

What ES is and what produces it

Our electromagnetic environment is becoming much more complex very rapidly with the introduction of new technology. We believe that sensitivity may develop as a result of exposure to one external source, or it may not begin until the person has been exposed to multiple sources, either simultaneously or sequentially. Finding people who are unexposed to the modern technology for the purpose of research comparisons, is getting harder and harder. The only people who may meet the requirement of being unexposed may be people from a developing nation, whose genetic make up and lifestyle will be so different as to make the comparison useless. Often the results of experiments are not available till about 3 years after they started, when the situation has already changed (often dramatically) for the people who took part in the experiment, as well as everybody else. No wonder the scientists disagree about research results.

Much of the experimental work has been done in laboratory conditions. Laboratory experiments often only use one source of exposure, which is becoming increasingly unrealistic these days. They also do not take into account the fact that physiological reactions may be immediate, but they can also take some time to develop. If more than one test is done on the same day, the symptoms can take some hours to diminish and this is unlikely to be taken into consideration. Animals are sometimes used in laboratory studies because their shorter life span means that any biological changes should show up more quickly. We do not know whether animals will react in the same way to such environmental stimuli as humans.

ES is and the problems of diagnosis

It seems that women are the ones who feel, or report, symptoms of ES more than men, and that there are significant day to day variations in their sensitivity (Hillert [2002](#), Leitgeb [2003](#)). People with ES tend to be in lower-paid employment (with different working conditions) or even unemployed. This was confirmed by the Irish Doctors Environmental Association (www.ideaireland.org/emr.htm) who reported that half the people with ill-health effects as a result of living near to mobile phone base stations were unable to work due to the severity of the symptoms. They also led a very restricted social life, feeling like 'prisoners' in their own homes, which were not always comfortable places for them to be either.

Furubayashi ([2009](#)) found that women who had mobile phone-related symptoms who took part in the study experienced more discomfort, regardless of whether they were actually being exposed to additional EMFs or not. Most ES people who take part in research studies find that the journey to the study centre sensitises them due to the exposures in transit, and their sensitivities at the start are at a higher level than the control subjects. This difference is rarely measured, and so the results of the experimental investigation can be misleading.

Access to medical services can be very problematic for sufferers of ES. It is not just hospitals that are almost impossible to enter due to the EMF pollution levels, but also dental practices rely heavily on fluorescent lighting (intolerable to most ES people) for good visibility. Halogen lights commonly used in practices are basically bright filament lights and should not be a problem as long as the transformer is some distance from the patient. It is unclear what effect these may have on people who have become photosensitive.

Fluorescent lights are used in most buildings with public access and public transport. Neighbours who are 'ham' radio operators can make an ES neighbour's life almost unbearable. A nearby lamp-post height mobile phone mast can make a house uninhabitable by an ES person. They may

not even be able to go down a road where one of these masts is situated. This makes living a 'normal' life almost impossible in severe cases of ES.

Cars have electrical and electronic equipment that can disturb electrically sensitive people, especially in the front seat. We have a freely available article on cars. <http://www.powerwatch.org.uk/library/downloads/cars-20090210.pdf> which has much more detail.

Allergy/functional impairment

Kjell Hansson Mild, of the National Institute for Working Life in Sweden, has done quite a lot of research into ES and he believes that there is a proportion of the population which is more sensitive to environmental influences, and likely to develop more than one idiopathic (allergic) reaction. As well as food allergies, people may also suffer from asthma or hay fever or other response to an identified allergen. People who react to a particular allergen are more often sensitive to other provocations, for instance from foods, perfumes, plants, etc. This may be the subgroup in which the majority of ES people fall, although certainly not exclusively. Mild has co-authored papers with Lyskov ([2001](#), [2001](#)) and Sandström ([1995](#), [1997](#), [2003](#)).

According to a Government report in July 2006 about a third of the population, approximately 18 million people, will develop an allergy at some time in their lives. The rise in the number of allergy sufferers has been linked to oversensitive immune systems. There are six major allergy centres in the UK, all in the south and south-east. Training in allergy recognition and treatment is minimal or non-existent.

Many electrically sensitive people seem to have quite dry skin and can carry high electrostatic charges on their body. Not only can other people experience a 'zap' when touching the person, but the electrostatic charges can also be transferred to electronic equipment causing equipment to malfunction. If you experience these problems, then you should wear clothes and shoes made of natural materials or even special conductive clothing and footwear that is made for workers in the electronics semiconductor industry. You need to have flooring that is made of natural material, as you build up static charges every time you move your feet.

