

# THE INTERNATIONAL EMF PROJECT

## Minutes of the 14<sup>th</sup> International Advisory Committee meeting

Executive Board Room  
WHO Headquarters, Geneva, Switzerland  
Thursday 11 and Friday 12 June 2009

*Prepared by L Martin, ARPANSA, Australia and M Gledhill, NRL, New Zealand*

### Thursday 11 June

#### **Session 1: Opening of Meeting**

Dr Emilie VAN DEVENTER, Scientist in charge of the WHO International Electromagnetic Fields Project at WHO introduced herself to the meeting, welcomed participants and wished the meeting every success. Mrs Lisa RAVENSCROFT of WHO provided information on practical matters and local arrangements. The participants then introduced themselves and the agency which they represented.

#### ***Election of Chair and Vice Chair***

Dr Mirjana MOSER, Swiss Federal Office of Public Health, was elected as chair and Dr Maha Saleh AL-SHEHAB, Ministry of Health, Bahrain, was elected as vice-chair.

Dr Moser took the chair and, as the Swiss representative, welcomed participants to Geneva and commented on the very full agenda. She then invited Ms Namita PRADHAN, Assistant Director General, Partnerships and UN Reform, WHO, to give the welcome address on behalf of WHO.

#### ***Welcome address, Ms PRADHAN, ADG PUN***

Ms Pradhan welcomed the participants to WHO and emphasized the importance to WHO of its strong scientific background and its partnership with experts from around the world in obtaining the best scientific advice. Ms Pradhan highlighted the issue in public health of the huge shift to non-communicable diseases and the concern among people, particularly in developing countries, that new technologies, such as mobile telephony and high voltage power distribution, have an impact on health. She mentioned the importance of being able to send the messages of science to the common people, and to continue to obtain the best science and withstand political and other pressures. She stressed the importance of meetings like the present one, where experts from around the world contribute the best evidence to enhance the strength of WHO.

## **Session 2: Update on the International EMF Project**

Dr van Deventer presented an overview of the International EMF Project, starting with a reminder about the WHO definition of health and summarized the structure of WHO and pointed out the breadth of the radiation program, including ultraviolet radiation (Intersun) and ionizing radiation

Dr van Deventer provided a summary of the history of the International EMF Project and outlined its objectives and described the role of partners. She then presented the content of the progress report ([http://www.who.int/peh-emf/publications/reports/Progress%20report 2008.pdf](http://www.who.int/peh-emf/publications/reports/Progress%20report%202008.pdf)).

In closing, Dr van Deventer noted the imminent departure from the EMF Project Secretariat of Lisa Ravenscroft and the very significant contribution she had made. She reminded participants of the forthcoming joint BEMS/EBEA meeting in Davos, next week, and the EU workshop on occupational exposure to EMF in Sweden in October. The chair congratulated the Dr van Deventer and the Secretariat on its work and noted that the accomplishments were impressive given the very slim funding.

## **Session 3: Report on EMF Activities from Collaborating Centres and International Organizations**

**Radiofrequency Radiation Branch, Brooks City-Base, USAF, Lt Col Scott M NICHELSON and Dr William P ROACH, Senior Science Advisor**

Lt Col NICHELSON briefly described the new structure of the USAF research laboratory, and described the laboratory of about 70 people as “running the gamut” and gave its mission as enabling the safe military exploitation of RF radiation. To do that the laboratory does research using bioeffects and dosimetry to build into standards. He explained that the capabilities include gene expression profiling, proteomics imaging and identification to support genomics. Dr ROACH went on to explain the laboratory’s focus on short pulses of 60 to 600 nanoseconds and that the response of cells did not follow the expected dependence on thermal energy deposition. Given the examples of new technology that make up the future of much communications and long-distance imaging, the observed effects of short pulses were of concern. Dr Roach discussed terahertz (THz) radiation as another area of interest and collaboration. He explained that THz radiation was often described as safe but, in reality, there was almost no bioeffects information in this region. The laboratory was looking at the microRNA level and expression effects from THz radiation. Dr Roach explained another significant part of the laboratory’s work was modelling covering all sorts of interesting issues. He concluded by noting that bioeffects research was a critical issue in the deployment and testing of systems for the military.

**Non-Ionising Radiation Branch, ARPANSA, Australia, Dr Colin ROY**

Dr ROY presented an overview of the EMF program carried out in Australia over the last year. The program built upon previous years and new activities were developments of ongoing activities. The Australian Government has supported a modest EMF program since the mid 1990s with AU\$1M per year, managed by the National Health and Medical Research Council. Under this program, the Australian Centre for Radiofrequency Bioeffects Research (ACRBR) was funded for 5 years, to finish in 2008. One additional year’s funding was provided and the NHMRC will

again call for research proposals at the end of this year. Its current research program includes a cohort study of teenagers and mobile phone use, a numerical dosimetry study looking at population variation, some human provocation studies and a survey of RF exposure in homes.

