



# THE INTERNATIONAL EMF PROJECT

## PROGRESS REPORT 1998-1999

### SUMMARY

This fourth progress report for the International EMF Project reflects another productive year of activities and outputs. The report has been formatted according to scheduled EMF Project activities: scientific reviews; research coordination; health risk assessments; harmonization of EMF standards; risk perception and communication; and environmental impacts of EMF. Achievements and activities within these areas for the period September 1998 to August 1999 are given below. Current details of the EMF Project, its activities and outputs can be found on the home page at:

<http://www.who.int/emf/>

The final scientific review phase of the Project was completed with the international meeting in Maastricht, Netherlands 7-10 June 1999. At this meeting there was a review of the biological and health effects of exposure to EMF in the intermediate frequency range 300 Hz to 10 MHz. A summary report will be published that provides information about current knowledge on health risks from exposure to EMF in this frequency range and also identifies research still needing to be completed to make better assessments of any risks. The International EMF Project will promote these research requirements.

Scientific review meetings have also been conducted in Moscow and China. The purpose of these meetings has been to:

- allow a better understanding of studies published in Russian or Chinese that are not widely available outside these countries;
- provide an opportunity to share the results of these studies more widely;
- discuss the results of studies conducted outside these countries with local scientists;
- better understand the rationale of national EMF standards;
- engage national scientists in the EMF Project's harmonization of EMF standards activities.

In accordance with the recommendations of the EMF Project's International Advisory Committee, an international review of subjective symptoms and psychosocial effects was conducted in Graz, Austria. The proceedings of the meeting have been published and are available on the home page. A summary report is being prepared for publication by WHO.

A mid-term scientific review of biological and health effects from exposure to pulsed, low-level RF fields will be held in Italy in November 1999. This meeting will update knowledge gained since the WHO/ICNIRP review in Munich in 1996. It will be the final EMF Project review prior to formal health risk assessments to commence in 2003 for RF fields.

An International Workshop entitled "Exposure Metrics and Dosimetry for EMF Epidemiology" was conducted in the UK at the National Radiological Protection Board (NRPB), a WHO Collaborating Centre. The proceedings, published in Radiation Protection Dosimetry will help future epidemiological studies ensure that one of their weakest components, exposure assessment, will be considerably improved.

Formal health risk assessments by WHO/HQ and IARC have been scheduled over the period 2001 to 2004. Results of these reviews will be published in the WHO Environmental Health Criteria and IARC monographs.

An international meeting on Perception and Communication of EMF Risks was held in Ottawa, Canada, 31 August to 1 September 1998 to further the database of information and results obtained at the Vienna meeting (held in October 1997) and to address in more detail such topics as the precautionary approaches.

Concerns about possible environmental impacts of EMF, especially from major development projects such as high voltage power lines, large telecommunication facilities, military radars and undersea power cables will be addressed at a meeting in Munich 4-6 October 1999. The proceedings of meeting presentations and a summary of the state of knowledge will be published. In addition, gaps in knowledge will be identified and studies to elucidate them promoted, but it is not anticipated that there will be further activities in this area of concern.

Below are more details on the EMF Project activities over the past year.

## **SCIENTIFIC REVIEWS**

### **Eastern Europe**

An international seminar was held in Moscow from 18 to 22 May 1998, that allowed Eastern European scientists to summarize their work, particularly that previously published only in Russian. Research results presented covered the entire frequency range 0-300 GHz. The meeting also allowed the rationales for current EMF standards in Commonwealth of Independent States (CIS) countries to be explained. The seminar was coordinated by the WHO EMF Project in collaboration with Professor Nikolay Izmerov and Dr Nina Rubtsova from the Russian Academy of Medical Science's Institute of Occupational Health, and Professor Yuri Grigoriev from the Centre of Bioelectromagnetic Compatibility of the Institute of Biophysics. Proceedings in both Russian and English have been published by WHO, and a report in English summarizing the results of this meeting will be published by WHO before the end of 1999. Some delays have occurred because some of the papers provided were incomplete and many needed to be re-translated. The reference for the proceedings is: "Electromagnetic Fields: Biological Effects and Hygienic Standardization." MH Repacholi, NB Rubtsova and AM Muc (editors), Proceedings of the International Meeting in Moscow, 18-22 May 1998. Publication WHO/SDE/OEH/99.5, Geneva: World Health Organization 1999 (available in English and Russian).

