimes the total number of people affected may include individual cases as well</p>	
<i>Data sources, availability and quality</i>	<p>Data on the number of outbreaks of water-borne diseases can be derived from a variety of sources, including:</p> <ul style="list-style-type: none"> Routine passive case reporting by health care workers (based on detection and investigation of the reportable outbreak cases) Community based surveillance programmes Special surveys Analysis of hospital admissions or GP statistics and records <p>All these are likely to lead to significant under-estimation of the number of outbreaks, due to incomplete referral and reporting. Serious inconsistencies in the estimates also occur between different areas or reporting periods because of variations in referral rates, in diagnosis and in reporting methods and accuracy.</p> <p>Data on the total resident population can usually be obtained from national censuses.</p>	
<i>Computation</i>	The results for drinking water and recreational water should be presented separately.	
<i>Units of measurement</i>	Number	
<i>Scale of application</i>	Local to international, though at broader scales interpretation is limited by problems of data consistency and completeness	
<i>Interpretation</i>	Careful, because of the inherent inconsistencies and inaccuracies in the available data.	
<i>Linkage with the other indicators</i>	<p>Pressure: <i>Waste water treatment coverage</i></p> <p>State: <i>Exceedance of WHO drinking water guidelines; Exceedance of recreational water limit values for microbiological parameters</i></p> <p>Exposure: <i>Access to safe drinking water; Access to adequate sanitation</i></p> <p>Effect: <i>Diarrhoea morbidity in children; Outbreaks of water-borne diseases</i></p> <p>Action: <i>Effective monitoring of recreational water</i></p>	
<i>Related data, indicators, legislation</i>	<p>WHO fact sheet N^o 112 on water, sanitation and health: http://www.who.int/inf-fs/en/fact112.html</p> <p>Protocol on Water and Health: http://www.unece.org/env/water/text/text_protocol.htm</p> <p>Implementing the Protocol on Water and Health: http://www.euro.who.int/eprise/main/who/progs/wsn/MainActs/20020114_2 and: http://www.euro.who.int/document/e74602.pdf</p> <p>Computerised Information System for Infectious Diseases http://cisid.who.dk/Csr/outbreaks/</p>	

WatSan_E2	Diarrhoea morbidity in children	DPSEEA
<i>Issue</i>	Water and Sanitation; Food safety	
<i>Definition of indicator</i>	Number of cases reported to national PH surveillance system out of the total number of children under 5 years in the area of concern	
<i>Underlying definitions and concepts</i>	<p>Diarrhoea: three or more watery stools in a 24-hour period, a loose stool being one that would take the shape of the container (WHO, 1996) or local definition of diarrhoea</p> <p>Episode of diarrhoea: An episode of diarrhoea begins with a 24-hour period with three or more loose or watery stools. An episode of diarrhoea is considered to have ended after 48 hours without three or more loose watery stools within a 24-hour period.</p> <p>Incidence of diarrhoea morbidity: total number of episodes of diarrhoea during a 1-year period amongst the children surveyed.</p> <p>Total population of children under five years of age: number of children less than five years of age in the survey, at the time of the survey.</p>	
<i>Specification of data needed</i>	Data on the number of episodes of diarrhoea among children under five years of age Population data for total number of children under five years of age	
<i>Data sources, availability and quality</i>	Morbidity data for diarrhoea disease does not tend to be collected on a routine basis. Data have to be obtained by <i>special surveys</i> or from notification systems. The later ones, report mostly cases in children under 2 years of age.	
<i>Computation</i>	<p>The indicator can be computed as:</p> I_c / P_c <p>Where I_c is the incidence of diarrhoea in children under five years of age in the survey, and P_c is the total number of children under five years of age in the survey.</p>	
<i>Units of measurement</i>	Number of cases per child per year	
<i>Scale of application</i>	Local to international; although application at broader scales may be limited by problems of data consistency and completeness	
<i>Interpretation</i>	<p>It is a measure of health status of children, especially under conditions of inadequate water or food hygiene and basic sanitation. Data on incidence of diarrhoea are also subject to large margins of error due to inconsistencies in reporting, definitions, and in lack of harmonised surveillance tools.</p> <p>A well-designed population representative survey combining several data items and a development of methodology is required.</p>	
<i>Linkage with the other indicators</i>	<p>1) Water and sanitation: Pressure: <i>Wastewater treatment coverage</i> State: <i>Exceedance of recreational water limits for microbiological parameters; Exceedance of WHO guideline values for microbiological parameters; Exceedance of WHO guideline values for chemical parameters</i> Exposure: <i>Access to safe drinking water; Access to adequate sanitation</i> Effect: Diarrhoea morbidity in children; Outbreaks of water-borne diseases Action: <i>Effective monitoring of recreational water</i></p> <p>2) Food safety: Exposure: <i>Potential exposure to chemical hazards monitored in food</i> Effect: <i>Outbreaks of food-borne illness, Incidence of food-borne illness; Diarrhoea morbidity in children</i></p>	
<i>Related data, indicators, legislation</i>	<p>WHO: http://www.who.int/water_sanitation_health/, Water Supply and Sanitation Sector Questionnaire WHO/UNICEF Global Assessment 2000: http://www.who.int/water_sanitation_health/Globassessment/GlobalTOC.htm See also WHO, Geneva about children's environmental health: http://www.who.int/peh/ceh/activities_indicators.htm Environmental Burden of Disease study http://www.who.int/peh/burden/burdenindex.htm</p>	

WatSan_A1	Effective monitoring of recreational water	DPSEEA
<i>Issue</i>	Safe recreation water environment: does NOT include enclosed water i.e. swimming pools	
<i>Definition of indicator</i>	Proportion of the bathing waters that are monitored and subject to systematic control (designated bathing waters) Reported separately for (a) freshwater and (b) marine water	
<i>Underlying definitions and concepts</i>	Bathing waters bathing sites where bathing is regularly practised by a large number of bathers. Large number is defined as more than 100 per day in average of at least 10 summer bathing season's days Monitoring of water quality of bathing water implies regular and systematic quality check with reference to legally binding limit values performed by a relevant authority or other competent agency during the locally relevant bathing season. Implementation of quality assurance system in the monitoring laboratories is included. Bathing water subject to systematic control means bathing sites where the relevant authority have recourse to measures to prevent possible health damage resulting from unsafe bathing water quality. These are informing the public on the danger, banning bathing if necessary and running water quality reclamation programmes, etc.	
<i>Specification of data needed</i>	Number of bathing waters (sites) in the relevant territorial unit Number of bathing waters (sites) under monitoring and control in the same unit (designated bathing waters)	
<i>Data sources, availability and quality</i>	Accurate information on the number of all bathing waters and the designated ones should be available mostly from the relevant health or environmental authority.	
<i>Computation</i>	The indicator can be computed as: $(D/B) * 100$ where D is the number of designated bathing waters, and B is the total number of the bathing waters (sites) These data should be separately given for freshwaters and marine waters	
<i>Units of measurement</i>	Percentage	
<i>Scale of application</i>	Regional to international although the latter may give rise to comparability problems due to possibly different water quality limit values and sets of control instruments.	
<i>Interpretation</i>	It is a measure of the control of the relevant authorities over bathing water safety regarding to health related quality issues. NB Use of internationally agreed limit values, monitoring principles and control measure instruments should be encouraged.	
<i>Linkage with the other indicators</i>	Pressure: <i>Wastewater treatment coverage</i> State: <i>Exceedance of recreational water limits for microbiological parameters; Exceedance of WHO guideline values for microbiological parameters; Exceedance of WHO guideline values for chemical parameters</i> Exposure: <i>Access to safe drinking water; Access to adequate sanitation</i> Effect: <i>Outbreaks of water-borne diseases, Diarrhoea morbidity in children</i> Action: Effective monitoring of recreational water	
<i>Related data, indicators, legislation</i>	See the EU bathing water quality report for 2000 (annually) at http://www.europa.eu.int/water/water-bathing/report.html Monitoring Bathing Waters (J. Bartram, G. Rees Eds), WHO Geneva, 1999 abstract at: http://www.who.int/water_sanitation_health/Water_quality/bathing.pdf WHO 1999 Health-based monitoring of recreational waters: the feasibility of a new approach (the Annapolis Protocol). Outcome of an expert consultation, Annapolis, USA, co-sponsored by USEPA: http://www.who.int/water_sanitation_health/Water_quality/recreat.htm or the report at: http://www.who.int/water_sanitation_health/Recreational_water/Annapolis.pdf WHO 1998 Guidelines for safe recreational water environment: Vol. Coastal and Freshwaters. Geneva, WHO (Unpublished document EOS/Draft/98.14) at: http://www.who.int/water_sanitation_health/Recreational_water/eosdraft9814.htm Bathing water quality in the EU Directive 76/160/EEC at: http://www.europa.eu.int/water/water-bathing/directiv.html See also: Water Quality: Guidelines, Standards and Health: Assessment of risk and risk management for water-related infectious diseases (edited by Fewtrell, L. & Bartram, J. for WHO 2001): www.who.int/dsa/justpub/waterquality.pdf	

