

RF fields and Health

A WHO Perspective



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ITU Forum & Training on "With ICTs everywhere - How safe is EMF? "

Zanzibar, Tanzania, 10 April 2018



OUTLINE

Introduction

Assessing the health risks

Discussion



World Health Organization



Function: act as the UN directing and coordinating authority on international health work

Objective: "the 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"

(Constitution, 1948)

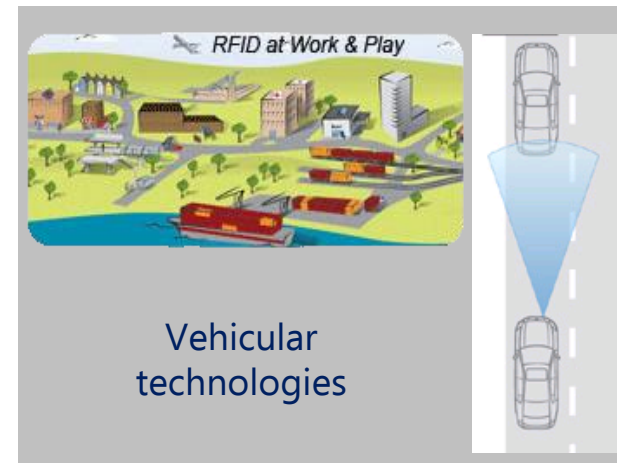


The Present EMF Context

- Increasing EMF human exposure due to electricity demand, medical technologies and wireless devices
- Concern from the public



Applications using radiofrequency fields (100 kHz – 300 GHz)



Mobiles 'boost cancer'

Radiation may make tumours grow faster

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

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 of



Stop Smart Meters!

Fighting for health, privacy, and safety



Applications using radiofrequency fields (100 kHz – 300 GHz)



5G



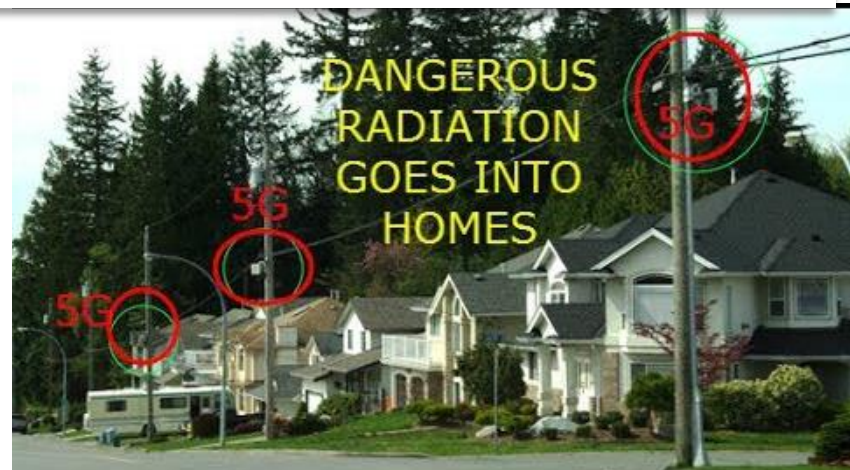
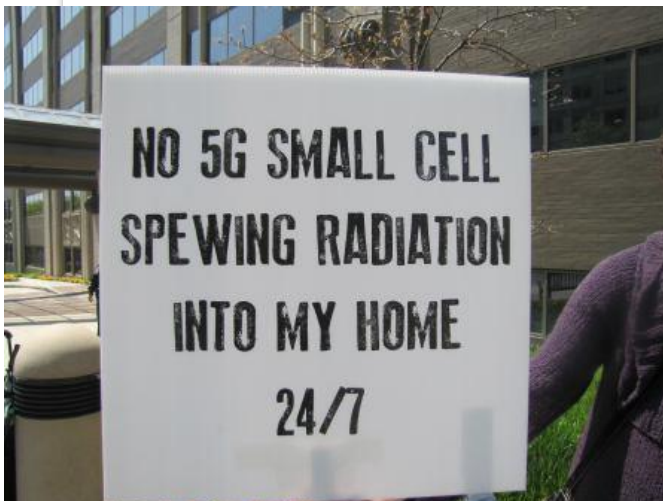
Scientists and doctors warn of potential serious health effects of 5G

September 13, 2017

We the undersigned, more than 180 scientists and doctors from 36 countries, recommend a moratorium on the roll-out of the fifth generation, 5G, for telecommunication until potential hazards for human health and the environment have been fully investigated by scientists independent from industry. 5G will substantially increase exposure to radiofrequency electromagnetic fields (RF-EMF) on top of the 2G, 3G, 4G, Wi-Fi, etc. for telecommunications already in place. RF-EMF has been proven to be harmful for humans and the environment.