Dr Roy described some of ARPANSA's work on exposure standards, including the current ARPANSA RF exposure standard which was published in 2002 and will be assessed to determine whether a formal review of the Standard is required. He also described the rather slow progress with the ELF Standard and inclusion of stronger precautionary measures that have followed since the public consultation phase. Dr Roy expressed a hope that the Standard would be ready for publication late this year.

In the area of mobile phone base stations, Dr Roy described the ARPANSA EME Report that must be prepared before base stations are deployed. He reported that a new version now included more information on sites of special interest or where topography may make the simplistic flat ground calculation less than conservative. He also reported that the small-scale audit of base stations was continuing and showed example web pages where the results are given in detail and explained. Finally he reported that analysis of the residential magnetic field survey was nearly complete and showed 2 – 4% of high occupancy rooms exceeding 0.4  $\mu$ T. Publication was expected in late 2009.

#### **Bundesamt für Strahlenschutz (BfS), Germany, *Dipl-Ing Rüdiger MATTHES***

Dipl-Ing MATTHES presented a summary of activities of BfS over the past year and some future events. This month BfS was trying an experimental "road show" on mobile telephony to try to provide to the public short stimulating presentations on the technology, scientific approach and risk communication. The main goal is to provide face-to-face discussions with the public. BfS has provided a chapter for a Handbook for Environmental Medicine (in German only) which includes paragraphs on all the programs where BfS is collaborating with WHO: International Radon Project, International EMF Project and Intersun. He also provided information about recent involvement in conferences and workshops including the ICNIRP/WHO/BfS workshop on terminology in Salzburg and a follow up conference to that held in Berlin last year on childhood leukaemia, to develop a research agenda on the etiology of childhood leukaemia from all causes, not just EMF. An important activity was the completion of new legislation to deal with intended application of NIR to the human body in medicine and cosmetic treatment. In particular it includes a ban on sunbeds for minors under the age of 18, regulations on the professional training needed when using high output NIR devices.

Dipl-Ing Matthes summarized some of the research studies that have been finalized recently, including several dosimetric studies which he identified as being of particular interest to the IAC. A study on WiMax base stations showed exposures generally lower than from UMTS mobile phone base stations but the potential for indoor devices to provide high exposures, higher than DECT or WLAN, and even exceeding limits, if used very close to the body. He reported on studies showing that in some cases use of a wired headset could increase SAR and that use of a device against the body could exceed SAR limits. He described work with the numerical models, freely available from BfS or the Swiss group, of children of ages 5, 8 and 14, and the effect of age on SAR in the head. While higher SAR was found in certain

areas of the heads of children due to variation in anatomy and conductivity, it was noted that mobile phone compliance testing remains conservative.

In the area of risk communication, Dipl-Ing Matthes reported an important survey of general practitioners and their attitudes to EMF and risks. The practitioners, many of whom had been consulted about EMF problems and believed EMF caused health effects below current limits, showed a high level of trust in WHO and this decreased their risk perception but they were not aware of the EMF Project. Dipl-Ing Matthes provided a list of future projects for which a budget of 4M Euro was available.

### **Health Protection Agency, United Kingdom, *Dr Simon MANN***

Dr MANN started by explaining how the Health Protection Agency had been formed to bring together various health protection functions in the UK. He discussed a recent report on static magnetic field exposures that concluded 4 tesla fields were acceptable for routine operations of MRI. This recommendation was based on the considerable experience with 3 tesla field machines that had greatly increased in number. Dr Mann described the HPA response to the UK stakeholder group on ELF EMF (SAGE) and its recommendation to focus on the childhood leukaemia question rather than all the issues raised by the stakeholder group.

Dr Mann went on to describe the work in theoretical dosimetry by Peter Dimbylow and Richard Findlay. One project was comparing SAR in different voxel phantoms to understand where differences arose. Major influences were in the choice of dielectric properties, particularly for skin and fat and how the components of electric field were turned into average SAR. Dr Mann described work on developing pregnant human voxel phantoms, including a comparison of the realistic models with the geometric phantom that represented the average position of the fetus rather than a single example in time. He discussed how the distension of the abdomen affected localized SAR and absorption. The theoretical dosimetry research also looked at spatial averaging as used with non-uniform exposures such as from dipoles very close to the body.

A major experimental piece of research was the high-profile assessment of exposures from computer networks in schools. He pointed out the difficulties caused by the multiple antennas used by the WiFi devices and the need to control the data transmissions to identify the power of individual pulses. He explained that future measurements would include installed systems and from determinations of actual transmission times would be able to be fed into a health risk review and showed data indicating all systems complied with the 100 mW limit on effective isotropic radiated power (EIRP).

HPA was also collaborating with France Telecom on the MobiKids Project led from CREAL, Barcelona, by Elisabeth Cardis. HPA and France Telecom were providing support for exposure assessment but were not particularly involved in the epidemiology except insofar as advising as how exposures should be assessed. Dr Mann noted that the MobiKids Project pays more attention to ELF emissions from phones than the Interphone study did.

Dr Mann reported that independent HPA Advisory Group on Non-Ionizing Radiation (AGNIR) had undergone changes in membership and it was presently reconfiguring

to start a comprehensive review of RF radiation that was expected that to take 2 – 3 years. He also mentioned a group looking at the feasibility of a cohort study looking at mortality and cancer incidence. The group will report to the HPA board about the possibilities for this type of research with workers and static magnetic fields.

