

**WHO workshop on Electrical Hypersensitivity
Prague, Czech Republic
October 25-27, 2005**

WORKING GROUP MEETING REPORT

On October 27, 2004, a working group meeting was held, which included the speakers, the WHO secretariat and other interested parties. The working group meeting included break-out sessions on the following topics: (i) Characterization, diagnosis and treatment, (ii) Research needs, and (iii) Policy options. The reports from each of these groups is provided below.

(i) Report on CHARACTERIZATION, DIAGNOSIS AND TREATMENT

Rapporteur: Lena Hillert, Department of Public Health Sciences, Karolinska Institute, Sweden

Participants:

Jan Bureš, The Academy of Sciences of the Czech Republic
Eduard David, Universität Witten-Herdecke, Germany
Gerd Friedrich, Forschungsgemeinschaft Funk e.V., Germany
Bruce Hocking, Medical Specialist, Australia
Sheila Johnston, Neuroscience Consultant, United Kingdom
Patrick Levallois, Institut national de santé publique du Québec, Canada
Torbjörn Lindblom, FEB - The Swedish Association for the ElectroSensitive, Sweden
Luděk Pekárek, The National Reference Laboratory for Non-Ionizing Radiation, Czech Republic
Martin Rössli, Department of Social and Preventive Medicine, University of Bern, Switzerland
Berndt Stenberg, Department of Dermatology, University Hospital Umeå, Sweden
Arne Wennberg, National Institute of Working Life, Sweden
Oldřich Vinař, Charles University Prague, Czech Republic

BACKGROUND

There are individuals that report a wide range of symptoms that they attribute to electromagnetic fields or being close to electrical equipment¹. To date, experimental and epidemiological studies have failed to provide clear support for a causal relationship between electromagnetic fields and complaints. The reported symptoms are generally non-specific and no consistent set of symptoms has been identified.

NAME AND WORKING DEFINITION

Name

The term *Idiopathic environmental intolerance (Electromagnetic field attributed symptoms)*, or IEI-EMF, is proposed to replace terms that imply an established causal relationship between symptoms and electromagnetic fields (e.g. electromagnetic hypersensitivity, electrosensitivity and hypersensitivity to electricity). Should a causal relationship to EMF or

¹ The term "electrical equipment" in this report includes any equipment which emits electric, magnetic or electromagnetic fields 0-300 GHz, e.g. power lines, electric motors, hair dryers, mobile phones and base stations etc. EMF is used as an abbreviation for these fields.

any other explanation be established in the future, the name of this condition may be changed according to this new knowledge. The specification “EMF attributed symptoms” is motivated by the need to distinguish the group of individuals who attribute their symptoms to EMF from individuals who attribute their ill health to other environmental agents, e.g. odorous chemicals. In the remainder of the text, it will be referred to as IEI.

Working definition

Symptoms that are experienced in proximity to, or during the use of, electrical equipment, and that result in varying degrees of discomfort or ill health in the individual and that an individual attributes to activation of electrical equipment.

CHARACTERIZATION

In the absence of any diagnostic criteria, further characterization of IEI is necessary. Several factors may be included in standardized protocols and questionnaires to characterize IEI individuals, as further detailed below.

i. Symptoms

Scores of most typical symptoms or indices of these symptoms (e.g. skin symptoms and neurovegetative symptoms, ‘headaches’ with mobile phones).

