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"Mid Term Review of the European Environment and Health Action Plan 2004-2010"

{COM(2007) 314 final}

TECHNICAL ANNEXES

TABLE OF CONTENTS

ANNEX I:
PROGRESS ON THE IMPLEMENTATION OF THE ACTION PLAN

ACTIONS ON ENVIRONMENT AND HEALTH INFORMATION

In the framework of actions 1 to 4 of the Action Plan the Commission has undertaken an extensive **review[1] of current environment and health information and monitoring systems** in 2006. The aim of this review was to identify whether current practice is adequate to identify emerging issues, assess the extent of environmental health problems, and evaluate policy options. The main conclusion is that a number of EU-wide environment and health monitoring and information systems exist and assessment strategies are in place to cover the range of environmental impacts expected to affect human health. In many cases further development is under way to improve the level of protection. The review makes concrete recommendations for increasing linkage and integration between existing systems, enhancing efforts on research and human biomonitoring, and improving data collection procedures, which are formulated in 14 concrete tasks. Implementation of the tasks mentioned in the Environment & Health Information Review and Implementation Plan has started.

To implement Task 1 on Data linkage the Commission's Directorate-General Information Society and Media launched a tender for a study on "*Connectivity between Environment and Health Information Systems: Supporting synergy between environment and health research and policies* "[2]. In the context of research to be carried out under the Seventh Framework Programme of Research (FP7 – 2006-2013)[3], the Information and Communication technologies (ICT) theme of the Cooperation Programme, Objective 2007.6.3 on ICT for Environmental Management and Energy Efficiency, calls for research in collaborative systems for environmental management with, among other, an enhanced capacity to assess population exposure and health risks.

Concerning Task 2 on a European advanced network for the combined monitoring of air pollution and related health effects, a call is currently open under theme Environment of the Cooperation Programme of FP7[4].

Regarding Task 3 on ambient air epidemiology, a call is currently open under theme Environment of the Cooperation Programme of FP7[5]. EC funding available will be up to €7M for a European cohort on air pollution. The aim of this cohort is to take advantage of existing cohorts in Europe. In order to address in a satisfactory manner all the challenges put forward in the Review document, further funding for a prospective study from future FP7 calls is under consideration.

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1 Commission Staff Working document Environment and Health Information Review and Implementation Plan (SEC(2006)1461) adopted by the Commission on November 8th 2006. A user friendly brochure is available in English, French and German on the Commission website http://europa.eu.int/comm/environment/health/index_en.htm.

2 Contract duration: 12 months; budget: 200. 000 euro; study expected to start in April 2007

3 http://cordis.europa.eu/fp7/home_en.html

4 http://cordis.europa.eu/fp7/cooperation/environment_en.html. The specific topic addressing Task 2 in the workprogramme is ENV.2007.1.1.2.1. Megacities, air quality and climate.

5 http://cordis.europa.eu/fp7/cooperation/environment_en.html. The specific topic addressing Task 3 in the workprogramme is ENV.2007.1.2.2.2. European cohort on air pollution.

To implement Task 5 on indoor air the Environment Directorate-General is funding a study on "*Ranking of indoor air health problems using health impact assessment*"[6], starting in January 2007.

Regarding Task 6 on drinking water safety plans, a Commission Proposal for a revision of the Drinking Water Directive is foreseen by the end of 2008. The ongoing EPIBATHE and VIROBATHE projects are providing research support for this purpose (see Table 12). A WHO study on water safety plans started in 2006 and will be finalised in April 2007; A Directorate General Environment funded grant to WHO was launched.

As far as Task 7 on drinking water data base is concerned, Water Information System for Europe (WISE) has been further developed and endorsed by the Commission Services, the European Environment Agency (EEA) and the Member States. The official public launch of WISE will take place on World Water Day 2007 at a European Water Conference hosted by Commissioner Dimas. Further development including the integration of drinking water data is foreseen in a detailed WISE Implementation Plan endorsed by Commission Services and EEA; as an indispensable step on the data collection side, new - already WISE-oriented - reporting guidelines have been developed and are foreseen for final endorsement until end 2007.

Task 8 on drinking water policy effectiveness indicators is being implemented through the ENHIS project[7]. In the framework of Work Package 7 (Health Impact Assessment team) a qualitative health impact assessment on drinking water pollution is being developed. The aim is to develop a tool or guidance for policy makers how to understand currently available data on drinking water quality from national and international databases in terms of public health risk and health effects of drinking water pollution.

Regarding Task 9, a comprehensive research project[8] on bathing water epidemiology is ongoing funded by Directorate General Research. The project will (i) complete a review of the international literature world-wide (covering all perceived health risks) and meta-analysis of current epidemiological data derived principally from UK and German studies; (ii) define data gaps restricting the application of 'evidence-based' policy to bathing water standards outside these regions; (iii) design and agree a suitable research protocol for filling these data gaps and undertake the first epidemiological studies in the Mediterranean and Hungary; (iv) complete the epidemiological studies in two bathing seasons; and will produce (v) a scientific report of the findings and detailed policy interpretation by the end of 2008. Based on this final report the Commission will then in early 2009 issue a document reporting on the outcome of the study and concluding on the further work to be done on the health implications of bathing water at EU level.

Concerning Task 12 on noise, calls will be launched under FP7 related to the health impacts of noise.

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6 Contractor VITO, Belgium, contract duration: 10 months; budget: 130 000 €.

7 ENHIS: Implementing Environmental and Health Information System in Europe http://ec.europa.eu/health/ph_projects/2003/action1/action1_2003_28_en.htm

8 EPIBATHE: Assessment of human health effects caused by bathing waters - http://www.aber.ac.uk/iges/research/epibathe

Tasks 13 regarding health impact assessment and burden of disease methodology. The Joint Research Centre in collaboration with EEA and WHO-Europe organised a workshop on "environment burden of disease" methodologies. The workshop concluded that a well established methodology exists, the one developed by WHO, and that this methodology is currently the "best available practice" for calculating disease burden. But the workshop also concluded that there still is a need for method development and refinement and that basic research is needed to establish causal and furthermore quantitative environment and health relationships. The Joint Research Centre is preparing an update and an extension of the burden of disease study on children in Europe made for the Fourth Ministerial Conference on Environment and Health in Budapest 2004.

The Commission and the member states of the WHO European Region are pursuing a collaborative effort to develop a comprehensive information system that would allow for the monitoring and evaluation of the link between environment and health and of the effectiveness of related policies, especially with regard to their impact on children's health. This environment and health information system (EHIS) is being developed under the EU Public Health Programme co-financed ENHIS2 project[9] and will be presented to environment and health Ministers in June 2007.

ACTION 3: HUMAN BIOMONITORING

Preparation for an EU pilot project on Human Biomonitoring

In Action 3 of the Action Plan the Commission committed to develop a coherent approach to **human biomonitoring** (HBM) in Europe and to test out its feasibility in an EU pilot project[10].

The preparation of this EU pilot project started in 2004 and addressed technical, political, financial and communication aspects in parallel. Two *technical* projects (BiPRO[11] and ESBIO[12]), financed by the European Commission, provided the basis for the Implementation Group (IG) on HBM[13] to make 3 recommendations addressing the policy-science interface for discussion with Member States and stakeholders. The ethical aspects of HBM programmes and the difficulties in accurate interpretation of data emerged as critical issues and were addressed in a stakeholder workshop[14], organised by the European Commission, in collaboration with non-governmental organisations and industry. Another workshop addressed the link with ongoing Community HBM research[15]. To address the issue of science-based *communication* avoiding unnecessary public alarm, the Commission is considering how best to approach health risk communication in collaboration with the Member States. A HBM

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9 ENHIS2: Establishment Of Environmental Health Information System Supporting Policy Making - http://ec.europa.eu/health/ph_projects/2004/action1/action1_2004_24_en.htm

10 All info on www.http://www.eu-humanbiomonitoring.org

11 "*Human Bio-monitoring: support to the European Environment and Health Action Plan 2004-2010"*. Study funded by DG Environment (June 2005-April 2006).

12 ESBIO: Expert team to support human biomonitoring in Europe - http://www.eu-humanbiomonitoring.org/sub/esbio.htmProject funded by DG Research under Sixth Framework Programme of Research (FP6: 2002-2006). Call topic elaborated in close cooperation with DG Environment.

13 HBM experts from Member States and Croatia.

14 December 6th – 7th 2006 in Brussels.

15 ECNIS (http://www.ecnis.org) workshop on biomarkers and their potential in HBM and environmental health surveillance, Luxembourg, 29th November 2006.

leaflet[16] was prepared in 2006 to give visibility to the EU HBM activities. On the *political* side, the participation of enough Member States in the pilot project was ensured by close contacts with governmental representatives. Moreover, progress was discussed in Member States meetings and the Consultative Forum on Environment and Health. With regard to funding, the 1st calls for proposals under the 7th Framework Programme for Community Research, Cooperation Programme,[17] reserved funding for an EU network on human biomonitoring[18], which could constitute a partial source for funding for the EU Pilot Project to start by the end of 2007, pending the proposal selection outcome.

The pilot phase will focus on (1) *capacity-building* and *harmonisation* of procedures allowing more comparable results in Europe; (2) *the future policy role* of HBM; and (3) transparency in aims and results by *appropriate communication* at individual and at community level.

For the post-pilot phase the Commission is exploring the possibility to embed future HBM activities in an established framework such as the EU Health Examination Survey[19], which is under construction.

Metabonomics for Human Biomonitoring

At the end of 2005, the Joint Research Centre initiated two research projects to investigate the application of metabonomics approach for human biomonitoring and analysis of human biofluids: NIMAC[20] and CARDIUM[21].

NIMAC was carried out in collaboration with the Pediatric Department of the Padova Hospital. In this study, metabonomics was applied, for the first time, to the analysis of Exhaled Breath Condensate (EBC) in asthmatic children. EBC samples were analysed by Nuclear Magnetic Resonance spectroscopy. This new non-invasive approach to the study of asthmatic inflammation allows the characterisation of airway biochemical fingerprints. Characteristics signals found in the spectra of EBC of asthmatic children suggest the presence of acetylated compounds. These observations pave the way to the study of new metabolic pathways that may have a role in asthma inflammation. The results of this study are in the phase of publication in a scientific medical journal.

CARDIUM is a cooperative project between the Varese Hospital for the collection of human plasma samples from cardiovascular pathologic cases, and the Joint Research Centre Medical service of Ispra for healthy cases. The statistical processing of the Nuclear Magnetic Resonance data of these samples show clear separation of the two groups indicating the strong potential of this approach for studying the apparition and evolution of cardio vascular diseases in humans. The results of this study will be submitted for publication in a scientific journal.

The methodologies developed and tested in the NIMAC and CARDIUM projects are now applied in the project PM-CARE, carried out in collaboration with the Hospital Luigi Sacco of Milano, for studying the impact of exposure to atmospheric Particulate Matter, especially PM10 resulting from pollution in cities, on the health status of population at risk (subjects

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16 HBM: Breaking the divide between environment and health

17 Published in December 2006. http://cordis.europa.eu/fp7/home_en.html

18 Under the Environment theme of the Cooperation Programme in the Environment and Health sub-activity.

19 http://ec.europa.eu/health/ph_information/dissemination/reporting/ehss_06_en.htm

20 Non Invasive Monitoring of Asthmatic Children

21 CARdiovascular Diseases Investigation Using Metabonomics

suffering from cardio or respiratory diseases). The results and scientific conclusions of the PM-CARE project will be completed in 2007.

Biobanks and environmental specimen banks

The Joint Research Centre and EEA organised a workshop on biobanks and environmental specimen banks as support to future European biomonitoring activities. Participants represented different environmental specimen- and biobanking activities in Member States. The possibility to establish a virtual environmental specimen bank based on current biobanking activities in member states was discussed. The workshop clearly identified the need for a coordinated bio/environment banking activity as support both for research and for monitoring initiatives.

The Health theme of the Cooperation programme of FP7 plans to fund from its first call for research proposals a large-scale European network on biobanking[22].

ACTION 5: TO INTEGRATE AND STRENGTHEN EUROPEAN ENVIRONMENT AND HEALTH RESEARCH

The main aims for the period 2004-2006 were:

A. To analyze the final results of relevant Community funded research projects for policy making and to consolidate research results

In the ***Fifth Framework Programme of Research of the EU (FP5 - 1998-2002)***, a dedicated Key-action called *Environment and Health*[23] provided funding for 183 projects with an annual budget of around €40M. In addition, the programme *Energy, Environment and Sustainable Development*[24] funded projects on the impact of global change on human health and the impact of endocrine disrupters on wild-life health[25]. The main funding was allocated to projects dealing with the impact of chemicals, air pollution and electromagnetic fields on health, respectively. A particular issue that received sizable funding was the mechanisms and health issues related to endocrine disruption. Results of these projects have been published in a catalogue[26] and on a dedicated research website[27]. Information related to projects focused on health impacts of exposure to electromagnetic fields as well as allergy and asthma[28] has been published[29]. The final reports or summaries of all other FP5 environment and health projects have been posted on the Environment and Health key action website[30]. During the first months of 2007, a publication called *'EU research on environment and health – Results from projects funded by the Fifth Framework Programme'* will be produced, highlighting the main outcome of FP5 environment and health projects and giving indication of how these results

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22 http://cordis.europa.eu/fp7/dc/index.cfm. Specific topic in the workprogramme: HEALTH-2007-2.1.1-1: Networking biobanking initiatives across Europe: developing standards and norms for existing and future human sample biobanks

23 *Key-action 'Environment and Health'* - http://cordis.europa.eu/life

24 *Energy, Environment and Sustainable Development* - http://cordis.europa.eu/eesd

25 Scope of the projects and budget allocation is given in Table 1.

26 *Commission research in action: tackling the hormone disrupting chemicals issue* - http://ec.europa.eu/research/environment/pdf/hormone_disrupting_chemicals_issue.pdf

27 *Endocrine disrupter research in the European Union* - http://ec.europa.eu/research/endocrine/index_en.html

28 *Allergy & asthma EU research projects synopsis* - ftp://ftp.cordis.europa.eu/pub/life/docs/allergy_asthma_catalogue.pdf

29 *Health and electromagnetic fields* - ftp://ftp.cordis.europa.eu/pub/life/docs/emf_brochure_sheets.pdf

30 http://ec.europa.eu/research/quality-of-life/ka4/index_en.html

have been applied to enhance EU policy. In addition, a comprehensive DG Research E&H research portal, through which all E&H-related projects funded in the past and currently can be accessed, is in the planning stages. Project results[31], where appropriate, have been disseminated directly to policy makers, e.g., through a number of dedicated workshops[32]. For example, the results of projects dealing with endocrine disrupting chemicals have contributed to the goals of the *Community Strategy for Endocrine Disrupters*[33] and those on ambient air pollution to the CAFÉ process[34], whilst the projects on noise will contribute to the updating of EU noise directives[35], and the results of projects on electromagnetic fields have been taken into account when the Scientific Committee on Emerging Health Risks of Health and Consumer Protection DG (SCENHIR) redrafted the opinion on *Possible effects of Electromagnetic Fields (EMF) on Human Health*[36] in 2006/2007 (see Action 13). Four projects deserve particular mention: PINCHE[37], AIR-NET[38], NANODERM[39] and NANOPATHOLOGY[40]. The PINCHE Thematic Network, focused on air pollution, cancer, neuro-toxicity, and noise, analysed studies related to children's health and environment in FP4 and FP5 projects as well as nationally funded studies and made policy-relevant and research recommendations. The AIRNET project had similar objectives, but focused solely on air quality issues. NANODERM and NANOPATHOLOGY were the first projects funded by the EU on health impacts of nanoparticles.

In the ***Sixth Framework Programme of Research of the EU (FP6- 2002-2006)***, the Scientific Support to Policies programme (so-called 'Priority 8'[41]) in particular funded projects[42], the aim of which is to carry out a detailed analysis of research activities undertaken in the past, including those funded by FP5 and national programmes. 4 domains have been covered: indoor air pollution (EnVIE[43]) ambient air pollution (CAIR4HEALTH[44]), electromagnetic fields (EMF-NET[45] and COST281[46]) and the 4 priority diseases/disorders identified in Action 6 of the Action Plan (HENVINET[47]). The EMF-NET coordination action has started producing results in the form of fact sheets on various issues related to health impacts of exposure to electromagnetic fields in various settings, highlighting policy relevance of the results. The DG Joint Research Centre (JRC) work programme comprised direct research actions on information systems and validation of non-animal testing methods, assessment of chemicals, computational toxicology, support to REACH, and total human exposure

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31 Highlights of results of major FP5 projects are given in Table 2.

32 Table 4

33 *Community strategy on endocrine disrupters* - http://ec.europa.eu/research/endocrine/activities_stategy_en.html

34 *The CAFÉ programme* - http://ec.europa.eu/environment/air/cafe/index.htm

35 *Noise* - http://ec.europa.eu/environment/noise/home.htm

36 *Preliminary opinion on possible effects of electromagnetic fields (EMF) on human health* - http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_006.pdf

37 *Policy interpretation network on children's health and environment* - www.pinche.hvdgm.nl

38 *Air pollution and risks for human health* - http://airnet.iras.uu.nl

39 *Quality of skin as barrier to ultrafine particles* - http://www.uni-leipzig.de/~nanoderm/

40 *The role of nano-particles in material-induced pathologies* - http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_nanopathology_en.pdf

41 *Scientific support to policies* - http://ec.europa.eu/research/fp6/ssp/index_en.htm

42 More details on these projects are given in Table 3. The EC contribution to these projects is €6M.

43 *Coordination action on indoor air quality and health effects* - http://indoorairenvie.cstb.fr

44 *Clean air for health – research needs for sustainable development policies* – website under construction

45 *Effects of the exposure to electromagnetic fields: From science to public health and safer workplace* -www.jrc.cec.eu.int/emf-net

46 *Potential health implications from mobile communication systems* - http://www.cost281.org/activities.php

47 *Health and environment network* – website under construction

assessment to chemical (THEXAS CHEM[48]) and physical agents (THEXAS PHYS[49]). In addition, the interactions between environmental stressors, human exposure and health effects were targeted with the EXPOHEALTH[50] research action and a feasibility study on the Integrated Environment and Health Information System. These activities will continue in FP7 with a focus to advancing the state of the science used for regulatory policy making at the Community level on environment and health.

B. To organize European conferences on environment and health to highlight the research results achieved in different priority areas

A number of targeted workshops/conferences[51] on specific E&H issues have been organised since the adoption of the Action Plan, e.g., on health impacts of air pollution, climate change and chemicals, as well as on the impact of modifiers to health risk assessment. Policy relevance of research results has been discussed in almost all of the workshops and policy makers have attended many of the events, thus gaining direct access to research results. Participants have included policy makers from national and EU levels, industry, civil society representatives and academia.

ACTION 6: TO TARGET RESEARCH ON DISEASES, DISORDERS AND EXPOSURES

By enhancing scientific basis of understanding of associations between exposures to especially chemicals and health impacts, the projects funded under this Action will contribute to many policies at EU level, especially concerning assessment of risks of exposure to chemicals[52]. The main aims for the period 2004-2006 were:

A. To study causes of asthma and allergy

A JRC initiative on human envirogenomics and 3 large-scale EU-funded projects GA_2LEN[53], GABRIEL[54] and EUROPREVALL[55] have been launched since 2004 with a total EC contribution of almost €40M[56]. These projects have greatly increased the visibility of allergy/asthma research in Europe by actively engaging stakeholders including policy makers in allergy/asthma research.

B. To investigate causes and mechanisms of neuro-immune disorders[57]

The aim of the CASCADE[58] network of excellence is to improve health risk assessment of chemical residues and contaminants in food, focusing on disruption of neurodevelopment, reproductive systems, hormonally dependent cancer in prostate and breast, colon cancer,

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48 *http://www.jrc.cec.eu.int/pce/actionsprojects_thexaschem.htm*

49 *http://www.jrc.cec.eu.int/pce/actionsprojects_thexasphys.htm*

50 *http://ihcp.jrc.ec.europa.eu/docs/flyer06/ExpoHealth-PCE.pdf*

51 Table 4

52 See Tables annexed

53 *Global allergy and asthma European network* - www.ga2len.com

54 *Multidisciplinary study to identify the genetic and environmental causes of asthma in the European Community* - www.gabriel-fp6.org

55 *The prevalence, cost and basis of food allergy across Europe* - http://www.ifr.bbsrc.ac.uk/Science/ScienceBriefs/europrevall.html

56 Table 5

57 The total EC contribution to these projects is €28M (Table 6)

58 *Chemicals as contaminants in the food chain: a NoE for research, risk assessment and education* - www.cascadenet.org

metabolic diseases and osteoporosis. PIONEER[59] is partially focused on neuroendocrine causes of early onset of puberty, ATHON[60] on neurobehavioural, reproductive and developmental toxicity, as well as tumour promoting activites of non-dioxin like PCBs, F&F[61] on reproductive effects of pharmaceuticals in drinking water, and DEVNERTOX[62] on neurotoxic effects of methylmercury and PCB mixtures.

C. To investigate effects of exposure to metals

PHIME[63], launched in 2006 and with EC contribution of €13M, aims at assessing the impact of exposure to heavy metals through food on diseases of public health concern (nervous system, cardiovascular, osteoporosis/fractures, kidneys, diabetes)[64].

D. To develop European networks to promote research into uncommon cancers; identification of gene-environment interactions involved in the development of cancer in high-risk populations[65].

Two large projects on environmental cancer risks were launched in 2005 and 2006: ECNIS[66] and NEWGENERIS[67], respectively. ECNIS aims at elucidating using biomarker approach the mechanisms by which dietary and lifestyle patterns increase or decrease cancer risk. NEWGENERIS is focused on uncommon cancers: those in children. It is examining the possible role of exposure to geno- and immunotoxic chemicals during pregnancy in the induction of increased risk of cancer and immune disorders in childhood. More details including two smaller cancer-related projects funded by FP6 are given in Table 8.

ACTION 7: TO DEVELOP METHODOLOGICAL SYSTEMS TO ANALYSE INTERACTIONS BETWEEN ENVIRONMENT AND HEALTH

The projects funded under this Action will aid risk managers to take appropriate measures and actions based on realistic risk scenarios as the projects aim at improving the methods and models necessary to carry out integrated environment and health risk assessment including combined exposures. In addition, they will improve methods and tools for health impact assessment and cost/benefit analyses. The main aims for the period 2004-2006 were:

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59 *Puberty onset – influence of nutritional, environmental and endogenous regulators* - http://cascade.projectcoordinator.net/~pioneer

60 *Impact of non- dioxin-like PCBs on neurobehavioural, reproductive and developmental toxicity, and tumour promotion* - www.athon-net.eu

61 *Pharmaceutical products in the environment: Development and employment of novel methods for assessing their origin, fate and effects on human fecundity* - http://foodandfecundity. factlink.net/182059.0

62 *In vivo and in vitro studies on the neurotoxic effects of mixture of neurotoxic seafood contaminants* www.imm.ki.se/ devnertox

63 *Public health impact of long-term, low-level mixed element exposure in susceptible population strata* - www.med.lu.se/english/research/phime

64 Table 7

65 Table 8. The total EC contribution to these projects is €30M.

66 *Environmental cancer risk, nutrition and individual susceptibility* - www.ecnis.org

67 *Newborns and genotoxic exposure risks: Development and application of biomarkers of dietary exposure to genotoxic and immunotoxic chemicals and of biomarkers of early effects, using mother-child birth cohorts and biobanks* - www.newgeneris.org

A. To develop integrated risk assessment methodologies and models for evaluating cumulative effects, interaction between stressors and their influence on human health; and methodologies, techniques, and models to address complexity in environment/health interactions (multi-causality of disease, toxicogenomics, low dose, long-term exposure, combined effects, etc).[68]

The NOMIRACLE[69] project is developing new methods for assessing the cumulative risks from combined exposures to several stressors, the final aim being more effective integration of the risk analysis of environmental and human health effects. The project will contribute to the likely future modifications in risk assessment approaches to be undertaken within the framework of REACH[70]. OSIRIS[71] will develop intelligent testing strategies for chemicals, based on a targeted exploitation of chemical, exposure-related and biological information including genomics, guiding REACH testing needs in the context of available non-test information. INTARESE[72] aims at producing a new integrated risk assessment framework, based on the full chain approach (causal chain spanning sources of pollution, releases into various media, dispersion and transport, exposure medium inhalation/dermal contact/ingestion, intake, uptake, dose, health effects and impacts). It will design a web-based integrated assessment toolbox or system, which will be the operational means to assess environment and health risks. One of the objectives of SAFEFOODS[73] is to investigate the health impact of human exposure to combinations of food contaminants and natural toxins. The recently started ENVIRISK[74] project aims at developing protocols for exposure assessment and for assessment of exposure-health effect relationships.

