WHO Research Agenda for RF fields

Dr E. van Deventer

World Health Organization

Outline

- Introduction
- The WHO RF Research Agenda
  - Motivation
  - Background
  - Content
- Discussion

World Health Organization

International EMF Project

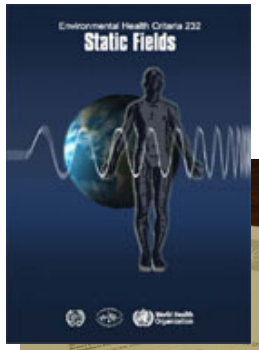
- Established in 1996
- Coordinated by WHO HQ (SDE/PHE/RAD)
- A multinational, multidisciplinary effort to create and disseminate information appropriate to human health risk assessment for EMF

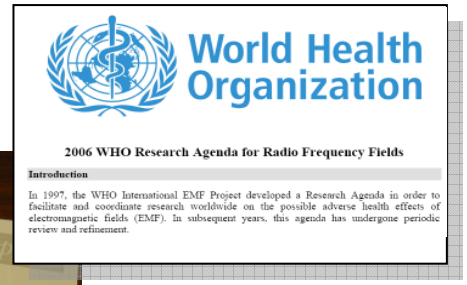
- To **assess health and environmental effects** of exposure to non-ionizing radiation (0-300 GHz)
- To **provide technical assistance** in strengthening national capacities for the sound management of EMF

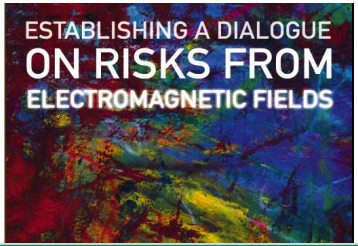
World Health Organization

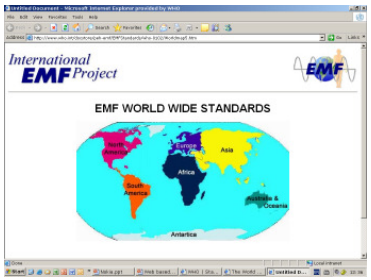
EMF: An environmental risk?

Science
Risk Assessment



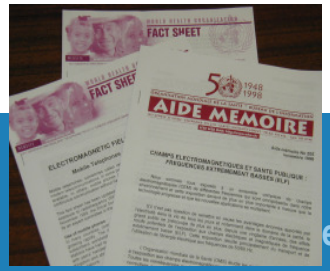






Public Concern
Risk Perception

Policies
Risk Management



World Health Organization

WHO EMF Project and Research

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

- ☑ WHO promotes research
- ☑ WHO assesses research
  - Scientific workshops
  - Health risk assessments

World Health Organization

WHO and EMF Research

http://www.who.int/emf

What has been done?

What is being done?

What needs to been done?

time

- WHO Research reviews
- Health Risk Assessments

WHO Research Database

WHO Research Agenda

World Health Organization

Research Agenda
Motivation

Funding Agencies

Sixth Framework Programme
2002 - 2006

MTHR
Mobile Telecommunications and Health Research

World Health Organization

Research agenda

Introduction

This Introduction is followed by the definitions used by WHO International EMF Projec
The next section of the agenda is a list of needed EMF research that still needs to be co
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 r
that includes resources for further investigation of the characteristics of good EMF resea

World Health Organization

Research Agenda

Goal: To promote studies which demonstrate a reproducible effect of EMF exposure that has the likelihood to occur in humans and has a potential health consequence

Research needs

- identified when the evidence for a health risk is judged **suggestive, but insufficient** to meet the criteria for assessing health risk
- established on the basis of **unconfirmed effects** having implications for health, and need for **replication** of key studies to confirm effects

World Health Organization

2006 WHO Research Agenda for Static Fields

Introduction

In 1997, the WHO International EMF Project
facilitate and coordinate research worldwide
electromagnetic fields (EMF). In subsequent y
review and refinement.

In December 2004, WHO carried out a health risk
fields, which was published as a WHO Environ
the objectives of the review was to identify gaps i
static field exposure. The Task Group conducting

- For static electric fields, there appears to be l
health effects. None of the studies conducted
except for possible stress resulting from rep

World Health Organization

2007 WHO Research Agenda for Extremely Low Frequency Fields

Introduction

In 1997, the WHO International EMF Project developed a Research Agenda in order to facilitate and coordinate research worldwide on the po
electromagnetic fields (EMF). In subsequent years, this
review and refinement.

