INTERNATIONAL EMF PROJECT
21st International Advisory Committee

Royal Flemish Academy of Belgium for Science & the Arts
Troonzaal, Hertogsstraat 1, 1000 Brussels, Belgium
Thursday 2 – Friday 3 June 2016

Rapporteur – Martin Gledhill, representative of the Ministry of Health of New Zealand

Thursday 2 June

Opening of the session common to UV and EMF topics
Christian Decoster, President (ad interim) of the Steering Committee of the Belgian Federal Public Service for Public Health, Food Chain Safety and Environment and Roland Moreau, Director-General for DG Environment, welcomed the participants and expressed their pleasure at hosting the meeting. They highlighted the interest in both UV and EMFs in the Belgian context, and the need for constant re-evaluation of policies in the light of new evidence.

On behalf of the WHO, Dr Maria Neira, Director of the Department of Public Health, Environmental and Social Determinants of Health, thanked the hosts for organising the meeting, and also thanked Emilie van Deventer for all her work. She noted that the environment was very important for health, and that 12.6 million deaths per year could be attributed to avoidable environmental risk factors, such as UV. The 20th anniversary of the EMF Project showed that it is still needed and appreciated.

Participants introduced themselves.

International Standards for NIR
Setting the scene (*Mirjana Moser*)
Mirjana Moser spoke to her presentation and outlined the perceived need for a common system of protection for all NIR. It was considered that this would reduce the burden on states, provide a consistent approach and reduce trade barriers.

Draft "Fundamental Safety Principles for Protection against NIR" (*E. Karabetsos*)
E. Karabetsos provided an overview of the draft Fundamental Safety Principles for Protection against NIR document. As a starting point, the similar document developed for ionizing radiation (IR) was used. It was considered that many of the existing IR principles could be applied (after modifications), to NIR too. The document was targeted at regulators who in a number of countries are also handling ionizing radiation, and therefore would already be familiar with the IR safety principles and requirements.

Discussion covered several aspects of the proposal:

- Is it realistic to try and harmonise standards (for example for UV protection) around the world? Should local characteristics merit different limits? (The ICNIRP representative noted that ICNIRP Guidelines are intended to protect all people, whatever the local conditions or characteristics).

- In Israel there has been success in applying the same principles to NIR as to IR.
- The range of NIR phenomena and the way they interact with the body make it difficult to envisage common protection principles which would not be so general that they could apply to any other agent. The IR BSS exist because IR has the potential to create cross-border hazards which therefore merit some international consistency in the approach to regulation: the same does not apply to NIR.
- It is not clear how to apply the draft NIR fundamentals to natural sources. Effort should be put into skin cancer prevention.
- It is not obvious how to apply the NIR fundamentals in real life. It would be good to have some examples.
- Colleagues are concerned that this will create a layer of bureaucracy which will take some time to develop and for which no sound case has been made.
- ICNIRP has published a rationale for NIR protection, and we have the WHO Model Legislation – were these considered or incorporated into the draft Fundamentals document? Answer: The draft was based on the IR – these suggestions are useful but are not in the scope of the fundamentals.
- There are several ongoing activities of the EMF Project, such as the RF EHC, the updated database of EMF Standards and the handbook for local authorities. The limited EMF Project resources should be dedicated to these before embarking on new work.

Opening of the EMF meeting

Peter Gajšek and Simon Mann were elected Chair and Co-Chair respectively. Peter reminisced about the first meeting of the IAC 20 years previously, and the good work which had been achieved since then.

Representatives who could not attend joined the meeting via video conferencing WebEx.

The proposed agenda was adopted. Emile van Deventer requested any comments and corrections on the draft Minutes for the previous meeting, which would be posted as final on the Project website the following week.

The EMF Project

Committed to protecting health -20 years EMF project and more to come (*Rüdiger Matthes*)
Rüdiger Matthes spoke of the background to the EMF Project, the pillars of the programme (scientific reviews, environmental impact assessments, risk perception and communication, Standards, information and training) and the achievements (publications, workshops, science reviews, research agendas, meetings, and training). Through his long involvement he had always found the programme supported governments, and provided a good forum for communications with others. The ability to reference WHO was always a strength.

