RESEARCH COORDINATION MEETING
WHO Geneva, 4-5 December 1997

Minutes

Opening

The meeting was called to order by Dr. Wilfred Kreisel, WHO Executive Director for Health and Environment. Dr. Kreisel welcomed the members and thanked them for their interest in resolving the world-wide concern about possible health effects of electromagnetic fields (EMF). He expressed his appreciation for their coming to Geneva to assist the International EMF Project in encouraging a coordinated programme of research that can help resolve uncertainties concerning these effects. He noted that resolving the uncertainties is necessary if WHO and IARC are to arrive at a more scientifically-sound health risk assessment.

1. Election of officers

Dr. Kreisel then nominated Dr. Alastair McKinley as Chairman of the committee, Sir Richard Doll as Vice Chairman, and Dr. Ben Greenebaum as Rapporteur. The committee accepted the slate without objection.

2. International EMF Project Activities and Goals

Dr. Michael Repacholi, Responsible Officer of the Project, also welcomed everyone appreciatively and briefly presented the Project's progress to date. The Project has already held reviews of the scientific research concerning ELF and RF effects. These reviews identified gaps in the scientific knowledge which must be addressed for definitive health effects analyses by WHO and its affiliate, the International Agency for Research on Cancer (IARC). This research coordination committee was created to allow those planning and funding research programmes to exchange information concerning past and ongoing research relevant to the issues and to identify which of WHO/IARC's needs are not yet being pursued. In the next 4-5 years WHO/IARC seeks to have enough new information available to allow new assessments of ELF and RF health effects. Each of these assessments will be published as WHO Environmental Health Criteria monographs. They will provide a scientific basis for re-examination of current guidelines and standards for exposure to EMF by the relevant national and international groups. Dr. Repacholi expressed the hope that international standards acceptable to all countries would be possible, rather than a multitude of national standards.

3. Agenda and Working Group Officers

Dr. McKinlay assumed the chair and received the group's assent to the proposed agenda. The group also accepted the willingness of Dr. Anders Ahlbom to chair the ELF working group, assisted by Dr. Leeka Kheifets as rapporteur, and of Dr. Russell Owen to chair the RF working group, assisted by rapporteur Dr. Michael Fett.

Dr. Repacholi introduced the members to the documents in their folders, including the agendas for future research and guidelines for quality research abstracted from the reports of the Project's earlier scientific reviews (Repacholi, 1998; Repacholi and Greenebaum, 1998). The full reports of the two review meetings were also included, as well as a description of the IARC guidelines for judging quality of research publications and carcinogenicity of substances and agents (Repacholi and Cardis, 1997). He reiterated that the goal of the meeting was to identify and encourage funding of the still-needed research in order to allow a more definitive determination of EMF health effects in about 5 years. He noted that under this time line, epidemiology and animal studies that will report in 3-4 years will be most important, buttressed where useful by in vitro and theoretical work, particularly on mechanisms and identifying the proper exposure metrics.

4. Roundtable on Interests and Concerns

The members then introduced themselves, noting their affiliations and stating briefly their specific interests and experience in the issues at hand and the interests or programs of their organizations. Those present included research managers and funding officers, public health officials, and researchers from governmental agencies, privately-owned and publicly-owned utilities, companies that make or operate mobile telephones, consortia of companies in both industries, and research institutes and universities. After everyone was appropriately awash in names, faces, interests and affiliations, coffee was served, giving the members an opportunity to begin connecting a few of the pieces of information.

5. Risk Assessment Criteria and Draft EMF Research Agenda

After the break, Dr. Repacholi began a discussion of the WHO/IARC criteria, which form the basis for past and future assessments of EMF health risk, and the research agenda recommendations of the earlier analyses of RF and ELF research. He started with the broad official definition of health contained in the WHO charter, as well as the working definition the project is using to make operational the official one (see definitions in Final Research Agenda.). He also discussed the Project's role under WHO's general mandate--to assess health risks and advise national authorities. Several members of the committee commented on aspects of these ideas, as well as on the relatively short time line: 3-4 years for research and a new health risk assessment in five years. Dr. Repacholi emphasized the implications of the IARC guidelines for research project design and protocols. The most useful studies would most likely be large and well-funded, with a staff that included all relevant disciplines. Project design must devote adequate attention to the projected sensitivity of the study and to quality control.

