INTERNATIONAL EMF PROJECT
19th International Advisory Committee

World Health Organization
Avenue Appia, Geneva, Switzerland
Wednesday 4 – Thursday 5 June 2014

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

Wednesday 4 June

Opening of the meeting

Dr Emilie van Deventer welcomed the participants and opened the meeting in the Executive Board Room of the World Health Organization's headquarters.

Dr Chris Dye, Director of Strategy in the Office of the WHO Director-General, spoke about the role of WHO as honest brokers in presenting the best evidence on health. He noted that there is never perfect evidence on which to base policy, and WHO has to give the best possible answer based on current evidence, but always be prepared to change its view in the light of new evidence. Most people do not wish to hear about uncertainties and probabilities in the assessment of health data, but it is important to communicate complex statistics and assessments of risk in a way which people will understand.

Election of Chair and Vice-Chair

Dr Mirjana Moser (Federal Office of Public Health - Switzerland) and Professor Victor Cruz (National University of San Marcos - Peru) were elected Chair and Vice chair respectively. Mirjana Moser took the Chair and delegates introduced themselves. For the first time, representatives who could not attend were invited to join the meeting via video conferencing WebEx. Leon du Toit (South Africa) and Oscar Leon (Columbia) were able to follow proceedings through an internet link.

The proposed agenda was adopted. The draft minutes of the 2013 IAC meeting were adopted with two corrections:

- Under "Election of chair and vice-chair", the correction about Tunisia should have read: "Tunisia had received 200 claims of EMF health effects, not 2000".
- The International Committee on Electromagnetic Safety report was presented by R Bodemann, not J Keshvari.

Update on the International EMF Project

Emilie van Deventer provided an overview of WHO's roles and functions, and noted the change in structure of the department housing the International EMF Project. The Department of Public Health, Environmental and Social Determinants of Health has been moved to the Cluster of Family, Women and Children (FWC) and, as such, WHO's work to improve health where it is affected by environmental factors relates to "Promoting health through the life course". The function of the IAC is to provide a forum for a coordinated response on issues affecting the

Project, to review Project outputs and provide feedback on its direction. Over 60 countries are now involved in the EMF Project, and three further South American countries have been invited to participate. In addition the Project works with several UN agencies and relevant NGOs.

The Swiss Federal Office of Public Health became a Collaborating Centre in March 2014, joining ARPANSA and BfS. Designations of the radiation protection division of the United Kingdom Public Health England (PHE), and the French Agency for Food, Environmental and Occupational Health & Safety (ANSES), are in progress.

The Project is entirely funded by voluntary contributions from Member States. Seven countries have made financial contributions in the past year, and several national institutions have provided in-kind contributions. Additional funding and in-kind contributions are needed to continue the Project. IAC members are encouraged to provide financial or in-kind contributions to the EMF Project as these would help speed up the finalization of ongoing activities, by for example allowing the engagement of a professional editor.

The development of a first draft of the monograph on radiofrequency fields (RF Health Risk Assessment) is ongoing, and it is planned to convene a Task Group in 2015. Work on the updated Standards database is continuing, with responses from 23 countries. The next step in this work will be to update country profiles. A consultancy meeting on the development of international NIR Standards was held on 2-3 June 2014, and this will be reported on in detail in the course of the IAC meeting. The handbook for Local Authorities has been further revised to simplify the content. Three Fact Sheets are being updated. There is a need for volunteers to help update the website content.

The meeting Chair noted that as next year will be the 20th meeting of the IAC, and the EMF Project had extended well beyond the five year term initially envisaged, an agenda item is included in the 2015 IAC meeting to rename the Project the “EMF Programme”.

Review of recent research on EMF

Epidemiology and IARC update (*J. Schüz, IARC, France*)

While in most areas the balance of evidence shows no risks of cancer arising from exposures to EMF, there are still uncertainties regarding possible associations between increase of childhood leukaemia risk in relation to elevated ELF magnetic fields and increase of brain tumour risk among heavy long-term users of mobile phones.

ELF: Epidemiology studies show an association between long term exposures to ELF fields and an increased risk of leukemia in children, but there is evidence of bias which could account for this, and little support from experimental data. Schüz showed no effects on childhood leukaemia survival, which does not support suggestions that ELF fields promote cancer development. Overall, ELF fields are not recognised as a causal agent in the development of childhood leukaemia, but this should be re-evaluated when more evidence is available. A new mouse model may help improve understanding in this area, with the first data available in 2015. If there is a true cause and effect relationship, ELF fields could be responsible for around 1% of all childhood leukaemia in Europe.

There was a question about the potential risks associated with MRI scans, and whether physicians should be confident that the procedure does not affect childhood leukaemia risk. Dr Schuz responded that it is difficult to extrapolate the ELF data, and that no specific MRI studies have been undertaken.

RF: Increased risks of glioma and acoustic neuroma show up amongst the most intense users of mobile phones in both the Interphone and Hardell series of case-control studies. The Hardell studies also suggest risks for more modest users. While the recent CERENAT case-control study also shows increased risks in intense users, the results substantially differ from Interphone due to use of different cut-point to define intense use (896 vs 1640 hours) and magnitude of risk. Registry studies of brain tumour incidence should be interpreted cautiously as many factors may influence time trends, but they can be used as a consistency check of results from epidemiological studies. The observed rates are in clear contradiction to the Hardell data, but not necessarily with the Interphone results although they do not support it either. Cohort studies do not indicate any risks from mobile phone use. Overall, recent data attenuate the evidence of glioma risks. There is still no information on risks in people who use mobile phones intensively for periods of more than 15 – 20 years. Further information will be added by the cohort study COSMOS now in progress.

In response to a question about a recent commentary on the risk communication aspects of the IARC classification scheme, Dr Schuz said that there are no plans to change the evaluation scheme.

