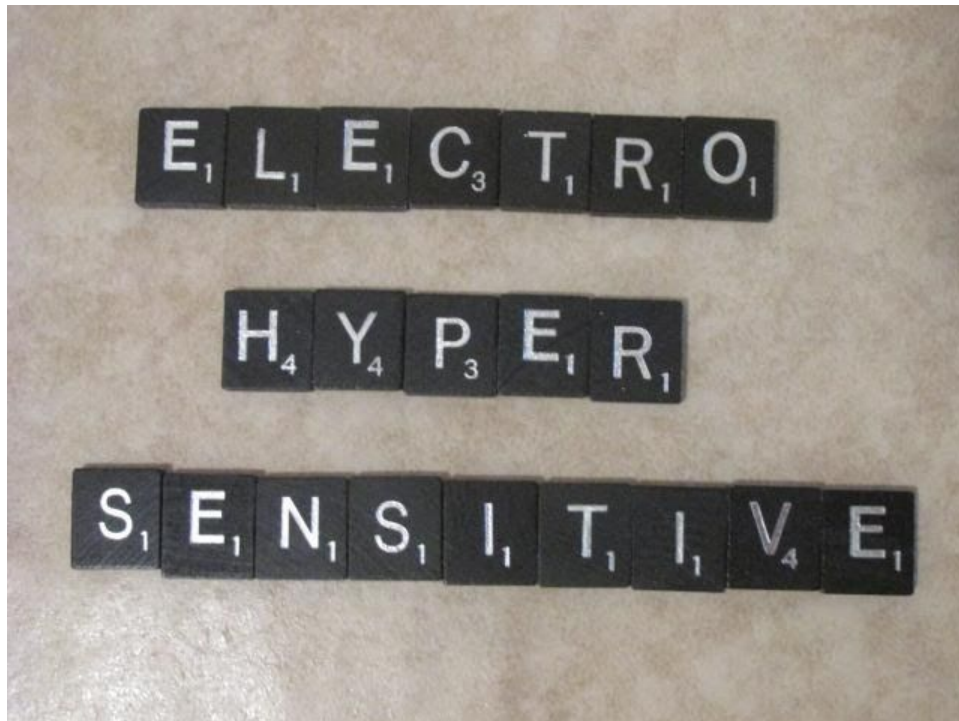


Introduction to Electrical Hypersensitivity



People who have electrical hypersensitivity (EHS) get symptoms from exposures to electromagnetic radiation at levels far below legal limits, such as from computers, electric stoves, mobile phones, electric wires and many other types of electronics and electrical equipment. The disease is controversial and poorly understood; research is still in its infancy and starved of funding.

Keywords: electrical sensitivity, electromagnetic hypersensitivity, EHS, electromagnetic fields, EMF, electromagnetic radiation, sickness, symptoms, diagnosis, children

This article is written from the patient perspective, but is based on scientific research as much as possible. We provide references and resources for further information. This is for informational purposes only and not intended to provide advice on diagnosis, treatment or other medical aspects. If you think you have EHS, please consult a physician with experience in this illness.

We use the term EHS here, as that is the one most commonly used throughout the world, both in the patient communities and the scientific journals. There are other

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terms used, such as “idiopathic environmental intolerance” which tends to be used by people who are focused on labelling EHS as purely psychological (often along with multiple chemical sensitivity). Another is “electromagnetic sensitivity,” though its acronym (EMS) is confusing since in the medical world it stands for “emergency medical service,” i.e. an ambulance team.

Symptoms

The symptoms of EHS are usually neurologic, and can affect many parts of the body. They vary from person to person; few have all the listed symptoms.

Common symptoms include:

- Tingling or burning skin, without redness (paresthesia)
- Ringing in the ears (tinnitus)
- Headaches
- Restlessness, irritability
- Dizziness, problems concentrating
- Sleep problems
- Chest discomfort
- Fatigue
- Joint pain/muscle pain

Many other symptoms have been reported, including irritable bowels, skin lesions, facial flushing, racing heart (tachycardia), anxiety, depression, eye symptoms (pain, vision disturbances), memory problems, light sensitivity, sound sensitivity and more (FEB, 2007; Genuis, 2011; Hedendahl, 2015; Belyaev, 2016; Belpomme, 2020).

None of these symptoms are specific to EHS; they can all have other causes.

Complex sensitivities

EHS appears to be a spectrum disease, where the sensitivities and symptoms can vary widely. Other examples of spectrum diseases are COVID-19, autism and migraines.

Small pioneering studies done in Britain in the late 1980s, and a major study by William Rea (Rea, 1991) show that people with EHS tend to be sensitive to some frequencies, but not all (Genuis, 2011). This is similar to people with pollen allergies, who are reactive to some pollen but not all pollen (EHS is not an allergy).

This may explain why some people are sensitive to some types of electronics and not others (FEB, 2007; Eltiti, 2007; Hojo, 2017). Anecdotally, this writer has met people from Europe who were bothered by power lines there, but not in the United States. The reason could be the different frequencies (50 cycles versus 60 cycles).