Food_Ex1	Monitoring chemical hazards in food: potential exposure	DPSEEA
<i>Issue</i>	Food Safety	
<i>Definition of indicator</i>	Dietary exposure assessment to potentially hazardous chemicals monitored in food according to the Global Environmental Monitoring System/Food Contamination Monitoring and Assessment Programme (GEMS / Food)	
<i>Underlying definitions and concepts</i>	<p>Chemical monitoring of food: the routine sampling and analysis of food commodities, including drinking water with the aim of assessing dietary exposure of the population to hazardous chemical contaminants or constituents</p> <p>The monitoring implies: Accreditation of laboratories for the provision of relevant data, and its use for policy and management purposes by the agencies concerned, as well as for the implementation of quality assurance system in the monitoring laboratories and fulfilment of the requirements for analytical methods</p> <p>Contaminant/ food combination: a specific combination of a chemical constituent or contaminant and food, considered to pose potential threat to human health according to the core list of the GEMS/Food yielding altogether 47 combinations (with exclusion of the group of organo-chlorine pesticides).</p> <p>Assessment of dietary intake of chemicals: evaluation of the amount of chemical ingested in diet.</p> <p>Acceptable daily intake (ADI): the amount of chemical, expressed on a mg/kg body weight basis, that can be ingested in daily over a lifetime without incurring any appreciable health risk, and is based on an evaluation of available toxicological data.</p> <p>Provisional Tolerable Weekly Intake (PTWI): the tolerable amount of chemical to be ingested weekly. Provisional values are re-evaluated.</p> <p>Summaries can be given for vulnerable groups (e.g. children), high percentiles food consumption (95th or 97.5th), etc</p>	
<i>Specification of data needed</i>	<p>GEMS/Food regional diets or national food consumption data e.g. Food Balance Sheets</p> <p>Food categorisation system (not harmonised)</p> <p>Body weight estimates (e.g. mean), or standards (e.g. adults 60 kg, children 15 kg)</p> <p>Concentrations of chemicals in food, number of samples analysed and results of the analyses</p> <p>Codex Alimentarius limits for the food chemical concentration</p>	
<i>Data sources, availability and quality</i>	Data on monitoring results should be should be available from the national food control authorities (agencies) and should be reliable given the above mentioned assumptions	
<i>Computation</i>	<p>The indicator can be computed as:</p> $1) \text{ Dietary exposure} = \frac{\text{Food Chemical Concentration} \times \text{Daily Food Consumption}}{\text{Body Weight}}$ <p>where <i>Food Chemical Concentration</i> is either same as Codex limit or weighted average of monitoring results; <i>Daily Food Consumption</i> is the individual or averaged ingested amount of food (in g/day), regional or national estimate, and the <i>Body Weight</i> is standard/ estimate. Some processing factors should be taken into account for the pesticides (for details refer to http://www.who.int/fsf/!pest.pdf).</p> <p>The exposure to the given chemical contaminant can be expressed also as proportion of the ADI, PTWI.</p> <p>2) Weighted average of the monitoring results</p>	
<i>Units of measurement</i>	<p>1) ADI, PTWI units</p> <p>2) Same units as in Codex limits</p>	
<i>Scale of application</i>	From national to international	
<i>Interpretation</i>	<p>It is a measure of the level of contamination and potential exposure. Interpretation of the indicator can be assisted by presenting data for sensitive groups, e.g. children.</p> <p>Codex limit values may be available in electronic forms, food grouping are not harmonised in the Codex: for pesticides, food additives and contaminants different food grouping is used.</p> <p>National and international food consumption estimates are based on different grouping of the food products.</p>	

<i>Linkage with the other indicators</i>	<p>Exposure: Potential exposure to chemical hazards monitored in food</p> <p>Effect: <i>Outbreaks of food-borne illness, Incidence of food-borne illness, Diarrhoea morbidity in children</i></p> <p>Action: <i>General food safety policy; Effectiveness of food safety controls</i></p>
<i>Related data, indicators, legislation</i>	<p>UN Indicators of sustainable development: http://www.un.org/esa/sustdev/isd.htm http://esl.jrc.it/envind/un_meths/UN_ME041.htm</p> <p>For the GEMS/Food list of potentially hazardous chemicals in food to be monitored in food groups see: http://www.un.org/esa/sustdev/indisd/english/chapt6e.htm or</p> <p>For GEMS/ Food contamination monitoring and assessment programme: http://www.who.int/fsf/chemicalcontaminants/index2.htm http://www.who.int/fsf/gems.htm</p> <p>Codex Alimentarius Commission: http://www.codexalimentarius.net</p> <p>Assistance to National Authorities in Developing and Strengthening National Food Safety Programme at: http://www.who.it/docs/fdsaf/GSNFSP6.pdf</p>

Food_E1	Outbreaks of food-borne illness	DPSEEA
<i>Issue</i>	Food Safety	
<i>Definition of indicator</i>	Number of outbreaks of food-borne illness and total number of cases in the outbreaks	
<i>Underlying definitions and concepts</i>	<p>Food: any substance, whether processed, semi-processed or raw which is intended for human consumption, including drinks, chewing gum and any substance which has been used in the manufacture, preparation or treatment of 'food' but excluding cosmetics, tobacco and substances used only as drugs.</p> <p>Food-borne illness: Diseases, usually either infectious or toxic in nature, caused by agents that enter the body through the ingestion of food. (WHO, 2000)</p> <p>Outbreak: an incident in which two or more persons experience a similar illness after ingestion of the same food and where epidemiological evidence implicates the food as a source of illness (WHO/FSF/FOS/97.3 Annex 2, 112)</p> <p>Summaries can be given: by type of foodstuff; causative agent (microbiological, chemical, other agents)</p>	
<i>Specification of data needed</i>	Number of outbreaks per year Total number of cases in the outbreaks per year	
<i>Data sources, availability and quality</i>	Outbreaks of food-borne diseases may be reported by a wide range of individuals and agencies, including the public, the media, health care providers and practitioners, and laboratories dealing with samples referred for analysis. In many countries, statutory notification systems also exist for some types of food-borne disease. Data on outbreaks are often collated by public health authorities. In all cases, however, the quality and the completeness of the data may be variable, because of incomplete reporting (many cases may not be referred to health services) and inconsistencies in diagnosis. Post-hoc investigations of outbreaks may also be undertaken, though these are likely to cover only more severe or unusual outbreaks.	
<i>Computation</i>	See definitions	
<i>Units of measurement</i>	Number of outbreaks Number of cases	
<i>Scale of Application</i>	Local to international, though problems of data consistency and completeness may limit applications at broader scales	
<i>Interpretation</i>	<p>For policy purposes, use the outbreak rate is more informative for interventions: Increase in outbreak rate => deterioration in health conditions and food hygiene. Problems of data quality and availability need to be taken into account. Different methods of monitoring and reporting are liable to give very different results, and care is needed in comparing or pooling data from different sources. Substantial uncertainties in the data also arise due to variations in the diagnosis, reporting methods, health system infrastructure.</p> <p>The episodic nature of food-borne disease outbreaks also means that long-term trends should not be inferred from short runs of data; the clustered nature of outbreaks similarly means that national patterns should not be deduced from local surveys. Only a small proportion of the total number of cases occur as outbreaks</p> <p>The existence and degree of sophistication of the notification system are important for reliable reporting</p>	
<i>Linkage with the other indicators</i>	Exposure: <i>Potential exposure to chemical hazards monitored in food</i> Effect: Outbreaks of food-borne illness ; <i>Incidence of food-borne illness</i> ; <i>Diarrhoea morbidity in children</i> Action: <i>General food safety policy</i> ; <i>Effectiveness of food safety controls</i>	
<i>Related data, indicators, legislation</i>	WHO fact sheet N° 237 on food-borne illness at: http://www.who.int/inf-fs/en/fact237.html WHO European Health For All statistical database (HFA – DB): http://www.who.dk/hfadb or for on-line access for Eastern Europe (EUPHIN – East) at: http://www.euphin.dk/hfa/Phfa.asp WHO Guidelines for investigation and control of food borne disease outbreaks. Geneva: WHO (under preparation) http://www.who.int/fsf/fdstxt1.htm#surveillance ; Health Education in food safety: food safety recommendations for prevention of foodborne infections: http://www.who.int/fsf/fdstxt1.htm#recommendations See also WHO Recommended Surveillance Standard. Second Edition. Geneva/WHO: http://www.who.int/emc-documents/surveillance/whoedscsr992c.html Assistance to National Authorities in Developing and Strengthening National Food Safety Programme at: http://www.euro.who.int/document/fos/gsnfsp6.pdf	