A follow-up meeting, to advance the work on EMF Standards Harmonization and Biological Effects, will be held in Moscow 20-25 September 1999. The International Conference is entitled "Problems of Electromagnetic Safety of Human Beings, Fundamental and Applied Research, Development of EMF Standards: Philosophy, Criteria and Harmonization". More information about this meeting can be obtained from Prof Yuri Grigoriev at Fax: +7 095 1903590 or by e-mail at: [CEMS.1@g23.relcom.ru](mailto:CEMS.1@g23.relcom.ru). It is not anticipated that the meeting proceedings will be published by WHO, but will be available from Prof. Grigoriev.

### **Intermediate frequencies**

The final scientific review of possible biological and health effects from exposure to EMF in the frequency range intermediate to the static and ELF and radiofrequency ranges, i.e. the range 300 Hz to 10 MHz, was held in Maastricht, The Netherlands, 7-8 June 1999. The International Seminar, entitled "Health Effects of Exposure to Electromagnetic Fields in the Frequency Range 300 Hz to 10 MHz", was followed by 2 days of working group meetings. Working groups finalized a summary report giving the current status of possible health effects from exposure to these fields and gaps in knowledge where further research is needed to make better health risk assessments. Outputs of this meeting were a proceedings of all papers that will be published jointly by WHO and ICNIRP and a summary report that will be published in the open scientific literature.

### **Psychosocial effects**

An International Workshop was convened in Graz, Austria 19-20 September 1998 to review scientific knowledge on psychosocial consequences of exposure to EMF. This International Workshop entitled "Electromagnetic Fields and Non-Specific Symptoms" was held in conjunction with COST 244 bis, the Austrian Government, Graz University, WHO and ICNIRP. The purpose of this meeting was to review the evidence for any relationship between EMF exposure and symptoms variously described as "non-specific", "psychosocial" or "hypersensitivity".

Outputs of this meeting included a proceedings of all presentations, that have been published, and are available from the meeting organizer (Prof. Norbert Leitgeb, Department of Clinical Engineering, Institute of Biomedical Engineering, Graz University of Technology, Graz, Austria

(Fax: +43 316 465348, E-mail: [leitgeb@bmt.tu-graz.ac.at](mailto:leitgeb@bmt.tu-graz.ac.at)). The meeting proceedings are also available on the WHO EMF Project home page. In addition, a summary of the results and conclusions of the meeting is being prepared and will be published as a WHO report.

Once the conclusions and recommendations have been completed, the EMF Project will initiate further action in this important area. In the meantime, WHO is producing a fact sheet on this topic, which will be published before the end of 1999.

### **Pulsed radiofrequency fields**

A mid-term scientific review of possible health effects of low-level pulsed radiofrequency fields will be held at the Ettore Majorana Centre for Scientific Culture in Erice, Sicily, Italy, from 21 to 25 November 1999. Given the widespread concern about possible adverse health consequences from use of mobile telephones, this will have significant interest. However, the purpose of the meeting is to conduct a final review of literature published since the meeting on non-thermal effects of RF fields held in Munich in November 1996. The meeting is intended to give a health status report on low-level pulsed RF field exposure as well as to identify research gaps not found during the Munich meeting that researchers are not currently addressing. This will be the final review prior to the formal review process established by the EMF Project where the International Agency for Research on Cancer (IARC) and WHO make assessments of health risk in 2003 and 2004. In addition to an updated summary report on possible health effects from pulsed, low-level RF fields, WHO will update its fact sheet number 193 on mobile telephones and base stations.

## **RESEARCH COORDINATION**

### **Exposure assessment for epidemiology**

At the EMF Project Research Coordination Committee meeting held in Geneva 4-5 December 1997, it was recommended that there should be greater collaboration between physical scientists and epidemiologists to improve exposure assessment for future EMF epidemiological studies. As a result, an International Workshop entitled "Exposure Metrics and Dosimetry for EMF Epidemiology" was conducted at the National Radiological Protection Board (NRPB), a WHO Collaborating Centre. The Workshop was organized jointly by the NRPB, WHO and ICNIRP and the proceedings have been published ("Exposure Metrics and Dosimetry for EMF Epidemiology," AF McKinlay and MH Repacholi eds, Radiation Protection Dosimetry 83 Nos. 1-2, 1999). This volume will help future epidemiological studies ensure that one of their weakest components, exposure assessment, will be considerably improved.