A hospital in Sweden has banned workers from wearing Crocs slippers after learning that the popular footwear can build up static electricity. They found that it interfered with medical equipment after two pieces of respiratory equipment for premature babies shut off for no apparent reason. The mysterious power outage was linked to the plastic slippers worn by members of staff. The slippers were capable of becoming charged with an electrical charge of up to 25,000 volts (reported in The EMC Journal July 2007).

There is a wide variation among non-ES people in the amount of electric potential they produce in the course of the normal functioning of the body. Added to this is electrostatic charge build up in rooms where there are furnishings, especially carpets, made of man-made materials (the charge from which may be made worse by the dry atmosphere encountered within houses or offices with central heating and inadequate humidity or ventilation). Another common place for even non-ES people to experience a high electrostatic charge is when sliding across the seat cover (made of man-made material) to get out of a car. This charge is then discharged on the metal of the car, giving rise to a small shock. This is normal, but can be somewhat unpleasant. The way to prevent it is to hold on to the metal door frame as you shift across the seat to get out.

For ES sufferers living in a high EMF environment, it is like a person with auditory sensitivity trying to carry on normal life with someone shouting in both ears all the time.

What produces ES?

Electrical hypersensitivity is a combination of up to three factors:

- a natural sensitivity, similar to other idiopathic or allergic reactions, which is not common in (or, at least, not typical of) the general population. There are about 12 million allergy sufferers in Britain and the number is increasing all the time.
- sensitisation by some trigger, which could be one or more of a variety of commonly encountered substances.
- sensitisation by some incident, which has the capability of damaging the bioelectrochemical communication within the body.

Most research studies have not found a direct link between electromagnetic fields and ES. One person with ES reported that when he was on holiday, he was about 200 metres from a 400 kV powerline. His meter consistently showed 6 nanotesla (nT), yet he felt his ES symptoms most days. He also had a nosebleed when in a classroom where the magnetic field level jumped to 300 nT (0.3 microtesla). He feels increased blood pressure/ thumping in the neck above 50-60 nT.

Chronic environmental overload, both physical/chemical and psychosocial, when added to genetic predisposition and chronic or acute illness (e.g. viruses have certainly been implicated in some environmental syndromes) increase a person's susceptibility and contributes to the development of electromagnetic sensitivity symptoms.

A research study by Hardell ([2008](#)) reported that the concentration of persistent organic pollutants (POPs) was higher in people with ES than in the control group.

The World Health Organisation's Dr Michael Repacholi, co-ordinator for the International EMF project says *"we are aware that certain people are more sensitive than others, and research should concentrate on studying this group and their symptoms."* One theory of susceptibility includes a belief or suspicion that ES is brought on by a latent brain injury, which predisposes some to become ES, in a similar way to that which can predispose to epilepsy.

One ES sufferer found that a significant proportion of other ES people who she was in contact with had suffered damage to the back, often from car accidents. This jarring to the spine led to an imbalance in the cranial fluid cushioning the brain, which may have resulted in a decreased ability of the brain to deal with external stimuli, causing it to go into spasm. It is not clear what effect this would have on general biological functioning, but it may well explain some of the differences in symptoms experienced by ES sufferers.

In one family a mother and daughter both suffer from ES, and in another a mother and two daughters all suffered from ES. This may indicate not only a genetic susceptibility, but possibly an inheritable genetic susceptibility. Whether it is linked by gender is another interesting question. This possibility has implications for being careful and informative with the children (of the same sex?) as a parent who is ES, and ensuring their environment is not going to present the trigger for an onset of ES.

In the early seventies, the first ES cases were identified and became a matter for public discussion and concern. Dr Robert Becker pointed to similarities from a neurological standpoint, between symptoms of chronic fatigue syndrome, multiple chemical sensitivity syndrome (MCS), and ES. They result from a breakdown of the body's systems for dealing with stress. Research suggests

that EMFs can affect biological functions by their influence on the production of neurohormones and which act as a biological stressor.

Dr Bill Curry, a US based EMF physicist and bio-effects expert, believes that whilst there is an effect of genetic variability, anyone subjected to microwave radiation on a chronic basis will eventually become electrosensitive. The symptoms often are not immediately recognized by the injured person as having been brought on by EMF or chemical exposure.

A host of conditions have been clustered under the umbrella of environmental illness, including multiple chemical sensitivity (MCS), cancer, chronic fatigue syndrome (CFS), ME (there is some evidence that ME can be triggered by electric fields), sick-building syndrome (SBS), asthma, candida-related complex, fibromyalgia, and ES.

Those who suffer from both MCS and ES have found that the symptoms which they feel after either electrical, microwave or chemical exposure are essentially the same; they are frequently unsure as to which type of exposure brought the symptoms on.