B. To develop accounting frameworks incorporating externalities associated with various environmental stressors, the assessment of health related externalities, and definition of sustainability thresholds. To extend and validate methods and tools for environment and health impact assessment, cost/benefit analysis and the identification of sources of pollution.[75]

The 2 integrated projects HEIMTSA[76] and 2-FUN[77] aim at developing and improving methodologies for health impact and cost benefit analysis, so that overall environment and health impacts caused by releases of substances into the environment from all relevant human activities can be evaluated. HEIMTSA will develop a related modular integrated assessment system for implementing the methodology Europe-wide. The tools provided by 2-FUN will be integrated into a more extended toolbox through a close collaboration with complementary projects (e.g., HEIMTSA, INTARESE).

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68 The total EC contribution to these projects is €35M. More details are given in Table 9.

69 *Novel methods for integrated risk assessment of cumulative stressors in Europe* - http://viso.jrc.it/nomiracle

70 *REACH* - http://ec.europa.eu/environment/chemicals/reach/reach_intro.htm

71 *Optimized strategies for risk assessment of industrial chemicals through integration of non-test and test information* – website under construction

72 *Integrated assessment of health risks from environmental stressors in Europe* - www.intarese.org

73 *Promoting food safety through a new integrated risk analysis approach for foods* - http://www.safefoods.nl/default.aspx

74 *Assessing the risks of environmental stressors: Contribution to the development of integrating methodology* – website under construction

75 The total EC contribution to these projects is €11M.

76 *Health and environment integrated methodology and toolbox for scenario assessment* – website under construction

77 *Full*-chain and uncertainty approaches for assessing health risks in future environmental scenarios – website under construction

The focus of the METHODEX[78], ESPREME[79], DROPS[80] and VERHI CHILDREN[81] research projects[82] is narrower. METHODEX project has advanced best practice in external cost assessment and has extended the EXTERNE[83] analysis to agriculture, industry, waste and other sectors. ESPREME was focused at the identification of cost-effective abatement strategies for heavy metals. The ongoing DROPS project aims at extending existing methodologies and models to provide an impact-pathway-based model for evaluation of the role of public health externalities on society, including the following pollutants: ozone, heavy metals, PCBs, dioxins and indoor air pollution. The VERHI CHILDREN project has developed and will use an original survey instrument in three countries that have disparities in terms of factors such as social insurance systems, health care systems, social concern about the environment, etc. This survey will be developed so as to provide estimates of willingness-to-pay for immediate and latent risk reductions to adult populations and child populations. This will allow cross-country comparisons and will provide a considerable input in the valuation of environmental health risks.

C. To assess health benefits of food against the health risks of potential environmental contaminants[84]

The ongoing BENERIS[85], QUALIBRA[86] and BRAFO[87] projects are attempting to create frameworks for handling complicated benefit-risk situations, and applying it for analysis of the benefits and risks of certain foods such as fish. One part of the SAFEFOODS[88] project mentioned above deals with the development of comparative safety assessment methods for foods produced by different breeding approaches and production practices, using modern profiling techniques, and new qualitative and quantitative risk-benefit (e.g., nutritional, economic) assessment models.

ACTION 8: TO ENSURE THAT POTENTIAL HAZARDS ON ENVIRONMENT AND HEALTH ARE IDENTIFIED AND ADDRESSED

The projects funded under this Action will provide research support for policy actions in the field of climate change, water quality and risk assessment of nanotechnologies. The main aims for the period 2004-2006 were:

To explore how health sector planning can be improved for future extreme weather events. To facilitate rapid assessment of emerging threats. To launch a research action on the assessment of Global Change-driven factors linked to the risk of introducing and

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78 *Methods and data on environmental and health externalities: harmonising and sharing of operational estimates* - www.methodex.org

79 *Reducing the environmental impact of heavy metals* - http://espreme.ier.uni-stuttgart.de

80 *Development of macro and sectoral economic models aiming to evaluate the role of public health externalities on society* - www.nilu.no/DROPS

81 *Coordination action on valuation of environment-related health impacts* - www.oecd.org/env/social/envhealth/verhi

82 Table 10

83 *Externalities of energy* - http://externe.jrc.es/overview.html

84 Table 11.The total EC contribution to these projects is €5M.

85 *Benefit-risk assessment for food: an iterative value-of information approach* – www.beneris.eu

86 *Quality of life - integrated benefit and risk analysis. Web-based tools for assessing food safety and health benefits* – www.qalibra.eu/about/index.cfm

87 *A specific support action to investigate the risk benefit analysis for foods* - http://europe.ilsi.org/activities/taskforces/riskassessment/RiskAssessmentChemicals.htm

88 *Promoting food safety through a new integrated risk analysis approach for foods* – www.safefoods.nl

spreading emerging human diseases. To address topics such as: (i) Climate change and health; (ii) Water pollution including emerging pathogens in drinking water sources; and (iii) Possible environmental and human health impacts of nanoparticles.[89]

Concerning extreme weather events, the MICRODIS[90] project will aim at developing the scientific understanding of social, economic and health impacts of disasters in developed and developing societies through theoretical and conceptual models. It has both European and Asian partners and will focus on earthquakes, windstorms and floods.

Two important projects focusing on the health effects of heat waves have been launched under the Community PHP 2003-2008. CANICULE – Etude de l'impact de la canicule d'août 2003 sur la population européenne – aims to determine the magnitude of excess mortality (number of deaths) in Europe during the heat wave of Summer 2003, specifying the countries and periods in question. It then aims to determine its impact on the population of very old people and should help to understand the effects of temperatures on mortality trajectories in the highest ages. The EuroHEAT Project's goal is to contribute to the improvement of public health responses to weather extremes and in particular heat waves. It provides for the setting up of a stakeholder network in different areas including public health, health care, epidemiology and meteorology. The project will help improve data collection and information sharing, preparedness and rapid response capabilities. Work will build upon the results of the cCASHh project and take full account the progress and the outcome of the PHEWE project both funded under the FP5 (see ANNEX III, table 2 for background on these projects).

Regarding impacts related to climate change, the EDEN[91] integrated project aims to identify, evaluate and catalogue European ecosystems and environmental conditions linked to global change, which can influence the spatial and temporal distribution and dynamics of human pathogens. Some of these diseases are already present in Europe (tick- and rodent-borne diseases, leishmaniasis, West Nile fever), others were eradicated (malaria) but may re-emerge, whilst others are endemic on the fringes of Europe (e.g. Rift Valley fever in West and Northern Africa).

The Joint Research Centre together with European Environment Agency, European Centre for Disease Control and WHO-Europe organised a workshop in Stockholm in March 2007 on effects of climate change and ecosystem effects on the dynamics of infectious diseases. The ambition was to make an overview and a prospective analysis on what consequences current changes in climate and ecosystems can have on the occurrence and spreading of infectious diseases in Europe.

The POLYSOA[92] project is investigating the nature and effects of high-weight polymers found in atmospheric aerosols, contributing to the understanding of their effects both in terms of climate change and risk to health.

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89 The total EC contribution to these projects is €25M. More details on these projects are given in Table 12.

90 *Health and socio-economic impacts of extreme events* – website under construction

91 *Emerging diseases in a changing European environment* - www.eden-fp6project.net

92 *Secondary organic aerosols serve as condensation points for cloud droplet formation and play an important role in global climate and atmospheric chemistry* - http://polysoa.web.psi.ch

Concerning issues related to water pollution, the EPI-BATHE[93] and VIRO-BATHE[94] projects are contributing to the assessment of human health effects caused by bathing waters to support a future revision of the Bathing Water Directive.

As far as emerging chemical and microbial risks are concerned, HEALTHY WATER[95] is developing and validating molecular detection technologies for microbial pathogens for mass application in drinking water samples and will investigate the human health impacts of emerging pathogens. The HI-WATE[96] project, on the other hand, is assessing the risks to health (risk of premature birth, semen quality, stillbirth and congenital anomalies, bladder and colon cancer) of exposure to drinking water disinfection by-products. The SAFEFOODS[97] integrated project mentioned above is developing a user-friendly, working procedure for identification of new emerging chemical and microbial risks in food production chains. Finally, the NORMAN[98] project has established a European network of reference laboratories, research centres and related organisations to improve the exchange of information on emerging environmental contaminants and to encourage the validation and harmonisation of common measurement methods.

Concerning possible environmental and health impacts of nanoparticles, the IMPART[99] coordination action and the NANOTOX[100] specific support action aim at improving the understanding of the potential impact of nanoparticles on human health and the environment.

Other projects focused on health impacts of nanoparticles include PARTICLE RISK[101], NANOSAFE2[102], DIPNA[103], NANOSH[104], CELLNANOTOX[105], and NANOINTERACT[106].

The Joint Research Centre has co-authored recently the chapter "Nanotechnology and the Environment" for the UNEP GEO Yearbook 2007[107] and presented a review of major European projects on nanotechnology and environment as an invited keynote paper at the International Symposium on Environmental Protection and Pollution, Hong Kong University of Science & Technology (in June 2006).

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93 *Assessment of human health effects caused by bathing waters* - http://www.aber.ac.uk/iges/research/epibathe

94 *Methods for the detection of adenoviruses and noroviruses in European bathing waters with reference to the revision of the Bathing Water Directive 76/160/EEC* - http://www.virobathe.org

95 *Assessment of human health impacts from emerging microbial pathogens in drinking water by molecular and epidemiological studies* - www.helmholtz-hzi.de/en/healthy_water

96 *Health impacts of long-term exposure to disinfection by-products in drinking water* – www.hiwate.org

97 *Promoting food safety through a new integrated risk analysis approach for foods* – www.safefoods.nl

98 *Network of reference laboratories for monitoring of emerging environmental pollutants* - www.norman-network.com

99 *Improving the understanding of the impact of nanoparticles on human health and the environment* - www.impart-nanotox.org

100 *Investigative support for the elucidation of the toxicological impact of nanoparticles on human health and the environment* - www.impart-nanotox.org

101 *Risk assessment for particle exposure* - www.iom-world.com/particlerisk

102 *Safe production and use of nanomaterials* - www.nanosafe.org

103 *Development of an integrated platform for nanoparticle analysis to verify their possible toxicity and the eco-toxicity* – website under construction

104 *Inflammatory and genotoxic effects of engineered nanomaterials* – website under construction

105 *Cellular interaction and toxicology with engineered nanoparticles* – www.FP6-cellnanotox.net

106 *Development of a platform and toolkit for understanding interactions between nanoparticles and the living world* – www.fiachra.ucd.ie/NanoInteract

107 http://www.unep.org/geo/yearbook/yb2007/

ACTION 9: TO DEVELOP PUBLIC HEALTH ACTIVITIES AND NETWORKING ON ENVIRONMENTAL HEALTH DETERMINANTS THROUGH THE PUBLIC HEALTH PROGRAMME

Environment and Health is a key priority in the Public Health Programme (PHP)[108] and has been covered in each of the yearly work programmes. Several projects linked to air quality were launched to reduce active and passive smoking (see Action 12). A project on electromagnetic field (EMF) issues finalised in 2005 (EIS-EMF)[109] built a network of EU policy makers on EMF issues, an operational science/policy interface and communication tools that improved communication to the public. A working party of the EU health information and knowledge system is especially dealing with environment and health issues.

ACTION 10: TO PROMOTE TRAINING OF PROFESSIONALS AND IMPROVE ORGANISATIONAL CAPACITY IN ENVIRONMENT AND HEALTH.

Education is primarily the responsibility of the Member States and the Action Plan calls on them to take the necessary measures. At EU level some facilitating work was done using the PHP. It included provisions in 2005 and 2006 Work Programmes but no projects were selected. The CHEST project[110], completed in 2006, aimed at improving the knowledge of professionals in different disciplines on the relationships between the health of children and environmental factors. It produced educational materials on children's environment, health and safety that can be used by trainers to improve the knowledge of professionals and personnel working in health care. A major diffusion tool linking the various policies affecting health at EU level is the EU Health Portal, which sets out a large spectrum of information on health, including environmental health, in most official languages.The Joint Research Centre co-authored with the European Environment Agency (EEA) a sub-report on "Environment and Health"[111] to the EEA's "State of the Environment in Europe Report 2005[112], which gives a comprehensive overview of current human health impacts in the EU by different environmental risk factors and is currently involved in the writing of the environment and health related chapter in the Belgrade 2007 report of EEA on the state of the environment in the Central and East European countries and requested by the Ministerial conference on the Environment in Belgrade in October 2007.

A majority of the FP6 projects described above under Actions 5, 6 and 7 have developed extensive training programmes at EU level for environment and health professionals and scientists, which include targeted courses or summer schools for interested stakeholders and web-based initiatives.

In FP7 the Joint Research Centre, in collaboration with the EEA and WHO-Europe has started to develop a "life quality index" for quantitative descriptions of environment and health interactions which is easy to understand and to communicate to the general public.

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108 http://ec.europa.eu/health/ph_programme/programme_en.htm

109 *European information system on electromagnetic fields exposure and health impacts* - http://www.jrc.ec.europa.eu/eis-emf/home.cfm

110 *Children's health, environmental and safety training* - http://ec.europa.eu/health/ph_projects/2003/action3/action3_2003_09_en.htm

111 Available at http://reports.eea.europa.eu/eea_report_2005_10/en

112 Available at http://reports.eea.europa.eu/state_of_environment_report_2005_1/en

ACTION 11: TO CO-ORDINATE ONGOING RISK REDUCTION MEASURES ON THE PRIORITY DISEASES.

The main risk reduction measures in place are on:

Respiratory disease, including exacerbation of asthma. Knowledge regarding outdoor and indoor air pollution should be better integrated. The effects of outdoor air indoor are already taken into account in the CAFÉ analysis[113]. This will be further improved by a possible (pending evaluation) FP7-project to be focused on long-term effects of ambient air pollution, to be funded under the Environment theme of the Cooperation Programme[114]. The report[115] of the DG SANCO Scientific Committee on Health and Environmental Risks (SCHER) provides a good indication on the relative contributions of outdoor and indoor air to the major health endpoints.

Cardiovascular disease. Impacts of outdoor air pollution, indoor air pollution and noise should be better integrated and taken into account. Integration of noise is particularly important for sectors such as transport, which produce both noise and air pollution. This will be considered by the FP7 project described above on long-term effects of air pollution.

There are a number of measures in place controlling potential *carcinogenic, mutagenic or reprotoxic* substances and substances with potential *endocrine-disrupting* impacts. This is being done in the context of various EU risk assessment regimes. Co-ordination and collaboration between the various regimes is being addressed by co-operation between DG SANCO scientific committees. The "*Study on the treatment of vulnerable groups in EU – risk assessment*"[116] concluded that "Current practice indicates that the present practice within the different EU risk assessment frameworks (i.e. present use of assessment factors for human variability) sufficiently cover the differences in susceptibility, although it is acknowledged that no appropriate data are available to confirm or disprove this consideration. International regulatory risk assessment regimes both within and outside the EU generally deal with vulnerable groups on an ad hoc basis and by expert judgment. The extent to which vulnerable groups can be addressed within the various EU risk assessment regimes depends on the data requirements within each framework.

Concerning air quality issues, a co-ordinated approach is based on identifying which sectors and substances are driving the health problem. However, a co-ordinated approach of this kind is not possible for diseases other than respiratory and cardiovascular disease, and therefore more information is needed. For diseases such as *cancer and regarding causation of asthma* (as opposed to exacerbation of asthma), a clearer view on the extent to which the environment is a driving force of the trends of disease is needed before reduction measures can be put into place. This is highlighted in the Review as a major research priority, and work is ongoing in FP6[117] as described under Action 6 and will be continued in FP7.

A major issue concerning *neurodevelopmental disorders* and *endocrine-related impacts* is that there are no clear diagnostic criteria. The two prerequisites for policy co-ordination are

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113 http://ec.europa.eu/environment/air/cafe/index.htm

114 http://cordis.europa.eu/fp7/cooperation/environment_en.html. The specific topic addressing Task 3 in the workprogramme is ENV.2007.1.2.2.2. European cohort on air pollution.

115 http://ec.europa.eu/health/ph_risk/committees/04_scher/scher_cons_01_en.htm

116 Carried out by "TNO – Quality of life" and "RIVM", on behalf of the European Commission. It was finalised by December 2006.

117 See Annex IIITables 5 and 8.

thus to (a) define good diagnostic criteria, and (b) investigate the extent of the environmental contribution. The PHP is pursuing the 1st but no suitable proposals have been received so far. The 2nd has been pursued by many projects over the last two EU Framework Programmes as described under Actions 5 and 6, and further research will be funded under FP7.

ACTION 12: TO IMPROVE INDOOR AIR QUALITY

This action contains 2 key elements: addressing environmental tobacco smoke (ETS) and developing networks and guidelines on other factors affecting indoor air quality by using research and exchange of best practice.

As regards ETS, the Commission adopted the Green paper "Towards a Europe free from tobacco smoke: policy options at EU level[118]" in January 2007 and launched a broad consultation process, involving the EU institutions, Member States and the civil society on the best way to tackle passive smoking in the EU. Currently, the Commission is preparing a follow-up initiative on smoke-free environments, due to be adopted in 2008. The Commission is also preparing a report on the implementation on the Council Recommendation 2003/54/EC[119] on the prevention of smoking and on initiatives to improve tobacco control that will include a detailed analysis of national anti-smoking policies and regulations. At international level, the Commission contributed to the development of guidelines on the protection from exposure to tobacco smoke in the context of the WHO Framework Convention for Tobacco Control[120]. The document will be adopted at the second Conference of the Parties to the Convention in July 2007. On 1st March 2005, the Commission launched the "HELP – For a life without tobacco" campaign[121] targeting young people as a priority. It addresses prevention, cessation and the dangers of ETS through television, press relations, public relation events and Internet. In January 2007 the campaign presented a new TV spot addressing the dangers of ETS on children, on more than 90 national channels covering the 27 Member States.

In May 2005 the Commission mandated the Scientific Committee on Health and environmental Risks (SCHER) to deliver an opinion on a possible risk assessment strategy to support policy on the indoor air issue, to identify potential areas of concern in relation to the different pollutants and to consider risks associated with the use of air fresheners. The SCHER issued a separate opinion[122] on air fresheners on 27 January 2006. With regard to the other questions, the Committee issued a preliminary report for public consultation on January 2007. The final opinion is under preparation.

An expert working group was established in October 2006 to follow up the opinions of Scientific Committee and to fulfil the expectations from the political side, Member States and other stakeholders (Parliament Resolution[123], Dutch and Luxembourg Presidency conferences in December 2004 and June 2005) who asked the Commission to use a wide approach and take concrete actions on a number of pollutants/areas. The group has been mandated to provide a forum for the exchange of best practice and information, to advise the Commission

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118 http://ec.europa.eu/health/ph_determinants/life_style/Tobacco/keydo_tobacco_en.htm

119 http://europa.eu/scadplus/leg/en/cha/c11574.htm

120 http://www.who.int/tobacco/framework/en/

121 http://en.help-eu.com/pages/index-2.html

122 http://ec.europa.eu/health/ph_risk/committees/04_scher/scher_opinions_en.htm

123 Report on the European Environment & Health Action Plan 2004-2010. Rapporteur Frédérique Ries (Final A6 – 0008/2005)

on EU programmes and policies related to indoor air quality and to advise on actions aimed at reducing relevant pollutant concentrations. With regard to the chemicals the group will take into account priority compounds identified by the INDEX report.

Two Sixth Framework Programme research projects are focused on issues related to indoor air quality: EnVie[124] and PRONET[125].

In the frame of the AIRMEX project[126] measuring campaigns in several European cities were carried out by the Joint Research Centre to monitor indoor/outdoor and personal exposure concentrations of selected volatile hydrocarbons (VOCs) and of low molecular weight carbonyls. The findings lead to the conclusion that true personal exposure cannot be determined directly from ambient air measurements. Personal exposure is strongly affected by individual behaviour and micro-environmental activity patterns. In Southern European cities indoor/outdoor as well as personal exposure concentrations are higher than those in cities of Central Europe. About 28% of the outdoor concentrations, 30% of the indoor concentrations, and 40.5% of the personal exposure concentrations exceeded the EU ambient air limit value for benzene of 5µg/m3 (annual mean) to be introduced by the year 2010. To complete the picture in characterising the factors affecting well being and health measurements for biological pollution indoors focusing on allergenic bacteria and fungi and on inflammatory response have started in 2006. Potential population health risk was estimated through the development of physiology-based pharmacokinetic and metabolic models capable of capturing the main interactions among the principal active substances in the indoor air. The results showed that unlike what was assumed so far the biologically effective dose of benzene at its main target organ (bone marrow) is higher when people are co-exposed to typical indoor air mixtures even at low doses than when they inhale benzene alone, due to metabolic inhibition from the presence of other VOCs. This finding would imply an increase in the health risk (cancer) estimate after lifelong exposure compared to what reported by the WHO. In order to enhance our mechanistic understanding of such phenomena at low exposure doses whole-DNA micro-array analyses have been undertaken with a view to elucidating the biological mechanisms involved in health risks from environmental chemical mixtures.

ACTION 13: TO FOLLOW DEVELOPMENTS ON ELECTROMAGNETIC FIELDS (EMF).

The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) has adopted an opinion on "Possible effects of Electromagnetic Fields (EMF) on Human Health" on 21 March 2007[127]. The main conclusions of the preliminary Opinion of the Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) on "Possible effects of Electromagnetic Fields (EMF) on Human Health" are:

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124 Co-ordination action on indoor air quality and health effects - http://indoorairenvie.cstb.fr/

125 *Pollution reduction options network* – http://www.proneteurope.eu

126 *European indoor air monitoring and exposure assessment project* - www.jrc.ec.europa.eu/project/airmex/index.htm

127 http://ec.europa.eu/health/ph_risk/committees/04_scenihr/scenihr_opinions_en.htm

Radio Frequency Fields (RF fields)

Since the adoption of the 2001 opinion extensive research has been conducted regarding possible health effects of exposure to low intensity RF fields, including epidemiologic, in vivo, and in vitro research. In conclusion, no health effect has been consistently demonstrated at exposure levels below the limits of ICNIRP (International Committee on Non Ionising Radiation Protection) established in 1998. However, the data base for evaluation remains limited especially for long-term low-level exposure.

Intermediate Frequency Fields (IF fields)

Experimental and epidemiological data from the IF range are very sparse. Therefore, assessment of acute health risks in the IF range is currently based on known hazards at lower frequencies and higher frequencies. Proper evaluation and assessment of possible health effects from long-term exposure to IF fields are important because human exposure to such fields is increasing due to new and emerging technologies.

Extremely low frequency fields (ELF fields)

The previous conclusion that ELF magnetic fields are possibly carcinogenic, chiefly based on occurrence of childhood leukaemia, is still valid. For breast cancer and cardiovascular disease, recent research has indicated that an association is unlikely. For neurodegenerative diseases and brain tumours, the link to ELF fields remains uncertain. No consistent relationship between ELF fields and self-reported symptoms (sometimes referred to as electrical hypersensitivity) has been demonstrated.

Static Fields

Adequate data for proper risk assessment of static magnetic fields are very sparse. Developments of technologies involving static magnetic fields, e.g. with MRI (Magnetic Resonance Imaging) equipment require risk assessments to be made in relation to occupational exposure.

Environmental Effects

There is insufficient data to identify whether a single exposure standard is appropriate to protect all environmental species from EMF. Similarly the data are inadequate to judge whether the environmental standards should be the same or significantly different from those appropriate to protect human health.

In this regard, the Commission can also count on the EMF-NET[128] Co-ordination action, a large EU network of scientists and experts that reviews and evaluates the emerging scientific evidence on possible health impacts from human exposure to EMF in the 0-300 GHz frequency range. This is a 4-year FP6-funded project ending in March 2008. Members of the advisory board include representatives from national laboratories, NGOs, industry and workers' associations.

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[128] *Effects of the exposure to electromagnetic fields: From science to public health and safer workplace* - http://www.jrc.cec.eu.int/emf-net/

Furthermore progress was made in the development of standards for products, which are published under Directive 1999/5/EC (the R&TTE Directive)[129], which governs safety requirements for radio equipment, including mobile hand sets and GSM masts. Besides updates of products for mobile hand sets, standards were adopted for the putting into service of GSM masts, so as to take account of existing transmitters in the immediate neighbourhood. These standards ensure that products that are placed on the market and put into service will not expose the public beyond levels as defined in Council Recommendation 1999/519/EEC.

[129] http://ec.europa.eu/enterprise/rtte/index_en.htm

ANNEX II:
PROGRESS ON HEALTH RELATED ENVIRONMENT POLICIES

The work done in the health related environmental policies is complementary to the 13 actions of the Action Plan and will contribute to the protection of human health.

