

Webinar on "*5G at workplaces: technical aspects and human exposure*", ICOH/ISSA meeting



The WHO Radiation Programme

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Outline



- Introduction
- **Risk assessment:** evaluating the health risks from EMF
- **Risk management:** international and national level
- **Risk communication** and perception
- Discussion

The World Health Organization

- Established on **7 April 1948**
- **Function:** act as the UN directing and coordinating authority on international health work
- **Objective:** attainment by all peoples of the highest possible level of health
- **Health:** “A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (WHO Constitution, 1948)



The WHO 3-level structure



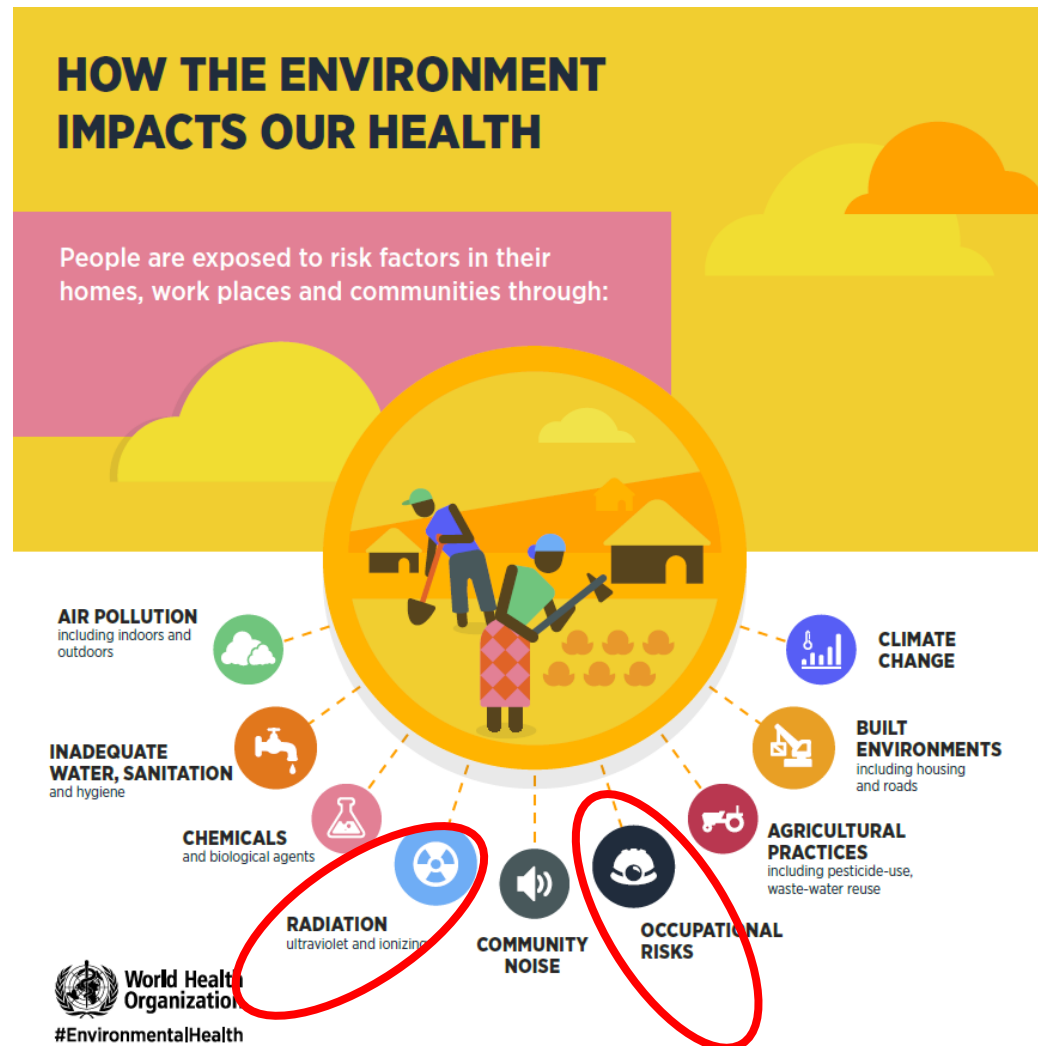
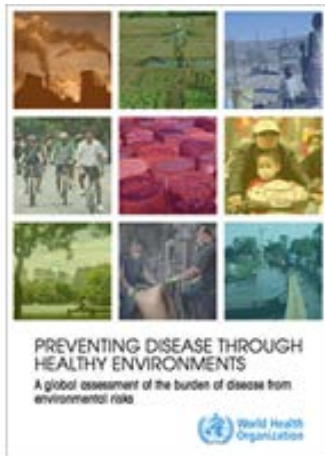
Over 7000 people work for WHO in

- Headquarters (Geneva)
- 6 Regional Offices
- 150 Offices in Countries, Territories and Areas
- International Agency for Research on Cancer (IARC)

WHO's core functions

1. Articulate ethical and evidence-based **policy positions**
2. Setting **norms and standards**, and promoting and monitoring their implementation
3. Shaping the **research agenda**, and stimulating the generation, translation and dissemination of valuable knowledge
4. Providing **technical support**, catalysing change and developing sustainable institutional capacity
5. **Monitoring** the health situation and assessing health trends
6. Providing **leadership** on matters critical to health and engaging in **partnerships** where joint action is needed

Public Health and Environment



Occupational health

<https://www.who.int/health-topics/occupational-health>



Occupational health

Occupational health is an area of work in public health to promote and maintain highest degree of physical, mental and social well-being of workers in all occupations.