The recommendations of this workshop will also be used in an ELF and childhood cancer study to be conducted in Tokyo, Japan (Dr M. Kabuto, principal investigator). A meeting was held in Tokyo, 7-11 November 1998 with Dr Kabuto's team and some members of the Research Coordination Committee to assist with the development of a high quality exposure assessment protocol for this study. The study is due to commence later in 1999.

### **RF dosimetry**

A NATO Advanced Study Workshop on "Radiofrequency Radiation Dosimetry" was held in Godz Martuljek, Slovenia 12-16 October 1998. This meeting brought together specialists to review the state of the science in RF dosimetry, measurements, and the relationship between specific absorption rate, power density, and the biological effects of RF fields. The Workshop:

1. Provided an international forum to determine what theoretical, technological and scientific events have occurred in order to revise the US Air Force RF Radiation Dosimetry Handbook.
2. Established longer term working groups to evaluate the advances and determine how to incorporate the revisions into the Handbook.

The proceedings of all presentations at this meeting are due for publication before the end of 1999. In addition, a working group was established to update the RF Handbook, and an International EMF Dosimetry Project was initiated to continue the work of improving RF dosimetry through provision of a web site for researchers.

This Workshop was important to the objectives of WHO's EMF Project in that it provided extensive discussion on requirements for high quality dosimetry in the conduct of laboratory studies. The EMF Project has emphasized the importance of high quality dosimetry for all studies on many occasions, since it ultimately allows greater precision for organizations setting EMF standards.

## **HEALTH RISK ASSESSMENTS**

### **Schedule of assessments**

An ad-hoc advisory committee meeting was held in Lyon 27-29 April 1998 to discuss the evaluation of physical agents in the IARC monographs. It was concluded at this meeting that the classification of carcinogenic potential of static and ELF fields would be made in 2001. A similar meeting will be held in 2003 to classify the carcinogenic potential of RF fields. At such meetings physical agents are classified into the following categories:

Group 1: The agent is carcinogenic in humans

Group 2A: The agent is probably carcinogenic in humans

Group 2B: The agent is possibly carcinogenic in humans

Group 3: The agent is not classifiable as to its carcinogenicity in humans

Group 4: The agent is probably not carcinogenic in humans

Following the completion of these meetings, WHO will be establishing formal task groups to review possible health effects of static and ELF fields in 2002 and for RF fields in 2004. IARC will publish the results of their meetings in the IARC monographs and WHO will incorporate the IARC conclusions into the results of the WHO task group meetings and publish them as WHO Environmental Health Criteria monographs.

### **NIEHS ELF reviews**

One of the WHO Collaborating Centres, the US National Institute of Environmental Health Sciences (NIEHS) completed its EMF RAPID Program in 1998. Under this Program an international working group was convened in Brooklyn Park, Minnesota 16-24 June 1998, to review the literature and use IARC evaluation criteria to classify the carcinogenicity of ELF fields. The working group report has been published by NIEHS (CJ Portier and MS Wolfe eds, Assessment of the Health Effects of Exposure to Power-line Frequency Electric and Magnetic Fields, Working Group Report, NIEHS pp 508, 1998). The working group classified exposure to ELF fields as Group 2B, a "possible human carcinogen". This has meant that research requirements recommended by the International EMF Project have had to focus on resolving this important issue.

An International Working Group convened by NIEHS reviewed the literature in June 1998 and concluded that ELF exposure was a "possible human carcinogen" using the IARC categorization of carcinogens. This conclusion was based on epidemiological evidence, but this categorization was not supported by the animal studies. Thus, ELF exposure was seen as a weak carcinogen, if it was a carcinogen at all. In his final report to the US Congress, Dr Ken Olden, Director of the NIEHS, noted that "ELF-EMF exposure cannot be recognized as entirely safe with exposure possibly posing a cancer risk. In our opinion, this finding is insufficient to warrant aggressive regulatory action. However, because virtually everyone in the United States uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern."

WHO has taken the NIEHS conclusion that there is a need for more focused research to resolve the outstanding questions raised by the epidemiological studies.

## **EMF RISK PERCEPTION AND COMMUNICATION**

Following the successful meeting in Vienna on "Risk Perception, Risk Communication and Risk Management" in 1997, a follow-up meeting was held in Ottawa, Canada, 31 August to 1 September 1998. The meeting, entitled "Perception and Communication of EMF Risks" was organized by WHO in collaboration with the Canadian Government Departments of Health and Industry. The purpose of this meeting was to further the database of information and results obtained

at the Vienna meeting and to address in more detail such topics as the precautionary approaches and how these are perceived.

