THE INTERNATIONAL EMF PROJECT

Progress Report

June 2008-2009

World Health Organization

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1. OVERVIEW

In May 1996, in response to growing public concern in several Member States over possible health effects from exposure to an ever-increasing number and diversity of EMF sources, the World Health Organization (WHO) launched an international project to assess the health and environmental effects of exposure to electric and magnetic fields, which became known as **the International EMF Project**.

The International EMF Project brings together current knowledge and available resources of key international and national agencies and scientific institutions in order to develop scientifically-sound health risk assessments of exposure to static and time varying electric and magnetic fields in the frequency range 0-300 GHz**.**

This Project has been devised to provide authoritative and independent peer-review of the scientific literature. Since its inception, the objectives of the EMF Project have been to:

- review the scientific literature on biological effects of EMF exposure;
- identify gaps in knowledge requiring research that will improve health risk assessments;
- encourage a focused agenda of high quality EMF research;
- formally assess health risks of EMF exposure,
- encourage internationally acceptable harmonized standards;
- provide information on risk perception, risk communication, risk management; and,
- advise national programs and non-governmental institutions on policies for dealing with the EMF issues.

1. 1. MEMBERSHIP

The EMF Project is open to any WHO Member State government, i.e. department of health, or representatives of national institutions concerned with radiation protection. Over 50 national authorities are currently involved in the Project. Over the past year, the Ministries of Health from several countries, such as Belgium, Luxembourg, and the United Arab Emirates, have been invited to join the Project. Further outreach is planned, but the challenge remains to locate the appropriate governmental contact at country level, with interest and responsibility regarding EMF protection. In some Member States, other Ministries may show interest, such as the Ministry of Industry or of Energy (dealing with electricity applications), the Ministries of Telecommunications (e.g. mobile phones), or Transport (radar equipment for air navigation), or Environment.

The national governments supporting the Project, together with representatives of international organizations and independent scientific institutions provide oversight for the International EMF Project through the International Advisory Committee (IAC). The IAC meets once a year to discuss national activities, current research programmes, legislation and public concern, and advises the International EMF Project on its activities.

The objectives of the IAC are:

- to provide a forum for a coordinated international response on the health concerns raised by exposure to EMF fields,

- ❖ to review outputs of the Project, including scientific information related to public and occupational health, and environmental management of the EMF issue, and
- ❖ to provide oversight on the conduct of the Project.

Over the last 13 years, activities have closely followed the original work plan, and most activities have or are being implemented. It is expected that all the health risk assessments will be completed and published by 2012. The Department of Public Health and Environment is committed to ensuring that the work of the International EMF project continues, subject to funding.

1. 2. COLLABORATION

The EMF Project has formal collaboration with different entities, i.e. non-governmental organizations (NGOs), international organizations and WHO collaborating centres (see below for details). It also cooperates in an *ad-hoc* manner with other institutions (e.g. co-sponsoring of meetings, etc) and with individual experts.

International agencies

Eight international agencies are involved in the Project (http://www.who.int/peh-emf/project/intorg/en/index.html). Over the reporting period, there has been active collaboration with several of them.

One of the most active collaboration is with the **International Commission on Non-Ionizing Radiation Protection** (**ICNIRP**) - an NGO in formal relations with WHO. Within the reporting period, WHO financially and technically contributed to two meetings organized by ICNIRP. First, the workshop "15 Years On: Reviewing the Past and Looking Forward," was held in September 2008 in Prague as a forum for the ICNIRP community and others to review ICNIRP's past achievements and look ahead to its future challenges. The goal of the meeting was to critically review its strategy and philosophy for the development of international guidelines on non-ionizing radiation (NIR) protection.

The other international workshop was held in Rio de Janeiro, Brazil, from 16 to 18 October 2008. Such an event is traditionally held at 4-year intervals, at the end of every Commission's term, close geographically and in time to the International Radiation Protection Association (IRPA) Congress. The 12th IRPA Congress was held just after the ICNIRP meeting in Buenos Aires, Argentina in October 2008.

Another major activity commissioned in 2005 by WHO to ICNIRP was a review of health effects from RF fields. This work is mostly finalized and should be published within 2009. This review will form the basis of an ICNIRP publication, similar to the previous review on static and ELF fields published in 2003 (http://www.icnirp.org/PubEMF.htm#).

The International Labour Office (ILO), a sister UN agency in Geneva, works closely with WHO in the area of occupational exposure to radiation, both ionizing and non-ionizing. One of its current tasks is to update its international list of occupational diseases which is annexed to the ILO Recommendation No. 194 (http://www.ilo.org/ilolex/english/recdisp1.htm). ILO is preparing the technical basis for an official meeting to update the list which is to be held in October 2009. As one of the issues being considered relates to diseases caused by RF radiation at work, ILO has prepared a draft, and asked WHO, through its experts network, for a review from

the health and scientific point of view by the end of June 2009.