Laboratory studies (*B. Veyret, University of Bordeaux, France*)

Bernard Veyret based his overview of recent work on the review published in 2014 by the Swedish Radiation Safety Authority (SSM).

Static and ELF: There has been little work on static fields, but some studies suggest that long term exposures in the mT range may reduce pain, and give an adaptive response to stress. Animal and cellular studies in the ELF region generally report a large variety of inconsistent results. However, there have been several studies on autophagy which merit further attention, although there are no clear consequences for health. There are also very few studies in the IF frequency range.

RF: In the RF region, there are still large numbers of studies with no clear hypothesis, and poor design. Some studies give weak indications of oxidative stress and effects on brain function. An attempt to replicate positive results found in the REFLEX project on DNA integrity was unsuccessful. There are some interesting results on adaptive response, neurite outgrowth and neuronal networks which need confirmation. There has been one further study into the effects of mobile phone signals on waking EEG and cognitive performance in adolescents, which found no effects.

Overall, there have been no breakthroughs and no obvious health effects demonstrated.

Hot topics

Electromagnetic hypersensitivity (EHS) *(Gunnhild Oftedal, Sør-Trøndelag University College, Norway)*

The numbers of people reported to suffer from EHS varies from country to country, which could be due to the way questions on incidence are framed. The types and seriousness of symptoms, and EMF sources considered to be responsible, also vary. However, sufferers are all convinced that EMF is the root cause.

Studies into effects of ELF fields, mobile phones and base stations overall find no effects, and no ability for sufferers to detect EMFs. No clear physiological or cognitive effects have been reported. A long term study on VDU users found that psycho-social factors were related to EHS, but not EMFs. A one year study on RF fields found no effects.

Other studies indicate that psychological factors play a major role in the development of symptoms (if symptoms are expected, they will be experienced), and media reports can also influence them. Cognitive therapy has been used to try and alleviate symptoms with some success.

WiFi in schools and public places (*Simon Mann, Public Health England, United Kingdom*)

Simon Mann presented a summary of the Wi-Fi project developed by the (then) Health Protection Agency, to address the lack of quantitative information on children's exposures to Wi-Fi, respond to public concern and continue the precautionary approach developed in IEGMP 2000. Overall the project found that exposures from WiFi from both access points and devices were low due to the low power of the sources, the low duty cycles and the increased distance between people and the RF source compared to that with a mobile phone. If a single 100 mW channel is shared between the devices in a room and fully loaded, the total radiated power in the room is similar to that if a mobile phone were used to make a call in the room.

The communications strategy around the project was to emphasise that the work was being undertaken to fill gaps in knowledge, not because it was expected that there may be health risks. Maintaining scientific credibility was very important. In the years since the work was completed, the IARC 2B RF classification lies behind many of the questions raised about WiFi and health, but the data showing such very low exposures still provides all the answers needed. Questions about the effects of modulation have been handled by the MTHR research work undertaken in the UK.

Questions and answers are summarised below:

Question	**Answer**
What about exposures from a laptop or tablet on the lap?	Laptop antennas are generally at or near the top of the screen, keeping it some distance from the body. For a tablet on the lap the low duty cycle still keeps exposures very low.
Are there concerns about base stations at or near schools?	In the UK, people are used to having base stations in their neighborhood, so this does not seem to be a major issue. There is a large database of exposure information, most exposures are well below limits.

In Israel there is action in the Supreme Court to ban WiFi in schools. What is the exposure from wired alternatives?	Wired alternatives are becoming less available. The low exposure data shows that there is no real need for them.
What is the law in France about WiFi in schools?	A Proposal has been passed in one Assembly to favour wired connections, but has not yet been considered by the second Assembly.

Mobile phones and children *(Eric van Rongen, Health Council of the Netherlands)*

Eric van Rongen presented an update of the Health Council of the Netherlands 2011 report into the influence of radiofrequency telecommunication signals on children's brains. Human and animal studies published since then showed no clear effects on brain development and function, behaviour, cognition or any long term effects. On that basis the 2011 conclusion that there are no grounds for concern is still valid. However, effects of long term exposures cannot be excluded, and more research is needed in this area and on younger children.

EMF and health benefits

While the main thrust of the International EMF Project is to investigate the possible health risks from EMF technologies, this session highlighted health benefits from such fields and their use in strengthening health systems.

Innovative uses of EMFs in biomedical applications: EC COST Action BM 1309 *(Mirjana Moser, Federal Office of Public Health, Switzerland)*

The EU COST (Co-operation in science and technology) programme supports scientific co-operation in Europe. BM 1309 (16.4.2014 - 15.4.2018) supports research on beneficial biological effects of EMF, and its use in biomedical applications (www.cost.eu/domains_actions/bmbs/Actions/BM1309).

Following on BM 0704 which was focused on health risks, the objectives of COST BM 1309 include building capacity for research on beneficial uses of EMF, improving understanding of EMF interactions, increasing the numbers of researchers in the area, providing a scientific basis for the use of EMF in medicine, developing computational and measurement tools, promoting new links with industrial partners, and providing inputs for Health Technology Assessment.

The action is chaired by Professor Antonio Sarolic, University of Split, Croatia and is organized into 3 Working Groups:

WG1: EMF-based cancer interactions, treatment and related applications
WG2: EMF-based non-cancer interactions and applications
WG3: EMF dosimetry - *in silico* tools and measurements

Context of use of mobile computing devices in public health *(R Krishnamurthy, WHO)*

In its 2011 report, the UN recommended increasing the use of ICT in national health systems and infrastructure. WHO considers that the use of mobile and wireless technologies to support the achievement of health objectives (mHealth) has the potential to transform the face of health service delivery across the globe…", and many such initiatives are now in place .

Examples range from Distance Learning for health Professionals (eLearning) to chronic disease management services, easy mapping of the distribution of mosquito net use, and emergency response following earthquakes. mHealth facilitates access to antenatal/neonatal care, and provides timely access to data, and increased accuracy of data at lower cost.