The proceedings of all presentations have been published by WHO and are available on the home page. Hard copies of the proceedings are available from WHO (Reference: "EMF Risk Perception and Communication." MH Repacholi and AM Muc (eds). Proceedings of an International Seminar, Ottawa 31 August to 1 September 1998. Publication: WHO/SDE/OEH/99.01, Geneva: World Health Organization, 1999). This is the final international review on this topic to be conducted by the EMF Project. A large amount of extremely useful information has now been gathered from which two monographs will be prepared:

- User-friendly handbook published by WHO for governmental and non-governmental organizations, and individuals interested in this topic. The format and language of the text will provide a how-to manual on risk perception and communication on EMF issues. A working group to complete the text is being convened and the publication is scheduled for late 2000.
- WHO EHC monograph on risk perception, communication and risk management. This will be a scientific document containing summaries of current information on this topic as well as recommendations for further research. Such a monograph would normally be used by specialists in the field as a basis for establishing programmes on risk and furthering research in this area. The monograph will include examples from all physical, biological and chemical agents, but will use EMF as a case study. Once an advanced draft has been completed, WHO will convene formal task groups to review the text and complete the document. When the task group has completed its work, WHO will have the monograph language edited prior to publication.

### **EMF ENVIRONMENTAL IMPACTS**

As technology has progressed, levels of EMF in our environment have increased steadily over the past 50-100 years. At specific frequencies, EMF emissions from man-made sources now exceed those from natural fields by many orders of magnitude and are detectable everywhere in the world. Significant increases in environmental EMF levels have resulted from major development projects such as high voltage transmission lines, undersea power cables, radars, telecommunication and broadcast transmitters, and transportation systems. Research has been focused to determine if EMF exposure of humans has any deleterious health consequence. By comparison, influences of these fields on plants, animals, birds and other living organisms have been less rigorously examined. Assessments of environmental impacts of EMF fields is important to:

- Ensure the preservation of balances in natural terrestrial and marine ecosystems, since these directly impact on human life.
- Preserve food supplies by ensuring there are no adverse impacts to fisheries, agricultural animals and plants.

An international seminar, the fourth in a series related to electromagnetic fields, organized by WHO and ICNIRP, and supported by the German Federal Office of Radiation Protection, will be held in Munich 4-5 October 1999. It will provide a summary of scientific knowledge about any consequences to the environment from man-made sources of EMF in the frequency range 0-300 GHz. Overviews of current knowledge in key areas will be presented by a selected panel of recognized specialists. On the day following the seminar, working groups will meet (6 October 1999) to finalize a report. This report will:

- Summarize information presented at the meeting and from other studies in the literature.
- Identify any gaps in knowledge.
- Recommend further research needed to fill these gaps so better EMF impact assessments can be made.

Outputs from the seminar will include:

- Proceedings of all presentations published by ICNIRP.
- Summary report published in the scientific literature.

- WHO fact sheet of the seminar results in lay language.

It is not anticipated that further meetings will be organized on this topic. The main purpose of this activity under the EMF Project is to provide information that specifically addresses environmental impacts of EMF fields. A comprehensive summary report on this topic will have at least two benefits. It will:

- be useful for both governmental and non-governmental institutions when conducting environmental impact assessments, and
- address any public concerns that EMF could be adversely affecting our environment.

### **HARMONIZATION OF EMF STANDARDS**

In November 1998, WHO commenced a process of harmonization of EMF standards worldwide. As over 45 countries and 8 international organizations are involved in the International EMF Project, it provides a convenient umbrella and a unique opportunity to bring countries together to develop an agreeable framework for standards. This framework can then be used to better define exposure limits once the EMF Project has completed its assessment of health risks associated with EMF exposure. With active participation by national authorities in the process of assessing health risk and the development of a standards framework, they will feel committed to a harmonized process for standards.

This WHO initiative to harmonize EMF standards is a response to the fact that many countries are considering new EMF standards. Globalization of trade and the rapid introduction of mobile telecommunications worldwide have focused attention on the large differences existing in standards. Differences in the EMF limit values in standards in some Eastern European and Western countries are, in some cases, over 100 times. This has raised concerns about their safety and has led to public anxiety about increasing EMF exposures from the introduction of new technologies.

It will take some years before this activity is complete, but the process will be finalized before formal assessment of EMF health risk assessments are published by WHO and IARC. Thus, the next generation of standards would be able to incorporate this health risk assessment information within the same harmonized standards framework.