The **Agency for Research on Cancer (IARC)**, a specialized institution of WHO, based in Lyon, France, also has links with the International EMF Project. IARC's mission is to coordinate and conduct research on the causes of human cancer, the mechanisms of carcinogenesis, and to develop scientific strategies for cancer control. Its *World Cancer Report 2008*, published at the end of 2008, includes a chapter on EMF radiation (made available for download on the WHO EMF Project site).

The IARC's Radiation programme includes studies of the carcinogenic effects of radiations, in particular, low doses of ionizing radiation. With regard to EMF, IARC is coordinating the 13-country INTERPHONE study of tumours of the brain, acoustic nerve and parotid gland in relation to radiofrequency radiation emitted by mobile telephones. Over the past months, links were further strengthened through meetings in Geneva with the new Director of IARC, Dr. Christopher Wild, as well as the Cluster head, Philippe Autier and members of the Radiation team. Since January 2009, IARC has taken a new initiative to work with all co-authors to finalize a first manuscript from all collaborating centres on gliomas and meningiomas which has been submitted for publication to a scientific journal. Work is on-going to prepare subsequent manuscripts for publication (http://www.iarc.fr/en/media-centre/iarcnews/2009/interphone_status.php).

Discussions have also been held with the head of the IARC Monographs Programme, Dr Vincent Cogliano, to coordinate efforts to accomplish common tasks for the WHO Environmental Health Criteria on Radiofrequency Fields and the expected IARC monograph on Non-Ionizing Radiation, Part 2: Radiofrequency electromagnetic fields and radar (including mobile telephones).

The **International Telecommunications Union** (**ITU**) is the leading United Nations agency for information and communication technology issues, and the global focal point for governments and the private sector in developing networks and services. Two out of three of its sectors are involved with the WHO EMF Project through the Telecommunication Standardization Sector (ITU-T) Study Group 5 - Protection from Electromagnetic Environment Effects, as well as through the Radiocommunication sector (ITU-R), which is organizing a workshop on the Exposure to Electromagnetic Fields from Wireless Systems in Athens with WHO involvement in June 2009.

Although the **European Commission's Coordinated Action EMF-NET** has officially ended, several outputs are still being delivered, including the proceedings of the workshop held in Stresa, Italy (2007), now available at http://web.jrc.ec.europa.eu/emf-net/pubblications.cfm.

Within the EC Second Programme of Community Action in the field of health (2008-2013), a new European health risk assessment network on EMF entitled **EFHRAN** (European Health Risk Assessment Network on Electromagnetic Fields Exposure) officially started on February 1, 2009 for a 3-year duration. The WHO EMF Project was invited to serve as member of its Advisory Board. WHO is participating as a collaborating partner, i.e. with no contractual commitments neither with the EC nor with the network. A special agreement between EC DG SANCO and WHO/EURO only allows this type of limited participation.

Further discussion is planned with the **European Commission Directorate-General for Employment, Social Affairs and Equal Opportunities (DG Employment**)

based in Luxembourg, regarding activities related to occupational exposure to EMF. In particular the topic of MRI and the EC Directive 2004/40/EC with regard to occupational workers (which has now been postponed to 2012 - providing more time to develop further useful tools) will be discussed.

WHO collaborating centres

A WHO collaborating centre (CC) is an institution designated by the Director-General to form part of an international collaborative network carrying out activities in support of the Organization's programme at all levels. Such designation follows a formal procedure within WHO, with specified terms of reference and annual reporting of joint activities (http://intranet.who.int/homes/kcs/collaborating_centres). With effect from 1 June 2007, processing of designations, re-designations and discontinuations of CCs are being done electronically.

The EMF Project works with the following scientific institutions that are formally recognized as collaborating centers of WHO (http://www.who.int/peh-emf/project/Org_Stru/en/index.html).

- Air Force Research Laboratory, TX (USA)
- Australian Radiation and Nuclear Safety Agency, ARPANSA (Australia)
- Institut für Strahlenhygiene, Bundesamt für Strahlenschutz, BfS (Germany)
- National Institute of Occupational Safety and Health, NIOSH (USA)
- Health Protection Agency - Radiation Protection Division (UK)
- McLaughlin Centre for Population Health Risk Assessment, University of Ottawa (Canada)

1. 3. SECRETARIAT

The Project is managed from the WHO Radiation Programme in Geneva, which has the responsibility for all activities related to ionizing and non-ionizing radiation. This programme is within the Unit named "Interventions for Healthy Environments" (IHE). The mandate of IHE is to help translate scientific findings on the linkages between environmental risk factors and health and on the effectiveness and cost-effectiveness of interventions into measurable health improvements in countries. This unit includes other thematic areas, such as occupational health, transport and indoor air pollution. within the Department of Public Health and Environment (PHE). Within the medium-term strategic direction of the organization for 2008-2013 (http://intranet.who.int/homes/prp/pdam/mtsp_pb/), PHE has for main objective to "promote a healthier environment, intensify primary prevention and influence public policies in all sectors so as to address the root causes of environmental threats to health".

