THE INTERNATIONAL EMF PROJECT

Progress Report

June 2007-2008

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 recommendations for 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, new countries, such as Romania and Tanzania, have been invited to join the Project. Further outreach is planned, but the challenge is to locate the appropriate contact at country level.

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 12 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 2011. 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 two types of entities, i.e. international agencies and independent collaborating centres (see below for details). It also cooperates in an *ad-hoc* manner with other institutes (e.g. co-sponsoring of meetings, etc) and with individuals.

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. On 5-7 May, 2008, an international workshop on "Risk Factors for Childhood Leukaemia", was organized by ICNIRP, WHO, and the German Federal Office for Radiation Protection (BfS) and held in Berlin, Germany.

Another major activity commissioned by WHO to ICNIRP was a review of health effects from RF fields. This work was started in 2005 and mostly finalized by April 2008. This review will form the basis of an ICNIRP/WHO publication, similar to the previous review on static and ELF fields published in 2003 (http://www.icnirp.org/PubEMF.htm#).

The WHO health risk assessments in the Environmental Health Criteria monograph series have been published jointly with ICNIRP as well as the **International Labour Organization** (**ILO**). ILO works closely with WHO in the area of occupational exposure to radiation, both ionizing and non-ionizing.

The **Agency for Research on Cancer** (**IARC**), a specialized institution of WHO, based in Lyon, France, also has close 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. The IARC's Radiation programme studies 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 with radio frequency radiation emitted by mobile telephones (http://www.iarc.fr/ENG/Units/RCA4.php). Over the past year, links were further strengthened through meetings in Geneva with the Radiation group head, Elisabeth Cardis, and with the Cluster head, Philippe Autier.

The **International Telecommunications Union** (**ITU**) also has been active with WHO over the last year through ITU-T Study Group 5 - Protection from Electromagnetic Environment Effects. A one-day workshop, entitled 'Human Exposure to Electromagnetic Fields (EMFs)' was held at the ITU headquarters in Switzerland on 20 November 2008. WHO was invited to organize and chair a session on the "I*nfluence of RF EMF on the human body and human health*". The workshop focused on cooperation and collaboration between organizations involved in the evaluation of human exposure and provided the opportunity to increase understanding

and alignment, reduce potential duplication of standardization effort, and to give support to developing countries in establishing national regulation concerning radiation protection.
(http://www.itu.int/ITU-T/worksem/emc-emf/200711/index.html).

Close collaboration continued with the **European Commission's Coordinated Action EMF-NET** which co-published and financed the printing of the proceedings on base stations and wireless networks this year. EMF-NET also organized the yearly joint workshop between Australia, China, EU, Japan, Korea, USA and WHO. The meeting was held in Brussels in November 2007, and its aim was to present significant research activities and results, to discuss the differences in the political approaches to EMF and health in the various countries, and to investigate possible future common research initiatives.

The European Commission Health and Consumer Protection Directorate-General (DG SANCO) has put forward a call for proposals for projects in the 2008 Public Health Program in which EMF and health issues are explicitly included (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:056:0036:0062:EN:PDF). In this Program, Paragraph 3.2.2.3. deals with Risk Assessment Thematic Networks on "promotion of the establishment of thematic networks of scientific excellence between EU, national and international Risk Assessment (RA) and scientific advisory bodies for exchange and collaboration on critical issues like nanotechnology, antimicrobial resistance, EMF, as well as on RA methodological aspects (e.g. benchmark approach, non-threshold carcinogenic substances, risk/benefit assessment etc.)". WHO is participating in a proposal with a consortium on that topic as a collaborating partner, i.e. with no contractual commitments neither with the EC nor with the consortium. A special agreement between EC DG SANCO and WHO/EURO only allows this type of limited participation.

WHO also participated in a workshop in Copenhagen (May 2008) on “Evaluating and Communicating Scientific Evidence on Environmental and Health Issues” that was co-sponsored by DG SANCO and the European Environmental Agency (EEA). This meeting was very relevant to WHO's health risk assessment work as it included case studies on both ELF and RF fields and provided a forum for discussion on the need for consistent terminology on cause/effect relationships and strengths of evidence in health risk assessments.

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, and 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.

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).

The EMF Project works with independent scientific institutions that are formally recognized as collaborating centers of WHO (http://www.who.int/peh-

emf/project/Org_Stru/en/index.html). Collaboration with these institutions over the reporting period is described in Table 1 below. With effect from 1 June 2007, processing of designations, re-designations and discontinuations of CCs are being done electronically.

