

RISKMANAGEMENT

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PUBLIC HEALTH AND ELECTROMAGNETIC FIELDS: OVERVIEW OF EUROPEAN COMMISSION ACTIVITIES

HISTORICAL BACKGROUND

Before the invention of radar, artificially produced microwave energy was not a general environmental problem. After people had discovered in the early parts of the 20th century that radio waves could be used to heat body tissues, some research was undertaken to study the mechanism of heating and its effect on the whole organism.



With the development of radar, early in World War II, health concerns related to exposure to electromagnetic fields (EMF) started within industrial and military circles. The question then was the possible deleterious effects that this new source of environmental energy could have on personnel. Research efforts began to take shape to address these concerns. Naturally, they started from previous medical research into the controlled biological effect of radiofrequency (RF) energy¹.

Between the early 1940's and 1960, research on the biological effects of microwave radiation, largely a US effort, slowly evolved from its medical context and the search for health benefits to a military-industrial perspective and the search for hazards. This resulted in a significant change of the funding pattern and institutional setting for most of the research, followed by the near abandonment of research effort on the biological effects of EMF in 1960. At that point, the military-industrial sponsors of the research had solved to their own satisfaction what were, to their own eyes, the major issues and stopped funding further work.

ICNIRP

Concern about the potential health effects of EMF lingered on through the 1970's and 1980's. At the end of this period, public awareness started to rise and various public bodies, including the European Commission (EC), realized the need for independent scientific advice on this issue. This led to the creation in 1992 of the International Commission on Non-Ionizing Radiation Protection (ICNIRP), a body of independent scientific experts recognized by the WHO. In 1998, the ICNIRP published its seminal *Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz)*. This was the first comprehensive attempt to produce a set of guidelines to protect the health of the general public from the potential health effects of EMF.

¹ Harold J. Cook, Nicholas H. Steneck, Arthur J. Vander and Gordon L. Kane, Early Research on the Biological Effects of Microwave Radiation: 1940-1960, *Annals of Science*, 37 (1980), 323-351

THE EU REGULATORY CONTEXT

In line with the European Union (EU) Treaty it is the Member States' responsibility to protect the health of the public and, in particular, to take decisions and measures regarding EMF exposure levels. However, EU regulators felt the need to provide



a common protective framework for the EU population. The purpose was to help Member States put coherent and comparable exposure limits in place. This led the European Council to adopt the *Council Recommendation (1999/519/EC) of 12 July 1999 on the limitation of the exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)*². The exposure limits set in the 1998 ICNIRP guidelines were taken over in the Council Recommendation 1999/519/EC.

This non binding text served as the framework of reference for the development of other EU legislation, especially Directive 2004/40/EC³ on the exposure of workers to EMF, as well as Directives 1999/5/EC⁴ on radio and telecoms equipment (also known as the R&TTE Directive) and 2006/95/EC⁵ relating to certain

2 Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz), Official Journal of the European Union L 199, pp 59-70, 30.7.1999, see <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1999:199:0059:0070:EN:PDF>

3 Directive 2004/40/EC of the European Parliament and of the Council of 29 April 2004 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields), Official Journal of the European Union L 184, pp 1-9, 24.5.2004, see <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:184:0001:0009:EN:PDF>

4 Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity, Official Journal of the European Union L 91, pp 10-28, 7.4.1999, see <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1999:091:0010:0028:EN:PDF>

5 Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (codified version) (Text with EEA relevance), Official Journal of the European Union L 374, pp 10-19, 27.12.2006, see <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:374:0010:0019:EN:PDF>

electrical equipment (also known as the Low Voltage Directive). These last two Directives led to the development of a number of technical standards that took the exposure limits in Recommendation 1999/519/EC as reference.

The Recommendation also invites the Commission to:

- ▶ „Encourage research into long and short-term effects of exposure to electromagnetic fields at all relevant frequencies [...].
- ▶ Continue to participate in the work of international organisations competent in this field and promote the establishment of an international consensus in guidelines and advice on protective and preventive measures.
- ▶ Keep the matters covered by this recommendation under review, with a view to its revision and updating, taking into account also possible effects [...], and
- ▶ To prepare a report, within five years, taking into account the reports of the Member States and the latest scientific data and advice.“

This is the basis of the EU policy action in this domain.

RECENT AND CURRENT EU ACTIVITIES

1. Advance scientific understanding

a) Research funding

In the context explained above, the Commission launched a major research effort on the potential health effects of EMF⁶ under the 5th Framework programme for Research⁷ (FP5; 1999-2002). This first wave of research led in particular to the funding of the INTERPHONE project.