The Secretariat facilitates all activities and provides regular reports to the International Advisory Committee and contributors to the Project. WHO Regional Offices participate where possible and facilitate communications with countries in their regions. WHO staff provide coordination and project management and are available to respond to enquiries. They organize and conduct review group meetings, key research meetings, prepare and publish reports and brochures, organize the preparation and publication of monographs and scientific reports, assist with the preparation and conduct of training programmes (particularly in developing countries), and arrange for consultants, collaborating agencies and key institutions to prepare material as required.

WHO management system
Since July 2008, a new Global Management System (GSM) has been introduced at WHO headquarters. Procedures and systems in all areas of programme planning, human resources, finance, travel, and procurement are now in one integrated system, enabling the more rapid gathering, collating and production of data. After an initial period of adjustment, the GSM is expected to simplify procedures and consolidate administrative services.

Personnel
Over the past year, Dr van Deventer has continued to lead the RAD programme, with administrative responsibility of both the Ionizing Radiation team as well as leading the non-ionizing programme including the WHO EMF Project and the Intersun UV Project.

Because of staff departures over the past couple of years and added responsibilities for the remaining staff, a vacancy position had been posted in June 2008 for a scientist to support the work in the area of non-ionizing radiation. However, due to the global economic crisis, constraints were imposed by WHO management on the hiring of staff outside priority areas and when long term sources of funding could not be secured.

In view of this situation, the EMF Project encourages Member States to promote direct involvement of country staff in the work of the International EMF Project through secondments. Other mechanisms are available through Junior Professional Officer (JPO) programs[1] or through WHO's Internship Programme which provides a wide range of opportunities for students to gain insight into the work of WHO. Every year a limited number of places for internships are available.
http://www.who.int/employment/internship/en/

Funding
WHO is financed largely from voluntary contributions intended for specific purposes. The EMF Project is currently solely funded through voluntary contributions from participating countries. These contributions are needed to cover both activities of the Project and salaries of the personnel. All contributions and accounting are audited by WHO. For any contribution, 13% of expenditure is deducted by WHO to cover administrative costs related to administering the funds, in accordance with World Health Assembly Resolution WHA 34.17.

Within WHO, the Department of Planning, Resource Coordination, and Performance Monitoring (PRP) has, as one of its mandate, to facilitate and sustain donor relationships with governments, development agencies, intergovernmental organization, and the private sector. It also develops standardized and harmonized systems for voluntary contributions. A number of countries have signed bilateral agreements with WHO for funding specific areas of work. For example, France has a bilateral agreement from 2008-2013 which includes the area of environmental health, under which EMF falls. For funding exceeding US$100,000, PRP is involved in the agreement while for smaller amounts, Technical Units may follow up on any funding

[1] The Junior Professional Officer (JPO) Programme provides young professionals who wish to pursue a career in development with hands-on experience in multi-lateral technical co-operation. JPOs are sponsored by their respective governments. Currently the following 11 donor governments sponsor JPOs for WHO: Austria, Belgium, Denmark, Finland, France, Germany, Italy, Japan, Luxembourg, Republic of Korea and Sweden

interest from the part of Ministries of Health, or other governmental bodies involved in NIR.

Several governments have given direct contributions to the WHO EMF Project, either on a periodic or ad-hoc basis. Some countries have supported financially specific activities within the Project, while others have provided in-kind contributions in the form of staff time or development of documents and sponsorship of meetings . This past year, the range of governmental contributions for the EMF Project was from US$ 5,000 to US$150,000.

A summary of funds received and spent is given in Table 2 below.

Table 1 - Funding summary for the International EMF Project (July 2007 - June 2008)

	INCOME
$207,610	**Governments (excluding pledges)**
$207,610	**TOTAL INCOME**
	EXPENDITURE
$233,309	Salaries for EMF Project Staff
$8,544	General operating costs
$65,832	EMF outputs (APWs, publications, translations, …)
$29,774	Staff travel costs
$23,000	Temp Adviser/Meeting Participant Travel
USD 425,481	**TOTAL EXPENDITURE**

2. RISK ASSESSMENT AND SCIENTIFIC ACTIVITIES

The primary goal of the International EMF Project is to assess the health risks from EMF within the frequency range 0 to 300 GHz and to develop policy options for protection of people from EMF exposure. The key **scientific objectives** of the Project are to:

- Assess the scientific literature and make a status report on health effects,
- Incorporate research results into WHO's Environmental Health Criteria (EHC) monographs where formal health risk assessments are conducted on EMF,
- Identify gaps in knowledge needing further research,
- Encourage a focused research program in conjunction with funding agencies and the global scientific community.

2. 1. RESEARCH EVALUATION

Environmental Health Criteria (EHC)
The health risk assessments related to chemical, biological and physical agents developed by WHO are published in the Environmental Health Criteria (EHC) series (http://www.who.int/ipcs/publications/ehc/en/). For over 20 years, WHO has addressed possible health effects from exposure to EMF through three monographs on extremely low frequency (ELF) fields (1984), static and ELF magnetic fields (1987), and radiofrequency (RF) fields (1993).

