

Safety of Future Technologies: a global approach based on science

Bernard Veyret

University of Bordeaux, IMS laboratory, 33607 Pessac, France

e-mail: bernard.veyret@ims-bordeaux.fr

100-word summary

One of the main concerns related to EMF producing technologies and health has been the fact that their fast deployment has never been preceded by research and health risk assessment. The rapid changes in technology and usage have made it very difficult to plan research programmes. The scientific assessment has always come late and guidelines have in principle been set as independent of the various technology. We need to look at the recent past, in terms of risk assessment, perception and management.

Introduction

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EMF-emitting technologies

Across the whole EMF spectrum, there are new technologies being implemented or improved (e.g., 3G and 4G in mobile telephony). An ICNIRP document provides a good overview of the various technologies and their applications (Statement on EMF Emitting New Technologies. Health Physics 94(4):376-392; 2008 www.icnirp.de).

Risk assessment

In the coming years, major health-risk assessment will be performed for RF (IARC) while the process is behind us for static and ELF fields. There is nothing planned for intermediate frequencies, millimetre and THz fields, but scientific surveillance is done by several institutions such as the Swedish Radioprotection Authority (SSM www.stralsakerhetsmyndigheten.se) and European programmes such as EFHRAN (<http://efhran.polimi.it/index.html>).

Risk perception

The basic equation for risk perception in this areas and many others is very simple: new technologies equals new fears, fuelled by media coverage, lack of scientific information and action of some pressure groups.

A major bias in risk perception has been the rapid increase in number of electrohypersensitive (EHS) people, across the EMF spectrum. New technologies can only add to this phenomenon, in spite of the fact that no causal link has been found between the exposure and the symptoms.

Research

Major research efforts have been made to address the health issues related to power lines and mobile telephony (up to 20 M\$/year). Much less was spent on intermediate frequencies. In the millimetre and THz ranges, research activity has so far been minimal. However, most of the EMF-emitting new technologies (Wi-Fi, 3 and 4G) are operating in the GHz range and the research has only started, in spite of major worldwide deployments. The question is therefore whether data obtained with the 2G signals can be extrapolated. This is also true for the intermediate frequency to be extrapolated from both sides (RF and ELF).

The weight of each research approach aimed at human health risk assessment is in descending order: epidemiology, laboratory studies in humans, animals, cellular systems, and mechanisms. RF research agendas and the one of WHO in particular have been instrumental in assisting countries to develop national funding priorities in this area (WHO update in 2010). The goal is to reduce scientific uncertainties through research, and respond to public concern through the development of better risk communication. In the update of the WHO agenda, there is only one item classified as “other research needs” (i.e., non high-priority item), which is to “identify the best set of experimental tests to detect cellular response after exposure to new RF technologies and co-exposures of RF EMF with environmental agents”. This is a far-reaching goal that makes sense only if effects can be found, which has not been the case so far using the current signals.

The whole research strategy related to new signals can be implemented if there is sufficient political will to set the health assessment and risk management on scientific grounds. However, the trend is today for a major decrease in research funding, which makes it very difficult to forecast the situation in a context of concerns and fears of the general public.

Risk management

Risk management is in principle done by national or supranational bodies as a political means to help protect populations in case of established risks (prevention) or suspected risks (precaution). In the case of EMF emitting technologies, the consensus so far is that, in the absence of established health risks, there is no need for prevention, but the Precautionary Principle has been often invoked as if there were concerns about potential severe health effects. As a consequence, exposure limits have been lowered in some countries (such as Belgium recently). Risk management remains a political tool that is not supposed to alleviate public fears in the absence of scientific evidence. The new technologies are not going to alter much the exposure pattern and should therefore not change much the approach, unless the management of fears of the unknown play a major political role.

Conclusion

One of the key issues is to keep informing the public and all stake holders about the research findings and their interpretation in terms of exposure assessment and hazard identification. One will need to explain that the overall exposure level is not increasing much and that the signals are all the same as long as the mechanism is thermal in the RF range.

New technologies will mainly add to the perceived risk of health effects in children, long-term and multiple-source exposure.

