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# Electromagnetic field reduction restores health of electro-sensitive people<sup>1</sup>

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## Abstract

Electromagnetically sensitized people may develop symptoms and health problems, when exposed to certain types of electromagnetic fields (EMF), known as electrical hypersensitivity (EHS). Over time, the effects may become stronger if such exposure continues. The Dutch EHS Foundation is committed to finding ways to understand these phenomena and to doing something about it. This study reports the results of a research questionnaire distributed among EHS people before and after that they had taken measures to reduce their exposure to EMF. Information requested included (1) the types of symptoms that people reported, and (2) the effects of EMF reduction strategies on the disappearance of EHS symptoms and improvement of well-being.

We assembled a 'long list' of curable symptoms based on the data received before field management: these included poor quality of sleep, fatigue, bad concentration ability, restlessness, and 'tight band around head'. We also assembled a 'short list' of the five most cited health problems alleviated after EMF reduction. We also made a 'short list' of EMF reduction methods that proved most effective: these include replacement of Dect phones by corded phones, reducing use of mobile phone, disconnecting WiFi routers, and reducing PC and TV time. Respondents usually reported more than one symptom. There are no EMF reduction measures, which satisfied every individual.

We propose that people may be assigned the 'status' of EHS when having suffered from a certain number of health symptoms cited here, which were alleviated by EMF reduction and shielding. We aim to achieve appropriate medical attention for electro-sensitive people, and help in creating electromagnetically clean living and working conditions.

## Introduction

### The problem

Estimations of the incidence of EHS depends on country and methods of evaluation, but generally run from 1,5% to much higher values (Genuis and Lipp 2011; Hedendahl et al 2015). There are no countries where EHS is formally recognized as a serious health condition, although in Sweden people showing EHS symptoms are considered to be 'functionally impaired' and are entitled to receive support for shielding their living and working quarters (Johansson 2015). Policy-makers are being approached to take interest in the EHS problem (5th Paris appeal congress 2015). Until now, the WHO (2005) does not refer to sensitivities for EMF; the term 'idiopathic environmental intolerance (IEI) attributed to electromagnetic fields' is now being advocated.

This paper covers a pilot experiment meant to demonstrate that there are ways in which electrosensitives can help themselves. The solution is relatively simple: (1) the identification of the disturbing EMF that causes the allergic-type hypersensitivity reaction, and (2) the reduction of exposure to that trigger. A number of people who have asked for advice and help from the Dutch EHS Foundation have been approached questionnaires. If they were interested in participating in a program of guided EMF reduction, or when they had recently done so, their findings were recorded as to which symptoms they experienced; the EMF reduction techniques they followed; and how their EHS symptoms changed after EMF reduction. Respondents could hire technical experts with EMF measuring expertise for assistance in field evaluation prior to and after EMF reduction programs, to ascertain that shielding and other measures were carried out according to specific installation requirements of the researchers. The survey also included 'dirty electricity', the phenomenon that certain modern electronic items disrupt the perfect 50 Hz AC sinus of our electricity grid at home and work. Such power surges may trigger electrostress linked symptoms experienced by sensitized people (Milham & Morgan 2008; Havas 2009).

It was helpful that we already had a standardized list of EHS symptoms established by the research concluded in 2008: Electrohypersensitivity (EHS) in the Netherlands – A Questionnaire survey (Schooneveld and Kuiper 2008). The selection of participants in this questionnaire is based only on their self-declared hypersensitivity to EMF and their intention to reduce EMF exposure to minimize symptoms. We followed EHS people in their homes between 2011-2012, both before EMF shielding and after EMF management by shielding and avoidance.

Interestingly, several persons sensitive to EMF demonstrated hypersensitivity to other environmental factors as well: smells, low-frequency sounds, sunlight, and several biotic or abiotic stress-inducing triggers such as pollen and fine particulates in the air (Hagström et al. 2013). The symptoms developing after exposure to such triggers, variable as they are, show a clear similarity to the EHS symptoms reaction.