Update on WHO activities

WHO health risk assessment of radiofrequency fields *(Eric van Rongen, Health Council of the Netherlands)*

The development of the WHO Environmental Health Criteria monograph on radiofrequency fields was started in 2012 and is making progress. The draft document is being developed by a Core Group of experts with the assistance of additional contributors. They have limited time to spend on this work, hence the protracted schedule. There are monthly phone conferences, and annual face-to-face meetings.

The approach being taken in preparing the draft HRA includes:

- Perform a systematic search of papers since 1992 using predefined search criteria – first selection of papers based on title, second selection based on review of the abstract or full paper.
- Apply inclusion/exclusion criteria previously developed.
- Extract information, and a draft description. Apply quality criteria to determine whether paper considered in full, or assigned to "grey zone" (eg if insufficient data on exposure levels).
- Draft text and tables, review by core group, prepare second draft for external review.

Currently the table of contents includes 14 chapters, with sections in various stages of preparation. The first draft is slated to be made available for comment on 15 September. The core group will review the feedback received and review/revise the draft and have a final draft available in January 2015 for the Task Group, who will meet in May or June 2015. Publication is expected in 2016.

There was a question about the need to include research recommendations in a publication of this nature, as they may date rapidly. Eric noted that all EHC include conclusions and research recommendations in Chapter 1. A Research Agenda will also be published separately.

EMF Policy database *(Shaiela Kandel, Israel)*

A working group has been working on developing the EMF policy database, which will be incorporated into the WHO Global Health Observatory. Data on occupational and public limits at static, ELF and RF frequencies, and their legal status, has been received from 28 countries so far. Additional comments can be inserted within the appropriate cell as needed.

There are a few issues with some of the data, including blanks, some confusion over units, and the status of standards. This has been entered into a draft form of the GHO which was shared with IAC members for their review and comments. Once the final data are cleared by Member States, the GHO pages will go live, hopefully by the end of 2014.

The next step will be to develop country profiles which would provide additional information at national level. Volunteers are requested to assist with this.

Local authority handbook *(Martin Gledhill, New Zealand)*

Forty pages of comments were received on the draft circulated at the last IAC. The main text has been revised accordingly, and passed onto a risk communication expert (thanks to the contribution of ARPANSA as a WHO Collaborating Centre). The main text is now simpler and has been reorganised to put health information closer to the front, highlight key points in text boxes, add diagrams and put local authority staff at the focus. More detailed appendices will now be an online supplement.

Update on fact sheets *(Emilie van Deventer)*

New WHO rules on Fact Sheets mean that the number of EMF Fact Sheets will be reduced, and that they will be restricted to facts, with no recommendations. Three Fact Sheets (on EHS, Base Stations and ELF fields) are being revised and will be circulated to the IAC when the review is complete. The Mobile Phone Fact Sheet is still current.

List Server *(Emilie van Deventer)*

Emilie outlined the functions of a List Server in facilitating communication and the dissemination of information to a group, and proposed that one be set up for the IAC. (There are currently List Sever groups for UV and radon.) There was general support for the proposal.

Expert group *(Emilie van Deventer)*

Emilie would like to assemble a list of subject matter experts who could be called upon as needed to provide assistance (for example, commenting on a new publication). A list of national experts is also needed to review the RF EHC draft to be uploaded in September this year. IAC members were requested to forward names of experts to Emilie.

Website updates *(Emilie van Deventer)*

The content of the EMF Project website needs to be updated – much of the material has not been changed for a long time and should either be updated or deleted. Volunteers to assist with this task are wanted and can contact the WHO Secretariat.

Review of national and regional EMF landscape

Mobile app for monitoring EMF in the environment (*Peter Gajšek)*

A mobile app (and web-based equivalent) has been developed in Slovenia to provide information on EMF in the environment. It is based on a database of the locations and technical parameters of RF sources, and calculations of EMF levels on a 10 m grid from a ray tracing model. Users can also monitor their mobile phone use. Mobile network operators can obtain feedback on network performance. The exposure calculations have been validated by measurements. The app has been well received since its introduction, with around 10,000

downloads so far.

General discussion
A number of areas were covered in the general discussion:

WiFi in schools
Several countries have addressed concerns about the use of WiFi in schools by making measurements to confirm that exposure levels are very low in comparison to recommended limits. It was recognised that scientists are not always the best people to communicate this type of information to the public as they may over-emphasise uncertainties, and the value of people with a background in journalism, or Science Media Centres was noted. The public's trust in safety messages from Ministers varied between countries.

General education on EMF
The value of general education on EMFs was suggested as a means to alleviate concerns through better understanding of the concepts. Some countries, such as Japan, have already prepared material for teachers and high school students. Other comments related to the benefits of such education included:

- General education on how science progresses, and assesses evidence to reconcile apparently contradictory evidence.
- The need to have educational material on the safe use of wireless devices (e.g. when driving, and social implications).
- Ensuring that medical practitioners were fully informed of the issues.
- The need to provide information allowing people to form their own judgements.
- Possible adaptation of some US resources on Ionising Radiation to NIR.

Introduction of exposure standards
In Brazil, having exposure limits based on WHO recommendations means that they are well accepted. Uruguay has recently adopted ICNIRP exposure standards, which means that the whole of South America is now covered.

Effects of EMF on animals
In Tunisia there are concerns about possible effects of EMF on animals, especially in rural areas. ICNIRP commented that when they had last looked at this question, they had concluded that if humans were protected, animals would be too. SSM is considering a review of EMF effects on animals, which could be ready in 2015. It was recommended that WHO liaise with consider inviting a representative from the International Agency for Animal Health to attend the IAC in 2015.