(Note: [Blue links](#) below are references.)

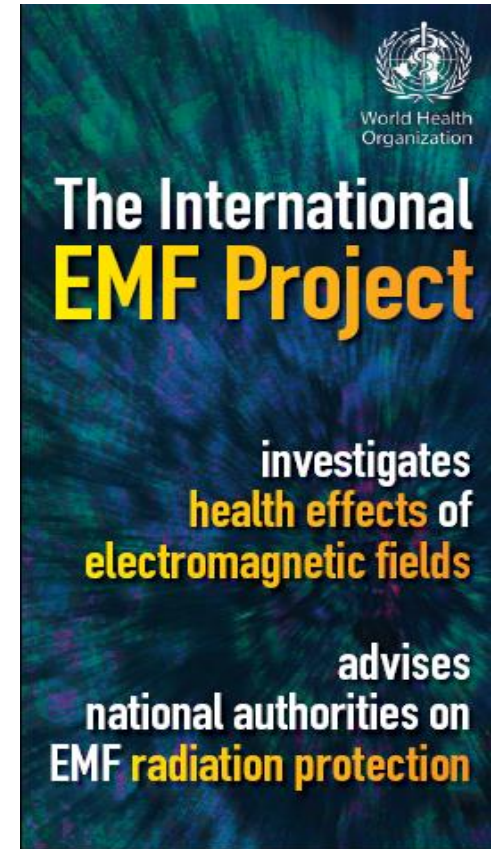
5G leads to massive increase of mandatory exposure to wireless radiation

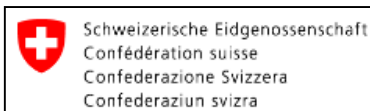


WHO International EMF Project



- Established in 1996
- Coordinated by WHO HQ
- A multinational, multidisciplinary effort to create and disseminate information on human health risk from EMF
- Membership
 - Open to any WHO Member State government department or representatives of national institutions concerned with radiation protection
 - Over 60 national authorities are currently involved in the Project



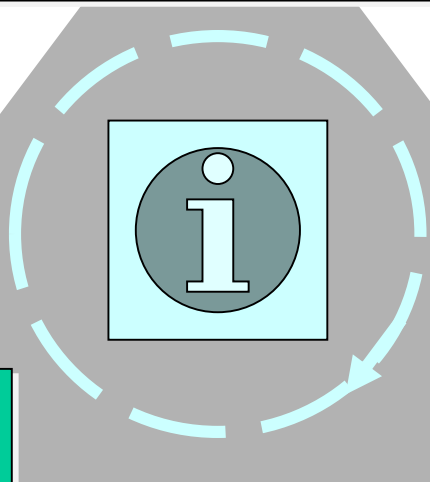
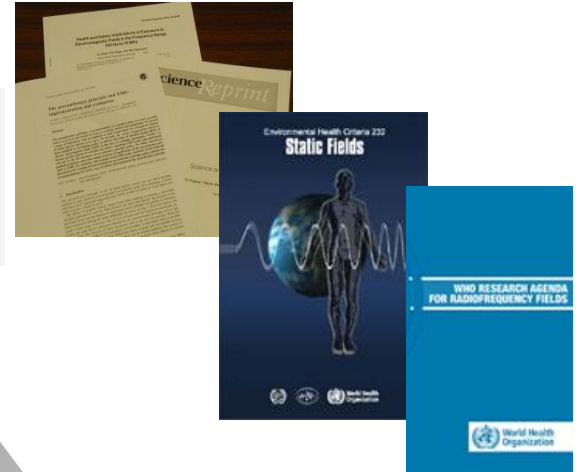


Federal Office of Public Health FOPH



Do EMFs pose a health risk?

Risk Assessment
The Evidence



Risk Perception
The Public Concern

Risk Management
The Policies

World Health Organization

Health topics Data Media centre Publications Country Programmes Governance

Electromagnetic fields (EMF)

EMF Home
About electromagnetic fields
EMF Project
Research
Standards
EMF publications & information resources
Meetings