Food_E2	Incidence of food-borne illness	DPSEEA
<i>Issue</i>	Food Safety	
<i>Definition of indicator</i>	Incidence rate for all type of food borne illness, food borne infections and intoxications	
<i>Underlying definitions and concepts</i>	<p>Food: any substance, whether processed, semi-processed or raw which is intended for human consumption, including drinks, chewing gum and any substance which has been used in the manufacture, preparation or treatment of 'food' but excluding cosmetics, tobacco and substances used only as drugs.</p> <p>Food-borne illness: Diseases, usually either infectious or toxic in nature, caused by agents that enter the body through the ingestion of food. (WHO, 2000)</p> <p>Summaries can be given: by type of foodstuff; causative agent (microbiological, chemical, other agents)</p> <p>Total population: total resident population</p>	
<i>Specification of data needed</i>	<p>Number of cases per year within a specified area</p> <p>Total population within the specified area</p>	
<i>Data sources, availability and quality</i>	<p>Outbreaks of food-borne diseases may be reported by a wide range of individuals and agencies, including the public, the media, health care providers and practitioners, and laboratories dealing with samples referred for analysis. In many countries, statutory notification systems also exist for some types of food-borne disease. Data on outbreaks are often collated by public health authorities. In all cases, however, the quality and the completeness of the data may be variable, because of incomplete reporting (many cases may not be referred to health services) and inconsistencies in diagnosis. Post-hoc investigations of outbreaks may also be undertaken, though these are likely to cover only more severe or unusual outbreaks.</p> <p>Data on the total population are obtainable from national censuses.</p>	
<i>Computation</i>	<p>The indicator can be computed as:</p> $100,000 * (N / P_t)$ <p>where N is the total number of cases of food-borne illness per year, and P_t is the total population</p>	
<i>Units of measurement</i>	Number of cases per hundred thousand population	
<i>Scale of Application</i>	Local to international, though problems of data consistency and completeness may limit applications at broader scales	
<i>Interpretation</i>	<p>For monitoring public health use the incidence rate is more informative for the magnitude of the overall problem</p> <p>Problems of data quality and availability need to be taken into account. Different methods of monitoring and reporting are liable to give very different results, and care is needed in comparing or pooling data from different sources. Substantial uncertainties in the data also arise due to variations in the diagnosis, reporting methods, health system infrastructure. The existence and degree of sophistication of the notification system are important for reliable reporting</p>	
<i>Linkage with the other indicators</i>	<p>Exposure: <i>Potential exposure to chemical hazards monitored in food</i></p> <p>Effect: <i>Outbreaks of food-borne illness; Incidence of food-borne illness; Diarrhoea morbidity in children</i></p> <p>Action: <i>General food safety policy; Effectiveness of food safety controls</i></p>	
<i>Related data, indicators, legislation</i>	<p>WHO fact sheet N° 237 on food-borne illness at: http://www.who.int/inf-fs/en/fact237.html</p> <p>WHO European Health For All statistical database (HFA – DB): http://www.who.dk/hfaddb</p> <p>or for on-line access for Eastern Europe (EUPHIN – East) at: http://www.euphin.dk/hfa/Phfa.asp</p> <p>Health Education in food safety: food safety recommendations for prevention of food-borne infections: http://www.who.int/fsf/fdstxt1.htm#recommendations</p> <p>See also WHO Recommended Surveillance Standard. Second Edition. Geneva/WHO: http://www.who.int/emc-documents/surveillance/whocdscsr992c.html</p> <p>WHO Surveillance Programme for Control of Food borne Infections and Intoxications in Europe at http://www.euro.who.int/Foodsafety or at http://www.bgvv.de</p> <p>Assistance to National Authorities in Developing and Strengthening National Food Safety Programme at: http://www.euro.who.int/document/fos/gsnfsp6.pdf</p>	

Food_A1	General food safety policy	DPSEEA
<i>Issue</i>	Food Safety	
<i>Definition of indicator</i>	Composite index for basic food safety measures	
<i>Underlying definitions and concepts</i>	<p>The existence of national food safety policy: national food safety programme as described, for example, in the WHO/ECEH-Rome document: Assistance to National Authorities in Developing and Strengthening their National Food Safety Programmes.</p> <p>The existence of special policy aimed for vulnerable groups: these groups are usually defined as composed by elderly, infants, pregnant women and immunocompromised patients.</p> <p>The existence, implementation and enforcement of specific measures to prevent and combat food-borne emergencies: food-borne outbreaks as defined by WHO</p> <p>The implementation and enforcement of internationally specified food safety management guidelines: Codex Alimentarius Commission: Food Hygiene - Basic Texts. ftp://ftp.fao.org/codex/standard/Fh_basic_e.pdf</p> <p>The existence, implementation and enforcement of food control</p>	
<i>Specification of data needed</i>	The indicator is calculated as a sum of 5 subset variables	
<i>Data sources, availability and quality</i>	<p>For basic components: information on the existence and implementation of food legislation, annual planning and reporting systems</p> <p>For general output components: specific food control reporting systems</p>	
<i>Computation</i>	<p>The index is computed as</p> $SUM(C_i)$ <p>Where C_i is the score for component i</p> <p>The full list of components (C_i) is as follows:</p> <ul style="list-style-type: none"> ▪ Basic components: <ul style="list-style-type: none"> C1 National food safety programme C2 Vulnerable groups (identified and) focused in food safety policy C3 Preparedness and action in food-borne emergencies <p>Scoring: 0- Not existing, not clearly stated 1- Clearly stated, partly implemented 2- Clearly stated, fully implemented</p> <ul style="list-style-type: none"> ▪ General output components: <ul style="list-style-type: none"> C4 Rate of implementation of the set of seven Codex HACCP principles in food establishments with more than 10 employees C5 Percentage of food establishments under regular control <p>Scoring: 0- Less than 50 % 1- 50-80 % 2- more than 80 %</p>	
<i>Units of measurement</i>	Ordinal score 0-10	
<i>Scale of application</i>	National to international	

<i>Interpretation</i>	The indicator provides a general measure of the status and orientation of food control activities and the implementation of internationally recognised HACCP based principles in food control. An increase in the score should be taken as a broad indication of improved capability in taking measures in food safety issues. Some components of the indicator measure specifically the capability of the system to prepare and react for exceptional situations.
<i>Linkage with other indicators in the set</i>	Effect: <i>Outbreaks of food-borne illness, Incidence of food-borne illness; Diarrhoea morbidity in children</i> Action: <i>Government preparedness; General food safety policy; Effectiveness of food safety controls</i>
<i>Related indicator sets</i>	Codex Alimentarius Commission: Food Hygiene - Basic Texts: http://www.codexalimentarius.net/STANDARD/standard.htm UK model of risk categorisation: http://www.food.gov.uk/multimedia/pdfs/cop9 (page 23-32)

Food_A2	Effectiveness of food safety controls	DPSEEA
<i>Issue</i>	Food safety	
<i>Definition of indicator</i>	Composite index for quantitative output parameters of food safety control	
<i>Underlying definitions and concepts</i>	<p>The existence, implementation and enforcement of instruments and measures within the food safety policy</p> <p>Inspections of food premises (based on risk categories)</p> <p>Resources available for performing food control</p> <p>[N.B. This indicator should be extended to cover also feed, i.e. for the control over the farm-to-table continuum]</p>	
<i>Specification of data needed</i>	The indicator is calculated as a sum of 2 subset variables	
<i>Data sources, availability and quality</i>	<p>Basic information included in national food safety programmes</p> <p>Annual food control results reporting systems</p>	
<i>Computation</i>	<p>The index is computed as</p> <p>$SUM(C_i)$</p> <p>Where C_i is the score for component i:</p> <p>C_1: Rate of food establishments inspected annually by competent authority or approved third party</p> <p>Scoring: $100 \cdot (N/E)$, where E denotes for total number of food establishments under the control of the authority, and N is the number of food establishments inspected annually</p> <p>C_2: Number of suitably qualified food control officers (full time equivalent) per 1000 inhabitants</p> <p>Scoring: $1000 \cdot (O_{FTE}/P)$, where O_{FTE} is the number of suitably qualified food control officers expressed as full time equivalent and P is the total population</p>	
<i>Units of measurement</i>	Absolute number	
<i>Scale of application</i>	From local to international	
<i>Interpretation</i>	<p>The indicator enables the quantitative follow-up of food control measures performed by competent authorities. In principle, an increase of the value of the indicator shows an improvement of food safety. The components of the indicator may be also used separately. The variable for food establishments inspected annually by competent authority does not take into account the largely different risk profiles of various types of food establishments. It, therefore, merely gives an expression of the inadequateness of food controls since it should be expected that all establishments are inspected at least once per year.</p>	
<i>Linkage with the other indicators</i>	<p>Effect: <i>Outbreaks of food-borne illness, Incidence of food-borne illness</i></p> <p>Action: <i>General food safety policy; Effectiveness of food safety controls</i></p>	
<i>Related data, indicators, legislation</i>	<p>Council Directive 89/397/EEC, http://europa.eu.int/eur-lex/en/lif/dat/1989/en_389L0397.html supplemented by Council Directive 93/99/EEC, http://europa.eu.int/eur-lex/en/lif/dat/1993/en_393L0099.html lays down general principles for the official control of foodstuffs, of food additives, vitamins, mineral salts, trace elements and of materials intended to come into contact with foodstuffs</p>	