Cosmetic applications of EMF

- A risk assessment on this question has been started in France, and should be published in 2015.
- In Germany, there have been some forthright discussions with the cosmetic medicine industry about the use of ultrasound.
- Norway deals with cosmetic applications of RF fields by insisting that applications in which exposures exceed the ICNIRP limits obtain prior approval.

Miscellaneous actions in different countries

- The Nigerian Communications Commission has a publication based on the WHO Fact Sheet 304 which is distributed where there are concerns about exposures.
- A French Dialogue Committee, convened by ANSES, which allows an exchange of views between stakeholders, is in abeyance while looking for a new chair for the group.
- Norway is focussing on occupational exposures (such as people working on masts or rooftops housing antennas.
- In the UK, a voluntary register of RF workers now includes 2100 people. This could be a valuable source of information for health studies.

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INTERSUN PROGRAMME
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Reports from WHO collaborating centres

Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), Australia (*R Tinker)*

An ARPANSA literature review has concluded that the limits in RPS3 continue to provide good protection, but that the safety margins may be lower than thought initially. They will be kept under review. A Whole of Government approach to the use of precautionary approaches in NIR will be developed. Work on the ELF Guidelines is continuing, and they are currently undergoing a further round of consultation.

ARPANSA receives 1,300 queries from the public every year, and key current issues include Smart Meters and WiFi in schools.

Operation of the UV monitoring network is continuing, with live information available from the monitoring sites. The Australia/New Zealand Standard on clothing protection, and the Australian Standard on shade cloth, is being revised. ARPANSA is also involved in research studies on UV exposures at swimming pools and UV exposures of workers.

Federal Office for Radiation Protection (BfS), Germany (*R. Matthes)*

The main issue of public concern in Germany is the expansion of the power grid necessitated by the phasing out of nuclear power. A planned HVDC line is attracting a lot of opposition.

A new ordinance requires minimisation of exposures to EMFs from power lines.

Research activities cover several items on the WHO research agendas, including brain function, cognition and neurodegenerative diseases. No effects have been found. The research programme on childhood leukaemia is continuing, with work to try and understand the etiology of the disease, and genome sequencing. Dosimetry research has found that children's exposures to EAS systems operating at <100 kHz may exceed basic restrictions. BfS is unable to take direct action on this, but has brought it to the attention of technical standardisation bodies. Further micro-dosimetry studies are planned.

Federal Office of Public Health (FOPH), Switzerland (*M. Moser)*

The FOPH/WHO collaboration includes research and information on EMFs. Over the past few years, the FOPH has published a wide variety of fact sheets available on its web site, with the most popular covering induction cookers.

A new law on NIR, which will fill a gap in existing legislation that currently only covers specific ELF and RF sources, is under discussion. Once in force, it will take three years to develop regulations. The scope of the new law will also include sound, ultrasound and optical radiation. It will extend product safety standards to cover applications such as laser pointers which are open to misuse, and also include medical devices of NIR (e.g. use of MRI for psychological studies on volunteers, use of fetal ultrasound pictures).

Public Health England (PHE), United Kingdom (*S. Mann*)

Material from the old HPA website is currently being migrated to new homes on other UK government sites. PHE is involved in a number of projects, including:

- The Mobi-Kids study
- IF and RF exposure assessment in the European GERoNiMO project
- Undertaking an assessment of Smart Meters, along similar lines to that done for WiFi in schools
- Preparing the guide to the EU EMF Directive
- Investigating the electrical properties of tissues of young people
- Evaluating various instruments for EPRI.

The AGNIR continues to monitor RF/health research, and has a responsibility to identify RF research priorities. AGNIR is currently working on a review of UV in relation to Vitamin D.

The UK bodies involved in EMF are
- The Department of Health: It has taken up the role of MTHR, and is funding research on cognitive behaviour of children exposed to RF (Prof Paul Elliot),
- Health and Safety Executive:

Three new UV monitoring sites have been installed, and a large cross-calibration exercise undertaken. Useful data has been gathered in Greenland for over 25 years

Reports from international organizations and NGOs

International Commission on Non-Ionizing Radiation Protection (ICNIRP) *(R. Matthes)*

ICNIRP has a new logo, and a new website from July 2014. A short report on the 2012 meeting on NIR protection in Medicine is now available on the ICNIRP website.

The final Guidelines on movement in static fields, which provides basic restrictions and reference levels, have been published. Current priorities include work on concepts of radiation protection, radiation protection in medicine, a health risk assessment for ultrasound and identifying gaps in knowledge. A health risk assessment on optical radiation is given low priority. It is intended that revised RF Guidelines will be available as soon as possible after

publication of the WHO review. A workshop on RF health effects and Standards will be held in Australia in November 2014. ICNIRP will participate in the IRPA International Congress in South Africa in April 2016.

International Electrotechnical Commission (IEC) TC 106 (*J. Keshvari*)

Interference of EMFs with pacemakers is a continuing interest. Of the several sets of internationally recommended public exposure limits available, only compliance with the ICNIRP 1998 general public reference levels guarantees that induced voltages will not exceed the immunity requirements in ISO 14117:2012.

A new project has been established to establish test methods for mobile phone exposures using vector probe systems. There are other projects covering (amongst others) computational methods for SAR from mobile phones, vehicle mounted antennas, and harmonisation of IEC and CENELEC compliance assessment Standards. IEC 62209-1 and -2 (on mobile phone SAR measurement) are to be combined, and IEC 62232 on base station assessment is in its maintenance phase. It is hoped to harmonise this with relevant ITU documents.

A report on implantable medical devices should be ready by next year.

International Committee on Electromagnetic Safety (ICES) (*R. Bodemann*)

A Standard covering military exposures to RF fields has been prepared and accepted in a recent ballot. The Standard includes the concept of a third tier "expert only access" region in which exposures exceed occupational limits, and where additional precautions are required to prevent injury (for example, ensuring a grasp rather than touch contact with metal surfaces). This will be published shortly. ICES has submitted comments to the FCC's review of limit values. Merging the ELF and RF Standards is continuing. A discussion on the need for two tiers of protection is in progress.