Once a person has become sensitized, the sensitivities tend to become worse over time if the exposures continue. It is thus a bad idea to try to tough it out, as that can have a lasting effect. Early intervention may halt further progression of EHS (there are no studies documenting this).

Many types of electronics generate several frequencies at the same time, which may be a reason they are a problem for so many people with EHS. Examples are mobile phones, computers and electric cars. (A mobile phone emits a carrier frequency, modulations and pulses of the carrier, plus several internal frequencies from voltage converters, microprocessors, etc).

Some people have symptoms within a couple of minutes of an exposure, while others will first have them later – sometimes even hours after the exposure ended.

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There is sometimes an adaptation effect where symptoms stop during ongoing exposure and may come back much later.

A major exposure may cause symptoms to last for days, and the person may have heightened sensitivity for some days or even weeks. This is similar to when skin is burned or broken, where the wounded place will be more sensitive for a while.

Tinnitus is a common symptom (Nordin, 2014). The prominent EHS physician William Rea, has speculated that exposure to EMF may create swelling inside the head that presses on the auditory nerve (personal communication).

In rare cases people with EHS can actually “hear” low levels of electromagnetic radiation (Wieske, 1963; Firstenberg, 2017). At high radiation levels most people are able to “hear” microwaves, which is called the “Frey effect” or “RF hearing” (Frey, 1962; Elder, 2003)

Light sensitivity is common. Thirteen to 45 percent of people with EHS also report sensitivity to light (FEB, 2007; Schooneveld, 2007; Kato, 2012).

Sensitivity to sunlight (or perhaps the many other frequencies emanating from the sun) may be a reason why many people with EHS feel better at night, even to the point where they normally stay up past midnight. However, many also report that they are more sensitive to electromagnetic radiation when trying to sleep at night.

These daily cycles have not been investigated scientifically, though already the fifth century Roman physician Caelius Aurelianus noted that asthma attacks were more common at night (Greenwood, 2018).

Sensitivity to flickering lights may also be common. Computers, televisions and fluorescent lights are some of the most commonly reported problems (FEB, 2007). Those three all emit flickering light, which may be a contributing factor to the symptoms people report. Swedish scientists exposed ten people with EHS to flashing lights in a low-EMF room, while measuring their brain waves. Their brain responses were distinctly higher than for the ten people without EHS they also tested (Sandstrom, 1997).

Some people with EHS are also sensitive to sound (Solberg, 2010; Nordin, 2014; Palmquist, 2013; Hillert, 2002). Anecdotally it appears to be especially a problem with complex sounds, such as music, and low-quality sound, such as from telephones.

It appears that people with EHS get sensitized to whatever frequencies they are exposed to frequently. In practice that means that a new piece of home electronics may cause no problems for a while, but eventually it does. This is also similar to pollen allergies, where people who move to a different climate may get relief from their allergies, but eventually become allergic to the local pollen. (EHS is not an allergy, we just use allergies as a familiar illustration.)

Metal implants may be a factor, as they can absorb, reradiate and reflect radio waves, thereby cause stronger levels in tissue directly in contact with the metal. In one of her books about EHS, Swedish journalist Gunni Nordstrom writes about a man who had a titanium plate installed in his jaw. He could not tolerate using a mobile phone until the plate was removed again (Nordstrom, 2000).

The Environmental Health Trust web site (ehtrust.org) lists multiple studies involving eyeglasses, jewelry and metal implants.

Diagnosing EHS

It is difficult to diagnose EHS, as there are no objective lab tests available yet and the symptoms can all have other causes. For instance, tinnitus can also be caused by metabolic deficiencies, mercury, lead and several types of drugs (Wikipedia).

A physician will tend to diagnose EHS based on patient history and by eliminating other possible illnesses (Belyaev, 2016).

There are physicians who are trying to put together more specific diagnostic procedures (Belyaev, 2016; Belpomme, 2020; Heuser, 2017; Austrian Medical Association, 2012), but no consensus yet.

The illness is controversial, and few physicians can actually diagnose it. In the United States, these specialists are organized in the American Academy of Environmental Medicine, which has a referral service on their website. In other countries a local EHS support group may be helpful with a referral.

Some people are not able to find a specialist or afford one. Trying to self-diagnose can be perilous as it may not be correct. An incorrect diagnosis can result in unnecessary life disruption, financial hardship and that the real illness is not addressed. Computers are a common source of symptoms, but is it the radiation that causes it, or the chemical fumes? Or simply eyestrain? Be skeptical of your own findings, don't jump to conclusions.

A common way to experiment is to turn off all portable electronics and as many breakers as possible before going to bed at night. Then sleep in a room away from the refrigerator, electric meter and other things still left on. Be aware that walls do not really block radiation, including from next-door neighbors. If you live in an apartment, it may not be possible to lower the radiation level enough to notice. An alternative is to go camping in a rural area with no electrical service, no nearby transmitters or houses, and no portable electronics at all. Or rent a primitive cabin.