## Method

Questionnaires were distributed to those registered with the EHS Foundation ([www.stichtingehs.nl](http://www.stichtingehs.nl)). The online questionnaire edition was designed with the online software program SurveyMonkey ([www.surveymonkey.com](http://www.surveymonkey.com)) and was received and analyzed through the website of the EHS foundation.

In total, 96 persons completed the questionnaire about electromagnetic frequencies (EMF) in their home or work environment, and 68 of them delivered a complete series of answers concerning the home situation; these form the basis of the analysis as presented. There were 9 major types of questions, divided into 47 more specific questions.

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The major basic questions were:

Their EHS cases history; information as to their way of life; general health background; general knowledge of electromagnetic fields; list of EHS related complaints and symptoms; preferred method of avoidance of EMF; field identification and measurement before and after field reduction; eventual effects of an EMF reduction program.

Participants were asked to provide the following data:

Their health symptoms in the original unshielded situation; measurements and analysis of the EMF in their home; development of a plan to reduced EMF exposure; nature of field reduction measures; assessment of health improvements after EMF reduction.

**Field measurements**

Some of the respondents possessed adequate field meters for low or high frequency EMF and could assess their situation themselves. Others relied on qualified EHS measuring engineers, who were trained to monitor, measure and analyze all types of domestic EMF and 'dirty power. Sources of EMF were traced and – where possible - removed or shielded. Field measurements before and after shielding should prove that the reduction has been substantial, if not completely effective.

**Graphical expression of health symptoms experienced**

Self-reported grades of health improvement were expressed on a 5-point scale, running from 0 (zero, no improvement) to 4 (maximum effect, abundant health). For reasons of clarity, the data was combined to form 3 groups: scale points 0+1, 2+3, and 4. Overall, 33 categories of EHS effects were distinguished to accommodate the wide variety of symptoms reported.

**Results**

**Educational background of participants**

As shown in figure 1, the majority of respondents were educated to degree level. Our interpretation is that better education enables respondents to understand the scientific nature of the EMF challenges and respond to questionnaires and to participate in

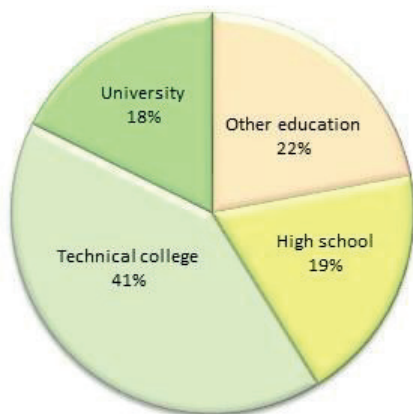


Figure 1. Educational background of respondents

scientific research. Also, EMF reduction measures sometimes involved important investments in field analyses, screening materials, books and articles, which can be perceived as complicated or scientific to those without an appropriate background.

**Gender**

Female participants formed 59% of all respondents. The average age of respondents was 56 years for the male respondents and 52 years for the female respondents. The upper age noted was 75 years.

**Costs**

Some people could afford moving to a less electronically contaminated area in the country or abroad. Total costs of EMF reduction for those who stayed at home were variable and could mount up to several thousand euro's, or more. Average expenditures were about €3,700 for shielding materials. The cost of a total house rebuild were not included.

**Simultaneous health problems (comorbidity)**

Almost half of the respondents reported health problems resembling those of EHS, but which are known under other names:

- Chronic fatigue syndrome (CVS) 16 cases
- Fibromyalgia (FM) 7 cases
- Multiple chemical sensitivity (MCS) 5 cases
- Post-traumatic stress dystrophy (PTSD) 3 cases

**Other environmental triggers threatening health**

Most of the respondents reported sensitivities specifically for:

- Strong and/or low frequency sounds 30 cases
- Odors of noxious synthetic chemicals 16 cases
- Cleaning agents 10 cases
- (Sun)light 10 cases.

