frequency emissions. Computer monitors also have higher frequency emissions due to the cathode ray tube technology.

Other health complaints suspected of being related to the computer user's radiation exposure are epilepsy, cancer, miscarriages, birth defects, cataracts, and electrical sensitivity.[2, 40, 53, 68, 69] For example, in 1992 the American Journal of Epidemiology reported the results of a study from Finland regarding miscarriages among female computer users. Clerical workers at three Finnish companies were the study subjects. One hundred ninety one miscarriage cases were compared with 394 births. Those who used a computer monitor emitting a high level of extremely low frequency (ELF) magnetic fields (more than 9 milligauss at 20 inches from the screen) were 3.4 times as likely to have had a miscarriage instead of a live birth compared with computer users having ELF magnetic field exposure levels below 4 milligauss.[81] Miscarriage clusters among office workers have been documented worldwide.[2]

In 1992, Sweden's National Institute of Occupational Health surveyed five major employers in Sweden and found one of every seven employees (out of 731 total) experiencing symptoms of ES.[23] Skin complaints were the most common, with ear/nose/throat symptoms second, followed by eye problems, mouth problems, and nervous complaints. Recorded nervous symptoms were fatigue, weakness, headaches, dizziness, prickly sensations, depression, heart rate fluctuations, forgetfulness, perspiration, and breathing problems. In one group of workers, six out of ten were allergic to chemicals in addition to ES symptoms. Some workers were also light sensitive, so sensitive that they could not be near anything brighter than candlelight.

Skin problems for these studied workers were two times as common if workers used computers more than four hours daily. Also, the study noted that workers using higher magnetic field emitting computer monitors had more skin problems than computer users with lower magnetic field monitors.[23]

A 1994 medical evaluation of ES skin problems done by the Experimental Dermatology Unit, Department of Neuroscience, Karolinska Institute, Stockholm,

Sweden concluded "...that certain paramount and profound changes in the dermis and epidermis take place..." upon exposure to television set EMFs.[17] Basically, in ES skin patients, immunoreactive skin cells were much greater in number than in non-ES controls. The scientist who headed this study is currently at risk of having funding discontinued. More studies like this are imperative.

In 1990, 1650 patients of Sweden's health care centers with ES-type skin symptoms were evaluated. Their symptoms were then categorized by degree of ES severity:

	Patients	Percent	Symptoms
Category 1	1150	69.7%	Skin pain at computer only.
Category 2	350	21.2%	Residual skin pain after computer use or other electrical exposure.
Category 3	90	5.5%	General electrical sensitivity.
— Sick leave or work transfer was required. —			
Category 4	60	3.6%	Serious ES symptoms, even at home.
—Severe work and lifestyle limitations. —			

Source: Work with Display Units 92[12]

Preliminary results of a recent survey of The Swedish Union of Clerical and Technical Employees in Industry (SIF), Stockholm, Sweden found the following indications of possible ES among 1,694 members who responded:

- For men, the most frequent symptom is eye problems. A large percentage of

respondents were young men under age 36.

- For women, more than one out of three have eye symptoms, joint pain, and skin problems.[16]

Sweden's Association for the Electrically and VDT Injured survey results indicate that 90 % of their members report computer usage as their cause of ES.[14]

Pre-survey indications in the United States show ES men predominantly former computer users, not necessarily MCS. United States MCS patients appear to be mostly women, so United States patients with MCS who get ES are often women, but not exclusively.

How could computers cause electrical sensitivity? Prolonged exposure to the EMF emissions of computer monitors is one strong possibility, with chemical emissions, particularly with brand-new equipment, a possible co-factor.[23, 69]

According to Sweden's Karolinska Hospital letter published in England's medical journal Lancet, computer skin rashes were suspected of being linked to static electricity drawing airborne particles to the computer user's face. When static electricity shielding was applied to the screen, some skin rash patients reported improvement while others did not improve.[3]

Beyond static electricity, the alternating magnetic fields create electric currents in electrical conductors, like the body. These electric currents create heat (in the body) which is called *induction heating* in electronics.[62] In other words, currents create heat, as does energy absorption at higher EMF frequencies. Currents tend to flow more on the surface of the conductor as the EMF frequency increases. In electronics, when the current flows more on the surface of a conductor, it is called a *skin effect*.[62, 89] Computer users are getting a *skin effect* also, it appears. What EMF frequencies and/or chemical offgassing factors produce their skin problems has not been scientifically determined. However, it seems clear that heating the skin with induced electric currents could lead to prolonged skin inflammation.

The scientific theory that most induced currents currently are non-thermal

(meaning you cannot feel the heat) is no guarantee that they are safe. Excessive heating of the body by high levels of radio frequency EMFs, above computer monitor levels, has been shown to produce cataracts, birth defects, and miscarriage, according to World Health Organization and International Radiation Protection Association publications.[71, 136] The eye is especially sensitive to heat because it does not have the blood supply to dissipate heat.[136] This fact is one reason why eye problems are being discussed in relation to computer radiation exposure. Induced heating of the computer user's wrists could possibly lead to tendon inflammation that compresses the median nerve, producing carpal tunnel syndrome. Office ergonomics are helpful to ensure repetitive motion is minimized and posture is comfortable, but office assessments need to consider both ergonomic and environmental factors.[122, 123]

Group ❸ - People Exposed to High Levels of EMFs for Prolonged Periods of Time

A third way ES can occur is by being exposed to higher levels of, or different types of, EMF than you had previously been exposed to.[34] This new EMF exposure can produce symptoms when your body does not adjust to the EMF stress.