### **International Committees**

#### **TC106, International Electrotechnical Commission, Geneva**

***Dr Michel BOURDAGES***

As secretary of the TC106 committee of IEC, on methods for the assessment of electric, magnetic and electromagnetic fields associated with human exposure, Dr BOURDAGES provided an overview of its activities. The TC106 committee, involving more than 120 experts from 20 countries, develops standards on characterization of EM environments with regard to human exposure, EMF measurement methods and instrumentation and numerical methods for EMF and induced currents and SAR. Dr Bourdages provided examples of several standards dealing with ELF. In the area of RF, he discussed standard 62369 which assists in the evaluation of human exposure to EM fields from short range devices, such as those used in Electronic Article Surveillance and RFID systems and standard 62209-1 which provides the procedure for determine the SAR of hand-held mobile phones. Dr Bourdages also described standards for measurement procedures of electric and magnetic fields generated by AC power lines (622110), for the evaluation of human exposure from a stand-alone broadcast transmitter (62577), giving guidance for evaluating exposure from multiple EM sources (62630), and for determining RF fields near mobile phone base stations (62232). He finished by pointing out that the standards described were applicable to any set of exposure limits.

#### **International Telecommunications Union (ITU), Geneva**

***Mrs Judit KATONA-KISS***

Mrs KATONA KISS presented a summary of the latest work by the ITU concerning health effects of EM radiation. The ITU develops recommendations for voluntary standards that can be used for evaluating radiation levels and in identifying hazardous situations after the appropriate exposure limits from another organization have been identified. Recommendations ITU-R BS.1698 (Evaluating fields from terrestrial broadcast transmitting systems), ITU-T K.52 (Guidance on complying with limits for human exposure) and ITU-T K.61 (Guidance on measurement and numerical prediction of EM fields for compliance with human exposure limits) provide the link between EM safety limits and the assessment of hazard. ITU-T K.70 provides guidance on this assessment and on the need for precautionary measures. This recommendation includes EMF predictor software. She discussed ITU-T Resolution 72, “Measurement concerns related to human exposure to electromagnetic fields” of 2008 which invited ITU-T and particularly study group 5, to expand and accelerate its work in recognition that some publications create doubt regarding EMF health effects. Mrs Katona Kiss also reported on the new recommendation ITU-T K.guide “Guidance on how to manage human exposure to EMF’s” which gives guidance on assessment and evaluation of exposure.

**--The meeting reconvened, after the lunch break, in the new venue.--**

**International commission for Non-Ionizing Radiation Protection (ICNIRP)**  
***Dr Paolo VECCHIA, Chairman***

Dr VECCHIA started his presentation by outlining the changes to the membership of the Commission and its standing committees. The usual two meetings per year, in spring and autumn, continued with a meeting in Rio de Janeiro in October 2008 and one in Paris in March 2009. In addition, a workshop for the occasion of the 15<sup>th</sup> anniversary of ICNIRP was held in Prague in September 2008. This workshop considered the tasks and responsibilities of ICNIRP in the light of experience and sought guidance for the future from past participants. The usual traditional workshop on all aspects of NIR, close in time to the IRPA meeting, was held and the significance to Latin America, where many countries can benefit from help in developing their own standards and legislation. Dr Vecchia then summarized the ICNIRP process for the development of science-based standards. He pointed out how some recommendations from the Prague workshop had led to changes in the way things were being done, including the preparation of plain language factsheets, explaining the philosophy and science for the public, to accompany the more formal guidelines. For static fields, new guidelines were published in Health Physics in 2009 and a factsheet is on the web site, together with an amended "Statement on Medical Magnetic Resonance Procedures (MR): Protection of Patients" to be available within a few weeks. Following another suggestion from the Prague workshop, a consultation draft of the new guidelines for ELF fields will be available on the web site in a few weeks and open for comment, by anyone, for 3 months.

Dr Vecchia explained that the situation with RF fields was still quite fluid, related to the delay in the publication of the Interphone study. Given that the Interphone results are not yet available and that this could cause a delay in the whole process, it has been decided to proceed with the parts of the "Blue book" that can be done, such as physics, sources, engineering and exposure. Dr Vecchia reported that Standing committee 4 had submitted a paper updating the epidemiological review for mobile telephony. Given the delays expected, a statement confirming the validity of the existing guidelines, particularly in respect of long-term effects, will be published. It is intended that such statements of continued validity will be issued with some regularity. Finally, Dr Vecchia reported that ICNIRP had participated in several conferences, including a workshop in Brussels held by the European Commission to clarify the position and methodology of ICNIRP in developing its published recommendations, in contrast to the different approach used in developing other documents that have been published by other groups.

**EC COST BM0704, *Dr Mirjana MOSER, Vice Chair***

Dr MOSER provided an update on COST BM0704 actions. She reported that not a lot of things had happened since the last presentation in Berlin. She explained that many of the current COST activities were continuations of previous ones dealing with communication and information technologies. Dr Moser explained that BM0704 included 5 working groups covering exposure, measurement, dosimetry, computational models, biology, epidemiology, risk communication, emerging technologies and health risk management. She outlined future joint meetings with WHO and ICNIRP and a focus on children.