For the future he considered that the Project should be reformed into a regular WHO programme, but that its extra-budgetary funding was also no long term option. He felt that there should be harmonisation with IR, and new topics such as medical devices should be included as future activities. The real challenge, in view of changes in how WHO develops recommendations, is the pathway for guideline development, which provides a rigorous and

transparent process but is financially very costly.

Finally he paid tribute to the work done by Emilie van Deventer, and called for more support for her as the only person involved in the Project at WHO.

Update on the EMF Project activities (*Emilie van Deventer*)
Emilie van Deventer provided an overview of the EMF Project, and how it works with other international agencies and NGOs, and collaborating centres. There are now has more than 60 national authorities involved. Recent contacts with new countries include the eastern Caribbean, Burkina Faso, Ghana, Madagascar, Sudan and Zimbabwe. The EMF Project secretariat facilitates the programme and ensures compliance with WHO policies, but all activities require extra-budgetary funding and the only acceptable funding comes from Member States. In the past year there were financial contributions from only four countries, with in-kind contributions from others.

The EHC publication on RF is still in progress. Following consultation on the first draft in late 2014, a second draft is being developed. The chapter on protective measures is now under discussion, and potential members of the Task Group which will agree the final text are under review.

Some countries have expressed interest in updating the static and ELF field research agendas.

A draft Fundamental Principles document on BSS-NIR has been prepared and was discussed earlier in the meeting. The Handbook for local authorities has been further reviewed, and the latest version distributed. The intention is to pilot it in Africa, South America, Asia and Europe. The updated EMF Standards database is coming along. The pages showing the existence of limits are now online.

WHO has developed a new corporate design for the website, and this should be implemented over the next months. Three Fact Sheets have been distributed for comment. Some have been translated: translations into other languages than the 6 UN languages (English, French, Spanish, Arabic, Chinese, and Russian) are possible but must be approved by WHO.

Several country reports for 2015-16 have been received and have been posted on the Project website, and the EMF list server is operating.

Reports on EMF activities from international organizations, NGOs and collaborating centres

Reports from international organisations

International Labour Organization (ILO) (*Shengli Niu)*
ILO has no current plans to update its own publications but looks to WHO for guidance on NIR issues. ILO is keen to be part of the process for developing guidance as it can use its own networks to assist with this.

International Telecommunications Union (ITU) (*Istvan Bozsoki)*
The ITU has several projects involving EMF safety and assessment and has recently published an EMF Guide for the public. Recent cooperation with WHO includes comments provided on

the draft NIR Fundamentals document.

International Commission on Occupational Health (ICOH) (*Fabriziomaria Gobba)*
ICOH is an NGO in official relations with WHO. The ICOH 2015 International Congress included several sessions on EMF. Topics covered included problems with implanted medical devices and health and safety of MRI operators. Some future activities related to the EU EMF Directive have been proposed, such as development of an evidence-based definition of activities involving particular susceptibility to EMF, criteria for health surveillance of EMF workers and management of overexposure.

International Commission on Non-Ionizing Radiation Protection (ICNIRP) (*Eric van Rongen)*
ICNIRP's annual report is available on the ICNIRP website. ICNIRP convened its 8th International NIR Workshop in Cape Town, South Africa from 9 to 11 May 2016. This NIR workshop, attended by 60 participants, was held in conjunction with the IRPA14 Congress on the occasion of IRPA's 50th anniversary.

The main projects at the moment are an update of the NIR Protection Principles, and the revised RF exposure Guidelines. A consultation draft has been prepared. Several project groups have been set up on ultrasound, diagnostic devices, cosmetic and other non-medical applications of NIR.

IEEE/ICES (*Jafar Keshvari)*
IEEE/ICES has established a new subcommittee SC6 on dosimetry modelling. There was a workshop in June 2015 and some of the papers from the workshop are available for free on the Physics in Medicine and Biology Workshop. A low frequency research agenda is also available.

The C95.3 measurement Standard and C95.1 RF exposure Standard are under review: the latter will be extended to include the low frequencies as well. Several other Standards are being developed in cooperation with the IEC.

International Electrotechnical Commission (IEC) (*Jafar Keshvari)*
Several key EMF assessment Standards (eg IEC 62209-1 and -2, IEC 62232) are in maintenance phases. A Guide for developing EMF compliance assessment Standards is being prepared.

Two new Working Groups have been established: one to cover the assessment of Wireless Power Transfer devices, and another on the assessment of contact currents.