International Labour Office (ILO), Switzerland (*S. Niu*)

Shengli Niu described the ILO functions and working methods. Several publications cover protection from EMFs and UV in the workplace. These are all available online, free of charge.

International Telecommunications Union (ITU), Switzerland *(T. Al Amri)*

ITU is a public/private partnership with 193 Member States and over 700 private sector members and associates. The ITU mandate on EMF, particularly with regard to measurement, is covered under various Resolutions, and several related guides have been published.

- ITU-T publications providing information on EMF from smartphones, laptops, tablets etc, and an information guide on human exposure to EMF are under study.
- ITU-D is also considering questions related to regulatory policies on EMF exposure, and methods to raise awareness about effects of EMFs.

There is some overlap in dissemination of EMF information, but this is coordinated with WHO, IEC, ICNIRP and IEEE.

European Union EMF Activities DG SANCO, Luxembourg (*D. Meroni, G. Gallo*)

The EU has various Recommendations and Directives covering EMF, including

- the 1999 Recommendation on limiting public exposures.
- the 2013 Directive on Occupational exposures: A non-binding guide to assist with implementation of the Occupational Directive is being prepared, with main focus on determination of exposure, demonstrating compliance and the conduct of risk assessments, especially using simplified techniques. the R&TTE Directive and the Low Voltage Directive.

Funding for EMF research is tailing off. Three Standing Committees cover consumer safety and health and environmental risks, and one of these (SCENIHR) has recently prepared a preliminary updated opinion on EMF, following Terms of Reference provided in 2011. A SCENIHR memorandum sets out the methodology to be followed in preparing such opinions. Consultation on this draft has now closed, and the SCENIHR Working Group will be reconvened to consider the comments received, and revise the Opinion as appropriate. Once the SCENIHR Opinion is finalised, the 1999 EU Recommendation will be amended if necessary.

SCENIHR only performs Risk Assessment. Risk Management is the responsibility of DG-SANCO. The European Environment Agency (EEA) is not involved in either assessment or management. DG SANCO will host the 2014 GLORE meeting in Brussels in November.

International Standards for NIR

Following a request from a member state that WHO develop basic safety standards for non-ionizing radiation (NIR) exposure, and based on positive feedback from the 18th IAC meeting, WHO held bilateral meetings with relevant UN agencies and organised a consultancy meeting on 2-3 June 2014. Participants included representatives from international organisations, NIR experts and relevant NGOs. The meeting agenda covered issues regarding the need for NIR standards, their content, the roles of various stakeholders and how NIR standards would be developed and supported.

This potential activity is motivated by the interest of Member States for clear guidance based on harmonised standards, and their application within an international protection framework. Currently, a number of non-governmental organizations have developed guidelines or standards for limiting exposure to non-ionizing radiation (NIR), including EMF, optical radiation and ultrasound. Gaps in and lack of consistency amongst guidelines in certain areas have proved to be challenging to regulators, policy-makers and their advisors in their efforts to develop national standards. The development of health-based standards is one of the 6 core functions of WHO.

The Standards would cover the non-ionizing radiation spectrum, including both electromagnetic radiation (from static field to optical radiation), as well as acoustic radiation (ultrasound and infrasound), with the aim of protecting health. Countries would be free to adopt them as they wish. Development could follow the same model used for the Ionizing radiation (IR) Basic Safety Standards (http://www-pub.iaea.org/MTCD/publications/PDF/p1531interim_web.pdf).

A force field analysis was performed, where a list of the top five forces in favour of, and

against, the development of standards emerged through a facilitated workshop session. The workshop also developed a project outline, including ideas on how the standards would be developed, what outcomes were expected, and how the work might be funded. Consideration of whether product safety standards would be included, and whether "Standard" or "Guideline" was the preferred term, was deferred.

The next steps will be to set up a small working group to engage with stakeholders, develop a more detailed proposal and evaluate funding needs. The working group will provide feedback to the Consultancy Group and the IAC. IAC members supported the formation of such a working group.

Subsequent discussion on this proposal, and other matters, included the following points:

- WHO Standards would be helpful
- In the EU there may be difficulties if there are differences between the content of WHO Standards and those used elsewhere. There may also be duplication of effort.
- It may be better to develop Guidelines which are based on health considerations. Eventual Standards developed by other bodies may include compromises between health-based Guidelines and other considerations.
- Development of Standards might be very difficult. Perhaps the WHO should aim to define the objectives of protection in different exposure situations.
- It would be helpful to have people in WHO Regional Offices who could coordinate EMF activities between countries in the region.
- Assistance from WHO on dealing with public concerns would be helpful.
- Challenges for the future include unregulated non-medical applications of NIR, and security/surveillance applications.

Administrative business

The Chair thanked Emilie for all her work and initiatives, and thanked all participants for their contributions.

Emilie thanked the Chair and Vice chair, and commented how pleased she was to see so many people at the meeting, and that some had been able to participate through video conferencing.

Next year's meeting could possibly be combined with a workshop on risk communication. Information will be circulated later.

Rapporteur – Emilie van Deventer, WHO

Thursday 5 June, PM

Mr Craig Sinclair (Cancer Council Victoria, Australia) agreed to chair the meeting.

Update on the INTERSUN programme activities (E. van Deventer)

Emilie van Deventer welcomed the participants to the meeting on ultraviolet radiation. She described the background to the InterSun programme, the partners and stakeholders and the activities to date. Over the past year, WHO participated in a roundtable with MEPs of the European Parliament on the European Skin Cancer Awareness Day (5 November 2013 in Brussels) on UV exposure risks for outdoor workers. WHO was represented by Professor Swen Malte John from the University of Osnabrück, Germany. WHO was invited to participate in the EC Action TD 1206 on Development and Implementation of European Standards on Prevention of Occupational Skin Diseases (StanDerm) and present at the Workshop entitled "Tackling challenges of occupational skin diseases (OSD) in Europe?" on 7-8 April 2014 in Bern (Switzerland).