Chem_P1	Sites containing large quantities of chemicals	DPSEEA
<i>Issue</i>	Chemical Emergencies	
<i>Definition of indicator</i>	Number of sites containing large quantities of chemicals according to the criteria of the EU 'Seveso II' directive	
<i>Underlying definitions and concepts</i>	<p>The indicator is based on the ability to identify fixed facilities qualifying as upper and lower tier establishments according to the EU Council directive 96/82/EC(09 Dec 1996), i.e. the 'Seveso II' directive. Underlying definitions are:</p> <p>Establishment: the whole area under the control of the operator where dangerous substances are present in one or more installations, including common or related infrastructures or activities.</p> <p>Dangerous substance: a substance, mixture or preparation listed in the Seveso II directive's annex I, part 1, or fulfilling the criteria in annex 1, part 2.</p>	
<i>Specification of data needed</i>	Inventory of all establishments that could potentially come under the Seveso II directive. Quantity of dangerous substances present in the fixed facilities identified above as a raw material, product, by-product, residue or intermediate, including those substances for which it is reasonable to suppose that may be generated in the event of accident.	
<i>Data sources, availability and quality</i>	All EU member states should have an inventory of establishments coming under the scope of the directive since February 1999. Other states can apply the methodology detailed in annex I of the directive to determine if establishments qualify as an upper or lower tier establishment, although this may require a fair amount of work.	
<i>Computation</i>	Count the numbers of upper tier and lower tier (only those <i>not</i> qualifying as upper tier) establishments separately, as outlined in annex I of the directive.	
<i>Units of measurement</i>	Numbers	
<i>Scale of application</i>	National and international	
<i>Interpretation</i>	<p>The indicator has a reasonable degree of resonance with the concept of potential damage to the public health. The few surveillance data available indicate that 80% of chemical incidents occur in fixed facilities; the proportion of those occurring in the larger facilities that (would) come under the scope of the Seveso II directive is unknown.</p> <p>All operators of establishments in EU member states coming under the scope of the Seveso II directive need to send a notification to the competent authority and to establish a Major-Accident Prevention Policy. In addition, operators of upper tier establishments need to establish a Safety Report, a Safety Management System and an Emergency Plan.</p> <p>Therefore, a facility coming under the scope of the Seveso II directive may be considered a serious potential hazard for its surroundings, the magnitude of the actual risk depending a/o. on the safety management, land-use planning and emergency planning.</p>	
<i>Linkage with the other indicators</i>	<p>Pressure: <i>Sites containing large quantities of chemicals</i></p> <p>Effect: <i>Mortality from chemical incidents</i></p> <p>Action: <i>Regulatory requirements for land-use planning; Poison centre service; Medical treatment guidelines, Chemical incidents register; Government preparedness</i></p>	
<i>Related data, indicators</i>	<p>EU Council directive 96/82/EC(09 Dec 1996) the 'Seveso II' directive http://www.europa.eu.int/comm/environment/seveso/index.htm See also Seveso Substance Database at http://mahbsrv.jrc.it/turku/seviisubs/seviisubs1.html See also Guidance Documents for Implementing Seveso II at: http://mahbsrv.jrc.it/NewProducts.html</p>	

Chem_E1	Mortality from chemical incidents	DPSEEA
<i>Issue</i>	Chemical Emergencies	
<i>Definition of indicator</i>	Mortality rate attributable to acute chemical incidents	
<i>Underlying definitions and concepts</i>	<p>Incident: an agreed exposure-category of incident. Typically this can be taken as the IPCS Level 3 - where there is suspected or actual ill health; and IPCS Level 4 - where a major emergency plan is activated.</p> <p>This indicator requires the ability to identify cases of mortality due to chemical incidents. Later deaths may or may not be ascribable to the incident. Sometime the nature of the incident may be such that it is not necessarily certain that a chemical was released.</p>	
<i>Specification of data needed</i>	<p>Number of deaths within a time period (e.g. a year) ascribable to acute chemical incident releases in the general public, first responders, and chemical site employees</p> <p>Population of the country</p>	
<i>Data sources, availability and quality</i>	<p>Most countries do not have a system collecting data on chemical incidents or chemical incident deaths. Under-reporting may occur if just health statistics are used, and double counting may occur if the other services (such as police, fire and ambulance) provide information as well. Ideally a national system should be set up.</p> <p>At international level OECD maintained a database on mortality. Currently the OECD is no longer collecting these data. The MARS – Major Accident Reporting System database provides this for the EU member states and some cases of chemical incidents</p>	
<i>Computation</i>	<p>The indicator can be expressed as:</p> $(M_n / P) * 1000000$ <p>where M_n is the number of deaths in year N attributable to chemical incidents, and P is the population of the country in year N</p>	
<i>Units of measurement</i>	Number of deaths per million population	
<i>Scale of application</i>	Mainly national to international	
<i>Interpretation</i>	<p>Difficulties and differences in the definition of acute chemical incidents, and problems in ensuring comprehensiveness of collection of all the deaths means that comparison between countries may prove difficult, even if they get national collecting systems running. Nevertheless, setting common definitions before their establishment can only be beneficial.</p>	
<i>Linkage with the other indicators</i>	<p>Pressure: <i>Sites containing large quantities of chemicals</i></p> <p>Effect: Mortality from chemical incidents</p> <p>Action: <i>Regulatory requirements for land-use planning; Existence of poison centres, Medical treatment guidelines, Existence of chemical incidents register; Government preparedness</i></p>	
<i>Related data, indicators</i>	OECD chemical accidents programme: http://www.oecd.org/ehs/accident.htm	

Chem_A1	Regulatory requirements for land-use planning	DPSEEA
<i>Issue</i>	Chemical Emergencies	
<i>Definition of indicator</i>	Regulatory requirement for land-use planning around sites containing large quantities of chemicals according to the criteria for upper tier of the EU 'Seveso II' directive	
<i>Underlying definitions and concepts</i>	<p>Underlying definitions are:</p> <p>Establishment: the whole area under the control of the operator where dangerous substances are present in one or more installations, including common or related infrastructures or activities.</p> <p>Dangerous substance: a substance, mixture or preparation listed in the Seveso II directive's annex I, part 1, or fulfilling the criteria in annex 1, part 2.</p> <p>Regulatory requirement on the land-use planning: clearly outlined restrictions on land use in the safety zone(s). The safety zones around an establishment are determined based on the identification and definition of accident scenarios involving the dangerous substances and determination of the likelihood of (health) consequences of these scenarios.</p>	
<i>Specification of data needed</i>	<ul style="list-style-type: none"> - Inventory of all establishments that could potentially come under the Seveso II directive. - On the basis of an assessment of establishments so identified, an inventory of establishments that (would) qualify as an upper tier Seveso II establishment (for all EU member states should have been completed by February 1999). Other states can apply the methodology detailed in annex I of the directive. - Existence and enforcement of regulatory requirement for land-use planning around all those fixed facilities that meet the upper tier criteria. The regulatory requirement should at least include: <ul style="list-style-type: none"> - Identification and definition of accident scenarios involving dangerous substances. - Rules for determining the likelihood of and the (health) consequences of these accident scenarios. - On the basis of the possible health outcomes, determine risk zones around an establishment. - Clearly outlined restrictions on land use in the safety zone(s). - Sanctions for non-compliance with the land use planning regulations. 	
<i>Data sources, availability and quality</i>	<p>Information on the existence of these instruments and measures</p> <p>Information should be available at ministries responsible for environment, safety and/or emergency response.</p>	
<i>Computation</i>	<p>0. A score 0 is assigned if any of the following apply:</p> <ul style="list-style-type: none"> • There is no inventory of establishments that could potentially come under the Seveso II directive, or • Less than 80% of the inventory of potential sites has actually been assessed for compliance with the Seveso II directive, or • There is no regulatory requirement that meets at least 4 of the above 5 criteria, or the land-use requirements are not enforced, or • Less than 20% of the establishments that (would) qualify as upper tier Seveso II are required to comply with regulatory land-use requirements as detailed above. <p>1. A score 1 is assigned if:</p> <ul style="list-style-type: none"> • All of the criteria under 1) do not apply, and • A proportion of 20% - 80% of the establishments that (would) qualify as upper tier Seveso II are required to comply with regulatory land-use requirements as detailed above. <p>2. A score 2 is assigned if:</p> <ul style="list-style-type: none"> • All of the criteria under 1) do not apply, and • More than 80% of the establishments that (would) qualify as upper tier Seveso II are required to comply with regulatory land-use requirements as detailed above. 	
<i>Units of measurement</i>	Ordinal score (0 – 2)	
<i>Scale of application</i>	National and international	
<i>Interpretation</i>	This indicator has a reasonable degree of resonance with the concept of potential damage to the public health. The underlying construct is that competent authorities should have a regulatory tool to enforce a 'safety distance' between hazardous installations and vulnerable objects, such as residential areas, schools, recreational areas etc.	