Do multiple tests and see if you feel better. Be aware that a relaxing camping trip may make you feel better even if you don't have EHS.

Another method is to keep a diary of symptoms and activities for a few weeks, and then go over it in detail to see if there is a pattern. This is especially helpful if the symptoms first appear some time after the exposure, or only certain exposures are a problem.

Experimenting by exposing yourself to electrical things is not reliable. You may simply get symptoms because you expect to (called placebo/nocebo effect). Even

if you have a friend turn things on or off without your knowing, this effect still makes such testing unreliable. People with EHS tend to have good days and bad days with symptoms that come and go for unknown reasons. This makes such testing very difficult.

Exposing someone to radiation without their consent is unethical and a serious breach of trust that can permanently damage a relationship. It is also not a reliable method (see later).

What causes EHS?

The cause of EHS is not known and hotly debated (Belyaev, 2016; Genuis, 2011). It may be that some people's bodies are more susceptible to the ever-increasing electromagnetic radiation we are all exposed to.

Humanity has lived with very low levels of electromagnetic radiation until recent decades. This author has measured the ambient microwave levels in remote areas to be below 0.001 uW/m^2 . In the late 1970s, the U.S. Environmental Protection Agency did extensive measurements in 15 large cities and found the median exposure level was 50 uW/m^2 (Tell, 1980).

Twenty years later, in 1999-2000, Swedish scientists found levels between 8 and 300 uW/m^2 in a large city (and 0.07 to 40 uW/m^2 in villages). (Uddmar, 1999, 2000.)

Measurements in today's cities show radiation levels that are often above 3000 uW/m^2 and occasionally exceed $100,000 \text{ uW/m}^2$ in both public places and private homes (Hardell, 2017b, 2018a, 2018b).

Today's cities expose people to radiation that is about a million times stronger than remote areas. Occasionally it is a hundred million times stronger. It may simply be we have exceeded what some people can handle.

Another possibility is that since electromagnetic radiation can make the blood-brain barrier leaky (Persson, 1997; Eberhardt, 2008), exposures to both EMF and neurotoxic chemicals at the same time may be a factor (Hardell, 2008; Belpomme, 2015). Computers may be a culprit, since they both radiate microwaves and offgas toxic chemicals (Bako-Biro, 2004).

There is also a theory involving the calcium channels in the human cells (Pall, 2013). Another theory is about mast cells (Gangi, 2000).

The human brain contains microscopic magnets (Kirschvink, 1996). The same types of magnets are used by migratory birds for navigation, which can be confused by radio towers (Engels, 2014).

There are several other hypotheses (Belyaev, 2016; Genuis, 2011).

There may be a genetic factor, as about 20% of people with EHS report that a close family member also has the illness (FEB, 2007; Schooneveld, 2007).

Clarity regarding EHS is likely to take decades yet. This continues to leave those suffering from the illness in limbo regarding treatments, accommodations, insurance coverage and disability acceptance. This is similar to other ill-defined diseases, such as multiple chemical sensitivity, post-Lyme disease, chronic fatigue syndrome and others (Cara, 2017; Haas, 2018).

Overlap with other diseases

There seem to be overlaps with some other illnesses, most of which are also poorly understood. Lack of research funding means this area is mostly uncharted.

Multiple chemical sensitivity (MCS) is a hypersensitivity to many chemicals, such as fragrances, pesticides, paints, exhaust fumes, printed materials and more. Like for EHS the symptoms are diverse and vary with the person. The two diseases also share a variety of symptoms, such as headaches, memory problems, problems concentrating, dizziness and fatigue (McC Campbell, 2011).

In six studies, people who reported they had MCS were asked if they also believed they had EHS.

United States	32%	LeRoy 1996
United States	8%	Levallois 2002
Italy	35%	De Luca 2011
Sweden	7%	Palmquist 2013
Spain	52%	Loria-Kohen 2017
Japan	14%	Watai 2018

People with MCS who also report EHS.

The large variety may be due to the selection of people. De Luca and Loria-Kohen asked patients at MCS clinics, which tend to have more severe MCS. It thus appears that people with severe MCS are more likely to also have EHS.

In these studies, people who reported they had EHS were asked if they also had MCS:

United States	60%	Levallois 2002
Sweden	33%	Palmquist 2013
Japan	76%	Kato 2012
Japan	40%	Hojo 2016

People with EHS who also report MCS.

A study by professor Dominique Belpomme in France found eleven biomarkers that might be used for diagnosing both MCS and EHS. He concludes that “This strongly suggests that both [diseases] share a unique common pathophysiological mechanism,” (Belpomme, 2015).

Some physicians speculate that MCS and EHS are two manifestations of the same underlying illness (Brussels Declaration, 2015).

