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

Thursday 29 June

Joint UV/EMF session

Medical and cosmetic uses of Non-Ionizing Radiation (NIR) devices

WHO programme on medical devices (*A. Velázquez*)
The WHO definition of health technologies covers a very wide range of products and devices, and includes some cosmetic devices. There are around 10,000 types of medical devices.
The WHO Health Technology Resolution (WHA 67.20) supports establishing and strengthening regional networks of regulatory authorities. There is a new Model Regulatory Framework for medical Devices (2017) which sets out four levels of risk and recommends a regulatory regime depending on the risk. The framework outlines controls and enforcement procedures for the pre-market, placing on market, and post market phases of device introduction.
Only 58% of countries currently have medical device regulations. The EU has a new Medical Device Regulations (April 2017) which includes devices that emit high intensity electromagnetic radiation. Benefits from the use of such devices should outweigh the risks.
WHO needs more resources for this work, and should work with Member States on NIR devices. WHO is working with other organisations, such as the IEC, on safety Standards. To date there has been no work looking at counterfeit medical devices.

Diagnostic devices using NIR: Regulations and potential health risks (ICNIRP) (*A. Green*)
Adele Green described the 2017 ICNIRP statement on diagnostic devices using NIR. The aim was to review the range of devices being used in clinical settings, document policies and regulations governing their use and the protection of patients and healthcare workers. ICNIRP also looked at potential risks for patients/operators, to determine whether there was hazardous equipment not covered by regulations.
The review found that there are gaps in the evidence including, for example, some optical exposures, and the use of contrast media with ultrasound.
Discussion raised the comment that there needs to be greater awareness on the part of clinicians about possible risks of fetal MRI.

French report on health risks related to the use of devices intended for the performance of aesthetic procedures (ANSES) (*O. Merckel*)
In France there is a growing demand for cosmetic procedures, commercial operators have varying amounts of training, and some devices on sale are intended for home use. Some serious complications have been reported. ANSES reviewed non-invasive hair removal and

lipolysis devices and techniques.
Non-invasive hair removal literature generally showed mild, localised reactions such as inflammation and pigmentation disorders. Case reports, however, showed some deep skin and eye burns due to poor practice. The efficacy of lipolysis, except for cold "therapy" is questionable, and there were reports of severe inflammation and pain. There is no information about possible long term effects, and assessments of "tolerance" to the treatments are poor. There are disputes between physicians and beauticians about the illegal practice of medicine.
The ANSES appraisal recommended that these devices should be regulated, and that cosmetic devices should be subject to the same requirements as medical devices. User qualifications should be specified, and information provided on potential adverse effects. There is also a need for studies on long term effects and a system to report adverse incidents.

Swedish report on aesthetic ultrasound devices (SSM) (*J. Estenberg*)
The 2013 report SSM 2013:31 surveyed ultrasound devices available in Sweden used for cosmetic/aesthetic purposes (body contouring and fat reduction). These used kHz frequencies, and some also used RF and/or lasers. A further report looking at cosmetic devices using any form of NIR is now being prepared.

Infrasound and Ultrasound-Why do we even talk about this here? (WFUMB) (*J. Abramowicz*)
In the USA, the FDA includes infrasound and ultrasound within its definition of radiation.
Regarding infrasound, there are various natural and artificial sources of infrasound, and only limited evidence of any biological or health effects. Some organisations have recommended infrasound limits, but only one country has mandated limits.
Regarding ultrasound, it is widely used in medicine, and in some industrial processes. There are two broad types of effect: thermal (absorption of acoustic energy in tissue) and mechanical (such as radiation pressure, cavitation). Since 1992, as a condition for allowing higher ultrasound output from diagnostic equipment, the FDA required the display of a Thermal Index (TI) and Mechanical index (MI), which predict the potential magnitude of these effects. There is poor understanding amongst users, however, of what these signify. There have been concerns about possible effects of ultrasound use in early pregnancy, but the only outcome with some evidence is on non-right handedness. Exposure minimisation is recommended. Professional bodies involved with ultrasound have published guidelines for its use.
Ultrasound is also used for various therapeutic purposes, and in cosmetic applications.