Table 1 - Activities with collaborating centers (July 2007-June 2008)

Institution	Activity
Air Force Research Laboratory, TX (USA)	- Discussion regarding hosting the RF Dosimetry handbook by WHO
Australian Radiation and Nuclear Safety Agency, ARPANSA (Australia)	- Renewed the CC status with revised terms of reference for EMF
Institut für Strahlenhygiene Bundesamt für Strahlenschutz, BfS (Germany)	- Co-sponsored the "Risk factors for Childhood Leukaemia" workshop, in Berlin (May 2008) with ICNIRP and WHO - Invited WHO to co-sponsor the final conference of the German Telecommunication Research Program in Berlin (17-18 June 2008) - Invited the IAC meeting to be held in Berlin (19-20 June 2008)
National Institute of Occupational Safety and Health, NIOSH (USA)	- Draft brochure on occupational EMF management
Health Protection Agency - Radiation Protection Division (UK)	- ELF EHC document finalization (R. Saunders) - RF EHC kick-of meeting (R. Saunders) - Discussions regarding WHO/COST 704 collaboration (A. McKinlay)
Karolinska Institute (Sweden)	No joint EMF activity
McLaughlin Centre for Population Health Risk Assessment, University of Ottawa (Canada)	No joint EMF activity

1. 3. SECRETARIAT

WHO acts as the Secretariat to coordinate, facilitate and implement the Project's activities. This Project is managed by the Radiation Program which has the responsibility for all activities related to ionizing and non-ionizing radiation within the Department of Public Health and Environment (PHE). During the past year, several organizational changes have occurred that had a direct impact on the RAD programme.

EMF within WHO

First, the structure of PHE has changed to reflect the new medium-term strategic direction of the organization for 2008-2013 (http://intranet.who.int/homes/prp/pdam/mtsp_pb/). With respect to health and environment, the main objective is 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". In that context, the Radiation and Environmental Health (RAD) Unit has been renamed the Radiation programme within a larger 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 new unit includes other thematic areas, such as occupational health, transport and indoor air pollution.

Also, as of November 2007, the cluster on Sustainable Development and Healthy Environment (SDE) was dismantled, and the PHE Department moved to a new cluster on Health Security and Environment (HSE). This cluster was formerly the Communicable Diseases (CDS) cluster and now includes the department of Epidemic and Pandemic Alert and Response (EPR) with the addition of the Cholera team and the team on Disease Control in Humanitarian Emergencies, the department of Public Health and Environment (PHE) and the department of Food Safety, Zoonoses and Foodborne Diseases (FOS).

A new WHO management system

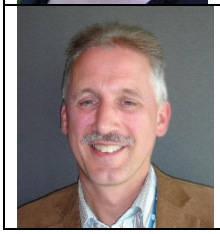
WHO is implementing a Global Management System (GSM) which promises to simplify and harmonize WHO's global work by integrating a wide range of management and administrative systems and processes. This integration is designed to enable a global view of the management of health programs, facilitate decentralization, and improve timeliness and accuracy of information.

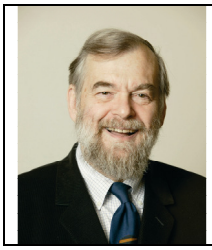
With the new Global Management System (GSM) in WHO, the activities to be performed by CCs will have to be aligned closely to the technical unit's workplans.

Personnel

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

Personnel

	Dr Emilie van Deventer leads the activities of the EMF Project. She has been involved as a scientist in the Project since 2000.
	Mrs Lisa Ravenscroft has been working as a Secretary with RAD since August 2005. She provides administrative support in all aspects of the Unit's non-ionizing activities and outputs, as well as maintaining the EMF Project web site.
	Dr Eric van Rongen has been working part-time for the EMF Project, on secondment from the Health Council of the Netherlands since November 2002. He has been instrumental in the development of the EHC monograph on Static fields and Extremely Low Frequency fields.



Professor Kenneth Foster, from the Department of Bioengineering at the University of Pennsylvania (USA) held a temporary position in August 2007. He contributed to the writing of a book chapter and to the RF Local Authorities brochure. His areas of research interest include biomedical applications/health effects of non-ionizing electromagnetic fields and the impact of technology on society.