Highlights



Campaigns

2021



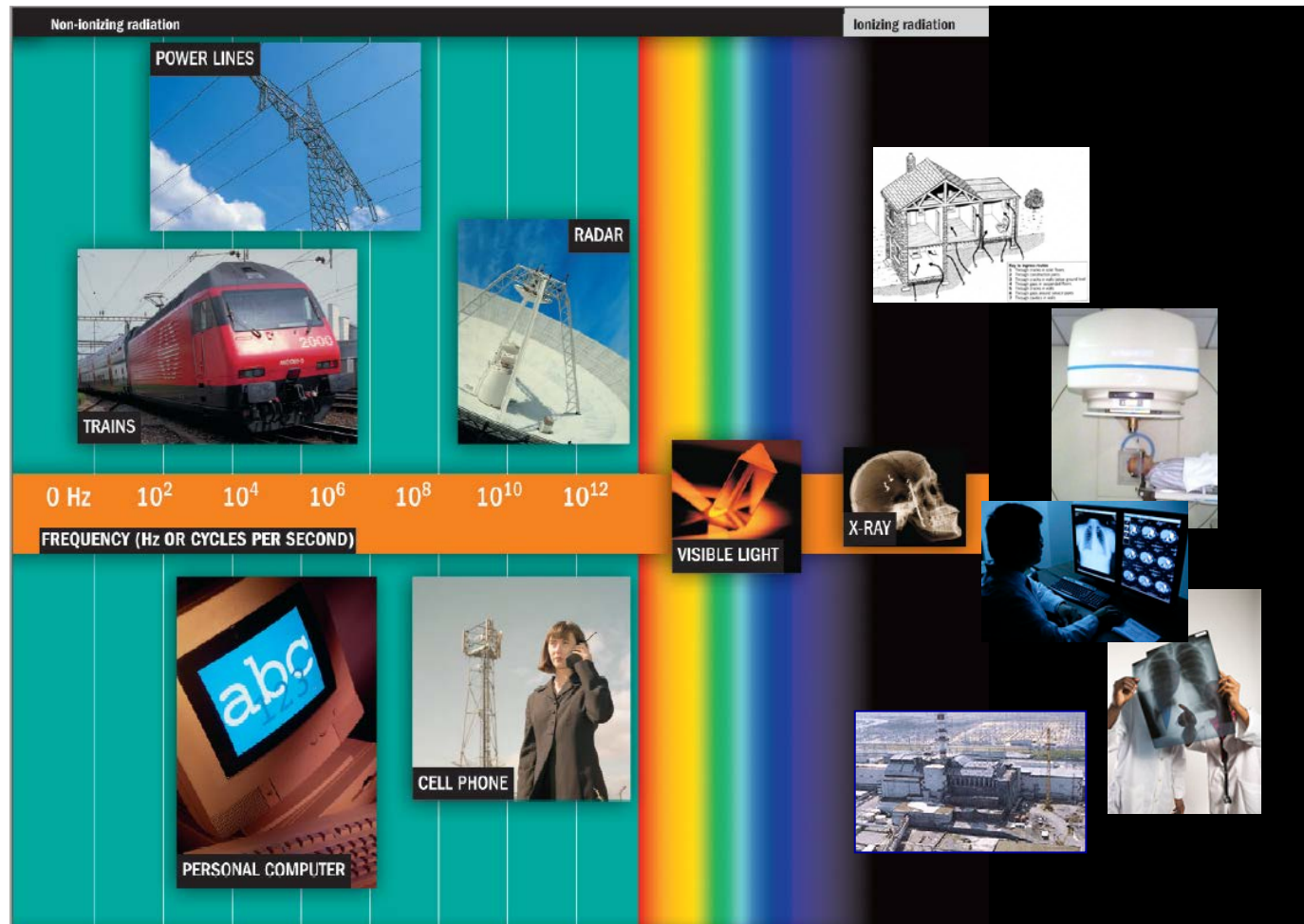
International Year of Health and Care Workers

Radiation and Health

Mission

We work to strengthen **radiation protection** of the **public, patients and workers** worldwide.

We provide Member States with **evidence-based guidance, tools and technical advice** on public health issues related to **ionizing and non-ionizing radiation**.



RADIATION



People are exposed both to natural radiation, for example ultraviolet radiation and radon, and to radiation generated by human activities. Radioactive sources (emitting for example X-rays) are used in medicine for diagnosis and treatment, and in research, industry and nuclear energy production. Other forms of radiation include electromagnetic fields emitted by electricity, by devices such as mobile phones, lasers, and LED lamps, and also by the sun. To protect people from overexposure to radiation, the health sector should engage further with other sectors tasked with managing these sources.

Aerial view of beach in Mallorca, Spain.

KEY RISKS TO HEALTH

EXPOSURE TO RADIATION FROM SEVERAL SOURCES CAN INCREASE RISKS OF CANCERS AND DEATHS



58 K

Over 58 000 deaths from lung cancer were caused by residential radon in 2016.



60 K

More than 60 000 skin melanoma-related deaths are caused by solar ultraviolet radiation yearly (2000).



450 K

More than 450 000 non-melanoma skin cancer and 10 000 melanoma cases are caused by sunbed use each year in the United States of America, Europe and Australia (2014).



20 K

20 thousand thyroid cancers were caused by the Chernobyl accident (up to 2015).

MEDICAL PROCEDURES EXPOSE PEOPLE TO LEVELS OF RADIATION:

4 B

Four billion medical imaging and millions of radiotherapy and nuclear medicine procedures are performed each year (2008).



MANY COUNTRIES HAVE DEVELOPED LEGISLATION FOR PROTECTION FROM SELECTED RADIATION RISKS:



78%

of surveyed countries (40 of 51 countries) developed legislation for protection against any electromagnetic frequency (e.g. power lines, radiofrequency).



56%

of surveyed countries (25 of 45 countries) developed legislation for protection against artificial tanning sunbeds.