In October 2005, WHO carried out a health risk assessment
electromagnetic fields up to 100 kHz, which is published
Criteria monograph[1]. Gaps in knowledge about possible he
are identified in this monograph, and form the basis for re
this Research Agenda.

Following a standard health risk assessment process, it w
substantive health issues related to ELF *electric* fields at

World Health Organization

2006 WHO Research Agenda for Radio Frequency Fields

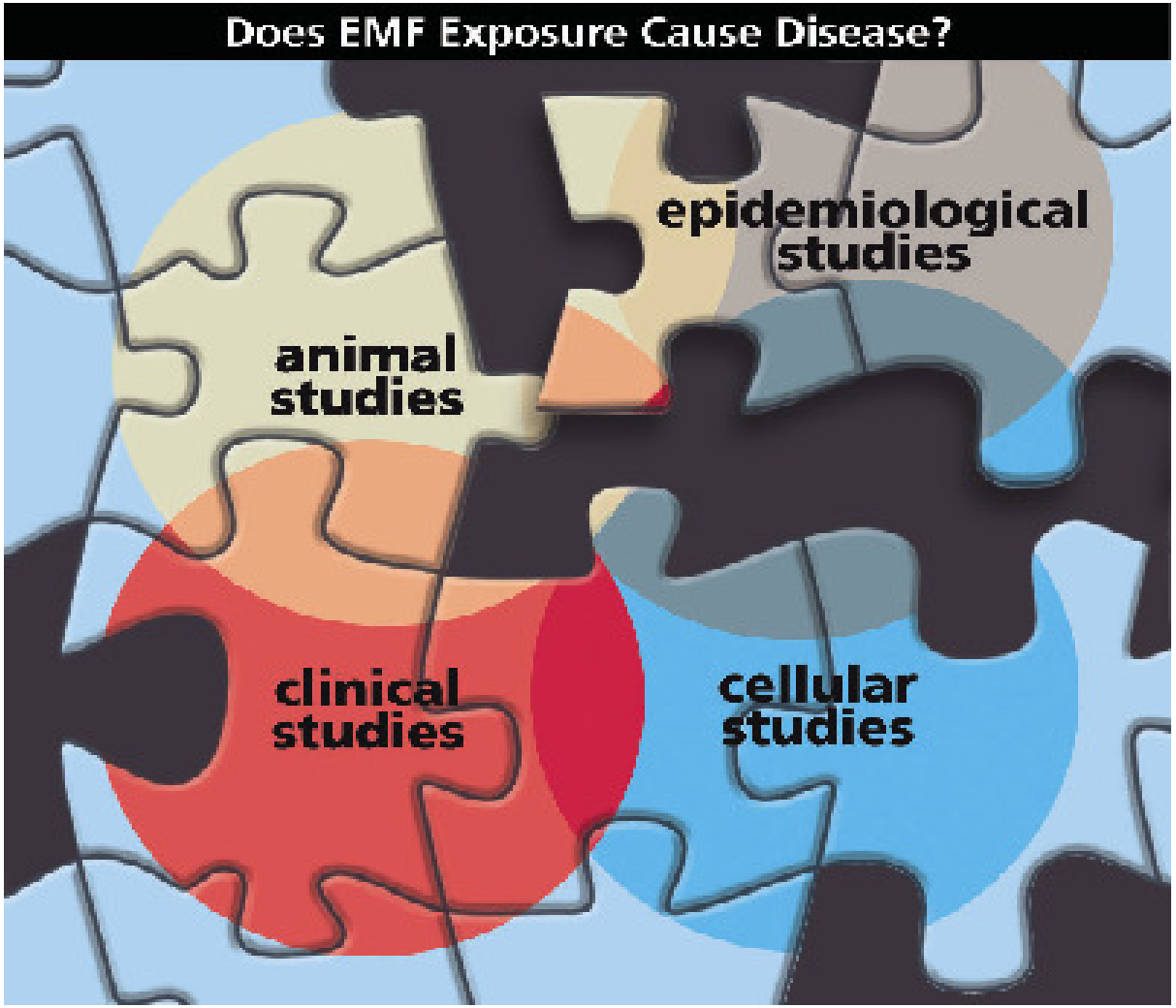
Introduction

In 1997, the WHO International EMF Project developed a Research Agenda in order to facilitate and coordinate research worldwide on the possible adverse health effects of electromagnetic fields (EMF). In subsequent years, this agenda has undergone periodic review and refinement.