European Commission DG Sante (*Donata Meroni)*
The EC Scientific Committees which carry out systematic health risk assessments have been reorganised and renamed. An assessment of EMFs was published in 2015, and will be reviewed in 5 years. In the light of the 2015 review conclusions, no major changes to the EU's 1999 recommendations on EMF exposure limits are needed.

European Commission DG Employment (*Zinta Podniece)*
The EMF Directive is due to be transposed into national legislation by 1 July 2016. The non-binding guide to facilitate its implementation has been published in three volumes.

There was a question asking for confirmation that the EU 1999 EMF recommendations for the

public were still applicable, and the confirmation was given. There was a request for further clarification because the 1999 recommendation did not cover implants, and since then ICNIRP has covered them and more people have them. It was felt that the recommendation should be updated in the light of these developments. In addition, ICNIRP's guidance at low frequencies has been revised. The response was that implants should be considered separately, and that changing the low frequency recommendations is not a priority.

European Commission DG Research (*Tuomo Karjalainen)*
The EU is currently spending about **€**33M on EMF/health research projects. Current projects include the Mobi-kids study, and GERoNiMO. Results from completed projects (such as ARIMMORA, EMF-WELD and EMsafety) are available at cordis.europa.eu/home_en.html.

International Union of Radio Science (URSI) (*Joe Wiart)*
URSI Commission K covers electromagnetics in Biology and Medicine, and promotes research and development in these areas.

Reports from collaborating centres

ARPANSA (*Rick Tinker)*
The ARPANSA ELF Standard/Guideline project has been dropped due to the amount of additional work needed, and the ready availability of alternative guidance from ICNIRP and the electricity industry.

A project to measure WiFi exposures in 12 schools is under way.

The "Talk to a scientist" programme for dealing with public queries has been well received, and the EME Reference Group continues to meet. There is now greater public awareness of national and international developments through social amplification of online views.

The ARPANSA RPS3 RF Standard will be reviewed following publication of the RF EHC and ICNIRP's revised Guidelines.

German Federal Office of Radiation Protection (BfS) (*Gunde Ziegelberger)*
Public concern over power lines continues in Germany due to the current line building activities. There has been an analysis of the public discourse on the health effects of the lines, increased communication efforts in areas where new lines are planned, and new information material prepared. There will also be further research on ELF fields and health.

Following introduction of a new Ordinance on ELF fields in 2013, there is now a requirement for precautionary measures to be investigated to minimise exposures from new lines. A catalogue of measures which should be considered has been identified.

There has been research into the effects of RF fields on cognition in the elderly, and the possibility of RF fields acting as a tumour promoter will be further investigated.

BfS commissioned a comparison of EMF regulations around the world, and obtained responses from 55 countries. There were problems with different understandings of the terms "law", "regulation" and "ordinance". The findings could supplement WHO's EMF legislation database.

UK Public Health England (PHE) (*Simon Mann)*
PHE has been redesignated as a collaborating centre and is contributing to several projects, including the RF EHC.

A project to measure RF exposures from Smart meters has started. This will involve laboratory measurements similar to those for the PHE WiFi project, and then measurements in homes.

PHE has been involved in exposure assessments for Mobi-kids and the Geronimo project, and is also working on the dielectric properties of tissues and in the SCAMP project.

Friday 3 June

Review of recent research activities

Laboratory studies **(***Eric van Rongen, Health Council of the Netherlands)*
The review was a personal view and did not necessarily represent the views of any organisation with which Eric is associated. It was based on the recent SSM yearly report, and concluded that because of the large variety of cell types studied and animal studies undertaken, with a large variety of end points, it was difficult to draw any conclusions. Many of the studies are of poor quality. There is still little coordinated research effort, despite the WHO research agenda.

There was discussion of the preliminary release of some of the NTP data. It was felt that little could be concluded until all the study data was published, and the data released so far did not justify any changes in policy.

Epidemiology studies **(***Joachim Schüz)*
Recent studies on ELF fields and childhood leukemia do not change current conclusions about a possible weak association. There is little evidence for an association with adult cancers.

Recent studies on ELF fields and neurodegenerative diseases provide mostly inconsistent data.

The COSMOS prospective study of cellphone users now has 290,000 participants, and should enable the study of brain tumours and other outcomes such as well-being and symptoms.