Electromagnetic fields



Exposure limits for radio-frequency fields (public)
Data by country

Country	Year	Electric field (V/m)		Power density (mW/m ²)		Specific absorption rate (SAR) (W/kg)		
		300 MHz	1000 MHz	300 MHz	1000 MHz	Whole body	Head and neck	Limbs
Argentina	2017	41.25	50.35	4.5	9	0.08	2	4
Australia	2017	41.17	50.17	4.5	9	0.08	2	4
Austria	2017	41.25	50.34	4.5	9	0.08	2	4
Bahrain	2017	41	50	4.5	9	0.08	2	4
Belgium	2017	41	50	4.5	9	0.08	2	4
Brazil	2017	41.25	50.34	4.5	9	0.08	2	4
Bulgaria	2017	0.14 ¹	0.14	0.17 ¹	0.17	0.1		
Canada	2017	32.17 ¹	40.22 ¹	2.24 ¹	4.47 ¹	0.08	1.67 ¹	4
China	2017			0.1116 ¹	0.1116 ¹	1.62 ¹	3.62 ¹	1.62 ¹
Cuba	2017	41	50	4.5	9	0.08	2	4
Cyprus	2017	41	50	4.5	9	[0.08]	[2]	[4]

World Health Organization

FRAMEWORK FOR DEVELOPING HEALTH-BASED EMF STANDARDS

MODEL LEGISLATION FOR ELECTROMAGNETIC FIELDS PROTECTION

OUTLINE

Introduction

Assessing the health risk



The Present Scientific Knowledge

- Large and increasingly sophisticated database
- Known mechanisms
- International exposure guidelines based on established health effects
- Scientific uncertainty



What do we know?