Chemicals

The **REACH legislation** (Registration, Evaluation and Authorisation of Chemicals)[130] was adopted in December 2006. It will replace 40 existing legal acts, create a single system for all chemical substances and will introduce a new European Chemicals Agency. REACH enters into force in 2007, and the Commission will focus on facilitating its implementation and preparing the start of the EU Chemicals Agency, which will become operational from 2008.

To decrease the risks from pesticide use in the EU, the Commission adopted a **Thematic Strategy on the Sustainable Use of Pesticides**[131]. The measures include establishment of *national action plans* by Member States*, training* of professional users, distributors and advisors*, prohibition or restriction of the use of pesticides in* sensitive *areas,* regular inspection of application equipment, prohibition of aerial spraying with derogation possibility, measures to protect the aquatic environment to be taken by Member States, measures ensuring the safe handling and storage of pesticides to be taken by Member States, promotion of low-pesticide input pest control techniques with Integrated Pest Management (IPM) becoming mandatory at the latest by 2014. By 2010 the proposal will probably be adopted by the co-legislators. The Commission proposes that Member States will have 2 years for transposition of the measures in national law.

The Commission proposed a **Mercury Strategy** in January 2005[132], and adopted in February 2006 a proposal to ban mercury for certain uses[133]. The European Parliament Environment Committee gave its backing to the proposed Mercury Strategy and in line with the strategy the Commission proposed in October a Regulation[134] that would ban mercury exports from the EU from 2011 and ensure safe storage of unused mercury. At the 24th Session of the UNEP Governing Council in February 2007, the EU aim was to achieve an international binding agreement on further international action on mercury. The compromise decision did not call for any legal action but recognised the need for further action and a working group was established to review and assess voluntary measures and new or existing international legal instruments until the next Governing Council meeting in 2009. The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) is currently assessing the safety of dental amalgam and alternative dental restoration materials for patients and users[135]. In parallel, the Scientific Committee on Health and Environmental Risks (SCHER) is working

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130 *Registration, Evaluation and Authorisation of Chemicals* - http://ec.europa.eu/environment/chemicals/reach/reach_intro.htm

131 COM(2006)327

132 Communication from the Commission to the Council and the European Parliament on a Community Strategy Concerning Mercury COM(2005) 20 final - {SEC(2005) 101}

133 COM(2006) 69 final. Proposal for amending Council Directive 76/769/EEC relating to restrictions on the marketing of certain measuring devices containing mercury.

134 COM(2006)636

135 http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_q_009.pdf

on a request for an opinion on the environmental risks and indirect health effects of mercury in dental amalgam[136].

The main activity in the Community Strategy on **Endocrine Disrupters**[137], notably the prioritisation of substances as to their potential of endocrine disrupting effects was continued. A Priority List of substances for further evaluation of their role in endocrine disruption was established. It ranks substances according to possible effects to wildlife/human health as well as for a limited number, to exposure concerns. The list is meant to be taken into account by regulators when drafting new or revising legislation and should thus contribute to protect human health. In terms of legislation, endocrine disrupters as such are taken into account in REACH. They are there recognised as substances of very high concern and will be covered under the authorisation regime. This will also have an impact on human health in the long term, as exposure to these substances is supposed to decrease.

An important development in relation to the Strategy on **Dioxins and PCBs** was the adoption in 2004 of the Regulation (EC) No 850/2004 on persistent organic pollutants[138] implementing the Community's obligations under the Stockholm Convention on POPs and the Protocol to the Convention on Long-Range Trans-boundary Air Pollution on Persistent Organic Pollutants. A Community Implementation Plan for the Regulation[139] has been developed, listing measures to take at EU level, including measures to address industrial and domestic sources for dioxin emissions[140] in the coming years. In 2005 an inventory of the dioxin situation in the new EU Member States was finalised. Two reports containing data on dioxin emissions, levels in the environment and human exposure have been published[141]. In the area of monitoring and communication to the public, data on industrial dioxin emissions have been made publicly available through the European pollutant emission register (EPER)[142] in 2004 and 2006. In autumn 2009 the Commission will publish new data reported by the Member States. The reporting will then be made under the more ambitious European Pollutant Release and Transfer Register (E-PRTR), and with a threshold for reporting on dioxins that has been lowered by a factor of 10, to 0.1 g I-TEQ. As regards long term monitoring, the Commission and EU Member States are participating in the work under UNEP to develop harmonised strategies for effectiveness evaluation of the policy measures taken. A proposal for such global monitoring will be presented in 2009.

Airquality

In 2004 the last of the air quality 'daughter' directives[143] has been adopted, setting target values for arsenic, nickel, cadmium and benzo(a)pyrene in ambient air. As the main deliverables of the Clean Air for Europe programme (CAFE[144]), the Commission adopted in 2005 the Thematic Strategy on Air Pollution[145] and the proposal for the Directive on Ambient

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136 http://ec.europa.eu/health/ph_risk/committees/04_scher/docs/scher_q_050.pdf

137 Community Strategy for Endocrine Disrupters COM(1999) 706 final

138 Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC, OJ L 158, 30.4.2004.

139 SEC(2007) 341 COMMISSION STAFF WORKING DOCUMENT Community Implementation Plan for the Stockholm Convention on Persistent Organic Pollutants

140 http://ec.europa.eu/environment/dioxin/index.htm#enlarged_eu

141 See http://ec.europa.eu/environment/dioxin/index.htm

142 http://eper.ec.europa.eu/

143 2004/107/EC

144 http://ec.europa.eu/environment/air/cafe/index.htm

145 COM(2005) 446

Air Quality and Cleaner Air for Europe[146]. Both were accompanied by a comprehensive Impact Assessment of the Thematic Strategy and the CAFE Directive. The Council and Parliament had in 2006 endorsed the Thematic Strategy, while the inter-institutional negotiations with the Council and European Parliament on the ambient air directive proposal continue in 2007.

Air emissions are being addressed at the Community level to improve air quality, to enable realization of the health objectives set in the Thematic Strategy on Air Pollution. New vehicle emission standards EURO 5/6 on passenger cars and vans are being agreed by the Council and Parliament at the end of 2006. The Commission proposal for new heavy duty vehicle emission standard EURO VI proposal is scheduled in 2007, as well as the revision of the existing legislation on industrial emissions (IPPC)[147]. The Commission has started the preparations for revising the National Emission Ceilings Directive. The 2020 emission ceilings for the four already regulated substances and potentially for the primary emissions of fine particulate $PM_{2.5}$ are being considered. The adoption of Commission proposal is scheduled in 2007. A review of the Strategy will be undertaken after 2010 which will incorporate all of the latest monitoring and research data including health effects research. This will coincide with the review of the new air quality directive foreseen in 2013.

A Community Implementation Plan on Persistent Organic Pollutants will also be presented.

By 2010 more of the same; activities are ongoing in addressing also the emissions from shipping, agriculture, small combustion installations. Energy & climate change package with measures on energy efficiency will also contribute to the improvement of air quality.

Water Information System for Europe (WISE)[148] has been further developed and endorsed by the Commission Services, European Environment Agency and Member States. Further development including the integration of drinking water data is foreseen in a detailed WISE Implementation Plan endorsed by Commission Services and European Environment Agency; new WISE-oriented reporting guidelines have been developed and are foreseen for final endorsement by the end of 2007. A Commission Proposal for a revision of the Drinking Water Directive is foreseen by the end of 2008. The Protocol on Water and Health is currently ratified by 21 countries, with three more having made the firm commitment to ratify by 2008. The majority of the Parties are EU Member States. Parties to the Protocol have created a Task Force on indicators and monitoring which will assess the possibility of creating a basic reporting system on drinking water quality. There are obvious synergies between the work of the WISE programme and the work of the Protocol. On 17 July 2006, the Commission adopted a proposal[149] for a new Directive to protect surface water from pollution, which will set limits on concentrations in surface waters of 41 dangerous chemical substances (including 33 priority substances and 8 other pollutants) that pose a particular risk to animal and plant life in the aquatic environment and to human health.

146 COM(2005) 447

147 96/61/EC

148 http://wise2.jrc.it/wfdview/php/index.php

149 COM(2006)397 final

In 2006 in the context of the IMAGINE FP6 project[150] the Joint Research Centre tested the frame measurement standard concerning the determination of the **noise** indicators L_{den} and L_{night} on the basis of the data obtained through the extensive measurements campaigns performed in 2004-2005 in different EU Member States. Regarding exposure to noise and associated health effects, the Commission effectively contributed to the WHO Night Time Noise Guidelines project (NNGL) over the last three years. Moreover, a launch event was organised by the Joint Research Centre in January 2007 in Ispra (Workshop on "*Combined Environmental Exposure: Noise, Air Pollution, Chemicals*"). The guideline document prepared within the frame of NNGL project aimed at covering the lack of guidance concerning night time exposure and was needed due to the fact that a substantial part of the EU population are exposed at levels that might risk their health and well being. The project deliverables are:

- A list of health effects and various end points of night time noise exposure;
- Validity of dose-effects relations and thresholds
- Guidelines and recommendations

The output of the NNGL project is an important piece of info to be used by the Commission in the frame of its activities in 2007 to review the health effects of noise.

In the above-mentioned Ispra workshop a state of the art review concerning the health endpoints affected by combined exposure to noise and other stressors (indoor air pollutants, outdoor air pollutants [PM, SO2, NO2, CO], asphyxiants [CO, hydrogen cyanide], solvents, heavy metals [lead, mercury], pesticides, biological agents, vibrations) in occupational and non-occupational settings has been performed. Moreover, the approached available to study combined exposures were scrutinised and a listing of confounding variables that should be considered in epidemiological studies of noise-induced health effects in the presence of air pollutants and other chemicals in the air as well as the data gaps to be covered and the priority issues to be considered for future research and policy making in EU have been elaborated and agreed upon.

Nanotechnologies

In the *Nanotechnology Strategy* and *Action Plan 2005-2009*[151] from June 2005, the Commission proposes concrete steps towards a "*safe, integrated and responsible*" development of nanotechnology, which means that environment, health and social aspects of nanotechnology need to be considered at the earliest possible stage. In September 2004, the Council of the European Union[152] endorsed the integrated and responsible Strategy proposed. In September 2006 the European Parliament adopted its resolution on the action plan, supporting the general aims of the Commission and stressing the need to comply with a high level of protection for environment and health. Research activities are at the centre of the Action Plan. One of the activities in 2006 was to review current regulatory frameworks to find

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150 *Improved methods for the assessment of the generic impact of noise in the environment* - http://www.imagine-project.org/

151 http://ec.europa.eu/research/industrial_technologies/articles/article_2580_en.html

152 Conclusions of the Council of the European Union of 24th September 2004 concerning the European strategy for nanotechnology, Council doc 12487/04 (Presse 269)

out whether they adequately cover manufactured nanomaterials and provide sufficient protection against their effects. A preliminary analysis shows that existing regulatory frameworks in principle cover nanomaterials and there is at this stage no need to develop new legislation. Different aspects of production and products are at the same time subject to various Community provisions. The *chemicals regulatory framework (in future REACH)* will be the main horizontal legislation for nanomaterials. Through the chemicals legislation it should be possible to identify hazards and risks and ensure that proper risk management measures are taken. Several other regulatory areas rely on hazard or risk data or generated by the chemicals legislation: this is the case for the Water Framework Directive, Seveso, and Waste Directives. Furthermore, work has started to develop harmonised standards and test methods. This has been done via FP7, the JRC and partly by participating in the OECD Working Party on Safety of Nanomaterials under the OECD Chemicals Committee. A Commission Communication on a Progress report of Action Plan 2007 will be delivered by November 2007 and a Review of EU legislation – staff working document will be published first half 2007.

Antimicrobial resistance: Recent scientific evidence suggests that during the last decade, antibiotic resistance by various mechanisms may have increased world wide in bacterial pathogens leading to treatment failures in human and animal infections. However, the resistance against different types of biocides (including disinfectants, antiseptics, preservatives, sterilants) has been studied and characterized only recently. Only limited sound scientific evidence to correctly weigh the risks of antibiotic resistance induced by resistance to biocides is available and some controversies remain. Furthermore, research indicates that biocides and antibiotics may share some common behaviour and properties in their respective activity and in the resistance mechanisms developed by bacteria.

The **Thematic Strategy on the Urban Environment**[153] aims to contribute to a better quality of life through an integrated approach concentrating on urban areas. It recognises the role of urban areas in relation to peoples' quality of life, the environment and in wealth and job creation. The Strategy also recognises the diversity that exists between cities in the European Union. For this reason, and following extensive consultation with local authorities and the Member States, the Strategy left local and national authorities the discretion, in accordance with the subsidiarity principle, to find and implement solutions most appropriate to local circumstances. The Commission has, however, committed itself to preparing guidance on (i) sustainable urban transport plans and (ii) integrated environment management plans with the aim of assisting local authorities implement the Strategy's objectives.

153 Adopted by the Commission on 11 January 2006, COM (2005) 718 final

ANNEX III:
TABLES REGARDING RESEARCH PROJECTS AND RELATED ACTIVITIES

Table 1. Areas of environment and health covered by the Fifth Framework Programme of Research (1998-2002) and budget share of each area

PROJECT AREA	NUMBER OF PROJECTS	BUDGET (SHARE)
Chemicals and health impacts	43	79.6 (56%)
Air pollution and health impacts	18	24.9 (17%)
Electromagnetic fields and health impacts	8	12.3 (8.7%)
Noise and health impacts	4	6.2 (4.3%)
Climate change and health impacts	1	0.8 (0.6%)
UV/radiation and health impacts	5	5.8 (4%)
Water-related health impacts	3	4.9 (3.4%)
Integrated environment and health risk assessment	7	7.3 (5.1%)
Cost/benefit; risk/benefit analyses	0	0 (0%)
Total	90	143

Table 2. Environment and health projects funded by the Fifth Framework Programme of Research (FP5 – 1998-2002)

ACRONYM, PROJECT TITLE, EC CONTRIBUTION	MAIN RESULT(S)	MORE INFORMATION
CHEMICALS WITH (REPRO)TOXIC & DEVELOPMENTAL EFFECTS		
ANEMONE Assessment of neurobehavioural endpoints and markers of neurotoxicant exposures EC contribution €1M	∉ In the cohort of children examined in Faroe Islands, PCB concentrations averaged about 60% of the concentrations in their mothers; concentrations increased with the duration of the breastfeeding period ∉ Children with different degrees of prenatal exposure to methylmercury and PCBs and other halogenated organic pollutants have been examined at age 7 years, and performance on neurobehavioural tests decreased at higher prenatal methylmercury exposures ∉ Brominated flame retardant concentrations showed substantial increases in milk and serum, when compared to samples collected in 1987 and 1994 ∉ Methods for determining biochemical markers of neurotoxicity were optimised. The effects on these biomarkers caused by methylmercury and halogenated organic pollutants and their combinations were determined in experimental studies ∉ Cholinergic muscarinic receptors of the brain constitute a sensitive biochemical endpoint altered by developmental exposure to methylmercury and PCB-153	∉ www.anemone-project.dk ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_anemone_en.pdf

BEEP Biological effects of environmental pollution in marine coastal ecosystems EC contribution €4M	∉ Development of biomarkers able to evaluate pollutant effects on the reproductive health of mussels and fish ∉ Selection of a standardised battery of biomarkers for implementation of biomarker techniques in national/international monitoring programmes (OSPARCOM, HELCOM)	∉ No project website ∉ Final report: http://ec.europa.eu/research/endocrine/pdf/beep_en.pdf
BIOCET Bioaccumulation of persistent organic pollutants in small cetaceans in European waters: transport pathways and impact on reproduction EC contribution €1.2M	∉ POP levels in female common dolphins were shown to be linked to diet, area and reproductive status ∉ POP concentrations above the threshold at which effects on reproduction would be expected were routinely recorded in harbour porpoises from the southern North Sea (where high levels of POPs were also recorded in fish) and in common dolphins from the French and Galician coasts	∉ www.abdn.ac.uk/biocet ∉ Final report: http://ec.europa.eu/research/endocrine/pdf/evk3-2000-00027-final-pr-rep_en.pdf
COMPARE Comparison of exposure-effect pathways to improve the assessment of human health risks of complex environmental mixtures of organohalogens EC contribution €1.9M	∉ Conclusions from the integrated and comparative risk assessment: There is presently sufficient margin of safety for brominated HPCs and current background exposure levels of human individuals to brominated HPC does not pose any risk for adverse health effects ∉ In terms of sources of exposure to hydroxylated PCBs, it is estimated that the main source of exposure would be the internal production by metabolism of the parent PCB congeners. The possible sources of external exposure are limited to eggs, liver, or liver products, blood, or blood products, due to the specific distribution pattern of hydroxyl-PCBs ∉ When considering a summing-up of chlorinated HPCs as µgT4-EQ/g lipid in cord serum, there is only a small margin of safety left of about a factor 45 for children born to mothers exposed to background levels of HPCs. This margin of safety	∉ www.compare-project.info ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report-compare_en.pdf

	does probably not exist when considering human individuals, in particular children, living in high exposure areas ∉ The study does not support that an additional risk for adverse health effects can be expected at current background exposure levels of the brominated HPCs investigated in human individuals	
COMPRENDO Comparative research on endocrine disrupters - phylogenetic approach and common principles focussing on androgenic/antiandrogenic compounds EC contribution €3.3M	∉ The investigations on food contamination with pesticides, organochlorines and organotin compounds of the participating European countries revealed that in none of these cases an exceedance of Acceptable Daily Intake values was observed taking into consideration national eating habits ∉ Androgen mimicking substances, such as organotins and some pesticides, resulted in human-relevant models and sentinel aquatic wildlife species in the induction of virilisation, a reduced reproductive performance, an accelerated sexual maturity, reduced larval development, reduced skeletal density, misaligned sex ratios, changes in sex steroid titres and enzyme activities and various effects on reproductive organs under histopathological investigation The observed effect concentrations were in the range of environmentally relevant concentrations and partially resulted in new Predicted No Effect Concentration-values for risk assessment	∉ www.comprendo-project.org ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_comprendo_en.pdf
ENDISRUPT Identification of critical rat testicular genes altered after fetal androgenic disruption by flutamide: use of DNA microarray EC contribution €1.7M	∉ In utero exposure to anti-androgens induces long-term programmed cell death of testicular germ cells ∉ At the doses of flutamide tested, no alteration in adult testis weight or histology is observed, although an increase in germ cells apoptosis is evident ∉ A list of testicular genes the expression of which is altered (microarray approach) has been produced ∉ Androgens have a role in foetal programming of germ cell fate at adulthood,	∉ http://lotus5.vitamib.com/hnb/endisrupt/endisrupt.nsf/Web/Frame?openform ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_endisrupt_en%20.pdf

	suggesting a health risk associated with foetal exposure to anti-androgenic endocrine disrupters	
ENDOMET Dysregulation of endogenous steroid metabolism potentially alters neuronal and reproductive system development: effects of environmental plasticisers EC contribution €1.5M	∉ The plasticisers and phenols tested were shown to act on steroid receptors (oestrogen, androgen, AhR, thyroid) and act non-genomically by inhibiting steroid sulphation, formation of sulphate and steroid synthesis. They also modulated cell signalling and intra-cellular transport and affected rat reproductive function in vivo ∉ Both plasticisers and phenols were shown to up-regulate certain human genes while down-regulating the expression of many more ∉ The project succeeded in providing in vitro test protocols to identify compounds with endocrine disrupting capacity. These are being patented to give systems which will be compatible with the REACH regulation	∉ No project website ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_endomet_en.pdf
ENV REPROD HEALTH Increasing incidence of human male reproductive health disorders in relation to environmental effects on growth- and sex steroid-induced alterations in programmed development EC contribution €2.7M	∉ Significant differences in sperm quality in the participating countries exist ∉ The contrast between Denmark and Finland is striking, which also is reflected in the incidence of testicular cancer in the two countries ∉ Standardised Danish and Finnish mother-child cohorts demonstrated that the incidence of congenital malformations of the male genitalia is much higher in Danish newborn boys than in Finnish ones ∉ Clinical and biochemical data, medical history and questionnaire data on life-style factors collected in a central database are currently being analysed for possible risk associations ∉ The hypothesis of a testicular dysgenesis syndrome (TDS) has been proposed	∉ No project website ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_envir_reprod_health_en.pdf

EUROPIT Toxicological evaluation of the immune function of pesticide workers, a European-wide assessment EC contribution €1.6M	∉ Exposure to the immunotoxic diethylcarbamate pesticide in agricultural workers: even if subtle immune alterations associated with exposure could be detected, no clinically significant effects were noted	∉ www.europit.org ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_europit_en.pdf
EXPORED Multi-organic risk assessment of selected endocrine disrupters EC contribution €2.3M	∉ The finding of a generally higher exposure of the Danish boys to environmental pollutants with endocrine disrupting effects supports the hypothesis that exposure to these compounds during foetal development may play a causative role in the higher incidence of cryptorchidism and hypospadias in Danish newborns compared to Finnish newborns ∉ Preliminary data evaluation indicates that PBDE exposure is associated with an increased risk of cryptorchidism, whereas dioxin and PCB exposures results are equivocal ∉ Among the halogenated hydrocarbons, persistent pesticides, and phthalates analysed no significant association between cryptorchidism and the individual compounds was evident ∉ A combined statistical analysis of the eight most abundant persistent pesticides show that pesticide levels in breast milk in general are significantly higher in the boys with cryptorchidism than in the healthy boys	∉ No project website ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_eurisked_en.pdfhttp://www.reproduction.dk/nafa2005/menu.htm

FIRE Risk assessment of brominated flame retardants as suspected endocrine-disrupters for human and wildlife health EC contribution €4.8M	∉ Brominated flame retardants (BFRs) as well as their oxidised metabolites can interfere in vitro with endocrine pathways; ∉ BFRs can be distinguished into separate groups based on their toxicological profile, which can change drastically after biotransformation.	∉ www.rivm.nl/fire ∉ Final report to become available in 2007
GENDISRUPT Genetic markers and susceptibility to the effects of endocrine disruptors during mammalian testis development EC contribution €1.1M	∉ The project analysed, from genetic point of view, the effect on testicular cells of a group of selected endocrine disrupters and the genetic susceptibility to their action ∉ Microarray analysis of gene expression: more than 3 million individual gene data have been analysed ∉ Mono esther phthalate (MEHP) shows the highest level of deregulation; induces deregulation when supplied to mothers during embryogenesis ∉ The highest deregulation affects mice exposed to the different EDCs during entire life period until analysis (4 weeks postnatal) ∉ Long-term exposure to MEHP and lindane: "low dose effect" detected ∉ Effects of different EDCs during testis development do not follow the same pathways at the level of gene deregulation ∉ Some morphologically visible effects on the seminiferous epithelium seen in exposed animals ∉ Exposure to oestrogens during embryonic life may have profound effect on germ cell growth and differentiation	∉ http://gendisrupt.cib.csic.es ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_gendisrupt_en.pdf

	∉ An in vitro assay set up to identify and quantify estrogenic activity of E2 and EDs on foetal testis cells ∉ The findings in humans support a genetic basis of human male infertility ∉ *ESR1* gene implicated in male infertility	
INUENDO Biopersistent organochlorines in diet and human fertility. Epidemiological studies of time to pregnancy and semen quality in Inuit and European populations EC contribution €1.8M	∉ Consistent and coherent positive associations of exposure and fertility: Male and female serum concentrations of PCBs were related to reduced fertility among couples from Greenland but not among Caucasians ∉ In Caucasians high PCB exposure was associated with more than 50% increase of spermatozoa with sperm DNA damage. This effect was not seen in Inuits who generally presented with high level of sperm DNA integrity ∉ Consistent negative findings: Serum concentrations of DDE and xenobiotic steroid receptor activities were not related to female and male fertility. Furthermore, blood levels of POP markers and xenobiotic receptor activities in serum were not related to sperm count and morphology and no evidence was found that POPs interfere with the regulation of sperm apoptosis ∉ Other findings: The study revealed several associations between POP blood levels and male reproductive hormones as well as Y/X sperm chromosome ratio but strong heterogeneity between regions complicates the interpretation	∉ www.inuendo.dk ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_inuendo_en.pdf

PBDE-NTOX Developmental neurotoxicity of polybrominated diphenyl-ethers: mechanisms and effects EC contribution €0.8M	∉ Gestational or early postnatal exposure of animals to the flame retardant PBDE significantly interfered with several neurobehavioural endpoints	∉ No project website ∉ Final results: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_pbde-ntox_en.pdf
PCBRISK Evaluating human health risk from low-dose and long-term PCB exposure EC contribution €1.1M	∉ Slovakian child cohort exposed to PCBs: significant associations between PCB serum concentrations and performances in sensomotor tests ∉ Effects on thyroid activity, tooth development and hearing observed	∉ www.pcbrisk.sk ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_pcbrisk_en.pdf