## **European Health Risk Assessment Network on Electromagnetic Fields Exposure (EPHRAM), *Dr Paolo RAVAZZANI, PI***

Dr RAVAZZANI presented a summary of the EFHRAN project, running from 2009 to 2012, a new initiative of the European Commission and the next step following EMF-Net. Somewhat like EMF-Net, EFHRAN aims to establish a European health risk assessment network, to provide an interpretation of research results and risk for policy makers. It will enhance the EC's ability to respond rapidly to health issues by using scientifically sound advice and analyses and aims to improve the compilation of knowledge. Dr Ravazzani gave more details of the 6 objectives of EPHRAM. He noted the many reports produced by EMF-Net, now all available on the web site and covering all frequencies from ELF to THz. He explained that EFHRAN was not a replication of EMF-Net but a next step with different objectives.

## **International Committee on Electromagnetic Safety, Institute of Electrical and Electronic Engineers (IEEE-ICES), *Dr Art THANSANDOTE***

Dr THANSANDOTE gave a summary of the procedures that IEEE and the ICES committee follow to prepare standards and guidelines for the safe use of electromagnetic energy. He described the principles of an open membership and decision making by ballot, overseen by the IEEE standards board. He commented that ICES was a non-profit organization that charged a small fee to cover the costs of each of its twice-yearly meetings. He summarized many of the standards that had been produced covering aspects of SAR determination, measurements and computations, and safety levels and distances.

**The chair thanked participants in this section of the meeting.**

## **Session 4: EMF health based standards and recommendations**

Dr van Deventer gave a rationale for this session explaining that the meeting would hear from two international organizations which deal with standards for workers; the ILO and the EC DG. Then a series of brief presentations would be given on national legislative development to give a feeling what's happening with regard to recently released standards. Reports from Brazil, Saudi Arabia, Tanzania and Lebanon would illustrate different situations. Finally, there will be short presentations on the situation regarding children and the RF EMR from mobile phones and developments with the WHO internet database on EMR Standards around the world.

## **International Labour Organization (ILO), *Dr Shengli NIU***

Mr NIU provided the background to the ILO's work in protecting the health of workers, through the use of conventions and recommendations. He explained the significance of the list of occupational diseases in Recommendation 194, 2002 and the role of the ILO in assisting individual countries to establish their own national lists so that workers could be properly protected and compensated. Mr Niu explained the process whereby the lists of occupational diseases should be updated based on scientific evidence and highlighted the fact that diseases attributed to RF or ELF EMF exposures are not currently on the list. Points were raised about the difficulties of separating social exposure from occupational exposure in relation to EMF and UVR.

**European Commission, Health and Safety at Work, DG EMPL.,  
Mr Georges HERBILLON**

Mr HERBILLON gave a presentation on the exposure of workers to EMF within the European Union and the challenges arising from the Directive 2004/40/EC. He outlined the principles underlying the EU legislation for health and safety and the mechanism and timetable for EU Directives to become binding legislation within member countries with 2 – 4 years. He discussed the particular case of how the ICNIRP Guidelines for EMF exposure became the basis for a binding directive and how, in spite of consultation being undertaken, the directive was found to present significant operational problems for the MRI community as well as for some other industries such as welding. The problems were of such importance that the implementation of 2004/40/EC was postponed by 4 years from 2008 to 2012 to allow further. The urgency of the process was emphasized and a timetable shown requiring adoption of a proposal by April 2001 so as to give time for member countries to implement by 2012. Mr Herbillon expressed optimism that the forthcoming conference under the Swedish Presidency in October 2009 would provide the opportunity for a final crystallisation of views before the final process began.

**--The meeting broke for afternoon tea and coffee, to reconvene at 16:00--**

**Recently released standards: The Brazilian experience**

***Mrs Maria Aparecida Muniz FIDELIS DA SILVA (Anatel) Brazil  
Cabral DOMINGUES (CEPEL), Brazil***

Mrs FIDELIS DA SILVA spoke about new legislation regarding RF and ELF EMF in Brazil and the way in which ANATEL, the national telecommunications regulator, was able to influence the process to follow the recommendations of WHO and ICNIRP to some extent. She emphasized the importance of international involvement but that this did not guarantee that legislation would be entirely based on scientific results. There were now limits in place in Brazil to prevent exposures up to 300 GHz in excess of the ICNIRP limits recommended by WHO and work was continuing on exposure assessment, monitoring and enforcement.

