

# **Introduction to Electromagnetic Hypersensitivity**

by Larry Newman

People who have electromagnetic hypersensitivity (EHS) get symptoms from exposures to electromagnetic fields (EMF). These fields surround all electrical wires and all electrical equipment, such as computers, televisions, electrical stoves, telephones, transformers, electric heaters, cell phones, fluorescent lights, all types of wireless devices and more.

The illness goes by several different names and acronyms, such as ES, EMF and EHS. EHS is the term used by researchers and the World Health Organization, and it appears to be the most accurate term, though ES (electrical sensitivity) is commonly used in the United States.

Most people with EHS also have multiple chemical sensitivity (MCS) and allergies, often severely so. Some are also bothered by noises, light, and other stimuli.

## **Symptoms of EHS**

The symptoms of EHS vary and may include flushing of the skin, tingling and burning sensations, joint pains and stiffness, headaches, a feeling of being “wired” and sometimes personality changes, such as mental confusion, sleep problems, restlessness and irritability. A variety of other neurological symptoms are also possible.

The level of sensitivity varies greatly with the person, just as it does with pollen and food allergies. Some people may just have minor symptoms, like flushing when working on a computer, while extremely sensitive people may need a modified vehicle and house in a remote area, away from transmission towers and power lines.

A person who is frequently exposed to EMF tends to become more sensitive over time once the path of illness has started. It is thus a very bad idea to try to tough it out, as that can very well have lasting, maybe permanent, effects.

Some people get symptoms several hours after the exposure. Some are stronger and able to tolerate more exposures at certain times, such as early in the day or after a meal, or simply for no known reason. A person who is also very sensitive to mold may be more tolerant of EMF by moving away from a moldy house, perhaps to a dry climate.

Stronger exposures generally can be better tolerated for a brief moment than for ten minutes. With longer exposures, the symptoms may go away, as the body tries to adapt, but the damage, and possibly increased sensitivity, may continue.

## **The history and status of EHS**

EHS is a new illness. The first case the author is aware of was a Swedish telecommunications engineer, who became ill in 1979. Dr. William Rea, a prominent environmental doctor in Texas, saw his first case in the early 1980s, though he said there may have been earlier cases he did not recognize.

Research into the illness is sparse, as it is just in the last decade that enough cases have surfaced to be noticed. Most research has been done in Europe, especially Russia and Sweden. A few medical conferences have been held in Europe, only one in the U.S.

The World Health Organization started getting interested when their own Director-General, Gro Harlem Brundtland, announced that she had EHS shortly before she retired. Dr. Brundtland is well known in Europe for many good works and as the Prime Minister of Norway for over ten years.

Until EHS has been proven and accepted, EHS patients not only have to struggle with a debilitating illness, but they are also routinely denied reasonable accommodation and are subjected to suspicion and often hostility and ridicule from the medical system and its doctors. This follows the pattern of many emerging illnesses, where the medical system finds it much more convenient to write patients off as mental cases—sometimes aided by special interests, as was done against people with Asbestosis (asbestos lungs). It is no more than a couple of decades ago that people with asthma were told by their doctors that they just needed to learn to relax, and when AIDS became an epidemic, it took 10,000 dead in the U.S. before the country's officials took it seriously—mostly prompted by the death of the Hollywood actor Rock Hudson. People with Lyme Disease were also often ignored by doctors, until reliable blood tests became available. The list goes on...

Even today, patients with fibromyalgia and endometriosis are still met with suspicion from some doctors.

Despite the fact that mainstream medicine does not accept that low levels of electricity affect humans, it is now common to use weak electrical currents to help heal complicated bone fractures. Research on using EMF to treat depression is also advancing rapidly.

## **Aid to people with EHS**

There is no known cure for EHS. The most effective treatment remains avoiding exposures to EMF. Some relief may be possible through taking care of other health problems, in particular allergies and chemical sensitivities, if these exist.