EHC monographs are usually revised if new data are available that would substantially change the evaluation, if there is public concern for health or environmental effects of the agent because of greater exposure, or if an appreciable time period has elapsed since the last evaluation. Three monographs spanning the 0-300 GHz EMF frequency range have been planned: static fields (0Hz), ELF fields (up to 100 kHz) and RF fields (100 kHz – 300 GHz). So far , the EMF Project has developed the first two volumes on Static Fields and ELF fields. These documents were developed following the publication of the IARC monograph on Non-Ionizing Radiation, Part 1: Static and ELF fields (2002). The IARC monographs provide a hazard identification regarding cancer, while the EHCs represent a health risk assessment of all studied (published) health endpoints, including the four classical steps of (i) hazard identification, (ii) exposure assessment, (iii) dose-response assessment and (iv) risk characterization. EHCs also include recommendations for national authorities.

EHC on Static fields (2006)
The Environmental Health Criteria (EHC) monograph on Static Fields (2006, http://www.who.int/peh-emf/publications/reports/ehcstatic/en/index.html) were used in the development of guidelines by ICNIRP, which were published earlier this year. Some of the protective measures recommended in this EHC will be further elaborated through the newly established WHO Global Initiative for Radiation Safety in Health Care Settings , in particular regarding the licensing of MRI units in order to ensure that protective measures are implemented, and collection of data on exposure of workers and patients using MRI units.
(http://www.who.int/ionizing_radiation/about/med_exposure/en/index.html)

EHC on Extremely Low Frequency fields (2007)
The Environmental Health Criteria (EHC) monograph on Extremely Low Frequency fields (2007, http://www.who.int/peh-emf/publications/elf_ehc/en/index.html) has been used by the WHO Country Office in Lebanon to assist the Ministry of Public Health by preparing a literature review report based mainly on the conclusions and recommendations of the EHC 238, on extremely low frequency fields.

The summary and research recommendations (Chapter 1) was also translated into Chinese.

EHC on Radiofrequency fields (upcoming)
The next major task in this evaluation process is the health risk assessment of radiofrequency fields. The timing of the EHC development is contingent on the release of the expected IARC monograph on *Non-Ionizing Radiation, Part 2: Radiofrequency (RF) electromagnetic fields and radar (including mobile telephones)*. From discussions with the IARC Monograph team, the earliest date for scheduling an IARC monograph meeting on RF would be February 2011, pending the release of INTERPHONE papers. Publication of the IARC Monograph would occur later that year.

Possible areas of collaboration have been informally discussed with IARC, regarding developing a common introduction sections for both documents, gathering exposure data from other sources than published scientific literature, and development of literature database. Currently an effort is being undertaken through the International EMF Project to gather key relevant publications in Russian language, with a view to have them translated and included in the overall database. Also RF publications from Latin America are presently being collected, and we hope to do the same with Chinese literature in the near future.

A review of scientific literature on the health effects of RF fields was commissioned by WHO in 2005. This review is expected to be published in 2009 and will serve as an input to the WHO Environmental Health Criteria monograph on RF fields.

At a RF EHC kick-off meeting in May 2008, it was decided that a core group would be formed to formulate the problem definition, develop the table of contents, oversee the call for experts and take the monograph to its completion. Chapters for the monograph will be first developed by individual experts or working groups, and then the collated document will be sent for extensive review, prior to the Task Group meeting. As discussed below, new procedures for developing guidelines have recently been introduced at WHO, which may alter somewhat the resource implications of developing the document but increase its uptake.

Guidelines Review Committee
The Guidelines Review Committee (GRC), established in 2007, is tasked with the development and implementation of procedures to ensure that WHO guidelines are consistent with internationally accepted best practices. The appropriate use of evidence is to be especially emphasized.

Excerpt from WHO Manual (1 July 2008)

"WHO guidelines are recommendations intended to assist providers and recipients of health care and other stakeholders to make informed decisions. Recommendations may be for clinical interventions, public health activities, or government policies. Guidelines should be systematically developed and based on the best available evidence. They should offer clear advice, but should take into account the range of circumstances in which they may be used

All WHO guidelines are covered by these regulations, irrespective of the type of health information product (book, website, brochure etc) in which they are presented

Products with a similar purpose may be called protocols, best practice algorithms, consensus statements, or integrated care pathways. Notwithstanding the title, these regulations apply to all documents containing or implying recommendations; the title of the document is irrelevant.

Products such as job aids, manuals to guide decision-making at the peripheral service delivery levels should be based on guidelines developed according to the WHO guidelines as described below and should refer to those as appropriate."

…

Adapting or endorsing other guidelines; preparing guidelines jointly with external organizations.

There are three possible scenarios for developing guidelines with other organizations
- developing a guideline jointly with another organization(s) involved from the beginning: such joint guidelines should be developed according to the standards for WHO guidelines. There should be agreement between the organization involved from the beginning about the methods and processes to be used.
- adapting a guideline form another organization(s) to become a WHO guideline
- endorsing a guideline from another organization(s) as a WHO product (i.e. providing the logo.)