CHEMICALS WITH GENOTOXIC & CARCINOGENIC EFFECTS		
ASHRAM Arsenic risk assessment and molecular epidemiology EC contribution €1.7M	∉ A large multi-country case-control study of arsenic and cancer risk was completed: A total of 948 cancers and 540 controls were included in the analysis. Exposure to life time average arsenic concentration in residential drinking water in this population ranged from 0.01 to nearly 200 µ/l ∉ A positive association between exposure to arsenic and all three cancers sites, basal cell carcinoma (BCC) of the skin, bladder cancer, and kidney cancer. BCC is most strongly associated with life time average arsenic concentration, bladder cancer with cumulative arsenic dose and kidney cancer with peak arsenic daily dose rate ∉ Arsenic species in urine produced by human metabolism of ingested inorganic	∉ No project website ∉ Final report will become available in 2007

	arsenic were identified in the ASHRAM population ≠ Advances were made in the field of arsenic chemistry ≠ Advances were made in the field of cancer genetics, with identification of genetic polymorphisms associations with risk of BCC	
ASRISK The mechanistic basis for providing a realistic cancer risk assessment for exposure to inorganic arsenic within the European community EC contribution €1.2M	≠ Human studies: induction of micronuclei in human lymphocytes the most sensitive biological indictor in vivo of oral exposure to arsenic; appears to be impacted at daily intakes above 100 σg/day. ≠ Experimental investigations: an increase of bulky DNA adducts upon exposure of mice to As(III). Studies in XPC repair deficient mice indicated that the repair status of the animals can modify the levels of these adducts, and that they accumulate with age ≠ As induces somatic recombination, and also seems to affect DNA replication bypass processes, such as trans-lesion synthesis ≠ Nucleotide excision DNA repair (NER) is inhibited by As in human cells at physiologically relevant concentrations	≠ No project website ≠ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_asrisk_en.pdf
CANCERRISKBIO-MARKERS Cytogenetic biomarkers and human cancer risk EC contribution €1M	≠ Frequency of chromosomal aberrations (CAs) is predictive of cancer risk at the group level ≠ Both chromosome-type and chromatid-type CAs appeared to predict cancer, but the former showed a more pronounced effect ≠ CAs particularly appeared to predict stomach cancer and colorectal cancer ≠ Cancer predictive value for micronuclei frequency is suggested	≠ No project website ≠ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_cancerriskbiomarkers_en.pdf

	∉ Two polymorphisms (GSTM1 and GSTT1) for which association to cancer risk predictivity could be assessed did not show a modifying effect	
EXASRUB Improved exposure assessment for prospective cohort studies and exposure control in the rubber manufacturing industry EC contribution €0.2M	∉ EXASRUB database was produced covering time period from 1965 to 2003, containing exposure measurements in the European rubber manufacturing industry. ∉ Contains 27,095 measurements comprising 59,609 individual concentrations alongside auxiliary information ∉ Analysis of inhalable and respirable dust (rubber process dusts) and rubber fumes: clear downward time trend. Average exposure to rubber process dusts and rubber fumes has dropped below existing occupational exposure limits for most countries	∉ http://exasrub.iras.uu.nl ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_exasrub_en.pdf
FIBRETOX Mechanisms of toxicity of asbestos-substitute mineral fibres: new approaches to hazard and risk assessment EC contribution €1.2M	∉ All four fibres tested could induce changes in early markers of lung inflammation ∉ Only amosite and RW1 induced changes suggestive of persistent inflammation, which were associated with increased levels of DNA damage and lung mutagenesis ∉ Chronic inflammation leading to persistent oxidative stress, rather than a direct mechanism, was the most important mediator of genotoxicity	∉ No project website ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_fibretox_en.pdf
OXEXRISK Oxidative stress and chronic diseases: Exocyclic DNA adducts as markers for disrupted genomic integrity and risk	∉ From the experimental approaches and studies in humans, further validation of etheno-adducts as promising biomarkers for their application in aetiology and cancer prevention research was achieved ∉ Lipid peroxidation derived DNA-adducts can be applied for: ∉ Search for unknown risk factors and elucidating mechanisms of cancers (breast, colon) associated with chronic inflammatory processes and diet, in particular the	∉ No project website ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_oxexrisk_en.pdf

EC contribution €1M	type and amount of fat intake ≠ Early identification of high risk individuals/groups before the manifestation of clinical symptoms, thus facilitating improved intervention, prevention and treatment of disease ≠ Verifying the efficacy of cancer chemopreventive agents in human studies and a non-invasive urinary assay has been developed ≠ Use as risk biomarkers in clinical and molecular epidemiologic studies on chronic degenerative diseases	
PEPFAC Protection of the European population from aneugenic chemicals EC contribution €1M	≠ A battery of methods capable of detecting and assessing the biological and health significance of aneugenic chemicals ≠ These methods demonstrated that the current levels of exposure to bisphenol A did not represent a significant health risk to the European population ≠ The studies also revealed that a range of natural and synthetic hormones were capable of inducing aneuploidy ≠ A range of aneugenic chemicals was shown in the in vitro models to have thresholds of activity at low doses ≠ When applied to the analysis of the karyotype of tumour cells, the methods provide some evidence that aneuploidy induction may be a useful biomarker of stages of progression	≠ http://www.swansea.ac.uk/cget/euproject/europeanresearch.htm ≠ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_pepfac_en.pdf

WOODRISK Risk assessment of wood dust: assessment of exposure, health effects, and biological mechanisms EC contribution €1.4M	∉ Studies exploring cellular and molecular mechanisms by which wood dust may induce health effects such as airway inflammation and cancer completed ∉ Evidence for the roles in which wood-dust induced pulmonary inflammation processes of proinflammatory chemokines and cytokines, generation of reactive oxygen species, and genotoxicity obtained ∉ Up-to-date estimates on the prevalence, type and level of inhalable wood dust exposure in the workplaces in the EU member states	∉ No project website ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_woodrisk_en.pdf

CHEMICALS WITH MULTIPLE EFFECTS		
DIOXIN RISK ASSESSMENT Comprehensive risk analysis of dioxins: development of methodology to assess genetic susceptibility to developmental disturbances and cancer EC contribution €1.5M	∉ Cancer: a case-control study on soft tissue sarcoma in Finnish population did not show any increased risk of sarcoma associated with elevated dioxin concentration; this is in line with a previous finding in rats that cancer is likely to be a high-dose phenomenon ∉ Tooth defects: studies in victims of Seveso accident showed missing teeth and tooth deformities in those exposed as children, and tooth defects could be followed and explained mechanistically in animal experiments; they seem to be among the most sensitive effects of dioxins ∉ Genetic variation: very few polymorphisms or genetic variations from the main population as to dioxin sensitivity were found and this does not seem to be an important issue in human risk assessment, although high variability is seen among various animal species and strains ∉ Risk assessment: Dose-response studies and molecular studies have enabled to divide dioxin effects to dioxin I type and dioxin II type. Important implications for risk assessment, because dioxin I effects are low-dose effects and they follow a reasonably predictable dose range both between species and within species. They include developmental effects and several biochemical changes. Dioxin II effects are very variable between species and strains, but usually high dose effects, and they include wasting syndrome, liver damage, and probably cancer. An obvious implication is that developmental effects are more important for risk assessment than cancer	∉ No project website ∉ Final report: http://ec.europa.eu/research/endocrine/pdf/qlk4-ct99-01446.pdf

ESTROGENS & DISEASE The impact of developmental exposure to weak (environmental) estrogens on the incidence of diseases in target organs later in life EC contribution €1.6M	∉ No statistically significant morphological effects of oestrogen exposure in testis, ovary, prostate and brain and mammary gland were found ∉ General conclusion: inappropriate exposure to low dose oestrogens before birth can cause subtle (but long-term) changes in expression levels of specific proteins, of which the physiological consequences need to be further investigated	∉ www.niob.knaw.nl/EU-QLRT-2000-00305/index.htm ∉ http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_estrogens_and_disease_en.pdf
EURISKED Multi-organic risk assessment of selected endocrine disrupters EC contribution €3.1M	∉ Endocrine disrupters act not only within the reproductive tract but also in many other organs of the organism including the immune system ∉ Many endocrine disrupters exert effects in the hypothalamo-pituitary-thyroid axis, which causes hypothyroidism in case of iodide deficient food supply ∉ Oestrogenicity of isoflavones may endanger mammary gland and uterus of postmenopausal women. They appear to have protective effects in male accessory sex organs such as the prostate ∉ Effects of anti-androgens in intact male animals were demonstrable. Exposure of male foetuses, newborns or babies to these anti-androgenic substances may be of concern, because it is known that androgens play an important role in imprinting brain structures at this early time of life ∉ UV-screens had oestrogenic effects and profound inhibitory effects within the thyroid gland to reduce thyroid hormone production ∉ Some endocrine disrupters were also active in the liver to modulate the production of high and low density lipoproteins (storage pools for cholesterol) and of triglycerides	∉ www.eurisked.org ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_eurisked_en.pdf

CHEMICALS: RISK ASSESSMENT, TESTING & MODELS		
ACE Analysing combination effects of mixtures of estrogenic chemicals in marine and freshwater organisms EC contribution €2.4M	∉ Development of improved analytical methods to accurately determine the concentrations of steroid estrogens and xenoestrogens in water ∉ Optimisation of the design of mixture experiments, incorporating appropriate biostatistical analysis of data ∉ Demonstration that the concept of concentration addition can be used to accurately predict the effect of a mixture of environmental oestrogens. Predictability occurs across a range of in vitro and in vivo assays, and with different mixtures ∉ Evidence was obtained to show that non-oestrogenic chemicals can markedly impair assessment of oestrogenicity ∉ Mixtures of oestrogenic chemicals containing each chemical at a concentration too low to produce a significant effect can nevertheless produce significant, and predictable, effects ∉ Current risk assessment procedures, based on individual chemicals, may not be as protective of the environment and human health as they could, and ought, to be ∉ A guidance document about the principles of testing mixtures of chemicals, with an emphasis on whether or not effects occur when each chemical is present at low (or no) effect concentration ∉ Validated prediction concepts for the effects of mixtures of estrogenic chemicals ∉ A report on the degree of concordance between the results from in vitro and in vivo assays	∉ www.the-ace-project.info ∉ Final report: http://ec.europa.eu/research/endocrine/pdf/ace_final_report_summary_en.pdf

APECOP Effective approaches for Assessing the predicted environmental concentrations of pesticides: a proposal supporting the harmonised registration of pesticides in Europe EC contribution €1.3M	∉ The new approaches for describing preferential flow in soil and volatilisation from soil and crop canopies resulted in new versions of the PEC ground-water models. The new releases of the codes will be considered by the FOCUS version control group for inclusion in the current first-tier harmonised operational ground-water exposure assessment procedures ∉ The scenario evaluation resulted in a first transparent and systematic assessment of the validity of the FOCUS ground-water scenarios. The validation test should, however, be extended for more active substances and more complex land uses scenarios. If the results are confirmed, then some of the current scenarios, in particular those for Southern Europe, should be considered for revision ∉ The spatially distributed modelling approach introduced to assess the validity of the ground-water scenarios allowed the project to introduce a detailed description of the variability of soil, crop and climate in ground-water exposure assessment	∉ No project website ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_apecopb_en.pdf
BONETOX Bone development and homeostasis – critical targets in toxicology. Research to support test-method development and human-health risk assessment for dioxins and other endocrine-disrupting compounds in the food chain EC contribution €2.8M	The project, to end in 2007, is expected to produce significant new information on: – The mechanisms of chemically induced bone toxicity as well as factors that affect individual sensitivity to this novel endpoint of endocrine toxicology – The mechanisms of chemically induced embryo toxicity, with special emphasis on effects on epithelial-mesenchymal interactions, budding and branching morphogenesis, sensitivities of different organs and altered retinoid metabolism – The specific roles of the retinoid, oestrogen, and AhR signalling pathways in mediating the effects of the selected EDCs – Chemically induced alterations in gene and protein expression profiles, and identification of novel EDC-regulated genes and proteins – The biological basis of species and strain variation in EDC-induced bone and	∉ http://www.imm.ki.se/bonetox ∉ Final report will be available at the end of 2007

	embryo toxicity, and hormonal disruption – The mechanisms and structural requirements for EDC-induced bone toxicity in vitro – The contribution of EDC-exposure and hormonal disruption to the increasing incidence of osteoporosis and other bone disorders in the Western world	
EASYRING Environmental-agent susceptibility assessment utilising existing and novel biomarkers as rapid non-invasive testing methods EC contribution €1.9M	∉ Comparison of fish populations, sediment and water samples from a non-polluted and polluted section of River Lambro in Italy: Bisphenol A found at higher levels than other chemicals ∉ Fish sampled in polluted section showed a trend towards increasing plasma levels of vitellogenin (VTG - biomarker for oestrogenicity), altered steroid plasma levels and morphological alteration of gonads and liver ∉ Total extracts of the water and sediment were either oestrogenic or anti-androgenic in in vitro assays ∉ Juvenile fish exposed to '1x Lambro mixture' for five months: Increase in plasma VTG, alteration of gonad differentiation, gonad morphology, sex ratio and steroid ratio ∉ Several genetic biomarkers of exposure identified in exposed Xenopus laevis ∉ New non-invasive system for the detection of the exposure to endocrine disrupters developed: vitellogenin can be detected in carp mucus using a lateral-flow immunoassay (dipstick assay) performed within a few minutes of sampling ∉ Development of models (QSARs) for the prediction of the endocrine disruption capability of compounds	∉ www.easyring.org ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_easyring_en.pdf

EDEN Endocrine disrupters: exploring novel endpoints, exposure, low-dose and mixture effects in humans, aquatic wildlife and laboratory animals EC contribution €8.6M	∉ EDEN is striving to determine whether the current hazard and risk assessment strategies currently in place in the European Union are sufficient to deal with the issues of endocrine disrupters or require revising. The results of exposure assessment and mixture studies undertaken will help EDEN to assess how this data can be taken into consideration in testing guidelines and risk assessment procedures for wildlife and humans ∉ Initial results from chemical analyses have revealed the presence of multiple endocrine disrupters in human and fish tissue specimens ∉ The effects of endocrine disrupters are not restricted to the reproductive system but involve multiple targets, including cell signalling and the nervous system ∉ Phthalates, widely used as plasticizers, are capable of inducing many effects in vivo that characterize the testicular dysgenesis syndrome observed in humans. These effects arise early in foetal life ∉ Analyses of semen quality were extended to Central Europe. New data indicate that poor semen quality is widespread in young men. In some areas of Europe, semen quality has approached crisis levels that may impair human reproduction ∉ Experiments designed to assess the effects of low doses of endocrine disrupters in cultured cells, fish and rodents are completed. Unusually-shaped dose-response curves were not observed but the work highlighted the weakness of customary approaches for estimating low dose effects ∉ Significant progress has been made with mixture studies. The effects of a four-component mixture on zebra-fish and of a three-component mixture on male sexual differentiation in the rat could be successfully predicted by using the concept of dose addition. The mixture led to disruption of male sexual differentiation at doses of the components that individually did not induce observable effects. These	∉ www.edenresearch.info ∉ Final report will be available at the end of 2007

	observations are of great importance for the regulation of endocrine disrupters in the EU	
EDERA Development and implementation of new in vivo and in vitro systems for the characterisation of endocrine disruptors EC contribution €0.7M	∉ Major advantages of the use of reporter animal technology with respects to the currently available model systems shown: – Reporter mouse technology is a candidate to replace the existing tests that, for their nature, are unable to provide a global view of estrogenic activity in the whole organism – It reduces the number of animals to be used in the in vivo tests by means of non-invasive in vivo imaging technology and provides the unique opportunity to follow endocrine effects in time in the same animal – It refines current methods by providing for the first time the possibility to observe study the effect of endocrine disrupters systemically and after long term exposure even to low doses, for animal testing our methodology will nullify the pain for the test and abolish the necessity of animal sacrifice	∉ www.edera.unimi.it/index.htm ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_edera_en.pdf
EDETOX Evaluations and predictions of dermal absorption of toxic chemicals EC contribution €2M	The project aimed to generate new data on dermal absorption of chemicals. It aimed at producing new knowledge that would – standardise in vitro systems for predicting percutaneous penetration and compare these to relevant in vivo studies – use the in vitro system to generate occupationally relevant dermal absorption data acceptable for risk assessment and – valuate predictive models of skin penetration of health related chemicals Details on to what extent the project was able to achieve these policy-relevant goals can be found in the final report	∉ www.ncl.ac.uk/edetox ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_edetox_en.pdf

FRAGRANCE ALLERGY Fragrance chemical allergy: a major environmental and consumer health problem in Europe EC contribution €1.4M	∉ Development of a method for the identification of fragrance sensitizers in complex mixtures: the model of oak moss ∉ The prevalence of sensitisation to certain oxidised compounds of fragrance terpenes evaluated in a clinical network: there is a risk of contact allergy in the population caused by the oxidised fragrance chemicals studied ∉ Hand eczema and fragrance allergy: 10% of the patients gave a positive test to one or more of the allergens in the new series ∉ Development of a new fragrance mix (FM). The new FM-II is a valuable tool for identifying subjects with a positive history of adverse reactions to fragrances. 30-50% of these patients would have been missed with the old FM-I ∉ The hand immersion technique used to assess relationships between hand exposure to fragrance chemicals present in household products and chronic hand eczema ∉ Three new fragrance allergens giving rise to significant problems in the consumer have been identified. These allergens currently are used at unacceptable levels in consumer products. Data on no-effect levels provided ∉ Isoeugenol ether derivatives may be a safer substitute than ester derivatives in isoeugenol allergic subjects	∉ No project website ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_fragrance-allergy_en.pdf
IMMUNOTOX CELL CHIP A new technology for fluorescent 'cell chip' immunotoxicity testing EC contribution €1M	∉ A new system for in vitro immunotoxicity testing developed, which employs changes in cytokine expression observed in vitro as an endpoint indicating potential for perturbation of the immune system in vivo ∉ A prototype of "fluorescent cell chip" was assembled based on a selected reporter cell line constructed and tested. It has demonstrated potential for application as a predictive screening test for immunomodulatory activities of chemicals	∉ http://www.immunotox.pl ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_immunotox_cell_chip_en.pdf

	∉ The major advantage of this approach is the possibility to apply this test in high throughput screening of high number of compounds for their well defined biological activity	
MENDOS Biomimetic optical sensors for environmental endocrine disruptor screening EC contribution €2M	∉ Main technological developments in the field of biomimetic and biological sensor systems for endocrine disrupters achieved ∉ Although one of the main goals to establish a fully functional molecularly imprinted polymers (MIP)-based optical sensor platform for endocrine disrupter monitoring in the aqueous environment could not be reached completely, major advances in underlying MIP technology and optical sensor equipment were made, thus setting the base for successful future implementation of highly sensitive biomimetic optical sensors ∉ MIP-based solid phase extraction materials were obtained that could significantly facilitate instrumental analysis of endocrine disrupters in environmental samples ∉ Biological sensors and assays for endocrine disrupters were established, which – after further validation – are prospectively useful tools for high-throughput laboratory based or in-the-field endeavours of screening for endocrine disrupting activity	∉ www.mendos.org ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_mendos_en.pdf
PLUTOCRACY Placental uptake and transfer of environmental chemicals relating to allergy in childhood years EC contribution €1.6M	∉ A significant regional difference in prevalence of maternal atopy exists whether atopy was defined on the basis of allergic history alone, sIgE alone, or a combination of both ∉ Concentrations of toxic metals (Pb and Cd) in maternal blood and placental samples show a positive correlation, suggesting that the placenta can be a bioindicator of (maternal) exposure ∉ There was a significant correlation between concentrations of the organochlorine	∉ www.bris.ac.uk/ plutocracy ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_plutocracy_en.pdf

	insecticides in each of the biological matrices, of which the most abundant was DDE ∉ Cord blood IgE positivity was most strongly associated with high maternal education level, residence in a city during pregnancy, living in a house and exposure to agricultural chemicals. Multivariate analysis only showed an association of elevated CB IgE for residence in a city and for having father or other smokers at home ∉ Placental contamination with organochlorine insecticides (DDT, DDE, gamma-HCH, alpha-HCH, beta-HCH) and 1,3,5-TCB (chlorinated biphenyl) was significantly associated with CB IgE positivity ∉ In utero environmental exposure to toxic metals and organochlorine insecticides influences immune function in placental tissue, maternal and cord blood ∉ Xenobiotic compounds cross the placenta in vivo and accumulate in foetal organs Elevated concentrations, compared with maternal concentrations, were seen in key fetal organs such as blood, spleen, bone-marrow, brain and liver ∉ When evaluated at 18 months of age, sensitisation in children was lower than expected compared with other studies. This may be due to the fact that the majority of subjects were from Eastern Europe and also because of the particularly young age of our cohort at evaluation ∉ In contrast with sensitisation, the highest incidence of allergy symptoms (atopic eczema, asthma) was found in Belgium, which is in accordance with prevalence of maternal atopy. Predictors for atopic eczema included allergy to cow's milk or other foods, recent ill health such as 'flu or recent fever, cough, runny nose, daycare outside the home. Asthma symptoms do not generally become evident until later in childhood, so it will be important to undertake a further follow-up of the cohort at a later stage	

RANTIV Development of methods for predictive toxicity testing with reference to neurotoxic volatile chemicals EC contribution €1M	∉ A novel system for exposing cells to toxic volatile compounds in vitro ∉ A set of in vitro cell systems to provide a wide range of relevant neuronal targets that could mimic the exposure to volatile neurotoxicants in vivo ∉ Identification of a number of relevant end-points in cellular and molecular processes occurring when neural cells are exposed to certain neurotoxic volatile compounds ∉ New tools and technical approaches to study possible signal transduction pathways affected by the neurotoxicants ∉ Neurophysiological studies showed that alterations of behavioural functions are a very sensitive marker in dose-response studies of neurotoxicity ∉ The correlation of in vitro with in vivo data showed that in vitro cellular models are powerful to dissect the mechanism of action of neurotoxicants. However, in vivo exposures followed by behavioural analyses are critical to detect subtle toxic effects ∉ A mathematical model for the interpretation of in vitro toxicological data, predicting correlations between in vivo and in vitro data, was developed ∉ A database on the substances studied has been established	∉ www.imm.ki.se/eurantiv ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_rantiv_en.pdf

RISKOFDERM Risk assessment for occupational dermal exposure to chemicals EC contribution €1.7M	∉ Large database with information on determinants of dermal exposure for the qualitative survey carried out in various industry sectors throughout Europe (in nine Member States) constructed ∉ Two large databases created containing the results of hand and body exposures based on the quantitative dermal exposure studies carried out in six Member States for a large series of different use scenarios for chemicals. These databases are available for use by policy makers, other researchers and exposure modellers ∉ Two major products were prepared: ∉ A predictive dermal exposure model set structured according to the chosen format of six different dermal operation exposure units. Also a set of adaptations has been prepared for the Technical Guidance Document Risk Assessment for the new and existing substance regulations (currently being developed into REACH) ∉ A toolkit for risk assessment and risk management of dermal exposures	∉ No project website ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_riskofderm_en.pdf
SENSPESTI Tissue engineering of living biosensors to evaluate risks for health by pesticides affecting the cholinergic neurotransmitter System EC contribution €1.4M	∉ Cell/tissue effects: Biological effects of pesticide exposures in selected model systems elucidated ∉ Pesticide-relevant biomarkers affecting development of cell cultures, 3D-tissue cultures and simple invertebrate embryos at low doses established ∉ Pesticide actions affecting differentiation of NT2 and adult human stem cells elucidated ∉ Micro capillary arrays based on neural 3D-tissues (living tissue biosensor - LTB) established ∉ Biosensor based on adult human stem cells produced	∉ www.biologia.unige.it/falugi/senspesti.html ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_senspesti_en.pdf

SUSCEPSTYRENE Genetic polymorphisms and biomonitoring of styrene EC contribution €1.4M	∉ Volunteers exposed in a toxicological chamber and workers from the reinforced plastic industry studied in 4 EU countries studied ∉ Although genotyping and/or phenotyping of relevant xenobiotic metabolising enzymes does not seem to significantly improve the interpretation of urinary levels of the main metabolites of styrene, these analyses might greatly improve the interpretation of urinary concentrations of the minor – but more specific - styrene metabolites (such as PHEMAs) ∉ PHEMA determination can now be considered as a useful tool for biological monitoring of styrene exposure in occupational or environmental settings ∉ Recommendation of this study: systematic GSTM1 genotyping is performed to allow proper PHEMA data interpretation ∉ In GSTM1 positive subjects excreting 'unexpected' amounts of PHEMAs, the measurement of CYP2E1 mRNA in peripheral blood lymphocytes could be recommended to discriminate between individuals who are really exposed to different levels and those who are more likely to be subject to host-associated factors influencing CYP2E1 expression	∉ No project website ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report-susceptstyrene_en.pdf
OMNITOX Operational Models aNd Information tools for Industrial applications of eco/TOXicological impact assessments EC contribution: € 2.265 M	∉ Models: Based on the experiences and findings from a very comprehensive and thorough comparison of existing LCIA models and selection methods, the LCIA model development resulted in two interlinked models ∉ LCIA/(E)RA comparison: Five case-studies were performed in the automotive, pulp and paper, detergent, and cosmetics industrial sectors and in a regulatory authority. ∉ OMNIITOX Information System (IS)	∉ http://www.omniitox.net