In June 2003, a major update to the radiofrequency (RF) section of the Research Agenda was undertaken with the input of an ad hoc committee of invited scientific experts. Since then, several of the research needs have been addressed and a revision was therefore deemed necessary. Also, three specialized workshops[1] have been held since 2003, where research needs in the RF range were determined. These have been consolidated in October 2005, by an ad hoc committee of scientific experts, into the present RF Research Agenda, which supersedes all previous RF Research Agendas.

RESEARCH

Balance of studies needed



http://www.niehs.nih.gov/emfrapid/booklet/emf2002.pdf

World Health Organization

Outline

- Introduction
- The WHO RF Research Agenda
  - Motivation
  - Background
  - Content
- Discussion

RF Research Agenda
Background

- Research agenda updated periodically
  - 1997, 2003, 2006
- Ad-hoc committee of experts
- Outputs of WHO workshops

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

World Health Organization

2006 WHO Research Agenda for Radio Frequency Fields

Introduction

In 1997, the WHO International EMF Project developed a Research Agenda in order to facilitate and coordinate research worldwide on the possible adverse health effects of electromagnetic fields (EMF). In subsequent years, this agenda has undergone periodic review and refinement.

In June 2003, a major update to the radiofrequency (RF) section of the Research Agenda was undertaken with the input of an ad hoc committee of invited scientific experts. Since then, several of the research needs have been addressed and a revision was therefore deemed necessary. Also, three specialized workshops[1] have been held since 2003, where research needs in the RF range were determined. These have been consolidated in October 2005, by an ad hoc committee of scientific experts, into the present RF Research Agenda, which supersedes all previous RF Research Agendas.

The specialized workshops pointed out the need for focused research on children especially regarding brain cancer and cognitive function. The workshop on EMF hypersensitivity (EHS) indicated that there should be further research to characterize EHS but did not recommend further studies on the relationship between EMF and EHS since, from the studies completed so far, there was no substantiated evidence for a causal relationship. Research on potential health effects from base station RF fields was deemed of low priority since studies of cancer risk related to such exposure are unlikely to be feasible and informative because of the difficulty of reconstructing adequately long-term historical exposures.

Key Issues

RF Research Agenda

- Epidemiology
- Human and animal studies
- Cellular studies and mechanisms
- Dosimetry
- Social issues

World Health Organization

Content

- **In each section,**
  - **brief summary of ongoing research**
  - **overarching issues**
  - **Rationale for each topic**

- **Ranking**
  - **High priority research needs:** Studies to fill important gaps in knowledge focused on health risk assessment that are needed to significantly reduce the uncertainty in the current scientific information.
  - **Other research needs:** Studies to better assist the understanding of the impacts of RF field exposure on health and that would contribute useful information to health risk assessment.

WHO RF Research Agenda

Epidemiology

World Health Organization

WHO RF Research Agenda
Epidemiology

- **High priority research needs**
  - Large prospective longitudinal cohort study of mobile telephone users
  - Large-scale multinational case-control study of brain cancer risk in children and adolescents in relation to mobile phone use

- **Other research needs**
  - Large-scale studies of subjects with high occupational RF exposure
  - Prospective cohort study of children and adolescent mobile phone users and all health outcomes other than brain cancer
  - Surveys to characterize population exposures from all RF sources

WHO RF Research Agenda
Human Studies

- **High priority research needs**
  - Acute effects on cognition and EEGs in children (ethical approval)

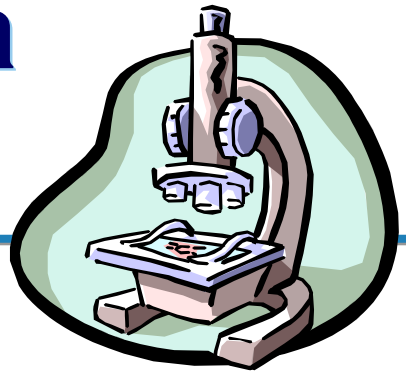
- **Other research needs**
  - None (*awaiting the outcome of current human and animal studies*)

WHO RF Research Agenda
Animal Studies

- **High priority research needs**
  - Effects from exposure of immature animals to RF fields on the development and maturation of the CNS, and on the development of the haemopoietic and immune systems