Because of staff departures over the past couple of years and added responsibilities for the remaining staff, a vacancy position has been created for a scientist within the Radiation team to support the work in the area of non-ionizing radiation (electromagnetic fields and/or ultraviolet radiation). The duration of this position is one (1) year. The incumbent will be based at WHO Headquarters in Geneva, Switzerland. A notice has been posted from 5 June until 3 July 2008 on:
https://erecruit.who.int/public/hrd-cl-vac-view.asp?o_c=1000&jobinfo_uid_c=18630&vaclng=en

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

The project is currently funded through extra-budgetary contributions from participating countries and other agencies. 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, there are no formal rules which precludes a Technical Unit from following up on any funding interest from the part of Departments of Health, Ministries of Health, or other governmental bodies involved in NIR. This flexibility is essential to the EMF Project which can receive ad-hoc funds to carry out EMF activities.

[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

Several governments have provided 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. This past year, the range of governmental contributions for the EMF Project was from US$ 5,000 to US$155,000.

In-kind contribution of staff time for Dr Eric van Rongen has been provided by the Health Council of the Netherlands, and others have provided translations of fact sheets and other documents free of charge. In addition, some countries host meetings or provide funds to third parties to cover costs of meetings, such as Germany who has kindly provided support for the 13th IAC meeting held in Berlin on 19-20 June 2008. In the past, other entities such as the European Commission, through EMF-NET and COST 281, have provided funds for speakers to attend WHO meetings.

Through an agreement set up in 1995 between WHO and the Royal Adelaide Hospital (RAH) in Australia, RAH provided financial management of funds received from contributions of non-governmental entities on behalf of the Project. Dr Repacholi was seconded from RAH to WHO from the time of the agreement until his retirement from WHO in June 2006. Following Dr Repacholi's departure, the agreement was terminated in early 2007. A new funding mechanism is now being sought.

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

Table 2 - Funding summary for the International EMF Project (July 2007 - June 2008)

	INCOME
$279,267	**Governments**
$339,749	**Others**
USD 619,015	**TOTAL INCOME**
	EXPENDITURE
$286,233	Salaries for EMF Project Staff
$7,929	Management and administration costs
$74,154	EMF outputs (APWs, publications, translations, …)
$21,493	Meetings costs and contribution to meetings worldwide
$11,608	Staff travel costs
$24,064	Temporary advisers 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. HEALTH RISK ASSESSMENTS

Background
The health risk assessments related to chemicals, and 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).

Static Fields
The EHC monograph on static fields (N° 232) was reviewed by a Task Group meeting in Geneva, December 2004 and published in March 2006. It is available at (http://www.who.int/peh-emf/publications/reports/ehcstatic/en/index.html).

To accompany this document, several other outputs were developed, including

- A WHO fact sheet on "Static Fields" (N° 299) http://www.who.int/mediacentre/factsheets/fs299/en/index.html)
- A Research Agenda for static fields, based on the research recommendations of the EHC Task Group
- An online summary of the Static Fields monograph, developed by GreenFacts, a non-profit, non-advocacy organization.

The first chapter of the monograph, providing a comprehensive summary and research recommendations is available in several languages in the print version (French, Spanish and Russian) and additional ones on the Project website (Japanese and Italian).

Extremely Low Frequency (ELF) fields
The EHC monograph on static fields (N° 238) was reviewed by a Task Group meeting

in Geneva, October 2005 and published online in June 2007 and in print in December 2007. It is available for download at (http://www.who.int/peh-emf/publications/elf_ehc/en/index.html) and in print through the WHO bookshop at http://www.who.int/bookorders/

To accompany this document, several other outputs have been developed:

- A WHO fact sheet (no. 322) http://www.who.int/mediacentre/factsheets/fs322/en/index.html
- A Research Agenda for extremely low frequency fields, based on the research recommendations of the EHC Task Group http://www.who.int/peh-emf/research/elf_research_agenda_2007.pdf

The first chapter of the monograph, providing a comprehensive summary and research recommendations is available in several languages in the print version (French, Spanish and Russian) and additional ones on the Project website in Japanese, Italian and Chinese thanks to our collaborators.

Radio Frequency (RF) fields

A review of scientific knowledge on the health effects of radiofrequency (RF) fields has been commissioned by WHO to ICNIRP, which has been delivered in April 2008. This review will be published jointly by WHO and ICNIRP and will serve as an input to the WHO Environmental Health Criteria monograph on RF fields.

