

WHO Research Co-ordinating Committee
Meeting in Cape Town, South Africa
7 December 2001

Ongoing radiofrequency research worldwide

Dr Michael Repacholi, WHO, Geneva, Switzerland

Discussed the IEGMP conclusions and research suggestions.

Children

More effort needed to look at absorption of power in the child's head. Model it and compare with adults and guidelines, publish and let the public know. We know that children can receive plane wave RF better than adults due to their size.

Cannot use children in laboratory studies, but should look at juvenile animals. Certainly the children can be recruited into epidemiological studies, but will short exposure time lead to any significant data?

Other volunteer studies

Cardiac function; sleep studies; learning abilities; memory loss, can only look at short term memory; headaches and other subjective symptoms; changes in physiological parameters.

Do we need studies on people around base stations? Scientific interest is low, but public will be very interested. Radio and TV signals will be much higher and if use pagers and mobile phones, then they will overwhelm base station signals. Probably is worth doing for a public concern point of view.

Need to do some more work on the skin, WHO thermal workshop in March 2002 which will probably be able to answer this. Brooks doing high level challenge work. Other studies are looking at synergistic effects, not really a good parallel for general environmental exposures.

Other areas:

- Synergy: Lack of studies with a physical or chemical stimulus is added to RF exposure. A few more of such studies using UV and pollutants would be welcomed.
- Cancer: There seems to be enough studies on-going related to cancer. One gap at the basic research level is the effect on gap junctions for which there are few data with RF.
- Ageing: 2-year Bioassays could include the investigation of ageing markers levels
- Pulse fields: Is there any study that would test pulse modulation effects
- Some positive data are available on heat shock protein (HSP) expression. There is a need for further research on well-chosen models *in vitro* and *in vivo*. One needs to know whether the effects are real (and reversible) at low SAR level and what is the relevance of the data in terms of health risks. Positive controls with temperature elevation must be included in the experimental protocols.

Discussion

Q - Hypersensitivity, should we do more, almost certainly not caused by RF.

A - Swedish studies looking to characterise the people and to see what it is that makes them feel that they are electrically hypersensitive. Half population studied at Karolinska will be hypersensitive.

Q - Children and base stations, may be absorbing more, so good reason to do study.

A - Guidelines are already based on maximal coupling. "Looking for a firefly in a searchlight".

Q - SAR and children, allegations about head absorption do need to be addressed.

A - Perhaps need a paper either with or without a workshop.

Ongoing ELF research Worldwide

Dr Leeka Kheifets, WHO, Geneva, Switzerland

- Childhood Leukaemia
Ongoing studies in Germany (now complete) Italy, Japan, US and UK. Long-term animal study 3rd and 5th harmonic plus 100 μ T. Still need: high exposure levels; contact current effects; transients; population mixing and to address selection bias
- Occupational leukaemia & brain cancers: Few or no studies. Exposure assessment based on job environment. Need to combine occupational and residential exposure. Use of alternative metrics (contact current, transients, peaks).
- Cancer biology. Research needs: radical pair intermediates, intracellular signalling and specific gene expression
- Breast cancer. Three residential and one occupational study underway and a further occupational needed
- Neurodegenerative disease: Little ongoing work. Research needs include: strong methodologic studies looking at electric shocks and other EMF exposures, particularly for ALS and effects of brief explicit shock and prolonged exposure on neurons and glial cells
- Cardiovascular disease: Currently two studies underway looking at existing data. Disease misclassification is problem on death certificates. Heart rate variability studies under realistic conditions needed
- Reproductive: Two studies about to be reported (research needs will depend on outcomes from these studies).

Round Table

There was a round table discussion on additional ongoing and planned studies where all country representatives informally presented their research. This was followed by working groups on ELF plans for WHO risk assessment and on RF research gaps, and a time frame for completion of the EMF project and the WHO review.

The primary goal of the International EMF project is to review the scientific literature on health effects of electromagnetic fields with frequencies 0 to 300 GHz, to assess the health risks of exposures based on this review, and to develop policy options in the light of this understanding.

Proposing series of working groups on topics; methodologies; and policy (including precautionary principle). Task Group will be approved by Director at WHO, will have a range of views and have representatives of the WGs. This is expected to be pretty definitive, exposure distribution and policy options will be new. The results will be published as an Environmental Health Criteria (EHC) monograph. This task will be carried out in two steps. First a thorough risk assessment of Extremely Low Frequency (ELF) and static fields will be performed by the end of 2003, followed by a risk assessment of RF fields to be achieved by the end of 2006. EHCs are the result of in-depth weight of evidence critical reviews conducted through independent scientific peer-review groups on various topics related to exposure to EMFs.

Working Groups

The ELF Cape Town working group discussed the EHC draft proposal, table of contents, preparation flow chart, tasks, and working group schedule of the EHC monograph on ELF and Static Fields to be completed by December 2003.

The 3 other Cape Town working groups discussed the WHO International Harmonisation Project progress thus far, with attention to a draft Framework for Developing Standards prepared by Leeka Kheifets including a draft research evaluation, model for developing standards or guidelines, and protection through standards and guidelines.

The research evaluation group discussed the prepared text, making editorial changes. One- or two-tier standards were discussed and two tiers were recommended. There is a need to match the safety factor to dosimetric values and possibly change the term safety factor to a more scientifically valid term such as temperature sensitivity variability. Measurement uncertainty needs to be defined and addressed.