In terms of communication aspects, the WHO Sunprotection listserv is increasing in membership. There is a need for volunteers to help update the content of the UV website (www.who.int/uv). A list of national contacts has been set up to respond to the survey of sunbed regulations. The fact sheets on sunbeds has been revised but have not yet been approved internally.

Reports on UV activities from WHO collaborating centres

Cancer Council Victoria (CCV), Australia (*C. Sinclair)*

The CCV established an international database of multicomponent community-wide UV programs following a call out through the WHO UV listserv for multicomponent community wide UV programs following a CDC study of the richness of such strategies. Sunbeds will be banned outright in the commercial market in Australia starting in 2015, a major breakthrough following on the IARC classification of sunbeds as carcinogenic in 2009 and Brazil ban that year. A study was performed to measure the impact of mobile digital technology (apps) to deliver timely UV messaging together with the New Zealand Health Sponsorship Council. A study on coverage of skin cancer prevention in the news showed changing themes over2001-2012: while core sun protection issues have remained constant over time, the topic of sunbeds has decreased somewhat while Vitamin D issues are on the rise. The 3rd International UV and Skin Cancer Prevention Conference will be held in Melbourne in December 2015 and promises to

cover a large number of public health topics, ranging from economics of skin cancer prevention, and impact of low dose UV exposure to effects of media on behaviour change and population screening and early detection.

Association Sécurité Solaire, France (*J-F. Doré*)

The Association, established in 1994, is a WHO collaborating centre since 1996. Throughout its 2012-15 designation period, it is tasked to assist WHO with the development and the promotion of primary and secondary teaching resource, disseminate WHO recommendations on occupational protection from UV exposure and support and promote WHO prevention messages regarding artificial tanning sunbeds. It has a multidisciplinary scientific council and is exclusively funded by the public sector. Its activities relate to the dissemination of UV Index, public speaking (media, conferences), publishing (books, game, …), training (educational, occupational environments), lobbying (sunbeds) and performing surveys and assessments.

Its teaching resource "Living with the sun" programme, continues to develop. In May 2013, it had over 36,000 registered professionals. 3700 classes and more than 91,000 students have completed the activities offered by the association. Unfortunately, the decline in public funding has reduced the power and growth prospects of the programme. At the international level, the efforts of the outreach focused on Catalonia (Spain), Brazil and the province of Québec (Canada).

Laboratory for Atmospheric Physics, Bolivia (*F. Zaratti*)

This Collaborative Centre (www.lfabolivia.org) carries out two main activities: an educational campaign at national scale, in coordination with PAHO-WHO and the Ministry of Health, and research work on UV series of data at La Paz, and other locations in Bolivia.

The UV campaign includes a number of activities ranging from, monthly press release on topics of UV and human health, participation in the City Fair with pamphlets and posters, certification of sunglasses with an instrument built in our laboratory, talks and conferences in schools, institutions and other events on photobiology and photomedicine. An achievement has been the change of uniform hats for policemen. Collaboration is ongoing with the Ministry of Health for consolidating the National Register of Cancer established in 2011 through PAHO.

The research work has included climatology of Ozone and UV (dose and UVI) at La Paz, design of a reliable instrument for certifying the quality of sunglasses (UV blocking capability) and studies of the albedo at the "Salar de Uyuni" to relate changes on albedo to climate change in that region.

Reports from international organizations and NGOs

World Meteorological Organization (WMO), Switzerland (*G. Braathen*)
Dr Jalkanen has retired and G. Braathen has taken on the position. The WMO Scientific Advisory Group (SAG) will discuss the risk scale of the UV Index when they next meet.

United Nations Environmental Programme (UNEP), France (*A. Fenner*)
One of the important activities of UNEP regarding UV relates to the Montreal protocol. The

Vienna Convention for the Protection of the Ozone Layer was adopted in 1985 and the Montreal Protocol on substances that deplete the ozone layer entered into force in 1987. A total of 197 governments are now party to this multilateral environmental agreement (Universal Ratification).

The UNEP OzonAction Information Clearinghouse, based in Paris, deals with the effects of ozone changes on UV in close co-operation with two panels: the Scientific Assessment Panel (SAP) and the Environmental Effects Assessment Panel (EEAP). A full assessment report is expected in 2014 that will address negative and positive effects of solar UV radiation on human health and other topics, including terrestrial and aquatic ecosystems and air quality.

Models have estimated that skin cancer incidence world-wide would have been 14% greater (2 million people) by 2030 (van Dijk, Slaper et al. 2013) without implementation of the Montreal Protocol and its amendments.

Joint educational activities with WHO include the distribution of INTERSUN publications (Global solar UV index and three booklets on Sun Protection), and joint projects (OzonAction Education Pack for Primary Schools (2006) and Secondary Schools (2008)). Each year, UNEP holds International Ozone Day (16 September 2014) with health-related messages.

Review of recent national or regional UV activities

Developments in the different regions of the world

Changes have been seen in relations to sunbeds around the world. In Canada, new sunbed legislation at national level regarding labelling has come into effect for the import and sale of tanning devices. At the provincial level, 6 or 7 provinces out of 10 have restricted for under 18 year olds. To date, about 70% countries that have implemented sunbed policies have included under-18 bans, following the IARC publications. A domino effect has been seen: a few weeks ago, when the US state of Maryland introduced under the 18, interestingly the sunbed industry were supportive of this initiative, mirroring the Australian context.

In the US, FDA has just reclassified sunbeds from Class I (low risk) to Class II (moderate risk). FDA can then exert more regulatory control over Class II devices, e.g. sunlamp products will have to undergo a premarket review by FDA. It is also requiring that certain user instructions and promotional materials for sunlamp products and UV lamps intended for use in sunlamp products include the specific warnings and contraindications (including that they should not be used by under-18s).