Does the technology start off some illnesses or do the effects of the illness(es) make people more sensitive to the effects of the technology and therefore liable to experience more irritation/effects? Or does the technology invoke symptoms of illnesses which the NHS misdiagnoses?

The Doll-Hill (1956) smoking risk figures were re-examined by Sam Milham (1998). The Relative Risk (RR) for heavy smokers with respect to non-smokers is 23.7; compared with light smokers it falls to 3.5 and with medium smokers to a mere 1.9. These are typical RRs we see in many epidemiological studies into possible EMF related adverse health outcomes. We are all exposed to light or medium levels of EMF pollution, so even if EMFs cause a lot of chronic health problems, they would be unlikely to stand out from the background noise in whole, or random, population studies.

For example, say that 3% of the population have tension-type headaches caused by exposure to a particular EMF frequency, but the other 97% do not. Say also that we are looking at chronic headaches that occur daily in 3%, and weekly in about 15%, of the UK general population (NHS data, excluding migraines) due to other, usually stress related, causes. We then split the population into two groups, one that we believe are regularly exposed to this particular EMF, and one who are not. This process is itself, very subject to a large degree of error due to the crude methods we have in assessing EMF exposure over large groups of people, but let us, for now, assume we could perfectly do this separation into the two groups.

In the 'unexposed' group we would have a frequent headache occurrence of somewhere between 5 and 10%, say 7.5%. In the 'exposed' group we would still have this 5 to 10% from other causes plus an additional few % from the electrically sensitive people. This would be less than the 3% figure, because evidence suggests that people who are ES often also react adversely to other environmental stresses. Let us say an extra 2% of the 'exposed' group would develop headaches. So the chance of someone developing a headache when exposed to this EMF would apparently increase from 7.5 in 100 to 9.5 in 100, a Relative Risk of only 1.3 which is non-significant and completely lost in the natural variation of 5 to 10% (0.7 to 1.3) of the unexposed population. Anything less than a doubling in incidence will certainly be ignored by regulators and it is usually necessary to have a three or four-fold increase in incidence before stricter guidelines are introduced. However, 3% of a population of 61 million people (approx UK population in 2009) actually represents extra suffering by 1,830,000 individuals!

That simplistic analysis was done assuming one effect (headache) with one type of EMF exposure. Of course, in practice, both the effects and the exposures are much more complex than

that, so the 'cause and effect' relationship is even harder to identify. It is also probably impossible to find the control group of "EMF-unexposed people" within any modern developed society. This will weaken the results of any comparisons between the reactions or symptoms of "exposed" and "unexposed" people.

Indeed, most epidemiology still seems to ignore the modern epidemiological concept that it is necessary to identify susceptible sub-groups in the population and to advise guidelines that help protect these vulnerable people. Gone is the time that we can expect to identify problems caused by single factors that affect almost everyone exposed. We now have many different and novel hazards that people react to in different ways, some being more susceptible to them than others. In whole population studies, the problems of susceptible individuals will always get masked by the majority of people and so the apparent relative risks (RR) are low and usually insignificant, whereas they are *much* higher and significant for the *susceptible groups* of people. At the 2001 Bradford-Hill Memorial Lecture, Dr David Strachan described the modern task of epidemiology to help provide "*safety for the susceptible*". This requires a significant change of emphasis for many epidemiologists and public health officials.

A report by Dr Neil Irvine (2005), commissioned by the Health Protection Agency - Radiological Protection Division (HPA-RPD, used to be the NRPB), acknowledged ES as a multi-faceted syndrome, which set the scene for it being a recognised valid diagnosis, and called for more research into treatment and causes (see Appendix 1). However, at the moment ES is not recognised, or at best reluctantly recognised, by GPs in the UK.

The HPA-RPD in a review in March 2009, said "*the use of the term electrical sensitivity in the review does not imply acceptance of a causal relationship between symptoms and attributed exposure.*" They continue "*People complaining of the condition can have real, unpleasant and sometimes disabling symptoms. Two main groups of symptoms are attributed to electrical sensitivity 1) skin symptoms 2) a wider range of more generalised symptoms.*" Severe symptoms occur in about 10% of sufferers.

No consistent marker for ES has been found. People who attribute illness to chemical and other environmental exposures report similar symptoms to electrical sensitivity.

A telephone survey of GPs in Switzerland (Huss & Rööslü [2006](#)) found that 69% of GPs who responded reported at least one consultation due to EMFs, and 19% reported 10 or more such consultations over the course of the last year. A previous study in Switzerland (Huss [2004](#)) which reported on information available to 2002, only found that only 2-12% of consultations were due to EMFs. The GPs judged the association between EMFs and the symptoms (especially tinnitus - 80%, concentration difficulties - 70% and tumours - 60%) to be plausible in 54% of the cases. An Austrian survey (Leitgeb [2005](#)) showed similar results.

