



JULY 2007

GATEWAY INTERVIEW WITH MICHAEL REPACHOLI

The RF and ELF Gateways recently interviewed Dr. Mike Repacholi, retired chief of the International EMF Project at the WHO about the goals, methods, and accomplishments of the EMF Project and his own qualifications and motivations in leading it from 1996 to 2006. Repacholi suggested the need to “set the record straight” because some anti-EMF activist groups launched bitter attacks against the WHO EMF Project and his own personal integrity as its leader. He also reflects on the EMF issue in general. Certain clarifications are needed, he suggests, because some anti-EMF activist groups, particularly in Europe, have launched bitter attacks against the WHO EMF Project and against Repacholi’s personal integrity as its leader. This interview transcript is not under copyright restrictions and may be freely distributed.

Gateway: Let’s start with your background. Can you tell us a bit about yourself?

Repacholi: I have a B Sc in Physics (University of West Australia), a Masters in Radiation Biology (University of London, UK) and a PhD in Biology (University of Ottawa, Canada). I have worked in the NIR area since 1968, participated in 14 WHO Task Groups on various NIR topics, including as Chair of 4 of them. While I have conducted many EMF research projects, my strength lies in the evaluation of the scientific results. I have also participated on many research evaluation committees for various international and national organizations and have over 200 scientific publications. I am steadfastly committed that high-quality science should be used to guide decisions on health risks and standards on exposure limits.

Gateway: What were your qualifications for leading the WHO International EMF Project?

Repacholi: Prior to joining the WHO, I had been a member of the International Non-Ionizing Radiation Committee (INIRC) of the International Radiation Protection Association (IRPA) since 1978 and Chairman of INIRC from 1988-1992. This Committee was chartered at the IRPA Congress in Montreal in 1992 to be an independent commission called the International Commission on Non-Ionizing Radiation Protection (ICNIRP). The INIRC/IRPA had collaborated with the WHO, the International Labour Office (ILO), the International Commission on Radiological Units (ICRU), and the International Electrotechnical Commission (IEC) to produce health criteria documents, safety codes, standards limiting NIR exposure and other publications in the NIR field. ICNIRP has continued these collaborations as an independent commission.

I was elected the inaugural Chairman of ICNIRP in 1992 and continued until 1996. When I joined the WHO I resigned as Chair of ICNIRP because there was a conflict of interest (the WHO and ICNIRP were collaborating on many EMF Projects). In 1996 I was honored as Chairman Emeritus of ICNIRP, a lifetime, non-voting member.

I started the International EMF Project at the WHO because we were in the midst of a technological revolution and there was considerable concern about possible health effects from the EMF exposures they produced. The WHO was a very appropriate international umbrella organization that was highly respected by national health authorities and had some 50 years experience in assessing health risks from exposures to various chemical, biological and physical agents. As I had been working with the WHO since 1976 and knew the system well, I was asked by the WHO to start the EMF Project and get the funding for it.

Gateway: You came to the WHO International EMF Project from your role as Chairman of ICNIRP at its

charter in 1992, an organization that emphasizes independence from bias, especially from industry. Had you been part of the earlier IRPA working group on non-ionizing radiation protection? How did this involvement inform your understanding of the goals of the WHO EMF Project?

Repacholi: As Chair of ICNIRP I gained considerable experience in assessing the evidence for health risks at the international level, particularly while working with the WHO. The IRPA committees and ICNIRP had already worked with the WHO on the production of the earlier Environmental Health Criteria (EHC) monographs. The WHO criteria process for reaching conclusions on health risks was very important in designing the EMF Project. It became apparent that the EMF Project had to be designed in such a way as to get all the information needed to draft the best EHC monographs possible. This meant that the basic flow of activities for the EMF Project objective of determining if there were health risks associated with EMF exposure was: a review of the science, identification of research needed to improve our understanding of possible health risks, use of the WHO criteria to properly assess health risks from the science and then the publication of all results.

It became apparent that the WHO Fact Sheets for the public were one of the most useful forms of publication, although scientific publications and detailed reviews were necessary to keep the scientific community informed of the results. Finally, the results of the detailed scientific reviews were then turned into recommendations for national authorities on how they can best manage the EMF issues. To me it was important that any conclusions and recommendations were anchored in solid science, as is done in the ICNIRP.

Gateway: What was your original role at the WHO International EMF Project, and did it change over time as the scientific evidence and public interest changed?

Repacholi: I initially managed just the EMF Project. However, the Project became so successful that the WHO also asked me to manage the whole radiation program (including EMF, ultraviolet radiation and ionizing radiation).

