

WORLD HEALTH ORGANIZATION
REGIONAL OFFICE FOR EUROPE



ORGANISATION MONDIALE DE LA SANTÉ
BUREAU RÉGIONAL DE L'EUROPE

WELTGESUNDHEITSORGANISATION
REGIONALBÜRO FÜR EUROPA

ВСЕМИРНАЯ ОРГАНИЗАЦИЯ ЗДРАВООХРАНЕНИЯ
ЕВРОПЕЙСКОЕ РЕГИОНАЛЬНОЕ БЮРО

**EUROPEAN CENTRE FOR ENVIRONMENT AND HEALTH
BONN OFFICE**

**DEVELOPMENT
OF
ENVIRONMENT AND HEALTH INDICATORS
FOR
EUROPEAN UNION COUNTRIES**

ECOEHIS

Grant Agreement SPC 2002300

Between the European Commission, DG Sanco
and the World Health Organization, Regional Office for Europe

Final Report



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Executive Summary

The Declaration of Fourth Ministerial Conference on Environment and Health in Budapest, June 2004, reaffirmed that the Environment and Health Information System (EHIS) is an essential tool to support policy-making. WHO, EEA and the European Commission were requested to further develop and manage the environment and health indicators, related data sets and the shared information infrastructure to establish a pan-European EHIS. The Declaration also stipulated that the progress be reported to the intergovernmental meeting by the end of 2007.

WHO started technical work to develop methods and tools for EHIS in 1999. The ECOEHIS project was a part of it, co-funded by the EC DG SANCO in the framework of its Health Monitoring Programme in 2002 (SPC 2002300). The project objective was to establish a **core set of environmental health indicators** for EU countries, focusing on the population's **exposure** to environmental hazards, their health **effects**, and policy **actions** to prevent the illnesses, injuries and deaths. The scope of the project was derived from the decision of the European Parliament and the Council, covering the topics of housing conditions, home and leisure activities, road accidents, and various aspects of external environment. Eleven Member States nominated national focal points to strengthen partnership for the project implementation. Working Groups of invited experts and national focal points identified indicators relevant for application in EU. Indicators thus selected were validated and tested for feasibility by the national partners of the project. WHO coordinated the work and contributed to its technical contents. The final consultation recommended the set of seventeen indicators on exposure, effects and actions that are ready for implementation in EU countries as a part of the EC Health Indicators (ECHI) set.

The project first evaluated the compatibility of the proposed 48 indicators with existing body of legislation and regulations at EU. These indicators at the outset were adopted from the core indicators identified by previous WHO projects. This step confirmed that 9 indicators would be non-compliant to existing EC legislation. Non-compliant indicators were not considered in the next step of the project, unless they were readily available in the existing international data sources on a voluntary basis. Therefore, most indicators considered in this project would not require new laws or regulations in order to be adopted as part of the EC health monitoring system. A comprehensive report, *Verification of Compatibility of WHO EH Indicators with the EC Body of Legislation*, was prepared by a consultant, and discussed by the Working Group at the project meeting in Berlin, May 2003.

The indicators on 'housing and health', 'noise and health', and 'road accidents' were recognized by previous WHO project to be in need of further elaboration. Therefore, the indicators on these three topics were developed and validated by the invited experts. For each area, experts held two technical meetings, and identified promising indicators based on their review of existing scientific evidence and approaches to the surveillance. These indicators were then validated and refined in a small-scale studies conducted by the experts before being proposed for pilot testing. For the indicators on other topic areas than the above three areas, core indicators previously developed by WHO's project were reexamined and updated by consulting experts. At the Working Group meeting in Luxembourg, January 2004, the national focal points and experts discussed the proposed set of indicators, selected 46 indicators to be subject to the pilot study in the participating Member States, and agreed on the protocol of the pilot study and the criteria for evaluating indicators.

The national project teams and network of experts collected information necessary for the implementation of selected indicators in their countries in accordance with the study protocol and a questionnaire. Indicators were graded as poor, fair, or good, for **four evaluation criteria: the availability, the quality, the comparability, and the policy-relevance**. Participating Member States submitted national reports summarizing their own assessments of readiness for the implementation of the proposed indicators.

At the Working Group meeting in Bonn, July 2004, participating countries reviewed the results of pilot study and reached an agreement on classification of indicators into three categories. Indicators that were both policy-relevant and readily available from existing international data sources with sufficient quality and comparability were recommended to the ECHI short list. When necessary, definition of indicators was adjusted to fit with the existing databases. In the end, the project produced essential guidelines regarding the definition and methodology of recommended indicators, including underlying concepts, specification of data, availability and quality of data sources, computation method and units of measurement, policy and regulatory context, interpretation and limitations, etc.