Fluorescent lights and energy-efficient bulbs are common culprits for ES reactions.[14, 23, 92, 109] Sometimes they appear to be the initial incitant that begins the ES process.[109]

Denmark's electrically and VDT injured group, EBD, says that most of their members were computer users or in an electrical environment which caused the ES. Their group has about forty-four members. Denmark's group is arranging the 2nd Copenhagen Conference on Electromagnetic Hypersensitivity, an international scientific conference, to be held at the University of Copenhagen, Denmark on May 22 -23, 1995.[1]

In Sweden during the late 1980's, about fifty young technicians at one employer, Ellemtel, became electrically sensitive. They were computer users and had additional potential EMF exposure from three microwave transmitters situated on the employer's roof.[19, 20] ES symptoms one worker experiences are extreme weakness and a skin burning sensation like a severe sunburn when EMF exposed. This worker now, of necessity, has

an EMF shielded room at work that he shares with other ES workers. At home he occupies one shielded room, shielded with 1,100 pounds of iron sheeting with two layers of silicone.

His symptoms began shortly after using high-resolution color computer monitors from England. He then began experiencing burning and stinging on his face at the computer. The symptom reactions spread to other EMF exposures: fluorescent lights, cars, and electrical appliances in general. He now has "hot spots" and red patches all over his body, which intensify near anything electrical. He was also light sensitive early on, but that symptom left over time.[19]

A survey of United States ES patients is being prepared, in part to better define the causes of ES. Currently, any EMF source could be considered a potential ES initiator.

In the future, all electrical appliances must be required to be shielded to reduce EMFs, perhaps by amending The Radiation Control for Health and Safety Act of 1968 designed originally to legislate reduction of x-ray emissions from television sets.

In reality, everyone is electrically sensitive at the cellular level; with some people the EMF reactions are less subtle than with others. The EMF cancer issue is a prime example.

Cancer, in its present form, could even be interpreted as an environmental illness, a cause external, not from a contagious source, but of an environmental basis. Cancer itself could also be loosely interpreted as ES, as EMFs in some studies promote the growth of cancer cells — cancer sensitive to and promoted by the electrical fields.[128] So, we could say that even though cancer patients may not feel EMFs, cancer is electrically sensitive. Further, you could surmise that everyone is essentially electrically sensitive, whether they notice it or not. The body's cells, nerves and organs are sensitive to external electromagnetic fields. When an ES patient tells you that the refrigerator's EMFs are biologically active at 20 feet, the implications of the biological activity of EMFs is in question for everyone.

What electromagnetic field sources are most difficult for ES patients to contend with?

Sensitivity varies depending upon the degree of illness, mild or severe, the uniqueness of the individual, and the variety of products and sources available.

Generally, computer monitors, television sets, motorized appliances, fluorescent lights, transformers, power lines and household wiring problems pose the greatest difficulties for the ES patient. Anything electrical is a potential health threat to those with ES.

Is electrical sensitivity more severe at some specific electromagnetic frequency exposures as opposed to others?

No known large-scale studies have been attempted yet to determine what frequencies ES patients may be most sensitive to. However, in a study of 100 ES patients, sixteen clearly symptom-responsive patients had the following frequency reactions:

1	Hertz	75%
2.5	Hertz	75%
5	Hertz	69%
10	Hertz	69%
20	Hertz	69%
10	kilohertz (10,000 Hz)	69%

Other frequencies tested (.1 Hertz (Hz), .5 Hz, 40 Hz, 50 Hz, 60 Hz, 100 Hz, 1 kilohertz (kHz) (1,000 Hz), 5 kHz, 20 kHz, 35 kHz, 50 kHz, 75 kHz, 100 kHz, 1 megahertz (MHz) (1,000,000 Hz), and 5 MHz) recorded less than a 69% response rate. Of these frequencies, the lowest responses (31%) occurred at .1 Hz, 35 kHz and 5 MHz. None of the 16 patients recorded ES reactions to all of the frequencies; the response range was between 1 and 19 positive responses out of the 21 frequencies tested.[102]

Of interest are the brain wave frequencies:

Brain Wave	Mental State	Frequency Range
Delta	Asleep	.5 Hz - 4 Hz
Theta	Deeply Relaxed	4 Hz - 7 Hz
Alpha	Relaxed	8 Hz - 12 Hz
Beta	Awake	14 Hz - 30 Hz

Source: Encyclopedia of Science and Technology[88]

Therefore, frequencies within the range of .5 Hz - 30 Hz would be expected to show the most neurological responses because they are simulating brain frequencies. The study above shows that five of the six highest response rates were from frequencies within the range of brain frequencies. And, indeed, neurological reactions were the ES symptoms reported most in this study — sleepiness, headache, dizziness, tingling, unconsciousness.[102]

Power line frequency is 60 Hz in the United States and 50 Hz in Europe. Computer monitors have two primary frequencies: power line frequency and very low frequency (VLF) of about 20 kHz (20,000 Hz). Fifty-six percent of the above study's patients had ES responses at 20 kHz, 63% responded to 60 Hz, and 50% responded to 50 Hz.[102]

Case Examples of Types of ES

The examples below are real people facing enormous health, legal, medical and social problems due to their electrical sensitivity.