In the UK, while enabling legislation exists UK-wide, regulations exist in Wales, Scotland, and Northern Ireland but not in England yet. Manufacturers are interested in compliance with the 0.3 W/m^2 for business purposes, but there is no equivalence rating provided by manufacturers on most lamps, even though the standard has been brought in a long time before.

In New Zealand, the sunbed industry is keen to have a better regulated industry. At national level, an under-18 restriction has been delayed, but some local authorities have implemented their own regulations. Some dermatologists have recommended the use of sunbeds for skin problems.

In Switzerland, the FOPH has verified lamps' characteristics. From a product standard perspective, lamps obey the standards, but not from the perspective of information to customers regarding, e.g. age restriction, differences in skin types, duration of use.

In Australia, the remarkable shift in policy relating to ban of sunbeds over the past few years resembles the plain packaging policy for cigarettes.

UV hot topics

Occupational exposures to UV radiation: A European perspective (*S. John, University of Osnabrück; Dr. Marc Wittlich, Institut für Arbeitsschutz der DGUV, Germany)*

There is a growing body of scientific evidence linking sun exposure in outdoor workers to the rapidly increasing incidence of skin cancer. It is expected that in Europe many more than 20 million workers are exposed to UV rays, and are at a 43% higher risk of basal cell carcinoma, and at a 77% higher risk of squamous cell carcinoma. In Germany, approximately 3,000 die annually from skin cancer (1% of all cancer deaths), 80% of whom from malignant melanoma. Meanwhile, non-melanoma skin cancer caused by UV is the most frequent of all cancers in several countries (e.g. US, EU, AUS, and NZ) and increasing, is one of the few almost totally preventable cancers, one of the few cancers that can be healed and one of the neglected occupational hazards.

WHO/IARC has ranked solar UV radiation as a carcinogen (Group 1) and may possibly include an occupational etiology for skin cancer in ICD-11. ILO has included, in its ILO List of Occupational diseases (2010), diseases caused by physical agents ("1.2.5. Diseases caused by optical (ultraviolet, visible light, infrared) radiations including laser") and skin diseases ("2.2.4. Other skin diseases caused by physical, chemical or biological agents at work not included under other items where a direct link is established scientifically, or determined by methods appropriate to national conditions and practice, between the exposure to risk factors arising from work activities and the skin disease(s) contracted by the worker").

The EU Recommendation / Schedule on Occupational Diseases (2003/670/EC) does not include UV radiation (solar, artificial) and the European Directive 2006/25/EC only includes artificial optical radiation. Therefore a "Call to Action to the European Commission on the Protection of Outdoor Workers from Occupational Skin Cancer" was published in April 2014 supported by a number of professional associations. Depsite this situation, occupational skin cancer by solar UV has been recognized by a number of countries (e.g. Austria, Croatia, Denmark, Germany, Portugal, Romania and Switzerland).

Skin cancer occurs most frequently in the most exposed areas of the body and correlates with degree of outdoor exposure. New advances in personal dosimetry monitoring have enabled UV-monitoring at outdoor workplaces. Describing the relationship of exposure (dose) to risk (skin cancer) requires the availability of a biological hazard function or action spectrum for photo carcinogenesis. In the talk, Dr Wittlich proposed the adoption of an action spectrum derived from experimental laboratory data and modified to estimate the non-melanoma tumor response in human skin. He described the *GENESIS-UV* project to develop an Activity-Exposure

Matrix using data collected by a newly designed personal dosimeter worn on the worker‘s arm. Several examples of recent data were shown for different occupations (e.g. roofer, forester, construction worker).

Further steps to strengthen occupational skin cancer (OSC) prevention include scaling-up reporting/surveillance of OSC , promoting prevention programs using multicomponent interdisciplinary approach and regulations at national and international level.

Discussion

While there is no solar UV-specific legislation at the European level, every Member State can take action to ensure that employers consider UV hazards from the sun for their workers. The EC does not encourage new legislation but is cognisant that the List of Occupational Diseases needs to be reviewed. At this point, there is no legislation based on a UVI level to prevent an outdoor worker from working irrespective of their skin type. Problems arise in SMEs mostly. WHO’s initiative on non-ionizing radiation standards and protection culture represents an urgent need.

In the UK, HSE published two free leaflets on protection against the sun, for both workers (“Keep your top on: Health risks from working in the sun”) and employers (“Sun protection: advice for employers of outdoor workers”). A campaign for companies was held for the construction industry a couple of years ago.

ILO has specific instruments for dangerous agents (e.g. lead, ionizing radiation). There is one on agriculture but none on UV, for which there is a need for convincing data for hazard assessment.

ICNIRP and WHO have developed a document on protection from UV for workers in 2007. WHO will discuss this further with colleagues in occupational health within its PHE Department and with ILO.

Global warming and thinning ozone level will increase the risk of UV exposure to future workers.

The UV Index: Proposal for a modification of the UVI risk scale (*F. Zaratti*)

Levels of UV radiation measured in the Altiplano Region as well as in other locations of South America show extreme UV indices (UVI) during most of the year (UVI >10 for over 70% of days). There is a concern among scientists from South America that the UVI public health messages do not represent the variety of geographic and social conditions, and that parts of the world where the (potential) problem is greatest are inadequately represented by “Eurocentric” messages. The educational messages of UV campaigns must be clear, coherent and reasonable for people living in any region. A large part of the population works outdoors.