Part 2: Environmental Health Indicators Core Set: Update of Methodology

<i>Linkage with the other indicators</i>	<p>Pressure: <i>Sites containing large quantities of chemicals</i> Effect: <i>Mortality from chemical incidents</i> Action: Regulatory requirements for land-use planning; <i>Poison centre service; Medical treatment guidelines, Chemical incidents register; Government preparedness</i></p>
<i>Related data, indicators</i>	<p>EU Council directive 96/82/EC (09 Dec 1996) the ‘Seveso II’ directive http://www.europa.eu.int/comm/environment/seveso/index.htm See also “Land-use planning in the context of Major Accident Hazards” at http://mahbsrv.jrc.it/turku/lup/sld001.htm</p>

Chem_A2	Chemical incidents register	DPSEEA
<i>Issue</i>	Chemical Emergencies	
<i>Definition of indicator</i>	Presence of an active, cumulative register of chemical incidents with national coverage	
<i>Underlying definitions and concepts</i>	<p>Underlying definitions are:</p> <p>Register - active database, with the population and geographical areas defined. The register should define the incident at least in terms of:</p> <ul style="list-style-type: none"> • Identification of the source: chemical(s) released (name and CAS number), estimated quantities and the medium to which the chemical(s) have been released. • Information about the location of the incident: unique identifier of geographical location (grid co-ordinates, latitude and longitude, or similar), fixed site or transportation. • Outcome: estimate of the number of people actually exposed (population, workers and responders). • A contact source of further information on the incident <p>Incident - an agreed exposure-category of incident. Typically this can be taken as the IPCS Level 3 - where there is suspected or actual ill-health; and IPCS Level 4 - where a major emergency plan is activated.</p>	
<i>Specification of data needed</i>	Evidence of existence of register with the above characteristics.	
<i>Data sources, availability and quality</i>	Information on the existence of the register.	
<i>Computation</i>	<p>A score 0 is assigned if there is no such instrument.</p> <p>A score 1 is assigned if the conditions are met partly, and less than 80% of the country is covered,</p> <p>A score 2 is assigned if:</p> <ul style="list-style-type: none"> - the conditions are met completely, i.e. the register is in operation with its full specifications, but less than 80% of the country is covered, or - the conditions are met partly, and 80% or more of the country is covered. <p>A score 3 is assigned if the conditions are met completely, i.e. the register is in operation with its full specifications, and 80% or more of the country is covered.</p>	
<i>Units of measurement</i>	Ordinal score (0 – 3)	
<i>Scale of application</i>	National and international	
<i>Interpretation</i>	The indicator is a measure of the degree of sophistication in a country's approach to chemical incidents. However, increases in the rate of incidents may be due to a real increase in the rate of incidents, or may be due to better incident ascertainment.	
<i>Linkage with the other indicators</i>	<p>Pressure: <i>Sites containing large quantities of chemicals</i></p> <p>Effect: <i>Mortality from chemical incidents</i></p> <p>Action: <i>Regulatory requirements for land-use planning; Poison centre service; Medical treatment guidelines, Existence of chemical incidents register; Government preparedness</i></p>	
<i>Related data, indicators</i>	<p>The WHO Collaborating Centre for a Clearing House for Chemical Incidents: http://www.healthchem.uvic.ac.uk</p> <p>IPCS Chemical Incidents and Emergencies: http://www.who.int/pcs/chem_incid_main.html</p>	

Chem_A3	Poison centre service	DPSEEA
<i>Issue</i>	Chemical Emergencies	
<i>Definition of indicator</i>	Poison centre service staff per head of population	
<i>Underlying definitions and concepts</i>	<p>A poison centre service provides all of the following functions relating to poison control:</p> <ol style="list-style-type: none"> 1. Permanent (24 hours/day, 365 days/year) poison information service. 2. Clinical services for patients exposed to chemicals (includes lists of antidotes and other agents used in treatment of poisoning). 3. Analytical toxicology services. 4. Toxicology-vigilance and prevention of poisoning. 5. Response to major emergencies involving chemicals. 6. Availability of common antidotes. 7. Expertise and experience with industrial chemicals (not just poisoning by medication and household products!). <p>Poison centre is a health care facility, which provides full poison centre service (as defined above) with appointed staff, possibly hosted by more than one organisation.</p> <p>Host organisation: organisation that hosts a poison centre, or part of a poison centre.</p> <p>Poison centre staff: number of whole-time equivalent technical and professional staff (not including administrative staff) appointed those poison centres that provide full poison centre service.</p> <p>Total population: total population size.</p>	
<i>Specification of data needed</i>	Whole-time equivalent technical and professional poison centre staff Total number of poison centres Number of organisations hosting the full i.e. 7 services poison centre function Total population	
<i>Data sources, availability and quality</i>	Information on the existence of the centres, and the localisation of parts of the poison centre. Data on the total population size exist from censuses.	
<i>Computation</i>	<p>For the cases where all 7 poison centre functions are operated from one host organisation (per poison centre), the indicator can be computed as:</p> $N_{\text{pcs}} * 10^6 / P_t$ <p>For the cases where all poison centre functions are available, but operated from different host organisations, the indicator can be computed as:</p> $(N_{\text{pcs}} * N_{\text{pc}} * 10^6) / (P_t * N_{\text{HO}})$ <p>Where N_{pcs} is the number of whole-time equivalent poison centre staff that meets the criteria outlined above, N_{pc} is the number of poison centres (under one roof or distributed over multiple host organisations), P_t is the total population and N_{HO} is the number of organisations hosting the full poison centre function</p>	
<i>Units of measurement</i>	Number of whole-time equivalent staff per million inhabitants, corrected for dispersion of poison centre functions over more than one host organisation.	
<i>Scale of application</i>	National to international	
<i>Interpretation</i>		
<i>Linkage with the other indicators</i>	Pressure: <i>Sites containing large quantities of chemicals</i> Effect: <i>Mortality from chemical incidents</i> Action: <i>Regulatory requirements for land-use planning; Poison centre service, Medical treatment guidelines, Chemical incidents register; Government preparedness</i>	
<i>Related data, indicators</i>	Guidelines for Poison Control. International programme on Chemical Safety. Webpage IPCS: http://www.who.int/ipcs OECD on Chemical Accident Awareness, Preparedness and Response http://www.oecd.org/ehs/accident.htm INTOX Poison Centres Worldwide: http://www.intox.org/pagesource/centres/centres.htm	

Chem_A5	Government preparedness	DPSEEA
<i>Issue</i>	Chemical Emergencies	
<i>Definition of indicator</i>	Government preparedness for chemical incidents	
<i>Underlying definitions and concepts</i>	<p>This indicator relates to the central government's ability to respond adequately to a chemical incident. The following are crucial elements that a government should have in place to enable its (co-ordinating role in the) response function:</p> <ul style="list-style-type: none"> • National Advisory Body: an institution/body (ideally centrally funded) staffed by professionals with a background in legislation, chemical incident management and data collation; and with access to specialist professionals. Its function is to advise Government on preparedness, and during significant chemical incidents; it can also coordinate all the regional and local functions. • Environmental/Public Health Plans for dealing with chemical incidents: an active, written, document detailing the actions required of public health and environmental health professionals before, during and after a chemical incident. • Emergency Response Guidelines: A widely accepted set of emergency response guidelines is an essential element of a country's ability to perform a rapid health risk assessment for a chemical incident. <i>Emergency response guideline:</i> a concentration of a substance in air or drinking water indicating a threshold for a well-defined level of toxic health effect in the general population from an emergency exposure with a specified exposure period. • Public alerting system: The presence of a system with very wide coverage to alert the public that an incident has occurred. 	
<i>Specification of data needed</i>	Evidence of existence of such instruments at regional or national level Population/geographical areas covered.	
<i>Data sources, availability and quality</i>	Information on the existence of a national advisory body, environmental/public health plans, emergency response guidelines and a public alerting system can be available through the national ministries of health or government agencies responsible for emergency planning and response.	