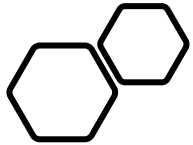


SUSTAINABLE DEVELOPMENT GOALS

17 GOALS TO TRANSFORM OUR WORLD

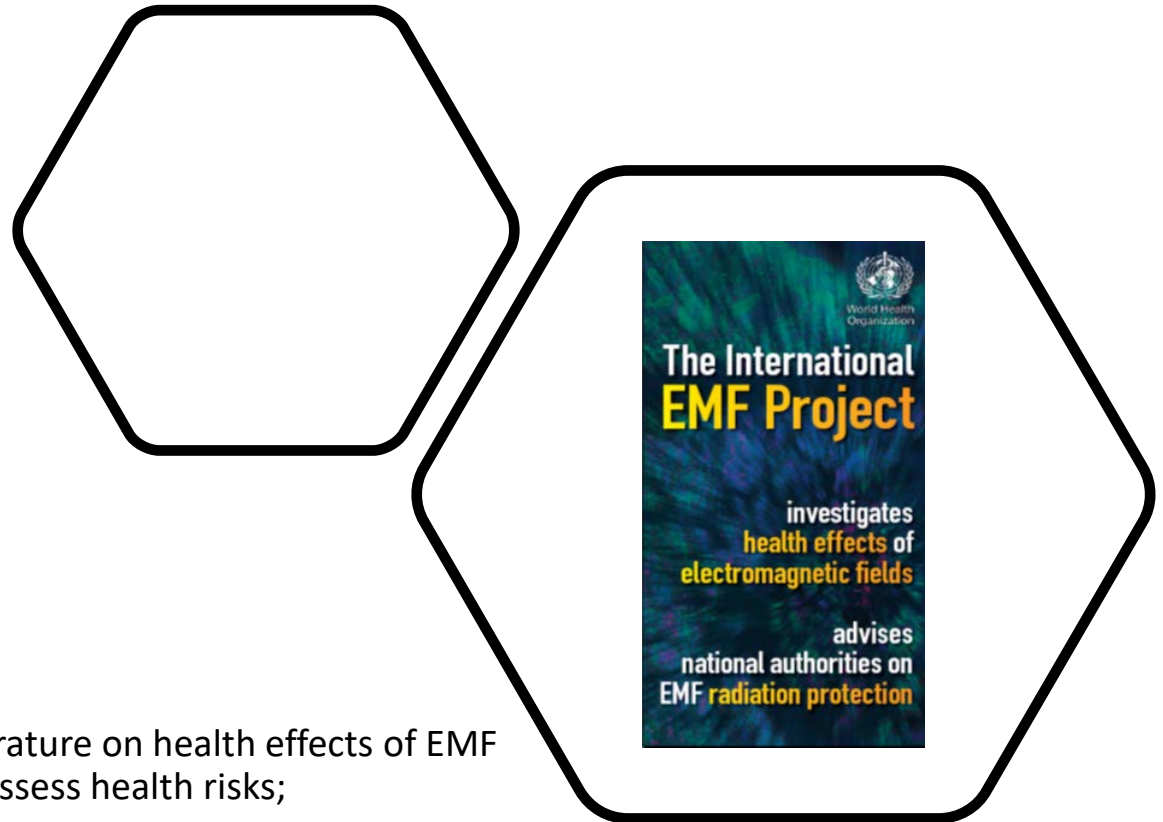




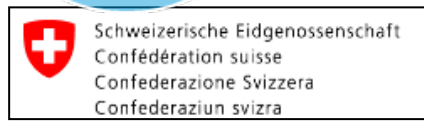


WHO International EMF Project

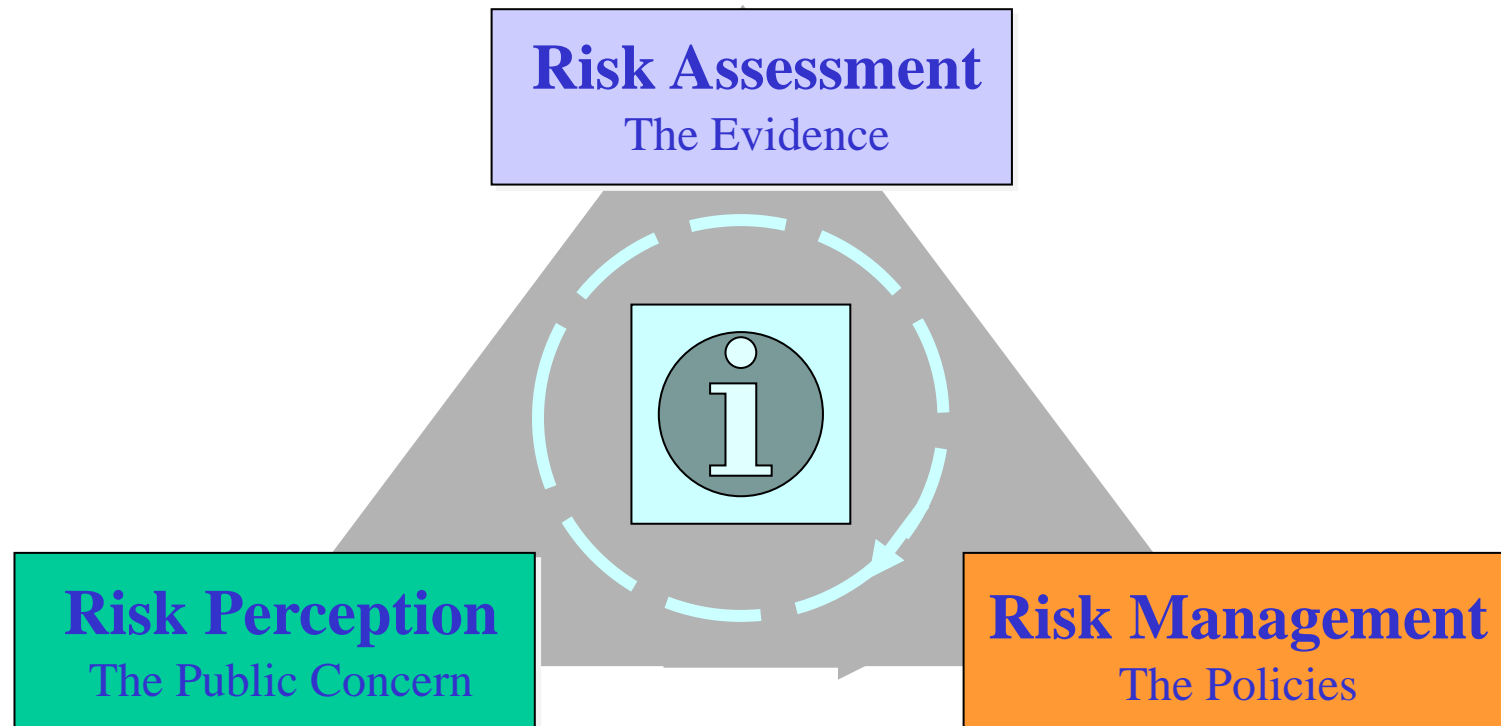
- Established in 1996
- Coordinated by WHO HQ
- Objectives
 - Review the scientific literature on health effects of EMF exposure and formally assess health risks;
 - Promote a focused agenda of high-quality EMF research;
 - Encourage internationally acceptable harmonized standards;
 - Provide information on risk perception, risk communication, risk management