The new NIR law in Switzerland (*D. Storch*)
Switzerland has just published a law and ordinances for protection against NIR and sound, and products which produce them. It is based on product safety legislation, but allows additional controls on the uses of NIR devices. It will permit, for example, specifying that IPL cannot be used for tattoo removal, controls on sunbeds, and training requirements for people that use NIR devices. Implementation is expected in 2019.

International standards for Non-Ionizing Radiation (NIR) Protection
Update on recent activities (*E. van Deventer*)
International Standards (IS) for NIR have been proposed using the example of the IR-BSS. The target audience for such voluntary Standards would be policy-makers, radiation regulators and relevant employers. Following the IR paradigm, with UNSCEAR reviewing effects and providing the scientific basis, ICRP making recommendations and the IAEA publishing Standards, for NIR

the scientific basis is provided by the Environmental Health Criteria monographs, organisations like ICNIRP, the CIE and ICES make recommendations and WHO (and possibly other relevant organizations) would then provide IS for NIR.
Along the same lines as the IAEA Fundamental Safety Principles (FSP), there would also be FSP for NIR which provide a common safety philosophy across all NIR.
A lot of feedback was received in the draft FSP-NIR circulated in 2016. The main comments were:

- The draft was too closely aligned with IR and did not explicitly consider the differences between IR and NIR;
- The approach was too broad to manage the different risks from each NIR modality;
- The scope could be too broad (egg including ultrasound and military applications);
- The IR terminology used is not always appropriate and does not have the same meaning, so could cause confusion;
- Existing international regulations cover some areas (egg occupational/public exposure, product safety) and should be taken into account as there are many NIR products on the market.

For now, the priority will be to develop the IS-NIR. Some of the background work for this is already complete (egg EHC monographs). The proposed structure is to have an introduction, general recommendations, and then Standards for public, occupational and medical exposures for each NIR modality. There are three main steps: reviewing existing regulations and guidance, identifying regulatory gaps and needs, and establishing main recommendations. The first two are complete, and the third is in progress. Existing regulations catalogued include ILO practical guides, recommendations and Directives from the EU, recommendations from Member States, e.g. the US ACGIH, and FDA Guidance documents, as well as reports from bodies such as ANSES, SSM and AGNIR. Gaps include regulation beyond product safety Standards, cosmetic applications and sun protection.
General recommendations are the establishment of a legal framework, specifying the responsibilities of regulatory bodies and allocating responsibilities for public, occupational and medical safety. There are also possible specific recommendations for public, occupational and medical exposures, such as monitoring compliance and provision of information, education and training.
It is envisaged that a draft table of contents will be ready next year.

EMF Session

Opening of the EMF meeting

The meeting was opened with a brief talk by Dr Elizabet Paunovic, Head of the WHO European Office in Bonn, who spoke about the work done by that office and their appreciation of the work done by the EMF Project.

Participants introduced themselves and Emilie van Deventer introduced online participants.

Rick Tinker was elected chair and Olivier Merckel Vice-Chair. The meeting adopted the agenda. There was one correction to the draft minutes of the 21st meeting, regarding E. Karabetsos' presentation on the draft Fundamental Safety Principles for Protection against NIR.

Update on WHO electromagnetic fields activities

The International EMF Project (*E. van Deventer*)
Emilie van Deventer gave an overview of the EMF Project and how it fits in with other WHO activities and works with Collaborating Centres, NGOs and other international agencies. She noted that later in the meeting there would be a more detailed presentation on WHO's Framework for Engagement with Non-State Actors (FENSA). There have been over 60 national authorities involved, with several new countries such as Zimbabwe.
The EMF Project is solely funded by extra-budgetary funding from Member States. In the past year, five countries have provided funding, and several others have made in-kind contributions. Work on the EHC monograph on RF continues and will be discussed later in the meeting. The FENSA potentially makes co-publication with ICNIRP problematic.
The EMF Project staff has been involved in the 3rd WHO Global Forum on medical devices. The handbook for local authorities was sent to South America and Slovenia for review, but there has not been as much progress as hoped. This project will be taken up by an intern who starts in August. The EMF Standards database should be online very soon. The EMF Project website will be streamlined and shortened. The list server has been active and EMF Project staff has been involved in discussion and communications with a wide variety of stakeholders, and have been invited to present at several EMF meetings.