<i>Computation</i>	<p>The value of this indicator (N_{GP}) is calculated as the sum of the values of the 4 components for each of the above aspects, which are calculated according to the following steps:</p> <ol style="list-style-type: none"> National Advisory Body: To determine N_{NAB}, score 0 if no national advisory body is established, 1 if the body was established but is not yet fully operational, and 2 if the body is established and fully operational. Environmental/Public Health Plans: To determine N_{EPH}, score 0 if these plans are not available, 1 if the plans are available but not fully operational / implemented, and 2 if the plans are available and operational. Emergency Response Guidelines For this component: <ul style="list-style-type: none"> Determine the number of chemicals with nationally accepted and applied emergency response guidelines (N_a for airborne guideline levels, N_d for drinking water guideline levels). If no nationally accepted and applied list of emergency response guidelines is available, N_c and/or $N_d = 0$. Score = $N_c + N_d$. <p><i>The value is assigned, based on the score:</i></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;"><i>Score</i> ≤ 100</td> <td style="width: 50%;"><i>Value</i> $N_{ERG} = 0$.</td> </tr> <tr> <td><i>Score</i> > 100 and ≤ 250</td> <td><i>Value</i> $N_{ERG} = 1$.</td> </tr> <tr> <td><i>Score</i> > 250</td> <td><i>Value</i> $N_{ERG} = 2$.</td> </tr> </table> Public Alerting System: The component N_{PAS} is calculated on the basis of: <ul style="list-style-type: none"> A general auditory public alerting system that covers at least 90% of all households. Public alerting system covers at least 90% of recreational areas with high numbers of visitors (theme parks, beaches, etc.). Public alerting system covers at least 90% of non-residential working areas (ports, industrial zones, etc.). Special arrangements in place for people with auditory handicap. Clear arrangements about roles and responsibilities for activating the system. Testing of the public alerting system at least once a year, with notification to the public. The score = the number of the above criteria that are met (minimum:0, maximum: 6). <p><i>The value is assigned based on the score:</i></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;"><i>If score</i> ≤ 1</td> <td style="width: 50%;"><i>sub-indicator value</i> = 0</td> </tr> <tr> <td><i>If score</i> 2, 3 or 4</td> <td><i>sub-indicator value</i> = 1</td> </tr> <tr> <td><i>If score</i> 5 or 6</td> <td><i>sub-indicator value</i> = 2</td> </tr> </table> The final score for Government preparedness N_{GP} is calculated as the sum of the component values: $N_{GP} = N_{NAB} + N_{EPH} + N_{ERG} + N_{PAS}$ 	<i>Score</i> ≤ 100	<i>Value</i> $N_{ERG} = 0$.	<i>Score</i> > 100 and ≤ 250	<i>Value</i> $N_{ERG} = 1$.	<i>Score</i> > 250	<i>Value</i> $N_{ERG} = 2$.	<i>If score</i> ≤ 1	<i>sub-indicator value</i> = 0	<i>If score</i> 2, 3 or 4	<i>sub-indicator value</i> = 1	<i>If score</i> 5 or 6	<i>sub-indicator value</i> = 2
<i>Score</i> ≤ 100	<i>Value</i> $N_{ERG} = 0$.												
<i>Score</i> > 100 and ≤ 250	<i>Value</i> $N_{ERG} = 1$.												
<i>Score</i> > 250	<i>Value</i> $N_{ERG} = 2$.												
<i>If score</i> ≤ 1	<i>sub-indicator value</i> = 0												
<i>If score</i> 2, 3 or 4	<i>sub-indicator value</i> = 1												
<i>If score</i> 5 or 6	<i>sub-indicator value</i> = 2												
<i>Units of measurement</i>	Ordinal score (0 – 8)												
<i>Scale of application</i>	Regional or national												
<i>Interpretation</i>	This indicator is a measure indicating a degree of sophistication in a country's approach to chemical incidents. Governments may be able to institute these functions after an incident has occurred (e.g. obtain advice from individuals, or from (interested) parties and bodies), but the effectiveness would be much reduced as compared with a well-prepared organisation.												
<i>Linkage with the other indicators</i>	<p>Pressure: <i>Sites containing large quantities of chemicals</i> Effect: <i>Mortality from chemical incidents</i> Action: <i>Regulatory requirements for land-use planning; Poison centre service; Medical treatment guidelines, Chemical incidents register; Government preparedness</i></p>												
<i>Related data, indicators</i>	<p>Web-page with example of National Advisory Body: http://www.natfocus.uwic.ac.uk OECD chemical accidents programme: http://www.oecd.org/ehs/accident.htm ATSDR Chemical Accidents: http://www.atsdr.cdc.gov/mmg.html Emergency Response Planning Guidelines: http://www.bnl.gov/scapa/ EPA Chemical Emergency Preparedness and Prevention Office: http://www.epa.gov/swercepp/</p>												

Work_E1	Occupational fatality rate	DPSEEA
<i>Issue</i>	Workplace	
<i>Definition of indicator</i>	Occupational fatality rate in the working population	
<i>Underlying definitions and concepts</i>	<p>This indicator requires the ability to identify deaths due to accidents or inappropriate working conditions and practices. Underlying definitions are:</p> <p>Fatalities: death due to occupational injury, regardless of the time between occupational injury and the death</p> <p>Total number of workers: the number of people carrying out or involved in, a trade or business, employed</p> <p>Summaries can be given: by economic sectors and occupational groups</p>	
<i>Specification of data needed</i>	<p>The number of cases of fatalities due to work-related injury per year</p> <p>The total number of workers per year</p>	
<i>Data sources, availability and quality</i>	<p>Data on occupational fatalities are available in all countries through routine reporting in accordance with employment and health and safety legislation. This data tends to be reliable: under-reporting is infrequent.</p> <p>Data on the total number of workers is usually available from the national employment statistics or company records. Such statistics, however, tend to omit those employed in informal or casual work or who have multiple (and often unregistered) jobs.</p>	
<i>Computation</i>	<p>The indicator can be expressed as:</p> $100,000 * (M_f / W)$ <p>where M_f is the total number of reported fatalities reported in the target workforce, and W is the total number of workers.</p>	
<i>Units of measurement</i>	Number per hundred thousand workers	
<i>Scale of application</i>	Enterprise level; national and international	
<i>Interpretation</i>	<p>The indicator provides potentially useful measure of workplace health risks associated with the occupational environment. The safety pyramid familiar in safety science allows this measure to infer performance of work associated injury and morbidity. An increase may be used to infer deterioration in the working environment and in the quality of the management of health and safety risks. A reduction in the number of deaths may imply an improvement. In making these in inferences there will be margins of error in relation to the reporting of fatalities with long related times to non specific causes. Problems in accurately quantifying the number of workers (total number of working years) may add to uncertainty. Changes in the total number of people employed may also affect the rate. Changes in the rate may reflect changes in the pattern of employment. Improvements could occur because of the decline in heavy manufacturing industry with a relative growth in service industries. In these circumstances a reduction may not reflect improvement. It is therefore important to look at the rates of fatalities per industry sector and within occupational groups if this data is available.</p>	
<i>Linkage with the other indicators</i>		
<i>Related data, indicators</i>	<p>International Statistical Classification of Diseases and Related Health Problems (ICD-10) in Occupational Health: http://www.who.int/environmental_information/Occuphealth/classdis_in_OH.pdf National Institute of Occupational Safety and Health (NIOSH), Worker Health Chartbook, 2000: http://www.cdc.gov/niosh/00-127pd.html ILO, Code of Practice: Recording and notification of occupational accidents and diseases: http://www.ilo.org/public/english/protection/safework/cops/english/download/e962083.pdf</p>	

