

“Measurements & Criteria for Standards Harmonisation for EMF Exposures”

Varna, Bulgaria, 03 May 2001

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Summary of plenary discussions

Dr Mike Repacholi and Professor Michel Israel led the session which discussed three important topics:

1. Criteria for Evaluating Scientific Studies for Standards

WHO considered that key findings should be replicated and all research for consideration should have been subjected to peer review when its design, results and conclusions could be critically examined.

Participants agreed that all public and occupational hygiene standards should be based on a careful analysis of the scientific literature. Scientists who work in hygiene standards development should be included in any review group. It was noted that most epidemiological studies were designed to study the possibility of a carcinogenic effect. Other pathological changes in health (for example: nervous system function; psychological, neurological or cardiovascular changes) should not be excluded. It was emphasised that the paper by Repacholi and Cardis [perhaps this should be Repacholi & Taki, *Mobile Telecommunications Safety*, edited by Kuster, Balzano & Lin, Chapman & Hall, London, 1997], published at the start of the project, was an important reference document. There was general agreement that dosimetric data should always be presented with results to avoid inconsistencies that had been indicated in some standards where SAR values could vary by three orders of magnitude. IEEE will shortly publish their criteria for research evaluation.

Consideration should be given to identifying the critical results that underpin the eastern European exposure restrictions and look to replicate them using the modern quality programmes for experimental design that are available in the literature.

2. Models for Determining Exposure Limits

The initial discussions centred on whether reporting specific energy absorption rate (SAR) was essential or whether just field strengths were enough. It was agreed that field strengths provided information about the source of the exposure, but SAR and induced current densities included considerations arising from the subject. It was agreed that sufficient data be provided to allow full dosimetric assessment which would improve comparison with other animal/subject models.

An important question was whether time weighted averaging (TWA) was relevant at all frequencies. It is agreed that some effects are acute, eg muscular stimulation, where TWA does not appear to have a role; but a stress reaction, for example may be dose related, ie a low field applied for a long time may be same as high exposures for short periods. The other averaging question upon which agreement is needed relates to partial body exposures and selection of the mass of tissue over which SAR will be averaged. Whatever time factor is under consideration in exposure guidelines should be explicitly stated with its justification. This not only improves public understanding, but also allows correct selection of exposure monitoring instruments that will have different time constants.

Information on exposure duration will be needed so that future development of a dose response relationship may be possible. This may then influence establishing guidelines.

3. *Uncertainty factors*

A number of aspects of experiment design may lead to uncertainties in the results reported. These may arise from the variability of the data or the biological subjects' age, gender or species. Currently, recommendations developed by ICNIRP and some other organisations apply a safety factor of ten to the observed effect threshold for occupational exposures, with an additional reduction factor of 5 for restrictions on public exposures (a healthy worker effect may be observed which should also be taken into account when deciding additional reduction factors). It was agreed that if the science improved then the safety factors should be altered - this may lead to relaxations or increased restrictions. It was generally agreed that safety factors should be derived from the scientific data available rather than social, economic or political factors. When communicating with the public it is important to remember that derived reference levels frequently include a high degree of conservatism (may be orders of magnitude, depending on the frequency of interest) which is why they should not be treated as limits in their own right.

The views expressed in Varna will be incorporated into the working papers that were initially drafted in San Antonio (November 2000) and will be circulated for discussion. Exposure guidelines and standards are extremely important because they have an enormous potential impact on people and business. However, they only have value if national authorities provide for systems to assess and monitor implementation and compliance.