Much more speculative is a possible overlap with autism – especially the high-functioning version that is called Asperger’s. Autism is a spectrum illness where the symptoms and severity can vary dramatically. People with autism tend to be affected by various stimuli such as noise, smells, flickering lights, fluorescent light and vibration that does not bother regular people. Many people have reached adulthood and had a thriving career in fields such as engineering and computer programming, despite having undiagnosed Asperger’s. These people also tend to be rather eccentric (Grandin, 2015).

All of the above also characterize many people with EHS, as observed by this writer. The thought of a connection is compelling.

Then add that there are stories floating around about autistic children having fewer episodes when the radiation level is reduced (ClearLightVentures, 2016). Some scientific reports (Herbert, 2013; Mariea, 2007; Mortazavi, 2016; Alsaeed, 2014) suggests that radio-frequency radiation could even be a cause of autism. Its rise did coincide with the wireless revolution.

Another speculative overlap is with ADHD (attention deficit hyperactivity disorder) as several people with EHS report similar symptoms when exposed to electromagnetic radiation. Such effects have been documented (Belyaev, 2016; Thomas, 2009; Havas, 2004).

A pediatrician serving 800 Amish families says he has not seen a single case of ADD in Amish children. The Amish are a religious sect who live without electronic gadgets, such as televisions and telephones. Some have no electricity at all (Ruff, 2005).

Even more speculative are possible overlaps with restless leg syndrome, phantom vibration syndrome and “road rage.” As cars can emit powerful electromagnetic radiation, especially to the driver, it may be a trigger of road rage in sensitive people (this author has measured car levels in excess of 100 milligauss/10 uT)

Children

EHS tends to mostly affect adults, but some children have it too. Even infants can have EHS (Belpomme, 2015).

Children have a particular hard time with EHS, especially in school, since few schools are willing to accommodate their needs and peer pressure is relentless. This can have tragic consequences, such as when British teenager Jenny Fry committed suicide (Levy, 2015).

Some parents have had to home-school their child or move to an area with a school that wasn't focused on wireless gadgets (Ladberg, 2010).

In Sweden there have been multiple summer camps for children with EHS, that were completely free of electronic gadgets. The children instead engaged in traditional activities, such as swimming, ball playing, and theatre (Ingram, 2014).

Mobile phone base stations can apparently effect the behavior of sensitive children (Thomas, 2009).



Exposure of pregnant women to mobile phones or magnetic fields could have health effects later on, including asthma and behavioral problems (Divan, 2008; Divan, 2012; Li, 2011). Whether this is related to EHS is unknown.

Treatments

Research into treatments for EHS is still in its infancy. Since the illness is still considered controversial, funding is rarely available for researching treatments.

Medical treatments should rely on scientific knowledge as much as possible, but it would be cruel to tell EHS patients to wait decades before trying what already appears to be helpful, despite lack of understanding. Even mainstream medicine relies to a large degree on “common practice” that is not actually based on solid science (Hardern, 2003).

Some physicians focus on psychiatric and symptom treatments, despite that patient surveys rate them thoroughly ineffective and sometimes even harmful (Belyaev, 2016; Hagstrom, 2013).

Avoiding or lessening exposures to EMF seems much more helpful, though it is not a cure (Belyaev, 2016; Genuis, 2011; El Wellspring, 2018c; Hagstrom 2013; Marshall, 2017; Solberg, 2010; Roosli, 2003).

A good start is to focus on the sleeping area. Keep in mind that most kinds of electromagnetic radiation pass through walls unhindered. Someone with EHS should not sleep near a refrigerator, electric meter, water heater, wireless phones, clock radio or any other appliance or electronics that is not fully disconnected. Experiment by turning as much as possible off at night. Turning off the breakers lowers the electric field in the house and ensures all electronics is truly off – much electronics is not fully off even when their switches are in the “off” position.

There is much advice on these things on the web. Some of that information is misguided, incomplete or based on myths. Use good judgement and experiment with simple and cheap measures before spending a lot of money and making major lifestyle changes.

Besides avoiding exposures to EMF, treatment may focus on reducing the body’s load of mold, toxic chemicals and heavy metals (Genuis, 2011). Be aware that removal of heavy metals (chelation and amalgam removal) can be harmful if not done properly.

Since there is no standard treatment, patients sometimes experiment themselves. When someone reports feeling better the story spreads and others try the same treatment. It becomes popular for awhile and then fades again as it was not the hoped-for cure. Such cycles have gone on for many years for all sorts of illnesses that have no cure, including tuberculosis, AIDS and cancer before effective treatments became available.

Various supplements are thought to be helpful, such as omega fatty acids, methylcobalamin B-12, N-acetyl cysteine and many others. Be aware that there is little science to support these, but the cost of trying them is usually moderate. Other treatments that some people have found helpful are “grounding” (“earthing”) and “brain retraining.”