Partners



Electromagnetic Fields



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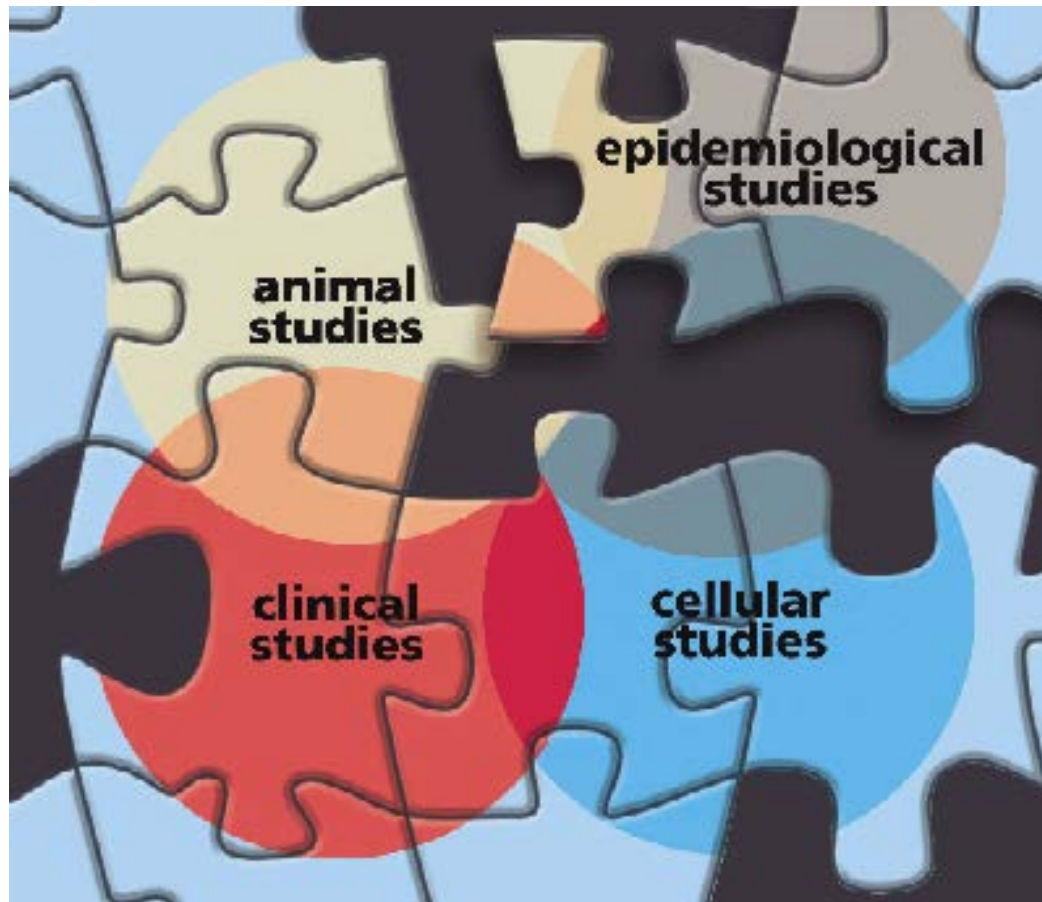
The Present Scientific Knowledge



- **Known biological mechanisms of interaction**
- **Large research databases and sophisticated dosimetric models**
- **International exposure guidelines based on established health effects**
- **.... But remaining scientific uncertainty**

Evaluating the health risks

Review of research



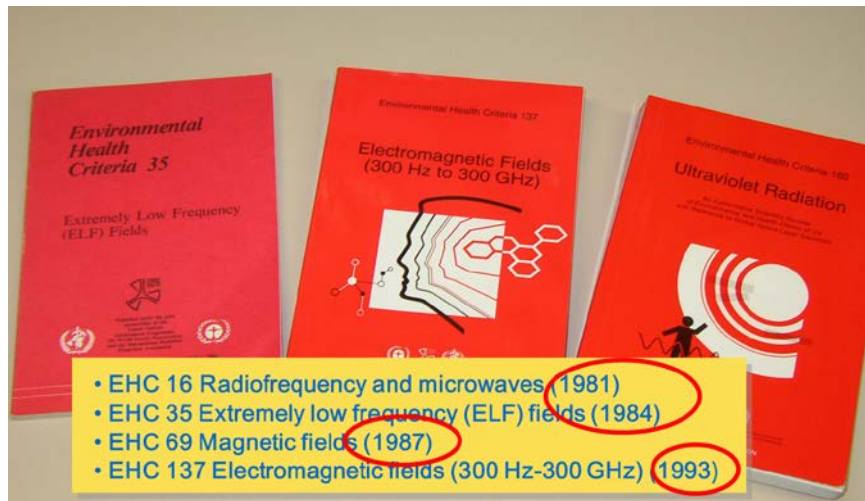
<http://www.niehs.nih.gov/emfrapid/booklet/emf2002.pdf>

Risk Assessment

The Evidence

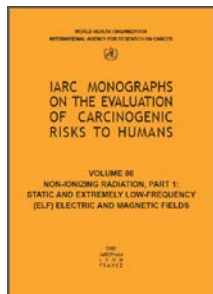
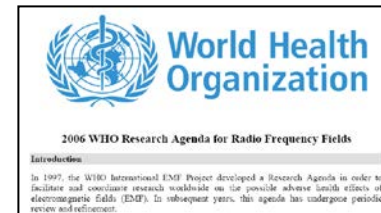


Health risk assessments



- 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)