### **Benefits of Harmonized International EMF Standards**

Since recent technology uses various parts of the electromagnetic spectrum, there are many benefits to having harmonized standards for EMF exposure. These are listed below:

- Increased public confidence that governments and scientists agree on health risks.
- Reduced debate and fears about EMF.
- Health protection for everyone to the same high level.
- Economic benefits to trade.

### **Elements of Harmonized Framework**

In establishing the framework for harmonization of EMF standards, numerous questions will have to be addressed. For example:

- Criteria used to evaluate research results for standards development.
- Detailed requirements for a scientific rationale to support limits.
- Model for developing standards.
- Methods for determining compliance.
- What to do with isolated data points at specific frequencies?
- When research data are absent in particular frequency ranges, how and with what degree of confidence can results be extrapolated to other frequencies or intensities?
- Applicability and extrapolation of animal or cellular studies to humans.
- Should one standard cover the whole frequency range from 0 to 300 GHz?
- Safety factors: should they address scientific uncertainties in the fundamental research or imprecision in the techniques used for exposure assessment and should they also allow for gaps in knowledge?
- Should standards be one or two tiered - i.e. differentiate between occupational or controlled exposure and general population or uncontrolled exposure?

- Should social and economic impacts be considered?

These and many other questions will be addressed in the standards harmonization process.

### **Activities to Date**

Before the launch of the EMF standards harmonization project, WHO organized an international meeting in conjunction with the Russian authorities to discuss scientific results of studies published in Russian and not easily available in non-Russian speaking countries. In addition, a large part of the meeting was devoted to understanding the criteria used to evaluate the science for the Russian EMF standards and the procedures used to establish exposure limits. Russian scientists also heard about criteria for acceptance of scientific reports and the rationale for standards established by ICNIRP and the US Institute for Electrical and Electronic Engineers (IEEE) C-95.1 Committee. This was an extremely valuable experience that has led to Russian scientists participating actively in the standards harmonization process.

The WHO initiative for harmonizing EMF standards worldwide was formally launched at a press conference during its first meeting in Zagreb, Croatia in November 1998. Over 21 countries were represented at the initial meeting: Australia, Austria, Canada, Croatia, Czech Republic, Finland, France, Germany, Hungary, India, Italy, Japan, Netherlands, New Zealand, Poland, Russian Federation, Slovenia, Sweden, Switzerland, United Kingdom, United States of America. Each country provided details of their current standards or at least what was being used as informal guidance and what was intended in the future. WHO has published the minutes of this meeting and they are available on the home page or by contacting WHO (Reference: "Inaugural Roundtable on World EMF standards harmonization." Minutes of meeting 18 November 1998, Zagreb. Publication WHO/SDE/OEH/99.4, Geneva: World Health Organization 1999).

An international meeting was held in Beijing, China 4-5 May 1999. This meeting provided a great opportunity to discuss the results of Chinese EMF research and existing standards. The Chinese Government currently wants to revise its EMF standards and needed an update on international and national standards. This meeting also provided an opportunity for the EMF Project to make contact with key scientists and to engage them in the standards harmonization process.

The next meeting is to be held during a series of meetings on biological and health effects of pulsed RF fields in Erice, Sicily, Italy, 21-27 November 1999. The date for the standards harmonization meeting is 27 November 1999.

### **EMF PROJECT MEETINGS HELD DURING THE YEAR**

#### **Meetings October 1998 to September 1999**

Seminars and meetings supported by the EMF Project to assist national authorities requiring information about EMF-induced health effects and updates on progress of Project activities and outputs are given below:

- Seminar on EMF Biological Effects and Update of International EMF Project. 9 October 1998, Ljubljana, Slovenia.
- NATO advanced research workshop on RF Dosimetry and its Relationship to Biological Effects of EMF. 12-16 October 1998, Gozd Martuljek, Slovenia.
- Roundtable on EMF Standards. Associated with European Bioelectromagnetics Society meeting. 18-22 November 1998, Zagreb, Croatia.
- Possible Health Effects of Mobile Telephones. 7-8 April 1999, Warsaw, Poland.
- Forum on Mobile Telephone Research. 19-20 April 1999, Bordeaux, France.
- International Seminar on Electromagnetic Fields. 4-5 May 1999, Beijing, China.
- International Seminar on Biological and Health Effects of Exposure to EMF in the Intermediate Frequency Range (300 Hz - 10 MHz). 7-10 June 1999, Maastricht, Netherlands.
- Australian Radiation Protection Association annual conference. 23-27 August 1999, Margaret River, Western Australia.