We are not endorsing any specific treatments here, but are just listing some that appears to stay popular and have some rationale. Be aware that there are many unsupported ideas and even outright charlatans hawking miracle cures. Desperate people are easy pray, just look at the predatory pricing schemes the American health care and drug industries get away with.

EMF protection devices

A whole cottage industry of “EMF protection” devices has sprung up. These devices are sold with enticing promises of easy relief at a manageable cost. The advertising tends to be very vague about how they work, or invokes grand scientific terms but no actual substance (MWN, 2010).

Some of these vendors say that they use patented technology, but having a patent means nothing. The patent office does not check if a device actually works, they only check if it is novel. There are lots of patents for perpetual motion machines and other devices that don't work.

The U.S. Federal Trade Commission has issued a warning against these products, which it labelled “scams.” They suggest common-sense measures instead, such as limiting the use of mobile phones, etc. (FTC, 2010).

Electrical sensitivity is not new

There were sporadic mentions of people unusually sensitive to electricity as far back as the 1870s. Early reports mostly involved operators of telegraphs and telephone switches. Later on came radar operators.

In 1971 scientist Zorach Glaser at the U.S. Naval Medical Research Institute published a list of symptoms associated with microwave use, along with an extensive bibliography.

In the 1980s computers were introduced by many businesses and the number of people having problems increased dramatically. The first EHS support group was started in Sweden in 1987.

In 1988 about fifty telecom engineers got sick at the Ellemtel research center. The center accommodated them with shielded rooms and modified computers, but otherwise tried to keep the issue quiet, since it reflected poorly on their industry.

Research into EHS started around 1990 and focused on exposing volunteers to electromagnetic radiation to see what happened, but many of these studies were poorly designed and failed even to “prove” EHS existed. Very little research funding has been available to this day.

The scientific, social and political history of EHS is covered in much more detail in documents available through a link at the end of this article (it also contains references to the above).

Who become electrically sensitive?

The scientific journals document cases across the industrialized world, including Canada, United States, Japan, Taiwan and several European countries. Whether the illness exists in lesser-developed countries has not been studied.

Some studies have attempted to estimate how common the illness is:

California, USA	3.2%	Levallois, 2002
Stockholm	1.5%	Hillert, 2002
Switzerland	5%	Schreier, 2006
Colchester, UK	4%	Eltiti, 2007
Austria	3.5%	Schrottner, 2008
Vasterbotten, Sweden	2.7%	Palmquist, 2013
Taiwan	4.6%	Huang, 2018

Prevalence of electrical sensitivity in general population.

The disease affects slightly more women than men (Hillert, 2002; Roosli, 2003; Schreier, 2006; Eltiti, 2007; Huang, 2018).

However, one clinic specializing in environmental illness reports that two thirds of their patients are female (Belpomme, 2015). Surveys of patient support groups show they are dominated by women (FEB, 2007; Schooneveld, 2007; Kato, 2012; Hagstrom, 2013; Hojo, 2016). This may mean that women tend to have the more severe version of electrical sensitivity.

The level of sensitivity vary. One study found that 3.2 percent of Californians had some level of electrical sensitivity, while 0.5 percent were so strongly affected they had to change jobs or stop working entirely (Levallois, 2002).

The illness affects people of all levels of education (Levallois, 2002; Roosli, 2003; Hojo, 2016).

People in the age group of about 35 to 60 years old are much more likely to have EHS than younger or older people (Schreier, 2006; Schooneveld, 2007; Hojo, 2016; Huang, 2018).

The survey studies must be looked at with some skepticism. They were mostly telephone surveys asking people for their opinion, they did not rely on diagnosis made by trained physicians.

Celebrity patients

The World Health Organization started getting interested when their own Director-General, Gro Harlem Brundtland, announced she had EHS in 2002. She retired shortly after that. Before taking the helm of WHO Dr. Brundtland was prime minister of Norway for ten years (Dalsegg, 2002).

We have heard of a couple of famous authors in Sweden go public with having EHS, but no other internationally known figures have stepped forward.

Impact on life

The impact on a person's life can be rather mild, such as having to live with headaches or facial flushing when using a computer or mobile phone too much.

At the other end of the spectrum the impact can be completely devastating. It can mean loss of career, breakup of family, loss of savings and even homelessness.

The downward mobility can be quite steep. People can go from an affluent life to living in a camping trailer and dependent on the help of others in just a few months (Evans, 2010; Ladberg, 2010; Granlund-Lind, 2004).

In a survey of 1732 Swedes with EHS, 79% stated they had a job prior to getting sick, while only 30% were able to continue working. In the same survey, 88% reported problems with fluorescent lights, 83% with computers without Wi-Fi and 62% with cars. Five percent responded that they lived partly, or wholly, without electricity (FEB, 2007).

Some studies have looked at the employment rate of people with EHS. Since they are survey studies and recruited people in various ways, they are difficult to compare with each other.