Some are multiple chemical sensitivity (MCS) patients who developed ES, others are ES only. Computers and other EMF factors account for the non-MCS cases. The author has talked to or corresponded with all of the following ES patients:

Case 1: Pension administrator in office setting develops a heat reaction on her legs. Her office is next door to the computer room, where four computer monitors run all

day. The heat reaction occurs at her desk, diminishes in other offices and disappears at home. Administrator's office is moved due to management's reallocation of office space. Heat on legs disappears and her assistant does all of the computer room work.

New office policy indicates that all employees will be getting a computer in their office. The office across the hall gets a new computer monitor. Heat reaction begins again and intensifies to extreme level. Administrator discusses the problem with her supervisor and supervisor agrees to move employee to a new office, away from computers. Employee gives three weeks notice to quit her job.

New office is away from both the computer room and the old office. However, unknown to the administrator, a new employee moved a color monitor against the wall behind her new office. The heat reaction begins again in the new office — a search of the area finds new employee's computer. Computer cannot be moved; administrator moves to the conference room to work. Her dermatologist, when asked whether computer radiation could be a factor contributing to the rash and heat reactions, answered, "Ridiculous".

Conference room was not always accessible and her office was unacceptable so employee requested to do work from home until her date of termination came. Supervisor agreed. Employee quit and has since had to quit two other jobs due to EMF exposure problems also. Worker's compensation was declined. Employee is not 100% disabled so cannot qualify for Social Security. Her business career is over, as she cannot be within two rooms of a computer monitor without developing "hot spots" on her legs. Her only hope is finding a non-computer job in an EMF safe location, but nearly *everyone* has a computer. She now also reacts to television sets, most motorized appliances, and other EMF sources.

Type of ES patient: Computer user

Case 2: Employee is an insurance agent who begins to feel ill at work. A doctor determines that the fluorescent lights are bothering her. She can work from home, but cannot comfortably work at the office anymore. When she leaves home, she must wear

dark sunglasses indoors, even on cloudy days, to protect her eyes from fluorescent lighting in malls, stores, and most commercial and governmental buildings everywhere. When required to be in a fluorescent lighting environment, she needs to be close to the windows to get as much of the natural light as possible, while wearing her sunglasses indoors. Years after the author met this person, she wonders whether fluorescent full-spectrum lighting at the office would allow the insurance agent to return to the office? The question is what frequencies were bothering her — and would full-spectrum lighting benefit her or are EMF frequencies that fluorescent lighting has in general making her ill, regardless of the bulb.

Type of ES patient: Incitant was EMF exposure to fluorescent lights

Case 3: Person with a Master's degree developed multiple chemical sensitivity followed by electrical sensitivity, in 1981. Her MCS has diminished somewhat over time, but she develops movement disorder, then paralysis from some EMF exposures. She says it mimics some of cerebral palsy or Parkinson's disease symptoms. In addition, severe seizures occur upon exposure to generators, transformers, elevators and other higher EMF emitters. One attack has been documented in an EMF video.[30] During filming, she walked up to a building — her neurologist's office — walked in, and when she got near the elevator, had a seizure. It took assistance from the video's producer to prevent her from bumping her head during the seizure and to get her out of the building, as she could not function then without help. She maintains that EMFs are biologically active and that we, as a society, must reduce EMF exposure to protect everyone's health.

She has Social Security benefits due to her functional disabilities near EMF, chemical, and smoke exposures.

Type of ES patient: Person with MCS

Case 4: A woman with chronic fatigue syndrome and multiple chemical sensitivity wrote the author about a reaction she had with her new computer monitor. Right after she started using the computer, she developed a skin rash on her face and her eyelids were puffy. She used the words "burning sensations" to describe her symptoms.

After she discontinued using the computer and returned it to the dealer, her rash and puffy eyelid symptoms went away.

Type of ES patient: MCS patient and computer user

Case 5: A teacher wrote to the author about having multiple chemical sensitivity, from which both ES and sun sensitivity also developed. She is housebound, as she cannot get into any car due to the reactions which develop there. A car can have many chemical exposures, plus EMF exposure due to the motor running. Also, ES patients can become sensitive to metals which make them react to metal enclosures, like cars. (See Metal Sensitivity, page 42.) When an ES patient is reacting to something like chemical or EMF exposure, they can produce electrical signals that bounce back to them when in metal enclosures.[9, 10] These rebounding signals make the ES patient's reactions worse. Essentially, then we have a type of autoimmune problem happening in these cases; the patient is allergic to themselves, or their own signals. Also, this patient mentioned not being able to touch her refrigerator, stove, or even the water faucet without getting a reaction.

In England, a published report on ES patient testing noted that it is not uncommon for ES patients to say they feel electric shocks when touching home or office appliances.[4]

This patient cannot use a phone, due to the EMF exposure.

Type of ES patient: MCS patient

Case 6: A male ES patient wrote the author, noting an intense reaction in his heart when applying the hand-brake on his bicycle. He may be reacting to the sound frequency of the brake upon application. (See Sound Sensitivity, page 37.) Rather than sound sensitivity, he felt it was a type of metal sensitivity and that his aluminum brake was attracting and transmitting EMFs. One or both factors may be what makes him react.

