EMF and Symptoms

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Electrical Hypersensitivity?

Re: Subset of population experiences symptoms in relation to EMF exposure
• Individuals are convinced they suffer from EHS

• Thus, scientists should test hypothesis that EHS exists;

• This is equivalent to test for association between EMF- exposure and symptoms
• Implicated symptoms not well defined, but resemble asthenia

• These symptoms have high prevalence and are multifactorial

• There is no biological marker
In other words

• A set of conditions are required for the outcome to occur
  – Explains why not everyone exposed gets outcome

• More than one route can lead to outcome
  – Explains why not everyone with outcome has been exposed
• Even if a subject with outcome is exposed to a causal factor, this must not necessarily have played a role in this particular case
Is any of these boxes EMF?
Designing study

Study population

EMF-exposure

Difference in symptom frequency?

Occurrence of symptoms

No EMF-exposure
Exposure and outcome must be assessed independently of each other

Note: Self reported EHS must not be used as outcome!
Some design options

• Experimental (provocational)
  Exposure is randomized and blinded

• Epidemiological (observational)
  Recall bias is concern

• Natural experiments
  E.g., deenergized power lines, inactive transmitters
Some other options

• General population

• Population who report they are EHS
  – In principle easier to detect effect
More options

• ELF
• RF
  – Phone strength
  – Base station strength
• Etc…
Epidemiological studies on RF

• Base stations
  – Navarro 2003

• Phones
  – Oftedal 2000
  – Chia 2000
  – Santini 2002
Comments

• All studies cross-sectional
• Response rates low or unreported
• Selection bias?
• Recall bias?
Experimental studies on RF

• Phones
  – Koivisto 2000, 2001
  – Hietanen 2002

• Base stations
  – Swamborn 2003
Comments

• Three different designs
• Association seen in one study, but only for newly introduced system
• Not strong basis to reject existence of EHS
Further studies:

- Experimental design (provocational) obvious choice, for short term effects
- Epidemiological studies may be used for long term effects and when adequate control can be made
- Begin with basic question of association or not