The EMF Project was originally scheduled to last for 5 years, but it soon became apparent that the work could not be completed satisfactorily in this time frame; the research and assessment process was going to take over 10 years to do properly. In addition, national authorities needed to know how best to communicate with the general public. So the EMF Project devoted significant time and effort to develop good strategies for this. Finally, it seemed that new concerns were coming up all the time and these had to be addressed; they were not in the original plan (e.g., rapid growth of wireless technologies, questions about EMF effects on children etc). Over the years the EMF project had to adapt to the changing concerns of national authorities and the public.

WHO was also identifying the research that was still needed to be carried out by the world scientific community; this resulted in national and international agencies funding well over \$250 million worth of research on EMF, a huge success for the EMF Project. The WHO research agenda had to be updated with new EMF issues.

Gateway: Please outline the steps you and the WHO have taken and continue to take in order to insure that the WHO appropriately weighs all the scientific evidence, including analysis of recommendations made by task groups, working groups, and other expert panels, before it makes conclusions about possible health hazard and risk assessment?

Repacholi: In the WHO EMF is treated like any other physical, chemical or biological agent. Internationally accepted criteria for health risk assessment, which have evolved in the WHO over some 50 years and are very well accepted world wide, are used to evaluate health risks.

Working groups are established to review the literature on particular topics. For static fields, ELF fields and now RF fields, ICNIRP Standing Committees have been or are now conducting the initial reviews for the WHO. ICNIRP publishes these in their "blue book series." When completed, the reviews are put into

the format of the EHCs and sent out for extensive review by scientific specialists worldwide. When comments have been incorporated, the draft EHC is finally subjected to a WHO Task Group. These Task Groups receive the draft well in advance of the meeting, and then they spend a week in their meeting reviewing and updating the text, and make the final decisions on health risks.

WHO staff facilitate this process as the secretariat, but are not members of the Task Group. Task Group recommendations for further research and conclusions on health risk cannot be changed by the WHO. Following the Task Group review, the WHO facilitates the scientific and language editing to ensure a clear, consistent and polished monograph. Effectively the EHC belongs to the Task group, but the EHC then becomes the scientific basis for other WHO publications on the topic, such as a fact sheet. Fact sheets are approved by the Director General's office and so become WHO approved facts.

Gateway: Considering the many hundreds of EMF studies, how does the WHO review and select those it will rely upon to formulate the weight-of-evidence approach to risk assessment?

Repacholi: The number of publications on EMF continues to grow daily and it is a challenge to sort them out. The WHO has used workshops on specific topics to get updates. These have included important topics such as hypersensitivity and mobile phone base stations and wireless networks. In these workshops specialists in the topic give an overview of the scientific literature and leave plenty of time for discussion. These workshops have resulted in scientific review papers and fact sheets on these topics. It should be understood that the WHO is essentially an administrative facility and so WHO staff publish results and conclusions of workshops or formal reviews.

The Environmental Health Criteria (EHC) monographs represent the highest-level reviews of the scientific literature within the WHO. The EMF Project has now published EHCs for Static Fields and the Extremely Low Frequency (ELF) Fields and they are on the Project web site (www.who.int/emf). In the Preamble for these EHC there is a detailed description of the criteria for review and assessment (<http://www.who.int/peh-emf/publications/Preamble1.pdf>).

For any health risk the EMF Project follows the EHC assessment procedure:

1. All studies, both positive and negative, are treated equally but evaluated individually on their own merits with respect to quality, methodology, internal consistency, analyses and conclusions with respect to potential health impact.
2. Studies are then grouped according to their type (in vitro, in vivo and epidemiological) and a weight of evidence approach used to compare high-quality studies and determine whether or not most suggest there may be a possible effect on health. All studies must be replicated or at least be in accord with similar studies.
3. Finally all studies are combined, but weighted according to their type: epidemiological and human studies are given the highest weight, then animal studies and lastly in vitro studies. The International Agency for Cancer Research (IARC), a WHO specialized agency on cancer, uses the same procedure.
4. Finally a committee of specialists has to decide from these data whether or not EMF poses a risk to health.
5. Committee members sign a conflict of interest form prior to participation.

Gateway: This sounds like a straightforward process but there has been criticism that some individual studies offering support for a biological or purported EMF health effect exposure are suppressed, not given much weight, or “discredited.” Do you believe there is a responsibility to explain this process in specific cases?

Repacholi: Honestly it is in no ones' interest to leave out or discredit studies showing a positive effect. The only criteria for any study being given a lower weight is that its results have not been reproduced, or that the methodology, dosimetry or analyses do not come up to the required standard. In addition, the EMF Project has specifically recommended further research in areas where individual studies have produced results that needed confirmation. In this case I can point to my own animal study on PIM1 transgenic mice.