Adaptation or endorsement of another organization's guideline should be initiated by the WHO Department concerned and not the external group. It could be considered when there is no existing WHO document or an outdated WHO document. Minimum standards for WHO guidelines should be met, including no commercial entity funding, declaration and reporting of conflict of interest. The approach for reviewing and summarizing evidence should be consistent with that recommended for WHO guidelines. There should be global representation of experts in the development of the recommendations and the recommendations should be appropriate for a global audience.

As all three approaches have potential difficulties, these approaches should be used exceptionally rather than routinely and therefore the GRC will consider proposals for adapting or endorsing guidelines on a case-by case basis.

The guideline should be prepared following consultation on the questions to be covered in it, supported by systematic reviews (that could be externally commissioned) and involve one or two consultation meetings. It should have a specified ‘expiry date’ depending on the expected rate of change of evidence in the topic area. In view of these new procedures, it is expected that systematic reviews on specific questions will have to be commissioned. For key recommendations, a discussion relating to benefit/harm assessment, values and preferences, costs will need to be carried out. While such a process will be more time and resources consuming, it clearly will enhance the quality of the documents and will provide further transparency of the process.

In that light, a systematic review of the scientific literature regarding the health impact of base stations has been commissioned, which will be peer-reviewed and published shortly.

2. 2. RESEARCH COORDINATION

To avoid unnecessary duplication of research effort and to make sure that all important questions are being studied, research coordination on a global level is important. To that end, the WHO International EMF Project has been providing such an umbrella for worldwide coordination and exchange of information about planned and ongoing projects.

Research agenda

WHO defines as one of its six core functions to "shape the research agenda, and stimulate the generation, dissemination and application of valuable knowledge" . From its inception, the WHO International EMF Project has strived to identify gaps in knowledge needing further research to make better health risk assessments, and to encourage a focused research programme in conjunction with funding agencies (http://www.who.int/peh-emf/research/agenda/en/index.html).

Over the past 15 years, several countries have funded research programmes and, in some cases, set up foundations to sponsor studies relating to this area. Most research funding agencies use the WHO Research Agendas as a basis for their national research programs when developing their call for proposals. Since 1997 over $200 million of funding for research has been conducted to complete these Agendas.

Based on the research recommendations developed by the Environmental Health Criteria Task Group, research agendas have published for static fields in early 2006 (http://www.who.int/peh-emf/research/smf_research_agenda_2006.pdf), and for ELF fields in July 2007 (http://www.who.int/peh-emf/research/elf_research_agenda_2007.pdf).

For radiofrequency fields, the first EMF Research Agenda was developed in 1997. In subsequent years, this agenda has undergone periodic review and refinement. The last major update to the RF Research Agenda undertaken with the input of an ad hoc committee of invited scientific experts was performed in October 2005 published in Spring 2006. (http://www.who.int/peh-emf/research/rf_research_agenda_2006.pdf).

With the scientific developments undertaken over the past 3 years and the completion and possible renewal of several national research programs, an update of the RF Research Agenda is now deemed necessary. To this end, it is planned to convene a meeting of experts in the second half of 2009. A report has been commissioned to review the uptake of research issues identified in the last agenda, and to compile recent research recommendations from other international organizations (e.g. EMF-NET 2006, SCENHIR 2009) and national agencies (US NRC 2008). This report will inform the group of experts that will meet to develop the next version of the RF Research Agenda.

Researchers are encouraged to use the Research Agenda as a guide to studies that have high value for health risk assessments. To maximize the effectiveness of large research programs, government and industry funding agencies are encouraged to

address the WHO Research Agenda in a coordinated fashion. Such coordination will minimize unnecessary duplication of effort and will ensure the timeliest completion of the studies identified as being of high priority for health risk assessment.

WHO input to funding agencies

The EMF Project has actively worked with international donors and national authorities to promote and fund research needs identified by WHO. The EMF Project also works with national programs to encourage them to assist with the research needs identified by WHO. Dr van Deventer currently serves on the Programme Committee Management of the Mobile Telephone Health Research program (MTHR) in the United Kingdom.

Research database

The EMF Project has assembled a web-based database of research projects as a service to the research community. Its purpose is to inform researchers about ongoing and completed projects relevant to the EMF Project's mandate. These projects address potential biological interactions from electromagnetic fields in the non-ionizing spectrum from static magnetic and low frequency, through the radiofrequency range, and up to millimeter wave and terahertz frequencies (just below visible light). The database is actively updated and is the core tool for each 5-year revision cycle of the IEEE C95.1 (radiofrequency) and IEEE C95.6 (static and low frequency) exposure standards. In addition, the EMF Project database is a publicly available source of information for both published and ongoing studies.

From January through December 2008 there were 282 studies added to the database, of which 132 were reviews and comments and 150 were primary data publications. Since Jan 2009 there have been 150 publications, 59 being reviews and comments and 91 primary data publications.

The database is currently undergoing a major revision to make it more useful to the general public including basic search features and charts, short and easily digestible project summaries, links to PubMed abstracts and other useful material, and a more interactive face page.