Dr DOMINGUES continued the presentation by highlighting the size of Brazil, and comparing it to the whole of Europe. He explained that Brazil's large dependence on hydroelectricity required very long transmission lines and the problems can spread very quickly throughout the whole system. Dr Domingues outlined the history of the process, starting with the growth of public concern from 2000, through the formation of a working group on ELF in 2004 and the creation of a National Commission of Bioelectromagnetism (CNBIO) with representatives from 9 ministries to the adoption of a National Standard NBR 15415 in 2008. He emphasized the assistance of international experts in trying to anchor the debate on a scientific rationale and the value of WHO documents and guidance. Dr Domingues discussed the next steps of modelling and an intensive measurement program to determine compliance. He discussed the challenges presented by new projects such as the more than 2500 kilometres of DC (+/- 600 kV) transmission lines and issues regarding the effect of air ionization on the observed electric field.



## **Recently revised standards: The Belgian experience**

***Dr Marina LUKOVNIKOVA-VANDERSMISSEN, Federal Overheidsdienst Volksgezondheid, Belgium***

Dr LUKOVNIKOVA-VANDERSMISSEN, from the Belgium Federal Ministry of Health, gave an overview of RF EMF limits in Belgium which, until 2009, were 4 times more stringent than ICNIRP. These limits now fall under regional government control. There are no limits for intermediate frequencies and ELF limits are the same as ICNIRP except in Flanders which has a limit of 100 microtesla and a goal value of 0.2 microtesla for residences. Dr Lukovnikova-Vandersmissen described how the National Health Council had recommended an additional safety factor of 200 below the ICNIRP limits, resulting in a recommendation of a limit of 3 V/m at 900 MHz. This was justified by referring to some biological effects being reported at this level, by 3 V/m being a European Standard for electromagnetic compatibility, and by suggesting 2 further safety factors of 7 should be introduced. These were to take into account the permanent nature of the exposure compared to the 30 minutes of so used in human studies and that all the population was exposed rather than just healthy adults. Since March 2009, the limit for all radiofrequencies except some particular sources such as radio and TV, is 3 V/m at 900 MHz. The exception for these sources was based on them not being “pulsed”. Other regional limits included a 3 V/m for all frequencies inside houses in the Walloon region and 3 V/m with a goal value of 0.6 V/m under the Flemish Government. Dr Lukovnikova-Vandersmissen commented on the feasibility of these proposals and pointed out that this depended on the method of determining compliance. Non-compliance was estimated at 40% in urban regions for one operator without sharing the limit. Dr Lukovnikova-Vandersmissen pointed out that the EMC standards in Europe vary according to whether the equipment is life supporting, non-life-supporting or implantable, with required tolerance varying from 3 V/m to 60 V/m. It was therefore possible that the new limits could provide the wearer of an implant with a higher degree of protection. She reported that a recent court case in Ghent had banned a base station on health grounds. She finished by mentioning the public pressure on other sources of EMF such as compact fluorescent lamps and for adoption of the Health Council’s recommendations concerning minimal distances from new electrical installations. There was also pressure at the political levels for more information on SAR for mobile phones and on restriction of marketing of phones to children.

In response to a question regarding the effect of the new limits on digital television, which could be considered pulsed, Dr Lukovnikova-Vandersmissen commented that the ordinance did not include a definition of “pulsed” but that the advice from the Health Council included a frequency analysis for different communication protocols.

The Chair commented that it would be interesting to see a report on the implementation next year.

## **Legislations under discussion**

### **Saudi Arabia, *Mr Tariq ALAMRI, Communications and Information Technology Commission***

Mr ALAMRI outlined the history of the Communications and Information Technology Commission, noting its establishment in 2001 as the National authority responsible for the regulation of communications and information technology sector in the Kingdom of Saudi Arabia. It also included the management and regulation of radiofrequency (RF) EMF in accordance with the Act, Bylaw and Ordinance. Mr Alamri reported that the WHO recommendations to national authorities for RF, including making use of ICNIRP guidelines, implementing programmes for public information and compliance, formed the basis of the programme. Since its establishment, CITC has implemented safety specifications for ICT equipment, including RF exposure limits. CITC has also established preliminary guidelines on limiting exposure from mobile phone base stations in 2007 which include a measurement programme, access provisions and power reduction when necessary to meet ICNIRP limits. National guidelines have also been produced, building on the WHO model legislation and making use of ICNIRP guidelines for limits and IEEE C95.3 for compliance. Use is also made of appropriate IEC standards for equipment and ITU recommendations for operators. Mr Alamri reported on field measurements at base stations and that all sites were found to have levels below 100 mW/m<sup>2</sup>. To provide information to the public a brochure containing questions and answer about EMR was published and 4 workshops in different regions were held. This was supported by information on EMR and EMF on the web site and by answering telephone enquiries.