Employed	Country	Source
30%	Sweden	FEB, 2007
38%	Holland	Schooneveld, 2007
22%	Norway	Solberg, 2010

19%	Japan	Kato, 2012
38%	Sweden	Nordin, 2014

Employment rate of people with EHS



The emotional toll can also be severe. When people's lives are wrecked by an "accepted" illness, such as cancer, or by a catastrophe such as a burned-down home, they usually receive sympathy and support from many directions. Severe EHS can be just as devastating, but the victims often find themselves the subject of suspicion and sometimes even ridicule. Moreover, the source of the trauma continues, depriving the patient of a sense of feeling secure.

Housing

Housing is a challenge for people with EHS. Apartments are often not feasible, due to the close proximity to neighbors and their electronic gadgets. The higher density of people may also mean a higher level of magnetic fields from the electrical wiring.

If they can afford it, people with EHS tend to migrate to single-family homes. People with severe EHS may need to move to a rural area, with greater distances to neighbors and a lower level of electrosmog. A few people have to live in camping trailers and specially built houses (Granlund-Lind, 2004; Evans, 2019).

Daily Life

The daily life of someone with EHS can be as varied as for regular people. The level of sensitivity dictates many parts of the daily routine, however.

Some can cook on an electric stove, perhaps making sure to keep a distance when not tending the pot. Others cook very simple meals to minimize exposures, cook on a remotely controlled hot plate, on an outdoor propane stove, or have someone else do the cooking.

Some people can listen to a battery-powered radio for a few minutes to catch the news, while others can listen to music for hours.

Most people with EHS avoid using cell phones or use them sparingly. A traditional landline telephone is often their only viable means of communication. Some need to use a speaker phone to keep a distance to the telephone, while some use a special “tube phone.”

Computers are a common difficulty (FEB, 2007). Some can only use a computer for five minutes, while others can use it much longer. In some cases, people live with the symptoms in return for being connected to the rest of the world a few times a week.

Access to medical clinics, dental clinics, hospitals and nursing homes can be difficult (Granlund-Lind, 2004; Evans, 2010; Bryngelson, 2014). Some places try to accommodate, but since modern medicine is now so dependent on electronics and wireless devices, it is difficult.

Transportation by cars, airplanes, buses and trains can be very difficult (Granlund-Lind, 2004; FEB, 2007; Evans, 2010; Kato, 2012).

Most people with EHS do their own shopping, which means they get exposed to various sorts of radiation in the store from cell phones, cash registers, fluorescent lights, wireless networks, etc. Getting out of the house is good for the mental health and hiring a shopper is not always feasible. The exposures can be reduced by going when there are fewer customers and by keeping a distance to various

radiation sources. It also appears that people with EHS can tolerate more radiation when moving around, compared to when at rest.

Some people with EHS have heightened sensitivities following trips out of their safe homes and may need a day of rest afterwards.

Daily living is often a matter of managing a budget of exposures. When the budget is exceeded, it has consequences. For some, this exposure budget is very small.

Social isolation

People with severe EHS are often socially isolated, since it is difficult to be around other people and go to public places due to the electronics that is everywhere (Granlund-Lind, 2004).

Using public transportation can become impossible (FEB, 2007; Kato, 2012).

Asking people to not bring their portable electronics inside when they come to visit is often seen as an imposition. Visiting other people's homes can be perilous, as people are often not even aware of all the electronics they have, and that much of it is still "on," even when the device is turned "off." And they may resent being asked to turn them off.

People with EHS may not be able to use a computer or a telephone and be isolated in that way as well. Few people are willing to correspond by letter anymore.

Some patients may rely on others for shopping and other chores outside the house and thus rarely go anywhere. This can also lead to a sense of loss of independence.

The controversy

Any new disease faces an uphill battle towards acceptance. Until a disease is accepted, its sufferers both have to live with a debilitating illness and with the effects of being labeled as "malingerers," "hypochondriacs" and "psychosomatics" (Haas, 2018; Caray 2017; Dodick, 2008; Ware, 1992; Ballweg, 1995).

This is also the case for EHS sufferers (Genuis, 2011; Ladberg, 2010). On social media they are subject to hate and ridicule (EI Wellspring, 2018a).

The group around British psychologist Dr. James Rubin has published several papers to discredit people with EHS (Rubin, 2005, 2011). They've even gone as far as claiming that the whole phenomenon is caused by media reports (Witthöft, 2012), and that people with EHS simply desire to withdraw from modern society and live like hermits (Boyd, 2012) – a clear case of blaming the victims.

The lack of acceptance means people with EHS may be denied reasonable accommodations in medical facilities, denied disability pensions and subjected to outright ridicule and hostility from families, officials and medical providers.

People labeled as mentally ill also get poorer service for other health needs (McCall, 2010)

The stigma can force people to hide their disease as much as possible, which may mean suffering symptoms, lost productivity, poor job reviews and eventual worsening of the illness and a lost job. The following is part of a public testimony in Sweden (Granlund-Lind, 2004):

I have friends who work in healthcare – I won't mention in which capacities – and when we meet in town we don't greet one another. People at their workplace, the general hospital, are unaware that they are electro-hypersensitive – and they don't dare mention it!