Type of ES patient: Computer user

Case 7: Computer user describes a skin rash on her legs. Works in close quarters with many other computer users. Wonders whether the computer disk drive box on the floor at her feet is contributing to her skin rash. The dermatologist does not know what is

causing her rash and cannot help her.

This employee notices that she feels heat sensations on her chest when using the office's microwave oven. She is concerned about the oven and has expressed her concern to co-workers, who do not notice anything wrong. She told the author that several co-workers are pregnant and use that microwave oven.

Employers take note: Have you checked the microwave emissions of the office microwave oven lately? Older ovens can lose their door seal or get dirt and crumbs in the seal, causing microwaves to escape. Microwaves cook food. This is intense radiation that can permanently harm an unsuspecting person. Microwave ovens should never be operated with the door open. Microwave ovens are not suitable for children to use. In addition to possible microwave emissions, many microwave ovens emit significant power-line type radiation at operating distances. (See Magnetic Field Readings from Common Home Appliances, page 82.)

Microwave ovens should be periodically checked for microwave emissions and repaired/cleaned/replaced, if emitting unacceptable microwave levels based upon the measurements. ES patients would do best to avoid microwave ovens altogether, due to the EMF exposures.

Type of ES patient: Computer user and high EMF exposure to microwave oven.

Case 8: A nurse administrator in an out-patient clinic, also a computer user, began having nausea, headaches, intense fatigue, difficulty concentrating, chest pain, and dizziness at work the week energy efficient lighting was installed. Also that week, her building was evacuated due to a chemical smell.

She developed such severe reactions that she went on sick leave and camped out in the pasture near her home to avoid EMF and chemical exposures as much as possible.

Food sensitivities, allergic-type reactions to certain foods, also became apparent. Sugar, alcohol, and caffeine are particularly troublesome for her. Wearing metal jewelry, watches, and being in close proximity to batteries accelerated the electrical sensitivity.

This nurse has been frustrated that conventional medical doctors seen early in her

search for answers did not understand her ES and their formal remarks of disbelief cost her health insurance denials and worker's compensation benefit denials.

Months after the onset of symptoms and these denials for benefits, she did find and receive care from an M.D. specializing in Environmental Medicine. This physician is familiar with electrical and chemical sensitivities and treated her for chemical sensitivities.

When her sick leave and vacation time were used up, she had to return to work or risk forfeiting her job altogether, with no other means of income support. Her environmental medicine physician allowed a trial return to work; she relocated to another area of the building.

While managing her symptoms through avoidance of EMFs and chemicals, and treatment for MCS, she can function to some extent. Symptoms flare-up, however, when leaving her new office to communicate with other employees in her normal work capacity.

Type of ES patient: Computer user, high EMF exposure to new fluorescent lighting, and possible MCS co-factor.

There is a great need for acceptance of ES on federal and state levels to insure that ES patients can get much needed services now denied them: Social Security, worker's compensation, protection under the Americans with Disabilities Act, low-income housing needs, removal of electronic barriers for access to public buildings, etc.

Opinion on Symptom Effects

Many complaints of ES surround heat reactions, feelings of pain and pressure, and organ disfunction. Some published ES reactions were severe enough to cause coma or death.[4]

The author believes that body weaknesses, in whatever form, are the areas/organs most susceptible to ES reactions in an ES patient. When EMF exposure produces induced electric currents, where these currents are impeded may be where the heat reactions, pain, pressure, and organ disfunction are occurring. Chemical or metal

concentrations in those areas may be a factor. Cancer, pre-cancerous conditions, chemical damage, burns (from fire, sun, or radiation), injuries, metal implants, etc., could be other pre-existing conditions leading to localized ES reactions at that site. "Hot spots" mentioned in connection with ES may have been initiated by radiation exposure concentrated near or projected from electrical equipment; *hot spot* is an electronics term.[62] Cancer is medically known to limit dissipation of heat, which may lead to some ES-type heat effects from EMF exposure.[63] The nervous system of the body may in some cases become irreparably damaged by chemicals or radiation exposure, resulting in severe neurological ES symptoms. This theory needs to be scientifically explored.

Diagnosis of Electrical Sensitivity

A difficult part of any environmental illness is sorting out the possible causes of reactions. Allergic-type reactions to foods, chemicals, and electromagnetic fields all need to be isolated. Further sensitivities may involve symptom responses to sounds, changes in the weather, sunlight, all light, metals, watches, other people, amalgam dental fillings, and/or geopathic stress.

Sound Sensitivity:

Sound sensitivity means that a person is extremely sensitive to sound. Certain pitches or frequencies of audible or inaudible sound cause the person feelings of stress or ill health. With sound sensitivity, noises may sound louder and more piercing than they really are.

Sound waves are a type of radiation called acoustic radiation. In medicine, ultrasound can take pictures of soft tissues, instead of x-rays. Ultrasound means sound above the level we can hear.