**EMF reduction by elimination of household equipment**

There are several ways to reduce exposure, for instance by moving away from the source of EMF, by switching off all electricity at home, by disconnection or by shielding the EMF source or by changing equipment to items emitting lower levels of EMF. Several methods have been employed successfully by different respondents, as shown in figure 3. The simplest remedy to fight EHS is not using home equip-

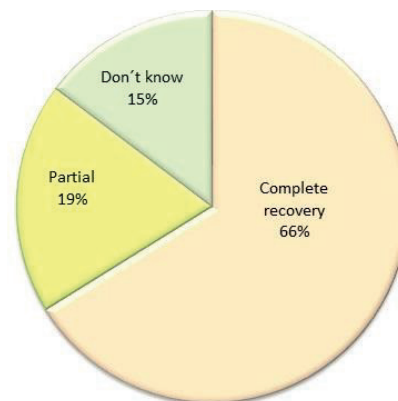


Figure 2. Degree of recovery after field management.

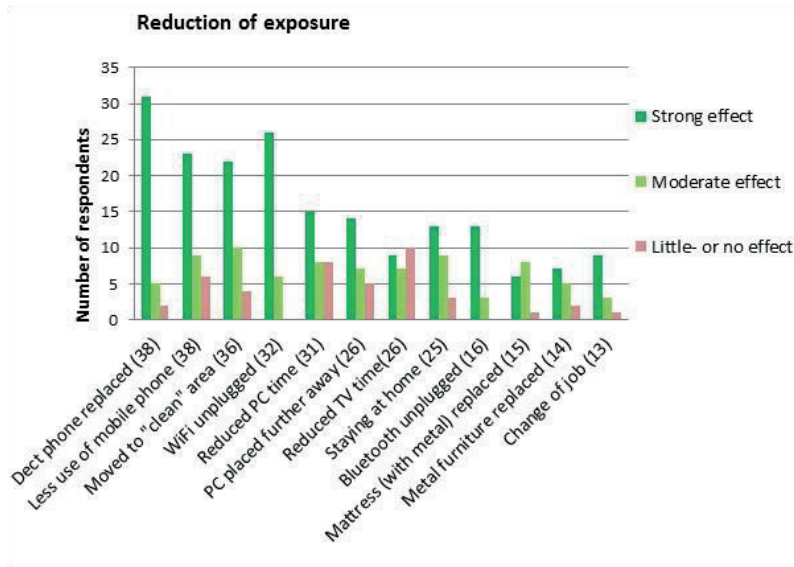


Figure 3. Number of people reporting relief after removal or specific household equipment.

ment which emits EMF on a 24/7 hrs basis, like DECT phones, mobile phones, tablets and WiFi routers. All other attempts to reach a negligible electromagnetic radiation level will fail if these sources are not eliminated first. Hard wired connections cost relatively little. A prerequisite is that family members or colleagues sharing the same living space cooperate and agree with this hard wired protocol.

### Multiple EMF triggers

Our data indicates that the large majority EHS persons suffer from more than one single EMF source; some can hardly bear any electrically powered equipment. Nevertheless, a crude distinction can be made between persons sensitized for low-frequency sources such as common household equipment, and others who are affected by high-frequency sources such as those used in cordless or mobile communication. Please note that a number of people appear to suffer from both low and radiofrequencies.

### Reduction of low-frequency EMF by technical interventions

All households contain electrical equipment and systems that emit low-frequency EMF. Also the electrical circuits in walls or ceilings and floors are important sources of electrical and/or magnetic fields from AC voltages, currents and 'dirty electricity'. General methods for field reduction include – among others - switching off all power, disengaging motors, disconnecting electrical equipment, shielding equipment or shielding from externally sourced radiofrequency fields from neighbouring properties or cell phone masts.

