ongoing and planned EHS research

N. Leitgeb

Institute of Clinical Engineering
Graz University of Technology
the EHS issue

- high public awareness
- EHS prevalence
- physician’s beliefs
- ongoing and planned research
- evidence and models
- EHS and sleep disorders
**EHS prevalence**

- **regional differences**
  - Bergqvist et. al. 1997

- **physician’s conviction**
  - Leitgeb et. al. 2004

- **estimations: ~2%**
  - A: <2% Leitgeb 1995
  - S: 2% Ericsson 2000
  - S: 1,5% Hillert et. al. 2002
  - US/Ca: 3,2% Levallois et. al. 2002

- **sources change**
  - VDU ➔ power lines ➔ MTC base stations

INSTITUTE OF CLINICAL ENGINEERING, GRAZ UNIVERSITY OF TECHNOLOGY, AUSTRIA
Workshop on Electrical Hypersensitivity, Prague, October 25-26, 2004
96%: EMF cause illness

67%: having EHS patients

96%: EMF + cofactors cause illness

Leitgeb et. al. 2004

Workshop on Electrical Hypersensitivity, Prague, October 25-26, 2004
ongoing and planned EHS research

EHS research recommended, e.g. by
- GB: IEGMP 2000
- D: SSK 2003
- EU: EMF-NET 2003
- WHO: If causal link confirmed, particular lab. studies

EHS research approaches
- prospective studies
- laboratory \textit{(provocational)} studies
- field studies
- epidemiological studies
Collection of EMF-attributed symptoms / cases

*Calls for listing of EMF-associated symptoms and related sources*

- **D:** “Mainz Watchdog” - hotline
- **AUS:** ARPANSA EMR health complaints register

Investigation of EHS cases

- **A, D, SF, S:** EMF perception and scoring
  *Short-term provocation to ELF-MF (A, S), MTC-μW (A, D, SF, S)*
- **A, D, SF, S, J, K, UK:** EMF provocation and bioparameters
  *Short-term provocation to MTC-μW*
- **NL, CH:** EHS: well being and cognition
  *TNO study replication ongoing in CH*
- **D, J, S:** EHS and psychological and somatic cofactors / indicators
  *Chemical sensitivity (dental amalgam, heavy metals), blood parameters, skin sensations, allergies, threat somatisation tendency*
EMF-associated laboratory sleep studies

- **D;CH**: simulated MTC signals and sleep disturbance
  - Röschke et al.: 3 studies with simulated MTC-handset fields
  - Borbely et al., Huber et al.: Short-term simulated handset, basestation exposure

EMF-associated on-site sleep studies

- **CH**: ELF-E,B and sleep disturbance
  - Müller et al.: On-site provocation to weak ELF fields, no follow up

- **D**: basestation and sleep disturbance
  - Danker-Hopfe et al.: Blinded basestation-switching: Pilot study finished, main study to be started

- **A**: environmental RF-EMF and sleep disturbance
  - Leitgeb et al.: Blinded RF-EMF-shielding: Pilot study finished, main study ongoing

Basestation-epidemiological studies

- **CH, D, GB**: Feasibility studies ongoing
  - Estimation strategies for exposure assessment

---

**INSTITUTE OF CLINICAL ENGINEERING, GRAZ UNIVERSITY OF TECHNOLOGY, AUSTRIA**
Workshop on Electrical Hypersensitivity, Prague, October 25-26, 2004
**well being and cognition**

TNO- study
double-blind exposure to MTC handset signals

- **well being**
  - higher score for EHS at UMTS
  - no significant changes for GSM

- **cognition**
  - influences on both, EHS and controls
  - higher score-sum for controls
  - selective results for groups / phones

<table>
<thead>
<tr>
<th>well being</th>
<th>EHS 11m+25w</th>
<th>control 22m+14w</th>
</tr>
</thead>
<tbody>
<tr>
<td>well being sum</td>
<td>X</td>
<td>9 18 UM</td>
</tr>
<tr>
<td>anxiety</td>
<td>X</td>
<td>9 18 UM</td>
</tr>
<tr>
<td>somatic</td>
<td>X</td>
<td>9 18 UM</td>
</tr>
<tr>
<td>inaedequacy</td>
<td>X</td>
<td>9 18 UM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>cognition</th>
<th>EHS 11m+25w</th>
<th>control 22m+14w</th>
</tr>
</thead>
<tbody>
<tr>
<td>reaction time</td>
<td>X</td>
<td>9 18 UM</td>
</tr>
<tr>
<td>memory comparis.</td>
<td>X</td>
<td>9 18 UM</td>
</tr>
<tr>
<td>visual selective</td>
<td>X</td>
<td>9 18 UM</td>
</tr>
<tr>
<td>dual tasking</td>
<td>X</td>
<td>9 18 UM</td>
</tr>
<tr>
<td>info filtering</td>
<td>X</td>
<td>9 18 UM</td>
</tr>
</tbody>
</table>

**author’s conclusions:**
- evidence for causal link
- impact on wellbeing
- EHS stronger reacting

**replication necessary**