A kick-off meeting with R. Saunders (HPA, UK) and E. van Rongen (HCN, NL) was held on 23 May 2008. It was decided that a core group would be formed to formulate the problem definition, to develop the table of contents, to oversee the call for experts and to 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.

The timing is still uncertain, as it hinges on the publication of key studies (e.g. the INTERPHONE epidemiological study) and on the schedule of the IARC monograph on the carcinogenicity of RF fields, which has not yet been set.

2. 2. SCIENTIFIC REVIEWS

WHO workshops

This past year, the EMF Project organized a workshop **on Developing and implementing protective measures for ELF EMF**, held in Geneva, Switzerland, on June 20-21, 2007. The audience included over 90 representatives from governments, industry, and consumer groups.

The aim of this workshop was to provide a forum for discussing low cost policy options, as recommended in the just released WHO ELF Environmental Health Criteria. The objectives were:

1. to describe the scientific background and sustained uncertainty that underpins the recommendations for low-cost protective measures in the ELF EHC;
2. to provide a public health perspective with health economics arguments;
3. to review residential sources of ELF and the types and costs of mitigation measures to reduce field exposure;

4. to review different national policies in a view to assist governments and other stakeholders in developing practical and effective policy measures;
5. to discuss the cost and feasibility of different options, including other factors (e.g. land cost; land scale, economical development, public concerns, energy demands);
6. to assist governments in communicating on this issue with the public.

A Rapporteur's report is in preparation, and a peer-reviewed publication is planned as an outcome of this workshop. Presentations can be found at http://www.who.int/peh-emf/meetings/elf_emf_workshop_2007/en/index.html

WHO co-sponsored workshops

WHO considers that a co-sponsored meeting is one organized by an external entity but where WHO provides a high level support and technical input. WHO co-sponsorship is subject to approval by the WHO Legal Office and by the Assistant Director General of the Cluster. Commercial enterprises that would have a direct interest in the outcome of the meeting (e.g. meeting topics dealing with issues in which the companies have a business interest) cannot be involved in the event in terms of financial support, organization, participation in the scientific committee, or other.

Over the past year, two workshops were co-sponsored by WHO according to these rules. These meetings were useful in providing information to specific WHO activities, or to provide an opportunity to discuss EMF issues at country and regional level.

- **International Workshop on "Risk factors for Childhood Leukaemia**" (Berlin, Germany, May 5-7, 2008)
  This meeting was co-organized with ICNIRP and the German Federal Office for Radiation Protection, BfS, was held in Berlin, Germany, on 5-7 May, 2008. The main objective of the meeting was to analyze the increased incidence of childhood leukemia observed in epidemiological studies at low-level magnetic fields or near nuclear facilities. The findings were considered in the light of other possible risk factors and of new data on the complex origin of childhood leukaemia (http://www.icnirp.org/WChildhoodLeukemia.htm).

- **Final conference of the German Mobile Telecommunication Research Programme** (Berlin, Germany,17-18 June 2008)
  To probe into the question of whether mobile telephony poses a health risk to the general public, the German Mobile Telecommunication Research Programme (DMF) was initiated in 2002 with a mandate until 2007. It was set up by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) under the auspices of the Federal Office for Radiation Protection (BfS). Funding of €17 million was equally shared by the Federal Ministry for the Environment and the network operators. It provided an opportunity for intensified and coordinated research to support the WHO's International EMF project research agenda and sought to increase the amount of data required for risk assessment. The conclusions of the DMF programme and their evaluation in view of the current international state of knowledge were presented at this meeting.

2. 3. RESEARCH COORDINATION

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 projects relevant to the EMF Project's mandate. 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).

From January through December 2007 there were 251 studies added to the database, of which 86 were reviews and comments and 165 primary data publications. Since Jan 2008 there have been 101 publications, 43 being reviews and comments and 58 primary data publications. Our collaborating centre, Brooks Air Force Base, is to assist with collecting Terahertz (60 GHz and above) literature.

The database is actively updated and is seen as a very important tool for revision of the IEEE C95.1 exposure standard, in addition to being a publicly available source of information for both published and ongoing studies. It will be further updated after the BEMS meeting (June 2008).

Research agenda
In 1997, the WHO International EMF Project developed a Research Agenda in order to facilitate and coordinate research on the possible adverse health effects of non-ionizing radiation. In subsequent years, this agenda has undergone periodic review and refinement. (http://www.who.int/peh-emf/research/agenda/en/index.html).