Figure 4 shows how technical interventions reduced field exposure. As shown in this figure, the four most effective methods of decreasing EMF exposure are the replacement of energy saving lamps, connecting equipment to proper earth, to place PC and peripherals far away, and shielding connecting cords. What's more: these measures cost very little and can easily be done by the layman.

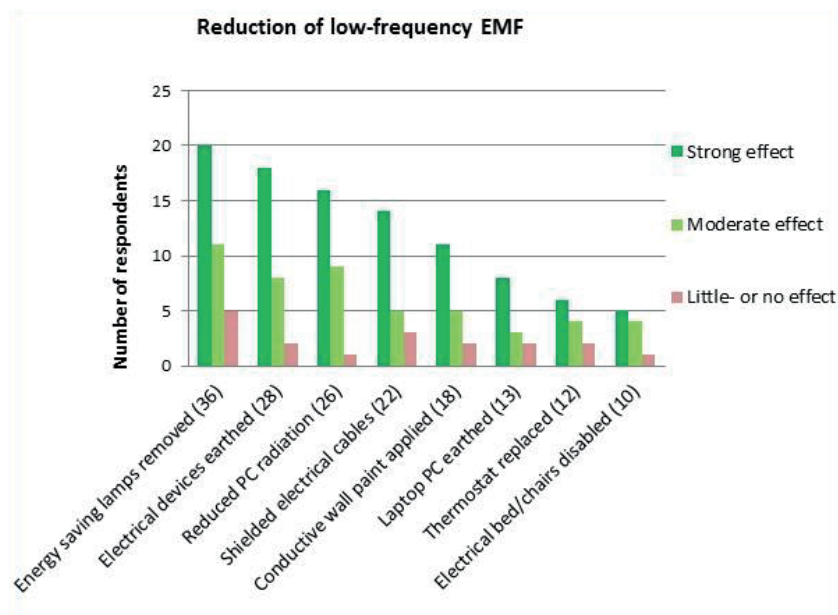


Figure 4. Number of people engaged in interventions to minimize specific fields from household equipment.

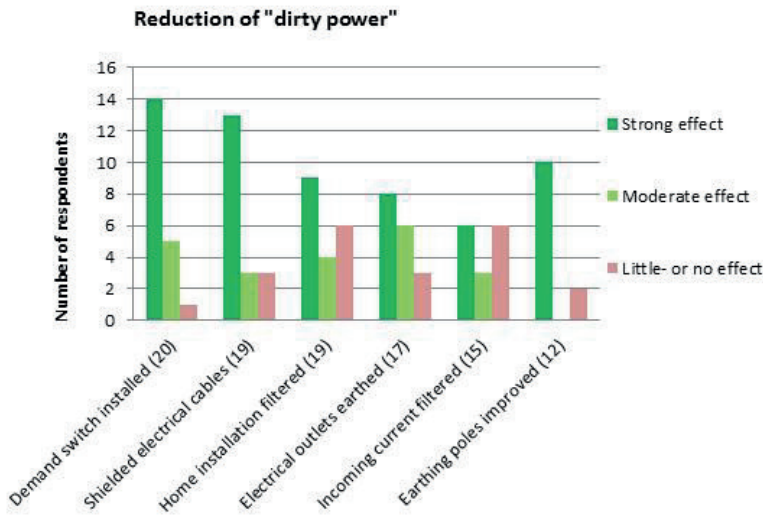
**The problem of “dirty power”**

It appears that the non-polluted ‘clean’ 230V 50Hz current waves in domestic wiring systems are not of concern to most electrosensitive people. It is the presence of electric surges and currents causing problems with the ‘dirty’ low frequency EMF’s they emit.

Energy saving lamps, electronic equipment and electric motors take up power from the wiring in a highly irregular erratic, non-sinusoidal wave. That holds true for all ‘non-linear’ users, such as handheld kitchen devices and hobby machinery. The problem is that wherever a non-linear piece of equipment is activated in the house, the ‘dirty power’ is

emitted from wires everywhere in the house. Avoiding such dirty fields is difficult, as the cables are always close by and partially harmful in seating and sleeping areas.