Dr. Repacholi then went through each point of the research agendas identified in the RF and ELF reviews in order to clarify any points of concern. The discussion from the floor concerned, among other topics, the WHO definition of health, the relationship between perception of risk and scientific assessment, and setting priorities.

An apparent emphasis on currently-used mobile telephone frequencies was questioned, and Dr. Repacholi noted that some additional commonly-used frequencies were also concerns. Neurodegenerative diseases were noted as important, but the current lack of good animal models makes it difficult to give them an extremely high priority.

An argument was made for increasing the priority of ELF epidemiological studies, since exposure is broader than for RF and has been occurring for a much longer time. It was noted that ELF epidemiological studies might establish definitively whether there was in fact a problem that would justify any more research expenditures. Given the small effect and significant uncertainties in exposure, and questions about dosimetry and confounders, large, powerful studies would be needed. As an example of the type of pre-planning and level of study of both ELF and RF effects that will be needed in the future, Dr. Cardis described a multi-centre study of RF effects on cancer that is now in the planning stages at IARC.

Questions were also raised about whether the RF review had actually identified research pointing toward possible ocular effects or whether the research recommendation in that area was really speculative. A member also pointed out that, although hazard is the focus for this research agenda, the possibility of beneficial uses of biological effects of EMFs, particularly in medical diagnosis and treatment, should not be forgotten. Dr. Repacholi noted that although the Project's specific concern was with detrimental effects, WHO Environmental Health Criteria also routinely assess benefits.

6. Working Group Meetings and Preliminary Reports

After lunch the group reassembled in separate RF and ELF working groups. Static fields, which are of much lower concern, were not considered. At the end of the afternoon, the RF group, which had enjoyed larger numbers, a trip to smaller quarters, and more extended discussions than their low-frequency colleagues, rejoined the ELF group in the main hall for brief summaries. Dr. Ahlbom reported that the ELF group had much discussion of the priorities in the agenda papers. They agreed that childhood leukaemia had high priority, but noted that about a dozen epidemiological studies were newly completed or in progress and recommended waiting for these results before starting new ones. In the meantime, the group felt that epidemiologists should try to understand the appropriate exposure measures and refine methodologies, based on prior results. The group also recommends that exposure assessment work begin immediately in preparation for future studies. Adult cancers were considered mostly of concern in occupational exposures, which can be higher than residential. The group recommended decreasing the priority placed on possible cardiac effects, since there is less clear research information supporting them.

The ELF group followed its general discussion by going through the recommended research item by item, identifying ongoing research where possible and discussing the recommendations and priorities. Dr. Ahlbom noted that the group was dominated by epidemiologists and that animal experiments, in particular, might not have been given as important a role as they might have received from a different group.

Dr. Owen opened his report by pleading for more time, since the group had not finished discussing all items on the agenda papers. They had methodically considered the recommended research agenda point by point, first looking at present and past research and then considering what could and should be done in the future. At the end of Dr. Owen's report it was agreed that the group would meet for an additional half-hour following the afternoon's session and would reconvene for an hour the following morning. The morning session of the full committee was postponed by 30 minutes.

The afternoon concluded with Dr. McKinlay getting the group's agreement that he and the working group leaders would work with WHO staff on the content of a press release describing the research agenda. He also noted that he would add to the next day's agenda, a discussion of Dr. Fett's suggestion for an international group or data base of peer reviewers.

7. ELF Working Group Report

Following the additional deliberations of the RF working group, the full committee reconvened. It first heard Dr. Kheifets present the report and research agenda recommendations of the ELF working group (full text of ELF group report). Through discussion on the floor of a number of the points as they were presented, the full committee's final recommendations for the ELF portion of the WHO research agenda were formed (text of Final Research Agenda).

Important discussion focused on uncertainties in what aspects of the environmental fields to measure and mimic in the laboratory, particularly with respect to transients. It was noted that at the end of the present NIEHS-funded, two-year toxicology bioassay of the effects of continuous sine wave fields, a briefer experiment has been begun using a sampling of realistic fields from various situations, including both harmonics and transients. Dr. Repacholi advocated seriously considering this type of approach to laboratory studies. He advocated both theoretical analysis of signal-to-noise ratios and experiments to determine of the effects of long-term exposure to fields containing typical transients. Both types of study are needed for all four types of experimental situations: in vitro, epidemiology, human volunteer and in vitro.