- **Other research needs**
  - None (*awaiting the outcome of ongoing animal studies*)

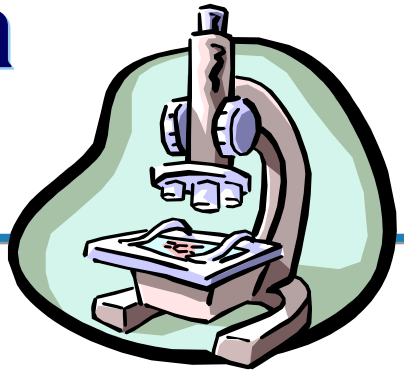
WHO RF Research Agenda
Cellular Studies



- **High priority research needs**
  - Independent replication studies of recently reported findings on HSP and DNA damage using low level (below 2 W/kg) and/or modulation- or intermittency-specific signals.

- **Other research needs**
  - Studies of RF effects on cell differentiation, e.g., during haemopoiesis in bone marrow, and on nerve cell growth using brain slices/cultured neurons

WHO RF Research Agenda
Mechanisms



- **High priority research needs**
  - None (*awaiting the outcome of ongoing studies*)

WHO RF Research Agenda
Dosimetry

- **High priority research needs**
  - Patterns of wireless communication usage and exposure of different parts of the body, including multiple exposure from several sources
  - Dosimetric models of children of different ages and of pregnant women. Improvement in dosimetric models of RF energy deposition in animals and humans combined with appropriate models of the human thermoregulatory responses

- **Other research needs**
  - Micro-dosimetry research (i.e., at the cellular or subcellular levels) that may yield new insights concerning biologically relevant targets of RF exposure

WHO RF Research Agenda
Social Issues

- Risk perception of individuals, including studies on the formation of beliefs and perceptions about the relationship between RF exposure and health
- Studies that analyse, if possible, in an international perspective, conditions of trust and confidence of stakeholders and the general public in technologies, policies, and risk communication and management strategies associated with RF applications
- Assess impacts of precautionary measures on public concern and the adoption of voluntary or mandatory policies
- Assess the role of health definitions (well-being) and other important concepts in RF risk communication on risk perception and risk management policies
- Quantify the health related beneficial effects of wireless communication
- Evaluate the success of programmes for public and stakeholder participation in various countries

Outline

- Introduction
- The WHO RF Research Agenda
  - Motivation
  - Background
  - Content
- Discussion

World Health Organization

عربي | 中文 | English | Français | Русский | Español

Search

All WHO | This site only

- Home
- About WHO
- Countries
- Health topics
- Publications
- Research tools
- WHO sites
- EMF Home
- About electromagnetic fields
- EMF Project
- Research
- Standards
- EMF publications & information resources
- Meetings

Electromagnetic fields (EMF)

About us | Publications | Contact us

WHO > WHO sites > Electromagnetic fields (EMF) > The International EMF Project

Participating countries & entities in EMF Project

Click on your location in the map below to find information on contact details and activities relating to EMF in your area.

WHO African Region
WHO European Region
WHO Region of the Americas
WHO Eastern Mediterranean Region
WHO South-East Asia Region
WHO Western Pacific Region

Participating countries & entities in EMF Project

WHAT'S NEW!

Model Legislation
More information

Standards Framework
More information

Fact Sheet N°304
Base stations and wireless technologies

QUICK LINKS IN THE EMF SITE

Fact Sheets and Information Sheets
Full text

The EMF Standards World Wide Database
Click here

World Health Organization

Impact on Research

- Trans-national programs
  - Europe (EC, FP6, FP7, …)
- National programs
  - Germany, UK, France, Switzerland, Denmark, Sweden, Finland, Netherlands, Japan, Korea, Australia, Brazil, …
  - Variations due to public interest/concern and national expertise
  - Funding sources (government, industry)
  - Funding envelope variable
- Industry-funded research programs
- Independent research programs