The following environmental health indicators on exposure, effects, and actions are recommended as the main outcome of the project.

I. Ready and recommended for immediate implementation* (These indicators are recommended as 'core' European Community Health Indicators):

Air quality:

- Population exposure to air pollutants: particulate matter, ozone, NO₂ and SO₂
- Existence of national policies to reduce environmental tobacco smoke exposure

Housing and Health:

- Crowding of the residence
- Dampness and mould growth in the residence
- Housing hygiene
- Crime and perception of crime in the neighborhood
- Deaths associated with extreme temperature

Noise and Health:

- Population exposed to various noise levels by different sources
- Existence of national policies to reduce exposure to leisure sounds

Traffic Accidents:

- Deaths due to road transport accidents
- Injuries due to road transport accidents

Water and Sanitation:

- Population supplied with safe drinking waters

Chemical Emergencies:

- Existence of regulatory requirements for land-use planning
- Existence of national registry of chemical incidents
- Government preparedness for chemical incidents

Radiation:

- Incidence of malignant melanoma
- Existence of effective environmental monitoring of radioactivity

II. Ready, but not feasible for immediate implementation (These indicators are recommended for WHO project such as ENHIS):

Air Quality:

- Years of Expected Life Lost due to air pollution

Housing and Health:

- Radon in dwellings
- Housing safety and accidents

* In addition, indicators on upstream determinants i.e. driving forces, pressures and state of the environment, were recommended to the core set when they are readily available and relevant to environmental health policies.

Noise and Health:

- Cardiovascular diseases and deaths due to noise exposure

Traffic Accidents:

- Potential Years of Life Lost due to traffic accidents

Water and Sanitation:

- Management of bathing waters

III. Desirable though requiring further developmental work (These indicators are recommended for further elaboration):

Housing and Health:

- Accessibility of the elderly or disabled people to the residence

Noise and Health:

- Annoyance and sleep disturbance due to noise

Traffic Accidents:

- Person time spent on the road
- Use of vehicle safety device
- Disability Adjusted Life Years (DALY) lost due to road accidents
- Deaths due to drinking driving

Water and Sanitation:

- Existence of water safety plans
- Outbreak of water-borne diseases

The participating Member States reported a very positive impact of collaboration in this project. For example, France reported that the ECOEHIS project activated a synergistic interaction between European countries and national experts for implementation of a harmonized European monitoring system. Italy reported that the technical reports by ECOEHIS project team would promote a regular environment and health reporting linked to European network. In the Netherlands, a steering committee of stakeholders was established for the project ensuring the progress towards the establishment of the national EHIS. Most of participating countries reported similarly positive experiences of capacity building for future adoption of EHIS.

In conclusion, this project developed, evaluated, classified and recommended environmental health indicators that can be readily applicable in most EU countries. These indicators will also serve as the main constitution of the pan-European EHIS as endorsed by the Budapest Declaration of 2004.

Introduction

This report summarizes the main activities and results of the project, 'Development of Environment and Health Indicators for Europe (ECOEHIS),' conducted under the WHO leadership from 1 October 2002 to 30 September 2004. The project was co-sponsored by the EC DG SANCO in the framework of its Health Monitoring Programme in 2002 (SPC 2002300). Details of results are also presented in technical reports enclosed as Annexes.

Objective of the Project

The main objective of the ECOEHIS project was to develop environmental health (EH) indicators to become part of the European Community Health Indicators (ECHI), which would serve as tools to:

- Measure the health impact of selected environmental risk factors, their determinants and trends therein throughout the Community
- Facilitate planning, monitoring and evaluation of Community programmes and actions
- Provide Member States and international organizations with information to make comparisons and evaluate their policies

Based on testing of the feasibility and usefulness and after approval by the EU Member States, the indicators were to be delivered according to the evidence, data and methodological limitations, in one of three categories:

- 1) ready and recommended for implementation
- 2) ready, but not feasible for immediate implementation, or
- 3) desirable though requiring further developmental work.

In addition, the project aimed at providing input to the ECHI process of selecting core set of indicators.

Scope of the Project

The scope of the project to cover was set in Annex II of the decision N^o 1400/97/EC of the European Parliament and the Council to adopt a programme of Community action on health monitoring within the framework for action in the field of public health:

- C3. Housing conditions;
- C4. Home and leisure activities (the subset "accidents at home")
- C5. Transport: Road accidents
- C6. External environment: air pollution, water pollution, radiation, and other types of pollution, including noise but excluding food safety.