Continuing down the recommended agenda, breast cancer and melatonin studies were advocated. There was strong support for theoretical modelling of signal-to-noise at low field levels, as a guide to what features of exposure should be measured. It was also noted that current instrumentation is not adequate to characterize exposure beyond time-weighted average or a specific type of quickly-changing fields.

8. RF Working Group Report

The RF working group's conclusions, presented by Dr. Owen, concluded the morning (full text of RF group report). There was a strong recommendation for a few full, two-year toxicology bioassays in animals, using standard animals and protocols. Beyond these, long-term tests using animals that are challenged chemically or genetically were also advocated, and there was brief discussion of the weight of these tests should carry under the IARC guidelines. There was also discussion at several points about whether to recommend further studies when past epidemiology had given negative results or later studies had discredited initial positive ones. Over lunch compromise wording on this point was agreed to, and following the break, the RF group concluded its report, including the compromise. The final recommendations of the full committee for the WHO RF research agenda are in the Final Research Agenda.

9. Research Scheduling and Data Base

The remaining agenda began with a discussion of how the identified research might be scheduled. All funding agency research managers present were asked to comment from the perspective of their agencies' plans and programs. Most had found the meeting useful and that the conclusions were parallel to at least part of their current thinking. A well-coordinated program was considered very important. It was agreed that most major animal or epidemiological projects took 5-6 years from planning for initial pilot studies to publication. Therefore, the five-year International EMF Project time line was considered somewhat unrealistic. However, Dr. Repacholi noted that the time line sets up a target. As part of this discussion, there were brief descriptions of the EC's past and future research frameworks and programs, recent studies of EMF research under the European COST 244 programme, and the possible role of COST 244b in a future EC-sponsored EMF research program. These were the subjects of some lively comments and questions from the floor.

The group then discussed whether the Project should create an on-line data base to identify projects that carried out its agenda, given the information resources that already exist. They also discussed what of this information might be of use to the members of the committee as well as to the Project. It was concluded that both WHO and research managers would find useful a listing of the WHO research priorities, each one linked to descriptions of relevant, newly-funded research projects. Project descriptions would be sent by the funding agencies to the International EMF Project and would be evaluated by WHO as to whether they would appear to contribute to the identified need. WHO would issue reminders to funding agencies of the need to submit new entries periodically.

The same Internet site would include WHO criteria for quality and possibly also guidelines or links to guidelines of groups such as the IEEE, as well as links to other listings of ongoing and completed results.

10. Other Business: International Pool of Peer Reviewers

A pool of information to help research sponsors and managers identify peer reviewers, particularly useful for funding organizations in smaller countries, suggested earlier by Dr. Fett, was discussed. Members stressed the time-honoured role of peers in maintaining quality through their collective expertise.

The discussion also noted that peer panels can provide the highly important buffer between a research programme and the funders of the research, particularly those such as industrial firms which are considered by the public to have a vested interest in the outcome of research. Using peer panels or independent consortia to plan, oversee, and manage research programmes are common ways of providing such a buffer. It was noted that peer panels could help assure quality both at the stage of proposal review and also during the research, when a panel can provide continuing, independent quality assurance through teams that visit the research sites periodically. WHO can provide a data base containing pre-screened candidates for this type of work. Access to the information should be controlled by WHO to preserve privacy and prevent commercial use. The International EMF Project can solicit names and requests for recommendations, and qualified users would receive either password access or a selected list upon application to the Project.

One member commented that WHO might coordinate and seek funds for the suggested meeting of epidemiologists interested in discussing exposure metrics and study design for the next generation of projects.

11. Adjournment

After afternoon coffee, the final wording of the press release describing the content of WHO's research agenda, arrived at with the advice of the committee, was discussed. The meeting concluded with the suggestion that the group reconvene in a year's time to review progress. The review would consider what research had been begun that was pertinent to the WHO research agenda, what new results had been reported, what changes in the agenda might be needed, and what additional studies were still being sought. The meeting adjourned with thanks to the chair, vice chair, working group chairs, Rapporteur's, organizers, and all attending.

References:

Repacholi, MH, ed. (1998) Low-level exposure to radiofrequency fields: Health effects and research needs. Bioelectromagnetics 19:1-19

Repacholi, MH and Cardis, E. (1997) Criteria for EMF health risk assessment. Radiation Protection Dosimetry 72: 305-312

Repacholi MH and Greenebaum B, eds. (1998) Interaction of static and extremely low frequency fields on living systems: Health effects and research needs. Bioelectromagnetics (submitted)