Before it could be accepted into the database for health risk assessment it had to be confirmed in similar studies. As it turned out, it was not replicated. The conclusion from this is that no one study can be used for health risk assessments; the weight of evidence approach used by the WHO has been shown to prove its value over the past 50 or so years.

Gateway: How do well-meaning scientists with sincerely different points of view resolve their differences? In your opinion, have the WHO, IARC, and the US NIEHS found a way to successfully air and resolve this issue? Is there room for improvement?

Repacholi: Throughout time, science has only progressed when all scientists are open-minded and can be persuaded by sound reasoning on the scientific results. The WHO requires that there be a range of scientific opinions at any of its workshops and task groups. This has been followed closely throughout the EMF Project. Alternative views are always welcome.

People perceive differences when the process of health risk assessment is not transparent. While there will always be room for improvement, I believe that the EMF Project, through its open workshops where all stakeholders are welcome to attend and comment, and the extensive review of papers prior to publication, has gone a long way to improving the acceptability of its conclusions and recommendations.

Gateway: Over the decade 1996 to 2006 coinciding with the International EMF Project's tenure, the Internet has become a forum for EMF debate and discussion. On the Web, a handful of vocal activist groups have occasionally charged that the WHO makes its EMF recommendations not motivated by higher public health interests but for the convenience of industry. They sometimes attack you personally. How do you respond to this? Have you found that constructive engagement with them is possible?

Repacholi: Activists have attacked the WHO and me almost since the EMF Project began; it is a very sensitive issue to many people. Many WHO staff members managing other sensitive health programs have also been attacked in a similar way, so this is not a new phenomenon. Some activists feel passionate about their stance and don't like it when the science does not agree with them. Since they do not have the scientific ability to debate the science they resort to personal attacks or say the WHO is in the pocket of industry, or both. Throughout my time at the WHO I can say unreservedly that all decisions were based on the science by committees of experts. Attacking the WHO or me is like shooting the messenger; it does not alter the facts.

The EMF project did engage with some activist groups, especially for the work on the use of precautionary approaches for EMF. In addition, these groups were given many of the initial drafts for review. Some success was gained by this engagement, but I found that when activist groups engaged with the WHO they were later spurned by other activist groups. During my term of office in the EMF project I wanted to engage reasonable activist groups, and we tried, but my impression now is that, overall, activists are not really interested in the science; unfortunately many are there just to make noise and names for themselves.

Gateway: Specifically, Serge Sargentini, President of Next-up, with Jean-Luc Guilmot of Belgium's anti-EMF organization, Teslabel, and others, have claimed that it's a "medical scandal" that WHO has not recommended that governments protect people against EMF hypersensitivity. But as WHO found in several meetings, workshops, and reviews of the literature over a span of years, scientific evidence shows that EHS individuals cannot detect EMF exposure any more accurately than chance, and the evidence does not link this misnamed syndrome, "electrosensitivity," to EMF exposure. Of all the findings from the WHO about EMF, it seems that it is one of the hardest for EMF activists to accept. Do you have an opinion about why this is?

Repacholi: The EMF Project spent many years trying to understand EHS. To assess all the facts, WHO held a special workshop in Prague to bring world scientists, treating physicians and activists like Ollie Johannsen to give presentations and discuss all aspects of EHS. The science was overwhelming, that EMF was not the cause of EHS. However, there is a strong belief among some EHS individuals that their symptoms were due to EMF exposure and they would not have their minds changed by any facts. Some

years ago, similar reactions were identified in individuals who felt their symptoms were caused by exposures to low levels of pollutants or chemicals in their environment.

In the EMF Project it was understood and conceded that most people would be convinced by the facts, but that there would always be fringe groups who would never be persuaded by the weight of evidence of the science. All EMF Project assessments, results and conclusions were, and continue to be in agreement with all other national and international peer-review committees assessing the same EMF topics. For example the UK HPA came to the same conclusions as the EMF Project.

Gateway: Activists have recently pointed to a study by Andrew Oxman of the Norwegian Knowledge Center for the Health Services and others that appeared in *The Lancet* ["Improving the use of research evidence in guideline development"] as evidence that the WHO has not made full and appropriate use of its own rules and recommendations for developing "evidence-based" health guidelines. As one media outlet put it, the WHO "forgets one key ingredient: evidence" [<http://www.newsmax.com/archives/articles/2007/5/8/155851.shtml>]. Would you care to comment on, and answer a criticism based on, Oxman et al.'s findings in relation to the WHO International EMF Project?