Project Structure and Organization

Project activities were performed in three Work Packages (WP's):

WP1: Verification of compatibility of EH indicators with the EC legislation

WP2: Development of indicators for 'housing and health', 'noise and health' and 'road accidents'

WP3: Testing and expert approval of proposed set by participating EU Member States

The personnel involved in this project included the national focal points of eleven participating Member States, subject area experts, and WHO/ECEH staff. Eleven Member States nominated national focal points to strengthen partnership throughout the project implementation. However, two countries, Belgium and Austria, could not complete the project. The national focal points coordinated and assured a broad discussion of proposed indicators in the partner countries by consulting national experts and stakeholders. They also played a key role in collecting information necessary for evaluating indicators in their countries. Invited experts played a

leading role in developing, validating, and proposing indicators on selected issues covered by the indicators system. The European Center for Environment and Health, Bonn Office, of the World Health Organization (WHO/ECEH), was the main implementing institution for the project. The names and affiliations of the personnel including national focal points, members of national teams and experts are listed in Annexes 1 and 2.

Project Activities

WP1: Verification of compatibility of EH indicators with EC legislation

The verification of compatibility of the EH indicators with EC body of legislation was carried out to assure the validity of the indicators for policy-oriented monitoring in the EU. The EH indicators proposed by the WHO in the previous project were used to identify the relevant EC legislation and confirm the reporting obligations of the legislation regarding the indicators. For each indicator, the relation to the EC legislation, reporting obligations to the legislation, planned modifications in legislation, and the need for modification in indicator were examined. The study on reporting obligations provided information about the mechanisms of reporting of the environmental data and also the relevant policy measures put in place by Member States to enact and comply with the EU legislation. They also provided a closer look at the mechanisms and measures precluded in the legislation to evaluate the policy effects and effectiveness. This step confirmed that 9 indicators would be non-compliant to existing EC legislation. Non-compliant indicators were not considered in the next step of the project, unless they were readily available in the existing international data sources on a voluntary basis. Therefore, most indicators would not require new laws or regulations in order to be adopted as part of the EC health monitoring system. A comprehensive report on the results of the crosscheck for each EH indicator, '*Verification of Compatibility of WHO EH Indicators with the EC Body of Legislation*', was prepared by a consultant, and became available upon request to info@ecehbonn.euro.who.int. This report was used as the background document. Detailed activities in WP1 are summarized below.

1. Identification of the relevant body of EC legislation (all types of regulatory texts)
 - 1.1 Initial list of EH indicators for EU countries based on the set of core indicators developed by WHO projects (<http://www.euro.who.int/EHindicators>) was selected.
 - 1.2 The relevant legislation was identified using the initial EH indicator list as the basis. In addition, the legislation useful for health-environment monitoring in the EU was also identified.
2. Cross-checking of the EH indicators for compatibility with the identified EC legislation: background document prepared by Øystein Solevåg.
 - 2.1 Each of the selected indicators was screened *vis-à-vis* the legislation focusing on the reporting obligations of legislation, including also future legal developments e.g. planned modifications.
 - 2.2 Analysis of compatibility was performed.
 - 2.3 The document summarizing the review results was prepared by consultant under a contractual agreement. The document served a background for discussion of the Working Group meeting convened in Berlin, 14-16 May 2003.
3. Creation of a network of national focal points: In parallel to the activities in 1) and 2), the following activities were implemented.
 - 3.1 Building the network: establishing contacts, defining the roles and responsibilities for the national partners and experts.
 - 3.2 Coordinating the work in the Member States concerning compatibility of the EH indicators *vis-à-vis* the EC legislation.
4. Meeting on EH indicators and EC legislation in Berlin, 14-16 May 2003 (For details, see Annex 3 or <http://www.euro.who.int/Document/E81285.pdf>)

- 4.1 Organizational aspects:
 - Venue: Federal Environment Agency of Germany (UBA)
 - Participation: twenty-seven participants – national focal points and invited experts focusing on selected issues covered by the indicators system and one observer from EC DG SANCO Unit G3.
- 4.2 Scientific preparation:
 - Background papers on the review of EH indicator compatibility *vis-à-vis* the relevant legislation and on the ongoing work for ‘housing and health’, ‘noise and health’ ‘road accidents’ were presented
 - The feedback from relevant national agencies evaluating the compatibility with the legislation was coordinated in the MS.
- 4.3 A set of environment and health indicators adequate for EH monitoring in the EU was identified.
- 4.4 The system adjustments, necessary for its harmonization with the requirements of the legislation, were agreed and determined.
- 4.5 Methodological developments of new indicators were recommended to fill the gaps identified from the verification of compatibility with the EC legislation.
- 4.6 ECOEHIS project network (national focal points and experts in the thematic areas) to steer the process was established.
5. Following the WG decisions, adjustment of the existing indicators for harmonization with the requirements of the legislation were finalized.
6. New indicators were developed to fill the gaps between the indicators and legislation identified by the WG.
7. The report, *Verification of Compatibility of WHO EH Indicators with EC Body of Legislation*, was prepared. The summary of this report is enclosed in Annex 3.