The proposal does not intend to modify the UVI scale (universally accepted), nor to make a change to Action Spectra (consensus of scientific community), nor a change to the recommended exposure time for burning (science-based). Rather, it proposes to adapt the UVI scale in terms of public health messages to make it more useful and reasonable worldwide, i.e. to maintain the WHO UVI scale with open upper limit, giving freedom to each country to define

local “reference” indices (i.e. for minimum level of protection and “extreme” value for alert policies). The idea is to adapt the educational messages to the specificity of each region, i.e. to discard “reference” levels of UVI, such as UVI=3 for need of protection, because it is not universal, or UVI = 11+ for alert policies (used by the sunscreen industry to promote cream use). Many cities in South America are adopting the so called “solmaforos”, devices that display the risk of UV as traffic lights (“semáforos”, in Spanish) do. With normal levels at these regions these devices will display levels of permanent alert which will give a useless message. Also, it is suggested to extend the colour range that describes the risk in order to better capture the range 11-20.

The myth of adaptive behaviour of native people to high levels of UV was also brought up. Indeed, the incidence of skin cancer is high in the Altiplano region in any ethnic group (including dark skin colours). According to the Cancer Register at La Paz region, skin cancer ranks third for both genders, following only cervical and uterus. While there are not similar statistics for eye diseases, ophthalmologists in the Altiplano region are reporting high and increasing incidence of early cataracts and eyes affections. This may be related to changes in behaviour (e.g. use baseball caps rather than large brimmed straw hats, spending time outside at midday without clothing). Zaratti proposed to host a future meeting on this issue.

Discussion

Victor Cruz (Peru) and Jorge Skvarca (Argentina) concurred with the situation described by Professor Zaratti. Israel has UV >11 in the west and south of the country for several months in the year and welcomes this initiative. It was mentioned that from a workers’ perspective, there is no European standard at present, and one can work at any UVI in Europe.

There is a clear recognition that WHO/WMO/UNEP should be reviewing this issue.

- WHO will discuss with partners including ICNIRP with whom they co-sponsored a workshop in December 2011. When discussing extension descriptors when come to extremes, and colour schemes, it will be important to include risk communication expertise.
- WMO will bring this point up with its Scientific Advisory Group (SAG). It was noted that the UVI breakpoint of 11 is artificial and does not necessarily reflect reality for a large part of the world population.
- UNEP is aware of this situation (e.g. use of solmaforos in Columbia), and has a regional office in Panama which it could contact on this topic.

Final comments

In the frame of prevention programmes, Switzerland conducts campaigns targeting children, parents of newborns, and workers. There are campaigns targeted to men with screening at the work place and at the same time to get information on this topic. WHO could collate the different initiatives around the world on this topic.

Following the last meeting, it was noted that there is a need for risk management on optical radiation (e.g. blue light) and UV radiation (e.g. Vitamin D). A COST action was proposed for artificial sources which is currently under review.

INTERNATIONAL EMF PROJECT **INTERSUN PROGRAMME**

19th International Advisory Committee Meeting 3rd Annual Meeting

AGENDA

WHO Headquarters, Geneva, Switzerland, 4-5 June 2014

Wednesday 4 June **Executive Board Room**

Session on EMF topics

9.00 Opening of the meeting
Welcome *C. Dye*
Election of Chair and Vice-Chair
Introduction of participants
Adoption of the agenda
Approval of the minutes of the 18th IAC meeting

9.20 Update on WHO electromagnetic fields activities
The International EMF Project *E. van Deventer*
IARC Environment and Radiation Section *J. Schüz*

9.50 Review of recent research activities
Research review of epidemiological studies *J. Schüz*
Research review of laboratory studies *B. Veyret*

10.30 Coffee break

11.00 EMF hot issues – What does the science say? How do policy makers respond?
Electromagnetic hypersensitivity (EHS) *G. Oftedal*
Wifi in schools/public places *S. Mann*
Mobile phones and children *E. van Rongen/M. Lukovnikova*

12.30 Lunch

13.30 EMF and health benefits
Innovative uses of EMFs in biomedical applications: EC COST Action (BM 1309) *M. Moser*
The WHO/ITU mHealth initiative *R. Krishnamurthy*

14.10 Update on WHO activities
WHO health risk assessment of radiofrequency fields *E. van Rongen*
EMF Policy database *S. Kandel*
Brochure for local authorities *M. Gledhill*
Update on fact sheets *E. van Deventer*
Listserv, expert groups, WHO website update
Discussion

15.30 Coffee break (Group photo)

16.00 Review of national or regional EMF landscape
Developments in the different regions of the world
Discussion

17.45 Close of day

18.00 Reception (WHO main cafeteria)

Thursday 5 June **Executive Board Room**

Session on EMF and UV topics

9.00 Introduction of new participants

9.10 Report on EMF activities from collaborating centres and international organizations
Reports from collaborating centres (ARPANSA, BfS, FOPH, PHE)
Reports from NGOs and professional bodies (ICNIRP, ICOH, IEC, IEEE/ICES)
Reports from international organizations (ILO, ITU, NATO)
Reports from the European Commission (DG SANCO, DG Employment, DG Research)

10.30 Coffee Break

11:00 International standards for Non-Ionizing Radiation (NIR) Protection
Summary of the Consultancy meeting (2-3 June 20 14) *E. van Deventer*
Discussion

12:00 Way forward
Future WHO EMF work plan
Upcoming meetings

12.30 Lunch

Session on UV topics

13.30 Adoption of the agenda

13.35 Update on the INTERSUN programme activities *E. van Deventer*
Sunbed database
Fact sheets, website

14:00 Report on UV activities from collaborating centres and international organizations
Reports from collaborating centres (Cancer Council Victoria, Association Solaire, Bolivia)
Reports from international organizations (WMO, UNEP)

14.30 Review of recent national or regional UV activities
Developments in the different regions of the world

15.00 Coffee break

15.20 UV hot topics
Occupational exposures to UV radiation: A European perspective *S. John*
Discussion
The UV Index: Proposal for a modification of the UVI risk scale *F. Zaratti*
Discussion

16:20 Way forward *C. Sinclair*
Future WHO UV work plan
Upcoming meetings

17:00 Close of meeting