Some types of electronic products, like computer monitors, produce ultrasound.[2, 53] A number of people have reported hearing a sound at computer monitors that others cannot hear. They may be detecting sound frequencies that people normally cannot hear. Sweden's TCO labor union notes that high frequency sound at and above 16 kHz (16,000 Hz) can be a troublesome noise, particularly for young computer users.[123]

Of interest is the fact that carpal tunnel syndrome (CTS) is medically known to be at higher risk where repetitive motion, temperature, force, or vibration are extreme. Ultrasound is a type of mechanical vibration occurring at the computer monitor.[71] All radiation, including ultrasound, produces heat. The most common way CTS occurs is by tendon inflammation which compresses the median nerve. Heating the body by ultrasound or other radiation may possibly lead to such inflammation or contribute to it.

Headaches and nausea have been reported by the International Radiation Protection Association (IRPA) when certain people use ultrasound cleaning tanks or approach commercial buildings having an ultrasound intrusion alarm. Fatigue, tinnitus, and ear pressure are other symptoms the IRPA also related to ultrasound exposures. Consumer products that use ultrasound include garage door openers, some alarms, some remote controls, electronic pest repellent, and guidance devices for the blind.[71]

You can become sensitive to sounds that you cannot hear because sound waves, like EMFs, are a stressor to the human body. When a person becomes ES it is possible that they may become sound sensitive also. Avoidance is the key with all sensitivities. If you suspect that something is bothering you, avoid the possible incitant to see if that avoidance helps you feel better.

Weather Sensitivity:

If you can feel a storm coming, you may be weather sensitive. Certain people feel ill or stressful a day or two before a weather front arrives, then feel relaxed and relieved when the storm comes. With thunderstorms, the stressful feeling may not pass until the weather calms.[72, 115]

Weather changes affect the concentration of positive and negative ions in the air. Ions are microscopic charged particles. Positive ions are considered stressful; negative ions are relaxing. Air normally has a positive and negative ion mix, with mountains, forests, ocean beaches and waterfalls having a high level of negative ions in the surrounding air. Negative ions are related to friction between the air's moisture content and the wind, while positive ions are related to dry, warm winds.[51]

In the 1970's, Felix Sulman, M.D. at Hebrew University, Hadassah Medical Center in Jerusalem, Israel found that the neurotransmitter serotonin is released in the body after high positive ion exposure. About the same time, Albert Krueger, M.D. at the University of California, Berkeley, California also found that positive ions were unhealthy in large concentrations while negative ions did not cause the release of serotonin in the body.[51, 72, 115]

Dr. Sulman's work demonstrated that serotonin release caused several unhealthy symptoms: headache, problems swallowing, dizziness, itchy eyes, breathing problems, and itchy/burning/dry nose.[51]

Before a storm, positive ion concentrations increase while after the storm negative ions increase. Weather sensitive people may be reacting to the higher concentration of positive ions.[105] Another possibility that ES patients may notice is ill health just prior to and during a thunder and lightning storm. The changes in air electricity other than ions can be a factor in causing ES-type reactions to weather. Areas with frequent or harsh storms can be quite disturbing to the weather sensitive person. A mild climate with little seasonal change may help to minimize the weather "spells".

Areas in the United States that have particularly harsh positive-ion creating winds are the Chinook winds in Montana and the Santa Ana winds in California. Foreign winds considered unhealthy to the weather sensitive include the Foehn in Germany and Switzerland and the Sharav in Israel, among others.[51, 72, 115]

Indoor environments are also often sources of high positive ion counts due to electrical equipment, poor air quality, and inadequate ventilation. Office environments are prime examples of places where serotonin release symptoms can occur.[51, 115]

Sun Sensitivity:

Sun sensitivity could present itself as a general feeling of illness, or an intense heat reaction on the skin, when sun exposed. Sun sensitivity differs from light sensitivity. With light sensitivity a person is ill when reacting to *any* form of light, not just sunlight.

Some pharmaceutical drugs can cause a temporary sun sensitivity. The prescribing

doctor would generally advise you to stay out of the sun while taking that type of drug to prevent a severe sun reaction. Chemically induced sun sensitivity may diminish or disappear over time.

Sun sensitivity is really an EMF sensitivity because visible light and ultraviolet are part of the electromagnetic spectrum.

Anecdotal accounts of sun sensitivity indicate a relationship to silicone breast implants that leaked. This could be true as silicone is related to silicon which is used in energy solar collector panels because of its sun sensitivity.

Severe sunburns may lead to sun sensitivity of the skin where the burn occurred. Sunburn induced sun sensitivity can also lead to localized ES at the damaged skin sites. Induction heating by EMFs can cause significant discomfort where heat dissipation is restricted, like old sunburns.

Another way sun sensitivity appears is with the autoimmune disease called *lupus*. Symptoms of lupus include any or several of the following: achy joints, fever over 100 degrees Fahrenheit, arthritis, prolonged fatigue, skin rashes, anemia, kidney problems, chest pain when deep breathing, butterfly-shaped rash across cheeks and nose, sun sensitivity, hair loss, white or blue color in cold fingers, seizures and/or mouth ulcers.[83] An important cross-over are three of these symptoms which are not unusual in ES patients who were prior computer users: skin rashes, butterfly-shaped rash across the cheeks and nose, and sun sensitivity. When lupus is limited to the skin it is called discoid lupus. When other organs are also involved the term is systemic lupus erythematosus (SLE). Lupus is fairly common, but not well known. One person of every 185 in the United States has lupus.[83] MCS patients may have lupus (SLE) symptoms; lupus sometimes has chemical exposure beginnings, particularly trichloroethylene (TCE), a solvent.[82, 94] When isolating factors involved in a person's illness, the doctor may need to consider whether the diagnosis of lupus fits the symptom picture. With discoid lupus, sunscreens are used to reduce rashes when sun exposed. Generally, lupus patients are not known to be electrically sensitive, only sun sensitive. However, discoid lupus patients do react to

ultraviolet exposures from fluorescent lights and older television sets.[25]

Sun sensitivity may also be related to the disease porphyria. (See Light Sensitivity below.)