WP2: Development of indicators for ‘housing’, ‘noise’ and ‘road accidents’

Development of the indicators on ‘housing and health’ and ‘noise and health’ was carried out by the WHO/ECEH housing and noise programmes. Development of the indicators for road accidents was subcontracted to the Public Health Agency of the Lazio Region, Italy. Indicators on these topic areas were recognized by previous WHO project to be in need of further elaboration. For each topic area, invited experts held two major meetings, reviewed the existing scientific evidence and approaches to the surveillance. They formulated initial set of indicators, and validated in small-scale studies before selecting them for pilot testing. For the indicators on other topic areas than the above three areas, indicators previously developed by WHO’s projects were reexamined by consulting experts. At the Working Group meeting in Luxembourg, January 2004, national focal points and experts discussed the proposed set of EH indicators, and agreed on 46 indicators to be tested by the pilot study in the participating countries. Detailed activities in sub-projects of WP2 are summarized below.

WP2A: Development of indicators for ‘housing and health’

1. Review of the existing approaches to the surveillance and identification of the housing-health issues as the basis of housing indicators.
 - 1.1 Literature review, background material preparation of expert consultation. The work served as background for discussion and guidance in preparing a new set of housing indicators.
2. Meeting in Lisbon, 04-06 June 2003 (See Annex 4-1 for minutes):
 - 2.1 Organizational aspects:
 - Venue: Division General, Ministry of Health of Portugal

- Participation: fourteen invited experts on the different health aspects of housing and built-in environment, and three WHO staff members.
- 2.2 Scientific preparation:
 - Preparation of the terms of reference of the expert proposals²
 - Preparation of background papers by the experts (Dr. Freitas, Dr. Gundersen and Prof. Ormandy).
 - 2.3 The initial set of fourteen housing indicators of most relevance for health was identified and agreed.
 - 2.4 The scope and purpose of testing the indicator proposal for validity were determined.
 3. Follow up of the First Working Group Meeting in Lisbon (See Annex 4-4 for details)
 - 3.1 A total of 12 indicator templates for housing and health were selected.
 - 3.2 The indicator sheets were reviewed within the group, by WHO and external experts.
 - 3.3 The final set of indicator templates was sent out to the meeting participants for a data screening. Each indicator was assigned to at least two experts, trying to identify the availability of data for the indicator. Similar screening processes were undertaken in two local authorities in order to see data availability on the local level.
 4. The Second Working Group Meeting in Rome, 14-16 January 2004 (See Annex 4-5 for details)
 - 4.1 The expert group discussed the results of the screening process. Some indicators were dropped, and all indicators were scrutinized based on the results of the screening.
 - 4.2 Nine housing and health indicators were recommended for the pilot study.

WP2B: Development of indicators for ‘noise and health’

1. Review of the existing approaches to the surveillance and proposal for a set of indicators for ‘noise and health’ according with the EC legislation.
 - 1.1 Literature review, background material preparation of expert consultation. The work served as background for discussion and work guidance to the Working Group Meeting.
2. Meeting in Brussels, 7-9 April 2003 (See Annex 5-1 for details):
 - 2.1 Organizational aspects:
 - Venue: European Commission (Brussels)
 - Participation: twenty two participants – invited experts on the different aspects of noise pollution, WHO staff and an observer from the EC DG Environment
 - 2.2 Scientific preparation:
 - Preparation of the terms of reference and meeting
 - Background papers on the indicators according to the DPSEEA model
 - Proposal of a set of key indicators by the experts
 - 2.3 The first proposal for a core set of indicators was agreed upon and the follow-up actions were defined.
3. Follow up of the First Working Group Meeting in Brussels
 - 3.1 The template methodology sheets for 18 candidate indicators for pilot study were prepared and reviewed by the expert group, WHO, and some ECOHIS focal points.
 - 3.2 A small group was established for defining the indicator “Attributable fraction of risk of cardiovascular morbidity/mortality to noise exposure”. The indicator methodology sheet was fine-tuned by Dutch and German experts.
 - 3.3 A set of methodology sheets for 15 indicators was proposed for testing. Noise experts and country focal points tested and validated the indicators to report at the second meeting. Eight countries checked the relevance and added values of the indicators and filtered them with real data. Each country expert tested a maximum of 3 indicators.
4. The Second Working Group Meeting in Bonn, 18-19 December 2003 (See Annex 5-2 for details)
 - 4.1 The experts discussed the results of the preliminary testing. Some indicators were improved and/or merged, and others deemed not feasible and therefore dropped.