Work_E2	Rates of injuries	DPSEEA
<i>Issue</i>	Workplace	
<i>Definition of indicator</i>	Rates of injuries in the working population	
<i>Underlying definitions and concepts</i>	<p>These indicators require the ability to identify cases of occupational injury, or occupational illness due to accidents or inappropriate working conditions and practices. They also require the ability to identify work days lost as a consequence of these injuries or illness. Underlying definitions are:</p> <p>Injury/illness rate per year – cases of occupational injury or illness per hundred thousand employees-workdays per year</p> <p>Lost workdays – the workdays lost as a consequence of absence from work due to occupational injury or illness</p> <p>Lost workdays rate per year due to injury/illness – the workdays lost as a consequence of absence from work due to occupational injury or illness per hundred thousand employees-workdays per year</p> <p>Summaries can be given: per enterprise, by economic sectors or occupational groups</p>	
<i>Specification of data needed</i>	<p>Total number of cases of occupational injury and illness in a year</p> <p>Number of lost workdays due to these cases of injury and illness.</p> <p>Total number of workers and total number of potential workdays.</p>	
<i>Data sources, availability and quality</i>	<p>Many enterprises may record some or all of the above as part of their routine reporting of their health and safety performance. Within enterprises there may be under-reporting due to poor recording of workers injury by the companies or enterprise, and by incomplete recall and attribution of injury by workers. Data on the days lost may be inaccurate.</p>	
<i>Computation</i>	<p>These indicators can be expressed by a number of events per thousand or hundred thousand working hours or employees: e.g. $100,000 * (M / W)$</p> <p>where M is the total number of reported cases or events reported (in accordance with the above definitions) in the target work force, and</p> <p>W is the total number of employees-workdays in a year.</p>	
<i>Units of measurement</i>	Number per hundred thousand workers or per hundred thousand workdays (hours).	
<i>Scale of application</i>	National and international	
<i>Interpretation</i>	<p>When reliable and consistent data are available, these indicators provide useful measures of the health risk associated with the occupational environment. Within enterprises particularly multi national companies many of these indices are standard measures of health and safety performance.</p> <p>Problems of data consistency and availability may limit interpretation of broader scales. Underreporting of minor injuries should be considered. Data on serious injuries (more than three days absence from work) is a more precise measure of effect, however problems with the data collection may occur.</p>	
<i>Linkage with the other indicators</i>		
<i>Related data, indicators</i>	<p>International Statistical Classification of Diseases and Related Health Problems (ICD-10) in Occupational Health http://www.who.int/environmental_information/Occuphealth/classdis_in_OH.pdf National Institute of Occupational Safety and Health (NIOSH), Worker Health Chartbook, 2000: http://www.cdc.gov/niosh/00-127pd.html ILO International Labour Standards http://webfusion.ilo.org/public/db/standards/normes/index.cfm?lang=EN International Labour Organisation (ILO), Code of Practice: Recording and notification of occupational accidents and diseases: http://www.ilo.org/public/english/protection/safework/cops/english/download/e962083.pdf ILO, Technical and Ethical Guidelines for Workers' Health Surveillance Report, 1997: http://www.ilo.org/public/english/protection/safework/health/whsguide.htm</p>	

Work_E3	Sickness absence rate	DPSEEA
<i>Issue</i>	Workplace	
<i>Definition of indicator</i>	This indicator is frequently defined as a severity rate collecting the amount of time lost due to absence attributable to illness compared to the normal working hours available. As such it includes all injuries, which result in absence from work.	
<i>Underlying definitions and concepts</i>	Indicators which can be used to analyse absence attributable to illness are as follows: Severity – lost time % due to absence from work attributable to illness or injury. The amount of time lost due to absence attributable to illness/injury as compared to the total working hours Duration – average length of absences from work attributable to illness/injury Long-term absence – Percentage of absentees of work due to illness for more than one month Short-term absence – The percentage of absentees of work for less than one month Summaries can be given: per enterprise, by economic sectors or occupational groups	
<i>Specification of data needed</i>	Total amount of time lost due to absence attributable to illness/ injury Average length of absences from work attributable to illness/ injury Total expected normal working hours Total number of workers	
<i>Data sources, availability and quality</i>	Routine reporting of these data does not occur to health and safety organisations. However, data on absence attributable to illness may be available in some countries. These data are often subject to considerable inaccuracy due to poor recording of absence by organisations, inaccurate self-certification by workers or by inaccurate labelling of causation by doctors. Data for the higher socio-economic categories in employment tend to be incomplete due to a lack of compliance of these groups with company organisation requirements to report and record absences from work.	
<i>Computation</i>	According to the underlying definition type (see above)	
<i>Units of measurement</i>	According to the underlying definition type (see above)	
<i>Scale of application</i>	National and international	
<i>Interpretation</i>	Where reliable and consistent data are available, this indicator provides a potentially useful measure of the well being of the work force associated with a particular occupational environment. Adverse trends can reflect deterioration in the physical mental and social well being of the workforce including the control of workplace-preventable ill health and work environments. Problems of data consistency and availability may limit the interpretations at a broader scale.	
<i>Linkage with the other indicators</i>		
<i>Related data, indicators</i>	International Statistical Classification of Diseases and Related Health Problems (ICD-10) in Occupational Health http://www.who.int/environmental_information/Occuphealth/classdis_in_OH.pdf	

Work_A1	Statutory reports of occupational diseases	DPSEEA
<i>Issue</i>	Workplace	
<i>Definition of indicator</i>	Existence of a national formal system for reporting cases of diseases diagnosed and confirmed as due to work in specific occupation at risk (register of occupational diseases).	
<i>Underlying definitions and concepts</i>	<p>Underlying definitions are:</p> <p>Register – active database, containing data on occupational diseases</p> <p>Diagnosis – confirmed by a doctor / occupational medicine specialist in an institution specialised in diagnosing the occupational diseases (different systems in different countries)</p> <p>Occupation – current or previous job of affected individuals; involves the work activity specifically associated with the disease</p>	
<i>Specification of data needed</i>	Evidence for existence and scope of a national register on occupational diseases	
<i>Data sources, availability and quality</i>	Data on occupational diseases are available in most countries through routine reporting in accordance with the Employment and Health and Safety legislation	
<i>Computation</i>	<p>The index is computed as</p> $\text{SUM}(C_i)$ <p>Where C_i is the score for component i</p> <p>C_1 Existence of the national register A score 0: no register. A score 1: a formal register exists</p> <p>C_2 Specificity of reporting of occupational diseases A score 1: no list of occupational diseases A score 2: an “open” list of occupational diseases exists A score 3: restrictive list of occupational diseases</p> <p>C_3 Nature of the compensation system A score 1: within general social security system A score 2: separate system for occupational diseases and accidents</p> <p>Validity of the existing system of the statutory reports of occupational diseases can be assessed based on the scores: 5-6 – very good 3-4 – good 1-2 – satisfactory</p>	
<i>Units of measurement</i>	Ordinal score	
<i>Scale of application</i>	National and international	
<i>Interpretation</i>	<p>Data based on governmental reports are usually accurate as the formal systems for diagnoses of occupational diseases are based on compensation systems and therefore linked to payment. However, the criteria for diagnoses are usually very strict thus only certain proportion of individuals potentially affected may be included in the official statistics.</p> <p>An increase can be used to infer deterioration in the quality of the working environment and in the control of workplace health risks. Decrease can represent an improvement. With the changing patterns of employment and improving working conditions, there has generally been a consistent decline in the number of cases occurring, partly due to the decline in the hazardous industries but also due to improved controls which themselves are often based on legislation. Nevertheless because occupational diseases are generally agreed (Information Notices and Diagnoses of Occupational Disease: European Commission: Report EUR 14768EN), they do provide a common basis for the recognition reporting of these classical occupational diseases.</p>	
<i>Linkage with the other indicators</i>		

<i>Related data, indicators</i>	<p>International Statistical Classification of Diseases and Related Health Problems (ICD-10) in Occupational Health http://www.who.int/environmental_information/Occuphealth/classdis_in_OH.pdf</p> <p>ILO International Labour Standards http://webfusion.ilo.org/public/db/standards/normes/index.cfm?lang=EN</p> <p>ILO, Technical and Ethical Guidelines for Workers' Health Surveillance Report, 1997: http://www.ilo.org/public/english/protection/safework/health/whsguide.htm</p> <p>Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work Official Journal L 183, 29/06/1989 (p. 0001 – 0008): http://europa.eu.int/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=EN&nmdoc=31989L0391&model=guichett</p>
---------------------------------	--

GENERAL DESCRIPTION

The environmental health indicators tool tentatively called *EuroIndy* is specialized software that enables the user to establish a database system on key environmental health (EH) statistics. These can be further processed into interlinked indicators to enable comparative assessments on the ten environmental health issues: air quality, housing and settlements, traffic, noise, waste and contaminated lands, radiation, water and sanitation, food safety, chemical emergencies, workplace. Potential environmental impacts on public health are considered in terms of the following health outcomes: mortality, morbidity and disturbance. For details of the methodology one can refer to Part 2.

The *EuroIndy* software allows users to generate information on environmental health at different geographical scales in a uniform way. It allows the establishment of a database at sub-national levels for the 51 WHO/Europe Member States. It uses the Nomenclature of Statistical Territorial Units (NUTS) classification system (more details for the EU and the ten accession countries at: http://europa.eu.int/comm/eurostat/ramon/nuts/home_regions_en.html).

EuroIndy contains as default the three NUTS levels (1, 2 and 3) and also a level "0" for the country as a whole. For those countries for which the NUTS level "1" is the national level, two sub-national administrative levels are set in the *EuroIndy*. It is pre-filled with codes from the WHO HEGIS (Health and Environment Geographic Information System) project for those WHO/ Europe Member States, for which there is no harmonised classification of the administrative/territorial units. All the names of the administrative levels as well as of the administrative units are kept in the original languages.