	∉ Quantitative result indicators below: The work of the OMNIITOX project has to date led to: – five PhDs, finalized or in late stages of thesis work; – a special OMNIITOX symposium at a SETAC Annual European meeting; – an external peer review by highly respected experts in the area of fate, exposure and aquatic toxicity; – 62 specific reports (three reports pending); – nine articles in scientific journals; – 19 conference platform presentations at five different scientific conferences; – 12 conference poster presentations at six different scientific conferences.	
AIR POLLUTION AND RESPIRATORY HEALTH		
AIRALLERG Effects of outdoor and indoor air pollution on the development of allergic disease in children EC contribution €1.1M	∉ Measurements of various indoor pollutants were made in 1069 homes of children participating in three different birth cohort studies in The Netherlands, Sweden and Germany ∉ NO2 and HONO concentrations differed markedly between countries higher concentrations were related to a higher use of gas for cooking and to tobacco smoking in the home ∉ Correlation between exposure to environmental tobacco smoke (ETS), cotinine and amount of cigarettes smoked in the home was very high ∉ Biocontaminant measurements: For the large majority of the measurements that were made, within-home variation was much smaller than between-home variation	∉ No project website ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_airallerg_en.pdf

	∉ Clear and consistent associations between the presence of a cat in the child's home and Fel d 1 levels in mattress and living room floor dust ∉ Floor type was the most important determinant of the amount of floor dust sampled and biocontaminant levels in floor dust	
ECHRS II European prospective study on environment, allergy and the lung EC contribution €2.4M	∉ ECRHS II collected information on health and lifestyle and environmental risk factors from more than 10,000 adults living in 28 areas in 13 European countries ∉ During the period of follow-up, the prevalence of symptoms of asthma in the cohort had changed little but there was an increase in the use of asthma medication ∉ Little change in IgE sensitisation, but the data showed a much higher prevalence of sensitisation in adults who were born more recently ∉ Asthma symptoms were more common in those exposed to gas cookers and to cleaning sprays in the home and there was some evidence that bronchial reactivity was increased in those exposed to cat allergen ∉ Cleaners, health care professionals and those who had an inhalational accident at work reported more asthma during the follow-up but in this relatively young group of adults ∉ Sex hormones may influence asthma in adults. The ECRHS II showed that perimenopausal women who used hormone replacement therapy had more asthma and lower lung function than those who did not	∉ www.ecrhs.org ∉ Final report to become available in 2007
HELIOS Biomarkers for the non invasive assessment of acute and chronic effects of air	∉ No evidence of chronic toxic effects on the lung function or epithelium that could be attributed to differences in air quality along the European gradient, in particular with respect to O_3 levels ∉ Trichloramine above a certain concentration can acutely and chronically damage	∉ http://airnet.iras.uu.nl/products/reports_and_annexes/HELIOS/HELIOS_final_report_Part_A.pdf

pollutants on the respiratory epithelium EC contribution €1.6M	the children's lung epithelium, and second, that regular exposure to this gas and possibly also to chlorinated aerosols was indeed associated with an increased risk of developing atopic asthma ∉ Evidence of a threshold for the short-term effects of ozone (O_3) in ambient air ∉ No evidence of an activation of the blood coagulation system by ambient air pollutants, at least at moderate exposure levels, even in particularly sensitive subjects ∉ Chlorine and its derivatives interact with allergens and/or some genetic traits to increase the risk of developing asthma	∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_helios_en.pdf
HEPMEAP Health effects of particles from motor engine exhaust and Ambient air pollution EC contribution €1.3M	∉ Particles collected from 9 sites in the EU and tested for the proinflammatory properties ∉ A successful collaboration between toxicologists and epidemiologists to collect and toxicologically test ambient PM fractions to try to determine PM composition-toxicity-health effect relationships ∉ $PM_{2.5-10}$ and $PM_{0.1-2.5}$ samples collected throughout Europe vary considerably in their composition and their bio-reactivity ∉ Though PM activities vary considerably at a given site with time, clear regional differences in activity profiles can be identified, and PM samples from high traffic sites appear more toxic on a equal mass unit basis ∉ Coarse and fine PM samples appear to have similar toxic activities when examined at an equal mass both in vitro and in vivo, though the mechanisms and sites of action differ ∉ Asthmatic subjects appear particularly sensitive to experimental air pollution	∉ www.hepmeap.org ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_hepmeap_en.pdf

	exposure such as to diesel exhaust by substantially increasing their airway hyperresponsiveness ∉ Asthmatics, elderly and subjects with chronic obstructive pulmonary disease (COPD) do not demonstrate a similar acute inflammatory airway response as young healthy subjects to diesel exhaust, and may have different adaptive or protective response mechanisms	
MOCALEX Measurement of occupational allergen exposure EC contribution €1.1M	∉ Parallel airborne samples (>400 per allergen) were taken in bakeries, grain and soy mills, the animal feed industry, and in laboratory animal facilities, using the newly developed parallel sampler. Samples were analysed with specific enzyme immunoassays (EIAs) for enzyme, wheat, soy or rodent allergens ∉ For most allergens and most EIAs, results from different laboratories measuring the same allergen showed strong correlations, and if the same standards were used, also high levels of agreement in absolute reported values ∉ Nasal sampling was shown to be a feasible approach for short-time measurements in bakeries and rodent workers. The method was applied successfully – in combination with a newly developed sensitive EIA for wheat proteins, in a study evaluating the effectiveness of respiratory protection in bakery workers ∉ Lateral flow immunoassays (LFIAs) were developed as a rapid test method with which occupational hygienists or other health care workers may demonstrate directly at the workplace the presence of a hazard of occupational allergen exposure. A 'ready-for use' test kit was developed and validated in preliminary field studies	∉ No project website ∉ http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_mocalex_en.pdf ∉

PAMCHAR Chemical and biological characterisation of ambient air coarse, fine and ultrafine particles for human health risk assessment in Europe EC contribution €1.6M	∉ Sampling carried out in 7 EU cities: substantial methodological developments were made before the actual sampling campaigns ∉ In vitro toxicology: The $PM_{10-2.5}$ samples were much more potent inducers of cytokine production than the $PM_{2.5-0.2}$ samples ∉ In vivo toxicology: the in-vivo connection between lung inflammation and genotoxicity in compromised rats suggests the former mechanism possibly being important also in the increased cancer risk observed in some US epidemiological studies on long-term PM exposures ∉ Human relevance: – The consistent results on strong inflammatory responses suggest an involvement of this mechanism and PM characteristics in the stronger PM_{10} mass concentration-based risk estimates of short-term mortality and morbidity observed in Mediterranean hot climate – The high organic matter, polycyclic aromatic hydrocarbon (PAHs) and arsenic contents as well as the high genotoxicity and cytotoxicity of some samples suggest increased carcinogenic and non-carcinogenic health risks in communities with heavy solid fuel consumption for residential heating	∉ www.pamchar.org ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_panchar_en.pdf
PATY Pollution and the young EC contribution €0.6M	Results pending	∉ www.lshtm.ac.uk/pehru/paty ∉ Final report to become available in 2007

RAIAP Respiratory allergy and inflammation due to ambient particles – A European-wide assessment EC contribution €1.2M	∉ Sampling and chemical characterisation: PM_{10} and $PM_{2.5}$ samples were collected in the cities of Amsterdam, Lodz, Rome and Oslo during winter, spring and summer ∉ Chemical characterisation shows distinct differences in composition among the locations and between the fine and coarse fractions ∉ Allergy screening: allergy-enhancing (adjuvant) activity was measured in mice. All ambient particulate matter fractions, with the exception of a few coarse ones, had an adjuvant effect at the doses examined (100-200 μg per mouse). Ambient particles, at least the fine fractions, stimulated both an allergic and a non-allergic immune response ∉ Inflammatory cell response (freshly isolated rat lung cells, isolated human lung cells, human lung cell line): Both site-specific and seasonal variations in the potential to induce release of inflammatory signalling substances (cytokines) were demonstrated in all cell types. Content of metals found in soil surface and combustion products positively correlated with increased levels of cytokines ∉ Allergy in vivo: associations between coarse and fine PM, geographical location and season. Inflammation in vivo: the highest response was noted for the coarse fraction at the higher concentration level ∉ Correlation of chemical composition and effect parameters: preliminary analysis undertaken	∉ www.raiap.org ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_raiap_en.pdf
RUPIOH Relationship between ultrafine and fine particulate matter in indoor and outdoor air and respiratory health	∉ Study conducted in Amsterdam, Athens, Birmingham and Helsinki. At a central site, $PM_{2.5}$, PM_{10} and total particle number counts measured in outdoor air continuously. In each city, between 30 and 37 non-working, non-smoking patients with asthma or chronic obstructive pulmonary disease (COPD) were recruited. For each subject, measurements of $PM_{2.5}$, PM_{10} and particle number counts inside the home and directly outside the home were conducted during one week.	∉ http://airnet.iras.uu.nl/products/reports_and_annexes/RUPIOH/RUPIOH_technical_annex.pdf ∉ Final report:

EC contribution €1.4M	⊄ Main results: – The highest particulate matter concentrations at the central site were found in Athens and the lowest in Helsinki – Concentrations measured at the central site were highly correlated with concentrations measured near the homes spread over the metropolitan area for all pollutants, including particle numbers. Thus, a central site is a good estimate for the temporal variation – Absolute concentration levels of particle number differed substantially between homes and central site – The correlation between residential outdoor and central site ambient particle concentrations did not differ significantly between homes located in the city centre versus suburbs or in urban background versus high-traffic roads – Residential outdoor concentrations were higher than central site ambient measurements when the home was located in a high-traffic intensity street major street and in the city centre – Daily average particle number concentrations measured at a central site were poorly to moderately correlated with indoor concentrations – Homes located in a major street did not have higher particle number concentrations than homes located in minor roads, in spite of the substantial increase in home outdoor concentrations – Smoking affected especially $PM_{2.5}$, PM_{10} and to some extent soot, but not particle numbers	http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_rupioh_en.pdf

AIR POLLUTION AND GENOTOXIC/CARCINOGENIC EFFECTS		
AMBIPAH Mechanism-based approaches to improved cancer risk assessment of ambient air polycyclic aromatic hydrocarbons EC contribution €1.1M	∉ The effects of 6 ambient air PAHs (benzo[a]pyrene, dibenzo[a,h]anthracene, fluoranthene, dibenzo[a,l]pyrene, benzo[b]fluoranthene and 1-methyl-phenanthrene) were investigated using a range of biological end-points which reflect potential for tumour initiation or tumour promotion ∉ Employing whole animals (rats or mice), precision-cut lung and liver slices or microsomes of rat or, in a few cases, human origin, the ability of the test PAHs, acting singly or in binary mixtures, to alter key xenobiotic metabolism pathways, and to induce DNA damage and mutations (markers of initiating potential) were investigated ∉ The mutagenic potency of the test PAHs in the lung and liver of lambda-lacZ transgenic mice was found to parallel closely their carcinogenic potency. The mechanism of mutagenesis of the parent compounds and of their critical metabolites (diols, diol epoxides) was further investigated using cultured mammalian cells, while the mutagenic potency of these compounds relative to that of gamma-rays (rad-equivalence) was measured as a tool for use in cancer risk assessment ∉ Using a similar range of test systems, the effects on gene expression at the level of individual genes or the whole genome (transcriptomics), as well as interactions with the aromatic hydrocarbon receptor (AhR; a key factor in PAH toxicity) pathway, were investigated to obtain information on the potential of the test chemicals to modulate pathways related to tumour promotion ∉ In studies with mixtures, additivity was observed most frequently. However, consistent evidence of interaction (usually antagonistic but, in some cases, synergistic) was also obtained	∉ http://airnet.iras.uu.nl/resource/posters/london/03AirnetPoster_soterios_kyrtopoulos_AMBIPAH.pdf ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_ambipah_en.pdf

	∉ It is concluded that a potential for interaction between components of the PAH mixture has been demonstrated, at doses which in come cases approached those of environmental relevance	
CHILDRENGENONET-WORK European network on children's susceptibility and exposure to environmental genotoxicants EC contribution €1.1M	∉ Concerted action exploring gene-environment interactions during the foetal, neonatal and infancy developmental periods ∉ Focus on genotoxic exposures and environmental factors with focus on air pollution (traffic and tobacco) ∉ Major findings: – Age- and exposure-related increases in cytogenetic endpoints of chromosomal aberrations (CAs), micronuclei (MN), sister-chromatid exchanges (SCE): consistently increased in children exposed to environmental pollutants; CA: mostly affected by exposure to chemicals present in the air, soil, and water; MN, SCE: also affected to a lesser extent; SCE, CA, DNA adducts: affected by environmental tobacco smoke (ETS) and in utero exposure to tobacco smoke – An overview of existing European cohorts carried out, database launched (www.birthcohorts.net) – Several national studies were initiated providing results of biomonitoring of children – Study of transplacental transport of environmental exposures has been initiated – This project will contribute to EU biomonitoring study to be launched in 2007	∉ http://cgn.pubhealth.ku.dk/childrengeno_en ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_childrengenonetwork_en.pdf

EXPAH Effects of PAHs in environmental pollution on exogenous and endogenous DNA damage EC contribution €1M	∉ 350 human volunteers in Czech Republic, Slovakia and Bulgaria studied ∉ PM_{10} levels were higher in winter compared to summer in all three locations ∉ Concentration of carcinogenic PAHs was at least 10 fold higher in winter than summer ∉ For the whole population, total bulky DNA adducts and B(a)P DNA adducts were significantly more abundant in the exposed group compared to the control group, and in smokers compared to non-smokers ∉ Changes in oxidative DNA damage products were observed at statistical significance between the exposed and control groups for 8-oxodG in Kosice and M1dG in Sofia ∉ The country of origin of the samples was associated with total DNA adducts, and B(a)P adducts levels, independently from other possible confounding factors Fluorescent in situ hybridisation (FISH) was more sensitive than conventional cytogenetic methods as a biomarker of effect ∉ GSTP1 polymorphism was significantly associated with FISH. Genetic polymorphism of GSTM1 affected the B(a)P adduct in the whole population. Effects of polymorphisms of GSTT1, CYP1A1, and XPD repair gene were seen on some biomarkers of exposure or effect, or of oxidative damage, in subgroups from individual countries ∉ Environmental exposure to PAHs significantly influenced the repair process of DNA damage induced by X-rays in the subject's lymphocytes	∉ www.le.ac.uk/biochem/pbf1/EXPAH.html ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_expah_en.pdf
GEN-AIR Molecular changes and genetic	∉ Quantitative assessment of the effects of air pollution and environmental tobacco smoke on cancers of the lung, bladder, pharynx, and larynx in non-smokers in 9	∉ No project website ∉ Final report:

susceptibility in relation to air pollution and environmental tobacco smoke: a case-control study in non-smokers nested in the epic investigation EC contribution €1.1M	European countries ∉ Higher exposure to (traffic-related) air pollutants can increase the risk of lung cancer ex-smokers since at least 10 years. No association was found in never smokers ∉ A whole group of respiratory conditions, and lung cancer alone, were associated to self-reported ETS exposure at the time of recruitment ∉ DNA adducts seemed to be associated with the subsequent risk of lung cancer ∉ The only single type of tumour showing a statistically significant association with the amount of DNA was leukaemia ∉ Presence of a mutation in plasma DNA was predictive for development of bladder cancer, but not of other types of cancers included in the study	http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_gen-air_en.pdf
AIR POLLUTION AND CARDIOVASCULAR EFFECTS		
AIRGENE Air pollution and inflammatory response in myocardial infraction survivors : gene-environment-interactions in high-risk group EC contribution €1.8M	∉ A multicenter epidemiological study in six European cities: Helsinki, Stockholm, Augsburg, Rome, Barcelona, and Athens ∉ 1,003 myocardial infarct (MI) survivors recruited and assessed with at least 2 repeated clinic visits ∉ Particulate air pollution was highest in the three Southern European countries, with Rome being the most polluted city, and Helsinki being the lowest ∉ Ambient particles were associated with increases in IL-6 and fibrinogen concentrations ∉ No association was found for ambient air pollution and CRP, which suggests that	∉ No project website ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_airgene_en.pdf

	current treatment of MI survivors with lipid-lowering medication, in particular statins may protect them from the effect of ambient particles ∉ The data presented here suggests that genetically determined susceptibility to ambient particulate matter may be due to polymorphisms which alter early physiological responses such as transcription of fibrinogen ∉ When comparing the size of air pollution effects to the effects of other constant factors, between 2-fold to 10-fold larger effects were determined for the time-invariant person characteristics ∉ Overall, inflammation in MI survivors is determined by a number of time-invariant as well as time-varying environmental factors, which increases the risk for subsequent events in this high-risk group of the population	
HEAPSS Health effects of air pollution on susceptible subpopulations: ultrafine particles and myocardial infarction EC contribution €1M	∉ Studies carried out in 5 EU cities ∉ Ambient air pollution is associated with incident out-of hospital coronary deaths and hospitalisations for myocardial infarction (MI), and with subsequent cardiac readmissions among acute MI survivors ∉ Less consistent results were found for total mortality among MI survivors, as the effects seem to be delayed and distributed over weeks ∉ In the general population, the elderly are more affected by air pollution, in terms of the risk of coronary death or hospitalisation for first MI ∉ Particle number concentration and carbon monoxide, both originating from traffic and other combustion processes, were the pollutants most strongly associated with all the health effects considered ∉ Results were not identical in the five cities. Differences in air pollution levels and	∉ www.epiroma.it/heapss ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_heapps_en.pdf

	inter-correlations, age and gender structure, and treatment practices among centres might explain some of the heterogeneity of the results	
MAAPHRI Multidisciplinary approaches to airborne pollutant health related issues EC contribution €1.6M	∉ In vitro experimental models showed that with high sulphur fuel in the absence of oxidation catalysis, particulate matter was the main toxic component triggering DNA damage and systemic inflammation ∉ A selective particle sizer (SPS) was designed allowing to continuously sample combustion aerosols and deliver flow of aerosol with selected particle sizes ∉ Cytokine reporter gene cell lines, exposed to combustion aerosols, displayed expression patterns which were variable according to aerosol particle size downstream SPS ∉ No evidence of mutation occurrence with two strains of Salmonella up to high emission concentrations of combustion aerosols ∉ In vitro and in vivo studies (rats) indicate that increased NO_2 emissions raise a new health safety concern that should be addressed by regulatory authorities, since recent epidemiologic studies point out to an important role of NO_2 for triggering airborne pollutant acute cardiorespiratory impacts	∉ No project website ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_maaphri_en.pdf
AIR POLLUTION AND NETWORKING, RISK ASSESSMENT		
AIRNET A thematic network on air pollution and health EC contribution €1.9M	∉ Air pollution seriously affects health in Europe today, and will remain to do so for a long time to come ∉ Impact estimates reveal that for ozone and fine particles, two major air pollutants, the extent of the effects on life expectancy is in the order of several tens to hundreds of thousands of premature deaths per year in Europe. Even if the air quality policy targets are being met, considerable health effects are still likely	∉ http://airnet.iras.uu.nl ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_airnet_en.pdf

	∉ For many millions of Europeans, life expectancy is more than one year less than it could have been under conditions of clean air such as prevails in northern Scandinavia. In addition to life shortening, also a number of diseases have been associated with fine particle exposure	
EMECAP European mercury emission from chlor-alkali plants EC contribution €2.2M	∉ Quantification of the atmospheric mercury levels in the surroundings of 3 selected mercury cell chlor alkali (MCCA) plants ∉ Epidemiological studies: knowledge on environmental exposure to mercury and early markers of biological effects in general population increased ∉ Innovative analytical devices designed and developed, suitable to monitor large contaminated areas	∉ www.emecap.com ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_emecap_en.pdf
RADIOFREQUENCY FIELDS AND HEALTH		
CEMFEC Combined effects of electromagnetic fields with environmental carcinogens EC contribution €1M	∉ Based on the results of the animal study, co-carcinogenic effects of radiofrequency fields are not likely in this experimental model and at the exposure levels chosen ∉ This conclusion is supported by the fact that no enhancement of genotoxic effects was found in vivo, and by the cell culture studies showing lack of effects characteristic of non-genotoxic carcinogenesis	∉ www.uku.fi/cemfec ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_cemfec_en.pdf
GUARD Potential adverse effects of GSM cellular phones on hearing EC contribution €0.8M	Main results: – No effects on the main measures of the status of the auditory system neither in animals nor humans – Potential effects of Global System for Mobile Communications (GSM) on the auditory efferent system should be further investigated	∉ www.guard.polimi.it/home/home.html ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_guard_e

	– Effects of other radio frequencies and modulations should be investigated	n.pdf
INTERPHONE International case control studies of cancer in relation to mobile telephone use EC contribution €9.4M	The objective is to determine whether mobile telephone use increases the risk of cancer and, specifically, whether the radio frequency (RF) radiations emitted by mobile telephones are carcinogenic. This objective is being achieved through case-control studies of tumours which, if RF is carcinogenic, would be those most likely to be related to mobile telephone use as they occur in the cells which receive most of the exposure. The studies include: – brain tumours (glioma and meningioma) – tumours of the acoustic nerve – tumours of the parotid gland Under the current contract, the studies were carried out using a common core protocol in nine countries: seven member states of the European Union (Denmark, Finland, France, Germany, Italy, Sweden, UK) and two associated states (Israel and Norway). In addition, studies were also conducted in Japan, Australia, New Zealand and Canada with separate funding. Joint analyses of the data from the national studies has been conducted centrally. The INTERPHONE study is now complete with 6,579 cases and 7,654 controls interviewed for a total of 14,233 interviews. Denmark and Sweden have published the results of their analyses of national data on risk of acoustic neurinoma and brain tumours and all other centres have publications in preparation or submitted. The Nordic countries and the UK have combined their data for acoustic neurinoma and the results have been published.	∉ ftp://ftp.cordis.europa.eu/pub/life/docs/emf_brochure_sheets.pdf ∉ Final report to be published in 2007 ∉ Intermediary report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_interphone_en.pdf

	Analyses of the international data set have been completed and the publications are in preparation.	
RAMP 2001 Risk assessment for exposure of nervous system cells to mobile telephone EMF: from in vitro to in vivo studies EC contribution €1.1M	∉ The project aimed to establish the effects of electromagnetic fields similar to those generated by cellular phones on the nervous system/brain ∉ Experiments performed either in vivo (rats) in order to detect possible variations in behaviour and in tissues, and in vitro (on cell populations), in order to evidence effects on cells, if any. ∉ Broadly speaking, no particular effect has been found, though some results are worth of further investigation	∉ ftp://ftp.cordis.europa.eu/pub/life/docs/emf_brochure_sheets.pdf
PERFORM-A In vivo research on possible health effects related to mobile telephones and base stations (carcinogenicity studies in rodents) EC contribution €2M	The objectives of PERFORM-A were to investigate whether radio-frequency exposure induces or promotes the development of cancer in mice and rats. This type of in-vivo research is important for the assessment of potential long-term effects of an agent on a biological system. PERFORM-A was conducted as six large-scale animal studies using both mice and rats exposed to typical mobile phone frequencies. Final results are pending. They will be published in the course of 2007	∉ ftp://ftp.cordis.europa.eu/pub/life/docs/emf_brochure_sheets.pdf
EXTRA-LOW FREQUENCY ELECTROMAGNETIC FIELDS AND HEALTH		
REFLEX Risk evaluation of potential environmental hazards from low-energy electromagnetic field (EMF) exposure using sensitive in vitro methods	∉ Intermittent exposure to extremely low-frequency electromagnetic fields (ELF-EMF) at 50Hz, a common electrical mains frequency, had genotoxic effects on human fibroblasts, human melanocytes and some animal cells. Lymphocytes and other cell lines were not affected ∉ In fibroblasts direct relationship between the intensity and duration of ELF-EMF exposure and the number of DNA breakages or micronuclei, both markers of	∉ ftp://ftp.cordis.europa.eu/pub/life/docs/emf_brochure_sheets.pdf ∉ Final report: http://ec.europa.eu/research/quality-of-