100 kHz

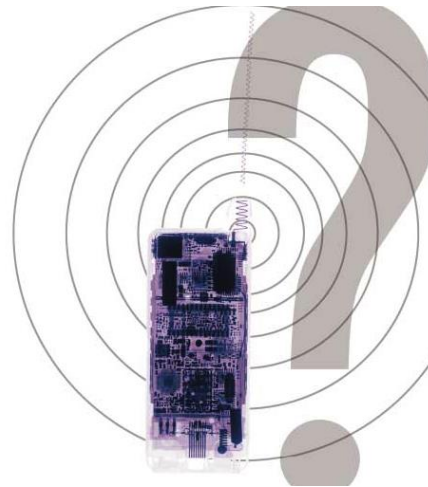
300 MHz

10 GHz

Frequency

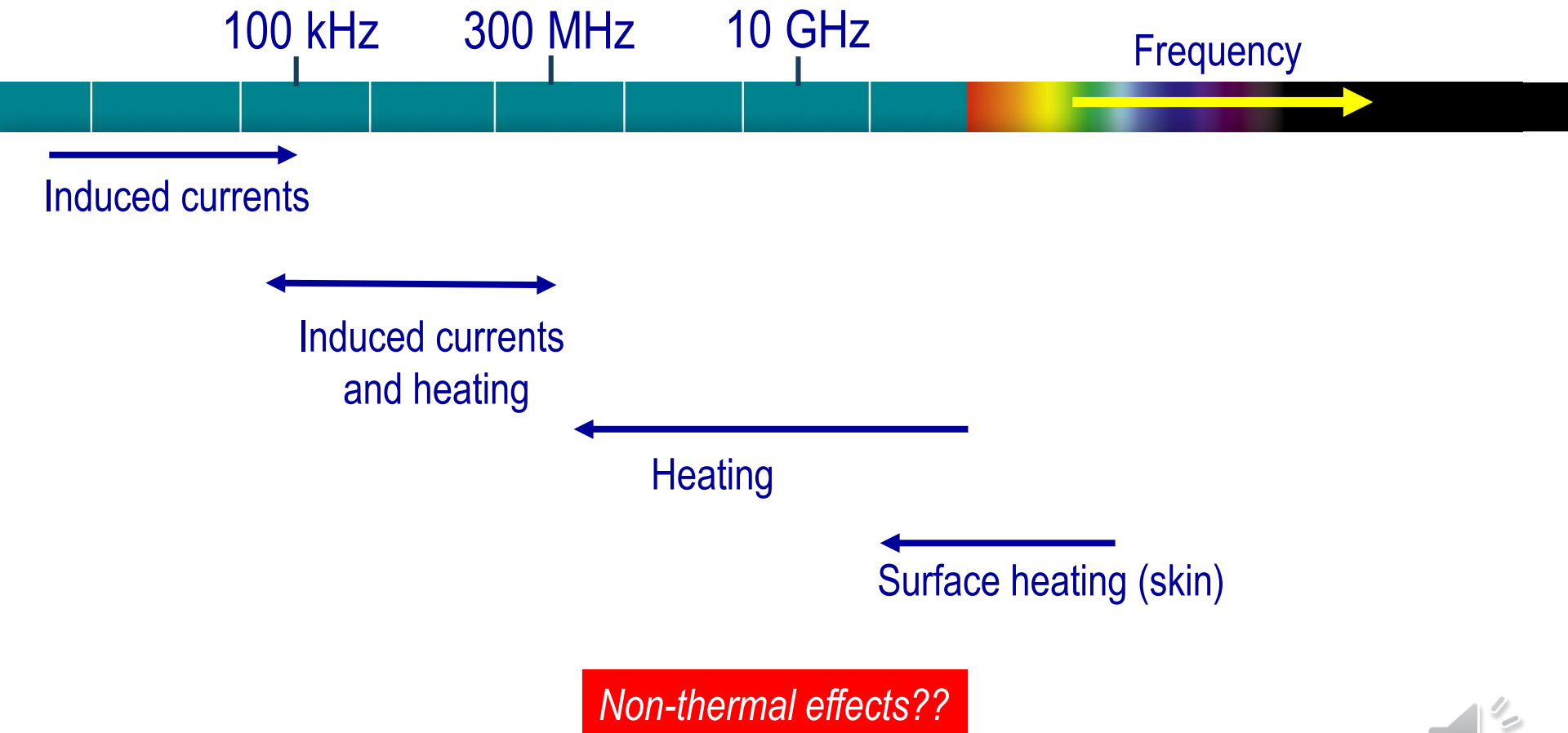


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What do we know?

Mechanisms of interaction



What do we know?

Mechanisms of interaction



5G

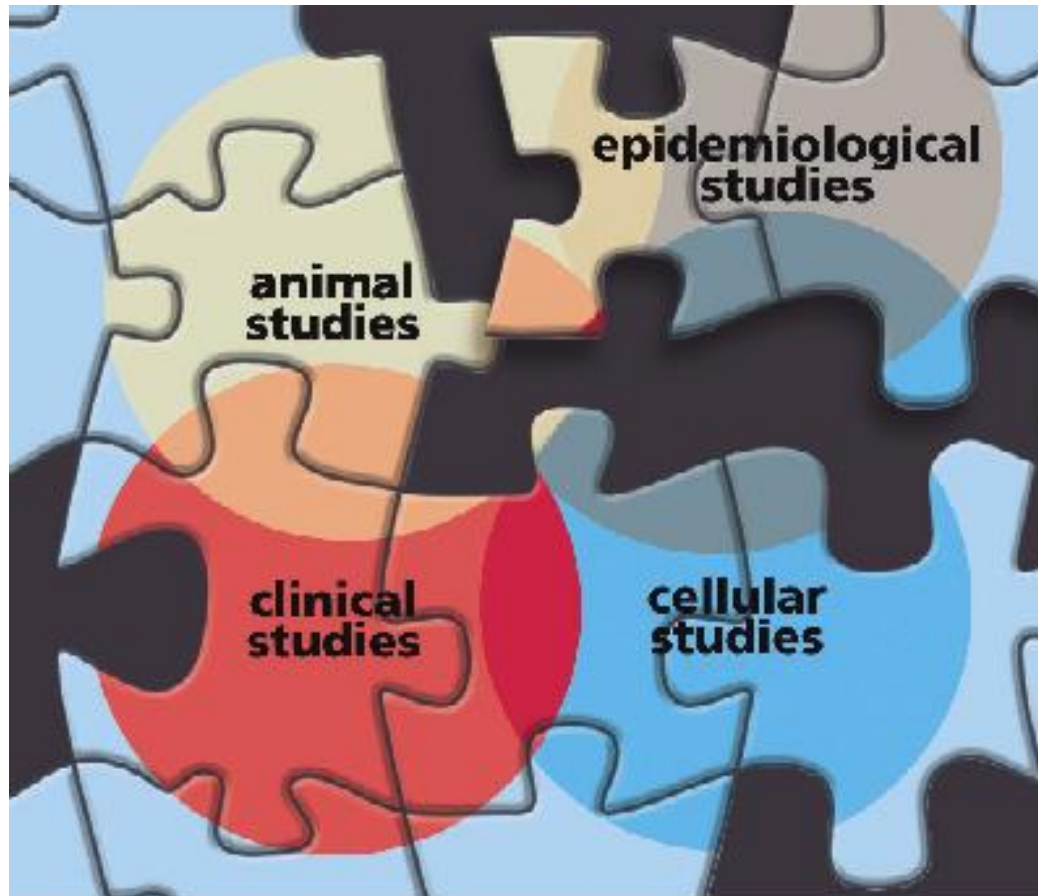
- Below 1 GHz
- 1 – 6 GHz
- Above 6 GHz and most likely above 24 GHz

?