Research agendas



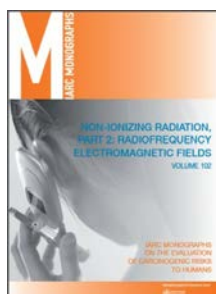
2002



2006



2007

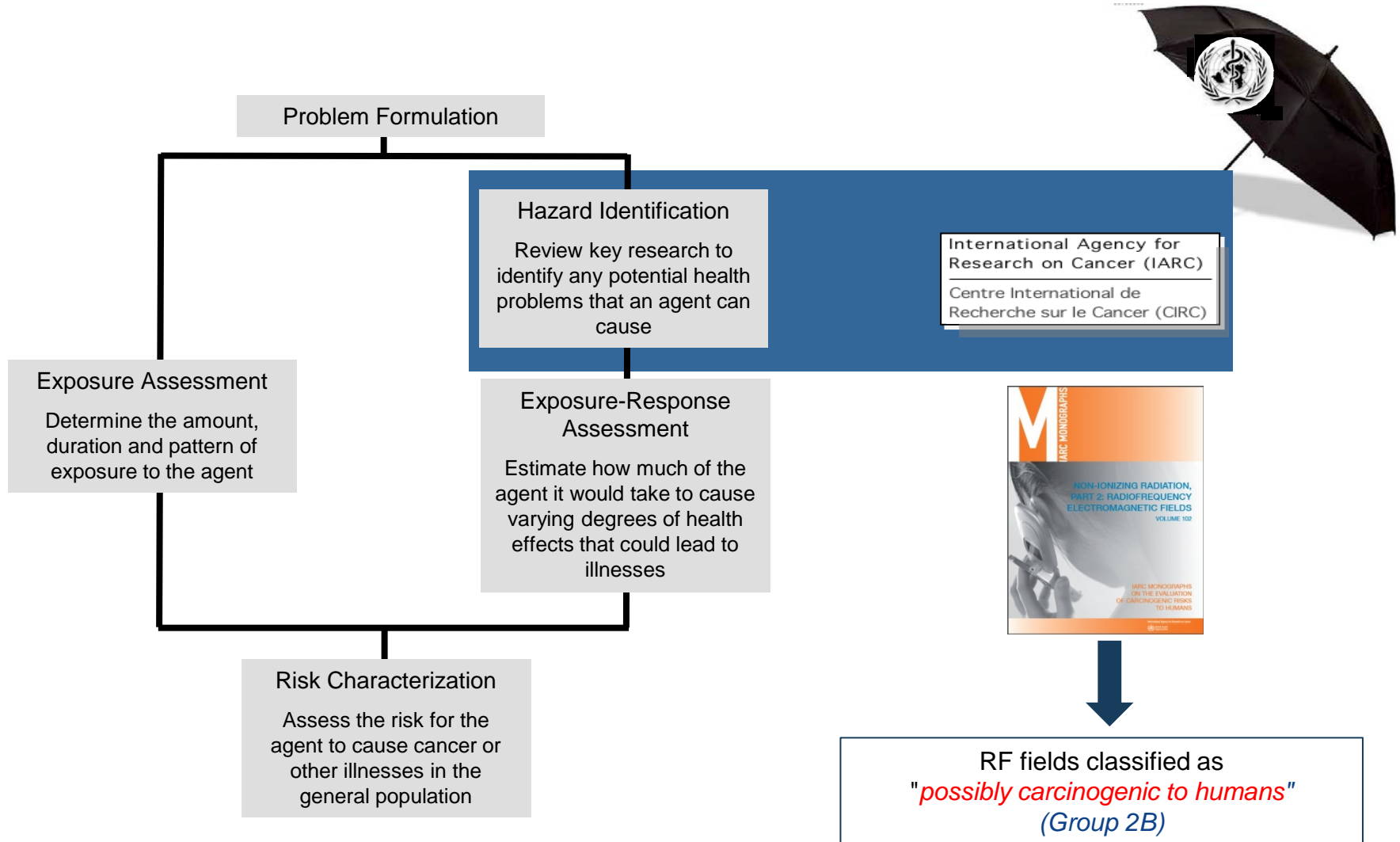


2013



RF Fields

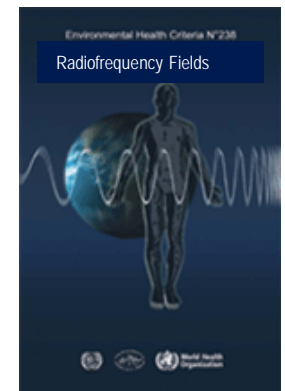
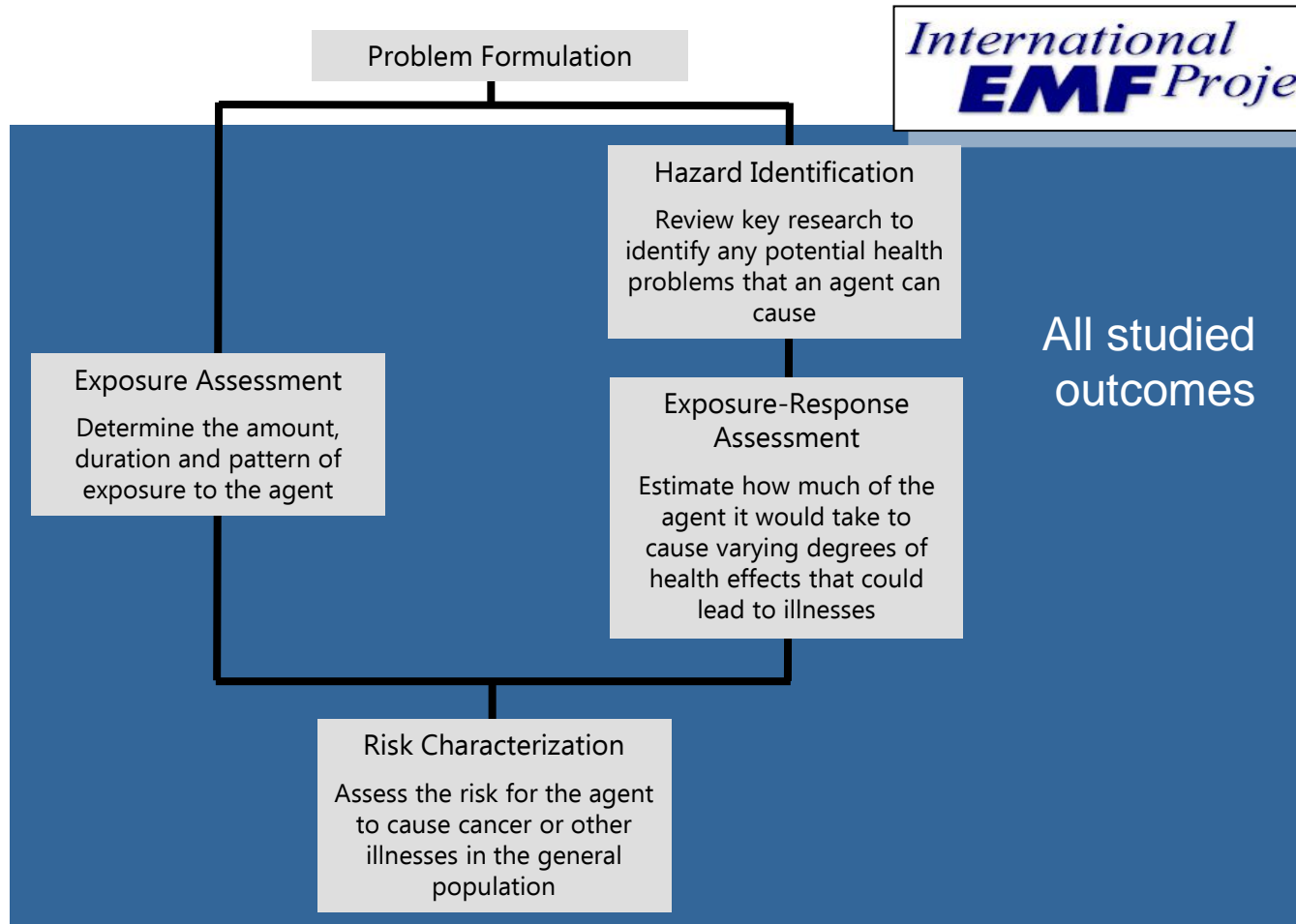
Health Risk Assessment