Recent registry studies do not show any increase in brain tumour incidence consistent with the uptake of cellphones. Because of their ecological nature such studies cannot be used to show that there is no risk, but they do show that some of the higher relative risks which have been reported are incompatible with real data.

Update on research in different countries of the world

Research projects on EMF and Health in Europe **(***Paolo Ravazzani)*
Paolo Ravazzani provided an overview of the many research projects recently completed or still in progress in Europe, including those funded by the EU and also projects funded by individual countries. While EU funding has decreased over the years, there are still many opportunities for funding at the national level.

Innovative uses of EMFs in biomedical applications **(***Antonio Šarolić)*
Antonio Šarolić described the COST Action BM1394 on innovative uses of EMFs in biomedical applications. While much previous EMF research has looked for harmful effects, this work is concerned with potential beneficial effects of EMFs. Examples include hyperthermia to improve the effectiveness of conventional cancer therapies, electroporation, nerve stimulation and the use of amplitude modulated RF fields at very specific frequencies as a cancer treatment. While some of these are well understood, others require basic research to understand the mechanism and overcome some of the challenges they present. It is necessary to improve regulations on EMF-based medical devices and implement Health Technology Assessment.

Review of national EMF Occupational management

Roundtable on the EC Directive 2013/35/UE into national law
Five speakers talked about the transposition of the EU 2013 EMF Directive into national legislation, Simon Mann talked about the non-binding implementation guide, and ILO and ICOH gave their perspectives on the EMF Directive.

Points arising from the national experiences with transposition included:

- The legislation was quite complex because of the possibility of exceeding the sensory ELVs, and permitting derogations;
- There was extensive consultation with industry and other agencies;
- Informing affected parties was a challenge;
- It was important to make full use of existing information (eg on exposures, or manufacturers' information).

The aim of the non-binding guide was to simplify implementation by building on existing knowledge. It considers common situations, especially where there is certainty of compliance, and uses case studies to bring in different aspects of the requirements. There is an online risk assessment platform at www.Oiraproject.eu.

ICOH commented that health surveillance is required under some circumstances, but there is no real definition of what is needed, and the workers considered to be at particular risk are not well defined either (apart from those with implanted devices). These items have been added to the ICOH work programme for 2017.

ILO consider the Directive to be important, and noted that while there have been no strong requests for ILO to do work on EMFs, there has also been strong resistance from employers to introduce material on EMF risks. Many of the relevant ILO documents are old and ILO will try and update them in collaboration with others (eg with WHO through the RF EHC).

Review of WHO EMF risk management activities

Update on the EMF Standards database **(***Shaiela Kandel)*
Information for the database was gathered in a 2013 questionnaire, and information on the existence of Standards are on the website of the WHO Global Health Observatory

(www.who.int/gho/phe), and public limits for ELF and RF fields should be on the GHO by the end of the month. Information (up to 1,000 characters) on legislation about specific devices, or sub-national legislation, can be incorporated into comments, rather than specific data tables. Because of the upcoming transposition of the EC Directive for workers in July 2016, information on occupational limits will be gathered later this year.

There has been some discussion about creating country page profiles for EMF similar to those for other health topics but at present it is considered that it would be better to concentrate on completing the entry of legislation data into the GHO. Country data is available through the EMF Project web pages, which provides links to national contacts, national information sources and annual reports of activities.

Emilie van Deventer stressed the importance of ensuring that the information on the database is accurate and up to date, and noted the amount of work needed to assemble the data.

Review of national EMF risk management activities

Upcoming French reports on EMC and medical devices, RF and children's' health, and EHS (*Olivier Merckel)*
ANSES have provided updated recommendations on the potential risks of interference to medical equipment from RF sources. They concluded that it is not possible to provide a unique separation distance to avoid interference, and it is better to provide recommendations based on the environment. For mobile phones, they propose defining three areas: those where public use is not permitted, those where use is restricted and areas where it is authorized. There should be a minimum 15 cm distance between mobile phones and implanted devices.

A draft report on RF and children's' health was circulated for consultation in 2015. 100 comments were received, and resulted in some changes to the report (such as improved descriptions, and additional material on some topics), and some additional references. While the consultation required considerable effort, it was felt to have been a worthwhile exercise. The report will be finalised later in 2016.