- 2<sup>nd</sup> International Conference: Problems of Electromagnetic Safety of The Human Being; Fundamental and Applied Research. Development of Standards: Philosophy, Criteria and Harmonization. 20-25 September 1999, Moscow, Russia.

#### **Future meetings**

- International meeting on EMF Environmental Impacts. 4-6 October 1999 Munich, Germany.
- Biological Effects, Health Consequences and Standards for Pulsed RF Fields. 21-25 November 1999, Erice, Sicily, Italy.
- Harmonization of EMF Standards meeting. 27 November 1999. Erice, Sicily, Italy.
- 4<sup>th</sup> International Workshop on Non-Ionizing Radiations. May 2000, ICNIRP/WHO, Kyoto, Japan.

### **ADMINISTRATION**

#### **Personnel**

During the period from October 1998 to December 1999, Dr Tony Muc, from Toronto, Canada, has been assisting with the EMF Project activities. In addition Dr Kjell Hansson-Mild will be assisting with the completion of the Project activities from 27 September to end of December 1999. Commencing January 2000, Prof. Ken Foster will work for the Project during his sabbatical year. It is anticipated that, because of extra duties given to Dr Repacholi by WHO, there will be a need for additional staff to assist with the EMF Project from 2000.

#### **Financial statement**

A financial statement of income and expenditures has been prepared and is in Annex 2.

#### **Home page**

WHO's home page and e-mail addresses have changed to a newly created domain from "ch" for Switzerland to "int" for international. Although both addresses will be valid for some extended period, the EMF Project home page is now at <http://www.who.int/emf/>. The WHO EMF home page provides:

- Details of the organization and scientific structure of the Project.
- Schedule of activities and outputs.
- Update on current events
- Copies of press releases and fact sheets in several languages.
- Reports of IAC and scientific meetings, publications and their availability, and details of future meetings.

#### **Brochure**

An extensive booklet on Electromagnetic Fields was drafted for the WHO European Regional Office. It is written for the lay public and local authorities, and was published in early 1999. This booklet gives details on the physical characteristics and biological effects of EMF, standards and protective measures, and is presented in a glossy format with many pictures and diagrams for ease of comprehension. Copies can be ordered directly on the web site at: [www.who.dk/environment/pamphlets](http://www.who.dk/environment/pamphlets) or from the Chartered Institute of Environmental Health, Chadwick Court, 15 Hatfields, London SE1 8DJ, UK.

#### **Leaflet**

A one-page brochure about the International EMF Project is available from the secretariat that gives a simple description of the Project's aims and objectives. It also provides information on why WHO is involved, the Project administrative and working procedures, national and international partners, WHO's definition of a health hazard and biological effect, and where to obtain further information. Reference: "The International EMF Project," publication WHO/EHG/98.7, Geneva: World Health Organization.

#### **FACT SHEETS**

The following WHO Fact Sheets concerning EMF have been published or are being drafted:

- Electromagnetic Fields and Public Health: The International EMF Project. WHO Fact Sheet #181 Oct. 1997, revised May 1998.

- Electromagnetic Fields and Public Health: Physical Properties and Effects on Biological Systems. WHO Fact Sheet #182 Oct. 1997, revised May 1998.
- Electromagnetic Fields and Public Health: Health Effects of Radiofrequency Fields. WHO Fact Sheet #183 Oct. 1997, revised May 1998.
- Electromagnetic Fields and Public Health: Public Perception of EMF Risks. WHO Fact Sheet #184 Oct. 1997, revised May 1998.
- Electromagnetic Fields and Public Health: Mobile Telephones and their Base Stations. WHO Fact Sheet #193 May 1998.
- Video Display Units (VDUs) and Human Health. WHO Fact Sheet #201 July 1998
- Electromagnetic Fields and Public Health: Extremely Low Frequency (ELF). WHO Fact Sheet #205 November 1998.
- Electromagnetic Fields and Public Health: Radars and Human Health. WHO Fact Sheet #226 June 1999.

Most published Fact Sheets are now available in Bulgarian, Dutch, English, French, German, Hebrew, Italian, Japanese, Russian, and Spanish. Translation into Chinese and Arabic is currently in progress. Translation into other languages would be considered if national authorities could assist. WHO fact sheets are available on the Project home page.