EC contribution €2.1M	genotoxicity, observed ∉ In some cell cultures both ELF-EMFs and radiofrequency EMFs may affect the expression of genes and proteins involved in such activities as cell division, proliferation and differentiation	life/ka4/pdf/report_reflex_en.pdf
TERAHERTZ RADIATION AND HEALTH		
THZ-BRIDGE Tera-hertz radiation in biological research, investigations on diagnostics and study on potential genotoxic effects EC contribution €1.4M	∉ No biological effects could be detected on DNA bases, human lymphocytes, membrane model systems and epithelial cell cultures ∉ Under some specific conditions of exposure, changes in membrane permeability of liposomes were detected and an induction of genotoxicity was observed in lymphocytes ∉ These studies suggest that medical imaging employing appropriate exposure parameters is most probably not harmful at least for single exposures	∉ www.frascati.enea.it/THz-BRIDGE ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_thz-bridge_en.pdf
ADVICE PULSED FIELDS Health impact from the use of security and similar devices employing pulsed and continuous electromagnetic fields EC contribution €58,000	∉ Advisory document on adverse effects and exposure to pulsed and continuous wave electromagnetic fields associated with the use of electronic security and similar devices ∉ The task undertaken by experts drawn from International Commission on Non-Ionizing Radiation Protection (ICNIRP) and its scientific standing committee ∉ Resulted in the publication of an extensive report in 2002. The results and recommendations were later summarised in an ICNIRP statement	∉ ftp://ftp.cordis.europa.eu/pub/life/docs/emf_brochure_sheets. pdf ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_apf_en.pdf
ULTRAVIOLET LIGHT, RADIATION, AND HEALTH		
IHA-UV	∉ The occurrence of primary adaptation to adverse effects was investigated by repeated measurements during an ongoing ultraviolet radiation (UV) course.	∉ www.iha-uv.org

Immunological health and adaptation following chronic exposure to environmental ultraviolet radiation EC contribution €0.8M	Accomplished by the application of a single UV dose, corresponding to a multiple of the (original) minimal erythema dose, and comparing results from "adapted" skin to that of non-irradiated controls ⊄ In the majority of the recorded parameters, a lack of protective adaptation was recorded for epidermal DNA lesions, urocanic acid total level, Langerhans cell numbers, peripheral NK-cell activity and contact antigen driven lymphocyte activation ⊄ Statistically significant protection against cutaneous erythemal reaction and C-reactive protein induction was seen in humans, and in mice protective adaptation of peritoneal macrophage activity was recorded ⊄ Conclusion: in certain inflammatory or immunological parameters, some evidence was found for UV adaptation, but the results obtained with the majority of innate or acquired immune parameters do not justify the recommendation of low-dose UV exposures as a precautionary measure for UV induced immune health risks	
MAUVE Genetic mechanisms involving ultraviolet light in the development of cutaneous malignant melanoma EC contribution €1.5M	⊄ Major advances made towards the identification of genetic mechanisms important in human melanoma development ⊄ Direct evidence obtained that damage to a single tumour suppressor gene, known as p16, plays a key role in melanoma formation. The importance of this change in cell immortalisation, together with activation of the 'immortality enzyme' telomerase, was clearly defined ⊄ Results were generated that underscore the importance of factors other than ultraviolet B (UV-B) radiation (heat and UV-A) associated with sun exposure in cancer induction. With both UV-A and heat-induced transformation, a specific amplification change to chromosome-11 (11q13) was associated with the acquisition of malignancy. One amplified gene in this region was strongly	⊄ No project website ⊄ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_mauve_en.pdf

	associated with the process of malignant transformation	
PREVENTION BIOMARKERS New bio-markers of oxidative stress to humans: a role in developing new strategies for human protection against environmental (UVA) damage to skin EC contribution €1.7M	∉ New bio-markers of acute and chronic stress to humans have been developed and these have been exploited to monitor changes due to the environmental stress of solar ultraviolet A (UV-A) radiation on the skin ∉ The bio-markers have been designed to have wide applicability and have been tested primarily on cultured human skin cells, fibroblasts and epidermal keratinocytes ∉ Two of the genes known to be activated by oxidative stress (ICAM-1 and MMP-1) were consistently and significantly activated by UV-A stress in the skin of the volunteers on the low flavonoid diet. This activation was consistently suppressed in volunteers maintained on the high flavonoid diet	∉ No project website ∉ Final report: ∉ http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_prevention_biomarkers_en.pdf
SUNALL Allergy to the sun: multidisciplinary investigation on the pathogenesis, treatment and prevention of polymorphic light eruption across Europe EC contribution €1.7M	∉ An empirically tested pathogenic model of PLE was developed. Studies were designed to test the hypothesis that Polymorphic Light Eruption (PLE) is initiated by an inadequate response of Langerhans cells after a UV challenge. Preliminary studies suggest that there is a failure of Langerhans cell migration from PLE epidermis on exposure to UV-B radiation. This situation was modelled using transgenic mice. ∉ Sun allergy is common: The overall life time prevalence of sun allergy was 18% and it can therefore be estimated that approximately 80 million Europeans suffer from sun allergy. ∉ There is a clear negative correlation between skin phototype and the risk of sun allergy; with higher skin types protecting against sun allergy. ∉ Across the 6 test centres, 52% of the people with sun allergy were never treated. There was an extremely large variation in the number of people who were seen by a physician for sun allergy across the 6 test centres. Overall the figure was 29%	∉ www.sunall.org ∉ Final report pending

	with the extremes being 45% in Greece but only 8% in the UK. ∉ The number of months during which patients were affected by PLE was normally distributed - with 4-5 months being the most frequently stated. Only 35% of patients reported that their rash improved as the summer progressed, suggesting that their skin was not being hardened by ambient sunlight. ∉ In the SUNALL study at least 50% of the patients reported that their faces were affected at some time.	
THYRRISK Environmental and host factors in the risk of thyroid cancer EC contribution €100,000	∉ Overall objective of the concerted action: bring together a multi-disciplinary group of experts from Europe to carry out complementary work and fully exploit the results of a large case-control study of thyroid cancer risk in young people in Belarus and Russia following the Chernobyl accident ∉ Specific goals: assess the effects of iodine deficiency, iodine supplementation and radiation exposure on the risk of thyroid cancer. Evaluate their relative importance and how they interact together and with radiation exposure in the observed thyroid cancer increase in Belarus and Russia ∉ Information on population indicators available for the study regions was not sufficient for adequate determination of the iodine status of the subjects in the epidemiological study. The most relevant information appeared to concern environmental indicators, in particular soil iodine content ∉ Analyses were carried out of the effect of iodine deficiency on the risk of thyroid cancer. The effects on thyroid cancer risk of iodine prophylaxis in the immediate post-accident period and of dietary supplements of stable iodine in subsequent years were also evaluated. Results have been submitted for publication and are confidential until then ∉ Recommendations for iodine prophylaxis in the case of exposure to radioactive	∉ No project website ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_thyrisk_en.pdf

	iodine have been prepared and will be published once the results of the study are publically available	
NOISE AND HEALTH		
HYENA Hypertension and exposure to noise near airports EC contribution €2M	∉ Overall objective: assess the impacts on cardiovascular health (primarily reflected by high blood pressure) of noise generated by aircraft and road traffic near airports ∉ The exposure-response relationships in adults between long-term exposure to airport related noise and high blood pressure, the modifying effects of traffic related air pollution (NO_2, PM) on noise associated cardiovascular risk factors and cardiovascular disease, the possible modifying effects by annoyance and sleep disturbances due to road and aircraft noise, on blood pressure have been assessed ∉ The impact of aircraft and road traffic noise on stress hormone levels and the difference in blood pressure resulting from different noise exposure patterns (day and night time exposure) has been assessed ∉ The final results will be published in early 2007	∉ www.hyena.eu.com ∉ Final report to become available in 2007
NOISECHEM Noise and industrial chemicals: interaction effects on hearing and balance EC contribution €1.5M	∉ Occupational exposure to organic solvents is associated with increased probability of developing hearing loss ∉ Combined exposure to noise and organic solvents is associated with substantially higher risk of hearing loss than isolated exposures to both these factors ∉ A relationship was found between the concentration of the organic solvents and hearing threshold shift (at high frequencies) ∉ Current national Occupational Exposure Limit (OEL) values for solvents do not account for possible solvent ototoxicity and may thus not sufficiently protect exposed populations	∉ www.ucl.ac.uk/audiological-science/EC%20Brochurev4_rotate.pdf ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_noisechem_en.pdf

NOPHER Noise pollution health effects reduction EC contribution €0.4M	∉ The work undertaken by partners of this concerted action led to an improvement in both the quality of research on noise pollution and its impact on health through European collaboration ∉ Europe-wide consensus was developed on the strength of causal relationships between environmental noise and health effects ∉ The results of the study were circulated widely through publications, and other educational material ∉ The project contributed significantly to increasing awareness of the hazards of noise across the whole of Europe ∉ A new international journal of Noise and Health was launched within NOPHER project to disseminate the work of the researchers and to bring into focus the contributions relating to noise and health, which were previously scattered in various journals across different disciplines ∉ A number of books have been published based on the conferences organised by the NOPHER partners	∉ www.ucl.ac.uk/noiseand health ∉ Final report: http://ec.europa.eu/research /quality-of-life/ka4/pdf/report_nopher_ en.pdf
RANCH Road traffic and aircraft noise exposure and children's cognition and health: exposure-effect relationships and combined effects EC contribution €2.3M	∉ High levels of chronic aircraft noise exposure impair children's reading and their ability to perform complex cognitive tasks. A linear exposure-effect association was found between chronic aircraft noise exposure and children's reading comprehension ∉ Road traffic noise did not show exposure-effect relationships with children's cognition and low levels of road traffic noise would probably not interfere with children's school work. An effect of road traffic noise at high levels cannot be ruled out ∉ The results for noise annoyance both confirm previous findings that children	∉ www.wolfson.qmul.ac.uk/ RANCH_ Project ∉ Lancet 2005; 365: 1942–49 ∉ Final report: http://ec.europa.eu/research /quality-of-life/ka4/pdf/report_ranch_e n.pdf

	experience annoyance and extend knowledge on exposure-effects for aircraft and road traffic noise exposure ∉ There is no evidence for exposure-effect relationships between noise exposure and children's self-reported health or overall mental health and inconclusive evidence for blood pressure and sleep disturbance ∉ Effects of combined exposure to aircraft and road traffic noise were only observed for reading comprehension and annoyance: high levels of road traffic noise moderated the effects of high aircraft noise on reading comprehension; high road traffic noise augmented children's annoyance response to aircraft noise and high aircraft noise augmented children's annoyance response to road traffic noise ∉ Children were able to assess the magnitude and quality of sounds as reliably as adults ∉ Opportunities for psychological restoration may potentially protect against adverse reactions to noise and improve children's well-being	
WATERBORNE STRESSORS AND HEALTH		
AQUACHIP Development and validation of a DNA-chip technology for the assessment of the bacteriological quality of bathing and drinking water EC contribution €2M	The following was achieved: – A simple and robust procedure for extraction of environmental RNA/DNA from water samples suitable for mass application was developed – Primers and probes for housekeeping and pathogenicity genes of the targeted pathogenic and indicator bacteria were provided – DNA-chips for the assessment of waterborne bacterial pathogens were designed and validated – Molecular assessment of activity and abundance of pathogenic bacteria in water	∉ www.gbf.de/aquachip/index.htm ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_aqua-chip_en.pdf

	was made – The overall microbial community structure and composition of bathing and drinking water was assessed – Classical and molecular analyses for assessment of water-borne pathogens were compared – It could be shown with a variety of drinking and bathing water samples that each habitat had its own characteristic molecular fingerprint of the bacterial microflora with underlying seasonal variations. These community fingerprints could function as indicators of the quality of drinking water from the supplier to the end user – The DNA-chip based technology for the detection of pathogenic and indicator bacteria in bathing and drinking water was tested and validated with a set of drinking and natural bathing water samples	
DUWS RISK ASSESSMENT Microbial risk assessment of dental unit water systems (DUWS) in general dental practice EC contribution €1M	∉ The majority of dentists did not clean, disinfect or analyse the microbial load of their DUWS. Dentists would welcome regular monitoring and advice on cleaning their DUWS ∉ The microbial load of DUWS in the different countries ranged from 0 to 4.4 x 104 cfu.ml-1 ∉ Water supplied by 44% of dental units in this microbiological survey of GDP DUWS failed current European Union potable water guidelines (100 cfu ml-1) and 51% failed Amercian Dental Association recommendations (200 cfu.ml-1) ∉ Biofilms were identified as the major source of contamination; therefore effective products should be able to reduce the biofilm load within DUWS ∉ Irrespective of overall contamination, pathogens such *Pseudomonas* spp.,	∉ No project website ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_duws_risk_assessment_en.pdf

	enterobacteria, *Legionella* spp. *Mycobacterium* spp. and *Candida* sp. could occasionally be detected, as could presumptive oral bacteria, indicating possible failure of antiretraction valves and potential for cross-infection incidents	
PEPCY Toxic and bioactive peptides in cyanobacteria EC contribution €1.9M	∉ The central objective of PEPCY was to improve cyanotoxin risk assessment and risk management ∉ A comprehensive understanding of cyanopeptides, i. e. mechanisms governing production, occurrence in nature, and impact on other biota, produced. ∉ Methods developed and materials produced, necessary for cyanopetide research ∉ The project developed and promoted a risk-based and setting-specific approach to protecting public health from cyanotoxins, which is in line with the current approach of the WHO for drinking-water quality and the EU Bathing Water Directive	∉ www.pepcy.de ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_pepcy_en.pdf
CLIMATE CHANGE AND HEALTH		
CCASHH Climate change and adaptation strategies for human health EC contribution €1.4M	cCASHh surveys showed that – Europe is not well prepared to cope with "unexpected" extreme thermal stress events. In Western Europe alone, 35 000 excess deaths were reported in the 2003 heat-wave. There is a 1 -10% increase of mortality by 1 degree increase of temperature, estimated – A contingent valuation survey was carried out to estimate the benefits of reducing the risk of dying during heat-waves. It was estimated for the city of Rome, that the monetized mortality damages of the heat-waves in the absence of planned adaptation programmes would be €281M for the year 2020 (in 2004 Euros) – There is incomplete information collection on short and long-lasting health effects	∉ http://www.euro.who.int/ccashh ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_ccashh_en.pdf

	of floods – Tick transmitting Lyme borreliosis and tick-borne encephalitis (TBE) (Ixodes ricinus) has spread into higher latitudes (in Sweden) and altitudes (in the Czech Republic) in recent decades and has become more abundant in many places – There are some hypotheses that point to a considerable potential for climate-driven changes in Leishmaniasis distribution in the future – Additional responses to climate change in Europe needed include strengthening of effective surveillance and prevention programmes in areas at risk of new diseases; sharing lessons, early warning systems, data and information across countries and sectors on prevention of extreme events; development of climate change risk management practices in health care systems; awareness raising and risk communication	
PHEWE Assessment and prevention of acute health effects of weather conditions in Europe EC contribution €0.8M	∉ The effect of temperature on mortality showed a significant association of mortality to both low and high temperatures in all cities studied ∉ The effect of heat was immediate ∉ The percent variation in mortality was higher for respiratory and cardiovascular mortality and the effect increased with age ∉ During winter, the temperature-mortality relationship had a linear negative trend, showing an increase in mortality as temperatures decline ∉ The pooled analysis showed a statistically significant effect for total and cardiovascular causes of death in all age groups while for respiratory and cerebrovascular mortality a statistically significant effect was observed only for the elderly.	∉ www.epiroma.it/phewe ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_phewe_en.pdf

	∉ The analysis of the effect of temperature on hospital admissions was not always consistent with results on mortality. During summer, no effect of high temperatures was observed on cardiovascular and cerebrovascular causes for all age groups considered, while for respiratory disease a significant positive effect of high temperatures was observed especially in the 75+ age group. ∉ During winter a significant effect of low temperatures was observed for respiratory admissions on all ages, while cardiovascular admissions had an effect only on the elderly. No effect was found for cerebrovascular admissions.	
NANOTECHNOLOGIES AND HEALTH		
NANODERM Quality of skin as barrier to ultrafine particles EC contribution €1.1M	∉ Quantitative information on the penetration and penetration pathways was obtained; ∉ Information on impacts of human health was acquired; ∉ Risk assessment data was obtained: – There is no risk at all for products containing TiO_2- nanoparticles for healthy skin; – Studies with psoriatic skin show deeper penetration, but are difficult to assess because of severe hyperproliferation. Studies with atopic skin would be highly desirable; ∉ Enforcement of better product information is recommended; Transfer of knowledge to the scientific community, industry, and health organisations was performed.	∉ http://www.uni-leipzig.de/~nanoderm/ ∉ Final report will be available in 2007
NANOPATHOLOGY	∉ The in-vitro experiments investigated the interaction of 5 different types of	∉ http://www.nanopathology.

The role of nano-particles in material-induced pathologies EC contribution €1M	nanoparticles with endothelial, gut and liver epithelial cells and macrophages from a toxicological and immunological point of view ∉ The in-vivo experiments carried out on rats investigated the response to the implantation of 5 materials as nanoscaled particles and bulk disks in rats' dorsal muscles ∉ The clinical investigations examined the presence of inorganic micro and nano-particles in pathological tissues affected by cancer in different organs, leukaemia and lymphoma ∉ The main in-vitro results indicated that: – in the presence of metallic nanoparticles (cobalt), macrophages become unable to mount appropriate defence to bacterial challenge and danger exists of increased susceptibility to infections – the in-vivo tests indicated that metallic nanoparticles (and not the bulk samples) induced rhabdomyosarcoma in rats in 6 months – the clinical samples showed the constant presence of micro and nanoparticles in the tissues with variable chemistry, sometimes directly related to the work place exposure	it ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_nanopathology_en.pdf
MULTIPLE STRESSORS/FACTORS AND HEALTH		
E21-4AYC Environmental influences and infection as aetiological agencies in atopy and asthma in young children	∉ The findings suggest important gene-environment interactions in the development of atopy and asthma and imply that reductions in domestic allergen exposure alone are unlikely to have a major impact in decreasing the incidence of these diseases in childhood ∉ Association of indoor NO_2 with any of the different indicators of lower respiratory	∉ No project website ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_e21-

EC contribution €0.4M	tract infections in three birth cohorts of infants using individual passive samplers for measuring NO_2 was found ∉ The results obtained do not support the recommendations given by present solid feeding guidelines stating that a delayed introduction of solids is protective against the development of asthma and allergy ∉ The results indicate that while childhood atopy is not uncommon in the rural Cretan community studied, symptoms consistent with associated allergic disease are rarely reported. Despite clear differences in their contact with farm animals at all ages, no consistent differences in the rates of atopy and allergic disease were found between those children whose parents are or are not farmers. It is likely that these contrasting results are due to differences in farming and it's protective qualities across Europe ∉ While the rates of atopy among those living in the villages are the lowest ever recorded in Europe, those among the townspeople are similar to rates measured in the highest prevalence areas such as the United Kingdom	4yc_en.pdf
EPILYMPH Environmental exposures and lymphoid neoplasms EC contribution €1.1M	∉ Increased lymphoma risk for subjects that were in contact with meat, in particular beef ∉ Occupational exposure to inorganic pesticides: increased risk of lymphoma ∉ No association between occupational artificial ultraviolet radiation exposure and lymphoma risk ∉ Being outside in the sun during childhood for more than 6 hours associated with a statistically significantly increased risk of 1842 non-Hodgkin lymphomas (NHL) ∉ Red hair colour conferred an increased NHL risk	∉ No project website ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_epilymph_en.pdf

	∉ Decreased risk of lymphoma for repeated diarrhoea and an elevated risk for hepatitis B and mononucleosis ∉ Decreased risk of lymphoma for diabetes, hypertension, asthma and arthrosis ∉ A significant decrease of lymphoma risk was also observed for history of food allergy ∉ Regular statin (hypolipidemic agent lowering cholesterol) use was associated with a lymphoma risk reduction ∉ The investigation of tobacco smoking did not reveal any association with the risk of NHL, HL or histological subtypes	
GEOPARKINSON Parkinsonism and Parkinson's disease EC contribution €1.1m	Main findings were as follows: – Analyses showed statistically significantly increased odds ratios for Parkinson's disease with an exposure-response relationship for pesticides – A history of ever having been knocked unconscious was associated with an increased risk of the disease with an exposure response relationship – We did not find a significant association between metal exposure (iron, copper, manganese) and Parkinson's disease – Use of anti-depressants, sleeping tablets or medicines for anxiety was associated with an increased risk of Parkinson's disease – Smoking reduced the risk of Parkinson's disease – There was a modest but significant association between monoamine oxidase A (MAO-A) polymorphism in males and Parkinson's disease risk	∉ www.abdn.ac.uk/deom/newsgeop.shtml ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_geoparkinson_en.pdf

	– Most gene-environment interaction analyses did not show significant effects – There was a possible interaction between GSTM1 null genotype and solvent exposure that was stronger when limited to cases with Parkinson's disease	
HEARTS Health effects and risk of transport systems EC contribution €2M	The main results and methods developed during the project comprised: – Selection of the most significant health end-points to characterise the health impact of air pollution, noise and road crashes as a function of urban transport policies – Review of existing data, models and software tools for transport models, time–activity patterns, air pollution and noise – Improvement of traffic modelling and emission modelling – Outline of the method for characterising transport scenarios – Development of an exposure model that takes into account the mobility patterns of the study population – Collection of new data on time–activity patterns, personal exposure to air pollution in transport microenvironments, ambient noise and pedestrian behaviour – Development and implementation of a geographic information systems (GIS)-based system that includes an air pollution model, noise model, pedestrian behaviour model, trip generation model and exposure model – HEARTS' findings point towards the need to significantly reduce traffic pollution exposure in – and not just from – public transport, in order to consolidate the individual and population level interests	∉ www.euro.who.int/hearts ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_hearts_en.pdf
PARSIFAL	∉ There is a lower prevalence of both subjective and objective markers of atopic	∉ No project website

Prevention of allergy - risk factors for sensitisation in children related to farming and anthroposophic lifestyle EC contribution €0.9M	disease when comparing the farm children and their reference group as well as when comparing the Steiner school group and their reference group ∉ The protective effect of farming is found for all of the studied atopy outcomes, both self-reported, as for example current hay fever symptoms, wheezing, atopic eczema and asthma, and objective in the form of sensitisation (serum-IgE >0.35 kU/l) when studying all countries together ∉ The protective effect of the anthroposophic life style is found for all of the studied outcomes except for current wheezing ∉ The first results from the house dust analyses demonstrate that farm children and - to a lesser extent - Steiner children, are exposed to higher levels of endotoxin, exopolysaccharide and glucans, than their respective references. This may contribute to the lower prevalence of atopy ∉ Preliminary analyses of the faecal samples suggest differences in the intestinal bacterial flora between Steiner children and their references, as well as a presence of certain bacteria in children from pig farms	∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_parsifal_en.pdf
PASTURE Protection against allergy: study in rural environments EC contribution €2M	∉ 544 farmer and 619 non-farmer families were included in the PASTURE study ∉ A comprehensive assessment of environmental exposure using interviews, self administered questionnaires and environmental samples such as dust and cow's milk was performed in addition to genotyping and gene expression studies ∉ The foremost interest was the investigation of immune responses in cord blood and at age one year to unravel the immunological mechanism involved in the protection from and the development of allergic diseases, respectively ∉ Maternal exposures were reflected in cytokine levels in cord blood from farming and non farming newborns. Immune responses at birth also comprise the	∉ No project website ∉ http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_pasture_en.pdf

	production of IgE antibodies to a number of food and inhalant allergens ∉ Serum-IgE was measured with a sensitive assay in cord blood samples of children participating in the PASTURE birth cohort. Differences in serum IgE levels detected between farming and non-farming newborns ∉ As part of the PASTURE cohort, large amounts of house dust samples were also collected. First analyses show in fact that levels of microbial components and allergens are linked to the farming status	
PDCAAE Prevalence and determinants of childhood asthma and allergies across Europe EC contribution €1M	∉ Wide variation in the prevalence of childhood asthma and allergies across European countries ∉ The link between asthma and atopic sensitisation differs between populations and that factors related to economic development are important mediators ∉ Risk factors which determine the occurrence of asthma in children identified. These include lifestyle factors as well as environmental factors ∉ Genetic studies: a surprisingly strong variation in the frequency of asthma susceptibility alleles in Europe. Indicates substantial heterogeneity of genetic risk factors underlying the asthma ∉ Analyses of the interaction between genetic and environmental factors is still ongoing ∉ Data integration in a broader framework of International Study of Asthma and Allergies in Childhood (ISAAC) phase II study centres worldwide (14 additional study centres in 12 countries such as Brazil, Ghana, India and New Zealand)	∉ No project website ∉ Final report: http://ec.europa.eu/research/quality-of-life/ka4/pdf/report_pdcaae_en.pdf
PINCHE	∉ Thematic network analysing studies related to children's health and environment (EU Fourth and Fifth Framework of Research projects; nationally funded studies)	▪ Final results and reports available at