Staying out of the sun is your best defense against sun sensitivity reactions. One way to do this without becoming housebound is to relocate to an area with lots of cloudy days, like Oregon or Washington. Severely sun sensitive people may not be able to comfortably go outside even on cloudy days.

Light Sensitivity:

The inability to tolerate light — daylight and artificial light — is called photosensitivity. Visible light is a form of electromagnetic radiation. So, light sensitivity could loosely be defined as a form of ES. Photosensitivity sometimes accompanies ES, particularly in the severe forms of ES.[19, 23] Light sensitivity generally involves either nerve stimulation making the eyes squint or hurt when light exposed, or skin problems manifesting when light exposed — pain, burning, etc.

Porphyria is a disease which can produce both sun and light sensitivity. Toxic chemical exposure is one suspected cause of porphyria; however, traditionally it has been considered a genetic disease of enzyme deficiencies. Some multiple chemical sensitivity symptoms may overlap porphyria symptoms. According to the Swedish National Institute of Occupational Health in Solna, porphyrinuria (porphyrin present in the urine) is due to a malfunction in hemoglobin breakdown.[23] An important point to note here may be that chemical pollutants called nitrates from fertilizers can change the chemical structure of hemoglobin, which prevents hemoglobin from refreshing the body's tissues with oxygen.[7] Perhaps nitrate exposure in particular is a factor in the development of porphyria. Neurological and skin diseases are a common result of porphyria.

Photosensitivity is known to be related to exposure to coal tar derivatives, because coal tars are active in the visible light range of the electromagnetic spectrum as determined by spectrum analysis.[114]

ES patients with the most severe light sensitivity live in near darkness, as they

cannot tolerate anything brighter than a candle without ES symptoms.[23]

An opposite reaction to light, when patients live in areas with diminished sunlight, especially in winter, is called Seasonal Affective Disorder (SAD). SAD is characterized by depression on cloudy days that dissipates in sunny weather. Where sunny weather is sparse, full-spectrum light bulbs have been used therapeutically to alleviate SAD symptoms.[36, 70] Full-spectrum lighting simulates sunlight. Incandescent light bulbs, in general, have less harmful electromagnetic emissions than the fluorescent bulbs. SAD has not specifically been shown to be related to ES, as with ES, the avoidance of various energy fields is necessary.

Epileptic seizures can occur from exposure to flickering lights, strobe lights, fluorescent lights, computer screens or other pulsating lights.[2, 92] When epilepsy is light-related, it is called photosensitive epilepsy. Young children using video games have developed this epilepsy worldwide. Photosensitive epilepsy is reportedly caused by brain wave interference from flash frequencies between 10 Hz - 43 Hz.[2]

Metal Sensitivity:

Electrically sensitive patients often are sensitive to metals. Metals have absorptive and reflective properties in the presence of EMFs. Metal can act like an antenna to attract and send EMFs. This antenna-effect is particularly noteworthy with metal-containing items worn on or in the body: jewelry, glasses, dental fillings, and surgically implanted pins and plates. (See Amalgam Dental Fillings, page 44.) ES patients have had reported difficulties with all metals listed above.[2, 9, 10] An ES patient's environmental medicine doctor might feel it necessary to do allergy testing for "allergic" reactions to liquid injections representing basic metals the person may be in contact with internally or externally.

A side issue here is whether the person has toxic metal (aluminum, lead, mercury, etc.) overexposure as represented by a blood test. Metal storage in the body might be a reason for ES in some cases, but this point has not been scientifically demonstrated as yet. Working with metals, metals in drinking water, metal dental fillings, metal cookware and

copper (or other metal) water pipes in the home can all contribute to the presence of metal in the patient's body.[105] About 10% of MCS patients at the Environmental Health Center, Dallas, Texas had intracellular metal deposits.[94]

Patients being allergy tested in rooms with porcelain-on-steel walls to diminish chemical sensitivity reactions may have reactions due to the metal walls. In England, it has been reported that medical tests of ES patients may require placing a glass bottle/plastic bucket of salt water in the testing room to help absorb electromagnetic fields in the room that are bouncing off the walls. (One handful of table salt to two gallons of water was used.)[10]

Everyone is electromagnetic. When ES patients are having an environmental reaction, they emit EMF signals. It is these signals that can bounce back to them and further make them sick because of the presence of the metal walls. Metal enclosures such as automobiles may also contribute to their symptoms for the same reason.[9, 10]

If you find that your house has high EMFs and you move or correct the problem, you may find that your bed's mattress springs have been magnetized by the EMF exposure. Checking the mattress with a compass should show the compass needle pointing only north, otherwise magnetic disturbances exist in the metal springs. Metal bed frames can produce magnetic and EMF attraction problems too. A way to avoid metals when sleeping is by using a natural futon mattress with a wooden bed frame.[39]

Reactions to Watches:

People with ES can become so sensitive that they cannot wear a watch, particularly battery-operated LCDs or metal watches. The battery-operated watches and LCD watches have an energy that can be troublesome for the ES patient.[105] The metal watch could be a problem because of the metal's EMF attraction/reflection problems.