Research

Balance of studies needed



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



Laboratory Studies

Cellular studies

- Genotoxicity
- Gene expression

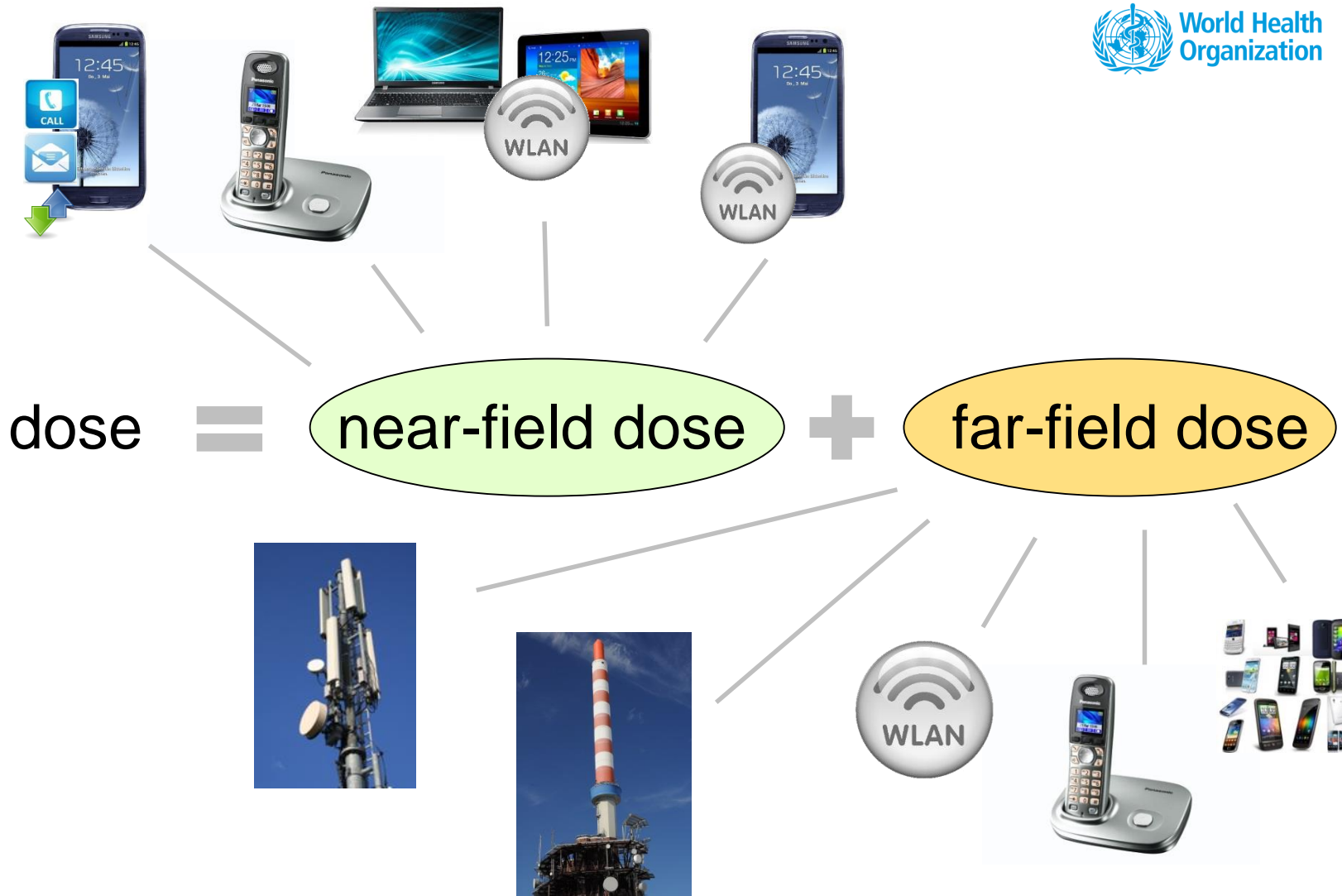
Animal studies

- Cancer
- Behaviour
- BBB
- Skin

Human studies

- Sleep
- EEG
- Hormones
- EHS





From Martin Röösli



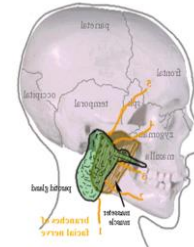
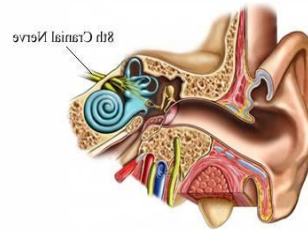
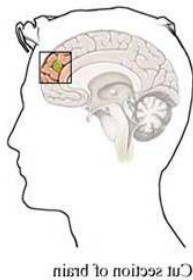
Epidemiological studies

Studies on mobile phones



Tumours in head and neck

- Glioma, meningioma, acoustic neuroma, parotid gland



Numerous studies on the use of mobile phones

- Published: USA, Nordic countries, INTERPHONE, CEFALO
- Ongoing: MOBI-Kids, COSMOS, GERoNiMO, ...