Policy interpretation network on children's health and environment EC contribution €1M	∉ Policy-relevant recommendations and identification of research gaps related to children, health and the environment ∉ Focus on air pollution, cancer, neuro-toxicity, noise ∉ Conclusions: – Reducing exposure to most of the air pollutants related to motor-vehicle transport, including benzene, diesel engine emissions, nitrogen oxides and particulate matter, has the highest priority in protecting children's environment and health – Reducing exposure to environmental tobacco smoke, a fully preventable exposure, also has high priority because of high exposure and serious health effects – The priority of reducing allergic symptoms is considered to be medium to high, because allergens are ubiquitous and millions of children in Europe are sensitised to allergens. Exposure of sensitised children to allergens greatly affects their daily performance – Reduction of exposure to ozone, another outdoor air pollutant, has medium priority. It is of specific importance for a susceptible group of children, those with asthma, in relation to outdoor activities – Reducing exposure to polycyclic aromatic hydrocarbons, which mainly originate from vehicle emissions and smoking has medium priority, it can negatively influence the development of the foetus – Exposure to the metals arsenic, lead, cadmium and mercury has a medium to high priority for action. Exposure to these metals has decreased, but some sources or settings still cause enough exposure to produce negative	www.pinche.hvdgm.nl

	health effects – The indoor exposure to mould, radon, formaldehyde and other volatile organic compounds (which also occurs outdoors, but indoor concentrations can reach especially high levels) also has medium priority for action. For each of these stressors, situations can be identified in which children can be exposed to high concentrations. Relevant indoor levels can cause adverse health effects	

Table 3. Projects focused on carrying out reviews of previous research accomplishments

PROJECT ACRONYM AND TITLE	MAIN AIMS AND EXPECTED OUTCOME	POLICIES ADDRESSED	DATE OF DELIVERY OF RESULTS	MORE INFORMATION
EMF-NET Effects of the exposure to electromagnetic fields: From science to public health and safer workplace	∉ Collation of the results of national and EU-level studies on electromagnetic fields, considering both laboratory and epidemiological studies and covering extremely low frequencies (ELF), radiofrequencies (RF), intermediate frequencies, terahertz (THz) radiation, interaction mechanisms and medical applications ∉ Support "informed decision-making" for regulation and risk communication, to harmonise the results providing information to regulatory bodies and industries	∉ Programme of Community action in the field of Health and Consumer protection 2007-2013 (COM(2005) 115) ∉ Council Recommendation 199/519/EC on recommended (non-binding) limits to the exposure to EMF of the general public in the Member States	∉ Some information sheets on links between specific types of exposure and health impacts are already available of the project website ∉ The website is continuously updated with new information sheets	www.jrc.cec.eu.int/emf-net
COST281 Potential health implications from mobile communication systems	∉ Obtain a better understanding of possible health impacts of emerging technologies, especially related to communication and information technologies that may result in exposure to electromagnetic fields ∉ Scientific evaluation of the available data for use by various decision makers involved in	∉ Directive 2004/40/EC on the established limits to the exposure of workers to EMF ∉ Directive 1999/5/EC on established restrictions concerning EMF originating from radio and	The project ended in 2006 and the results will be available on the project website by the end of the year	www.cost281.org

	risk management of electromagnetic ∉ Basis for risk communication efforts related to emerging technologies, electromagnetic fields and possible health risks and ∉ Data on electromagnetic field exposures related to emerging technologies on a European level	telecommunication terminal equipment placed on the EU market ∉ Other product legislation like the Low Voltage Directive and the Medical Devices Directive		
HENVINET Health and environment network	∉ Establish expert teams for each of the four priority diseases of the Environment and Health Action Plan, which shall extract and summarise the current scientific basis regarding the links between health and environment and best practices of applying this knowledge, and prepare policy relevant material for dissemination to decision makers and other stakeholders ∉ Ensure efficient dissemination of all material resulting from the project activities (research results of policy relevance, policy relevant summaries, best practice, decision support tool descriptions), to be uploaded into a dynamic web-based information system and be made available to stakeholders outside the project, for review and to promote discussion with the scientific community ∉ Select a number of key and relevant areas of relations between health end points and	Environment and Health Action Plan	First results will be available at the earliest in 2008	Project negotiations recently finished – no website yet

	sources of environmental exposure (cause-effect chains), where decision support tools have been developed or suggested ∉ Develop plans for validation studies in these subject areas, as well as actively work towards the wider use of such tools, to support development of new policies ∉ Identify relevant ongoing and recently completed research projects focused on decision support tools			
CAIR4HEALTH Clean air for health - research needs for sustainable development policies	∉ Strengthen and exploit research results obtained by European and other projects related to air quality and health impacts ∉ Identify the remaining knowledge gaps in the field of air pollution and health in relation to the objectives of Environment & Health Action Plan ∉ Identify the technology development and deployment needs in the area of air pollution and health impact mitigation, in the context of implementation of the Environmental Technology Action Plan ∉ Identify the research and development needs to facilitate the implementation of the Thematic Strategy on the Urban Environment for improving the quality of	∉ Thematic Strategy on air pollution ∉ Thematic Strategy on the Urban Environment ∉ CAFÉ Thematic Strategy on Air Quality ∉ Environmental Technology Action Plan ∉ Ambient Air Quality Framework Directive 96/62/EC	First results will be available at the earliest in 2008	Project negotiations recently finished – no website yet

	life in urban areas in the context of air quality and health impact ≠ Identify research needs and knowledge gaps in relation to the CAFÉ Thematic Strategy on Air Quality and its future requirements			
ENVIE Coordination action on indoor air quality and health effects	≠ Critically review and collate European research on the most indoor air- relevant health effects and respective exposures to contaminants in indoor air ≠ Evaluate the significance of indoor sources on the onset of asthma and allergy symptoms and the potential of building envelope and heating, ventilating, and air conditioning (HVAC) system to protect the susceptible individuals ≠ Review survey designs in terms of the interpretation and generalisation of the identified source to exposure mechanisms ≠ Attribute selected indoor air contaminants to sources ≠ Review indoor exposure models for the assessment of past and present exposures, as well as the exposure consequences of alternative future scenarios ≠ Review construction materials and the	≠ Programme of Community action in the field of Health and Consumer protection 2007-2013 ≠ Thematic Strategy on air pollution ≠ Community strategy on health and safety at work 2002–2006	First results will be available at the earliest in 2008	http://indoorairenvie.cstb.fr/

	perspectives of the technologies and the quantities in use and their contribution to indoor environmental dysfunctions ∉ Review the policies on the outdoor air pollution releases from buildings, building product emissions, and whole building and building equipment performance including energy efficiency within Europe with the aim of proposing a uniform approach ∉ Evaluate the policies concerning indoor air releases from consumer products, and how these should be taken into account in indoor air quality management (Task 3) ∉ Review the effectiveness of behavioural modifications and building maintenance to improve indoor air quality and sustainability of the residential and working environments			
SHAPE-RISK Sharing experience on risk management (health, safety and environment) to design future industrial systems ∉ The main objective of the	∉ The main objective of the SHAPE-RISK CA is to optimise the efficiency of integrated risk management in the FP6 context of the sustainable development by addressing sustainable waste management and hazard reduction (operational safety and environmental risks in production, storage and manufacturing) ∉ Results:	In this CA involving 19 partners, risk management is related to: ∉ Environment (IPPC directive) ∉ Major Accident Hazards (SEVESO II directive) ∉ Occupational health and	<u>End date:</u> <u>28 February 2007</u>	All documents provided by the 19 European partners are available on the website: http://shaperisk.jrc.it

SHAPE-RISK CA is to optimise the efficiency of integrated risk management in the FP6 context of the sustainable development by addressing sustainable waste management and hazard reduction (operational safety and environmental risks in production, storage and manufacturing) ∉ Results: Propositions for operating cleaner and safer industrial facilities endorsed by Industry and other stakeholders	Propositions for operating cleaner and safer industrial facilities endorsed by Industry and other stakeholders Key recommendations include: – Creation of "meta-directive" integrating all HSE aspects, – Development of a "one-stop-shop" providing Industry and Competent Authorities with a ready access to risk-related data & information, – Elaboration of an integrated methodology for HSE risks analysis, – Implementation of on-site inspections common to Labour and Environment authorities in EU MS.	safety (ATEX directive, etc.)		

Key recommendations include: Creation of "meta-directive" integrating all HSE aspects, Development of a "one-stop-shop" providing Industry and Competent Authorities with a ready access to risk-related data & information, Elaboration of an integrated methodology for HSE risks analysis, Implementation of on-site inspections common to Labour and Environment authorities in EU MS. In this CA involving 19 partners, risk management is related to:				

∉ Environment (IPPC directive) ∉ Major Accident Hazards (SEVESO II directive) Occupational health and safety (ATEX directive, etc.) <u>End date:</u> <u>28 February 2007</u> All documents provided by the 19 European partners are available on the website: http://shaperisk.jrc.it				

Table 4. Events related to environment and health (2005-2006)

EVENT	ORGANISER	YEAR	MAIN AIM	PARTICIPANTS	MORE INFORMATION
Related to Action 3					
Workshop 'Birth cohorts in Europe'	Childrengenonet-work (FP5 project) and DG Research	2005	Gain an overview of all projects in Europe using birth cohorts and biobanking	Scientists DG Environment DG Research	http://cgn.pubhealth.ku.dk/childrengeno_en/networkactivities/
Workshop 'Synthesising research results for supporting human biomonitoring in Europe'	DG Research	2005	∉ Explore the contribution of EU-funded research especially on issues like cohort studies, biomarkers and biobanks to human biomonitoring ∉ Exchange views among researchers and policy-makers on the contribution that research can bring to the development of a coherent approach to biomonitoring in Europe ∉ Present the main results of relevant research projects ∉ Discuss the future approaches to research to ensure a better integration among research activities and policy	Scientists DG Research DG Environment DG SANCO	N.A.

			initiatives		
Workshop 'Biomarkers and their potential in human biomonitoring and environmental health surveillance'	ECNIS Network of Excellence (www.ecnis.org) DG Environment	2006	Provide an overview of the current state of biomarker science and discuss its potential in human biomonitoring and environmental health surveillance activities	Scientists Policy-makers NGOs Industry	www.ecnis.org
Related to Action 5					
International Conference 'European Environment & health Action Plan 2004-2010 : Implementation': Conference organised jointly by the Dutch Presidency and the Commission	DG Environment DG Research DG Joint Research Centre	2004	Contribute to the implementation of the Environment and Health Action Plan Focus on – Information on environment and health – Human Biomonitoring – Research – Indoor air quality	Scientists Policy-makers NGOs Industry Press	http://ec.europa.eu/environment/health/implementation_en.htm
Open Stakeholder Consultation: Priorities for Environment & Health Research in FP7	DG Research	2006	Present and discuss the future priorities of environment and health research in view of launching the first calls for proposals in the Seventh Framework of Research	Scientists Policy-makers NGOs Industry	http://ec.europa.eu/research/environment/newsanddoc/article_3907_en.htm

Workshop 'Community-sponsored research on environmental cancer risks and regulation' and kick-off event of ECNIS Network of Excellence'	DG Research in association with the ECNIS NoE (www.ecnis.org)	2005	Present selected results of Commission-sponsored research projects in the cancer field in Fifth Framework of Research (FP5); allow exchange of ideas between coordinators of FP5 and Sixth Framework Programme of research (FP6) projects; gather views for priorities in Seventh Framework Programme of research (FP7); explore research/policy interfaces in the field of cancer	Scientists Policy-makers Press	www.ecnis.org
Workshop 'Strategic research review workshop on food/environment'	DG Research	2005	∉ Current state of science in the field of food/feed and environment (FP5/FP6 projects, other ongoing research) ∉ Discuss old and new open questions related to 'environment and food': what needs further support, what is less important	Selected scientific experts	Restricted distribution (Commission and workshop participants)
Workshop 'Epidemiology of long-term air pollution effects'	Utrecht University with financial support from DG Environment	2006	Bring together researchers with expertise in air pollution epidemiology to exchange information about ongoing studies on long-term effects of air pollution in Europe; to provide the EU with advice on research priorities in FP7; and to discuss designs and options for future research collaborations in this area	Scientists Regulators	http://ec.europa.eu/environment/health/pdf/bilthoven.pdf
Final meeting/workshop of PINCHE, CHILDREN-	PINCHE, CHILDREN-	2005	Present the outcomes from the 'Policy Interpretation Network on Children's	Policy makers	www.pinche.hvdgm.nl

GENONETWORK AND PLUTOCRACY Fifth Framework Programme of Research projects	GENONETWORK PLUTOCRACY and DG Research		Health and the Environment' (PINCHE), the 'European network on children's susceptibility and exposure to environmental genotoxicants' (CHILDRENGENONETWORK) and the 'Placental Uptake and Transfer of Environmental Chemicals Relating to Allergy in Childhood Years' (PLUTOCRACY) projects to policy makers at EU and national level	Scientists	
Training session in 'International conference on environmental epidemiology & exposure'	L'Agence française de sécurité sanitaire de l'environnement et du travail (AFFSET) International Society of Environmental Epidemiology International Society of Exposure Assessment	2006	∉ Highlight the results of all FP5 projects dealing with E&H issues ∉ Present plans regarding E&H-related activities in FP7	Scientists Regulatory agencies French government representatives Press	www.paris2006.afsse.fr
Third mobile communications seminar 'Health, environment and society - risk assessment, risk evaluation,	GSM Europe Mobile Manufacturers Forum (MMF)	2006	∉ Offer an exchange forum and improve the dialogue between a wide range of stakeholders ∉ Provide background information to	Industry Regulators Academia	www.mmfai.org/public/

deployment risks'	DG Enterprise DG Health and Consumer Protection		give all stakeholders the same informational basis ∉ Provide a comprehensive and interdisciplinary review of the issue	NGOs	
Workshop 'Global noise policy - Euro-noise'	Euro-noise 2006	2006	∉ Progress and outlook for EU environmental noise policy ∉ Past and future research activities funded by the EU on noise	DG Environment DG Research European Environment Agency National environmental ministries Academia Industry	http://virtual.vtt.fi/virtual/proj3/euronoise2006/en2006_noise_policy_workshop.htm
Workshop 'Air quality research needs and opportunities in the EU Seventh Framework Programme of Research (FP7)'	CONCAWE with contribution from the European Commission's DG Research to the elaboration of the agenda	2007	∉ Foster a multidisciplinary approach to identifying research needs & opportunities in air quality ∉ Serve as a forum for international exchange and integration of data, particularly between disciplines (e.g., between toxicology & epidemiology) ∉ Provide opportunity for participants to reveal gaps and discrepancies and to	Industry Academia DG Joint Research Centre DG Research DG Information Society and Media	www.concawe.be

			identify most productive areas for future studies building on successful approaches in previous framework programmes	National air pollution agencies	
Related to Action 6					
Workshop 'Enhanced international collaboration in the field of endocrine disrupters: how to do it in practice?'	DG Research	2005	Get an overview of research programmes and activities of major international players in the field of endocrine disrupter research, and to explore ways of improving collaboration between the actors involved.	Research institutes and universities Industry NGOs and consumer organisations (Inter)governmental bodies Commission services and agencies	http://ec.europa.eu/research/endocrine/pdf/ed_workshop_report_may_2nd_2005.pdf
Workshop 'Endocrine disrupter testing and assays in commission-sponsored research projects: useful for regulatory purposes?'		2006	Highlight results of endocrine disrupter projects, funded by the EC in FP5, relevant to regulatory testing	Organisation for Economic Co-operation and Development European Centre for the Validation of Alternative Methods	http://ec.europa.eu/research/endocrine/workshop_nov2005_en.html

				Industry NGOs European Environment Agency Academia	
Workshop 'Impacts of endocrine disrupters' (Weybridge+10)	Co-organised by DG Research and the Academy of Finland, under the auspices of the Finnish Presidency of the EU	2006	Highlight achievements in the endocrine disrupter field in the past 10 years since the first Weybridge workshop and prioritise research needs for the next 10 years	Academia Organisation for Economic Co-operation and Development European Centre for the Validation of Alternative Methods Regulators European Environment Agency NGOs Industry	www.aka.fi/euseminars (Final report to be published by EEA)
International conference 'Food contaminants and neurodevelopmental	Devnertox FP6 project funded by DG Research		∉ Review effects of food contaminants on cerebral function and development, physiological mechanisms of	European Food Safety Agency	www.fundacioncac.es/eng/fundacion/catedra/ca

disorders'	(www.imm.ki.se/devnertox), Fundación José Pastor Fuertes Fundación Valenciana de Estudios Avanzados Centro de Investigación Príncipe Felipe Ciudad de las Artes y las Ciencias Conselleria de Empresa, Universidad y Ciencia de la Generalitat Valenciana		environmental and food-linked environmental hazards, understanding of exposure pathways, analysis of the effects of cumulative, low dose and combined exposures, long-term effects; impact of endocrine disrupters, chronic chemical pollution and combined environmental exposures ∉ Discuss possible implications of the research results on EU policy concerning food contaminants	Academia National regulatory agencies DG Research	tedra.jsp
Related to Action 7					
European workshop 'Harmonisation of risk analysis of chemicals in food'	DG Research	2005	∉ What scientists can provide for regulatory and advisory authorities ∉ What regulatory authorities need from scientists	DG Research DG Health and Consumer Protection European Food Safety Agency	Commission internal use

Workshop 'Needs and potential for integrated risk assessment'	Intarese Integrated FP6 Project (www.intarese.org)	2006	Demonstration of the operational toolbox for integrated E&H risk assessment to potential endusers	European Environment Agency National regulatory bodies	www.intarese.org
Espreme/Drops workshop on cost/benefit and uncertainty analysis	Espreme (Reducing the environmental impact of heavy metals), Drops (Development of macro and sectoral economic models aiming to evaluate the role of public health externalities on society) FP6 projects	2007	∉ Discuss the assessment of health related externalities, and definition of sustainability thresholds. ∉ Discuss tools for environment and health impact assessment, cost/benefit analysis	Tbd	N.A.
Related to Action 8					
Workshop 'Global environmental change: risks to human health'	DG Research	2005	Discuss current problems and future challenges for research and data collection, modelling the impact of climate change on health, translating research into action	Academia DG Research	Commission internal document
International Symposium 'Climate Change Research Challenges'	DG Research	2006	Discuss climate change research challenges, in view of preparation of the Seventh Framework of Research	Academia Policy-makers	http://cordis.europa.eu/sustdev/environment/ev20060203.htm http://ec.europa.

					eu/research/environment/newsanddoc/article_3905_en.htm
Workshop 'Climate change impacts on the water cycle, resources and quality research-policy interface'	DG Research DG Joint Research Centre	2006	Discuss impact of climate change on water and to analyse the results of EU-funded projects which have conducted research in this area. Health aspects were also partially covered	Scientists Water managers Policy-makers	http://ec.europa.eu/research/environment/newsanddoc/article_3908_en.htm
Workshop 'Polar environment and climate: the challenges European research in the context of the International Polar Year'	DG Research	2007	∉ Strengthen visibility of EC support to polar research at the start of the International Polar Year ∉ Will include a session on environmental pollutants and their impact on the health of Arctic populations	Scientists DG Research	(To be published) http://ec.europa.eu/research/environment/index_en.htm

Table 5. Allergy/asthma-related projects funded in FP6 (2002-2006)

PROJECT ACRONYM AND TITLE	MAIN AIMS AND EXPECTED OUTCOME	POLICY ADDRESSED	MORE INFORMATION

GA2LEN Global allergy and asthma European network	∉ Integrate research activities in Europe and to establish the structure for a European Research Area of excellence in allergy and asthma that will endure	∉ Programme of Community action in the field of Health and Consumer protection 2007-2013 ∉ EU Thematic Strategy on air pollution Ambient Air Quality Framework Directive 96/62/EC	www.ga2len.com
EUROPREVALL The prevalence, cost and basis of food allergies across Europe	∉ Characterise the patterns and prevalence of food allergies across Europe in infants, children and adults ∉ Develop methods to improve the quality of food allergy diagnosis, reducing the need for food challenge tests ∉ Determine the impact of food allergies on the quality of life and its economic cost for food allergic people and their families, workplace and employers, and healthcare		www.europreva ll.org
GABRIEL A multidisciplinary study to identify the genetic and environmental causes of asthma in the European Community	∉ Identify how genes and the environment cause the development of asthma, identifying both risk and protective factors, with the long-term aim of preventing the illness		www.gabriel-fp6.org

Table 6. FP6 projects focused on neuroimmune disorders

PROJECT ACRONYM AND TITLE	MAIN AIMS AND EXPECTED OUTCOME	POLICY ADDRESSED	MORE INFORMATION
CASCADE Chemicals as contaminants in the food chain: a NoE for research, risk assessment and education	∉ Provide novel information on the mechanism of action of contaminants in food that interfere with nuclear receptor signalling pathways (Focus on 4 model compounds [genistein, vinclozilin, bisphenol A and TCDD)] ∉ Develop in vivo, in vitro and in silico test methods to screen for the potential of a broad range of chemical residues in the food, including food extracts and mixtures and metabolites of chemical residues ∉ Identify exposure biomarkers ∉ Provide mechanistic information regarding disease development (disruption of neurodevelopment or interference with the development and functioning of male or female reproductive systems, hormonally dependent cancer in prostate and breast, colon cancer, metabolic diseases and osteoporosis)	∉ European strategy for Sustainable Development ∉ The Community Strategy on Endocrine Disrupters ∉ Community strategy for dioxins, furans and polychlorinated biphenyls (2001/C 322/02) ∉ Registration, Evaluation and Authorisation of Chemicals (REACH) ∉ Council Regulation (EEC) No 315/93 on food contaminants ∉ Commission Directive 2002/72/EC, amended by Com. Dir. 2004/19/EC (concerns bisphenol A) ∉ Pesticide legislation: Directive	www.cascadenet.org

		91/414/EEC, Directive 79/117/EEC ∉ Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC ∉ European Pollutant Release and Transfer Register (Regulation (EC) No 166/2006 ∉ Legislation on food contaminants: Council Regulation (EEC) No 315/93	
PIONEER Puberty onset – influence of nutritional, environmental and endogenous regulators	∉ Obtain updated data on the age of puberty onset in the different regions of Europe ∉ Identify genetic and nutritional factors involved in the regulation of the onset of puberty (including certain endocrine disrupters) ∉ Develop novel experimental models, optimised for the investigation of genetic and nutritional factors regulating onset of puberty ∉ Define if specific preventive actions could be taken within EU	∉ European strategy for Sustainable Development ∉ The Community Strategy on Endocrine Disrupters ∉ Registration, Evaluation and Authorisation of Chemicals (REACH)	http://cascade.projectcoordinator.net/~pioneer
FOOD AND FECUNDITY	∉ Develop and employ validated methods for the screening and testing of pharmaceutical products (mainly oestrogens, androgens and progestogen-like compounds) and their metabolites	∉ European strategy for Sustainable Development	http://foodandfecundity.factlink.net/182

Pharmaceutical products in the environment: Development and employment of novel methods for assessing their origin, fate and effects on human fecundity	∉ Determine their adverse effects, origin, fate, and mechanism of action ∉ Assess their risk on male and female fecundity in various geographical locations and exposure scenarios in Europe.	∉ The Community Strategy on Endocrine Disrupters ∉ Registration, Evaluation and Authorisation of Chemicals (REACH) ∉ Council Regulation (EEC) No 315/93 on food contaminants ∉	059.0
DEVNETOX In vivo and in vitro studies on the neurotoxic effectsof mixture of neurotoxic seafood contaminants	Develop experimental models to improve predictive toxicity testing and mechanism-based risk assessment for neurotoxic food contaminants	∉ European strategy for Sustainable Development ∉ The Community Strategy on Endocrine Disrupters ∉ Community strategy for dioxins, furans and polychlorinated biphenyls (2001/C 322/02) ∉ Registration, Evaluation and Authorisation of Chemicals (REACH) ∉ Council Regulation (EEC) No 315/93 on food contaminants ∉ Community Strategy	www.imm.ki.se /devnertox