EHS (IEI-EMF) was excluded from an ANSES report on RF fields and health in 2013 due to the breadth of the topic, which it was felt, would not fit into a classic risk assessment. A specific report on EHS will cover several areas, including the definition of EHS, the search for a mechanism to explain it, limitations of provocation studies and medical care for sufferers. A draft should be released for consultation later in 2016.

Deployment of smart meters in France has been controversial, with concerns expressed about health and data privacy. 150 cities have refused to have them (some cities own the meters and wish to avoid the possibility of harming people). ANSES will soon be distributing an international survey to ask about the deployment of smart meters around the world.

Siting wireless base stations (*Theodoros Samaras)*
Theodoros Samaras outlined some of the challenges faced in siting base stations, and provided examples of successful approaches to solving the problem by local and national authorities. The WHO booklet on *Establishing a dialogue on risks from electromagnetic fields* provides good background information and advice on what arouses concerns, and how these might be

addressed.

Examples of successful approaches came from Cape Town, where the city had established clear objectives and policies for the establishment of telecommunication masts, and the UK, where the Mobile Operators Association had published a Code of Best Practice. Overall, it was found that clearer guidelines on the establishment of infrastructure led to faster deployment.

Restrictive exposure limits and exclusion zones, on the other hand, delay the introduction of new technologies.

The conclusions were to stick to science-based limits for health protection, engage in a dialogue with the community, educate people (promote technology awareness) and minimise environmental (and visual) impact.

One meeting participant commented that people in countries with arbitrary limits tend to have higher anxiety.

Malaysian approach to RF-EMF management and regulation (*Norzailah Mohd Yusoff)*
There has been an enthusiastic uptake of mobile technologies in Malaysia, but infrastructure deployment creates some confusion. Gaps in knowledge and uncertainty are major issues in some areas, and some people claim adverse effects from a base station even before it is turned on.

The MCMT follows the WHO risk assessment/risk perception/risk management triangle. A mandatory exposure Standard based on ICNIRP applies to operators. An exposure assessment must be submitted before commissioning a site, and there is a random measurement audit of operating sites. Exposures are always very low.

The MCMF has prepared information material for the public, and is involved in research collaborations.

Why Wi-Fi in Haifa **(***Stelian Ghelberg)*
The mayor of Haifa recently decided to ban WiFi in all schools. The national policy in Israel is that preference should be given to installing a wired network that will not create safety concerns resulting from its installation and use. However wireless is acceptable subject to some limitations. The ban in Haifa arose through a number of circumstances, including research suggesting that there were particular problems with children's health, and WiFi was suggested as one possible reason for this. In practice few schools had WiFi, and measured exposure levels were very low. However, alternatives were available so WiFi could not be justified anyway.

The way forward

Teaching NIR in universities and high school (*Guglielmo D'Inzeo)*
There is a proposal to prepare a document to send to Ministries of Health and Education to ask about the development of a syllabus for teaching NIR in University. Guglielmo would like to convene a small group to collect ideas and create a draft document to present to the next IAC.

The ITU representative mentioned that ITU is developing training on spectrum management, and could add an EMF module.

GLORE (*Chiyoji Ohkubo)*
The 2016 GLORE meeting will be held in Yokohama. GLORE has expanded from a Japanese/Korean collaboration to embrace all countries. It is organised by government agencies, with the first day open to everyone and the second day a closed session to discuss political and critical issues.

Wrap up (*Emilie van Deventer)*
Emilie van Deventer found the discussion on the BSS-NIR interesting thanks to the spread of opinions, and was very open to comments and feedback. It is important to get input as there could be a considerable amount of work involved, which is not worth doing if it is not useful. The idea of BSS-NIR is going outside the usual comfort zone, and there could be resistance to something new. These activities complement the work undertaken by ICNIRP, and WHO will work closely with them.

Feedback on all aspects of the EMF Project was welcomed, especially to develop agenda items for future meetings.

The chair also noted the evolution of the EMF Project and the achievements over the past 20 years. The WHO secretariat thanked all participants for attending and in particular Marina Lukovnikova, Senior attaché and Expert Noise and Non-ionizing radiation in DG Environment of the Belgian Federal Public Service for Health, Food Chain Safety and Environment, who organized a flawless event in a particularly stately venue for the 20th anniversary of the International EMF Project.