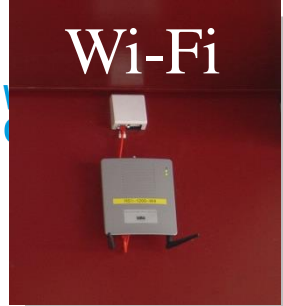


Epidemiological studies

Base stations and wireless networks



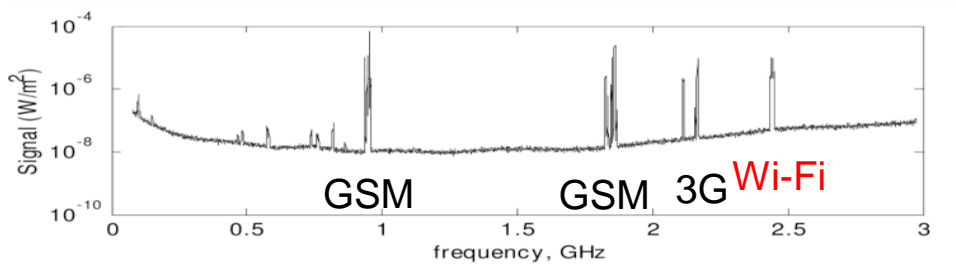
Wi-Fi



Some studies have been performed

- Well-being and performance
- Cancer

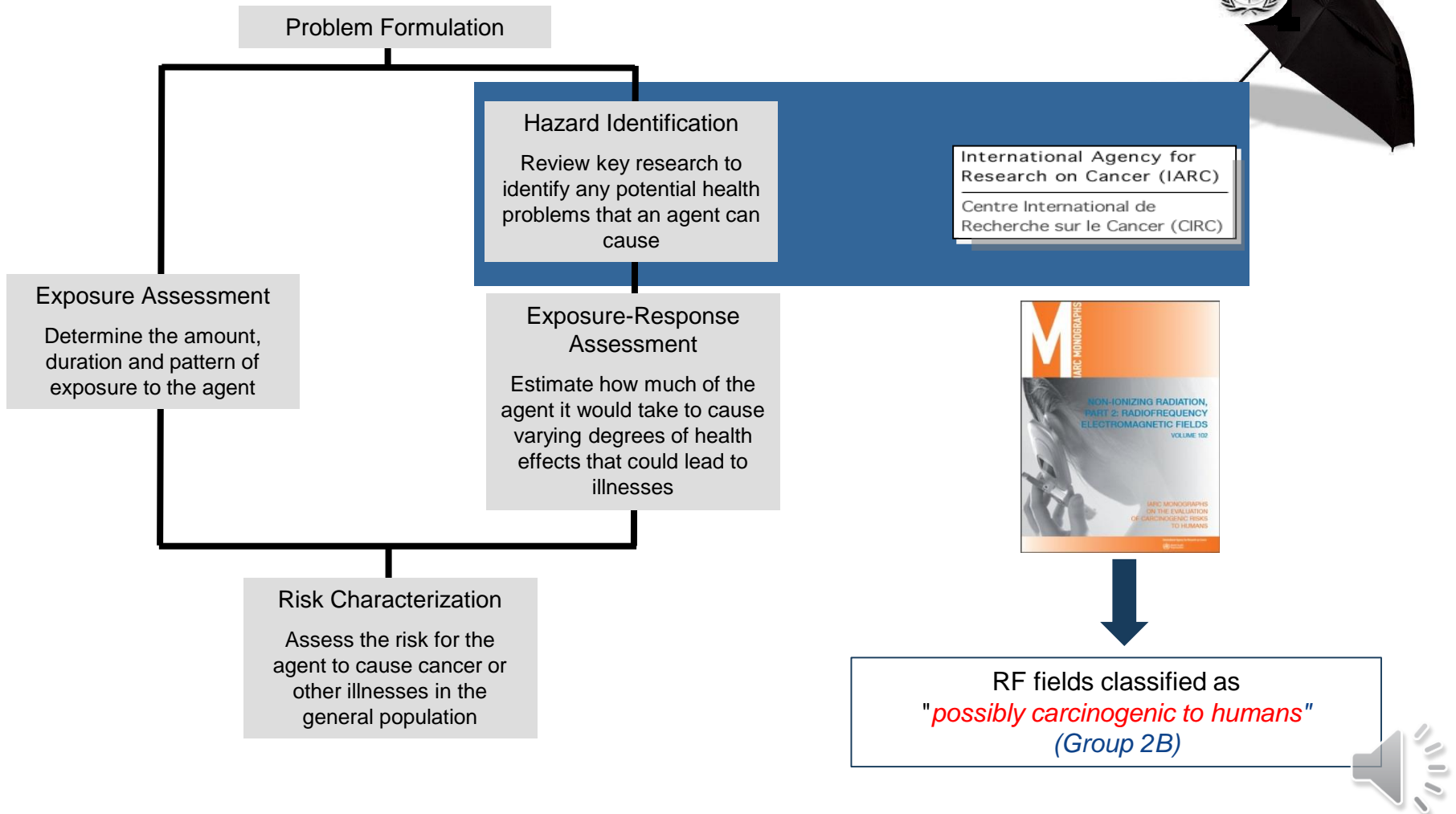