During the same period, large research efforts on this issue were made in the EU and worldwide that fuelled a significant advancement of knowledge on the issue. Unfortunately, these efforts, while providing reassurance on a number of points have, so far, not provided conclusive evidence on the potential long-term effects of the various types of EMF.

Under these conditions, the Commission continued to fund research on the issue under FP6 (2003-2006, see in particular EMF-Net⁸) and FP7 (2007-2013).

6 http://ec.europa.eu/health/electromagnetic_fields/research/funding/index_en.htm

7 ftp://ftp.cordis.europa.eu/pub/life/docs/emf_brochure_sheets.pdf

8 <http://web.jrc.ec.europa.eu/emf-net/>

Three projects are currently running:

- ▶ MOBI-KIDS⁹, a case-control epidemiological study aiming at determining whether there is a link between mobile phone use and brain cancer in children and adolescents, and
- ▶ SEAWIND¹⁰, a project aiming at developing instrumentation and procedures for the accurate assessment of exposure to EMF and demonstrating compliance with exposure limits and at assessing typical daily-life exposure scenarios.
- ▶ ARIMMORA¹¹, a project on possible biophysical interaction mechanisms that could clarify the association between residential exposure to extremely low frequency EMF and childhood leukemia observed in epidemiological studies.

Two smaller projects have been funded by the EU Health Programme (2008-2013)¹². One aimed at analysing the actual exposure of the general public to EMF in the EU and at identifying measures that could be taken to reduce the exposure of the general public to EMF¹³.



The main objective of the other, the European Health Risk Assessment Network on Electromagnetic Fields Exposure (EFHRAN)¹⁴, is to maintain capacity and scientific expertise in the EU for assessing the potentials risks linked to exposures to EMF. EFHRAN also plays a role in improving the compilation of knowledge and its dissemination on issues related to EMF and health. However, the

9 <http://www.mbkds.com>

10 <http://seawind-fp7.eu/>

11 http://ec.europa.eu/health/electromagnetic_fields/docs/fp7_arimmora.pdf

12 <http://ec.europa.eu/eahc/health/index.html>

13 http://ec.europa.eu/health/electromagnetic_fields/docs/bio_frep_en.pdf

14 <http://efhran.polimi.it/>

EU has other, more formal tools at its disposal for assessing the potential health risks related to exposure to EMF.

b) Assessing the scientific evidence

As called for by the Council Recommendation, the Commission is keeping „the matters covered by this recommendation under review“. So far, the Commission has requested four independent scientific assessments of the validity of the exposure guidelines to make sure they provide a high level of protection to the public:

- In 1998 by the Scientific Steering Committee¹⁵,
- In 2001 by the Scientific Committee on Toxicity, Ecotoxicity and the Environment¹⁶,
- In 2007 and 2009 by the Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR)^{17,18}

To date, these assessments have not identified any scientific rationale that could lead to a revision of the exposure limits. However, in 2009, the SCENIHR also produced recommendations for additional research¹⁹ to address a number of knowledge gaps. In 2010, the WHO also produced recommendations for a research agenda on RF fields²⁰. These two sets of research recommendations are coherent with each other.

Today, research results keep appearing that provide new insights, sometimes from the application of new experimental techniques, such as PET scans²¹. As science is moving forward DG SANCO has decided to organize a scientific conference in November 2011, to identify the areas of scientific consensus on potential health effects of EMF and to develop proposals on a strategy to address the remaining knowledge gaps.

2. Monitor policy actions and public opinion

While scientific knowledge is steadily moving forward, scientific controversies continue to rage and the issue continues to mobilize millions of concerned citizens across the EU. The development of a policy approach at EU level requires information in three main areas: the regulatory situation across EU Member States, the state of the public opinion, and developments at international level.

15 http://ec.europa.eu/food/fs/sc/ssc/out19_en.html

16 http://ec.europa.eu/health/archive/ph_risk/committees/sct/documents/out128_en.pdf

17 http://ec.europa.eu/health/archive/ph_risk/committees/04_scenihr/docs/scenihr_o_007.pdf

18 http://ec.europa.eu/health/archive/ph_risk/committees/04_scenihr/docs/scenihr_o_022.pdf

19 http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_024.pdf

20 <http://www.who.int/peh-emf/research/agenda/en/index.html>

21 Nora D. Volkow et al., Effects of Cell Phone Radiofrequency Signal Exposure on Brain Glucose Metabolism, JAMA. 2011;305(8):808-813. doi: 10.1001/jama.2011.186

a) *The regulatory situation in EU Member States*

The Council Recommendation requires a 5-yearly reporting on the state of its implementation in Member States. This general reporting can only be performed by compiling information provided by each Member State. To that end, the Commission is organising periodic information meetings with Member States and is making periodic surveys of the regulatory situation in Member States.

