ICNIRP, 5G, Guidelines & Health

Rodney Croft
Chair, International Commission on Non-Ionizing Radiation Protection (ICNIRP);
University of Wollongong, Australia
r.croft@icnirp.org
What is the ICNIRP?

• Not-For-Profit Non-Governmental Organization in official relations with World Health Organization & International Labour Organization

• To develop and disseminate science-based advice on limiting exposure to non-ionizing radiation, including radiofrequency fields relevant to 5G

• Independent from industry; members declarations of interests available at www.ICNIRP.org
ICNIRP & 5G

- Exposures from 5G infrastructure & devices fall within the ‘radiofrequency’ (RF) spectrum (100 kHz – 300 GHz)
- ICNIRP published updated RF guidelines in May 2020
- These provide restrictions that specify safe levels of RF exposure for humans
- People being exposed to RF from 5G devices will be safe providing that their exposures do not exceed the restrictions
THE ICNIRP RF GUIDELINES
Scope

• Radiofrequency (RF) EMF (100 kHz – 300 GHz)
• Provides protection against adverse health effects to humans under realistic exposure conditions

• *Not included*
  – exposure for medical purposes (patients, carers and comforters)
  – exposure of medical implants
  – electromagnetic compatibility
  – compliance issues (e.g. measurement protocols)
Overall objective

- Define exposure levels, below which harm will not occur
- Not always possible for ICNIRP (e.g. UV radiation)
- No benefit in making exposures even lower!!!
Conservative nature of guidelines

• Reduction factors are only one of the conservative steps used to provide safety
Conservative nature of guidelines

• Many conservative steps added to guideline setting process
  – Incorporating predictions of potential harm based on mechanisms, even where RF EMF has not been shown to cause harm
  – Basing limits on potential health effects, which do not normally cause harm (e.g. small temperature elevations are normally uneventful)
  – Where only limited research is available for known effects, reducing the degree of certainty required to demonstrate RF-induced harm (i.e. accept best estimate)
Conservative nature of guidelines

• Many conservative steps added to guideline setting process
  – Application of reduction factors to provide a buffer to harm
  – Applying reduction factors consistently, even where, individually, less stringent reduction factors may appear justified
  – Conservative derivation of Reference Levels for most cases (e.g. plane wave exposure)
Adherence to the ICNIRP Guidelines will permit...

- At worst, a maximum local temperature rise for the general public of 0.5 degrees (e.g. in skin), or 0.2 degrees (e.g. in deeper tissue)
- No detectable increase in body core temperature
- No increased risk of any adverse health effect
Indeed all restrictions are highly conservative estimates that will remain protective unless they are exceeded by a substantial margin.
Example of how restrictions are derived

Whole-body exposure
Whole-body exposure protection (100 kHz - 300 GHz)

**Threshold**

Body core temperature rise 1°C

**Exposure**

4-6 W kg⁻¹

**Reduction Factors**

Occup. 10  Gen. Pub. 50

**Basic Restrictions**

0.4 0.08

Variation: biology, baseline & environment; Uncertainty: science

Total heat load; signs of heat stress

Exposure from 5G must remain below these values
Example of how restrictions are derived

Local exposure
Protection against local exposure (6-min) > 6 GHz

Threshold: 2°C deep head, trunk, testes
5°C remaining tissue

Exposure: 200 W m²

Reduction Factors:
- Occup.: 2
- Gen. Pub.: 10

Basic Restrictions:
- 100
- 20

Variation: biology, baseline & environment;
Uncertainty: science

Signs of harm (e.g. pain)

Exposure from 5G must remain below these values

20°C air temperature 35°C

Acchoff & Weaver 1958
Common misconceptions about the Guidelines
But what about (#1)

• “the GDLs only protect against thermal effects”
  – all potential effects are considered; the GDLs specifically look for ANY evidence of health effects, regardless of the mechanism
  – however, where a mechanism is known (such as thermal), this enables us to use a larger body of science to ensure appropriate restrictions
But what about (#2)

• “but there is evidence that RF causes diseases such as cancer (e.g. IARC 2B possibly carcinogenic classification, 2011; NTP Report, 2019)”
  – These have been considered in detail by ICNIRP, but the science does not show that RF EMF causes or promotes cancer
But what about (#3)

• “but the GDLs don’t protect electro-hypersensitive people”
  – all potential effects are considered; even though some report RF hypersensitivity, there is no evidence that it is caused by RF
  – indeed, the only strong evidence coming out of this domain is that belief (and not exposure) is sufficient to cause symptoms
But what about (#4)

• “but why do the GDLs ignore all those studies that show that RF causes harm?”
  – No research is ignored
  – Some excluded because not relevant (e.g. a biological effect without health consequence, such as the RF-EEG effect)
  – Some is not interpretable due to methodological limitations
  – Some has been shown to be erroneous (e.g. by failed replication attempts)
    • i.e. both ‘X’ and ‘NOT X’ cannot be true
But what about (#5)

- “but the GDLs only consider acute effects”
  - reports of both acute and chronic effects are considered; however there is no evidence supporting the claims that there are chronic effects (such as cancer)
  - by basing the restrictions on the only substantiated effects, protection is provided against ALL effects of RF EMF
But what about (#6)

• “but 5G is new and there is no research on that!”
  – This is a misunderstanding of how science works
  – If we have a new brand of tobacco cigarette; we don’t need to spend another 70 years to check if this is safe, we use our scientific understanding to conclude that it is NOT safe
• This is appropriate
But what about (#7)

• “but 5G is new and there is no research on that!”
  – It is the same with RF-EMF and 5G
  – We have an extensive body of science clarifying how RF-EMF affects the body as a function of frequency
  – We have an extensive body of science showing how 5G will differ from 3G/4G in terms of health
  – Science can conclude that 5G is safe
But what about (#8)

• “but I’ve heard on the web that 5G causes coronavirus!”
  – 5G DOES NOT cause or spread coronavirus!!!

One in eight Australians believe 5G is spreading coronavirus

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