

Briefing for the States of Jersey Sub-Panel on Mobile Phone Masts
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From February 2007, Visiting Professor, University of Rome, Italy

Qualifications

A brief summary of my qualifications and professional status is given as Appendix 1. My main experience on mobile telephony and health comes from the 11 years I spent managing the International Electromagnetic Fields (EMF) Project at the World Health Organization (WHO) in Geneva. During this period I was Coordinator of the Radiation and Environmental Unit that was responsible for the entire radiation health and safety programme within WHO.

I was also the only foreign specialist on the much quoted UK Stewart Committee investigating mobile phones and health.

I retired from WHO on 30 June 2006, and so I do not represent or speak on their behalf, but have a very good knowledge of WHO's operating procedures, activities and publications.

Introduction

The Health, Social Security and Housing Scrutiny Panel established a Sub-Panel to consider public concerns relating to perceived health effects resulting from the increase in applications for mobile phone mast installations, following the recent expansion of the mobile telephony market. In undertaking this review the Sub-Panel will have regard to

- Advice provided by the Health Protection Department;
- International standards and best practice in respect of health precautions;
- Health concerns raised by the Public; and
- Reporting its findings and recommendations to the States.

My briefing to the Sub-Panel is in response to a general call for evidence prior to the hearing dates. I have been asked by Mr David Watson, CEO of Jersey Airtel Limited to provide a briefing on the possible health effects from exposure to the radiofrequency (RF) fields emitted by mobile telephone networks, international standards and best practice on health precautions, and particularly the results and current recommendations from the World Health Organization on mobile phone base stations.

I have been provided with a report on Mobile Phones and Health, mobile phone base stations, issued by Health Protection, Public Health Services of the States of Jersey Department for Health and Social Services, and a document entitled Jersey Mobile Phone Base Stations (Masts) issued by the Jersey Pressure Group Against Mobile Masts. My briefing will comment on both these reports.

Health effects of mobile phones and international standards

During the 11 years I spent managing the International EMF Project, much effort was spent reviewing scientific EMF studies, identifying gaps in knowledge where further research was needed to fill these gaps in order to make better health risk assessments, promoting this research to the world scientific community and providing sound, science based advice to national authorities on what to do to protect their citizens from possible health effects from exposure to EMF. Most of the studies and research during the past 10 years have investigated effects from RF fields emitted by mobile telephony networks.

Given the concerns expressed by people about mobile phones and their base stations, WHO held a special workshop on this topic in June 2005, inviting world class scientists with specialties in all areas needed to properly assess any health effects from mobile phone base stations. Following this workshop, WHO issued a Fact Sheet in May 2006 that summarized the its results aided by a review of scientific studies on the biological effects of RF fields. This Fact Sheet is attached as Appendix 2.

The Fact Sheet concludes: “Considering the very low exposure levels and research results collected to date, there is no convincing scientific evidence that the weak RF signals from base stations and wireless networks cause adverse health effects.” WHO’s Fact Sheet also recommends the use of International EMF standards: “International exposure guidelines have been developed to provide protection against established effects from RF fields by the International Commission on Non-Ionizing Radiation Protection (ICNIRP, 1998) and the Institute of Electrical and Electronic Engineers (IEEE, 2005). National authorities should adopt international standards to protect their citizens against adverse levels of RF fields. They should restrict access to areas where exposure limits may be exceeded.”

Our best scientific understanding is supportive of there being no consequences of base-station RF exposure on health, and none are foreseen at the levels typical of cellular telephone technology. This viewpoint is not only consistent with the conclusions of the 2005 WHO workshop on “Base Stations and Wireless Networks,” but it is also consistent with numerous other public-health reviews on the safety of wireless technologies. Some of these blue-ribbon, consensus-group conclusions are listed below.

The International Commission on Non-Ionizing Radiation Protection (ICNIRP, 1998) has developed guidelines to protect human health from exposure to EMF across the RF spectrum. These ICNIRP guidelines have been adopted by over 30 countries. Certain countries have instituted standards limiting emissions from cellular telephone base stations that are significantly below recommended ICNIRP limits. Such additional restrictions are not based on any known health effects, but rather tend to be either a precautionary measure or a “as low as reasonably achievable” (ALARA) measure that requires base station transmissions to be no more than required for providing a good service.