### **PRESS RELEASES**

The following press releases have been published by WHO on the Project:

- WHO Launches New International Project to Assess Health Effects of Electric and Magnetic Fields. Press release WHO/42, 4 June 1996.
- Electromagnetic fields: Experts Met in Vienna to Assess Public Perceptions of Risks. Press release WHO/75, 23 October, 1997.
- Health Effects of Electromagnetic Fields: WHO Recommends Research Priorities. Press release WHO/95, 19 December 1997.
- Scientists Meet in Moscow to Discuss Adverse Effects of Electromagnetic Fields. Press release WHO/38, 20 May, 1998.
- WHO Launches an Initiative to Harmonize Electromagnetic Field Standards Worldwide. Press release WHO/88, 17 November 1998

Further details can be obtained from the Programme Manager, Health Communications and Public Relations, WHO, Geneva, Tel: +41 22 791 2532, Fax: +41 22 791 4858. All WHO press releases can be obtained on the Internet on the WHO HOME PAGE <http://www.who.int/>.

### **PROJECT PUBLICATIONS**

A complete listing of publications and reports of the International EMF Project is given below in chronological order:

- WHO Launches New International Project to Assess Health Effects of Electric and Magnetic Fields. Press Release WHO/42, 4 June 1996
- Minutes: First International Advisory Committee meeting (30-31 May 1996) WHO/EHG/96.14
- Progress Report (1995-1996) WHO/EHG 96.19
- Minutes: Second International Advisory Committee meeting (30-31 May 1997), WHO/EHG/97.14
- Progress Report (1996-1997) WHO/EHG 97.19
- Electromagnetic Fields: Experts Met in Vienna to Assess Public Perceptions of Risks. Press release WHO/75, 23 October, 1997
- Minutes: First Research Co-ordination meeting (4-5 December 1997), WHO/EHG/98.14
- Health Effects of Electromagnetic Fields: WHO Recommends Research Priorities. Press release WHO/95, 19 December 1997
- WHO's Agenda for EMF Research WHO/EHG/98.13
- International EMF Project leaflet WHO/EHG/98.7

- Electromagnetic Fields and Public Health: The International EMF Project. WHO Fact Sheet #181 October 1997, revised May 1998
- Electromagnetic Fields and Public Health: Physical Properties and Effects on Biological Systems. WHO Fact Sheet #182 October 1997, revised May 1998
- Electromagnetic Fields and Public Health: Health effects of Radiofrequency Fields. WHO Fact Sheet #183 October 1997, revised May 1998
- Electromagnetic Fields and Public Health: Public Perception of EMF Risks. WHO Fact Sheet #184 October 1997, revised May 1998
- Non-Thermal Effects of RF Electromagnetic Fields. R Matthes, JH Bernhardt and MH Repacholi (eds) Proceedings of Munich meeting, November 1996. ICNIRP Pub. 3/97. From: ICNIRP C/- Bundesamt für Strahlenschutz, Institut für Strahlenhygiene, Ingolstädter Landstraße 1, D-85764 Oberschleißheim, Germany. Tel:+49 89 31603288, Fax:+49 89 316 03289, E-mail: RMatthes@bfs.de
- Biological Effects of Static and ELF Fields. R Matthes, JH Bernhardt and MH Repacholi (eds), Proceedings of Bologna meeting, June 1997. ICNIRP Pub. 4/97. From: ICNIRP C/- Bundesamt für Strahlenschutz, Institut für Strahlenhygiene, Ingolstädter Landstraße 1, D-85764 Oberschleißheim, Germany. Tel:+49 89 31603288, Fax:+49 89 316 03289, E-mail RMatthes@bfs.de
- Risk Perception, Risk Communication and its Application to EMF Exposure. R Matthes, JH Bernhardt and MH Repacholi (eds) Proceedings of Vienna meeting, October 1997. ICNIRP Pub 5/98. From: ICNIRP C/- Bundesamt für Strahlenschutz, Institut für Strahlenhygiene, Ingolstädter Landstraße 1, D-85764 Oberschleißheim, Germany. Tel:+49 89 31603288, Fax:+49 89 316 03289, E-mail RMatthes@bfs.de
- Repacholi MH, Cardis E (1997): Criteria for EMF Health Risk Assessment. Radiat Prot Dosim 72: 305-312
- Munich Meeting Report: MH Repacholi (ed) (1998) Low-Level Exposure to Radiofrequency Electromagnetic Fields: Health Effects and Research Needs. Bioelectromagnetics 19: 1-19 (1998)
- Bologna meeting report: MH Repacholi and B Greenebaum (eds) (1999) Interaction of Static and Extremely Low Frequency Electric and Magnetic Fields with Living Systems: Health Effects and Research Needs. Bioelectromagnetics 20: 133-160 (1999)
- Scientists Meet in Moscow to Discuss Adverse Effects of Electromagnetic Fields. Press release WHO/38, 20 May 1998
- Electromagnetic Fields and Public Health: Mobile Telephones and their Base Stations. WHO Fact Sheet #193 May 1998
- Video display units (VDUs) and Human Health. WHO Fact Sheet #201, July 1998
- Electromagnetic Fields and Public Health: Extremely Low Frequency (ELF). WHO Fact Sheet #205 November 1998
- WHO Launches an Initiative to Harmonize Electromagnetic Field Standards Worldwide. Press release WHO/88, 17 November 1998
- Electromagnetic Fields and Public Health: Radars and Human Health. WHO Fact Sheet #226 June 1999.
- Minutes: Second Research Coordination Committee Meeting (7-8 Dec. 1998)
- WHO/SDE/OEH/99.3.
- Progress Report (1998-1999) WHO/SDE/OEH/99.9