Research agendas were published for static fields in early 2006, followed by an update of the RF fields in Spring 2006. The Research Agenda for ELF fields has been compiled following the ELF EHC monograph review (July 2007) and is available on the web. Over the past year the ELF Research Agenda has been presented at the request of several entities (HPA, UK; Lisbon, Portugal; Erice; Italy), and the RF Research Agenda has also the topic of several presentations (Washington, USA; Copenhagen, Denmark and Berlin, Germany).

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.

WHO staff have been represented on the scientific committees of the Mobile Telephone Health Research program (MTHR) in the UK (M. Repacholi, 2004 to 2006; E. van Deventer, 2007 to present) and the French foundation, "Fondation Santé et Radiofrequences" (E. van Deventer, 2005-2007).

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 any hazards resulting from EMF exposure and any needed 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 standards) and international standards that limit the emissions of EMF from devices (IEC and IEEE device emission standards). This model legislation is 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 is being translated in Chinese.

The Model legislation has been the basis of several legislations that are currently being developed (e.g. Saudi Arabia, Bahrain). Discussions have been held with the Chamber of Deputies of Brazil, a delegation of the Czech Parliament and China.

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 regularly updated, the overall database needs to be migrated to another server platform. In addition, a more complete analysis of the international situation is envisaged to provide decision-makers with the tools to develop or review their EMF legislation and to respond accurately to their stakeholders. Search tools will be added to provide the possibility of comparison between standards and further entries will be provided for completeness. A small

group has been assembled to carry out this task, including Shaiela Kandel 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.

3. 3. OCCUPATIONAL EMF MANAGEMENT

WHO has been developing a document entitled "Occupational EMF Management" with the US National Institute of Occupational Safety and Health (NIOSH), one of its collaborating centre, and the International Labour Organization (ILO). 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 radio frequency 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 had with EC DG Employment to avoid duplication of efforts and complement 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 an extensive brochure that gives scientific findings and communication aspects, for local authorities that have more expert personnel dealing with environmental issues.

A similar brochure for local authorities is being developed on ELF fields, and will provide local authorities with all the information they need to plan and approve the siting of power lines and similar installations. Dr Andrew Wood from Swinburne University, Melbourne assisted in the first draft of the brochure.

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:

- United States of America: The National Research Council's **Committee to Identify Research Needs Relating to Potential Biological or Adverse Health Effects of Wireless Communications Devices** held a workshop in August 2007. The task for the Academies' committee was to identify research needs and gaps in the knowledge of the biological effects and adverse health outcomes of exposure to radiofrequency energy (RF: 300 KHz-300GHz) from wireless communications devices The committee invited WHO to present its research agenda which highlights research needs and gaps.

- South Africa: **South African Mobile Phone Symposium (**Johannesburg, South Africa**,** October 7-9 2007) The purpose of the Symposium was to provide an opportunity to all interested parties to obtain the latest information on aspects of mobile telephony as it relates to health, standards, compliance and precaution. South Africa's active mobile phone research program began about 5 years ago in response to "public outcry" about possible RF EMF health effects. After consulting the WHO EMF research agenda, the South African Bureau of Standards (SABS) determined that future work in South Africa should build on existing expertise. SABS and the Department of Health were expected to consider future directions over the following months and consult a stakeholder group on the national research agenda.(https://www.sabs.co.za/code/index.html)

- France: **First scientific conference of the French Foundation for RF and Health** [(FSR) Fondation Sante et Radiofrequences]. It featured speakers who are conducting RF EMF research funded by the 5-year, 5-million-Euro French national research program. (http://www.sante-radiofrequences.org)

- Portugal: The **BIOCEM symposium** (Lisbon, 23 January 2008) was organized by the Faculty of Pharmacy at the University of Lisbon, the Foundation for Science and Technology and the national electricity distribution providers. This meeting was set up to contribute to the public understanding of the health effects from exposure to electromagnetic fields, and in response to public fear over the current deployment of new transmission lines. The timing of the meeting coincided with the kickoff of a major research initiative, with funding over 40 Million euros over 10 years. Media (TV and radio) were present, as well as representatives from several ministries and industry.

- Romania: **Launch of the "Mobile Communications and Health" national information campaign** (Bucharest, 15 April 2008), in collaboration with the

Ministry of Public Health, and the Ministry for Communications and Information Technology. The event announced the launch of the "Mobile Communications and Health" brochure, as well as the www.emf.ro portal, containing EMF measurements in Romania. These two information tools represent the key communication instruments in the development of the information campaign.