Dirty power EMF are difficult to detect, owing to their specific frequencies and low voltage magnitude, typically in the millivolt range. Yet, exposure can be harmful. The EMF caused by the electric surges in household wiring can be neutralized by applying shielded wires throughout the house, and other measures. Figure 5 indicates what survey respondents found useful for reducing dirty power electricity at home or at work.



**Figure 5.** Number of people reporting different methods of dirty power reduction.

**Reduction of radiofrequency fields from outside**

EMF from cell phone masts, or EMF from DECT phones or Wi-Fi access routers in neighbouring homes permeate through common walls, building materials do not prevent EMF from passing through. Wearing clothes with EMF reflecting tissue properties can be helpful for personal protection. Sleeping under a EMF reflecting canopy (Faraday cage) can improve sleep quality, if installed properly. EMF can be blocked by painting walls with carbon containing and electricity conducting paint or wall paper. Windows may be coated with metal film which reflects EMF, such as glass type HR++ (available in the Netherlands). Also, small-mesh wire netting of stainless steel can form an EMF-reflecting external house screening. [Please check for installation guidelines, shielding properties and earthing requirements].

Warning: using EMF radiating equipment inside the screened room will greatly increase exposure because the fields from own equipment are beamed back into the interior and mobile phones will emit EMF at higher power to reach the base station antenna. Expert measurements of EMF strength is required for a successful screening program. Figure 6 shows which procedures people have used successfully. The majority have painted their walls and ceilings with specialized high attenuation paints.

**Analysis of the health complaints reported in the survey**

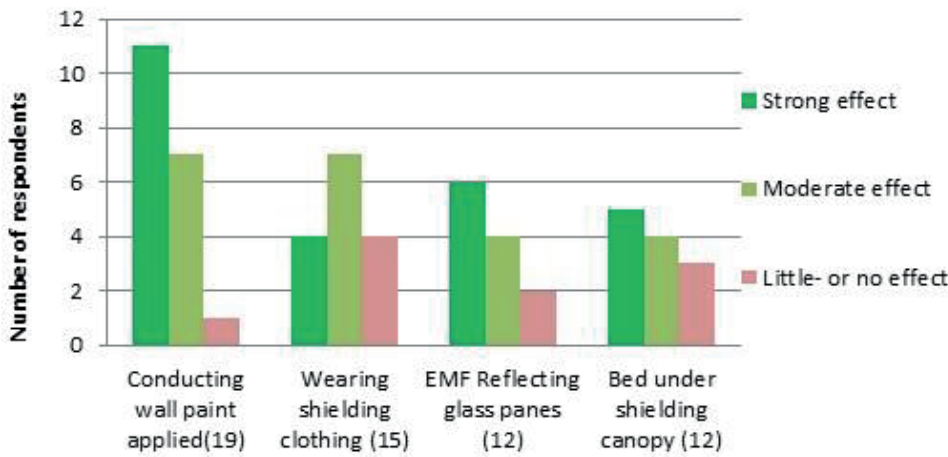
The respondents were asked to comment on their EHS symptoms and how these had been alleviated by EMF shielding. Figure 7 illustrates a total of 33 symptoms mentioned by at least two respondents. The bar chart indicates the most frequently improved symptoms under expert shielding. That is, with the exception of ‘ear ringing’, or tinnitus, which might be triggered by other factors, in addition to EMF.

Two persons reported to suffer from diabetes (type not specified). One of these learned that EMF reduction alleviated his problem. That is consistent with an observation of Magda Havas (2009) and Milham and Morgan (2008) suggesting that dirty electricity in household wiring can trigger diabetes type-2.