The condition is well established in Sweden, where ES was recognised as a physical impairment in 2000. However, as Olle Johansson has informed us, international handicap laws and regulations do not ask for causality evidence behind a functional impairment. The laws say that the most important issue is the one regarding accessibility measures. About 300,000 Swedish men and women are sufferers. In Stockholm sufferers can have their homes adapted to remove or screen out sources of electromagnetic radiation. If this proves ineffective, they can even rent council-owned cottages in areas of low radiation. In Austria, 64% of GPs are convinced that ambient EMFs can cause health problems when considered together with other environmental stressors.

Electricity has been around for a long time, and the benefits have been focused on almost exclusively, without any consideration to a potential harmful side, except for electric shocks. The medical profession tend to dismiss the symptoms (which could be due to other problems) and concerns (which can be dismissed as stress or anxiety) of sufferers, prescribing tranquillisers

and/or referring patients to their psychiatric colleagues for treatment. Recent figures on the UK National Health Service explain why such referrals are so readily made. The service contains approximately 31,000 GPs, 34,000 psychiatrists, 10,000 psychologists, 1,200 toxicologists and only 350 neurologists.

It is clear why GPs might refer patients to their psychiatric colleagues (apart from the number of them). We do not have the sensitive instrumentation to quantify people's subjective experiences of pain, tingling, etc. These are very real experiences but can only be expressed in subjective terminology. People vary in their ability to describe their own symptoms, and further problems arise depending on the experience and appropriate vocabulary of the person to whom these symptoms are being described. Psychiatrists are accustomed to attempting to make sense of subjective terminology.

People suffering from ES can also suffer from hallucinatory experiences. Brain research by scientists such as Wilder Penfield has shown that different brain areas, when they are stimulated electrically give rise to a wide variety of experiences and hallucinatory effects. EMFs in the house of a person with ES can produce a complex series of visual hallucinations and odd sensations which can be very strange indeed. The areas called the temporal lobes, which are the most electrically unstable brain areas, create a feeling called a 'sense of presence' when they are irradiated by an electronic signal. This is where a person has the overwhelming feeling that someone is in the room with them and they are being watched, although nothing can be seen. (Budden 1994).

Psychologist Dr Michael Persinger, who has researched into the sensitivities of the temporal lobes, has found that this brain area in particular is responsible for paranormal experiences. He states: *"These areas are also the most electrically labile portions of the human brain of people who display limbic or temporal lobe epilepsy. People with this enhanced electrical lability often display quantitative increases in the report of mystical or paranormal experiences, altered states, or an inordinate interest in poetry, philosophical or religious themes."*

Some people with ES can apparently detect information stored as electromagnetic fields in the water of the bricks and cement of buildings. They may also be able to access information from the nervous system of others, much like an electric fish can detect impulses from other living organisms in its environment. This is a testable sixth sense, and doctors working in this field take for granted that ES people have paranormal experiences due to the emission of these personal fields when in a hypersensitive state. Some of the apparitions that these people report may not be hallucinations, but actual 'recordings' made by the electrical emissions of other people who are ES that have been stored in the materials that buildings are constructed of. Therefore, the person with ES may see (or feel) hallucinations which are generated within the brain due to the stimulation of external electromagnetic fields to which the skull is entirely transparent, or due to their ability to read personal recordings.

It is easy to see how the difficulty the patient has in describing their symptoms can be handed over to psychiatric experts, who are more experienced in dealing with abnormalities of people's experience when they relate to the external world, or in describing their internal reality. The difficulty arises when the experiences of the electrically sensitive are dealt with as if they are describing a *distortion* of 'reality', a subjective abnormal response to a benign environment.

Patients with diagnosed psychiatric disorders are often treated with drugs for cognitive or chemical imbalances. ES people, after referral for psychiatric consultations, may be offered such drug therapy, and, in fact, some ES people's experiences *do* change after such treatment. There is no doubt that the gross chemical flooding of the neurological system by drugs can have effects that might improve the condition, although the side effects from such medication can also be very unpleasant. Some psychiatric medication can be addictive, and after taking it for some time, a

person's tolerance level is reached and they can experience withdrawal symptoms whilst on the same dosage of the drug. Electrical hypersensitivity (and other idiopathic conditions) can produce neurological changes similar to those that accompany some psychiatric conditions, which may then be alleviated through drug treatment. It is impossible to assume from this that the neurological abnormalities created the electrical sensitivity.