An interesting counterpoise is when someone cannot wear watches at all because watches stop working or break when that person wears them. A United States medical survey by Melvin Morse, M.D. at the University of Washington questioned over 400 people who claimed to have had a near-death experience as a child (seeing a "light" or

tunnel while unconscious in an extremely ill state). One question they were asked was whether they had problems with lights, electrical appliances, or watches. More than 25% of the respondents reported that they could not wear watches because the watches stop when worn.[90] Perhaps a case of strong EMFs from the person is affecting the watch. (See The Other ES Symptom, page 18.)

Reactions to People:

Under medical testing and evaluation of ES patients in England, it was reported that if several patients were tested for EMF reactions in the same room, it could become difficult to ascertain whether the person was reacting to the EMF frequency being tested or to other patients reacting in the room. Patients who are reacting to environmental chemicals or EMFs can send out strong EMF signals during the reaction phase. Also, some people can emit signals that disturb an ES patient without being ill themselves.[9, 10]

Reactions to Amalgam Dental Fillings:

Silver amalgam fillings are made with silver and mercury. Mercury is a well-known poison, but silver amalgam fillings have not been conclusively scientifically accepted as poisonous. However, silver amalgam fillings are sometimes related to MCS symptoms.[106] ES patients who have metal dental fillings may experience tooth or mouth pain due to EMF exposure. Also, the metal mixed with EMFs cause mercury to be released, particularly if other metal, like gold, is also in the mouth. The combination of metals produces an electrochemical reaction, releasing the mercury from the amalgam fillings.[13]

A booklet from Sweden's FEB group documents a study performed by an engineer and an orthodontist that revealed computer monitor radiation exposure can increase the release of mercury in silver amalgam dental fillings.[14]

Some people sick from their amalgam fillings have them removed and replaced with non-metallic fillings. ES patients from Sweden have reported that replacing amalgam fillings with non-metal ones makes them feel better in some cases.[1]

Having the amalgam fillings removed may make the patient sicker at first due to

mercury leakage when removal occurs. Removal may need to be done in stages if the person is very ill.[13]

The body can store mercury accumulations after the amalgam fillings are removed. One Swedish man recovering after having his amalgam fillings replaced reportedly takes the mineral selenium daily to help remove any residual mercury contamination in his body.[13] Selenium has been shown to help the body detoxify heavy metals like mercury.[28]

Whether amalgam fillings are a cause of ES is not clear but it is certainly not the only cause. ES has occurred in patients who do not have *any* type of dental fillings.

A medical notation from the homeopathy sector of alternative medicine indicates that homeopathic mercurius solubilis is sometimes used by homeopaths treating patients ill from their amalgam dental fillings.[103]

Reactions to Geopathic Stress:

Geopathic stress means natural magnetic field gradients in the earth — energy disturbances in the earth itself, relating to soil composition, subterranean water, magnetic field abnormalities within the earth, etc.

Some people believe that prolonged exposure to geopathic stress can lead to cancer and other illnesses.[5, 6, 38]

Geopathic stress may be troublesome for some ES patients as an article from England regarding ES diagnosis notes that geopathic stress at the testing site may affect testing results.[10]

How do you find geopathic stress? The question is not easily answered. One possible way to locate geopathic stress is by dowsing.[38] Does dowsing really work? Some natural gas utility companies in the United States have used dowsing to locate their hidden gas lines. Dowsing is not 100% reliable but it can work to locate underground springs, buried utility lines and other disturbances in the earth that create magnetic field gradients.[32] The person holding the dowsing rod(s) appears to be responding to very small changes in the earth's magnetic field scientifically measurable by magnetometers.[38, 67]

In diagnosing ES, a medical doctor who specializes in environmental medicine is often helpful to sort out the possibilities with the ES patient. (See Medical Resources, page 72.) Determination of specific food and chemical incitants may also be helpful by allergy testing. One scientific evaluation of MCS patients noted that 80% also had food sensitivities, and 90% had water sensitivity, requiring purified or spring water.[94] Diseases that are common to environmental illness patients should be watched for by the attending doctor — chronic fatigue syndrome, candida yeast, Epstein-Barr Virus, etc.[47] Fatigue is common with any environmental illness. Stress factors accompanying the illness may need attention also.

Electrical sensitivity is difficult to diagnose as the connection between the cause of the patient's symptoms and their symptom picture may not be easily apparent. Therefore, their doctor may be treating the symptoms without an understanding of the symptoms' cause.

Keeping the prior list of other/related sensitivities in mind, EMF provocation testing can reveal ES cause and effect responses to disturbing EMF frequency exposures.

In Sweden, EMF provocation testing was done in an electrically insulated room. Random EMF exposures were at 50 Hz and 20 kHz (20,000 Hz) (the two primary computer frequencies in Sweden). Fourteen ES subjects were tested by scientists from the National Institute of Occupational Health, Solna and Sweden's National Institute of Radiation. This joint study found better than random results from three of the test subjects, who individually indicated when the EMF exposure was on and when it was off.[23]

Why all of the ES subjects did not have better than random test results could be because of delayed reactions, prolonged effects, and the fact that some ES patients and symptoms have a more clearly apparent cause and effect pattern in the presence of EMFs. For example, the onset and diminishment of pain reactions — headache, tooth/mouth

pain, muscle/joint pain, skin burning, pressure in the ears, etc. — may be more clearly apparent to the patient than the onset and diminishment of fatigue, sleepiness, depression, etc.