Many other now-accepted illnesses have gone through the same process, such as migraines, endometriosis, asthma and multiple sclerosis. Autism used to be blamed on the mother not being affectionate enough and until recently stomach ulcers were believed to be caused by stress (EI Wellspring, 2018b; Pall, 2013).

Even sixty years after the first studies showed cigarettes could cause cancer, all the issues are not fully understood (Oreskes, 2010).

The skeptics of EHS point to the lack of scientific research on EHS – research that is sorely lacking due to no funding being available. Funding is very difficult to obtain for a controversial illness, which is kept controversial because there is so little science. It's a vicious cycle. As *Scientific American* wrote: “Review panels, even when they are made up of excellent scientists, are allergic to risky ideas” and “Any idea that survives the scrutiny... has little chance of being truly disruptive or innovative. It must be mainstream...” (Ioannidis, 2018).

Some detractors also point to the many and diverse symptoms people with EHS report and suggest it is impossible they all come from one source. Then consider

that cigarettes are proven to cause two dozen diverse health effects, including heart disease, lung disease and low birthweight (Oreskes, 2010). People with autism can also display a wide variety of symptoms and sensitivities (Grandin, 2015).

Some point to the studies where people with EHS were exposed to electromagnetic radiation and could not tell the difference from a sham/placebo exposure (Rubin 2005, 2011). In some of the studies the test subjects could, in some they couldn't. These kinds of tests are devilishly difficult to do, because of the complexities and diversity of people's sensitivities, the need for strict environmental controls and for better selection of test subjects. We have yet to see any such test where they measured all the types of EMF that might be present. Some of those studies were like asking asthmatics whether they could detect a cigarette smoker in a room filled with cigar smoke.

These studies have been strongly criticized by many physicians (Genuis, 2011; Belyaev, 2016; Brussels Declaration, 2015; Belpomme, 2020).

One major problem is the lack of a good case definition to screen the participants in these studies. Most studies simply include anyone who believes they have EHS, despite that all the symptoms can have other causes. If people who are sick, but not with EHS, are included in the group of people believed to have EHS, that can greatly skew the results. This is also a problem with the study of other "new" diseases, such as chronic fatigue syndrome (Tuller, 2018).

It is also important to screen out participants who are traumatized by their illness, as they are probably not reliable testers. We are only aware of one study that explicitly used such a screen (Sandstrom, 1997).

It has been suggested that people with EHS suffer from stress from using new technology (technostress) or get psychosomatic symptoms after hearing about health concerns in the popular media. A study of forty people with EHS in France found that just a few of them had even heard about any health effects before they got sick, and most had to search for an answer for a long time before they heard about EHS. Several were also technically savvy and thus unlikely to have "technostress" (Dieudonne, 2016). This is also echoed in a detailed personal account of a computer engineer, who took about a year to figure out his computer caused his headaches (Evans, 2010).

When special interests are threatened by medical research, they tend to mount campaigns to keep the issue controversial in the eyes of the public. This has happened several times already, most notably with lead, asbestos and tobacco (Oreskes, 2010; McGarity, 2008). Special interests, especially the cell phone industry, have been very successful at keeping health effects from EMF controversial by funding research to cast doubt on the issue. Swiss researchers have shown that only 33% of industry-funded research finds any health effects, while 82% of independent research does show effects (Huss, 2007). An investigative article in *Microwave News* found similar results (MWN, 2006), as did one for power line studies (Carpenter, 2019). An Australian study also confirmed this effect (Leach, 2017). This “funding effect” is a general phenomenon, which is documented very well (McGarity, 2008; Bekelman, 2003).

For more discussion see (Blank, 2014; Davis, 2010; Elwellspring, 2018b)

Much research is needed

Much basic research is needed to understand EHS’s complex pattern of symptoms and sensitivities, as well as the biological mechanism.

The disease still lacks a clear definition, an objective method of diagnosis and is still debated whether it even exists as a legitimate illness.

Without a clear definition of who has EHS, it is difficult for scientists to compare their data and there is also a danger that people who do not actually have EHS are included in studies. Most studies simply include anyone who believes they have EHS, and who are willing to come to the scientist’s office. This may exclude the most severe cases and include people who actually do not have EHS but think they do.

Studies where EHS patients are exposed to electromagnetic radiation without knowing when it is on or off have turned out to be unreliable (Rubin, 2005, 2011). The reasons are many, including improperly controlled environments and not giving the test persons enough time to recover (Belyaev, 2016; Belpomme, 2020). In one large study, 25% of the “EHS group” did not even react to any of the exposures (Rea, 1991), so the choice of who to include in the “EHS group” is paramount.

Because of these types of studies are often unreliable, many scientists recommend not doing them until better methods are developed (Belyaev, 2016; Brussels

Declaration, 2015). Even an editorial in the *British Medical Journal* frowns upon using such “placebo tests” in general (Spiegel, 2004).