### **Tanzania, *Dr Mwijarubi NYARUBA, Tanzania Atomic Energy Commission***

Dr NYARUBA explained the history of radiation protection in Tanzania from the Radiation Protection Act in 1983, through the Atomic Energy Act in 2003 and establishment of the Atomic Energy Commission, to the establishment of an NIR department in 2007 and starting of EMF activities in 2008. As in many other countries, public concern regarding mobile phone technology was a major force. Following media and political interest, a measurement programme was established in 2007 and a preliminary study of 150 base stations and radio and television transmitters, showed levels were very low, only 0.05% of ICNIRP Guideline limits. There was a need for legislation in Tanzania and in several neighbouring countries and so the 1st East African workshop on exposure to EMF and health was held in Arusha, Tanzania, in October 2008. Dr Nyaruba reported that 5 African countries, Kenya, Uganda, Tanzania, Rwanda and South Africa, attended the workshop which was addressed by speakers from WHO, ICNIRP and industry. The objective of the workshop was to provide basic knowledge in EMF and the related health issues with a view to developing harmonized legislation and the WHO model legislation for electromagnetic fields protection was to be used as a reference. Dr Nyaruba emphasized the challenges of lack of skilled personnel in all the countries, the lack of financial resources for meetings, travel and equipment, and the lack of legislation. Future plans included workshops and training to educate the public, the preparation of harmonized legislation within East Africa and the undertaking of collaborative research.

**Lebanon, Mrs Nohal AL-HOMSI, Technical Assistant- Environmental Health Program, WHO Lebanon.**

Mrs AL-HOMSI explained that a National Committee on the Impact of the Electromagnetic Fields on Public Health in Lebanon was established at the Ministry of Public Health on the request of the Council of the Prime Minister, and that the WHO Country Office was to be a member. The WHO Country Office assisted the Minister of Public Health by coordinating the work of the National Committee and by preparing a literature review report that included some recommendations based on those in WHO EHC 238 on ELF fields. Mrs Al-Homsy explained that concern flowed primarily from proposals for high-voltage transmission lines that, because of restricted land availability in Lebanon, would need to run within 60 m of residences. The report noted that the conducting of a study in Lebanon on the health effects of ELF fields was unlikely to change the conclusions reached on the basis of the WHO EHC. While a study on ELF exposure and childhood leukaemia in Lebanon would be of interest it was important that it be interpreted cautiously. Mrs Al-Homsy outlined a Ministry of the Environment project that involved taking measurements of magnetic fields generated by electric cables, transformers, power stations and generators. It also included collaboration with the Ministry of Public Health to measure the association between the occurrence of childhood Acute Lymphoblastic Leukaemia (ALL) and ELF field exposure in the country. Mrs Al-Homsy finished by providing statistics on the incidence of various childhood cancers observed at the Children's Cancer Centre of Lebanon (CCCL) and mentioning future plans for the National Committee to work on establishing National guidelines and developing related National legislation.

**Bahrain, Dr Maha Saleh AL-SHEHAB, Ministry of Health, Bahrain**

In a brief report, Dr AL-SHEHAB noted that Bahrain was the smallest country in the Arabian Gulf, consisting of 33 islands and having only a limited land area of 721 km<sup>2</sup> of land area. She announced that in April 2009 a Ministerial order was issued to establish the requirements to monitor and control non-ionizing radiation. Bahrain was the first country to reach such a stage in alignment with WHO and ICNIRP recommendations.

**Recommendation and Policies for Children's Mobile Phone Use,  
Dr Emilie VAN DEVENTER, WHO**

Dr VAN DEVENTER presented an overview of the situation around the world concerning regulation and children's use of mobile phones. She commented that the 2 major points of discussion were mobile phone base stations and children's use of mobile phones. She noted that children's use included not only talking but also texting and downloading. Dr van Deventer summarized the advice of international advisory bodies from 2000 which included advice on how concerned parents could reduce the exposure of their children through use of hands-free devices, that the ICNIRP recommendations were intended to apply to children and adults without difference, and that by using worst-case scenarios and including significant safety factors, there was no need to further reduce limits for children. While SCENHIR made no specific recommendations for children it did recommend that exposure to

possibly sensitive groups be investigated. A resolution of the European Parliament in April drew attention to an appeal for caution from the coordinator of Interphone to limit children's time of use of mobile phones and for more investigation. A list was presented of countries who had precautionary policies for children (Belgium, Finland, Israel, Russia) and those with some general cautionary statements (UK, France) and those without (Ireland, The Netherlands, India, Australia, New Zealand, Canada and the USA). Dr van Deventer then presented a list of "individual efforts" recommending additional protection for children, including the Bioinitiative Report, the Appeal of the 20, activist groups and medical associations in Britain, Austria and elsewhere. Dr van Deventer gave examples of specific national policies and noted that these would be included in the updated database on standards to be described later. A point was made that what applies to mobile phones should also apply to cordless phones as their power was often higher, due to the absence of adaptive power control.

In later discussion, it was noted that the overprotection of children was generally accepted as a desirable goal, if only because of their increased length of potential exposure. It was suggested WHO should include a more positive statement about precaution for children. Dr van Deventer reported that COST BM0704 was scheduling a meeting on children.

