

# ELECTROMAGNETIC HYPERSENSITIVITY

## History

During the 1950s clinics were established in Moscow, Leningrad, and other cities in the Soviet Union and Eastern Europe to study and treat thousands of workers suffering from a new occupational disease. It was named radio wave sickness. These patients manufactured, inspected, repaired or operated microwave equipment. Some worked at radar facilities, others for radio or TV stations, or telephone companies. Still others operated radio frequency heaters and sealers being used in an expanding number of industries using technology developed during World War II.

The patients at these clinics suffered from headaches, fatigue, weakness, sleep disturbance, irritability, dizziness, memory difficulty, sexual dysfunction, and occasionally sensitivity to sunlight. Some had heart palpitations, stabbing pains in the region of the heart, or shortness of breath after exertion. Many developed emotional instability, anxiety or depression, and a few had symptoms of mania or paranoia. On physical exam they had objective findings including acrocyanosis (blue fingers and toes), decreased sensitivity to odors, sweating, tremors, altered reflexes, unequal pupil size, heart arrhythmias, and unstable pulse and blood pressure. They showed abnormalities on EEG and EKG, and, in advanced stages, signs of oxygen deprivation to the heart and brain.

Most clinicians reported that about 15% of microwave workers developed symptoms of radio wave sickness, and that about 2% had to permanently cease working (Sadchikova 1960, Klimková-Deutschová 1973).

These workers were exposed to microwave radiation only during working hours. And they were exposed to levels of radiation that were less than what the general public is exposed to now for hours per day, or even all the time, from cell phone and wireless Internet technologies.

Because of the large number of publications about radio wave sickness coming out of the Soviet Union and Eastern Europe, a US/USSR scientific exchange on microwave radiation research was begun in the mid-1970s. And the US government contracted with Dr. Zorach Glaser to catalog the world scientific literature—journal articles, books, conference proceedings—on reported biological and health effects of radio frequency and microwave radiation. By the end of the 1970s, Glaser's bibliography included 5,083 documents (Glaser 1984).

Also during the 1960s and 1970s, ophthalmologist Milton Zaret, under contract with the Army and the Air Force, examined the eyes of thousands of military and civilian personnel working at radar installations in the US and Greenland. Large numbers of them, he found, were developing cataracts. Most of these cataracts were caused by chronic exposure of the eye to radiation at power densities around one milliwatt per square centimeter—a level which is regularly exceeded by each of the two and a half billion cell phones in use today (Birenbaum et al. 1969; Zaret 1973).

During those years American biologist Allan Frey discovered that microwave radiation damages the blood-brain barrier (Frey et al. 1975), and he proved that humans and animals can *hear* microwaves (Frey 1961). One of the most active American researchers during the 1960s and 1970s, Frey caused rats to become docile by irradiating them at a power density of 50 microwatts per square centimeter (Frey and Spector 1976). He altered specific behaviors at 8 microwatts per square centimeter (Frey and Wesler 1979). He altered the heart rate of live frogs at 3 microwatts per square centimeter (Frey 1970). At only 0.6 microwatts per square centimeter, 100 times less than levels commonly encountered today at a normal operating distance from a wireless laptop, he caused frogs' hearts to develop arrhythmias, and sometimes caused the hearts to stop beating, by timing the microwave pulses at a precise point during the heart's rhythm (Frey and Seifert 1968).

In 1977 Paul Brodeur, in his book, *The Zapping of America*, warned that proliferating microwave towers and radar facilities were endangering public health. But compared to today, microwave and radio facilities were still very rare indeed.

When in 1977 Apple sold its first personal computers, exposure to high levels of electromagnetic radiation spread to the general population, and electromagnetic illness ceased being only an occupational disease. In that year deaths from asthma in the US, which had been declining steadily for decades, began to rise for the first time. In 1981, Representative Al Gore chaired the first of a number of Congressional hearings on the health effects of video display terminals (VDTs). These were held because two editors at *The New York Times*, young men in their 20s and 30s, had developed cataracts; half of all surveyed UPI and AP employees were complaining of visual problems or headaches; an unusual number of babies with birth defects had been born to employees at *The Toronto Star*; and clusters of miscarriages were occurring among female VDT operators all over the U.S. and Canada. The newspaper industry had been the earliest industry to be transformed by computer technology. During the 1981 hearings by the House Committee on Science and Technology, Charles A. Perlik, Jr., president of the Newspaper Guild, testified that had his membership known that VDTs were capable of dangerous emissions, "We would not have quietly permitted the transformation of an essentially benign workplace into a hazardous one."<sup>1</sup> In 1985 Canadian author Bob DeMatteo published a popular book titled *Terminal Shock: The Health Hazards of Video Display Terminals*.