IARC Environment and Radiation Section (*J. Schüz*)
IARC is involved in three EMF studies:

- The COSMOS cohort study, which started in 2007 and has just added France as a participant. This brings the number of study subjects to over 300,000.
- ASTRO RF – This study, funded by ANSES (France) will explore the survival of patients with different grades of gliomas as function of RF exposure, using people from the Nordic Interphone study as subjects. It will also investigate survival in RF exposed rats compared to sham.
- The CLIC (Childhood Leukemia International Consortium) Parental EMF Project will estimate exposure of parents to EMF (using a job-exposure matrix) to see whether there is a relationship to childhood leukemia. It will use existing study populations in several countries.

Joachim Schüz noted with concern the decrease in EMF research funding, which is reducing the amount of expertise available. This can break the link between research and policy, and make it difficult to recommence research in the field at short notice. He suggested that the model used in France, in which research is funded through levies on industry, could help preserve the knowledge and expertise.
It was noted that Australia has a similar model of indirect funding of research by industry.

EMF activities from international organizations and collaborating centres

The new WHO Framework on Engagement with Non-State Actors (FENSA) (*G. Silberschmidt*)
WHO engagement with external organisations of any kind has always had the potential for challenges, risks and benefits. It can bring greater resources, but also risks of conflicts of interest and reputational harm. Non-state actors include NGOs, private sector entities, philanthropic foundations and academic institutions.

Through the new FENSA Resolution, there has been a change from a piecemeal policy to a more comprehensive policy. There were always rules about engagement, but staff was not always aware of them, and insufficient monitoring on whether the rules were followed. FENSA

provides an overall framework for engagement, and separate policies and operational procedures for each group, in order to achieve better engagement and better protection from undue influence. A Register of non-State actors provides increased transparency and accountability. A guide for non-State actors is currently in preparation. It is important that WHO staff are aware of the policies, and a guide for them has been prepared.

Reports from international organisations

International Telecommunications Union (ITU) (*Istvan Bozsoki)*
ITU-T (Standardisation) has produced various recommendations on EMF exposure, several of which were renewed over the past year. They are collecting information on best practice techniques to reduce exposure, and examining the effect of 5G technology on exposures.
The ITU-R handbook on spectrum monitoring includes a chapter on RF measurement. There is an ongoing study on exposure measurement.
ITU-D (development) is proposing to compile regulatory policies on RF exposure and monitoring, methods of disseminating information on RF exposures and best practices. They note the need for standardised exposure guidelines in ITU countries for the introduction of 5G.

European Commission
The DG-Santé reported that the Mobi-kids project is complete and the report has been given to the Commission, but the results are awaiting publication. The GERoNiMO project will be completed within the next two years.

NATO (*B Jon Klauenberg)*
Dr Klauenberg provided an overview of NATO work on Standards development and particular features of the STANAG 2345 Standard. NATO is setting up a new research sub-group to look at damage thresholds of new high energy EM systems with unique parameters.

GLORE (*C. Ohkubo)*
GLORE (Global Coordination of RF Communications on Research and Health Policy) held its 2016 meeting in Japan and included sessions on exposure regulations and policies, research programmes, consideration of advanced wireless systems, long term effects of exposures to RF fields and harmonisation of Standards. The 2017 meeting will be hosted by the US FCC and held in the USA.

Reports from collaborating centres

ARPANSA (*R Tinker)*
The Australia RPS3 RF exposure Standard is being reviewed pending publication of revised ICNIRP RF exposure limits. ARPANSA measured Wi-Fi and other RF exposures in 23 schools. The results have been published in the journal Radiation Protection Dosimetry (RPD) and showed that exposures from all sources are very low. The highest exposures came from radio broadcast transmitters. The study did not investigate health effects.
ARPANSA receives about 1,000 public enquiries per year, with the top issues being sun exposure, base stations and power lines.
A new RF research agenda has just been published, which essentially updates the WHO 2010 agenda. There is a need to work through the implications of advancing new technology.