		Concerning Mercury ∉ European Pollutant Release and Transfer Register (Regulation (EC) No 166/2006	
ATHON Impact of non-dioxin-like PCBs on neurobehavioural, reproductive and developmental toxicity, and tumour promotion	∉ Provide missing critical health hazard information, to clarify biological mechanisms underlying the various types of toxicity of NDL-PCBs and to evaluate these data from a regulatory toxicology point-of-view ∉ Establish quality-controlled experimental in vivo and in vitro models for studies of NDL-PCBs ∉ Provide toxicokinetic data for NDL-PCBs ∉ Provide quantitative and qualitative toxicity profiles for NDL-PCBs ∉ Provide a new classification strategy for NDL-PCB congeners based on effect biomarker information ∉ Provide an up-to-date compilation and evaluation of toxicological effect and exposure data on NDL-PCBs and PCB metabolites	∉ European strategy for Sustainable Development ∉ The Community Strategy on Endocrine Disrupters ∉ Community strategy for dioxins, furans and polychlorinated biphenyls (2001/C 322/02) Registration, Evaluation and Authorisation of Chemicals (REACH) ∉ European Pollutant Release and Transfer Register (Regulation (EC) No 166/2006 ∉ Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC	www.athon-net.eu
EXERA	Development of transgenic animals to test for endocrine disrupting compounds	∉ European strategy for	Under construction

Development of 3D in vitro models of estrogen-reporter mouse tissues for the pharmaco-toxicological analysis of nuclear receptors-interacting compounds (NR-ICs)		Sustainable Development ⊄ The Community Strategy on Endocrine Disrupters ⊄ Registration, Evaluation and Authorisation of Chemicals (REACH) ⊄	

Table 7 Project focused on health impacts of exposure to heavy metals

PROJECT ACRONYM AND TITLE	MAIN AIMS AND EXPECTED OUTCOME	POLICY ADDRESSED	MORE INFORMATION
PHIME Public health impact of long-term, low-level mixed element exposure in susceptible population strata	∉ Will assess the impact of toxic metals (Cd, Hg, Pb, Mn) exposure through foods on diseases of public health concern (nervous system, cardiovascular, osteoporosis/fractures, kidneys, diabetes) ∉ Focus on interaction between toxic elements in mixed exposures and on "new" elements (platinum, palladium, rhodium and manganese) and susceptible groups (foetuses/infants/children, fertile women and elderly) ∉ New methods for biomonitoring of exposures will be developed and validated ∉ Geographical patterns/sources of exposure in the EU, especially in children and women, will be defined ∉ Time trends of exposure will be assessed, retrospectively and prospectively	∉ Programme of Community action in the field of Health and Consumer protection 2007-2013 ∉ Community strategy on health and safety at work 2002–2006 ∉ Council Regulation (EEC) 315/93 on food contaminants ∉ Directive 2002/32/EC of the European Parliament and of the Council of 7 May 2002 dealing with undesirable substances in animal feed ∉ European strategy for Sustainable Development ∉ Ambient Air Quality Framework Directive 96/62/EC	www.med.lu.se/english/research/phime

Table 8. Projects focused on cancer

PROJECT ACRONYM AND TITLE	MAIN AIMS AND EXPECTED OUTCOME	POLICY ADDRESSED	MORE INFORMATION
NEWGENERIS aternal exposure to geno- and immunotoxic compounds: induction of carcinogenic and immunotoxic events in the unborn child; risk of cancer and immune disorders in later childhood	∉ Hypothesis to be tested: Maternal exposure to certain compounds results in in utero exposure and subsequently induces carcinogenic and immunotoxic events in the unborn child, thereby leading to increased risk of cancer and immune disorders in later childhood ∉ Biomarker approach: (i) biomarkers of dietary exposure to chemicals with carcinogenic and associated immunotoxic properties (focus on PAHs, acrylamide, mycotoxins, organochlorines, heterocyclic amines…); (ii) biomarkers of pre-carcinogenic and immunotoxic effects ∉ Dietary exposures of mothers and fathers obtained using existing European mother-child birth cohorts ∉ The project will consider the impact of endocrine disrupters, by studying exposure to and immunotoxic properties of some well-known hormone-active agents such as dioxin and PCBs	∉ EU pesticide legislation ∉ Council Regulation (EEC) 315/93 on food contaminants ∉ Directive 2002/32/EC of the European Parliament and of the Council of 7 May 2002 dealing with undesirable substances in animal feed ∉ European strategy for Sustainable Development ∉ Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC	www.newgeneris.org
ECNIS Environmental	∉ A concerted effort to achieve improved understanding of the environmental causes of cancer	∉ European strategy for Sustainable Development	www.ecnis.org

cancer risk, nutrition and individual susceptibility	∉ The potential of diet to prevent cancer ∉ The ways by which heredity can affect individual susceptibility to carcinogens ∉ Will focus on the utilisation biomarker-based technologies to approach these goals (new biomarkers as well as the application of existing and new biomarkers) ∉ Optimal use of existing European cohorts and biobanks; population-based studies from different regions of Europe with different climates, pollution levels and dietary habits	∉ Registration, Evaluation and Authorisation of Chemicals (REACH) ∉ EU Thematic Strategy on air pollution ∉ Ambient Air Quality Framework Directive 96/62/EC	
DIEPHY Dietary exposures to polycyclic aromatic hydrocarbons and DNA damage	∉ Levels of DNA adducts in non-smoking women (Poland, Serbia and Italy) ∉ Genetic polymorphisms in main activating and detoxifying enzymes ∉ Impact on DNA adducts, oxidative lesions and chromosome damage from food and environmental PAH exposures in persons living in the vicinity of Serbian petrochemical complexes (extremely polluted areas in the Balkans) ∉ Synergistic effects of simultaneous exposure to PAHs and As in drinking water ∉ Validate biomarkers (buccal cells)	∉ European strategy for Sustainable Development ∉ Registration, Evaluation and Authorisation of Chemicals (REACH) ∉ EU Thematic Strategy on air pollution ∉ Ambient Air Quality Framework Directive 96/62/EC	www.imp.lodz.pl/diephy/diephy.htm
EUROLYMPH Collaborative European action	∉ Develop a network of studies to investigate the association between environmental risk factors and NHL with the specific objective to conduct a detailed investigation of environmental and nutritional risk factors previously suggested to be associated with NHL on the	∉ Programme of Community action in the field of Health and Consumer protection	N.A.

into environmental, nutritional and genetic factors in non-Hodgkin's lymphoma aetiology	pooled data from the studies participating in the InterLymph consortium ⋐ Produce results on risk of NHL for exposure to different categories of pesticides and solvents, organic dusts, ultraviolet radiation, and contact with animals and animal related products, and on their interplay with genetic susceptibility factors.	2007-2013	

Table 9. Projects on methods for integrated risk assessments of cumulative stressors

PROJECT ACRONYM AND TITLE	MAIN AIMS AND EXPECTED OUTCOME	POLICY ADDRESSED	MORE INFORMATION
NOMIRACLE Novel methods for integrated risk assessment of cumulative stressors in Europe	∉ Develop a research framework for the description and interpretation of cumulative exposures and effects ∉ Develop new methods for assessing the cumulative risks from combined exposures to several stressors (including mixtures of chemical and physical/ biological agents) ∉ Achieve more effective integration of the risk analysis of environmental and human health effects ∉ Quantify, characterise and reduce uncertainty in current risk assessment methodologies ∉ Develop assessment methods which take into account geographical, ecological, social and cultural differences in risk concepts and risk perceptions across Europe	∉ European strategy for Sustainable Development ∉ Registration, Evaluation and Authorisation of Chemicals (REACH)	http://viso.jrc.it/nomiracle
OSIRIS Optimized strategies for risk assessment of industrial chemicals through integration	∉ Develop methods and guidance for transparent and scientifically sound use of chemistry driven information in intelligent testing strategies (ITS) ∉ Provide efficient strategies and guidance for exploitation of all types of biological information on toxic effects of chemicals in ITS, focusing on reduced animal use and informed extrapolation across human and	∉ Registration, Evaluation and Authorisation of Chemicals (REACH)	Under construction

of non-test and test information	environmental toxicology, species, endpoints and time scales ≠ Develop criteria for exposure informed testing as foreseen in the future REACH regulation, and to refine relevant exposure assessment methods accordingly ≠ Develop weight-of-evidence approaches for ITS based on a computerized decision theory framework ready for web access, optimizing the use of existing data and non-test information, and minimizing the need for new testing in risk assessment procedures ≠ Evaluate the feasibility and effectiveness of the new ITS methodologies and to provide guidance for their use in concrete form, covering major human and environmental endpoints		
INTARESE Integrated assessment of health risks from environmental stressors in Europe	≠ Improve scientific support for policy on E&H, the immediate priority should not be on investigating individual causal associations between E&H, but rather on improving the use made of the data and knowledge that we already have in order to obtain more integrated assessments of risks and impacts. ≠ Develop a conceptual framework within which to bring together the latest scientific evidence across all the relevant environmental sectors and disciplines as a basis for integrated assessment of both environmental and health impacts and risks ≠ Build an operational toolbox for integrated assessment that can be applied to different stressors and environmental media (air pollution, water pollution, climate change etc), settings (ambient, domestic, occupational) and agents (chemicals, solid wastes, natural hazards, noise etc)	≠ European strategy for Sustainable Development ≠ Registration, Evaluation and Authorisation of Chemicals (REACH) ≠ EU Thematic Strategy on air pollution ≠ Ambient Air Quality Framework Directive 96/62/EC ≠ The transport, health and environment pan-	www.intarese.org

	∉ Apply this approach to undertake integrated assessments for a range of key policy areas, including transport, housing, agricultural land use, water management, household chemicals, waste management and climate	European programme (THE PEP) ∉ EC Integrated Environment and Health Information System for Europe (EHIS) ∉ EU waste legislation (Directive 2006/12/EC)	
ENVIRISK Assessing the risks of environmental stressors: Contribution to the development of integrating methodology	∉ Identify and assess the available monitoring data and exposure models for realistic exposure assessment, and to analyse methods and models for their use in the analysis of relationships between environment, exposure and health ∉ Develop protocols for exposure assessment and for assessment of exposure-health effect relationships, integrating the modelling of environmental releases, dispersion, human activity and physiology into an exposure modelling framework, and to provide interface between this exposure modelling framework and health effect modelling ∉ Develop a framework for the assessment of relationships between exposure and health for selected pollutants including those that are subject to multimedia transport, to suggest protocols for such assessment and provide their economic appraisal ∉ Pilot the exposure and risk modelling framework for three EC Environment and health Action Plan-relevant indicators: exposure to atmospheric PAH, multimedia PCBs, dibenzofurans and dioxins, and atmospheric particulate matter and other irritants relevant to respiratory	∉ EC Integrated Environment and Health Information System for Europe (EHIS) ∉ Registration, Evaluation and Authorisation of Chemicals (REACH)	Under construction

	morbidity and mortality ≠ Contribute to the EC Integrated Environment and Health Information System for Europe (EHIS) through development of a prototype tool for exposure assessment		

Table 10. Projects on health impact assessments and cost/benefit analyses

HEIMTSA Health and environment integrated methodology and toolbox for scenario assessment	∉ A methodology for health impact and cost benefit analysis, so that overall environment and health impacts caused by releases of substances into the environment from all relevant human activities can be evaluated at the European level, as reliably as practicable given current knowledge ∉ A related modular integrated assessment system (IAS) for implementing the methodology Europe-wide, i.e. across the EU-30 (EU25 and Norway, Switzerland and the accession countries) ∉ Results from using the IAS to apply the methodology for health impact and cost-benefit assessment of realistic policy scenarios at the European level ∉ Development of HIA/CBA capability in Europe	∉ European strategy for Sustainable Development ∉ Registration, Evaluation and Authorisation of Chemicals (REACH) ∉ EU Thematic Strategy on air pollution ∉ Ambient Air Quality Framework Directive 96/62/EC ∉ The transport, health and environment pan-European programme (THE PEP) ∉ EC Integrated Environment and Health Information System for Europe (EHIS) ∉ EU waste legislation	Under construction

		(Directive 2006/12/EC)	
2-FUN Full-chain and uncertainty approaches for assessing health risks in future environmental scenarios	∉ Provide decision-makers with powerful mechanistic tools to support the analysis of current and future trends in environmental conditions and pressures that cause health problems, and to evaluate and rank the management options of their risk factors ∉ Development of methodologies for building and assessing future realistic environment and health scenarios ∉ Development of methodologies allowing the integrated assessment of multi-stressors, multi-routes and multi-exposure for various target groups (especially children) ∉ Improvement and development of uncertainty models for further health management ∉ Application of a full-chain approach for health risk assessment to specific case-studies of general interest to the EU ∉ Dissemination of new methodologies and tools on a large scale (scientific community, policy-makers, industry, citizens), providing inputs for harmonised tools and European policy makers ∉ A main breakthrough in the tools proposed by 2-FUN lies with the explicit accounting of uncertainty throughout the full mechanistic computation chain and with the possibility to functionally integrate different data classes, seamlessly crossing different time and spatial scales	∉ Transport, energy, agricultural, food safety, air quality, soil protection and water protection policies ∉ EU sustainable development strategy ∉ REACH (Registration, Evaluation, Authorisation and restriction of Chemicals) ∉ EC Integrated Environment and Health Information System for Europe (EHIS)	Under construction
METHODEX	∉ Advance best practice in external cost assessment, and extend the ExternE analysis to agriculture, industry, waste and other sectors	∉ Clean Air for Europe (CAFÉ) Programme	www.methodex.org

Methods and data on environmental and health externalities: harmonising and sharing of operational estimates		∉ UN ECE Convention on Long Range Transboundary Air Pollution (CLRTAP) convention ∉ EU waste legislation (Directive 2006/12/EC) ∉ Ambient Air Quality Framework Directive 96/62/EC	
ESPREME Reducing the environmental impact of heavy metals	∉ Cost-effectiveness and cost-benefit analyses to identify strategies that will reduce both the release of heavy metals and, ultimately, their impact on the environment and human health	∉ Ambient Air Quality Framework Directive 96/62/EC ∉ Aarhus Protocol on Heavy Metals ∉ Water Framework Directive ∉ EU Mercury Strategy	http://espreme.ier.uni-stuttgart.de
DROPS Development of macro and sectoral economic models	∉ Provide a full-chain analysis related to impact of health protection measures related to priority pollutants as identified by the E&H Action Plan (ozone, heavy metals, PCBs, dioxins, indoor and outdoor pollution) ∉ Support the development of cost effective policy measures against pollution	∉ Clean Air for Europe (CAFÉ) Programme ∉ Ambient Air Quality Framework Directive	www.nilu.no/DROPS

aiming to evaluate the role of public health externalities on society	related diseases and their wider impacts	96/62/EC ∉ UN ECE Convention on Long Range Transboundary Air Pollution (CLRTAP)	
VERHI CHILDREN Coordination action on valuation of environment-related health impacts	∉ Improve the incorporation of environment-related health impacts in policy-making ∉ Focus on two measures employed to examine environmental policies: the Value of a Statistical Life (VSL) estimated from willingness to pay for mortality risk reductions, and Quality-Adjusted Life Years (QALY)	Clean Air for Europe (CAFÉ) Programme	www.oecd.org/env/social/envhealth/verhi

Table 11. Projects on risk/benefit analyses

PROJECT ACRONYM AND TITLE	MAIN AIMS AND EXPECTED OUTCOME	POLICY ADDRESSED	MORE INFORMATION
BENERIS Benefit-risk assessment for food: an iterative value-of information approach	∉ Develop and use integrated methods to evaluate both the risks and health benefits related to any given food item (in this project fish and vegetables)	∉ EU food contaminant legislation ∉ Registration, Evaluation and Authorisation of Chemicals (REACH) ∉ EU sustainable development strategy	www.beneris.eu
QALIBRA Quality of life - integrated benefit and risk analysis. Web-based tools for assessing food safety and health benefits	∉ Develop quantitative methods for assessing and integrating beneficial and adverse effects of foods ∉ Make them available to stakeholders as web-based software for assessing and communicating net health impacts ∉ Focus on fish/functional foods		www.qalibra.eu/about/index.cfm
BRAFO A specific support action to investigate the risk benefit analysis for foods	∉ Develop a framework that allows a quantitative comparison of human health risks and benefits of foods and food compounds, using a common scale of measurement		http://europe.ilsi.org/activities/taskforces/riskassessment/RiskAssessmentChemi

			cals.htm
SAFEFOODS Promoting food safety through a new integrated risk analysis approach for foods	∉ To develop comparative safety assessment methods for foods produced by different breeding approaches and production practices, using modern profiling techniques, and new qualitative and quantitative risk-benefit (e.g. nutritional, economic) assessment models.		www.safefoods.nl

Table 12. Projects on emerging environment and health threats

PROJECT ACRONYM AND TITLE	MAIN AIMS AND EXPECTED OUTCOME	POLICY ADDRESSED	MORE INFORMATION
MICRODIS Health and socio-economic impacts of extreme events	∉ Investigate relationship between extreme events and their health, social and economic impacts ∉ Develop and integrate knowledge, concepts, methods, tools and databases towards a common global approach ∉ Improve human resources and coping capacity in Asia and Europe through training and knowledge sharing	∉ EU sustainable development strategy ∉ Hyogo Framework ∉ GEOSS initiative ∉ EU policy on flood risk management ∉ EU civil protection legislation ∉ The global programme of the UN/ISDR platform ∉ The EU DIPECHO programme ∉ The ASEAN Committee on Disaster Management	Website under construction
EDEN	∉ Catalogue European ecosystems and environmental conditions linked to global change able to influence the spatial and temporal	∉ European Climate	www.eden-

Emerging diseases in a changing European environment	distribution of pathogenic agents (Tick-borne pathogens, rodent-borne viruses, Leishmaniasis, West Nile Virus, malaria etc) ∉ Provide predictive emergence and spread models including global and regional preventive, early warning, surveillance, and monitoring tools and scenarios	Change Programme ∉ WHO Global Change and Health programme ∉ Programme of Community action in the field of Health and Consumer protection 2007-2013 ∉	fp6project.net
POLYSOA Secondary organic aerosols serve as condensation points for cloud droplet formation and play an important role in global climate and atmospheric chemistry	∉ POLYSOA will investigate the nature and effects of high-weight polymers found in atmospheric aerosols (secondary organic aerosols can form from both natural and man-made emissions) , contributing to the understanding of their effects both in terms of climate change and risk to health.		http://polysoa.web.psi.ch
EPI-BATHE Assessment of human health effects caused by bathing waters	∉ Investigate the level of risk associated with bathing water exposure to support future reviews and revision of the Bathing Water Directive	∉ Bathing Water Directive 76/160/EEC	http://www.aber.ac.uk/iges/research/epibathe
VIRO-BATHE Methods for the detection of Adenoviruses and Noroviruses in European bathing waters with	∉ Improved rapid detection methods for waterborne noroviruses and adenoviruses ∉ Surveillance data on the target viruses through a range of EU recreational waters ∉ Technology transfer to non-participant laboratories through a 'Tech-		www.virobathe.org

reference to the revision of the Bathing Water Directive 76/160/EEC	Transfer' Workshop at the end of the Project ∉ Increased confidence in water quality monitoring for EU bathing waters		
HEALTHY WATER Assessment of human health impacts from emerging microbial pathogens in drinking water by molecular and epidemiological studies	∉ Develop and validate molecular detection technologies for emerging microbial pathogens to provide a format ready for mass application in drinking water samples ∉ Carry out molecular survey and comparative studies of emerging microbial pathogens in European drinking water sources and supply systems ∉ Understand human health impacts of emerging pathogens ∉ Assess risk for emerging waterborne microbial infections in Europe	∉ EU Drinking water directive ∉ EU water framework directive	N.A.
HI-WATE Health impacts of long-term exposure to disinfection by-products in drinking water	∉ Determine the disinfection by-product composition and levels in drinking water in various regions in Europe ∉ Develop predictive models ∉ Assess the risk of premature birth, semen quality, stillbirth and congenital anomalies, including any gene-environment interactions where possible ∉ Assess the risk of cancer (bladder, colon) ∉ Conduct risk/benefit analyses including quantitative assessments of risk associated with microbial contamination of drinking water versus chemical risk		

	∉ Assess the policy implications of current disinfection practices		
SAFEFOODS Promoting food safety through a new integrated risk analysis approach for foods	∉ Development of a user-friendly, transparent, and easy to use working procedure for identification of new emerging chemical and microbial risks in food production chains	∉ EU food contaminants legislation ∉ Registration, Evaluation and Authorisation of Chemicals (REACH)	
NORMAN Network of reference laboratories for monitoring of emerging environmental pollutants	∉ Establish a European network of reference laboratories, research centres and related organisations (including standardisation bodies) in order to improve the exchange of information on emerging environmental contaminants and to encourage the validation and harmonisation of common measurement methods and monitoring tools so that the demands of risk assessors and risk managers can be better met	∉ The CAFÉ process ∉ Registration, Evaluation and Authorisation of Chemicals (REACH)	www.norman-network.com
IMPART Improving the understanding of the impact of nanoparticles on human health and the environment	∉ Prevent knowledge of the health and environmental implications of nanoparticles from lagging behind the technological advances ∉ Improve the understanding of the potential impact of nanoparticles on human health and the environment ∉ Foster communication between different initiatives, streamlining resources and facilitating cooperation	∉ Community Strategy on Health and Safety at Work 2002-2006 ∉ Sustainable Development Strategy ∉ IPPC (Integrated Pollution Prevention Control) directive 96/61 EC ∉ ATEX directives	www.impart-nanotox.org
NANOSAFE2 Safe production and use of nanomaterials	∉ Develop an integrated system addressing potential hazards related to nanoparticles, in particular for health and environmental protection ∉ Develop detection and characterisation techniques, hazard		www.nanosafe.org

	assessment, safe production processes and applications ∉ Equipment for new detection techniques in air and liquid, nanotracers and markers and miniaturised translocation test system ∉ Management of toxicology data globally ∉ Safe production methods demonstrated ∉ Establish a total safety system in cooperation with other projects	(94/9/EC and 99/92/EC) ∉ Air (96/62 EC), water (2000/60 EC), transportation (roads 94/55 EC, rails 96/49 EC), chemicals (98/24 EC) directives	
PARTICLE RISK Risk assessment for particle exposure	∉ Investigate the possible adverse health effects from exposure to NP ∉ Develop novel methods for NP risk assessment ∉ Challenges ∉ Overcome the knowledge gaps regarding potential translocation of NP in the body ∉ Toxic impact on specific organs and tissues		www.iom-world.com/particlerisk
NANOTOX Investigative support for the elucidation of the toxicological impact of nanoparticles on human health and the environment	∉ Provide investigative support for the elucidation of the toxicological impact of nanoparticles on human health and the environment ∉ Improve the understanding of the potential impact of nanoparticles on human health and the environment		www.impart-nanotox.org
DIPNA	∉ In-vitro tests of interaction of engineered nanoparticles (NP) with		Website under

Development of an integrated platform for nanoparticle analysis to verify their possible toxicity and the eco-toxicity	cells, ∉ Identification of the modes of NP-cell interaction ∉ Application of the laboratory-developed cellular models on the field investigations ∉ Basic knowledge on the interaction between nanoparticles and cells ∉ Better understanding of the possible risks related to nanoparticles and criteria to assess the risk case by case ∉ Assessment of the health risk for nanotechnological operators, citizens and end-users and identification of safety procedures ∉ Criteria for prevention and contribution to standards for policy makers		construction
NANOSH Inflammatory and genotoxic effects of engineered nanomaterials	∉ Characterisation of nanoparticles and definition of exposure levels in laboratory conditions and workplaces ∉ Assessment of the genotoxic, inflammatory and microcirculatory effects of nano-particles ∉ Better understanding of the characteristics, behaviour, and toxicity of nanoparticles ∉ Useful methods to assess exposure to and health effects of nanoparticles ∉ Create a reliable and sound foundation for the safety assessment of new nanomaterials		Website under construction

CELLNANOTOX Cellular interaction and toxicology with engineered nanoparticles	∉ Unravel the correlation between the physicochemical characteristics of NPs and their toxic potential on various organs of the human body ∉ Develop innovative multidisciplinary sets of tests and indicators for toxicological profiling of nanoparticles (NPs) ∉ Address the risk of occupational and general population exposure to industrially manufactured NPs ∉ Generate new knowledge on potential health risk of industrially manufactured NPs ∉ Provide objective arguments for recommendations and regulation		www.FP6-cellnanotox.net
NANOINTERACT Development of a platform and toolkit for understanding interactions between nanoparticles and the living world	∉ Connect nanoparticle properties in physiological solution to mechanism of uptake into and transport in cells ∉ Connect final cellular location of nanoparticles with the intra- and inter-cellular processes disrupted ∉ Establish experimental protocols for every aspect to ensure complete reproducibility ∉ Fundamental view of how engineered nanoparticles interact with living cells ∉ A knowledge-based and rational approach that underpins the development of nanotoxicology ∉ Understand effect of adsorbed protein on nanoparticle stability and nanoparticles on protein conformation and function		www.fiachra.ucd.ie/NanoInteract