It is important to stress that the database is as accurate and updated as the information received from researchers to the EMF Project (http://www.who.int/peh-emf/research/database/en/index.html). Therefore IAC representatives are encouraged to promote this tool to researchers in their countries for inclusion of publications in this international database.

3. RISK MANAGEMENT ACTIVITIES

WHO's International EMF Project provides a unique opportunity to bring countries together, identify criteria for science-based standards setting and encourage the establishment of exposure limits and other control measures that provide the same or similar level of health protection for all people.

The key **risk management objectives** of the Project are to:

- facilitate the development of internationally acceptable standards for EMF exposure,
- provide information on the management of EMF protection programs for national and other authorities, including monographs on EMF risk perception, communication and management, and
- provide advice to national authorities, other institutions, the general public and workers, about potential hazards resulting from EMF exposure and possible mitigation measures.

3. 1. MODEL LEGISLATION

To assist countries which do not yet have appropriate legislation to protect their population, the EMF Project has developed a Model Act and Model Regulation that provide the legal framework to provide this protection. The Model Legislation follows the widely accepted practice among lawmakers of setting out an enabling Act which permits the responsible Minister to subsequently issue Regulations, Statutory Orders or Ordinances, as appropriate, to deal with specific areas of concern.

This legislation recommends the use of international standards that limits EMF exposure of people (ICNIRP exposure guidelines) and international standards that limit the emissions of EMF from devices (IEC and IEEE device emission standards). This model legislation available on the website in English and Spanish (thanks to the help of INICTEL in Peru) at: http://www.who.int/peh-emf/standards/emf_model/en/index.html, and has been translated this year into Chinese and French.

The Model legislation has been the basis of several legislations that are currently being developed. It was presented for discussion at the First East African Workshop on Electromagnetic Fields Exposure and Health (18-19 October 2008) in Arusha, Tanzania for the East African countries (including Tanzania, Uganda, Kenya, Burundi and Ruanda).

3. 2. STANDARDS DATABASE

A number of national and international organizations have formulated guidelines establishing limits for occupational and residential EMF exposure. The International EMF Project provides information on worldwide EMF standards in a web-accessible database which was set up in 2001 and revised in 2004. This database includes details of a number of EMF standards worldwide, with details on the limits and a link to the national web site where possible.
(http://www.who.int/docstore/peh-emf/EMFStandards/who-0102/Worldmap5.htm)

While the content of the database has been periodically reviewed, the overall database needs to be migrated to another server platform. In the new version, an interactive site will enable users to view worldwide uptake of legislation and search tools will be

added to provide comparison between national approaches to EMF protection. A small group has been assembled to carry out this task, including Shaiela Kandel, Colin Roy and Dina Simunic. The French agency for environmental health and labor (Agence française de sécurité sanitaire de l'environnement et du travail, AFSSET) is interested to collaborate with WHO on this topic, in the light of their recent extensive review of the international situation. A kick-off meeting of this initiative was held in Paris in December 2007. The design of the database will resemble that of the WHO Body Mass Index database (www.who.int/bmi).

3. 3. OCCUPATIONAL EMF MANAGEMENT

WHO, together with the US National Institute of Occupational Safety and Health (NIOSH), one of its collaborating centre, and the International Labour Organization (ILO). has developed a document entitled "Occupational EMF Management". The objective of this document is to provide information and guidance for appropriate occupational applications and interventions and to develop strategies to prevent occupational harm resulting from such exposures. The booklet deals with occupational exposures to electromagnetic fields, including those fields associated with the delivery and use of electricity, electrical equipment, and devices that emit radiofrequency electromagnetic radiation. It is intended to provide practical advice to workers, managers, industrial hygienists and occupational safety and health and other professionals who are not experts in EMF exposure assessment, but require more than a general understanding of workplace EMF exposures in order to carry out the evaluation, management and control of such exposures in all types of workplace environments.

A first draft was completed and reviewed in 2006. After the February 2007 meeting in Milan, it was decided to refine the content of the document to complement a number of other related products that were to be developed prior to the implementation of the EC Directive 2004/40/EC in April 2008. However, with the postponement of the Directive, the guide of good practice that the EC had commissioned has only been provided as a final draft in June 2008. It is hoped that fruitful discussion can be held with EC DG Employment to avoid duplication of efforts and complement, and possibly adapt or endorse the products already developed. The final WHO document will be a general guide, targeting an international audience beyond the European countries that will have to implement the EC Directive.

