The WHO
International EMF Project

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Radiation and Environmental Health
Public Health and Environment
World Health Organization
Geneva, Switzerland
The Present Global Context

- Ever more sophisticated RF systems
- Increasing number of devices and users

⇒ Increasing exposure to EMF
⇒ Increasing concern from the public
Mobiles ‘boost cancer’
Radiation may make tumours grow faster

By Tim Utton
Science Reporter

New safety fears about mobile phones emerged yesterday over a possible link with cancer.

Radiation from the phones could promote the growth of tumours, according to scientists.

A new study suggests the radiation can kick cancer cells into ‘high gear’ and make tumours grow much more aggressively.

There are 40 million mobile users in the UK, but despite the millions spent on research in the last decade, the health implications of sustained use are still unclear.

The biggest British study, led by Sir William Stewart two years ago, could find no evidence of a risk to health. But Sir William still recommended a precautionary approach, particularly in children.

The World Health Organisation has called for more research and has urged people to limit mobile use.

Now Italian scientists believe they could be closer to the truth.

Dr Fiorenzo Marinelli, of the National Research Council in Bologna, exposed leukaemia cells in the laboratory to 48 hours of continuous radio waves at a similar power and frequency to mobile phone emissions.

Initially, the radiation killed the cancer cells. But then the scientists noticed this lethal effect had gone into reverse as a ‘survival mechanism’ was triggered, which made them replicate at a ferocious speed.

Dr Marinelli said: ‘We don’t know what the effects would be on healthy human cells.

‘But in leukaemia cells the response is always the same.’

The radiation may initially damage DNA, he said, interfering with chemical signals in a way that ultimately triggers the defensive reaction prompting cancer cells to replicate faster.

Cancer develops when control signals in a normal cell go wrong and an abnormal cell results. Instead of destroying itself the mutant cell keeps on dividing and forms a lump or tumour.

The results of the Italian study support the belief of some scientists who say radiation can damage DNA and destroy the cell repair system – making tumours more deadly.

Dr Peter de Pomerai of the University of Nottingham, who studied effects on the body earlier this year, said the research was ‘intriguing’.

Radiation may indirectly damage DNA by affecting its repair system, he said. If the DNA repair mechanism does not work as well as it should, mutations in cells could accumulate – with disastrous consequences.

‘Cells with unrepaired DNA damage are likely to be far more aggressively cancerous,’ said Dr de Pomerai. Dr Marinelli presented his results at the International Workshop on the Biological Effects of Electromagnetic Fields, held in Greece.

The study is published in this week’s New Scientist.

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The Present Scientific Knowledge

- Large and increasingly sophisticated database
- Known mechanisms
- Health effects not established below international guidelines
- Scientific uncertainty … precaution?
OUTLINE

• Introduction

• The WHO International EMF Project
  – Risk assessment of EMF research
  – Risk management programs
  – Risk communication tools

• Conclusions
"HEALTH is a state of COMPLETE physical, mental and social well-being and not merely the ABSENCE of disease or infirmity"

(WHO Constitution)
• Established in 1996
• To assess health and environmental effects of exposure to electromagnetic fields in the frequency range from 0 to 300 GHz
• A multinational, multidisciplinary effort to create and disseminate information appropriate to human health risk assessment for EMF
• Coordinated by WHO
Characterizing evidence in EMF risk assessment, Berlin, 4-5 May 2006

Structure

EMF Project Secretariat

International Advisory Committee

Research Coordinating Committee

Standards Harmonization Committee

International Organizations

Collaborating Institutions

National Authorities
EMF: An Environmental Risk?
WHO EMF Project and Research

- WHO does NOT perform research
- WHO does NOT fund research

- WHO coordinates research
  - E.g. French-Russian study

- WHO assesses research
  - Scientific workshops
  - Health risk assessments
WHO and EMF Research

http://www.who.int/emf

What has been done?
- WHO Research reviews
- Health Risk Assessments

What is being done?
- WHO Research Database

What needs to be done?
- WHO Research Agenda
Research agenda

Introduction

This Introduction is followed by the definitions used by WHO International EMF Project. The next section of the agenda is a list of needed EMF research that still needs to be conducted and assessments of any health risks from exposure to EMF.

