ITU Workshop on “5G, EMF & Health”
Warsaw, Poland, 5 December 2017

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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)

- Telecommunications
- Navigation/Radar
- Commercial
- Wi-Fi
- Telecommunications
- Residential sources
- Broadcasting
- Vehicle technologies
- RFID at Work & Play
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 car.
Applications using radiofrequency fields
(100 kHz – 300 GHz)

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
Do EMFs pose a health risk?

Risk Assessment
The Evidence

Risk Perception
The Public Concern

Risk Management
The Policies

World Health Organization
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

≠
What do we know?
Mechanisms of interaction

- Induced currents
- Induced currents and heating
- Heating
- Surface heating (skin)

Non-thermal effects??
What do we know?
Mechanisms of interaction

- Below 1 GHz
- 1 – 6 GHz
- Above 6 GHz and most likely above 24 GHz
Research
Balance of studies needed

Laboratory Studies

Cellular studies
• Genotoxicity
• Gene expression

Animal studies
• Cancer
• Behaviour
• BBB
• Skin

Human studies
• Sleep
• EEG
• Hormones
• EHS
dose $\equiv$ near-field dose + far-field dose

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

Some studies have been performed
- Well-being and performance
- Cancer

Personal exposure assessment

Health Risk Assessment

Problem Formulation

Hazard Identification
Review key research to identify any potential health problems that an agent can cause

Exposure Assessment
Determine the amount, duration and pattern of exposure to the agent

Exposure-Response Assessment
Estimate how much of the agent it would take to cause varying degrees of health effects that could lead to illnesses

Risk Characterization
Assess the risk for the agent to cause cancer or other illnesses in the general population

RF fields classified as "possibly carcinogenic to humans" (Group 2B)
Health Risk Assessment (cont'd)

- Problem Formulation
- Exposure Assessment
  - Determine the amount, duration and pattern of exposure to the agent
- Hazard Identification
  - Review key research to identify any potential health problems that an agent can cause
- Exposure-Response Assessment
  - Estimate how much of the agent it would take to cause varying degrees of health effects that could lead to illnesses
- Risk Characterization
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All studied outcomes

Radiofrequency Fields
Discussion
“5G, EMF & Health”

- Is it too early to discuss this point?
Challenges

- Exposure assessment
- Compliance assessment
- Epidemiological studies

What will be the size of compliance zones around 5G network antenna sites?

This is a difficult question to answer at this point as the technical standards for the 5G networks and devices are still under development. It is expected that the size of the compliance zone for 5G antennas will be similar to that of other mobile technologies using similar transmitter powers. The size and shape of compliance zones will be evaluated and implemented according to international technical standards.

Mobile networks are designed to use only the power needed to provide quality services. Too much power...
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
- 超高周波
- 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?

HEALTH
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(Constitution, 1948)
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.

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