Health Risk Assessment (cont'd)



International
EMF Project



5G and health?

- Millimetre waves are absorbed within mm of the skin surface (unlike RF energy at lower frequencies which can penetrate into tissue)
- Thermal effect still relevant
- A number of exploratory studies, but not necessarily targeted at possible health risks
- A lot of media attention
- Level of citizen concern varies between countries

Reviews on health aspects of 5G

National examples

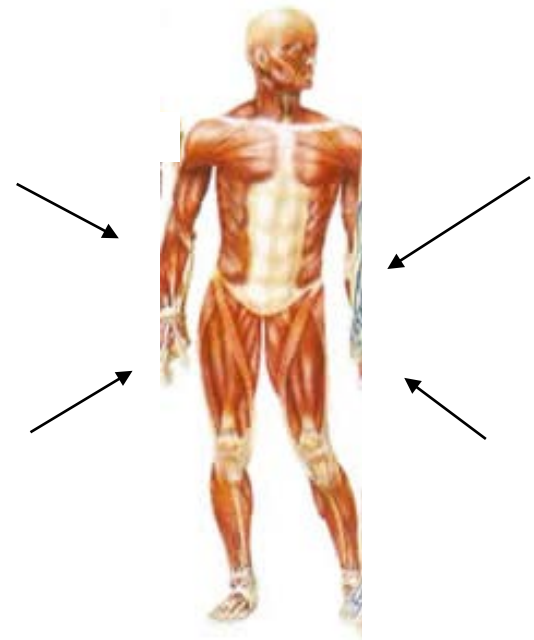
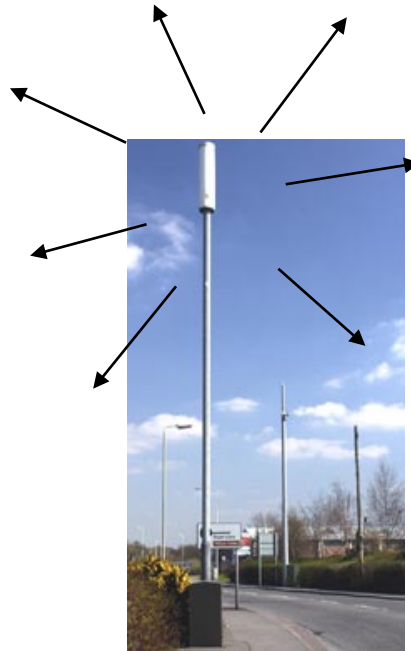
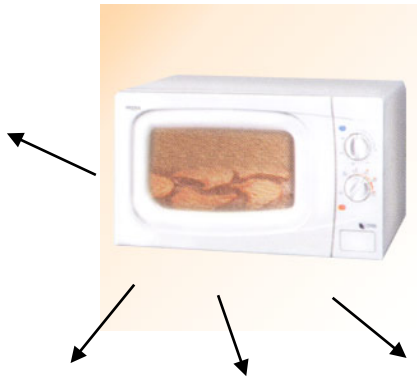


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EMF Standards and Guidelines