Note that IEI is not to be used as a diagnostic classification. In the absence of any identified disease, diagnosis should be based on the most pronounced symptoms (e.g. headache), according to ICD-10 (International Classification of Diseases; for diseases and/or symptoms) or DSM-IV (Diagnostic and Statistical Manual 4th edition; for psychiatric disorders)

ii. Self reported triggering or aggravating sources

Include information on the EMF sources that are considered by the patient to be the cause of their ailment, for example:

1. Electrical environment in general
2. Specified electrical equipment or sources of EMF (e.g. VDU environment, mobile phones, power lines, other specific electrical equipment)

iii. Exposure (assessment)

Assess EMF exposure to determine if the person's exposure is below existing EMF limits.

iv. Temporal aspects

Symptoms vary/do not vary within 1 hour (or alternatively 24 hours)

upon change in presumed exposure

Yes/No

Symptoms increase with longer duration of exposure

Yes/No

Perceived exposure – response relationship

Yes/No

v. Behaviour

Avoidance behaviour

Yes/No

Sick leave (If yes: Number of days)

Yes/No

vi. Clinical findings

Pathological findings in medical work-up, e.g. in blood chemistry, skin tests

or in investigations of reactions in the autonomic nervous system (ANS) Yes/No

In case of provocation tests (see discussion in next section), indication of a relationship between exposure (specify!) and complaints Yes/No

Subgroups

Typical subgroups may be described based on the variables above in order to focus on these specific groups in experimental or epidemiological studies. These groups may include, for example:

- A. A group of persons, without a reasonable alternative diagnosis, with predominantly skin symptoms that present themselves within one hour of work with VDUs, all persons still working part or full time.
- B. A group of persons, without a reasonable alternative diagnosis, with predominantly neurovegetative symptoms that present themselves within 24 hours of exposure to mobile phone base stations or other EMF source e.g. power lines (as reported by the persons themselves), working or on sick leave, all of which have taken measures to reduce their exposure to EMF in their homes or places of work.
- C. A group of persons, without a reasonable alternative diagnosis, with predominantly unpleasant feelings on the scalp (which the patient distinguishes from ordinary headaches) and sometimes feeling of slowness of thought, which the afflicted persons associate with use of mobile phones.

MANAGEMENT AND TREATMENT

The patient's medical history needs to be carefully taken to assess the plausibility of symptoms in relation to EMF exposures (dose-response) and possible alternative diagnoses. Physical examination should be carefully done to assess signs (e.g. skin changes) or alternative diagnoses.

IEI patients suffer from real health problems, but there is no known biological marker or any diagnostic test for IEI. Different contributing factors have been indicated in scientific studies. The primary focus of the medical work-up is to exclude or identify any medical diagnosis or psychological condition that calls for specific handling or treatment (see Figure 1). Psychosocial factors that may influence the patient's well-being should also be considered.

Several studies on IEI patients have indicated that this group of patients has an imbalance in their autonomic nervous system. Deviating reactions have been shown for different environmental stimuli (but not EMF) as well as indications of increased sympathetic activation. Standardized tests for investigation of individual patients may be developed. It is presently not known whether these findings may be predisposing factors or an effect of long suffering from ill health.

Information on what is known about health effects from exposure to EMF and medically unexplained symptoms in general are important parts in the medical consultation. The prognosis of IEI seems to be good in many patients, especially in those reported early and in predominantly skin symptoms. The use of hands-free mobile phone kits have been reported to resolve the problem with complaints during mobile phone calls. If symptoms do persist in spite of medical work-up and interventions, it is usually necessary to refrain from pursuing a causal factor and focus on reducing symptoms and disability. The choice of treatment should be based on a broad evaluation of the patient's symptoms and situation and taking the patients motivation for different interventions into account. Regardless of the initial cause of

ill health, the patient may be in need of continued support from the medical doctor or a psychologist due to co-existing psychological conditions or secondary effects of suffering from ill health of unknown origin where no standard cure is to be offered.

General recommendations to the physician for the medical consultation and follow-up include

- allowing enough time and/or repeated visits
- establishing a trustful relationship and agreeing on a shared ambition, i.e. the patient's improvement
- ensuring follow-up of the patient
- applying a non-judgmental and supportive approach, but informing the patient of your professional opinion
- in case of persisting symptoms, focusing on reducing disability rather than searching for a specific causal factor.