**WHO EMF Standards Database, *Dr Shaiela KANDEL, Hebrew University of Jerusalem, Israel***

Dr KANDEL presented an update on the Worldwide EMF Standards database, currently available on the WHO EMF project web site. She described how a small working group, starting at a meeting hosted by AFSSET in Paris in December 2007 had considered a new way of thinking about the database. The database had to be migrated to a new server and cannot be maintained in its present form. A model based on a WHO database used to display body-mass-index (BMI) was considered. Dr Kandel described how a multi-layer approach which the ability to obtain an output in the form of maps or tables could be used. This could show countries having EMF standards with various different parameters, including whether or not they based their standards on ICNIRP, whether they were stricter or less strict than ICNIRP, which parts of the frequency spectrum were covered, whether limits applied to the public or occupational or both, whether the standards were mandatory or voluntary, etc. A detailed PDF document for each country would include a narrative on the history of standards in that country, details of NIR protection, which government agencies were involved, major technological developments and main public concerns. Dr Kandel pointed out that the information would be provided by the people present and would be a valuable source of information for different stakeholders. The next steps included finalization of the design and the filling in of data for each country by representatives. The table design and models of the database would be circulated for comment.

Points were made in discussion regarding the risk of the ease of comparisons between countries prompting a "beauty contest" and whether this might happen or may not, that perhaps ICNIRP standards and precaution could co-exist, and whether precaution could be used in a way that doesn't belittle scientific knowledge. It was pointed out that as presented the database was much centred on ICNIRP and it should be more neutral in comparing different standards. It was noted that one could compare countries without having one specific standard as a benchmark. It was also

commented that with such a wide range of parameters governing standards it may be difficult to know what to enter at a high level of the table until further detail was available. This discussion finished with a request to please send the data [when required].

## **Friday 12 June**

### **Session 6: Update on WHO research activities**

#### **WHO new guidelines requirements, *Dr Laragh GOLLOGLY, WHO***

Laragh GOLLOGLY opened the session with an introduction to the work of WHO's guideline review committee, and the new processes in place for developing WHO Guidelines. (In this context, a "Guideline" is any recommendation intended to help stakeholders make informed decisions.) This work arose from a desire to improve the transparency of WHO Guidelines, and ensure that they are evidence-based.

A key part of the process is to define the scope of the Guidelines and the problems they are intended to address. An expert group is appointed (taking care to evaluate possible conflicts of interest) to retrieve, evaluate and synthesize the evidence. The evidence is graded in a systematic way to help prevent errors, and resolve disagreements. Finally, the expert group must make its recommendations, recognizing that these are judgements reflecting the quality of the evidence, the possible trade-offs between benefits and harm, costs, values and circumstances. Recommendations are considered strong if the group is confident that desirable effects in following them outweigh any undesirable consequences. If this is not so clear (for example, if there is no high quality evidence, or uncertainty in how different individuals might value the expected outcomes) the recommendations are categorized as weak.

#### **Development of the Environmental Health Criteria on Radiofrequency fields, *Dr E. VAN DEVENTER, WHO***

An important output from the EMF Project is the publication of critical reviews in the WHO's Environmental Health Criteria (EHC) series, and Dr Emilie VAN DEVENTER discussed planning for the EHC covering RF fields. EHC documents are primarily intended for national and international authorities to help them make risk assessments and risk management decisions, and must necessarily include recommendations. This will be the first EHC produced under the auspices of the EMF Project since implementation of the new WHO Guidelines development process, but Emilie noted that previous publications have nevertheless largely followed the new requirements.

An electronic database using Reference Manager is being developed to assist with the literature review, and the expert group appointed by WHO will also be able to call on recent and forthcoming reviews from national and international expert bodies. This will include the IARC evaluation, but while IARC is restricted to carcinogenic risks, the EHC will provide a comprehensive evaluation of all risks.

## **Update from IARC, *Dr V. COGLIANO***

Vincent COGLIANO provided an update on IARC's evaluation, noting that IARC is waiting on publication of the Interphone results, following which it will convene a working group meeting. IARC is giving the RF evaluation its highest priority.

## **WHO view on health research, *Mr R. TERRY***

In May 2007 the 60th World Health Assembly requested the DG of WHO to submit a "strategy on the management and organization of research activities within WHO" and Rob TERRY of WHO presented an overview of this strategy. WHO recognizes that research is central to making progress in health, and the strategy identifies how WHO can work with partners and member states to produce research evidence which will benefit health. There are three principles underlying the strategy: research must be of high quality, priority should be given to research with the greatest potential to improve health, and WHO should work in partnership with member states and stakeholders, and promote the participation of communities and society.

## **Development of the WHO RF research agenda, *Dr E. VAN DEVENTER***

Coordination of research is another fundamental activity of the EMF Project, and has been achieved through the periodic updating of a Research Agenda. The Research Agenda for RF (last updated in 2006) is currently being reviewed, and a status report has been commissioned. Later in 2009 or in early 2010 an expert group will be convened to develop a new research agenda, which will include the topic of social issues for the first time.

## **Session 7: Research review**

The second session of the morning helped set the scene for the review of the RF research agenda, with much of the discussion focussed on this part of the spectrum.

## **Biological research, *B. VEYRET***

Bernard VEYRET prefaced his overview of biological research by noting that much EMF research was done in the context of forthcoming health risk assessments for RF fields (such as the ICNIRP review about to be published), incomplete coordination of programmes and projects, and diminishing funding. The IF range continues to receive little attention, and work at RF is mostly driven by mobile phone related studies. Of particular interest for RF/cancer research is a large bioassay under way in Chicago, while work on RF interaction mechanisms has found the radical pair mechanism implausible at GHz frequencies, and the "Q" experiment has not shown evidence of non-linear effects (e.g. demodulation) in cell cultures. Overall, Dr Veyret concluded that there were few new results, and too many experimental endpoints and protocols being pursued, but insufficient studies focussing on young animals. The possible contribution of high throughput techniques is still unclear, and the effects of exposures to multiple low level exposures at a wide range of frequencies could be an important issue to investigate in the future.