As it can be assumed that the biological, and possibly other energy, systems of an ES person, especially someone with severe ES (who may also have MCS), are in a sensitised state and are likely to be more affected by such drugs, including their adverse effects, and possibly with permanent damage to organs such as the kidneys and liver as well as the brain.

Taking such drugs may be seen as an appropriate response by a doctor desperate to find a remedy for a patient whose illness they do not understand or even accept. It is difficult to see how such medication is likely to be of benefit to the ES person, particularly in the medium to long-term. Their primary problem is a physical condition that could, indeed, bring on a psychological problem, as can any illness.

An environmental exposure questionnaire is not completed for most medical examinations, despite the fact that this could help reduce the number of blind alleys investigations go down. This is not just the case in the UK, as, in April 2002 the Nova Scotia Environmental Health Centre's Dr. Jonathan Fox said he sees many patients who report that their family doctors are confused by their collection of symptoms. "*An individual may have gastrointestinal symptoms which they may have been referred to a gastroenterologist to assess at the same time as they're having muscle pain and they're seeing a rheumatologist and it's often not connected together*" said Fox.

Fox estimates 15 to 20 per cent of the Canadian population may show symptoms that are linked to exposure to environmental toxins such as pesticides, lead or any of the 70,000 industrial chemicals used in Canada. The Canadian Medical Association Journal suggested that a routine environmental exposure history on new patients, or those with puzzling symptoms should be taken.

Doctors' independent status with respect to large drug companies has come under challenge from time to time. In February 2002, the Journal of the American Medical Association revealed that the vast majority of doctors involved in establishing national guidelines on disease treatment have financial ties to the pharmaceutical industry that could potentially sway their recommendations and inappropriately influence thousands of other physicians. 87% of guideline authors had some type of relationship with drug companies, which is probably an underestimate as only 52% of the authors contacted about their involvement, for the survey, responded. While industry ties don't necessarily mean that a doctor can't provide an objective opinion, "*it's a potential problem,*" the author of the study Dr. Allan Detsky, physician-in-chief at Mount Sinai Hospital in Toronto, told Reuters Health.

ES cannot be directly ameliorated by most medication, so this may have an effect on whether it is recognised, as the drug companies do not see a way of making a profit from it. Homoeopathy can help some people with ES, but these treatments do not have the same commercial backing as allopathic treatments, and are probably not subject to the same commercial pressures.

Modern medical practitioners not only fail to recognise ES, but also other environmental illnesses. It will not make these illnesses go away, in fact they are likely to become an increasing drain on the resources of an overstretched NHS as the number of mobile phone masts, and other source of environmental EMFs keeps growing and the length of time people have used their mobile phones, DECT phones, WiFi, etc. leads to ES reactions. Even if it is only a subset of the population who are susceptible to this condition, it could be a subset of millions. The time is fast approaching

when it will be impossible for our public health systems to ignore this reality by denying it or by attributing its causation to psychological dysfunction.

Professor Brice Dickson, Chief Commissioner of the Northern Ireland Human Rights Commission wishes to have put on the agenda the human rights violation inherent in medical misdiagnosis. He has indicated his support of the right of people who are electrically hypersensitive to have their human rights grievances duly considered by Human Rights Commissions.

Animals also react to radiofrequency EMFs, which seems to suggest that a psychiatric diagnosis is unlikely to be helpful, as most animals do not suffer the same psychological difficulties that people do. Peter G, an Air Traffic Controller in East Anglia, and colleagues were surprised when a barn owl's steady and sedate flight would suddenly become erratic (in height and heading) as the owl entered the coverage of the Precision Radar beams.

The Hum

There are many people who hear the 'Hum'. There have been theories about what may be causing this highly disruptive sound, and there may be more than one source.

In the UK, there are over 500 complaints of low frequency noise a year and positive identification is made in 88% of cases, including factories, music, traffic/vehicles, commercial premises, foundries, electrical installations, quarries/blasting, construction sites, mining, combustion, railways, aircraft, oil and gas rigs. People suffer from a variety of health effects as a result of being exposed to such noise, predominantly women, and more problematical with increasing age (Persson Waye 1997, [2001](#), 2002, 2003, [2003](#), [2004](#), Mirowska & Mroz 2000).

A questionnaire survey was carried out in Denmark, describing "*Humming, rumbling, constant and unpleasant, pressure in ears, affects whole body, sounds like large idling engine, coming from far away*", heard mainly indoors at home. The noise was experienced as sound coming through the ears. About 40% were the only ones they knew who could hear the sound (Møller & Lydolf 2002).

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