Measuring and reducing the exposure to electric and/or magnetic fields

Patients who suffer from ill health and attribute it to electric or magnetic fields frequently ask for measurements of fields and actions to reduce the exposure to EMF. Measuring fields are not generally recommended since there is no known causal relationship between electric or magnetic fields and symptoms unless the EMF fields are likely to exceed recommended exposure limits. However, measurement in workplaces may be important to assess compliance with exposure standards. For further discussion on advantages and disadvantages of actions aimed at EMF, please see the chapter "Handling of individuals claiming "electromagnetic hypersensitivity" in *Possible health implication of subjective symptoms and electromagnetic fields; A report prepared by a European group of experts for the European Commission, DG V*. [Bergqvist U et al. Stockholm, Sweden; 1997: National Institute for Working Life. (1997:19)] http://ebib.arbetslivsinstitutet.se/ah/1997/ah1997_19.pdf.

Provocation tests

Provocation studies with double blind exposure sessions have failed to verify a causal relationship between electric, magnetic or electromagnetic fields and complaints. The option to conduct individually designed provocation tests on a single patient needs careful consideration by the physician and the patient, including discussions on how different outcomes of the tests might be interpreted.

Should individually designed provocation tests be considered, it should be noted that the design needs to be carefully considered, e.g. regarding the exposure field intensity and modulations, blinded randomization of exposures, number of tests etc. If the patient states that he/she will not change his/her belief regarding the cause of ill health, regardless of the outcome in any provocation tests, a provocation test will not serve any purpose.

