ICNIRP PROTECTION PRINCIPLES

ICNIRP/WHO/ICRP/IRPA/ILO Workshop “Radiation protection principles: Similarities and differences in ionizing and non-ionizing radiation”
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Current position

ICNIRP Statement

GENERAL APPROACH TO PROTECTION AGAINST NON-IONIZING RADIATION

International Commission on Non-Ionizing Radiation Protection*

Health Physics 82(4):540-548; 2002

What is not covered?

- Social, economic, and political considerations
  → authorities
- Measurements, design of equipment, shielding to reduce exposure, setting emission limits for devices
  → technical standards bodies

Basic approach

- Good quality scientific research:
  - Peer reviewed papers
- Biological effects → beneficial, health effects
  - Annoyance, discomfort: potential health hazard
- Health effects: trivial – life threatening: balanced judgement
- Concern on unsubstantiated health effects:
  - Information

Hierarchy of data

- Epidemiological studies
- Human experimental studies
- Animal studies
- In vitro studies
- Clinical reports: complementary information

- Other data (e.g. dosimetry studies)

Process

- Review of all data
  - Standing committees → Project groups
- Overall evaluation, development exposure guidelines
  - Commission
    - Scientific data
    - Uncertainties
    - Expert judgement

Exposure–effect relations

- Threshold:
  - Limits + uncertainty factor
- No threshold:
  - Other risk reducing strategies
- ICNIRP: analyze risk in terms of levels of consequences that could be quantified
- Acceptability of risks: based also on social and economic considerations
  - Authorities

Critical effect

- Established adverse health effect that is relevant at the lowest level of exposure

Exposure characterization

- Biologically effective quantity:
  - Basic restrictions
- Direct measurement possible:
  - EMF > ~10 GHz, optical radiation
- Direct measurement not possible:
  - Lower frequencies
  - Mathematical modeling, extrapolation
  - Worst-case conditions
  - Reference levels (measurable quantities)

Reference levels

- Reference levels provided strictly as an aid for practical exposure assessments to determine whether the basic restrictions are likely to be exceeded
- ICNIRP recommends the use of reference levels as a general guidance for limiting exposures of workers and of the general public

Population groups

- General population
- Workers
- Patients
  - 2002: no guidance, medical trade-off
  - 2004: guidance MRI exposures

ICNIRP Statement

MEDICAL MAGNETIC RESONANCE (MR) PROCEDURES: PROTECTION OF PATIENTS

The International Commission on Non-Ionizing Radiation Protection*

Reduction factors

- Uncertainties
- Size of reduction factors depends on:
  - Knowledge of effect
  - Expert judgement
- Uncertainty in measurements not considered
- Extra reduction basic restrictions → reference levels (worst-case situation)

Risk management

- Established health effects:
  - Guidelines (provided by ICNIRP)
- Suspected health effects:
  - Protective measures (as decided by National Authorities)
    - Reducing needless exposure
    - ICNIRP recommends that these “should not undermine or be to the detriment of science based exposure guidelines”
  - Reference to guidance of European Commission on use of Precautionary Principle

Issues to be discussed

- Stochastic / deterministic effects (threshold)
- Safety / uncertainty factors
- Risk perception: influence on protection principles / uncertainty factors
- Workers vs. general public vs. patients
- Cosmetic, wellness exposures
- Environmental protection
- Precaution / prevention