4.2 Six noise and health indicators were recommended for the pilot study.

WP2C: Development of indicators for ‘road accidents’

This activity was coordinated by the Public Health Agency of the Lazio Region, Italy. The sub-project activity report is enclosed as Annex 6-1.

1. Determination of the work plan and terms of reference, creation of network of partnership.
2. Review of the existing surveillance systems and of the information reporting approaches used by Member States and the EU bodies.
3. Evaluation of compatibility of existing indicators on road accidents with the EC legislation (all types of regulatory texts) concerning road traffic and casualties prevention.
 - 3.1 The relevant body of EC legislation (all types of regulatory texts) was identified.
 - 3.2 Existing risk factor and road accident indicators were checked *vis-à-vis* the EC legislation.
 - 3.3 Document summarizing the results from 3.1) and 3.2) was prepared by Carlo Pasquariello.
4. Working Group meeting Rome, 31 March–1 April 2003 (See Annex 6-2 for details):
 - 4.1 Scientific preparation:
 - Background papers on the review of surveillance systems and on key issues and criteria for selecting road accidents indicators were presented.
 - The key issues to be covered by road accidents indicators within the DPSEEA-adjusted framework were identified.
 - 4.2 The initial set of road accident indicators was selected.
5. The Second Working Group Meeting in Rome, 17–18 November 2003 (See Annex 6-2 for details)
 - 5.1 The matrix evaluation criteria by each indicator were constructed.
 - 5.2 A standardised frame for the definition of the proposed indicators was developed.
 - 5.3 Follow-up to the meeting:
 - Evidence-based actions to prevent road accident health effects were reviewed.
 - A small-scale validation studies were performed for data sources and indicators.
 - 5.5 Eleven road accidents indicators were recommended for the pilot study.
 - 5.6 A scientific report on road accidents indicators was prepared and enclosed as Annex 6-3.

WP3: Testing & expert approval of proposed set by EU Member States

In collaboration with national focal points and network of experts, WHO/ECEH completed a pilot study to test the proposed indicators for feasibility and applicability. With limited financial support, the national focal points collected the information on the data (meta-data) and the data, if applicable, in their own countries according to the study protocol and the structured questionnaire. The four main evaluation criteria (i.e., the availability, the quality, the comparability, and the policy-relevance) were scored as poor, fair, and good, and the overall readiness for implementation was assessed. Data availability from the international databases was reviewed by WHO/ECEH. The information thus collected was reviewed in accordance with four evaluation criteria and the expert consensus. Participating Member States produced separate national reports summarizing their assessment of the readiness of the country for application of the indicators. As a consequence of this collective process, the EH indicators were categorized into three levels of readiness for implementation, and the indicators most ready for implementation were recommended to the ECHI. Detailed activities in WP3 are summarized below.

1. Test feasibility and applicability of data collection for the proposed indicators
 - 1.1 ECOEHIS Meeting in Luxembourg, 29-30 January 2004: *Design of pilot study* (See Annex 7 for details):