Repacholi: It is indeed unfortunate that some WHO programs are under huge pressure to come up with conclusions when there is insufficient evidence. In some WHO programs conclusions have to be made on only a few papers. I can say without hesitation that the EMF Project has always made decisions from the high quality research that is available. Over 6000 papers exist in the scientific literature on EMF; this number of publications makes it the second most studied agent in the world after ionizing radiation. Thus, there is a huge database from which to make decisions. In addition, for the past 10 years the WHO has been identifying research needs where gaps in knowledge exist. While there is still research needed in certain key areas, the EMF Project has only published its recommendations and conclusions in those areas where sufficient knowledge exist. The Oxman et al findings do not apply to all WHO programs and certainly not to the EMF Project.

Gateway: Do you think the ordinary person trusts WHO recommendations as much today as they did in the past? If yes, is it attributable to successful risk communication or something else? If no, are we seeing a general decline in respect for Authority in the world? Or is something else at work, perhaps a move to more shared authority? Is there an adjustment to be made by the WHO or ICNIRP to a new reality for public health policy?

Repacholi: While there seems to have been a general decline in trust and respect for Authority and scientific opinion over time by ordinary people, this may be because open (media publicized) scientific debates on issues are more common. People generally want to know whether something is safe or not (a black or white answer); they are less interested when scientists hedge their bets and offer shades of grey, which is typical for scientists who admit they don't know everything. Also there are many scientists who use public debate for their own ends, to get more research funds etc. This can lead to reduced trust. Less trust in authorities is mostly due to a lack of transparency and input from ordinary people.

There may have been a reduced trust in WHO recommendations by activists, but I don't believe this is the case for ordinary people. From all my feedback, the WHO is still the most highly respected health agency in the world, established by the United Nations to provide sound health advice that is based on the best-quality science available. WHO recommendations save millions of lives every year and are heavily relied upon by governments and by the huge majority of people around the world. Most countries automatically take WHO advice into their own policies. In the case of EMF, some countries may take a more cautious approach following pressure from their own citizens. At least the WHO provides the advice from which sound national policies can be developed.

I don't believe that ICNIRP or the EMF Project needs to make much adjustment in respect to public trust. Both organizations are not influenced by industry, regardless of what anyone says, and they have embraced a policy of openness (inviting stakeholders to open meetings to allow inputs from all segments of society) and transparency in their decision-making. Excellent criteria for decision-making have been developed

and, when used, should lead to the same conclusions by anyone. Certainly both organizations should be mindful not to erode trust.

Gateway: Since you retired from the WHO last July, the WHO, with Emilie van Deventer as the new chief of the EMF Project, has released its Environmental Health Criteria monograph on ELF EMF, held a well-attended workshop in Geneva in June on practical aspects of implementing the WHO recommendations in member states and around the world, and now presumably is turning toward planning the expert panels, workshops, and task groups for the same sort of review of the evidence for possible health effects of exposure to RF fields from mobile telephony, etc. Do you have any advice for us as we go forward? Did the process culminating in the ELF EHC work well? What does the future hold for EMF policy?

Repacholi: Emilie van Deventer worked with me for many years and is very capable of carrying on the key activities of the EMF Project. All decisions will still be based on the science and will not be influenced by any special interest group. She, as I was, will only be a facilitator for the gathering of science-based information from which WHO publications will come.

While the process of language and scientific editing of the ELF EHC was a long process, the final monograph is very high quality and has been well accepted worldwide. In addition, the WHO Fact Sheet resulting from this extremely detailed review made conclusions and recommendations that were exactly in accord with the science. The EMF project is in good hands.

The RF review process will generally follow the same procedure as the ELF. This process has been established by the WHO for many years. We will all have to wait and see what the WHO review groups conclude, but I am confident that it will be fully anchored on the science. My only advice is to be patient and let WHO do its work so that sound science forms the basis for policymaking.

Gateway: How can perceived conflict of interest be avoided as long as industry remains the largest funding source for EMF research? Any suggestions?

Repacholi: Before I retired from the WHO we conducted an analysis of funding for the EMF Project. It indicated that industry was providing less than 50% of the resources. Industry is not the largest funding source for the EMF Project. Further, industry funding was provided in a manner that no influence could be brought to bear on any decisions of the Project. WHO staff merely form the secretariat for the working groups and meetings that make the decisions and conclusions on health risk. It is not possible for WHO staff to influence results; they can only publish the results of these workshops and committees.

Further, it was felt at the commencement of the Project that industry was creating the health concern with its EMF devices and so should contribute funds to a project whose aim was to obtain better information on health risks. The WHO used the same principle that has been used by many national authorities, where industry contributed to research programs that were then managed by independent agencies or committees who ensure industry cannot influence the work.

I know that people may perceive a conflict of interest if industry provides any funding. Everyone can be assured that the WHO is well above any outside influence; it would not be worth spoiling its substantial reputation.