3. 4. LOCAL AUTHORITIES BROCHURES

At the local level, municipalities often have authority over land use and building and installation permits for power lines and mobile telephony base stations. As such, they are often confronted directly by public anxiety and discontent. Municipalities sometimes override national regulations, and introduce further conservative measures based on political considerations rather than science. It is therefore important that local authorities be given a minimum knowledge of the EMF issue to answer questions from the public or be ready to direct requests to appropriate sources of information. To that end, a brochure for local authorities has been developed on Base Stations and Wireless Networks that will provide local authorities with all the information they need to plan and approve the installation of mobile phone base stations. The Brochure is also intended to provide information on levels of RF fields and risks of exposure to all current wireless network fields. Drs Colin Roy (ARPANSA) and Alastair McKinlay (UK HPA) assisted in the preparation of the first draft brochure. Since then, it was decided to have two documents, one being the executive summary for local authorities that only require the basic principles, while

the second being an extensive brochure that gives scientific findings and communication aspects, for local authorities that have more expert personnel dealing with environmental issues. The present version includes targeted advice to local authorities. However, with the new WHO procedures regarding formulating recommendations (see Section 2.1), the feedback from the IAC members will be sought as to the way forward.

3. 5. COUNTRY FOCUS

In line with WHO's greater focus on country work, the Country focus initiative, announced in May 2002, provides a basis for WHO at all levels to intensify its response to the needs of countries. For the EMF Project, this has translated into increased technical support for meetings held in regions and countries that face significant concerns with respect to EMF.

Countries visited over the past year to support national or regional EMF programs include:

- **Brazil:** *Sixth International Non-Ionizing Radiation Workshop*, ICNIRP and Brazilian Ministry of Science and Technology, 14-17 October 2008, Rio de Janeiro, Brazil
- **East African Countries:** *1st East African Workshop on EMF exposure and Health*, Tanzania Atomic Energy Commission, Arusha, Tanzania 28-29 October2008
- **Switzerland:** *Téléphone portable et santé*: Café de la santé, Semaine du Cerveau, 17 March 2009
- **Saudi Arabia:** *Workshop on health effect of the non-ionizing electromagnetic radiation and the international standards*, Communications and Information Technology Commission, Riyadh, 7-8 April 2009
- **China:** *International Seminar on Extremely Low Frequency Electromagnetic Fields and Standards*, State Grid Electric Power Research Institute, Beijing, 22-23 April, 2009
- **France:** *Table ronde: Radiofréquences, santé, environnement*, Ministry of Health, Paris, 6 May 2009

4. RISK COMMUNICATION ACTIVITIES AND RESOURCES

4. 1. ENQUIRIES

A large number of enquiries are sent to the EMF Project from the general public, the media (e.g. the French version of Marie-Claire in March 2009, Belgian TV company RTBF http://blogrtbf.typepad.com/qalu/2009/02/a-ne-pas-manquer-ce-mercredi-11-f%C3%A9vrier-d%C3%A8s-20h20-les-ondes-%C3%A9lectromal%C3%A9fiques.html) and governments. Depending on the nature of the enquiries, these are usually handled by the Project staff or by the communications officers of WHO. Technical support is regularly needed - and given - as requests in other languages are often forwarded to IAC members for translation and/or response.

4. 2. WEBSITE INFORMATION

The general WHO website provides information in 6 languages (Arabic, Chinese, English, French, Russian, Spanish). Scientific documents on he EMF Project website have partly been translated in some of these languages. We wish to thank all the colleagues who have provided translations in their own languages.

Home page

While the EMF Project website (at http://www.who.int/emf/) is regularly updated, it will require further revision over the coming year as WHO is revising its format. Currently, WHO is conducting a public web survey to improve its usefulness. Feedback from IAC members as to the ease of navigation of the website is welcome.

National contacts and information

Many enquiries to the EMF Project are of a local nature. Therefore a country-focused database of information, that lists the Member States of the EMF Project, has been set up thanks to the input of the IAC members (http://www.who.int/peh-emf/project/mapnatreps/en/). Countries are encouraged to provide updated information for their respective pages.

4. 3. EDUCATION AND LEARNING PROGRAMS

WHO promotes health education and research, and the EMF Project has invested in developing distance learning programs as well as co-sponsoring bioelectromagnetic courses.

On the request of WHO, Dr Bernard Veyret, of the University of Bordeaux in France (and one of the organizers of the series of courses on EMF held in Erice, Italy), developed an online course called "Methodology in Bioelectromagnetics Research." Its primary audience is the community of young scientists, world-wide, undertaking bioelectromagnetics research. The course covers all frequencies from static to RF fields. The intent of the course is to introduce young scientists to the subject of bioelectromagnetics research and present physics to the biologists and biology to the physicists. It should also be of interest to teachers and the general public.

It can be accessed via the EMF Project's web site at http://www.who.int/peh-emf/about/Training/en/index.html. Further divulgation of this website is encouraged.

4. 4. WHO PUBLICATIONS

All the outputs of the EMF Project are reviewed by the International Advisory Committee before seeking formal approval by WHO management. Recent documents are available electronically for download on the Project's website. Some of the materials are available free of charge, while priced publications are on sale through the WHO Online Bookstore http://apps.who.int/bookorders/

WHO Press (WHP) receives regular requests for permission to translate our EMF fact sheets and publications. In the past 12 months the following translation and publication rights have been granted:

- **Model legislation for electromagnetic fields protection**

Chinese: ISBN 92 4 159432 2, ISBN 978 924 159432 5

- **Framework for developing health-based EMF standards**

Chinese: ISBN 978 7 5083 6768 2

- **Establishing a dialogue on risks from electromagnetic fields**

Arabic: request granted by WHP. Not yet printed.
Chinese: ISBN 92 4 1545712
French: ISBN 978 92 4 254571 5 (in collaboration with AFSSET)
Hungarian: ISBN 978 963 06 2229 5 (in collaboration with Dr Thuróczy György)
Polish: request granted by WHP. Not yet printed.