Avoidance is central to keeping a patient well. The extent needed depends on the individual. At the least, it is important to keep the sleeping area as safe as possible by removing all electrical equipment from the vicinity. Keep in mind that EMF is not blocked by walls. A patient should not sleep near a refrigerator, electrical meter, water heater or other appliances, even with a wall in between.

A gaussmeter is essential for measuring the EMF levels. Gaussmeters are available from several vendors that serve people with environmental sensitivities. It is important to realize that such a meter only shows a limited range of the possible types of radiation present. Several instruments may be required for full coverage. In the end, the EHS patient is the best judge of whether a place is acceptable or not.

The current radiation standards are highly misleading, as they are purely based on the heating of human tissues from exposures to EMF—the microwave oven effect.

Very little help is available to the EHS patient today. The exception is in Sweden, which has taken the lead from the very start. The Swedish Confederation of Professional Employees (or TCO) started publishing standards for low-radiation computer screens already in the 1980s. These standards have been improved since that time and are adhered to by most manufacturers today, but are still inadequate for many EHS sufferers.

Swedish social services sometimes pay to electrically “sanitize” the homes of people with EHS and even rent out remote homes to the severest cases who cannot live near populated areas. Four Swedish hospitals now have specially outfitted operating rooms and facilities to accommodate people with EHS. There has also been discussion of creating cell-phone-free zones in public areas, such as sections of the Stockholm subway.

## **Research results**

Some interesting results have been documented in lab tests, but these need to be verified and enhanced to be considered scientifically valid. There is still no theory to explain the phenomenon of EHS. A theory needs to be found that explains the illness, and then it must be validated before the medical community will accept it. So far, some theories have been floated that attempt to explain parts, but not the whole. There is very little funding available and it is not a field that promises fame and fortune at this time. The few researchers in the field are often denied funding and put under pressure by special interests. Thus, it is not attractive to much research talent.

There have been some studies on rats, mostly at the University of Lund in Sweden. These demonstrate the effects of cell phone radiation on the rat brain, such as damage to the cell DNA. The blood-brain barrier has also been demonstrated to become leaky, which means that a person who is exposed to chemicals and a cell phone at the same time have a much higher risk of the chemical affecting the brain. This may explain why there seems to be a link between EHS and multiple chemical sensitivities (MCS).

There have been human studies as well. A French study of workers showed that their levels of white blood cells were lower when they worked near a building transformer and higher once they were moved away. Once they were moved back near the transformer, their levels dropped again.

A Swedish professor of dermatology discovered that he could see microscopic changes in skin cells on people when they used computers, compared to when they had not used them for several hours. This may help explain why some EHS sufferers have skin problems, such as flushing, tingling and burning.

A researcher at CalTech discovered that human brains contain microscopic magnets (magnetite crystals), just as many animals do. Migrating birds are known to rely on these magnets to navigate using the earth's magnetic field. The existence of these magnetic receptors in humans may be another clue to the puzzle.

A psychiatrist in Boston noted that people who are depressed get a mood lift when exposed to the electromagnetic field of an MRI machine. He is now experimenting with using it as a therapy device.

There have been a number of experiments where EHS patients have been exposed to EMF and their symptoms recorded. Some of these experiments have shown effects, others have not, casting doubt on the validity of the claims that EHS sufferers make.

It is very difficult to set up well-designed experiments that really produce clear-cut results. The most common problem is that the experiments do not remove all unintended exposures of EMF, which may interfere with the results. In many of the studies, what the authors call the "sham conditions" is just as active as what they call the "active condition". The researchers have clearly not understood the magnitude of the problem. That is like trying to judge whether someone is bothered by a single cigarette with the person sitting in a smoky room. In many of the experiments, a computer is used in the same room as the test subject occupies, for instance.

Another problem is that some people tend to be more sensitive to certain frequencies than others. If the experiment does not use a frequency that is bothersome, the patient may not have a reaction—at least not at low levels.