- Denmark: **Final conference of the national research program on "Health risks from non-ionizing radiation due to mobile telephony"** (Copenhagen, 27 May 2008). In 2003 the Danish Government and the Danish Parliament decided to establish a strategic research programme to shed light on potential health risks associated with mobile telephony. A total of DKK 30 million was earmarked for this programme. This conference was called to review the status of the research projects supported in respect to the overall programme objective and to the current status at the international level. WHO was invited to present international efforts to define research priorities for RF fields.
(http://www.mobil-straaling.dk/index.php?menu=20&lang=2#)

- Germany: **Final conference of the German Mobile Telecommunication Research Programme** (Berlin,17-18 June 2008) - see section 2.3 for further details

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 (newspapers, TV, radio) 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 languages such as Spanish and Italian are often forwarded to IAC members for translation and/or response.

4. 2. WEBSITE INFORMATION

The general WHO website is now set up to provide information in 6 languages (Arabic, Chinese, English, French, Russian, Spanish). The EMF Project website has 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.

Web-based course for young researchers

This work has been spearheaded by Professor B. Veyret, University of Bordeaux (while on sabbatical at the University La Sapienza, Rome). Its primary audience is the community of young scientists world-wide undertaking Bioelectromagnetics research. It spans across the whole spectrum: DC to mm. The approach is experimental, in the context of health risk assessment and exposure standard setting. The content is based in part on what already exists (Erice course, various university courses in Europe). The website will be opened to a forum where young scientists can ask questions and share their experience. The title is “Methodology in Bioelectromagnetics research”. The course should be useful to other audiences: teachers, general public, etc. It introduces physics to the biologists and biology to the physicists. It has been accessible for comments at: http://www.jrc.ec.europa.eu/emf-net/bioEMF/index.html, and the final version will shortly be uploaded on the WHO website.

International School of Bioelectromagnetics 4th Course on "Electromagnetic Fields and Epidemiology" (Erice, Italy, 26 March-02 Apr 2008)

The 4th course of the International School of Bioelectromagnetics "Alessandro Chiabrera", established at the Ettore Majorana Foundation and Centre for Scientific Culture, was held in Erice (Sicily, Italy). The course covered basic fundamentals of epidemiology, and included several talks reviewing the literature for various endpoints for exposure to both ELF and RF fields. Several principal investigators of the long-awaited INTERPHONE case-control study were present and provided insight into the upcoming debate around the potential effects of mobile telephony. Posters were presented, and a copy of the WHO ELF EHC monograph was given as an award for the best poster! It is hoped that a similar web course can be developed from the presentations from the Erice lectures.

RF Dosimetry handbook
THE EMF Project was approached to host the latest edition of the RF Dosimetry handbook, sponsored in part by the US government, and by the UK. No final decision has yet been reached.

4. 4. WHO PUBLICATIONS

All publications of the EMF Project are reviewed by the International Advisory Committee before seeking formal approval by WHO management. All recent documents are available electronically for download on the Project website. Some of the printed documents are available free of charge, while other are on sale through the WHO Bookstore.

- Environmental Health Criteria N°232 *Static Fields* (778 copies sold)
- Environmental Health Criteria N°238 *Extremely Low Frequency Fields* (497 copies sold)
- Handbook on *Establishing a Dialogue on Risks from Electromagnetic Fields* (517 copies sold)

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)

Current and past fact sheets have been translated into several languages, and can be found on the **EMF Project website** (http://www.who.int/peh-emf/publications/facts/factsheets/en/index.html).

WHO is currently making some changes to their fact sheet format, i.e. shorter and less technical, to address the press and general public. Therefore we have been requested to develop a new overall fact sheet on ELF for the WHO Media Centre website, with a link to more background information on the EMF Project site.

While there is a great need to update the Fact sheet on mobile telephony (FS 192) which was published in 2000, we have been planning to release it with the INTERPHONE publication for several years now.

Note that the information sheets have been discontinued as they do not represent a

formal WHO product.