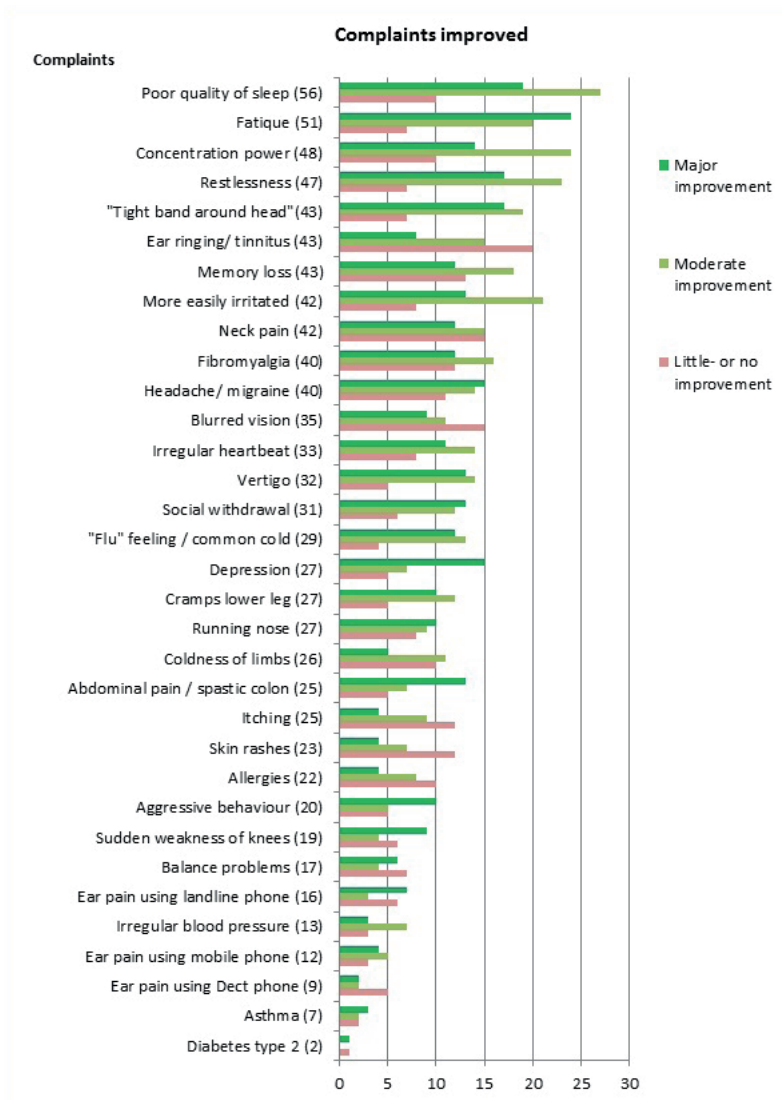
**Discussion**

We have demonstrated that people who are sensitive to certain EMFs and show symptoms of EHS may well help themselves, once the nature of the EMF sources has been identified and neutralized. Symptoms may be relatively insignificant such as ‘hearing’ hissing sounds, or may seriously hinder social outlook, possibly generating depressive and possibly suicidal feelings. Symptoms will rarely improve without appropriate action to minimize exposure to the particular EMF.

## Reduction of high frequency EMF



**Figure 6.** Number of people reporting beneficial effects of shielding against radiofrequency EMF from outside.



**Figure 7.** Ranking the 33 most-reported EHS symptoms based on their relative occurrence. Bar colours indicate the effectiveness of EMF reduction, whatever their nature. Between brackets, the number of persons reporting that particular symptom. The more frequent occurring symptoms benefit most from EMF reduction. On the basis of this distribution the condition of EHS can be decided upon when at least 9 out of the top-20 symptoms are reported. (see text for details).