In the mid-1980s Olle Johansson, a neuroscientist at the Karolinska Institute in Stockholm, discovered a new skin disease. Since only people who worked in front of computer screens got it, he named it screen dermatitis. Such patients often complained also of neurological symptoms such as memory loss, fatigue, insomnia, dizziness, nausea, headache and heart palpitations—the same neurological symptoms written about three decades earlier by Soviet doctors—but since Johansson's specialty was skin diseases, he studied the skin of computer operators. His subjects ranged from those with only redness and itching, to those with severe, disfiguring skin lesions. An organization named Foreningen for El- och Bildskärmsskadade (FEB) was formed as a support group for Swedes suffering from this "new" disease that they

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<sup>1</sup> *Potential Health Effects of Video Display Terminals and Radio Frequency Heaters and Sealers*. Hearings before the Subcommittee on Investigations and Oversight of the Committee on Science and Technology, U.S. House of Representatives, Ninety-seventh Congress, first session, May 12, 13, 1981.

called Electromagnetic Hypersensitivity (EHS)—a disease that was not new at all, but was a well-known occupational disease in another part of the world.

In the mid-1990s the telecommunications industry embarked on a project that was to result in the exposure of the entire world to microwave radiation on a previously unimagined scale. They planned to place a cell phone and a wireless computer in the hands of every man, woman and child on Earth—and to dot our world with so many broadcast antennas that those phones and computers would work in every home and every office, on every street, in every country, on the highest mountain and in the deepest valley, on every lake, in every national park, wilderness area and wildlife refuge, without exception. And so during the next decade levels of microwave radiation increased roughly a thousandfold on average, everywhere on Earth.

In recent years researchers have correlated symptoms such as sleep disturbance, fatigue, memory loss, headaches, depression, dizziness and tremors—the same symptoms reported by Soviet doctors half a century ago—with either intensity of cell phone use or proximity of homes to communication towers. Teams of scientists in 14 countries have concluded that the health of as much as three quarters of the population on Earth is affected by wireless technology (Haugsdal 1998, Hocking 1998, Cao 2000, Oftedahl 2000, Chia 2000, Sandström 2001, Santini 2002, Navarro 2003, Santini 2003, Zwamborn 2003, Wilén 2003, Oberfeld 2004, Bortkiewicz 2004, Al-Khlaiwi 2004, Salama 2004, Meo 2005, Preece 2005, Waldmann-Selsam 2005, Szykowska 2005, Balikci 2005, Balik 2005, Hutter 2006, Abdel-Rassoul 2007). But the term “electromagnetic hypersensitivity” persists because no health authority in any Western country admits that electromagnetic radiation has any effect on the health of any normal person. EHS, therefore, refers to those people who have happened to find out that electromagnetic fields are the cause of their poor health, and who in addition are affected so seriously that they are disabled.

The numbers of people with EHS have been estimated, from government surveys, at 3.1% of the population (Sweden) (National Board of Health and Welfare 2001); 3.2% (California) (Levallois 2002); 5% (Switzerland) (Schreier 2006); 6% (Germany) (Schroeder 2002); and 7% (Marin County, California) (Marin County Department of Health and Human Services 2002).

## **Coping**

Reduction of electric fields, magnetic fields, and electromagnetic radiation, at home and at work, is of the greatest benefit to people with EHS. In the past this was easier than it is today.

Reduction of fields, or “sanitizing” a building, requires eliminating fluorescent lights, dimmer switches, electronic security systems, electric heaters, and all wireless technology, including cell phones, cordless phones, wireless computers, baby monitors, bluetooth devices, etc. It may require eliminating or relocating entertainment systems, or equipment with digital displays or digital clocks. It may require eliminating or shielding televisions and computer monitors. And it sometimes requires the complete rewiring of a building and the burying of power lines. Unplugging all electrical devices from their outlets when not in use is recommended, and turning off all circuit breakers, or the mains power supply, at night is

sometimes necessary. Many people with EHS drive very old cars with minimal electronics, or diesel cars, which can be driven without any electricity.