Informal Reports on on-going research

Mr Peter Winklev-Jensen from European Commission, now looking forward to the sixth framework (FP6). Quality of life programme funded some studies on EMF. Start of 2003 for FP6, but EMFs are not highest priority. Need to look at results so far before setting EMF as a priority area again. European Research Area where EC will play a role in co-ordinating research to get critical mass from multinational programmes.

COST programme on Co-operation and Co-ordination of science and technology. COST 281 is looking at health implications from mobile telecommunications, focussing on upcoming developments. The web site is: www.cost281.org

Q: Scientific Opinion on ICNIRP limits relating to Council Recommendation 519/99/EC.

A: Answer was to leave them unchanged as advice to the member states (non-mandatory instrument).

Q: Non-mandatory, but what do you do to encourage or discourage activities eg, Switzerland and Germany, Italy?

A: Internal market issues as well as health. Product standards from CEN and CENELEC. Meeting last week on use of guidelines. WHO to help communicating background to guidelines to member states. Trying to keep process as transparent as possible.

Dr Mays Swicord, Motorola and Mobile Manufacturers Forum (MMF)

MMF tries to fund 50% of project with Government participation where possible. Four programmes jointly with GSM Association.

First two are part of the fifth framework - Interphone programme and Perform A which are six long term animal studies.

Perform B which is replication of Litowitz ODC work and Lai behavioural response and DNA damage, in six laboratories in Europe.

Study in progress of development, Karolinska Institute looking at sleep, heart rate and subjective disorders. A parallel study in UK, for instance, would be good.

Thermal Workshop is supported. Try to determine what exposure conditions cause the temperature rise - theoretical work at Utrecht, Netherlands.

Interested in mechanisms studies. FGF workshop in Dresden to bring physicist and theoretical types together to look at mechanisms other than thermal that might be causing effects.

Contracting five people to write papers on these mechanisms. MMF support has been cued by WHO Agenda. Will consider anything, but feels that most is now covered.

Nokia sponsors Finnish programme, cardiac pacemakers and bioeffects on brain, biomarkers and human dosimetry, case control on brain tumours. Effects of mobile phones on hearing and balance.

Dr Solomon Wanguru (Windhoek, Namibia), African region will come together to see what they can do about arranging co-operation with other scientists to make sure that African scientists are involved. Would like to enhance links with WHO as it gives a good contact route with other scientists. Public are asking questions and things are getting politicised as the politicians are nearer the public.

Ms Jo-Anne Basille CTIA, Washington, USA), US study under National Toxicology Programme, whole life animal bioassay, NIST with Chris Portier leading.

Prof Chiyoji Ohkubo (Tokyo, Japan), Japan- ELF programme tumourogenesis 6 studies in progress on mammary, skin, brain and lymphoma tumour promotion. Epidemiology study childhood leukaemia and brain tumour is recruiting, but with fairly low participation rates. Six RF studies, including BBB, Interphone epidemiology and long-term animal studies. So far seeing no effects on memory, BBB or micro-circulation. Ministry does not want to do a mobile phone base station epidemiology study.

Working Groups

Working groups on ELF and RF identify outstanding issues that need discussion. Other research that has not been covered.

Focus on childhood mobile phone exposure. Need to know more about the way that children use phones. In US do not do so much SMS. Europe is different. Jo-Anne Basille looking to gather some data. Wiart (France Telecom) says that marketing departments are not able to answer and need to ask more precise questions. IARC needed the better questions as well.

It was suggested that WHO should contact someone to draft a report that is a review of young people's development characteristics. IEGMP was reasonably happy with the data from studies such as Preece. Therefore the question about children was valid. French Miro report also asked the same question. FDA actually dismissed the issue (see www.fda.gov/cdrh/mobilphone.html consumer update report). Canadian review of their report did not mention children.

Maybe collect data on childhood use and age differences through whole school surveys. Nothing to do with base stations. However European Commission think that a base station study would be politically very acceptable. Would be better with improved personal monitors rather than relying on residence to mast distance. McKinlay (NRPB) has meter for occupational studies, perhaps could be adapted. Joint European Science Centre is doing some work on developing logging RF meters.

Other research needs:

- Gene expression questions and particularly more work needs to be done on heat shock protein. Litowitz is supposed to be reporting something out soon.

- What about other new technologies, eg Bluetooth headset changes exposure pattern? IEC are developing a SAR measurement standard for all devices.
- Any radar studies, for people working on board ships for example?

ELF research needs

Exposure distributions world-wide will be useful, need to come up with a protocol to be applied in many countries. Same for RF. As well as IARC there is a call for a more general survey which could act as a starting point (currently a move to undertake survey in Australia). Argument is much stronger for doing a logging study that characterises the range of exposures.

Conclusions

Governments need to identify their needs and inform the WHO.

Research community needs to be mobilised to collaborate around the world on a regional basis. Need to have a progression that will result in an assessment having gone through the whole process leading to substantiated and validated conclusions to draw out any health effects. Identify them and provide information and advice on mitigating any technologies that produce enhanced health effects. Governments have to make their own decisions within their own borders based upon their societal needs.

Want to get more direct involvement in the EMF Project, more people actively participating in the work of the project. We want decisions to be made on an informed basis. If ensure have investigated possible mechanisms then they can be checked against novel aspects of emerging technology. A positive contribution as an umbrella for research activities into EMF effects. Proposals that support the Research Agenda should get higher priority. WHO is now moving into the health risk assessment phase for ELF. This will be a comprehensive assessment and not just another review. ELF assessment will act as model for RF health risk assessment in a few years time.