One standout study was done at Louisiana State University, where one person was tested a total of 450 times in a controlled setting and could accurately distinguish whether the equipment was on or not (McCarty, 2011).

Unfortunately, the lack of conclusive studies is sometimes used to paint people with EHS as psychosomatic and not suffering from a “legitimate” illness (Rubin 2005, 2011). This makes it more difficult to obtain research funding to resolve the issues.

Acceptance

The Austrian Medical Association is the only general medical society that has accepted EHS as a “legitimate” illness (Austrian Medical Association, 2012).

In Sweden EHS is accepted as a “functional disability” which is more vague (Johansson, 2010). In practice Swedes with EHS are still discriminated against by many government agencies.

French courts have fully accepted EHS as “real” since 2015 (Le Monde, 2015).

In 2011 the Council of Europe issued Resolution 1815 in support of people with EHS. The Council is an advisory body to the European Parliament (Council of Europe, 2011).

The Bioinitiative Reports of 2007 and 2012 support people with EHS. It is produced by a group of independent scientists specializing in health effects from electromagnetic radiation (Sage, 2007, 2012).

The EUROPAEM EMF Guideline 2016 report (Belyaev, 2016) is the first attempt at suggesting radiation limits for people with EHS.

The World Health Organization has recognized the existence of EHS, but not formally accepted it by issuing an official diagnostic code – despite calls from the scientific community to do so (Brussels Declaration, 2015; Hardell, 2017a; Belpomme, 2020).

In popular media

EHS has been featured in popular media. The TV series *Better Call Saul* (2015-2017) had a fictional character with EHS. The Netflix “docuseries” *Afflicted* (2018) featured one person with EHS. Both series falsely portrayed EHS as an imagined illness.

Communities

Some of the people with EHS have fled the electropollution in the cities and moved to rural areas, where a few informal communities have sprung up. These communities offer a way out of the social isolation and people who understand what we all have to go through. There is not the ongoing suspicion or need to keep reminding friends to turn off their wireless toys when visiting.

This is similar to veterans organizations, since only a fellow soldier can understand what serving in a war means.

The most famous EHS community is located around Green Bank, West Virginia, where most wireless devices are banned to protect a large radio observatory (Gaynor, 2015).

Another large community is near the town of Snowflake, Arizona (EIWellspring, 2019). There are other communities around the American Southwest (Evans, 2019).

In Europe there is a community in France (Abelous, 2009). There is also one on an island off the coast of Sweden (they asked the location to be withheld).

Organizations

There are support groups and advocacy organizations across the world, including Australia, Britain, Canada, France, Germany, Spain, Japan, the United States and all the Scandinavian countries.

The oldest EHS organization was started in Sweden in 1987 and is still very active.

Activism

EHS organizations and individuals are demanding their civil rights in various countries. They have asked for safe access to medical facilities, fought against

mobile phone base stations, against smart meters and to retain telephone land lines. So far the successes have been few and modest.

As EHS is still falsely thought of as some sort of “anxiety” by many, it is difficult to be taken seriously. It is also difficult for the activists to show up in the halls of power, since the radiation levels there are likely to be rather high. With so many people with EHS so sick, it is difficult to get more than a handful to show up.



Picture courtesy Josh Hart/Stop Smart Meters!

The EHS community has not been active asking for funding for medical research. Funding is unfortunately very much a political process. According to surgeon Sherman Nuland, advocacy efforts were a major factor in increasing the budget for Alzheimers research 800-fold during the 1980s (Nuland, 1993).

The EHS activists have still not learned to band together with other disability and patient groups for mutual support.

Recommended literature

The Non-Tinfoil Guide to EMFs, Nicolas Pineault, N&G Media, 2017.

The Invisible Rainbow: a history of electricity and life, Arthur Firstenberg, Santa Fe: AGB Press, 2017.

Overpowered: what science tells us about the dangers of cell phones and other WiFi-age devices, Martin Blank, Seven Stories Press, 2014.

Forced to Disconnect: Electrohypersensitive Fugitives in Sweden, Gunilla Ladberg, 2010. (Available for free download, originally published in Swedish).

Chemical and Electrical Hypersensitivity – A Sufferer’s Memoir, Jerry Evans, McFarland, 2010.

The Invisible Disease, Gunni Nordstrom, O-Books, 2005.

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

Cross Currents – The Perils of Electropollution, Robert O. Becker, M.D., Tarcher, 1990.

More information

A wide variety of articles about how to cope with EHS is available on www.eiwellspring.org.

For articles about the history of EHS, including scientific, social and political milestones, www.eiwellspring.org/ehshistory.html.

For personal stories go to www.eiwellspring.org/facesandstories.html.

References and notes

The list of references is in a separate file:
www.eiwellspring.org/health/IntroductionToEHSreference.htm

2008 (updated 2021)