- All indicators recommended by WP1 and WP2 were reviewed by the ECOEHIS partners.
 - A total of 46 Indicators on Air, Noise, Housing, Traffic Accidents, Water and Sanitation, Chemical Emergencies, and Radiation were agreed for further pilot testing in participating countries.
 - Decisions were made to revise and update the definition for selected indicators.
 - The objectives and scope of the pilot study were agreed and a protocol of pilot study was drafted.
 - Criteria to evaluate the indicators were discussed.
- 1.2 Implementation of the pilot study: February-July 2004 (Study protocol and questionnaire is presented as Annex 8)
- Methodology sheets were updated and distributed.
 - Questionnaires for collecting meta-data and data were prepared and distributed.
 - The protocol for pilot study was prepared and distributed.
 - ECOEHIS partners in member states collected meta-data and data from April until July.
 - For the countries having difficulties in identifying the meta-data, WHO/ECEH supported the data identification process by bringing in national experts identified through the WHO network.
 - WHO/ECEH checked the availability of international databases for the indicators under study.
2. Review of pilot study results and formulation of Member States recommendation
- 2.1 ECOEHIS Meeting in Bonn 7-9 July 2004: *Results of pilot study* (See Annex 9 for details):
- The meeting was attended by twenty-seven project partners and invited experts.
 - The experiences from implementation of pilot study in Member States were presented.
 - The feasibility and applicability of the proposed indicators were assessed by reviewing results of pilot study from national and international perspectives.
 - The final agreement on the core set EH indicators for EU countries were made.
 - Fine adjustment of definitions of indicators was recommended to enhance the availability according to the decision at the meeting.
 - Follow-up actions needed to enhance the use for recommended indicators were identified.
- 2.2 Secretariat and experts adjusted definition of selected indicators according to the meeting recommendation (Updated methodology sheets are presented as Annex 10)
- 2.3 Member States prepared national reports on the implementation and conclusion of pilot study in their countries (National reports are presented as Annex 11)
3. Preparation of final project report
- 3.1 Summary of project activities, meeting reports, and related documents were collected from the Working Groups of WP1, WP2, and WP3, and were compiled by WHO/ECEH.
- 3.2 WHO/ECEH drafted the final project report for review and approval by the ECOEHIS partners.

Project Results

Development of New Indicators

In the topic areas of housing, noise, and road accidents, the ECOEHIS project made a technical progress in the definition, methods and tools of indicators, developed new indicators, and checked for their compatibility with EU legislation in the Working Group. The methods and tools were updated to be able to use the available international databases for the indicators recommended for the ECHI as presented in Annex 10.

Housing and Health

A total of nine housing indicators were developed and tested in the Member States. Background documents for these indicators are presented in Annexes 4-1 through 4-5. As compared to the previous ones, these indicators cover wider range of housing and health issues, and more realistically reflect important exposures to housing conditions. These indicators also integrate more innovative topics including accessibility of the disabled and elderly to the residence, deaths due to extreme temperature, domestic accidents, affordability issues, and crime/fear of crime in residential areas. Among nine indicators tested in the pilot study, six indicators were considered to be ready for immediate implementation in the EC, two were recommended for WHO use, and one for further recommendation.

Noise and Health

A total of six noise indicators were developed and proposed by the Working Group on noise indicators, and tested in the Member States. Background documents for these indicators are presented in Annexes 5-1 and 5-2. These indicators cover the population exposure to noise, which was made possible by the scope of the recently adopted European Directive 2002/49/EC. As an innovative indicator, 'attributable fraction of risk of cardiovascular morbidity/mortality to noise exposure' was newly developed after a meta-analysis on the issue in the Working Group. In selecting indicators for recommendation, the project considered the fact that European Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 will be fully implemented in 2007. Among six indicators tested in the pilot study, two were considered to be ready for immediate implementation in the EC, two were recommended for WHO use, and two were dropped from further consideration. Because some Member States will not have the national data until 2007, a gradual adoption was recommended for the noise indicators until 2007.

Road Accidents

A total of eleven indicators were developed by subcontractor, and tested in the Member States. Background documents for these indicators are presented in Annexes 6-1 through 6-3. As compared to the previous set of indicators, these indicators cover wider range of causal chain including upstream determinants and action indicators. New indicators cover important risk factors of road accidents such as person time and distance on the road, cars exceeding speed limits, and use of safety devices. Public health effects of road accidents on mortality and injury rates were further elaborated by computing 'Years of Life Lost' and 'Disability Adjusted Life Years (DALY)' as separate indicators. An indicator on mortality due to drinking driving was proposed separately. The working group discussed the necessity to develop action indicators and decided not to propose them because it was agreed in the Working Group that the scope of the indicators was to monitor the changes introduced by policies, preventive programs, laws, and other actions in the field of road accidents and their health consequences. Among eleven indicators tested, five were considered to be ready for immediate implementation in the EU countries, the others were recommended for WHO use.

Recommended Indicators

The main result of the project, the methodology sheets of the EH indicators proposed for implementation in EU countries, is presented in Annex 10. The indicators were categorized into three groups by the project participants as below.

1. *Indicators ready and recommended for implementation in the EC.*
These indicators are recommended for inclusion in the ECHI short list.
2. *Indicators ready, but not feasible for immediate implementation in the EC.*
These indicators are recommended for WHO project including ENHIS.
3. *Indicators desirable though requiring further development.*
These indicators are recommended for further elaboration.

I. Indicators recommended for ECHI

The indicators in this category have high policy-relevance, and are readily available from international databases adding little reporting burden to member states. Table 1 shows the environmental health indicators in this category dealing with **Exposure, Health effects, and Action** in the framework of DPSEEA.