Several groups in Great Britain have evaluated potential health effects of RF. The Advisory Group on Non-Ionizing Radiation (AGNIR, 2003) updated the year 2000 report of the Independent Expert Group on Mobile Phones (IEGMP, 2000) and concluded that “Exposures due to living near to base stations are extremely low, and the overall evidence indicates that they are unlikely to pose a risk to health.”

http://www.hpa.org.uk/radiation/publications/documents_of_nrpb/abstracts/absd14-2.htm

The UK Health Protection Agency (formerly the National Radiation Protection Board) (NRPB, 2004a) also has concluded that RF energy can potentially cause health effects only if people are exposed to RF levels significantly exceeding international limits. That is, they recommended that exposure to EMFs (0 to 300 GHz) in the UK be based on the guidelines issued by the International Commission on Non-Ionizing Radiation Protection (ICNIRP, 1998).

(http://www.hpa.org.uk/radiation/publications/documents_of_nrpb/pdfs/doc_15_3.pdf).

In a specific review of cellular telephone technology (NRPB, 2004b), the agency proposed that even though “there is a lack of hard information showing that the mobile phone systems in use are damaging to health” they continued to endorse a “precautionary approach” to the use of mobile phone technologies.

(http://www.hpa.org.uk/radiation/publications/documents_of_nrpb/abstracts/absd15-5.htm)

The Health Council of the Netherlands (Health Council, 2002) has prepared a report on the potential risks of EM fields from mobile telephones. The report concluded: “The EM field of a mobile telephone does not constitute a health hazard, according to the present state of scientific knowledge.” Moreover, the review committee concluded that: “the scientific information concerning non-thermal effects discussed in this report provides no reason to apply the precautionary principle and lower the SAR limits for partial body exposure.”

<http://www.gr.nl/pdf.php?ID=377>

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA, 2003) prepared a Fact

Sheet entitled: “What about base stations and telecommunication towers – are there any health effects?” ARPANSA concluded: “The weight of national and international scientific opinion is that there is no substantiated evidence that RF emissions associated with living near a mobile phone base station or telecommunications tower poses a health risk.”

http://www.arpansa.gov.au/pubs/eme_comitee/fact9.pdf

The Royal Society of Canada has an “Expert Panel on Potential Health Risks of Radiofrequency Fields from Wireless Telecommunication Devices” and their most recent update (2004) notes that: “All of the authoritative reviews completed within the last two years have concluded that there is no clear evidence of adverse health effects associated with RF fields.”

http://www.rsc.ca//files/publications/expert_panels/RF//expert_panel_radiofrequency_update2.pdf

The advice of the US Health Physics Society (HPS, 2005) is that there is no reason to believe that cellular base-station towers could constitute a potential health hazard to nearby residents or students

<http://hps.org/publicinformation/ate/faqs/cellphoneqa.html>.

One can only draw the conclusion that there are no known or likely health effects from exposure to the RF fields emitted from mobile telephone base stations (masts). All national and local authorities are recommended by WHO to adopt and enforce international standards for EMF as has been done in the UK and many other countries world wide.

Comments on Reports

1. States of Jersey Department of Health and Social Services Report.

This report of April 2006 from Stephen D Smith (Assistant Director, Health Protection), notes one of the main concerns of people is that there is uncertainty associated with the science and hence possible long-term health effects, and further expansion of the networks should be curtailed. Health Protection provides a well thought-out and well researched response on the health issues. References to support the conclusions were made to recent reports in the UK and ICNIRP; also mentioned in my brief above.

An important note is made in the Health Protection report about the possible lack of communication with the public on the expansion of the network. Unfortunately this has been a problem of governments and operators world wide and is not just a local issue. WHO has recommended for some time that both government and operators should inform people to be affected by new base stations what is about to happen in their neighbourhood and provide them the necessary information for a basic understanding of the technology and safety aspects, and allow them an opportunity to comment.

Overall I found the report to be accurate and well referenced and that the conclusions and recommendations are in accordance with all other national and international conclusions. I believe the recommendations form a solid basis for the States of Jersey to move forward on this issue.

2. Jersey Mobile Phone Based Stations (Masts)

This report has a large amount of misinformation referring only to all the “activist web sites” instead of the national and international peer review panels and authorities that have been established to assess the safety of mobile telephony.

As an example of the misinformation, this report states that mobile phone base stations are considered a serious threat. This totally untrue according to all the national and international reviews listed above in my brief, and the WHO fact sheet of May 2006 (Appendix 2). Further, the report states that the UK has not updated its EMF guidelines since 1998. In fact after the Stewart report in 2000 their guidelines were updated to come in line with the ICNIRP guidelines that were adopted by the EC. They were also reviewed again in 2004 and confirmed (NRPB, 2004a,b).