In England, at least sixty ES patients have been medically tested for EMF sensitivities by the use of a frequency oscillator with a range of .1 Hz - 10 MHz (10,000,000 Hz). EMF leakage from the oscillator is used to determine what frequencies the person is sensitive to. Their symptoms can be clinically neutralized by switching the EMF exposure to a non-reactive or less-reactive frequency. Therefore, cause and effect relationships between EMFs and ES patients can be clearly shown. These test results proved that what could be induced electromagnetically, could be neutralized electromagnetically, just as in allergy testing chemical reactions are induced and neutralized chemically. Also, they found that reactions chemically induced could be neutralized electromagnetically at a non-reactive frequency. Further, reactive EMF frequencies could sometimes be chemically neutralized by injection of the patient's individualized non-reactive chemical antigen usually used to reduce chemical or food allergies. Some ES patients reported correspondingly similar EMF reactions as with their food or chemical allergies. They noted having "a perfume reaction", "a milk reaction" or even "a thunderstorm reaction" from specific EMF-reactive frequencies.[4, 9, 10]

Because ES patients could not easily be EMF neutralized with non-reactive EMFs at home, another way of neutralizing EMF reactions was sought. An experiment was conducted by placing vials of pure water in the patient's EMF neutralizing frequency for five to fifteen minutes. Later, when the ES patient held the vial of charged water, their reactions were neutralized just as if the oscillator was turned on to that neutralizing EMF frequency. Initial findings show that the charged water will hold its charge at least two weeks, so patients can take vials home for use when an EMF reaction makes them ill.[4, 10]

One concern the author has with EMF neutralization in whatever form it takes is that potentially the neutralizing frequency could make the patient sensitive to that frequency too, just like overexposures to certain foods, chemicals, etc., can cause

allergies. This concern is warranted in part by the English study's findings that, over time, the EMF sensitizing dose may need to be changed — in other words, it becomes a reactive frequency. Therefore, as suggested by one of the testers, several vials of neutralizing charged water, each charged at a different frequency, could be rotated as needed to minimize possible allergic reactions to just one vial.[10] Similar charged water experiments have also been done with ES patients at the Environmental Health Center in Dallas, Texas.

In the United States, diagnosis of ES patients was further demonstrated by the use of a binocular iriscorder to examine the patient's eyes while EMF exposed. This test is called a pupilography. The iriscorder device determines when and at what rate pupil dilation or constriction occurs. Comparing the changes in the eyes to EMF reactions in patients produced a direct correlation. When the ES patient was reacting to EMF reactive frequencies, the left and right eyes simultaneously dilated. At other frequencies pupil dilation was not synchronized. The doctors administering this test concluded that the EMFs were interfering with the body's autonomic nervous system at each individual's reactive frequencies. Study results showed neurological symptoms as dominant.[102]

Provocation testing must be carefully done to ensure other contaminants in the area are minimized. The room should be environmentally clean of chemical and electromagnetic co-factors that could interfere with test results.[4, 10, 102] Care should be taken that the patient is minimally exposed to reactive EMFs, as continued testing sensitizes the ES patient to more reactive EMFs, and diminishes the patient's health further. England's ES medical team notes that medical staff need to be present and prepared during EMF provocation testing.[10]

ES Legal and Economic Tangles

After the patient is diagnosed as electrically sensitive, legal and economic problems become apparent. In an ordinary illness, if the cause was work-related then worker's compensation would be pursued. If the illness was severely disabling, but not work-related, Social Security benefits would be pursued. A private disability insurance claim could be filed if available. But, ES is not yet a medically recognized illness in many ways and therefore traditional health/disability insurance payment, legal avenues, and federal/state benefit programs are difficult to access.

The chemically sensitive have had the same scientific/medical/political roadblocks as the electrically sensitive and have made some strides in accessing proper medical/legal/governmental help. If you are ES and MCS, the path may be easier, as these roads have been successfully crossed by other ES/MCS patients. Some MCS patients were able to get Social Security benefits after being diagnosed as having "environmental illness" or "immune system disregulation".[86] (See Medical Resources, page 72.) Check with Social Security regarding your individual case.

Social Security benefits can take up to two years to get, usually with a five month minimum wait. Of course, two years is a very long time for a seriously ill person to wait with no economic assistance in the meantime. The Lupus Foundation of America, in particular, has been pressing for reduction of the two-year Social Security and Medicare wait for its members under their health care reform agenda.[84] So, the environmentally ill are not the only ones waiting up to two years for benefits. Streamlining of this governmental process is certainly necessary.

ES needs to be specifically included under the umbrella of environmental illness for Social Security and other benefits in future public policy. Further, we, as ES patients, need insurance reimbursement under traditional medical insurance plans when we use an environmental medicine specialist. Currently, this is not happening and medical care is generally out-of-pocket no matter what insurance coverage the ES patient has.

Legal roads regarding product liability and injury are very new in the EMF area.