German Federal Office of Radiation Protection (BfS) (*B Pophof)*

BfS has completed an analysis of the reasons for divergent opinions in EMF risk assessments, an evaluation of the EMF-Portal usability and a project on tumour promotion in mice. A number of other projects are in progress, including an investigation of age and gender dependency of RF effects on the brain, the effects of ELF fields on the immune system and potential contribution to the development of Acute lymphoblastic leukaemia (ALL) in mice, and detailed dosimetry of free moving rodents exposed to RF fields. A systematic review of exposures from new technologies in the IF range, and their possible effects, is also under way. A number of other activities are planned in the future, covering cosmetic applications of NIR sources, a workshop on ELF fields and neurodegenerative diseases, and an assessment of public exposures to ELF fields.

Swiss Federal Office of Public Health (FOPH) (*D Storch)*

The FOPH website has been renewed. It contains many fact sheets in several languages, including English. The fact sheet on induction hobs is the most downloaded. There are plans to revise the fact sheets on wireless LANs and create a new one on smart technologies, such as wrist-worn devices.

UK Public Health England (PHE) **(***S Mann)*

PHE received about 160 public enquiries about EMFs in 2016, with approximately equal numbers about power lines, EHS, cell phones and cell sites, science and standards, and Wi-Fi___33 and smart meters.

The results of laboratory measurements on smart meter exposures have been published, and the exposures were very low. This project has now progressed to making measurements in homes and computational modelling of exposures.

PHE has led the dosimetry work of the Mobi-kids study, and a paper on ELF exposures from wireless phones has been published. PHE are also involved with the GERoNiMO and SCAMP studies, and have been working with IT'IS on dielectric spectroscopy.

The work programme of the Advisory Group on Non-Ionizing Radiation (AGNIR), an independent scientific advisory group, has been completed and the group is being wound up. PHE will still review NIR topics as necessary, and work with the existing COMARE expert group.

Reports from NGOs and professional bodies

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

In the past year ICNIRP has published a report on its 2016 workshop on thresholds of thermal damage, and a statement on diagnostic devices using NIR. Presentations from a workshop in Tokyo, Japan in December 2016 on NIR protection related to 5G are on the ICNIRP website. ICNIRP's statement on radiation protection principles is being revised, and WHO is organizing a joint meeting with ICRP, IRPA and other international organisations on bringing together protection systems for ionising and non-ionising radiation.

A project group is working on revision of the HF Guidelines, and another project group is undertaking a systematic review of HF dosimetry to support the work of WHO on the RF EHC monograph. A statement on cosmetic devices which use NIR is in preparation, and ICNIRP's guidance on ultrasound is being updated.

Work plans for the future include revision of ICNIRP's statements on LEDs and laser pointers, and preparation of a new statement on blue light.

International Electrotechnical Commission (IEC) (*Jafar Keshvari)*
IEC is working with IEEE/ICES to develop dual logo EMF compliance assessment standards. This will include an eventual merged pair of Standards covering SAR measurements from hand-held and body-mounted devices, which will also incorporate compliance assessment for LTE, proximity sensor related clauses, average power technologies and fast SAR measurements. A decision on extending SAR measurements up to 10 GHz will be made by August 2017.
The rapid development of 5G mm wave technologies has led to the establishment of a group to develop a technical report on compliance assessment for mm wave technologies. Computational Standards will also be looked at by another group. There will be liaison with ITU.
A technical report on exposure assessment of wireless power transfer is in preparation.

IEEE/ICES (*R Bodemann)*
ICES is progressing with a revision and merger of their ELF and RF exposure and measurement Standards. The first Standard on numerical modelling of exposures (for vehicle-mounted antennas) has been published as a dual logo ICES/IEC Standard. Other computational Standards are in preparation.
IEC/ICES are working on a guide for the development of EMF compliance Standards in order to facilitate and accelerate the development of new Standards, and the revision of existing publications.