Refereed publications

- E. van Deventer and K. Foster, Risk Assessment and Risk Communication for Electromagnetic Fields: A World Health Organization Perspective, chapter in book *The Role of Evidence in Risk Characterization: Making Sense of Conflicting Data*, . P. Wiedemann and H. Schütz, eds., WILEY-VCH (2008)

- M. Repacholi, E. van Deventer and P. Ravazzani (Editors) Base stations and wireless networks: exposures and health consequences. Proceedings of the International Workshop on Base stations and wireless networks, Geneva, Switzerland, June 15-16, 2005. World Health Organization, EMF-NET, Geneva (2007).

4. 5. MEETINGS

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

When	Where	Title
June 22, 2007	Didcot, United Kingdom	Presentation of the ELF EHC monograph to the Health Protection Agency
July 5-6, 2007	Paris, France	Meeting of the scientific committee of the *Fondation Santé et Radiofréquences*
August 7-9, 2007	Washington DC, USA	Workshop to "Identify Research Needs Relating to Potential Biological or Adverse Health Effects of Wireless Communications Devices"
September 17, 2007	Paris, France	Meeting of the scientific committee of the *Fondation Santé et Radiofréquences*
October 7-9, 2007	Johannesburg, South Africa	South African Mobile Phone Symposium
October 23-25, 2007	Paris, France	Meeting of the scientific committee of the *Fondation Santé et Radiofréquences* First Conference of FSR
November 20, 2007	Geneva, Switzerland	ITU-T Workshop "Human Exposure to EMF's"
November 26-27, 2007	Brussels, Belgium	Joint research meeting (GLORE)
Dec 18-19, 2007	Paris, France	EMF Database Kickoff Meeting (19 Dec) France Telecom event (20 Dec)

January 11, 2008	Zurich, Switzerland	NRP57 meeting on Non-Ionizing Radiation - Health and Environment
January 23, 2008	Lisbon, Portugal	International BIOCEM symposium
January 25, 2008	London, UK	MTHR committee meeting
March 26 to 2 April, 2008	Erice, Sicily	4th course: Electromagnetic Fields and Epidemiology
April 3, 2008	Paris, France	Interview with the *Fondation Santé et Radiofréquences*
April 15 , 2008	Bucharest, Romania	Launch of EMF Information Campaign hosted by the Ministries of Health and of Communications
May 5-7, 2008	Berlin, Germany	Workshop on "Risk factors for childhood leukaemia, co-sponsored by WHO, ICNIRP and the German Federal Ministry of Environment
May 26, 2008	Berlin, Germany	Workshop on "Omics For Assessing Unclear Risks", sponsored by FGF
May 27, 2008	Copenhagen, Denmark	Conference on health risk from NIR due to mobile telephony
May 28-29, 2008	Copenhagen, Denmark	Workshop on “Risk Assessment Terminology and Approaches to Evaluating Scientific Evidence on Environmental and Health Issues”
June 17-18, 2008	Berlin, Germany	Final workshop of the German Telecommunication Research Programme

Note that the 5th International EMF Seminar in Zhangjiajie, China, which was to be jointly sponsored with WHO, was postponed to 2009.

5. FUTURE ACTIVITIES

5. 1. UPCOMING MEETINGS

At the present time, two conferences will be held with WHO participation for the coming months, while others are at the planning stage.

- **Sixth International Non-Ionizing Radiation Workshop** (14-17 October 2008, Rio de Janeiro, Brazil)
  Every four years, an international workshop is organized by the International Commission on Non-Ionizing Radiation (ICNIRP) to present an up-to-date overview of the advancement of science and protection in different areas of non-ionizing radiation. The 6th International Non-Ionizing Radiation Workshop, jointly organized by ICNIRP and the Brazilian Ministry of Science and Technology and co-sponsored by the World Health Organization, will take place in Rio de Janeiro, Brazil, from 14 to 17 October 2008.

- **12th Congress of the International Radiation Protection Association (IRPA)** (Buenos Aires, Argentina, October 19-24, 2008)
  The Congress agenda will address both ionizing and non-ionizing radiation and will promote a full and wide engagement of the radiation protection profession.
  The Congress will focus on three major areas: (1) The epistemology of radiation, namely the methods, the validity and the scope of current knowledge of the physical and biological sciences in relation to the effects of radiation exposure; (2) the paradigm of radiation protection, namely the conceptual model for keeping people safe from the health effects due to radiation exposure; (3) the practice of radiation protection, namely the actual application and use of radiation protection plans and methodologies by practitioners and industries making use of radiation.
  http://www.irpa12.org.ar/

FOR FURTHER INFORMATION ON THE INTERNATIONAL EMF PROJECT

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