



Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

## International Conference on Non-Ionizing Radiation and Children's Health

### **Session 5 – Risk management and Prevention Discussion**

**Mirjana Moser**

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**Are our children today  
sufficiently protected against  
NIR?**



## Are our children today sufficiently protected against NIR?

### *Evidence*

- What is the **level of evidence** for particular, children related, risks from NIR?
- What level of evidence do a risk manager need?

### *High exposures, technology development*

- Which are **critical / high exposures**?
- What technology **development** should we follow in order to **anticipate** potential future risks for children

### *Research need*

- What are **research priorities**?

### *Measures*

- What protection, precaution **measures** are feasible and “reasonable”?
- What measures have been taken?
- What measures should be taken?



# Static Electric and Magnetic fields

## *Evidence*

- Some data on pregnancy and occupational exposures up to ~ 2T
- **???** effects for stronger fields

## *High exposures, technology development*

- **MRI - occupational exposure of pregnant women**

## *Research need*

- **Effects of static fields > 3T**

## *Measures*



- revision of occupational exposure directive?



## *Evidence*

- **childhood leukaemia** (might be **multistage, multifactor effect**)
- risk for brain cancer (some suggestions)?
- no effect on development (animal studies)

## *High exposures (> 0.4 $\mu T$ ), technology development*

- power lines
- **household installations** and appliances (floor heating, transformers, electric blankets, waterbeds..)
- **transportation**

## *Research need*

- **interdisciplinary research on leukaemia** (genetic, animal, epi, different agents)  
like research programm in Germany (BfS)
- big, worldwide prospective studies?
- **mechanisms** (new ideas like radical pair mechanism – RPM)?

## *Measures*

- precautionary measures** mostly considering power lines
- precautionary measures for other appliances (no waterbeds for children)?
- recommendations or more strict regulations** (limits, restrictions)?



# Intermediate frequencies EMF

## *Evidence*

- ???
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## *High exposures, technology development*

- **induction cooker**
- **RFID, EAS**
- **energy saving lamps**
- **wireless power transfer**

## *Research need*

- **research need in all disciplines!!**
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## *Measures*



- research programm covering all disciplines**



## *Evidence*

- **brain cancer** (CEFALO –in publication, Mobi-Kids starting), no increase in cancer incidence
- **well-being, cognition, behaviour** - some indications, but methodological problems; lifestyle influence,  
day-time sleepiness because of sending SMS during night
- **development, teratological effects** (animal studies) – no effects
- changes in EEG (human)?
- animal studies on: brain structure and function – no effect, blood-brain barrier – some effects

## *High exposures, technology development*

- **mobile phones**
- **emerging (telecommunication) technologies?** change in exposures? change of lifestyle?

## *Research need*

- **interaction mechanisms** (gene expression, mechanistic tumour promoters)
- **exposures and dosimetry of new technologies**
- **prospective epidemiological studies**
- other end-points (hormonal level)
- evaluation of **co-exposure** effects

## *Measures*

- precaution
- monitoring:** exposures from new technologies, early detection of possible risks (prospective studies)



# Infrared radiation

## *Evidence*

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## *High exposures, technology development*

- infrared “saunas”
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## *Research need*

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## *Measures*

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# Visible Light

## *Evidence*

- **burn (skin, eye), eye injuries – retina coagulation (laser)**
- **photochemical retinal hazard - blue light hazard**
- **effects on sleep?**

## *High exposures, technology development*

- **Laserpointers (up to 5 W), Lasers,**
- **IPL, cosmetic applications, laser epilation**
- **LED, lamps**

## *Research need*

- **blue light hazard, biological spectral relevance**
- **night illumination**

## *Measures*

- **ban strong laserpointers**
- **no cosmetic applications for kids**



# UV Radiation I

## *Evidence*

- **skin cancers** (high evidence, risk factors known)
- **immunosuppression** -> viral infections like herpes simplex (not high evidence), lower response by vaccination (hepatitis B, rubella), but might also be protective effect by vaccination against tuberculosis
- **positive effects** (risk reduction due to D-Vitamin or immunosuppression?) - polymorphic light eruption – PLE, multiple sclerosis, asthma, allergies
- **photoaging**, melanocytic naevi
- **effects on eye**: phototoxic, photosensitive, photoallergic effects → cancer, photokeratitis, cataract  
sensitivity is a function of age – children more sensitive

## *Research need*

- **positive effects and the role of vitamin D**
- in-vitro models for children
- **UV-sensitivity of children**, epidermal stem cells



# UV Radiation

## *High exposures, technology development*

- **Sun**, ozone depletion increases skin cancer (20% depl -> 5% more cancers)
- **sunbeds**

## *Measures*

- **optimal sun-protection?** Protect from cancer, but allow D-vitamin (vitamin supplementation)
- **educational programmes** + policy accreditation programs for preprimary school → since 1980 in Australia → decreasing of skin cancer incidence from 1995
- **sunbed problem!** → **no sunbed use for children!**



# Overarching Issues

## ***Evidence***

- combined exposures?
- sensitivity?
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## ***High exposures, technology development***

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## ***Research need***

- multifactor, multistage effects, cofactors?
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## ***Measures***

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