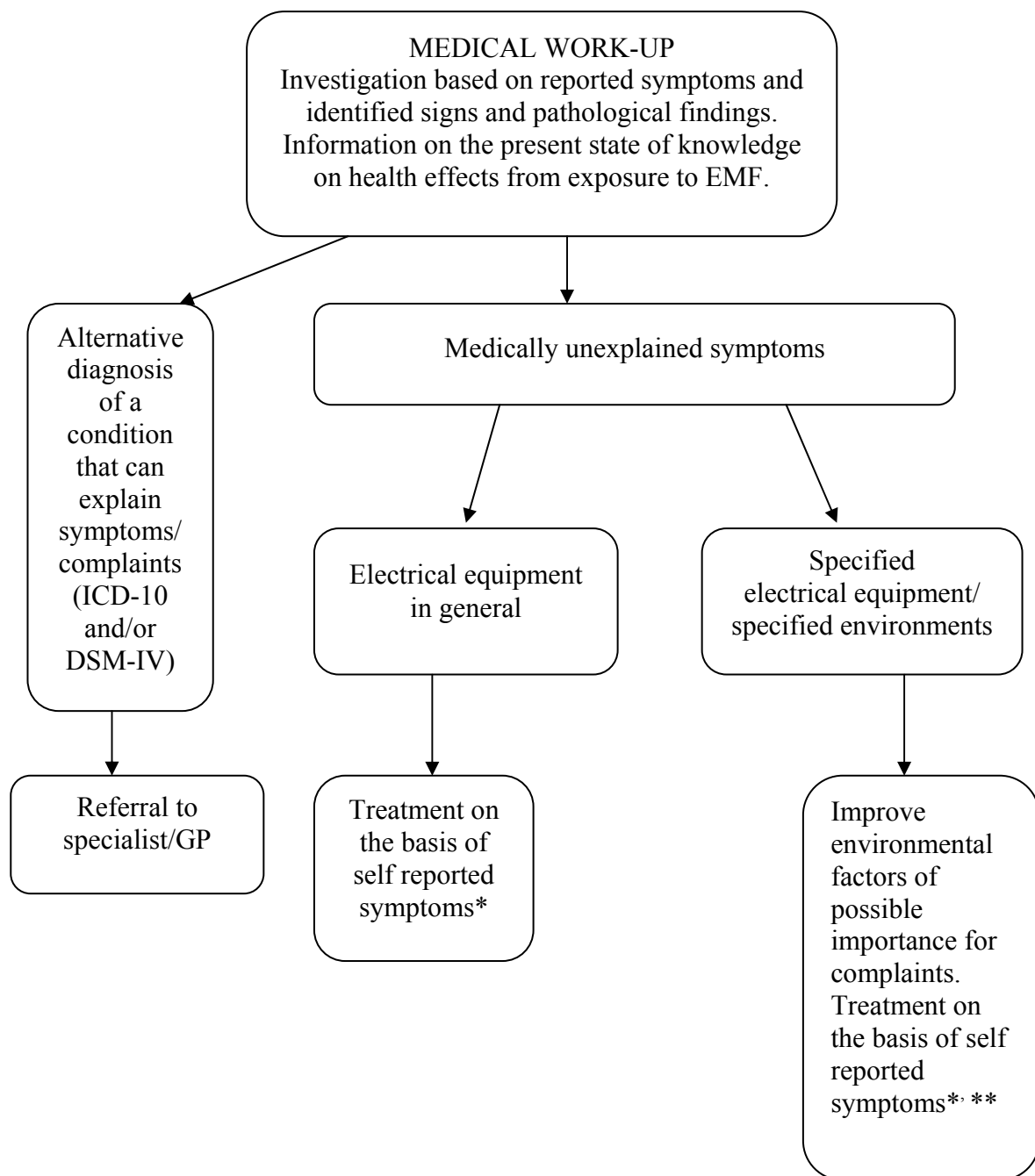


Figure 1. Flow chart of investigation and intervention of IEI patients.

*The choice of treatment may be based on reported success of different treatments for similar symptoms of other conditions and may include stress reduction strategies and cognitive behavioural therapy.

**Different options that the afflicted person may choose to consider may be discussed (e.g. use of hands-free mobile phone kit, reduction of working time with a VDU), but the decision to take these actions is left to the patient.

(ii) Report on RESEARCH NEEDS

Rapporteur: N. Leitgeb, Graz University of Technology, Graz, Austria

Participants:

Anders Ahlbom, Karolinska Institute, Sweden

Jan Bureš, The Academy of Sciences of the Czech Republic

Robin Cox, Independent Occupational Physician, United Kingdom

Lawrie Challis, Mobile Telecommunications & Health Research Programme, United Kingdom

Kjell Hansson Mild, National Institute for Working Life, Sweden

Maila Hietanen, Finnish Institute of Occupational Health, Finland

Michel Israel, National Centre for Protection of the Public Health, Bulgaria

*Olle Johansson, The Experimental Dermatology Unit, Karolinska Institutet, Sweden

Eric van Rongen, Health Council of the Netherlands

Monica Sandström, National Institute for Working Life, Sweden

Herman Staudenmayer, Behavioural Medicine & Biofeedback Clinic of Denver, United States of America

** Dr Johansson has reservations with the contents of this report*

The working group (WG) noted that electrical hypersensitivity (EHS) has gained relevance that goes beyond the number of individual cases but influences the risk perception of a much wider percentage of the general population.

The WG was aware that the term "electrical hypersensitivity" is only one among others such as "electromagnetic hypersensitivity" and "sensitivity to electricity". It concluded that these terms are misleading and should be replaced by IEI (idiopathic environmental intolerance) which would fit better in the commonly used terminology for similar health-associated environmental factors.

The working group concluded that specific diagnostic IEI facilities would be helpful and that there was a need for further research in this field. Research needs in the following ranges were identified:

DIFFERENTIATION OF IEI

IEI cases with EMF attributed symptoms needs to be differentiated from other IEI cases:

- a) there should be a search for a symptom cluster: Present studies were very valuable in determining groups of self-declared EHS cases. There is a need not to restrict the attempt to self-declared EHS cases but to study the group of IEI on a broader scale, e.g. by hypothesis-based studies of symptom groups according to the frequency of occurrence or symptom-trigger by specific sources.
- b) there is a need to define IEI inclusion/exclusion criteria, e.g. definitions based on baseline tests for characterizing the status of the autonomic nervous system and the psychological/ psychiatric status.