Personal exposure assessment



Kenneth R. Foster, *Radiofrequency exposure from wireless LANs utilizing WI-FI technology*. Health Phys. 92(3):280–289; 2007



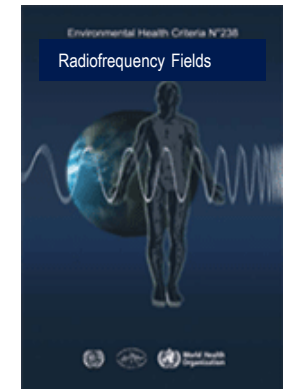
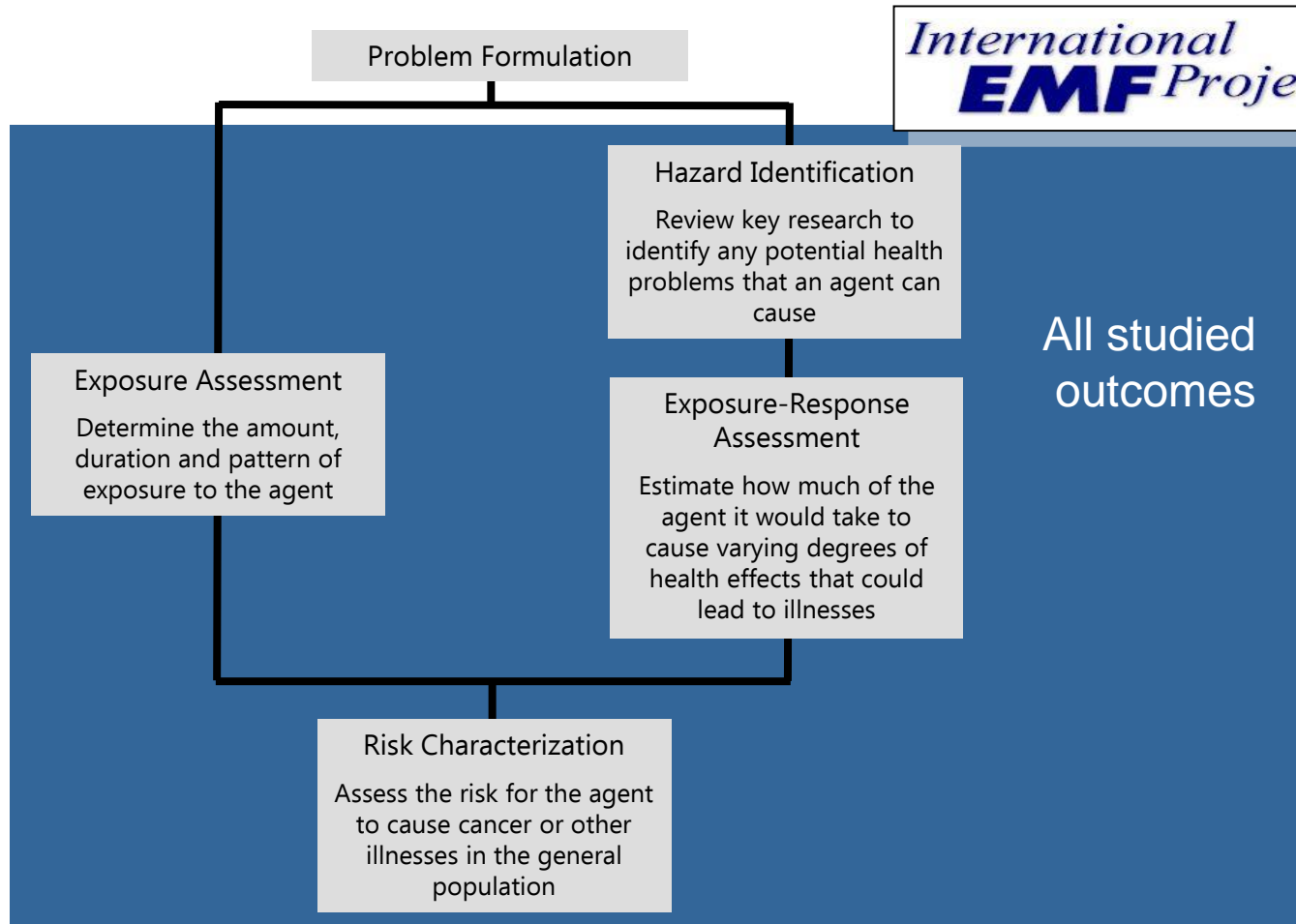
Health Risk Assessment