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

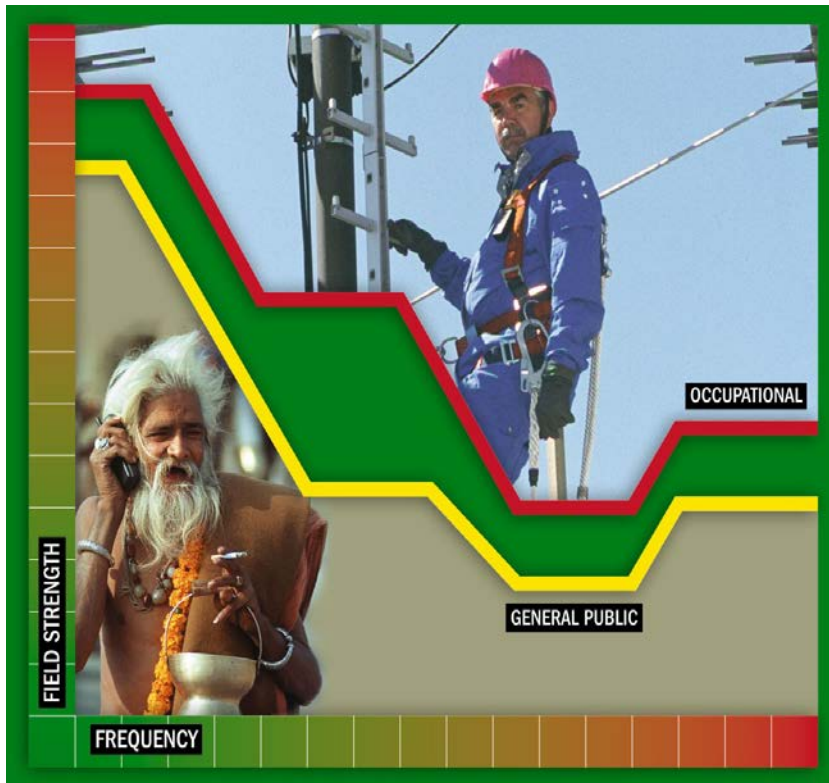


Standards and Guidelines

- Emission standards
- Measurement standards
- Exposure standards



Exposure guidelines

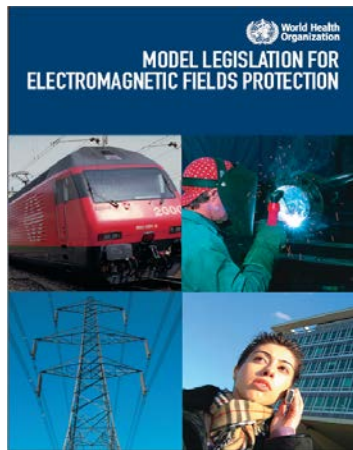


- Exposure guidelines are frequency dependent, and are independent of any specific technology
- A number of countries have legislation over the whole EMF spectrum, which therefore covers the frequencies to be used by **5G**
- **To date, WHO has not developed EMF exposure guidelines, and does not endorse guidelines developed by external entities**

Risk Management

The Policies

Legislation and standards



National regulations and policies



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Electromagnetic fields

Appears in: [Environment and health](#)

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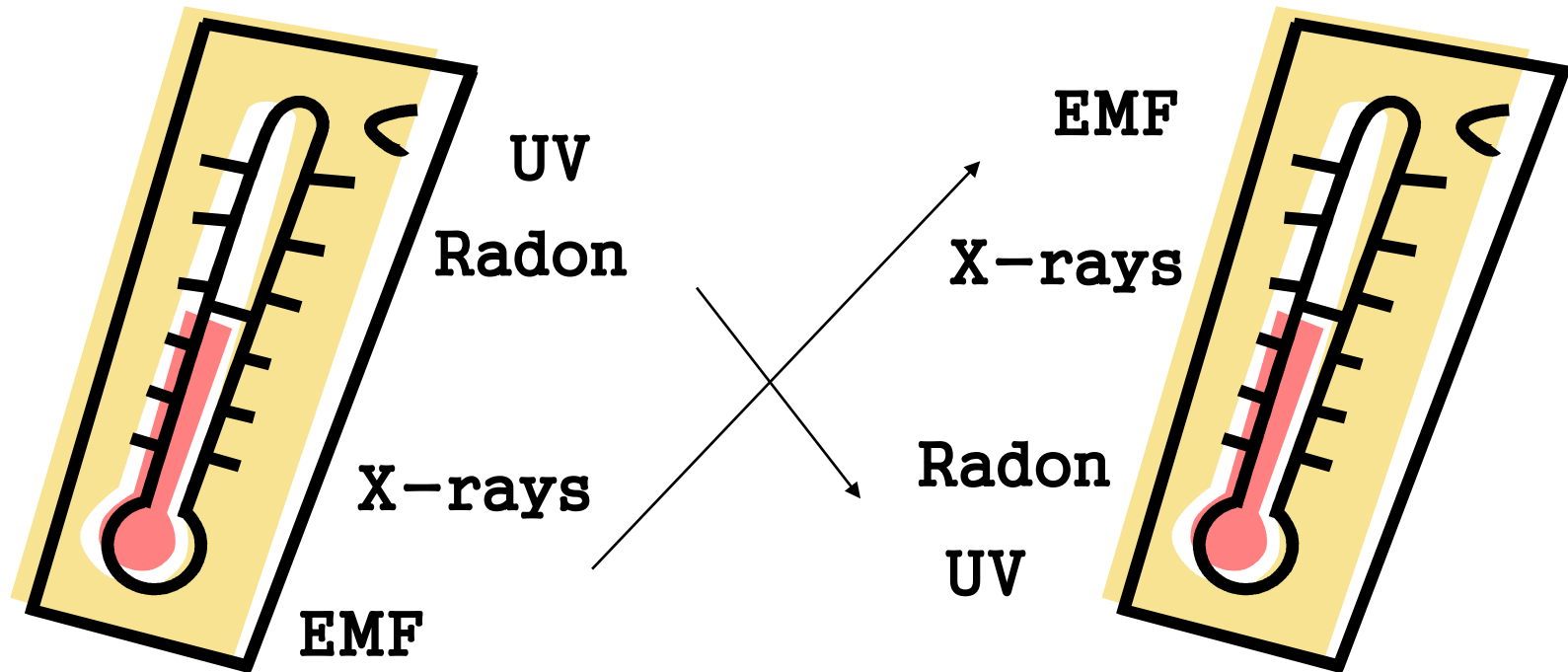
Radiation

Risk Communication



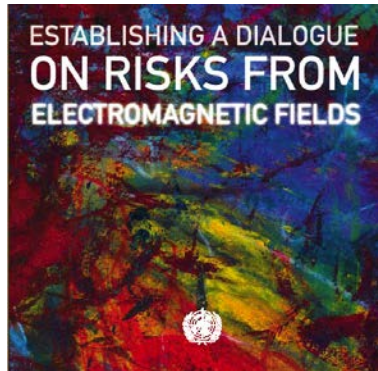
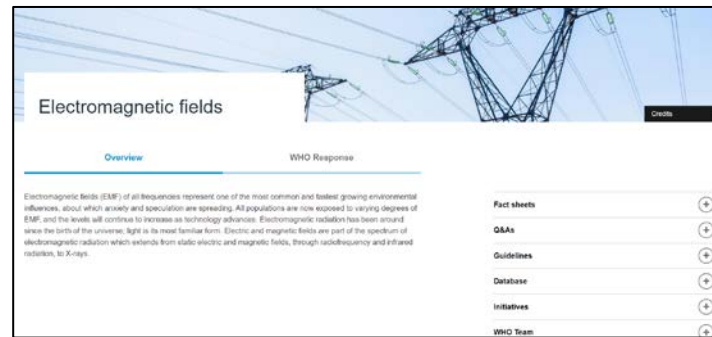
Public Health