Review of national or regional ELF landscape

Current research activities on ELF-EMF in Germany (*B Pophof)*
In response to public concerns about possible effects of ELF magnetic fields from an expansion of the German national grid, there will be a new ELF-EMF research programme. This will cover 35 projects in 9 areas, and was developed after consideration of recently published research agendas and research reviews.
The research topics are:

- Neurodegenerative diseases
- Action and perception thresholds
- Childhood leukaemia
- Miscarriage
- Exposure assessment
- Corona discharges
- Risk communication

The official launch will take place in July 2017.

ELF STAT: Modelling of exposure of children to ELF (*P. Ravazzani)*
The study project, entitled ELF STAT, which is funded by ANSES, will characterise child exposure to ELF in real exposure scenarios, using statistical methods, and provide information to help assess the effect of new technologies on exposures. It will also consider fetal exposures. The project will run until February 2019.

TRANSEXPO Project: Current Status (*G. Thuroczy)*
TransExpo is a multi-national study of childhood leukaemia among children who lived in

apartment buildings with built-in transformers. This should provide a highly exposed population and a study design giving no risk of selection bias. Pilot studies have shown that the apartment location (for example, above the transformer compared with other floors) is sufficient to distinguish high and low exposures. Several countries have completed pilot studies and others are in progress. The study has several strengths compared with the case-control studies carried out to date, and participation of a large country like France will give it good statistical power.

Friday 30 June

Review of recent research activities

Research review of laboratory studies (*I. Lagroye)*
There has been a wide range of laboratory research for static, ELF and RF fields. For static and ELF fields there was a majority of papers looking at medical applications, and several papers on oxidative stress in both frequency ranges. RF research included effects on the brain, genotoxicity and development.
There are still many open questions, on RF fields and fertility and ELF fields and neurodegenerative diseases, for example. There have been contradictory results or effects reported for very specific exposure conditions or cell types. Studies on long term exposures are still needed, and a focus on the quality of studies is important.

Research review of epidemiological studies (*I. Deltour)*
Two large ELF fields-childhood cancer epidemiology studies have been reported, from California and the UK. The California study did not replicate earlier results of excess risk, but could be compatible with an excess. The UK study found that there were differences in risks depending on the time period considered.
A Danish study found increased risks of dementia and motor neurone disease in electrical utility workers exposed to high magnetic fields.
Some studies have reanalysed Interphone data and essentially come to similar conclusions as previously. There have been several registry studies, which generally do not support relative risks of the magnitude reported by Interphone.
A number of studies have investigated the occurrence of symptoms, either in relation to exposures from fixed transmitters, or the use of personal RF devices. Either no associations are found, or associations are inconsistent.
France will begin participation in the COSMOS study in 2017.

Update on WHO activities

EMF regulations database (*S. Kandel)*
Data were first collected in 2013, and over the past few years, more countries have provided information. The database has now been updated for EU countries following transposition deadline of the EU EMF Directive. It is now loaded into an internal database and should be on the public GHO website very soon.
In the future more information can be added, such as titles of legislation. This could either be through the use of pop-up information fields in the GHO, or on a separate country page. Country data can be updated annually, and more countries added.
In discussion, there was a preference for the use of pop-up information fields to provide

additional information on EMF legislation (as is done on the GHO pages about the existence of sunbed legislation).