Table 1. Indicators related to Exposure/Effects/Action recommended for the ECHI list

Topic area	Recommended indicator	Indicator code*
Air	<ul style="list-style-type: none"> • Exposure to air pollutants <ul style="list-style-type: none"> ○ Population-weighted annual average concentration of PM₁₀ ○ Population-weighted annual average concentration of PM_{2.5} ○ Population-weighted annual average concentration of O₃ ○ Exceedance of AQ limit values for NO₂ ○ Exceedance of AQ limit values for SO₂ • Composite index on national policies to reduce environmental tobacco smoke exposure 	<ul style="list-style-type: none"> •AIR_Ex1 ○ AIR_Ex1_PM₁₀ ○ AIR_Ex1_PM_{2.5} ○ AIR_Ex1_O₃ ○ AIR_Ex1_NO₂ ○ AIR_Ex1_SO₂ •AIR_A1
Housing and Health	<ul style="list-style-type: none"> • Proportion of households living in crowded housing conditions • Percentage of the population living in housing suffering from dampness/mould growth. • Percentage of the population living in housing with missing hygienic amenities. • Incidences and perception of theft, robbery and vandalism in dwellings and public spaces. • The sum of excess deaths during periods of exposure to extremely high or low temperatures 	<ul style="list-style-type: none"> •HOUS_Ex1 •HOUS_Ex3 •HOUS_Ex4 •HOUS_Ex6 •HOUS_E1
Noise and Health	<ul style="list-style-type: none"> • Population exposed to various noise levels (Lden and Lnight) by different sources • National regulations on maximum sound levels for indoor and outdoor leisure events 	<ul style="list-style-type: none"> •NOISE_Ex1[#] •NOISE_A1
Traffic Accidents	<ul style="list-style-type: none"> • Mortality rate due to transport accidents • Injury rate due to transport accidents 	<ul style="list-style-type: none"> •TRAF_E1 •TRAF_E3
Water and Sanitation	<ul style="list-style-type: none"> • Proportion of population with continuous access to adequate amount of safe drinking water in the home 	<ul style="list-style-type: none"> •WATSAN_Ex1
Chemical Emergencies	<ul style="list-style-type: none"> • Regulatory requirements for land-use planning • Presence of an active, cumulative register of chemical incidents with national coverage • Composite index of government preparedness for chemical incidents 	<ul style="list-style-type: none"> •CHEM_A1 •CHEM_A2 •CHEM_A3
Radiation	<ul style="list-style-type: none"> • Incidence of malignant melanoma • Existence of effective environmental monitoring of radioactivity in compliance with quality assurance program 	<ul style="list-style-type: none"> •RAD_E1 •RAD_A1

In addition, the following indicators dealing with **Driving Force, Pressure, and Status** in the framework of DPSEEA were selected as highly relevant to the EH policies, and readily available from international data sources (Table 2). These indicators were considered to add no more reporting burdens to the Member States.

* Indicator codes in this report were assigned for the reference in the pilot study of ECOEHIS. Each indicator should be assigned a new permanent code at the stage of implementation for unique identification.

[#] Because some Member States will not have data representing the national level until 2007, a gradual adoption was recommended for these indicators until 2007.

Table 2 . Indicators related to Driving Force/Pressure/Status recommended for the ECHI list

Topic area	Recommended indicator	Indicators code
Air	<ul style="list-style-type: none"> • Passenger-transport demand by mode of transport • Freight-transport demand • Road transport fuel consumption • Air pollution emissions 	<ul style="list-style-type: none"> • AIR_D1 (=TRAF_D1) • AIR_D2 • AIR_D3 • AIR_P1
Housing and Health	<ul style="list-style-type: none"> • Percentage of the population facing financial problems with the housing expenditures 	<ul style="list-style-type: none"> • HOUS_P1
Traffic Accidents	<ul style="list-style-type: none"> • Passenger-transport demand by mode of transport • Age of vehicle fleet • Road accident rate 	<ul style="list-style-type: none"> • TRAF_D1 (=AIR_D1) • TRAF_S1 • TRAF_S2
Water and Sanitation	<ul style="list-style-type: none"> • Wastewater treatment • Recreational water compliance • Drinking water compliance 	<ul style="list-style-type: none"> • WATSAN_P1 • WATSAN_S1 • WATSAN_S2
Chemical Emergencies	<ul style="list-style-type: none"> • Industrial facilities under EU Seveso II Directive 	<ul style="list-style-type: none"> • CHEM_P1

II. Indicators recommended for WHO project including ENHIS

These are indicators relevant to EH policies, but require more efforts in data collection, computation, or interpretation. They are not feasible for immediate implementation in the EC, but are recommended for WHO project such as ENHIS. All indicators in this category were dealing with Exposure/Effects/Action in the framework of DPSEEA (Table 3).