Delayed reactions are another problem. The test person may first be in pain after being led out of the test room, or the reaction may first show up later while a placebo is given, thus "proving" that the sensitivity is not real.

Finally test persons easily tire out and can no longer tell anything. The exposure from their transportation to the test site can often be enough.

A well-designed study also needs to allow the test persons to acclimatize to the test location, so symptoms caused by the place itself can be noted.

Many of the most sensitive people would not be able to participate in studies, as the effects from the exposures could be severe and long-lasting.

A notable experiment was done in 1991 in Texas, involving 100 people. The experiment

showed that people can be more sensitive to certain frequencies than others. Sixteen people were able to correctly identify the 32 active challenges and the 160 placebos in a random double-blind test. The experiment was repeated, but did not show the same results.

One cleverly conducted experiment (though with computers present) was done in Holland. A mini-cell-tower was installed in a shielded room and a group of EHS sufferers and controls were exposed. The surprising result was that the control group was affected by the radiation as well. The radiation was found to have a stimulatory effect, which supports the observation that some EHS sufferers become restless when exposed to EMF.

A Swedish study connected a group of people with EHS to heart monitors for 24 hours. It found that the group had disturbed heart rhythms compared to a healthy control group. The pattern was similar to people with fibromyalgia and different from people with panic disorder.

Other experiments have shown EMF to affect a person's ability to pay attention and that it may change brain patterns in humans. The ability of a person to sense a low current has also been shown to vary much more than was previously thought.

Some research was funded by military and industrial interests, supporting their claims of no health effects and no disease syndrome from exposure to EMF. This is also a common problem in research on health effects from chemical exposures.

A few studies have tried to estimate how many people suffer from EHS or are bothered by EMF to some degree. A telephone survey of 2072 Californians in 1998 showed that 3.2 percent reported being sensitive to electronic devices, while 0.5 percent reported being bothered so much they had to change jobs or stop working entirely.

A much larger survey of 15,000 people in Stockholm, Sweden was published in 2002. It showed that 1.5 percent thought themselves to be sensitive to EMF. A 2007 systematic study of 20,000 people in Colchester, Great Britain, found 4 % to be sensitive to EMF, using a stricter criteria than the earlier surveys.

The studies mentioned are listed at the end of this article.

## **Conclusions from research**

That electromagnetic radiation affects human cells was already determined by 1996, when Dr. Goodman at the University of Wisconsin reviewed two hundred published cell studies. He concluded that "current evidence suggests that cell processes can be influenced by weak electromagnetic fields" despite "one would not expect a cell to respond at all".

This didn't mean it was necessarily harmful to humans.

Then in 2001, the International Commission for Non-Ionizing Radiation Protection issued a paper that reviewed eighteen population studies from nine countries. They concluded that the risk for leukemia is significantly higher for children who are exposed to EMF at levels above 4 milliGauss (0.4 microtesla).

Some researchers suggest that almost all leukemia is a result of EMF. That can never be proven, as there are no children that are not exposed to EMF for comparison.

Then in 2007 arrived the *BioInitiative Report*, which was produced by a group of researchers and public health professionals from five countries. In this 600 page report, they go over all the available materials from many fields of research associated with EMF exposures. This is possibly the first comprehensive cross-disciplinary document ever done on EMF issues.

The report concludes that there are still many things not understood, but there is ample evidence that the current radiation standards are not protecting the public health, and now is the time to take policy action. Waiting until the full proof and understanding is available is not warranted and will cause enormous cost and disruption to society.

## **Recommended literature**

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*Black on White: Voices and Witnesses about Electro-Hypersensitivity*, Rigmor Granlund-Lind and John Lind, Mimers Brunn, 2004.

*The Electrical Sensitivity Handbook*, Lucinda Grant, Weldon Publishing, 1995.

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All listed articles should be obtainable through a major university library. Some are available directly on the Internet. The articles flagged with a square bracket are also available through CIIN, PO Box 301, White Sulphur Springs, MT 59645.

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