WHO health risk assessment of radiofrequency fields (*E. van Deventer)*
Work on the RF EHC began in 2012. Care was taken to incorporate new WHO processes for such work, which require a systematic review of the science. Inclusion and quality criteria were developed for each type of study. A first draft was made available for consultation in late 2014, with one of the key aims to see whether any outcomes or research papers had been left out. The draft was updated based on the feedback received.
After several years with no clear feedback, the WHO Guideline Review Committee has decided that, even though the content is not typical, the RF monograph should follow the formal Guideline Development process. This adds extra requirements to the preparation of the EHC, and a methodologist has been contracted to assist with this process.
In order to meet WHO requirements for Guideline Development, systematic reviews of the research on the outcomes of interest must be commissioned externally. An initial analysis suggests that 15 such reviews are needed, which will cost around US$10-15k each.
A second question concerned cooperation with ICNIRP in the development of the EHC. The WHO Guideline Development process would permit this provided the required processes were followed. However, it is not clear whether this is possible with the introduction of the new FENSA.
Finally there is the question of exposure limits. In the past, organisations like ICNIRP have used the WHO EHC documents as the bass for preparing these. Even now, WHO cannot endorse such limits, so a third question is whether WHO should develop its own limits. Input from member States is requested on this.
The following points came up during discussion:

- The money needed to commission systematic reviews is not currently available, and this message should be taken back to member States.
- There was general support for work on the EHC to continue.
- There should be provision for countries to develop their own exposure guidelines based on their own populations as the effects may vary with population characteristics.
- The question of co-operation with ICNIRP is not yet resolved. Perhaps feedback from States is needed on this.
- There may be dangers in aligning WHO with ICNIRP, and cooperation will not make the Guidelines better.

The future of the EMF Project (*M. Gledhill)*
When the EMF Project started in 1996 it had a well-defined set of objectives and was well funded from voluntary contributions. Those objectives are now mostly complete, and much less funding is available. Therefore this is a good time to get feedback from States on what they think the priorities of the EMF Project should be over the coming years, and whether they would be able to help fund it.
A draft questionnaire was presented and discussed, and the feedback from participants will be used to finalise the questionnaire which will be sent out to participating countries in August 2017.

Review of national or regional RF landscape

A review of regulations regarding Wi-Fi in schools (*S. Sadetski)*

There are two main approaches to the use of Wi-Fi in schools. One is that exposures to Wi-Fi are low, there is no scientific evidence to link the exposures to adverse effects, so there is no reason not to use it. The other is that the technology has been used for only a relatively short time and the health effects are still being investigated, children are a vulnerable population and the exposures are involuntary; therefore wired networks should be preferred and Wi-Fi use limited.
Most countries choose to allow Wi-Fi. Policy in Israel is to allow Wi-Fi but with limitations depending on the children's ages. There should also be wired access points, and the Wi-Fi should be disconnected when not being used. Exposures should be measured before and after installation of the Wi-Fi. Some other countries follow similar policies. There has been no pressure from parents to allow greater use of Wi-Fi.

5G: What should we expect? (*J. Wiart)*
Most discussions about 5G concern the capabilities, rather than the exposures. 5G is designed for more than voice calls and internet access, it will also allow greater connectivity of all kinds of sensors. This will require a higher density of base stations (small cells), which will reduce exposures if a user is close to one.
5G will re-use some existing mobile communication bands, but also extends to new bands at frequencies >24 GHz. At these frequencies the organ with the highest exposure is the skin, so for epidemiology studies knowledge of frequency used will be very important. Voice calls will be via VoIP, in which information is transmitted in packets, so the duration of a call will not be the same as the duration of exposure.
Base station antennas will use beam forming and MiMo technologies, which will affect exposures.
By 2020 there could be 50-80 billion objects connected on the Internet of Things (IoT). Emissions will be sparse and low, but there will be lots of them.
Points raised in discussion included:

- Whether exposure assessment Standards will keep up with the technology. Compliance assessment Standards are still under discussion but it is recognised that these must be available before devices come on to the market.
- There should also be discussion about health effects of this technology – uptake is usually very fast, but gathering evidence about health effects takes a long time.
- There are few devices available to make exposure measurements. Mostly they only measure in the far field. Measurement of near field exposures is under development, but some protocols and equipment are already available. Assessing exposures for epidemiological studies will be difficult due to the flexibility of the network technologies. It will be easy to assess worst case exposures for compliance, but not so easy to record day to day exposures.
- It would be good to have exposure assessment capabilities built into devices, as was done with XMobiSense. However, this is not easy.
- ITU has a project on the assessment of exposures from all types of wireless transmitters. This should be available at the end of 2018.