The list of required research is followed by a set of general guidelines for quality EMF research that includes resources for further investigation of the characteristics of good EMF research.
Scientific Process

Science

Define hypothesis
Design study
Seek funding
Conduct study
Publish study in peer-reviewed journal
Incorporate study in health risk assessment

Policies
RESEARCH
Balance of studies needed

Risk assessment of all health outcomes (Environmental Health Criteria)

Hazard identification and classification of possible carcinogens (Monographs)
### Health Risk Assessment Schedule

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<tr>
<th>Static</th>
<th>ELF</th>
<th>RF</th>
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**INTERPHONE** multinational epidemiologic study

IARC evaluation of *carcinogenic* risks to humans from RF

WHO assessment of all health risks to humans from RF
Key Issues

WHO workshop on
Electromagnetic hypersensitivity
Prague, October 2004

WHO workshop on
Children sensitivity to EMF
Istanbul, June 2004
Key Issues

WHO workshop on
Base stations and wireless networks
Geneva, June 2005

http://www.who.int/peh-emf/meetings/base_stations_june05/en/
N. Kuster, WHO Base station workshop, June 15, 2005
http://www.who.int/peh-emf/meetings/archive/bsw_kuster.pdf
Los campos electromagnéticos y la salud pública

Estaciones de base y tecnologías inalámbricas

Hoy día la telefonía móvil es algo corriente en todo el mundo. Esa tecnología inalámbrica se basa en una amplia red de antenas fijas o estaciones de base que transmiten información mediante señales de radiofrecuencia (RF). Hay más de 1,4 millones de estaciones de base en todo el mundo, y la cifra está aumentando de forma considerable con la aparición de las tecnologías de tercera generación.

Hay otras redes inalámbricas que permiten obtener servicios y acceso a Internet de alta velocidad, como las redes de área local inalámbricas (WLAN), cuya presencia también es cada vez más frecuente en los hogares, las oficinas y muchos lugares públicos (aeropuertos, escuelas y zonas residenciales y urbanas). A medida que crece el número de estaciones de base y de redes locales inalámbricas, aumenta también la exposición de la población a radiofrecuencias. Según estudios recientes, la exposición a RF de estaciones de base oscila entre el 0,002% y el 2% de los niveles establecidos en las directrices internacionales sobre los límites de exposición, en función de una serie de factores, como la proximidad de las antenas y su entorno. Esos valores son inferiores o comparables a la exposición a las RF de los transmisores de radio o de televisión.
Characterizing evidence in EMF risk assessment, Berlin, 4-5 May 2006

OUTLINE

Science
- Scientific Reviews
- Health Risk Assessment

Communication
- Information
- Risk Perception
- Dialogue

Policies
- Standards
- Legislation
- Precaution

World Health Organization
Norms, Standards and Guidelines

- **Emission standards** have specifications that limit the EMF emissions from devices

- **Exposure standards** have specifications that limit EMF exposure to people
• **Emission standards** have specifications that limit the EMF emissions from devices

• **Exposure standards** have specifications that limit EMF exposure to people
International EMF Project

EMF WORLD WIDE STANDARDS
| Country #1 | Peru |
| EMF protection #2 | Yes |
| Instrument type #3 | Decree |
| Instrument coverage #4 | National |
| Title of Instrument #5 | |
| Issued by whom? #6 | Ministry of Transport and Communications, MTC |
| Issued when? #7 | July 2003 |
| Is there a revision pending? #8 | Yes |
| Are the limits based on ICNIRP? #9 | Yes |
| Compliance #10 | Mandatory for MTC-licensees and grantees |
| If mandatory - how is | MTC review and supervisory activities |
New policy documents …. 
Model Legislation

- To assist countries without appropriate legislation to protect their population from EMF
- Uses international standards for exposure and emission limits

- Model Act and
- Model Regulation
- Explanatory Memorandum

Framework for Developing EMF Standards

Motivation

• Many countries currently considering new EMF standards

• Concerns about public safety and anxiety about increasing EMF exposures from new technologies

• Large differences between national standards

Framework
Guiding Public Health Options in Areas of Scientific Uncertainty

- Science-based and precautionary options for EMF
- ELF and RF case studies
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Challenges

- Technologies on the market before health evaluation
- Lack of harmonization in standards
  - Restrict technological advances and loss of benefits
- Public concern
  - Need for scientists and decision-makers to communicate with all stakeholders
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