### **Epidemiological research, *M. RÖÖSLI***

Recent epidemiological research on some of the key issues of interest to the EMF Project was discussed by Martin RÖÖSLI. He concluded that recent studies show a decreased likelihood that RF fields may play any role in the development of EHS or other symptoms, or leukaemia in children. Many of these studies have benefited from improved exposure assessment. Studies on mobile phones and cancer, on the other hand, show no clear pattern, with continuing questions about possible biases arising from the methodology and study populations.

In the ELF range, a recent Swiss study has added to the evidence that exposures are associated with Alzheimer's disease, but not with other neurodegenerative diseases. There is no new evidence affecting the assessment of leukaemia's or brain tumours.

### **Dosimetry research, *J. WIART***

Dosimetry continues to advance and Joe WIART presented some of the important recent research directions and findings. It is now well established that average exposures from UMTS phones are much lower than for GSM. Computations show that the maximum 10 gm SARs in child and adult heads are the same, but children may have a higher SAR in the cortex than adults. A wide range of computational phantoms has now been created around the world, including pregnant female phantoms, highlighting the diversity of exposure conditions to be considered. The GLORE and COST groups are both developing programmes to investigate the uncertainties in exposure simulations.

### **Recent scientific reports, *E. VAN RONGEN***

Finally, Eric VAN RONGEN rounded off the morning with an overview of findings from recent scientific reports put out by bodies such as EMF-NET and the Health Council of the Netherlands.

## **Session 8: Dealing with scientific uncertainty and public concern**

Placement of mobile phone base stations has proved controversial recently in France, and the first two speakers of the afternoon covered different aspects of the debate.

### **Scientific and social controversies: mobile telephony, *Danielle SALOMON*, CSO**

Danielle SALOMON reviewed the interactions between the scientific and social aspects of the debate. Discussion of health and the environment is part of everyday life, and often characterized by uncertainty. There are strong social movements for "lay science", and mobile telephony is considered in many places as a health risk. Scientific expertise is contested, neutralizing messages from experts so lay people go to other sources of information. The activist movements have become very efficient, putting out simple messages ("0.6 V/m exposure limit"), actively circulating information and producing doubt by invoking the precautionary principle. (Institutions, by comparison, follow a very traditional and mostly passive approach, for example just posting material on a web site.) A way forward could be to incorporate new forms of expertise (e.g. social considerations) into what to date has

just been treated as a scientific debate, and the “Public value of science” paper produced by the UK Demos think tank was given as an example.

### **The French experience, *Camille FÉVRIER, Ministry of Health of France***

Camille FÉVRIER gave an example of the practical application of such an approach by the French government in recent months in order to overcome a deadlock in the implementation of mobile technologies. A round table, including government and public agencies, elected representatives, industry, NGOs and trade unions, was established to create a dialogue between the parties (who otherwise would not have talked together) and identify actions (e.g. research, provision of information, monitoring, consultation) which could be taken. The debate was viewed as social, not scientific. The round table’s first report gave an opinion that use of the precautionary principle for mobile phones was justified because of the uncertainties, but that base stations did not pose any risks and no additional exposure limits were needed. However, additional requirements for information on exposures and for consultation would be established.

The work of the round table is continuing, and will be informed by reports due later in the year from AFSSET (French agency for environmental and occupational health and safety) and OPECST (Parliamentary office for the evaluation of scientific and technological choices).

### **The European experience, *E. VAN RONGEN***

Eric VAN RONGEN presented the wider European experience, giving an outline of the recent resolution in the European Parliament (available on the Parliament’s website) urging (amongst other things) a review by SCENIHR of the adequacy of current limits and calling for increased research. SCENIHR’s most recent opinion was published in February 2009 and updated its 2007 report. They found no new evidence giving cause for concern, but noted areas where further research was needed.

Emilie van Deventer finished the session with a reminder of the WHO’s role in dealing with controversies, and commented that the EMF Project has produced a high proportion of the WHO Fact Sheets available. The style of these is changing, and in the future they will be briefer, descriptive, and factual but not include recommendations unless they have been developed according to the new WHO guidelines. The Fact Sheets on mobile phones and base stations will be reviewed this year. An advanced draft of the Guide for local authorities on managing health and safety issues related to wireless technologies was circulated for review.

### **Session 9: Administrative business**

Staffing for the project is at an all time low as a post advertised last year (for which external funding was available) was not filled because of a WHO wish to restrict staff numbers. The Project’s administrative assistant is due to leave shortly to take up another position at WHO, leaving Emilie van Deventer as the only staff member. While funding has been sufficient to cover Project expenses, the need for increased funding over the next few years to cover anticipated activities was highlighted.