Country / Program	Time period	Budget (M€)
Australia	2004-2009	**1.5**
Denmark	2004-2008	**4.0**
Finland	2004-2007	**1.9**
Germany	2002-2008	**17.0**
UK: MTHR 1	2002-2008	**12.2**
MTHR 2	2007-2012	**8.3**
France	2006-2010	**4.8**
Korea	2005-2010	**10.8**
Netherlands	2006-2014	**16.6**
Switzerland	2006-2010	**3.2**
USA: NTP	2005-2010	**18.0**
NIH	2007-2010	**?**
EC COST	2008-2012	**1.9**
EU 7th Framework	2007-2013	**?**
Japan	1997-2007	**?**
	2007-2010	**?**
China	**?**	**?**
Total	>100 M€	

Key Functions

Infectious Diseases
Chemicals & Poisons
Radiation
Emergency Response
Business Activities
Local & Regional Services

HPA Press Statement

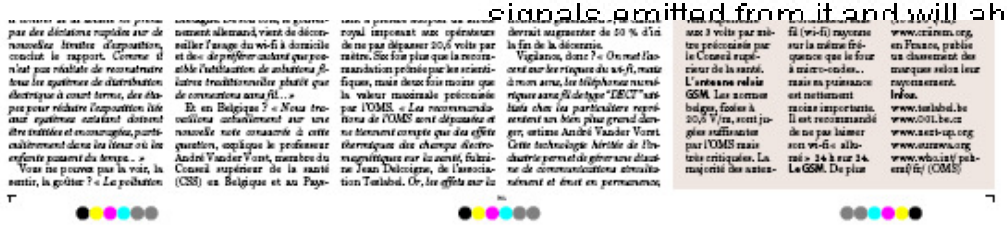
12 October 2007

Health Protection Agency announces further research into use of WiFi

The Agency is to carry out a systematic programme of research into wireless local area networks (WLANs) and their use. This will include measurements of exposures from the Wireless Fidelity (WiFi) network and is part of the Agency's ongoing programme of work in the area of electromagnetic fields.

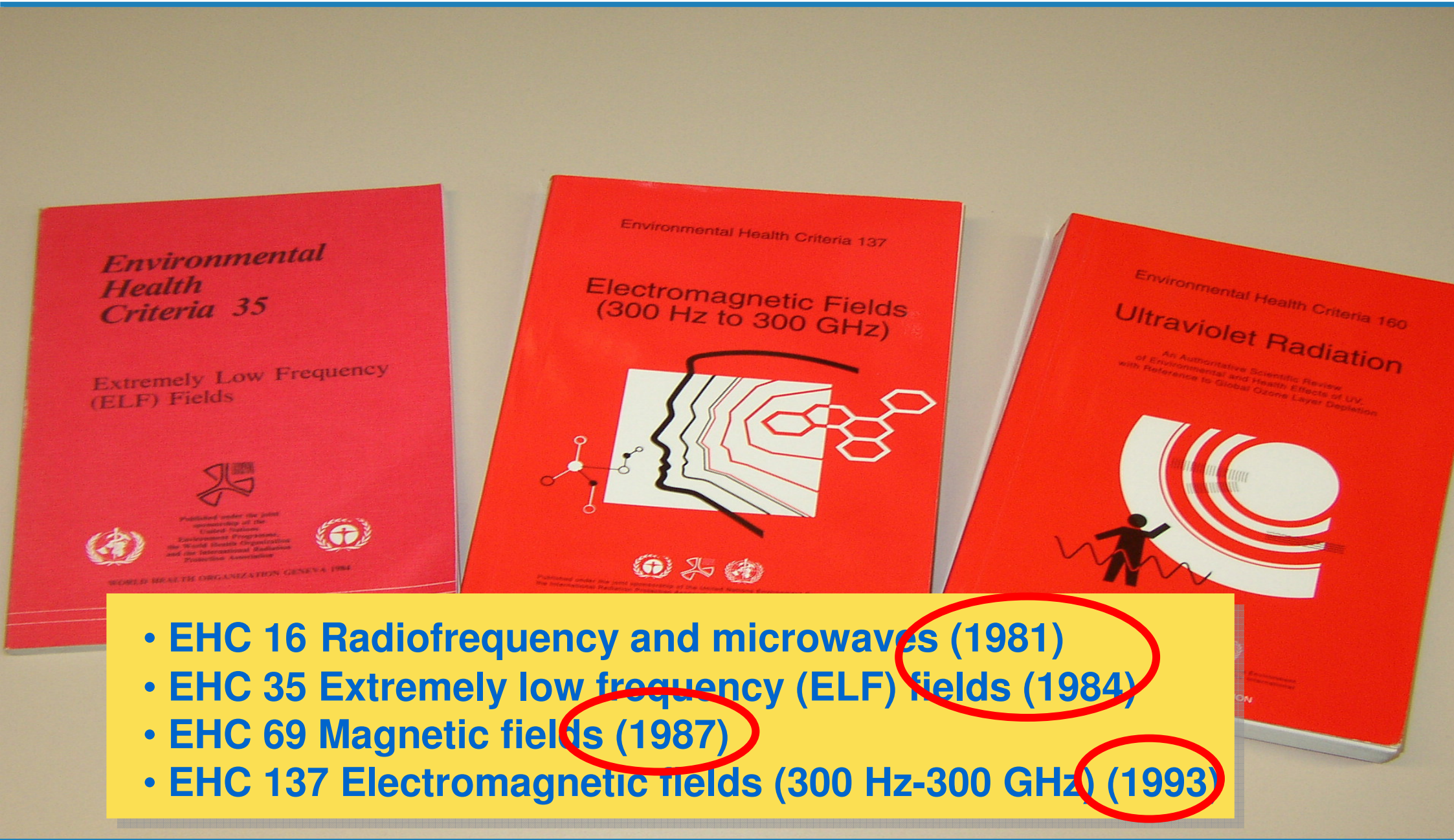
Professor Pat Troop, Chief Executive of the Health Protection Agency said: "There is no scientific evidence to date that WiFi and WLANs adversely affect the health of the general population. The signals are very low power, typically 0.1 watt (100 milliwatts) in both the computer and the router (access point) and the results so far show exposures are well within ICNIRP guidelines. Given this, there is no particular reason why schools and others should not continue to use WiFi or other wireless networks. However there has not been extensive research into what people's exposures actually are to this new technology and that is why we are initiating this new programme of research and analyses. We have good scientific reasons to expect the results to be re-assuring and we will publish our findings."