Health Risk Assessment (cont'd)



International
EMF Project



Discussion

"5G, EMF & Health"



- Is it too early to discuss this point?



Search

millimeter wave

[Advanced literature search →](#)

Search

The search found 1007 items. Due to your filter selection, 397 items are being displayed.

The following terms were included:

millimeter wave

extrem hohe Frequenz

Millimeterwelle

EHF

extremely high frequency

MMW

超高频波

ミリ波

Filter by category

Articles (998) Glossary (6) Info texts (3)

Filter by language

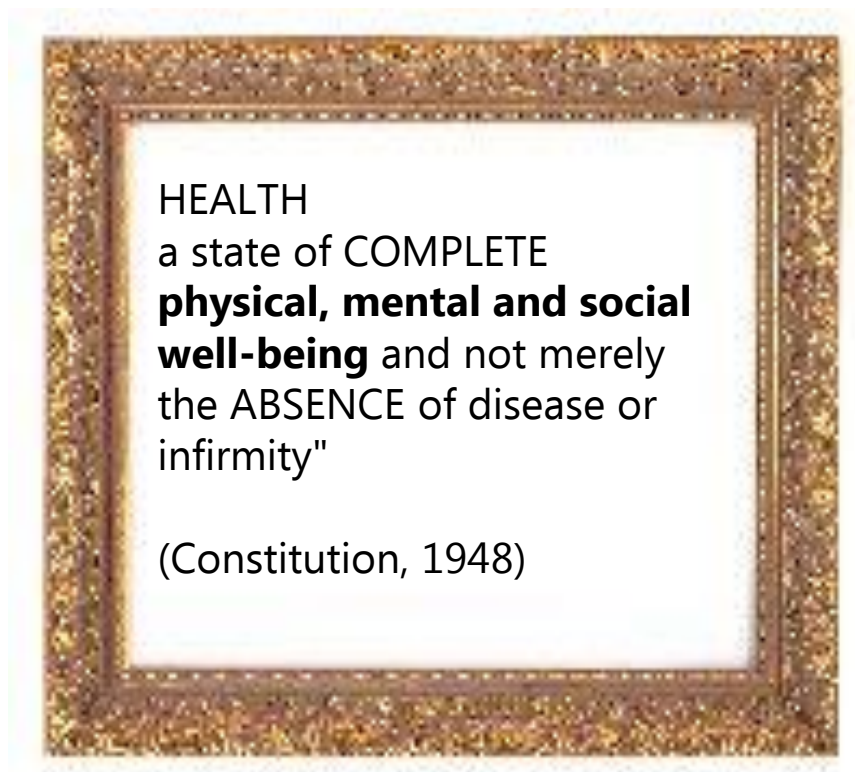
English (397) Japanese (328) German (282)



Discussion

"5G, EMF & Health"

- Is it too early to discuss this point?
- Is exposure to radiofrequency fields from wireless technologies the main health concern?



Discussion

"5G, EMF & Health" (cont'd)



Interdisciplinary Summit on Children and Screen Time

November 1, 2017 | Washington, D.C.



Cognitive, Psychosocial, and Physical Effects



- learning
- attention
- sleep
- anxiety

Effects on Family, Society, and Culture



- parenting
- privacy
- digital inequality
- stereotypes

Media, Usage, and Devices



- violence
- cyberbullying
- advertising
- social media

3



urgent questions:

- How is digital media enhancing and/or impairing children's ability to live happy, healthy, and productive lives?
- How are years of electronically mediated interactions shaping children's physical, cognitive, emotional, and social development?
- What should we do about it?

PEDIATRICS

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

NOVEMBER 2017 • VOLUME 140 • SUPPLEMENT 2

A SUPPLEMENT TO PEDIATRICS

Children, Adolescents and Screens: What We Know and What We Need To Learn



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



Conclusions

- Need for clear roles and responsibilities in government on this topic
- Need for adoption and compliance of health-based standards
- Need for a public information program and dialogue with stakeholders
- Need for promoting research to reduce uncertainty

We are a "global village"



Thank you.



World Health
Organization

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