However, the spread of wireless technology is making the avoidance of electromagnetic radiation difficult to impossible in many parts of the world. Reducing the fields originating within a building to zero is no longer sufficient. Cities and utility companies are changing over to wireless electric, gas and water meters, which can irradiate a whole neighborhood. The arrival of Broadband over Power Lines (BPL) can mean that it is no longer possible to keep high frequency fields out of your home if you want to have electricity.

Radiation also comes through the walls from neighbors' wireless telephone, computer and security systems, from neighborhood cell towers and, increasingly, from large-area wireless Internet (Wi-Fi) systems which are expanding to cover whole cities, counties, and even small countries like Singapore and Macedonia. Therefore many people are attempting to cope by living in metal structures, or shielding their walls and windows with conductive fabrics, paints and plastics to keep all the microwave radiation out. This is not always successful. As Dr. Felix Gad Sulman pointed out (Sulman 1980), the presence of the Earth's natural electromagnetic fields is necessary for health, therefore an electrically sensitive person in a shielded room would need to have all of the Earth's natural fields duplicated inside the room, a difficult to impossible task.

People with EHS are discovering that there is no place left to run to, and that the only solution, if we want to secure a future for ourselves, our children and grandchildren, and for birds and wildlife, is to work together to make widely known and recognized the health effects of electromagnetic fields, until society admits that wireless technology was a terrible mistake and gets rid of it.

## **Symptoms**

*Neurological:* headaches, dizziness, nausea, difficulty concentrating, memory loss, irritability, depression, anxiety, insomnia, fatigue, weakness, tremors, muscle spasms, numbness, tingling, altered reflexes, muscle and joint pain, leg/foot pain, "flu-like" symptoms, fever. More severe reactions can include seizures, paralysis, psychosis and stroke.

*Cardiac:* palpitations, arrhythmias, pain or pressure in the chest, low or high blood pressure, slow or fast heart rate, shortness of breath.

*Respiratory:* sinusitis, bronchitis, pneumonia, asthma.

*Dermatological:* skin rash, itching, burning, facial flushing.

*Ophthalmologic:* pain or burning in the eyes, pressure in/behind the eyes, deteriorating vision, floaters, cataracts.

*Auditory:* Chirping, buzzing, or ringing in the ears; hearing loss.

*Others:* digestive problems; abdominal pain; enlarged thyroid, testicular/ovarian pain; sexual dysfunction; dryness of lips, tongue, mouth, eyes; great thirst; dehydration; nosebleeds; internal bleeding; elevated blood sugar; immune system abnormalities; redistribution of metals within the body; hair loss; pain in the teeth; deteriorating fillings; impaired sense of smell; light sensitivity.

## Terminology

Because health authorities do not recognize this condition, there is no standard name for it. The following terms have been used:

*Affected by electromagnetic fields:* A term used in Spanish-speaking countries; “afectados por campos electromagnéticos”.

*Electrical injury:* The term originally used by the Swedish group FEB; “El- (och Bildskärms)skadade”.

*Electrical sensitivity:* Widely used in English-speaking countries.

*Electromagnetic hypersensitivity:* Illness caused by exposure to electromagnetic fields; a term coined by patient support groups.

*Microwave sickness:* A synonym for radio wave sickness.

*Radio wave sickness:* An occupational disease, first described after World War II in the Soviet Union, caused by exposure to radio waves.

*Screen dermatitis:* A skin condition caused by exposure to electromagnetic fields; so called because it was first described among users of VDTs.

The following terms are suggested as being more accurate:

*Acute electrical illness:* Acute illness, similar to influenza, caused by exposure to electromagnetic fields, characterized by a sudden breakdown in the electrical systems of the body.

*Chronic electrical illness:* A chronic condition caused by exposure to electromagnetic fields. The same as radio wave sickness, except it may be caused by any type of electromagnetic fields, not just radio waves.

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