**FOR FURTHER INFORMATION:**

Visit the International EMF Project World Wide Web site at: <http://www.who.int/emf/>

or contact:

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## **Annex 1: International EMF Project Description**

### **Benefits Of Participating**

- The International EMF Project provides a forum for a coordinated international response on the EMF issue. Coordination of response is needed, as many government and non-governmental organizations do not have the expertise to deal with the EMF issue in all its complications. In addition, actions by one government can impact on actions of others. Coordination of response by governments will enhance public confidence.
- Research on EMF has been ad hoc and largely uncoordinated. Results of unreplicated research are placed at the same level as research that is of high quality and in which the results are established in a scientifically valid manner. Because of this, EMF issues have now reached a high level of concern among the general public and workers. This needs to be addressed at the international level, since the problem is truly global in nature. Research objectives are needed with a clear focus on improving the database of science used for health risk assessments. The International EMF Project has these objectives clearly stated in its description and is encouraging coordinated research worldwide through open scientific reviews.
- Once research has been completed there needs to be reviews of the published scientific studies as well as the results of the coordinated research programme. The International EMF Project will organize these reviews and have them subjected to formally constituted WHO task groups that make health risk assessments. These reviews are then published through the well respected WHO Environmental Health Criteria monographs. These monographs would provide support for national programmes and non-governmental organizations in dealing with EMF.
- Contributors to the Project receive draft outputs for review, copies of all publications, and can participate in the open scientific review process. Contributors are kept fully informed of activities and receive the latest information on possible health effects of EMF.
- The International EMF Project addresses all areas of the EMF issue, including how best to understand the public's concerns about EMF and how to more effectively communicate with the public. Special reports on "EMF risk perception, communications and management" are being completed following the specialized review meetings in Vienna 22-25 October 1997 and Ottawa 31 August-4 September 1998. These reports will be extremely useful to governmental and non-governmental organizations as well as other interested people.
- The International EMF Project is intended to be a complete package that includes research, review, publications and support for governmental and non-governmental organizations for dealing with the EMF issue. In addition, the International EMF Project will be publishing WHO Fact Sheets and brochures on various topics related to health effects from exposure to EMF. These can be used by contributors to communicate with their clients. Any questions of concern will receive responses from WHO.
- Since ICNIRP is a full partner in the Project, health risk assessments from the Project will form the basis of international standards. ICNIRP is a fully recognized non-governmental organization (NGO) of WHO, and so all activities in EMF are conducted with their participation. Members of the IAC will work with ICNIRP and develop a better understanding on how international standards are developed. The International EMF Project is using this international forum to facilitate the development of harmonized EMF standards worldwide. This would beneficially impact on public confidence and be very useful for global trade.

### **Annex 2: INTERNATIONAL EMF PROJECT**

**Financial Statement 1996-1999**  
**Statement of income and expenditure as at May 1999**

	<b>Income received at WHO US\$</b>	<b>Expenditure US\$</b>
	1 176 616	
Salaries (to end of 1998)		591 800
Travel (WHO Staff and others)		80 020
Work contracts		70 780
Consultants		132 060
Miscellaneous (postage/computer supplies)		15 850
Publications		15 760
Programme Support Costs		152 960
	1 176 616	1 059 230

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An additional amount of about US\$ 320 000 would be needed in the very near future to be able to cover three additional posts for the Project: one scientist specialist in EMF, one Consultant, and a secretarial post.