Ambient air quality data is gathered from monitoring networks in the urban agglomerations. *EuroIndy* considers only cities with population $\geq 100,000$ inhabitants (a provisional NUTS level "6" is assigned for all these cities in EuroIndy). It is important for the user to remember that when working with the air quality information the population of the city is needed in the EuroIndy.

The abovementioned sub-national levels have been agreed upon in the WHO WG meeting (see Part 1) on the EH indicators pilot implementation. The user is given flexibility to apply the EuroIndy at lower NUTS levels: the same software can be used and only the respective codes and names should be added.

In respect to the years for which the EuroIndy database should be filled in, these are, according to the protocol for the pilot EH indicator study, the years 1996 – 2000 or the last five years of available data. The user may wish to add other time series as well.

The ‘core’ of the EuroIndy – the EH database system should be protected from unauthorized access and a ‘backup’ copy should be made regularly. It is an MS Access-based data system. Data can be entered into user-friendly data entry form field-by-field, or via a spreadsheet for those who want to use the tabular data entry advantages. The underlying definitions for the database variables according to the EH indicators methodology are shown throughout the data entry process. The updated methodology sheets are incorporated into the Help section for an easy reference. The user is given the possibility to add comments related to data quality, monitoring strategies, measurement and surveillance practices etc in a free text through the button “Note”. This can serve as a basis for establishing a meta-database (‘data about the data’) in the future.

To use the spreadsheet form, the user has first to select the years, regions and indicators for which data should be entered. This is done through the Query function.

A very important function of EuroIndy is the data exchange facility. A specificity of the environmental health information is that it is spread among different bodies and agencies and the pattern varies from one country to the other. The user creates a spreadsheet by selecting (through the Query function) the years, regions and data variables, which are provided by one and the same agency. It is then converted into MS Excel format through the Export function. The completed MS Excel file is then imported in EuroIndy.

The Query function, which enables the user to make different 'cross-sections' of the database, can also be used to check that the database system is operating properly.

There is a built-in possibility to translate all the menus, labels and texts into different languages. EuroIndy has also the first version of a Help topic.

Currently only the geographical information is pre-filled in EuroIndy. It is planned to fill it in with all the relevant internationally available data sets e.g. population and other statistics.

The current version of EuroIndy presents the functionality of the data entry module, the most essential element in establishing an EH information system. Parallel to the pilot testing of the software, the project team will continue the development of the module for calculating the indicators and further expanding the functionality with data presentation.

EuroIndy is a necessary tool in setting up a harmonised data exchange system on health and the environment with your multiple partners.



ANNEX 1 WORKING GROUP MEMBERS (2001 – MAY 2002)

Marita Afezolli ^d	Department of Primary Health Care, Ministry of Health, Tirana, Albania
Hristina Mileva ^{a,c,d}	Division of Environmental Health, Ministry of Health, Sofia, Bulgaria
Ružena Kubínová ^{a,c,d}	National Institute of Public Health, Prague, Czech Republic
Jüri Ruut ^{a,c,d}	Central Laboratory, Health Protection Inspectorate, Tartu, Estonia
Erja Alanen ^{a,c,d}	Provincial State Office of Western Finland, Turku, Finland
Veli-Mikko Niemi ^{b,d}	Ministry of Social Affairs and Health; Helsinki, Finland
Tarja Wiikinkoski ^{a,c}	Provincial State Office of Western Finland, Turku, Finland
Dieter Arnold ^d	Centre for Surveillance of Chemicals in Food (BgVV), Berlin, Germany
Wolfgang Hellmeier ^{c,d}	Institute of Public Health (loegd), North-Rhine Westphalia, Bielefeld, Germany
Hans-Guido Mücke ^{c,d}	WHO Collaborating Centre for Air Quality Management and Air Pollution Control, Federal Environmental Agency, Berlin, Germany
Angela Queste ^d	Institute for Hygiene and Public Health, University of Bonn, WHO CC on Health Promoting Water management and Risk communication, Bonn, Germany
Mihály Kádár ^b	Fodor József National Center for Public Health, National Institute of Environmental Health, Budapest, Hungary
Tibor Málnási ^{a,b,c,d}	Office of the Chief Medical Officer, National Public Health Service, Budapest, Hungary
Anna Páldy ^{a,c,d}	Fodor József National Center for Public Health, National Institute of Environmental Health, Budapest, Hungary
Béla Somogyi ^b	Fodor József National Center for Public Health, National Institute of Environmental Health, Budapest, Hungary
Jana Feldmane ^{a,c,d}	National Environmental Health Centre, Riga, Latvia
Ingrida Zurlyte ^{a,c,d}	Division of Public Health Monitoring, State Public Health Centre, Vilnius, Lithuania
Aida Čiuladaitė ^{a,c,d}	Division of Public Health Monitoring, State Public Health Centre, Vilnius, Lithuania
Annelike Dusseldorp ^{a,c,d}	Laboratory of Exposure Assessment, National Institute of Public Health and the Environment (RIVM), Bilthoven, The Netherlands

Annex 1: Working Group Members

Kees Huijsmans ^b	Laboratory of Exposure Assessment, National Institute of Public Health and the Environment (RIVM), Bilthoven, The Netherlands
Jessica Kwekkeboom ^{a,b,d}	Laboratory of Exposure Assessment, National Institute of Public Health and the Environment (RIVM), Bilthoven, The Netherlands
Frank de Leeuw ^b	Laboratory of Air Quality, National Institute of Public Health and the Environment (RIVM), Bilthoven, The Netherlands
Marc Ruijten ^{b,d}	Centre for Epidemiological Investigation of Emergencies, National Institute of Public Health and the Environment (RIVM), Bilthoven, The Netherlands
Brigit Staatsen ^{a,c}	Laboratory of Exposure Assessment, National Institute of Public Health and the Environment (RIVM), Bilthoven, The Netherlands
Dorota Jarosinska ^{a,b,d}	Institute of Occupational Medicine and Environmental Health, Sosnowiec, Poland
Bogdan Wojtyniak ^{a,c,d}	Department of Medical Statistics, National Institute of Hygiene, Warsaw, Poland
Renata Zlotkowska ^{a,b,c}	Institute of Occupational Medicine and Environmental Health, Sosnowiec, Poland
Nune Bakunts ^{a,d}	Department for Hygiene and Anti-epidemic Surveillance, Ministry of Health, Yerevan, Republic of Armenia
Alexandra Cucu ^{a,c,d}	Environment and Health Department, Institute of Public Health Bucharest, Bucharest, Romania
Ioana Iacob ^{b,d}	Department of Public Health, Ministry of Health and Family, Bucharest, Romania
Vladislav Fourman ^{a,c,d}	Environmental Health Department, CPPI, Moscow, Russian Federation
Larissa Privalova ^{a,d}	Ural Regional Center for Environmental Epidemiology, Yekaterinburg, Russian Federation
Martin Kapasny ^{a,c,d}	State Health Institute, Žilina, Slovak Republic
Katarína Hálzlová ^d	National Public Health Institute of Slovak Republic, Bratislava, Slovak Republic
Luis Soldevilla Benito ^{a,c,d}	Centro de Investigación sobre el Síndrome del Aceite Tóxico Instituto de Salud Carlos III, Madrid, Spain
Manuel Posada de la Paz ^{a,d}	Centro de Investigación sobre el Síndrome del Aceite Tóxico Instituto de Salud Carlos III, Madrid, Spain
Åsa Ahlgren ^d	Division of Environmental and Public Health, Socialstyrelsen Stockholm, Sweden
Ingall Paulsson Lutz ^b	Division of Environmental and Public Health, Socialstyrelsen Stockholm, Sweden

Annex 1: Working Group Members

Sonja Kahlmeier ^{a,c,d}	Institute for Social and Preventive Medicine, University of Basel, Basel, Switzerland
David Kay ^d	CREH University of Wales, Ceredigion, United Kingdom
Paul Wilkinson ^c	Environmental Epidemiology Unit, Department of Public Health and Policy, London School of Hygiene and Tropical Medicine, London, United Kingdom
Peter Bosch ^d	European Environment Agency, Copenhagen, Denmark
David Phillips ^d	Population and Environmental Health Programme, Institute for Environmental Science and Research, Porirua, New Zealand

WHO STAFF MEMBERS

Xavier Bonnefoy ^d	WHO European Centre for Environment and Health, Bonn, Germany
Dafina Dalbokova ^e	WHO European Centre for Environment and Health, Bonn, Germany
Gunter Klein ^{c,d}	WHO European Centre for Environment and Health, Bonn, Germany
Michal Krzyzanowski ^e	WHO European Centre for Environment and Health, Bonn, Germany
Annette Pruess ^d	WHO, Geneva, Switzerland

- a. Feasibility study national team
- b. Expert contributing to the developmental work
- c. Participant in the WHO progress review meeting July 2001
- d. Participant in the WHO WG meeting November 2001
- e. Project management