The French ANSES reports on RF and children, smart meters and EHS (*O. Merckel)*
ANSES has released two reports on EMF and health recently, and one more is being prepared. A report on RF fields and children's health was published in July 2016. It concluded that there were no effects on many of the outcomes studied, but possible effects on some cognitive

functions and the EEG. There is a possible effect on well-being but that could be attributable to a behavioural cause. The report recommended that the Health Canada approach to Reference Levels be considered for far field exposures, and that in the near field the relevance of SAR should be reassessed. A new exposure indicator taking into account real exposure conditions (frequency, signal quality, voice /data call) should be developed. Compliance with limits should be ensured whatever the conditions of use (even against the body), and children should be discouraged from using mobile phones.
A revised opinion on Smart meters was published in June 2017. These have been controversial, for both health and other reasons. Electricity meters transfer data over the power wires with one main period of communication during the night and frequent, brief communications the rest of the time. Water and gas meters use brief, infrequent radio transmissions.
Exposures to EMFs are very low (lower than from other domestic appliances) and the report concluded that there was a very low probability that they could cause short or long term health effects.
A report on Electrohypersensitivity is being prepared. A draft for consultation was released in July 2016, and many hearings have been held. 540 comments were received, and it has been a major effort to address these and take account of new research. The final report should be published in late 2017 or early 2018.
Points raised in discussion included:

- The transmitter power for water and gas meters is very low as these are battery powered.
- There were some difficult contacts with the electricity industry on this report. Comments from industry were published at the same time as the report.
- In the Australian State of Victoria, there were many queries about Smart Meters arising from poor deployment. Communication about deployment has been improved in other States.
- In California, controversy over deployment of Smart meters decreased when they became voluntary.

Innovative uses of EMFs in biomedical applications: EC COST Action (BM 1309) (*A. Šarolić)*
COST Action BM1309 is looking for beneficial effects of EMFs. There are working groups covering cancer related effects (WG1), non-cancer related effects (WG2), and dosimetry (WG3).
WG1 has made great improvements in hyperthermia targeting. Deep seated tumours, however, still pose a challenge. There is also a lot of variability in tissue dielectric properties between patients. Electric field/electric current stimulation devices have shown some promise. Some non-thermal EMF cancer treatments lack a clear or convincing biological interaction.
There have been some advances in the stimulation of excitable tissues, but the complexity of the nervous system makes this challenging. Effects of low frequency and pulsed fields on skin growth have been found but lack any explanation. Many other possible treatments and diagnostic approaches are also being investigated.
WG3 has noted some uncertainties and inaccuracies in published dielectric data.
The COST Action ends in 2018, and there will be a conference and training school in April 2018.

Exposure assessment according to European Directive 2013/35/EU (*C. Neumann)*
There have been several case studies comparing exposure assessments carried out according to regulations in place before the EU EMF Directive came into force, and assessments carried

out following the requirements of the Directive. Overall, the requirements of the Directive are less restrictive than previous Regulations, but special attention should be paid in the 100 kHz – 10 MHz frequency range.
Points raised in discussion included:

- There is a new European radio equipment Directive, which covers EMC and health and safety. A fundamental change is that the risk assessment should cover "reasonably foreseen use", not just "intended use". This has a potentially unlimited scope, so CENELEC has a working group looking at a better definition.
- In India there has been a serious issue with base stations, especially where facilities are shared. India has had to gather its own data on the health effects of such exposures on its population. A website has been established where people can ask for exposure assessments in their homes.
- All European countries have transposed the EMF Directive, as they were obliged to. In the UK the implementation was fairly simple.

The way forward

A questionnaire about the future of the EMF Project will be sent out to get feedback on the IAC meetings and the EMF Project activities.
Several upcoming meetings have been mentioned during this meeting: Emilie can circulate information about other meetings as requested.
The IAC meeting next May or June could be held in Geneva, or in Portorož, Slovenia (in conjunction with the BioEM meeting) or The Hague (in conjunction with the 5th European IRPA Congress). IAC members will be asked for feedback on these options.