The last implementation report on the Council Recommendation was published in 2008²².

b) *Public opinion on EMF*

Developing a policy on EMF also requires a good knowledge and understanding of the public opinion. In 2006, the Commission had performed a first Eurobarometer survey on EMF that showed a high level of concern among the public. In order to know whether the situation had changed, the Commission ran another Eurobarometer survey in 2010²³. This latest survey showed that among the 15 environmental factors presented as potential threats to health, the sources of EMF appear in the lowest five positions. Among these, high voltage power lines and mobile phone masts came first with 35% and 33% of the respondents respectively believing that they affect their health to a large extent. There was a general gradient of concern from northern Europe (low) to southern Europe (high).

Interestingly, the survey showed that while more than two thirds of the respondents believe that their health is affected to some extent by high voltage power lines, mobile phone masts and mobile phone handsets, only 46% say that they are very or fairly concerned about the potential health risks of EMF. There is a slight decrease in concern across the EU between 2006 and 2010 (48% to 46%). Moreover, 58% of Europeans do not believe that public authorities protect them from potential health risks linked to EMF. Particularly high figures were found in Greece (75%), Latvia (72%), Lithuania (71%) and Slovenia (70%).

The 2010 survey asked for the first time how people thought that the EU could support their national authorities in protecting them from the potential health risks from EMF. Overall, nearly half of the respondents (48%) feel that the EU should inform the public on these potential health risks, with particularly high figures in Cyprus (77%), Greece and Slovenia (both 67%). Finally, 39% believe the EU should set safety standards for products and a further 36% believe it should develop guidance for public health protection.

²² http://ec.europa.eu/health/electromagnetic_fields/eu_actions/implementation_reports/index_en.htm

²³ http://ec.europa.eu/health/electromagnetic_fields/eurobarometers/index_en.htm



c) *Developments at international level*

With respect to international cooperation, the European Commission (EC) is maintaining a good relationship and exchange of information with the International EMF Project of the WHO and participates in international events such as the GLORE (Global Coordination of RF Communications on Research and Health Policy) conference.

3. Communicate, inform and build trust

Media articles, letters of citizens, written questions from the European Parliament and the Eurobarometer surveys confirm that European citizens are concerned about the potential health effects of EMF and have little trust in the ability of public authorities to protect it.

This means that, in spite of the broadly reassuring independent scientific assessments, the perception within parts of the public on potential health effects of EMF remains negative. This has adverse consequences, not only for the deployment of new wireless services and technologies, but also on the construction of new power lines, a major element of the EU energy policy for the next decades.

This calls for specific, long-term actions. Beyond the systematic response to letters and parliamentary questions, the Commission has developed a website on EMF and health: http://ec.europa.eu/health/electromagnetic_fields/policy/index_en.htm.

The Commission also writes articles, replies to letters, and participates in interviews. In May 2011, the Commission launched a Stakeholder Dialogue Group on EMF to provide it with advice and policy recommendations on how to manage matters relating to EMF and health at EU-level²⁴. This group of 17 people covers the various points of view on the question, a broad range of EU regions, and all necessary fields of expertise and types of credentials. It includes members from academia, industry, NGOs, research, and civil service, who were, importantly, all

²⁴ <http://ec.europa.eu/transparency/regexpert/detailGroup.cfm?groupID=2535>



recruited in their personal capacity to be able to engage in open and constructive discussions.

The objective of the group is to achieve a consensus on a way forward to try and resolve the ongoing controversies and to address the various outstanding issues. The desired outcome would be a proposed plan on what to do next for each of the main stakeholders. This would be a good chance for forming the basis for new policy developments.

CONCLUSION

Exposure to EMF is widespread in today's society and rapid developments in mobile telecommunication and other electronic appliances have substantially increased the number of sources and types of EMF we are exposed to.

While these devices contribute to our quality of life in many ways, concerns regarding possible health effects could not be fully dispelled despite overall reassuring results from numerous official scientific assessments. In its various roles and functions, the European Commission is keeping the dialogue with all stakeholders open to reconcile as much as possible the different interests to deliver the benefits that new technologies can bring to society while controlling the unacceptable risks.

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The „EMF Spectrum“ contains reports on studies and conference proceedings written by experts from different fields of EMF research. The authors analyze research findings, explore wireless technologies and shed light on current topics regarding the electromagnetic compatibility with the environment. Currently the EMF Spectrum is only available in German.

For further information about the working group „EMF and Environment“ please visit: <http://www.wik-emf.org/home.html?&L=1>