WiFi is becoming increasingly widely used in homes, schools, offices and throughout the general working and public environments. People using WiFi, or in proximity to WiFi equipment, are exposed to the radio signals emitted from it and will absorb some of the transmitted energy. From existing information, it would



Environmental Health Criteria

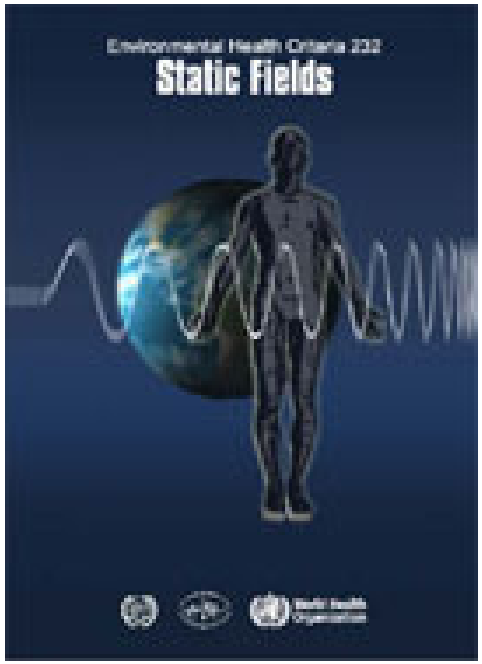
Electromagnetic Fields



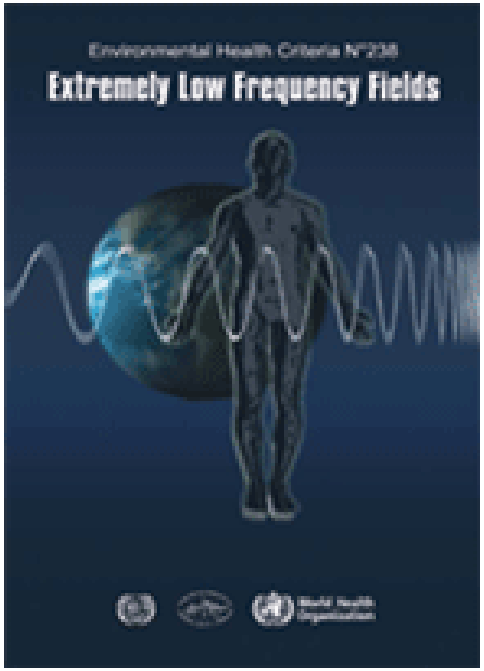
- EHC 16 Radiofrequency and microwaves (1981)
- EHC 35 Extremely low frequency (ELF) fields (1984)
- EHC 69 Magnetic fields (1987)
- EHC 137 Electromagnetic fields (300 Hz-300 GHz) (1993)