While it is understood that people may not like to have base stations located near their homes, it is not a health issue. If it was, radio and TV, that emit the same sort of RF signals, would have caused a huge health concern long before mobile telephony.

References

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http://www.rsc.ca/index.php?page=expert_panels_rf&lang_id=1&page_id=120
- World Health Organization Fact Sheet N°304, Electromagnetic fields and public health: Base stations and wireless technologies. May 2006 <http://www.who.int/emf>

Appendix 1: Short CV
DR MICHAEL REPACHOLI

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Former Coordinator, Radiation and Environmental Health Unit
World Health Organization, Geneva, Switzerland
Responsible for WHO's radiation (ionizing and EMF) health programs 1996-June 2006.

B.Sc. (Physics) University of Western Australia
M.Sc. (Radiation Biology) London University, United Kingdom.
Ph.D (Biology) Ottawa University, Canada.

Past Chairman and Chairman Emeritus of the International Commission on Non-Ionizing Radiation Protection (ICNIRP).

Participant in 14 World Health Organization task groups on various NIR.

Member UK Expert Committee on Mobile Telephone Technology (Stewart Committee)
Member Program Management Committee of UK Mobile Telecommunications Health Research Program
Member of Italian Commission on NIR
Chair of Irish Working Group on EMF
Member of the Advisory Board for the European Commission's EMF-NET

- Fellow and Past President of the Australian Radiation Protection Society.
- Fellow and Past President of Australasian College of Physical Scientists and Engineers in Medicine.
- Fellow of the Australian Institute of Physics
- Fellow of the Institute of Physics, UK.
- Member of the Health Physics Society.
- Member of the Bioelectromagnetics Society.

Author or co-author of over 200 scientific publications

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Appendix 2: World Health Organization Fact Sheet on Base Stations and Wireless Networks

Fact sheet N°304
May 2006

Electromagnetic fields and public health

Base stations and wireless technologies

Mobile telephony is now commonplace around the world. This wireless technology relies upon an extensive network of fixed antennas, or base stations, relaying information with radiofrequency (RF) signals. Over 1.4 million base stations exist worldwide and the number is increasing significantly with the introduction of third generation technology.

Other wireless networks that allow high-speed internet access and services, such as wireless local area networks (WLANs), are also increasingly common in homes, offices, and many public areas (airports, schools, residential and urban areas). As the number of base stations and local wireless networks increases, so does the RF exposure of the population. Recent surveys have shown that the RF exposures from base stations range from 0.002% to 2% of the levels of international exposure guidelines, depending on a variety of factors such as the proximity to the antenna and the surrounding environment. This is lower or comparable to RF exposures from radio or television broadcast transmitters.

There has been concern about possible health consequences from exposure to the RF fields produced by wireless technologies. This fact sheet reviews the scientific evidence on the health effects from continuous low-level human exposure to base stations and other local wireless networks.

HEALTH CONCERNS

A common concern about base station and local wireless network antennas relates to the possible long-term health effects that whole-body exposure to the RF signals may have. To date, the only health effect from RF fields identified in scientific reviews has been related to an increase in body temperature ($> 1\text{ }^{\circ}\text{C}$) from exposure at very high field intensity found only in certain industrial facilities, such as RF heaters. The levels of RF exposure from base stations and wireless networks are so low that the temperature increases are insignificant and do not affect human health.

The strength of RF fields is greatest at its source, and diminishes quickly with distance. Access near base station antennas is restricted where RF signals may exceed international exposure limits. Recent surveys have indicated that RF exposures from base stations and wireless technologies in publicly accessible areas (including schools and hospitals) are normally thousands of times below international standards.

In fact, due to their lower frequency, at similar RF exposure levels, the body absorbs up to five times more of the signal from FM radio and television than from base stations. This is because the frequencies used in FM radio (around 100 MHz) and in TV broadcasting (around 300 to 400 MHz) are lower than those employed in mobile telephony (900 MHz and 1800 MHz) and because a person's height makes the body an efficient receiving antenna. Further, radio and television broadcast stations have been in operation for the past 50 or more years without any adverse health consequence being established.

While most radio technologies have used analog signals, modern wireless telecommunications are using digital transmissions. Detailed reviews conducted so far have not revealed any hazard specific to different RF modulations.