Fact sheets

Simple, easy to read information is provided through fact sheets that are formally approved by the Director General's Office. The latest EMF Fact Sheets can be found on the WHO **Media Centre website**, which is aimed primarily at the press and general public (http://www.who.int/mediacentre/factsheets/en/). These include:

- Exposure to extremely low frequency fields (Fact sheet N°322)
- Base station and wireless networks (Fact sheet N° 304)
- Static electric and magnetic fields (Fact sheet N° 299)
- Electromagnetic hypersensitivity (Fact sheet N° 296)

Since the Project's inception, translations were encouraged, many of which being undertaken by members of the IAC. These translations have proven to make the EMF Project a web site well visited over the years.
(http://www.who.int/peh-emf/publications/facts/factsheets/en/index.html)

At the end of 2008, the WHO Legal Department recommended that the existence of the multilingual content held within the EMF Project web site be formalized. The WHO Press sent an email out to translators confirming that WHO had granted formal permission for translations of *WHO Electromagnetic Fields and Public Health* fact sheets to be undertaken. Because so many fact sheets were already on our web site in non-UN languages, the permissions were worded in such a way as to convey that permission was granted for future fact sheet translations but that it also covered translations already undertaken on behalf of the EMF Project. No fact sheets translations have needed to be removed from the EMF web site.

WHO has made some changes to their fact sheet format, i.e. shorter (less than 1000 words) and less technical, to address the press and general public. This new format is

being used to develop an updated version of the fact sheet on mobile telephony (FS 192), last published in 2000, to be released in conjunction with the INTERPHONE publication.

Another fact sheet to be reviewed shortly is the fact sheet no. 304 on base stations and wireless networks, following the publication of a commissioned systematic review of new scientific evidence published since 2006.

Publications

C. del Pozo, D. Papameletiou, P. Wiedemann, P. Ravazzani. E. van Deventer (Editors) Electromagnetic Field Exposure: Risk Communication in the context of Uncertainty. Proceedings of the 2nd Workshop on EMF Risk Communication, Stresa, Italy, May 2-4, 2007.
http://web.jrc.ec.europa.eu/emf-net/doc/pubblications/Book_Risk%20communication.pdf

4. 5. MEETINGS

WHO staff members participated in a number of local, national and regional scientific meetings:

When	Where	Title
SEPT 8-9, **2008**	London, UNITED KINGDOM	Radiation Research Trust conference "EMF and Health - A Global Issue Exploring appropriate precautionary approaches"
SEPTEMBER 15-16	Prague, CZECH REPUBLIC	ICNIRP Workshop "15 Years on: reviewing the past and looking forward"
OCTOBER 16-18	Rio de Janeiro, BRAZIL	6th International Non Ionizing Radiation Workshop of ICNIRP
OCTOBER 19-24	Buenos Aires, ARGENTINA	IRPA12 Congress PLENARY talk on "Status of Levels and Effects of Non-Ionizing Radiation"
OCTOBER 28-29	Arusha, TANZANIA	1st East African Workshop on EMF Exposure and Health
NOVEMBER 3	Lausanne, SWITZERLAND	Science Brunch Swiss Research Foundation on Mobile Communication "EMF Health Research: Responsibilities, Priorities, Challenges"
JAN 12-13, 2009	Didcot, UNITED KINGDOM	Meeting of the MTHR Programme
FEBRUARY 11-12	Brussels, BELGIUM	EC DG - SANCO/ENTR/EMPL Workshop on "EMF and Health: Science and Policy to address public concerns"
MARCH 10	Paris, FRANCE	Dialogue & Health Fondation Santé et Radiofréquences
MARCH 17	Lausanne, SWITZERLAND	Téléphone portable et santé Semaine du cerveau 2009

APRIL 7-8	Riyadh, SAUDI ARABIA:	Workshop on Health effect of the non-ionizing electromagnetic radiation and the international standards Communications and Information Technology Commission
APIL 17-19	Hangzhou, CHINA:	5th International EMF Seminar
APRIL 21-23	Beijing, CHINA	International Seminar on Extremely Low Frequency Electromagnetic Fields and Standards
MAY 6	Paris, FRANCE	Round table on RF and Health Ministry of Health
MAY 8	Fribourg, SWITZERLAND	Guest lecture "WHO's Position on EMF" University of Fribourg
JUNE 2	Lyon, FRANCE	IARC Monograph Vol.100D meeting on radiation

FOR FURTHER INFORMATION ON THE INTERNATIONAL EMF PROJECT

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