### **Effective field reduction and alleviation of health problems**

The large majority of respondents (66%) in this survey were helped by effective shielding. A minority reported a moderate success. It should be born in mind that people with severe EHS distress do not always improve with mere field reduction. A severe case of EHS should also pay attention to lifestyle factors, exercise, diet, and a positive emotional overhaul. Those persons suffering from additional environmental illnesses other than EHS, such as MCS, CFS, also report a major improvement in symptoms at the same time, as and when triggering EMFs are taken care of.

Data arranged in another fashion shows that most symptoms can be alleviated by proper EMF reduction measures. The most common problems, such as sleep quality, fatigue, concentration, restlessness, and 'tight band around the head' are shared by about half of the respondents. The remainder have other problems that might be solved by the same field reduction methods. This means that EHS is a 'condition' that can be dealt with by field management, once the triggering frequencies have been identified.

### **EHS diagnosis**

There is a urgent wish among medical practitioners to have some sort of diagnostic criteria for EHS, not to prescribe medication, but rather to give the patient adequate support and advice. Professor Dominique Belpomme from the Parisian based cancer institute ARTAC has been working with EHS patients for many years and has over 1000 cases diagnosed and treated. Tests include an analysis of the cerebral bloodstream (Belpomme 2015). When the test results deviate from accepted average values, the patient receives a certificate stating that he or she is electrohypersensitive and that this person should be shielded and protected against exposure to EMF. An organization of Austrian physicists (AG-EMF 2012) prepared a reference report to help doctors recognize and understand patients with EHS, and to give advice on EMF reduction matters, where appropriate. We suggest that our results point to a reliable diagnosis of electrosensitivity. We follow a 'no-nonsense' approach based on an everyday approach to ascertain the cause of respondent's health problems and do something practical and reduce levels of EMFs in homes and workplaces. No other formalities are required. It is self-evident that EMF reduction methods should meet scientific standards, with reading registered before and after shielding, to ensure a reliable level of protection.

As most survey respondents reported several ailments, an EHS certification could – for example - be awarded once he or she has documented that field reduction alleviated (most of) the EHS symptoms experienced. Of course, there is much space for subjective considerations, and an objective set of criteria, such as proposed by Dariusz Leszczynski (2010) is highly desirable. But time is pressing and it is no use waiting for refinement of underlying criteria, as the problems are serious and growing right now. Action is needed immediately to minimize potential suffering.

Igor Belyaev and colleagues (2015) are well aware of the pitfalls of unprofessional field reduction measures and of the concerns of physicians consulted. They see it as important that a physician treats the medical symptoms in the first place.

But they also emphasize the need for lifestyle coaching that contains advice on exercise, eating a healthy diet, reduction of work load to avoid stress, a good sleep regime among other lifestyle choices.

We should make clear that EHS symptoms exhibited by an individual may change over time. We recall that the original signals of electrical hypersensitivity in early papers include skin rashes and a series of other ailments that cover our present spectrum of effects. However, skin rashes are reported rather rarely, nowadays, which could be the result of the change in types of electronic equipment over the years. Therefore, with regard to changes in electronic equipment in our 'infosphere' (new term invented in Sweden – Johansson 2015), surveys might yield different results, when investigated in later years. EHS symptoms may shift to include other phenomena induced by the mostly pulsed radiofrequency EMF (Redmayne & Johansson 2015). Without help, such electrosensitives will lose social contacts and be marginalized permanently. Removing or shielding from the triggering EMFs, by whatever means, often alleviates the symptoms, within a few days.

In summary, the EHS symptoms reported vary widely among electrosensitives and various methods adopted to reduce symptoms are equally variable. This lack of consistency may contribute to the level of scepticism around EHS. A diagnostic protocol is needed for the medical profession, consistent across Europe. No wonder, therefore, that EHS is not easily accepted by critics. A diagnostic protocol is badly needed by the medical profession (Hedendahl et al. 2015).

We have suggested the adoption of a practical solution: check whether symptoms match with those listed in our figure 7 and verify that there have been successful attempts to minimize exposure to EMF, thereby minimizing EHS symptoms and restoring good health.

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