Environmental Health Criteria

Electromagnetic Fields



2006



2007

RF Fields

201x

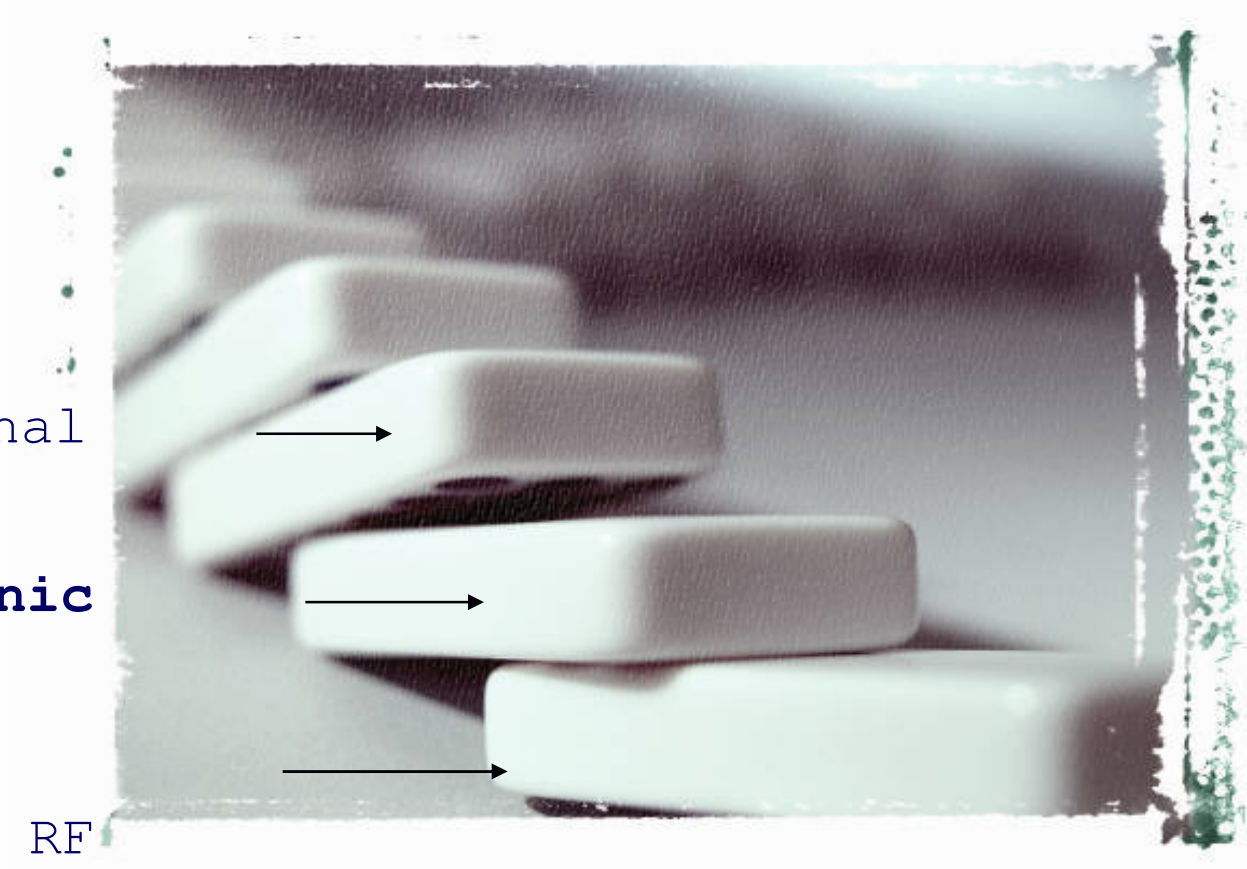
World Health Organization

Timing

INTERPHONE multinational epidemiologic study

IARC evaluation of **carcinogenic** risks to humans from RF

WHO assessment of all health risks to humans from RF



World Health Organization

The International EMF Project
Radiation and Environmental Health
Public Health and Environment
World Health Organization
21 Avenue Appia
CH-1211 Geneva 27
Switzerland

email: emfproject@who.int
website: www.who.int/emf