Table 3 . Indicators related to Exposure/Effects/Action recommended for WHO project

Topic area	Recommended indicator	Indicator code
Air	<ul style="list-style-type: none"> • Years of expected life lost due to Particulate Matter exposure 	<ul style="list-style-type: none"> • AIR_E1
Housing and Health	<ul style="list-style-type: none"> • Indoor radon in dwellings • Housing safety and accidents 	<ul style="list-style-type: none"> • HOUS_Ex5 • HOUS_E2
Noise and Health	<ul style="list-style-type: none"> • Attributable fraction of risk of cardiovascular morbidity/mortality to noise exposure 	<ul style="list-style-type: none"> • NOISE_E1
Traffic Accidents	<ul style="list-style-type: none"> • Potential Years of Life Lost due to transport accidents 	<ul style="list-style-type: none"> • TRAF_E2
Water and Sanitation	<ul style="list-style-type: none"> • Management of bathing waters 	<ul style="list-style-type: none"> • WATSAN_A1

III. Indicators recommended for further elaboration

These indicators are desirable, but they are not ready yet for implementation. Except for an indicator on exceeding of speed limit (TRAF_S3), all indicators in this category were dealing with Exposure/Effects/Action in the framework of DPSEEA (Table 4).

Table 4. Indicators related to Exposure/Effects/Action recommended for further elaboration

Topic area	Recommended indicator	Indicator code
Housing and Health	<ul style="list-style-type: none"> • Accessibility of disabled and elderly to the dwellings 	<ul style="list-style-type: none"> • HOUS_Ex2
Noise and Health	<ul style="list-style-type: none"> • Self reported noise health effects - Annoyance and sleep disturbance 	<ul style="list-style-type: none"> • NOISE_E2
Traffic Accidents	<ul style="list-style-type: none"> • Person time spent on the road • Use of vehicle safety device • DALY lost due to road traffic accidents • Mortality due to drinking driving 	<ul style="list-style-type: none"> • TRAF_Ex1 • TRAF_Ex2 • TRAF_E4 • TRAF_E5
Water and Sanitation	<ul style="list-style-type: none"> • Outbreak of water-borne diseases • Water safety plans 	<ul style="list-style-type: none"> • WATSAN_E1 • WATSAN_A2

Capacity Building in Member States

The process of ECOEHIS project had various positive impacts on national capacity building to establish a pan-European EHIS. By participating in the project as country representatives, establishing national networks of experts and stakeholders, and collecting metadata and data for the pilot study, the national focal points and project teams set off the capacity building in their countries for the implementation of EHIS. In their national reports, the participating Member States reported very positive experiences of collaboration in this project (See Annex 11 for national reports). For example, France reported that the ECOEHIS project gave national organizations the opportunity to exchange information and optimize national response to monitoring issues for Europe, activating a synergistic interaction between European countries and national experts for implementation of a harmonized European monitoring system. Italy reported that the technical reports by ECOEHIS project team would promote a regular environment and health reporting of identified national information needs linked to European network. In the Netherlands, a steering committee was created as an advisory body for the pilot study, which includes representatives of the ministries of environment, health, transport, as well as local health authorities, environment agencies and NGOs. It was pointed out that this steering committee, if permanently running, would ensure progress towards the establishment of the national EHIS. Other countries testified similarly positive progress in their countries, confirming that the implementation of the ECOEHIS project contributed to the capacity building in the Member States for future implementation of pan-European EHIS as endorsed by the Budapest Declaration of 2004.

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ВСЕМИРНАЯ ОРГАНИЗАЦИЯ ЗДРАВООХРАНЕНИЯ
ЕВРОПЕЙСКОЕ РЕГИОНАЛЬНОЕ БЮРО

**EUROPEAN CENTRE FOR ENVIRONMENT AND HEALTH
BONN OFFICE**

Annex 1 List of Personnel

DEVELOPMENT OF ENVIRONMENT AND HEALTH INDICATORS FOR EUROPEAN UNION COUNTRIES

ECOEHIS

Grant Agreement SPC 2002300

Between the European Commission, DG Sanco
and the World Health Organization, Regional Office for Europe



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Annex 2

List of Subject Area Experts

DEVELOPMENT OF ENVIRONMENT AND HEALTH INDICATORS FOR EUROPEAN UNION COUNTRIES

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