Cancer: Media or anecdotal reports of cancer clusters around mobile phone base stations have heightened public concern. It should be noted that geographically, cancers are unevenly distributed among any population. Given the widespread presence of base stations in the environment, it is expected that possible cancer clusters will occur near base stations merely by chance. Moreover, the reported cancers in these clusters are often a collection of different types of cancer with no common characteristics and hence unlikely to have a common cause.

Scientific evidence on the distribution of cancer in the population can be obtained through carefully planned and executed epidemiological studies. Over the past 15 years, studies examining a potential relationship between RF transmitters and cancer have been published. These studies have not provided evidence that RF exposure from the transmitters increases the risk of cancer. Likewise, long-term animal studies have not established an increased risk of cancer from exposure to RF fields, even at levels that are much higher than produced by base stations and wireless networks.

Other effects: Few studies have investigated general health effects in individuals exposed to RF fields from base stations. This is because of the difficulty in distinguishing possible health effects from the very low signals emitted by base stations from other higher strength RF signals in the environment. Most studies have focused on the RF exposures of mobile phone users. Human and animal studies examining brain wave patterns, cognition and behaviour after exposure to RF fields, such as those generated by mobile phones, have not identified adverse effects. RF exposures used in these studies were about 1000 times higher than those associated with general public exposure from base stations or wireless networks. No consistent evidence of altered sleep or cardiovascular function has been reported.

Some individuals have reported that they experience non-specific symptoms upon exposure to RF fields emitted from base stations and other EMF devices. As recognized in a recent WHO fact sheet "Electromagnetic Hypersensitivity", EMF has not been shown to cause such symptoms. Nonetheless, it is important to recognize the plight of people suffering from these symptoms.

From all evidence accumulated so far, no adverse short- or long-term health effects have been shown to occur from the RF signals produced by base stations. Since wireless networks produce generally lower RF signals than base stations, no adverse health effects are expected from exposure to them.

PROTECTION STANDARDS

International exposure guidelines have been developed to provide protection against established effects from RF fields by the International Commission on Non-Ionizing Radiation Protection (ICNIRP, 1998) and the Institute of Electrical and Electronic Engineers (IEEE, 2005).

National authorities should adopt international standards to protect their citizens against adverse levels of RF fields. They should restrict access to areas where exposure limits may be exceeded.

PUBLIC PERCEPTION OF RISK

Some people perceive risks from RF exposure as likely and even possibly severe. Several reasons for public fear include media announcements of new and unconfirmed scientific studies, leading to a feeling of uncertainty and a perception that there may be unknown or undiscovered hazards. Other factors are aesthetic concerns and a feeling of a lack of control or input to the process of determining the location of new base stations. Experience shows that education programmes as well as effective communications and involvement of the public and other stakeholders at appropriate stages of the decision process before installing RF sources can enhance public confidence and acceptability.

CONCLUSIONS

Considering the very low exposure levels and research results collected to date, there is no convincing scientific evidence that the weak RF signals from base stations and wireless networks cause adverse health effects.

WHO INITIATIVES

WHO, through the International EMF Project, has established a programme to monitor the EMF scientific literature, to evaluate the health effects from exposure to EMF in the range from 0 to 300 GHz, to provide advice about possible EMF hazards and to identify suitable mitigation measures. Following extensive international reviews, the International EMF Project has promoted research to fill gaps in knowledge. In response national governments and research institutes have funded over \$250 million on EMF research over the past 10 years.

While no health effects are expected from exposure to RF fields from base stations and wireless networks, research is still being promoted by WHO to determine whether there are any health consequences from the higher RF exposures from mobile phones.

The International Agency for Research on Cancer (IARC), a WHO specialized agency, is expected to conduct a review of cancer risk from RF fields in 2006-2007 and the International EMF Project will then undertake an overall health risk assessment for RF fields in 2007-2008.

FURTHER READING

[ICNIRP \(1998\) www.icnirp.org/documents/emfgdl.pdf](http://www.icnirp.org/documents/emfgdl.pdf)

IEEE (2006) IEEE C95.1-2005 "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz"

RELATED LINKS

- [Base stations & wireless networks: Exposures & health consequences](#)
- [Fact sheet: Electromagnetic fields and public health: Electromagnetic Hypersensitivity](#)
- [WHO handbook on "Establishing a Dialogue on Risks from Electromagnetic Fields"](#)
- [2006 WHO Research Agenda for Radio Frequency Fields \[pdf 791kb\]](#)

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