PROVOCATION STUDIES

Provocation studies are considered to be the most powerful way of studying/ proving a causal relationship. For proper design, apart from ethical considerations, the following aspects need to be considered:

- differentiation between potential electromagnetic versus psychological/ psychophysiological impact by adequate tests
- double-blind placebo-controlled crossover design
- inclusion of an appropriate psychiatric control group exhibiting similar symptoms (e.g. anxiety, affective disorders, somatoform reactions, etc.)
- inclusion of a positive control factor, e.g. other environmental stressors like sound, flickering light or mental stress
- accounting for potentially different individual reaction onset/recovery time constants
- characterization of provocation conditions, including the duration of exposure and the duration of washout times
- measurement of the EMF background level (which should be well below the provocation level)
- consideration of person's belief/ experience when choosing provocation factors (e.g. fields, exposure time)
- use of well documented and validated questionnaires and test procedures with preference given to yes/no questions (such as the Minnesota MMPI-2 test protocol or the SCL-90R- symptom checklist)
- neuropsychological testing before and after exposure
- consideration of appropriate signal characteristics, e.g. frequency, modulation and intensity

There is a need to harmonize protocols and establish multinational/ international cooperation.

EPIDEMIOLOGICAL STUDIES

For the time being, epidemiological studies are not considered helpful. The reasons for this are the following:

- the definition of "cases" is still lacking
- possible device-specific reactions could be missed because of the different devices encountered in daily life
- exposure level might not necessarily be a selection criterion for exposure groups

(iii) Report on POLICY OPTIONS, COMMUNICATIONS WITH IEI INDIVIDUALS AND RECOMMENDATIONS TO NATIONAL AUTHORITIES

Rapporteur: Jill Meara, National Radiological Protection Board, United Kingdom

Participants:

Pavel Sístek, National Reference Laboratory on Non-Ionizing EMF, Czech Republic
Wendla Paile, STUK - Radiation and Nuclear Safety Authority, Finland
Fabriziomaria Gobba, University of Modena & Reggio Emilia, Italy
Christopher Muller, ergonomie & technologie (e&t) GmbH, Switzerland
Emilie van Deventer, World Health Organization, Switzerland

INFORMATION FOR GENERAL PUBLIC

WHO to develop a general fact sheet that includes the following points:

- range of symptoms of IEI
- no attribution of causality to EMF
- do not include prevalence of EHS but rather prevalence of the different symptoms (and longstanding history of these) in general population
- do warn against commercial products to shield against EMF
- discourage measurements in homes
- exclude underlying somatic disease by usual physical examination
- no proof of any correlation between these symptoms and later diseases
- reminder of basic physics (NIR vs. IR, etc)
- recovery is certainly possible without taking drastic measures
- stress due to introduction of new technologies
- need for coping strategies

INFORMATION FOR PHYSICIANS

- Information regarding ill-defined symptoms and undifferentiated illness should be included in post-graduate training
- Experts should develop an international protocol for physicians that includes current diagnosis and treatment information
- National governments should develop tailored information for medical practitioners

ADVICE TO GOVERNMENTS

Governments need to put the issue of IEI into their general risk communication strategies.

They also need to address the following issues:

- Patients have real symptoms, some of which are attributed to EMF, but there is no scientific evidence of causal link, therefore no grounds to use IEI as a diagnostic classification for handicap status. But symptoms could be used as a classification.
- No indication that lowering the limits would reduce the prevalence of symptoms attributed to EMF
- Discourage measurements in homes
- Develop appropriate interaction with self-help groups
- Anticipate problems with new technologies, and provide balanced information, promote dialogue. Note different attitude taken for new pharmaceuticals, both before introduction and post-marketing surveillance. Possible role for complaints registers?