Public Concern



Risk Perception

The Public Concern

Electromagnetic fields

Overview WHO Response

Electromagnetic fields (EMF) of all frequencies represent one of the most common and fastest growing environmental influences, about which anxiety and speculation are spreading. All populations are now exposed to varying degrees of EMF, and the levels will continue to increase as technology advances. Electromagnetic radiation has been around since the birth of the universe, light is its most familiar form. Electric and magnetic fields are part of the spectrum of electromagnetic radiation which extends from static electric and magnetic fields, through radiofrequency and infrared radiation, to X-rays.


- Fact sheets
- Q&As
- Guidelines
- Database
- Initiatives
- WHO Team



Questions & Answers on 5G



World Health
Organization

 **Health Topics** ▾ **Countries** ▾ **Newsroom** ▾

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5G mobile networks and health

27 February 2020 | Q&A

<https://www.who.int/news-room/q-a-detail/5g-mobile-networks-and-health>

What is 5G?

What are the main differences between 5G and previous technologies?

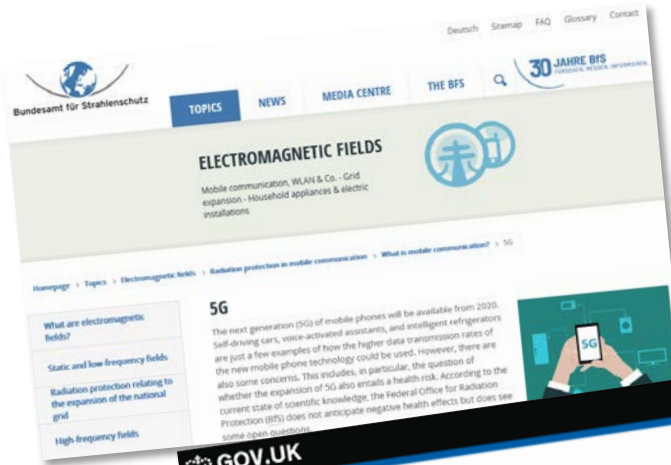
Exposure levels

What are the potential health risks from 5G?

What are the international exposure guidelines?

What is WHO doing?

Information provision on 5G National examples



Bundesamt für Strahlenschutz

TOPICS NEWS MEDIA CENTRE THE BFS

30 JAHRE BfS
100 Jahre Medizin

ELECTROMAGNETIC FIELDS

Mobile communication, WLAN & Co. - Grid expansion - Household appliances & electric installations

Homepage > Topics > Electromagnetic fields > Radiation protection in mobile communication > What is mobile communication? > 5G

5G

The next generation (5G) of mobile phones will be available from 2020. Self-driving cars, voice-activated assistants, and intelligent refrigerators are just a few examples of how the higher data transmission rates of the new mobile phone technology could be used. However, there are also some concerns. This involves, in particular, the question of whether the expansion of 5G also entails a health risk. According to the current state of scientific knowledge, the Federal Office for Radiation Protection (BfS) does not anticipate negative health effects, but does see some open questions.

What are electromagnetic fields?
Static and low frequency fields
Radiation protection relating to the expansion of the national grid
High frequency fields



GOV.UK

Home > 5G technologies: radio waves and health

Public Health England

Guidance 5G technologies: radio waves and health

Published 3 October 2019

Communications technology has developed through several generations from 1G to 4G and 4G base stations installed throughout the country. 5G mobile phones and other devices.

Australian Government
Australian Radiation Protection and Nuclear Safety Agency
arpansa

Home Understanding radiation Our services Regulation and licensing Research and expertise About us

Home > 5G: the new generation of the mobile phone network and health

In this section

Home

Understanding radiation

20 March 2019



Challenges to governments....

- Rapidly evolving RF technologies
- Launched on the market before health evaluation
- Disparities in risk management measures and regulations around the world
- Concern from the public

- Balancing any potential risks with major benefits from digital technologies for health (e-health, m-health, artificial intelligence, ...)

5G mobile networks DO NOT spread COVID-19

Viruses cannot travel on radio waves/mobile networks. COVID-19 is spreading in many countries that do not have 5G mobile networks.

COVID-19 is spread through respiratory droplets when an infected person coughs, sneezes or speaks. People can also be infected by touching a contaminated surface and then their eyes, mouth or nose.

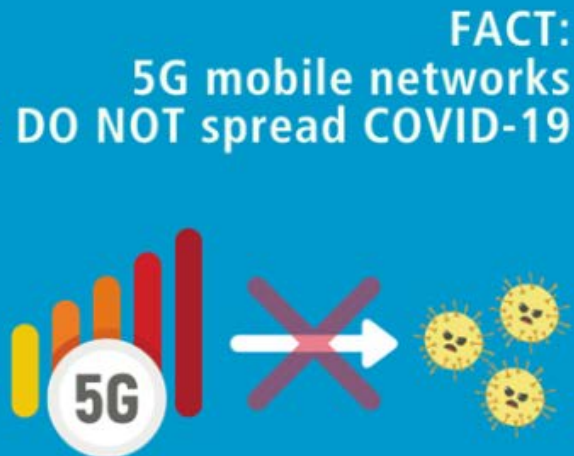


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#Coronavirus #COVID19

8 April 2020

Download and share graphic

[https://www.who.int/images/default-source/health-topics/coronavirus/myth-busters/web-mythbusters/eng-mythbusting-ncov-\(15\).tmb-1920v.png](https://www.who.int/images/default-source/health-topics/coronavirus/myth-busters/web-mythbusters/eng-mythbusting-ncov-(15).tmb-1920v.png)