

# **ELECTROMAGNETIC HYPERSENSITIVITY (EHS)**

## **A PERSONAL CASE STUDY**

**A briefing on EHS for Health Professionals, Research Scientists, Government Officials and concerned members of the Public**

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## Introduction

I felt compelled to write this personal case study because through my own personal experiences I have found that there is a serious lack of understanding of what Electromagnetic Hypersensitivity (EHS), also commonly referred to as Electrosensitivity (ES), is and its cause. For some people EHS can be completely disabling and in some extreme situations can lead to hospitalisation due to aggravation of pre-existing medical condition(s), development of tachyarrhythmia, which at times can result in a loss of consciousness, and other acute effects on the neurological system.

The main problem being faced by people who are suffering from EHS is that they are left in a tenuous position where there is a complete absence of government support. EHS is declared to be “not a medical diagnosis” [1] by the World Health Organisation (WHO) and so sufferer’s symptoms are ignored by government health authorities and often misdiagnosed by the medical profession. This then can lead to the prescription of unnecessary and ineffective medication. Only Sweden recognises EHS as a functional impairment while the Austrian Medical Association has provided guidelines on the diagnosis and treatment of Electromagnetic Radiation (EMR) related illnesses [2]

My hope in writing this case study is to dispel misconceptions some members of the scientific community, government bodies and the general public have on this functional impairment. I also hope that by detailing my own personal experience with EHS that I can help those who may be suffering similar symptoms recognise the cause and help them understand how they can manage their condition, and to some degree, protect themselves.

### Conflict of Interests Declaration:

I would like to declare that I have no conflicts of interests. I stand to make no financial or political gains by writing this personal case study and declaring my sensitivity to EMR. By making such a declaration regarding my sensitivity, there is a real possibility that I am putting my career in IT at risk.

## What is Electromagnetic Hyper Sensitivity (EHS)

EHS, as a functional impairment, has been known by the scientific community for many years. In the 1970’s it was referred to as microwave sickness or radiowave sickness – same symptoms as EHS, just a different name. The website Powerwatch.org.uk lists a total of 130 studies relating to the topic of EHS and has categorised them as follows: 69 studies with positive findings, 27 studies with null findings and 24 studies that offered important insights but were neither a positive or a null finding. Further descriptions of EHS symptoms are provided below.

*“Individuals living within 100 metres of a wireless facility of any kind tend to report symptoms such as dizziness, nausea, memory loss, inability to concentrate, irritability, rise in blood pressure, peculiar pressure behind the eyeballs, joint pains moving around the body, hurt of feet sole, high-pitched noises in their ears, itchy systemic rash and even internal bleeding -- all symptoms of radiowave sickness. Clinics report an immediate increase in respiratory illness: bronchitis, flu, pneumonia and asthma during the first weeks of PCS base station start-up and hospitals become inundated.”*

Source: [http://www.laleva.cc/environment/taskforce\\_eng.html](http://www.laleva.cc/environment/taskforce_eng.html)

### ***The Microwave Syndrome: A Preliminary Study in Spain. Epidemiological Study***

"Insomnia, cancer, leukemia in children, and brain tumors are the clinical entities more frequently described (Dolk et al., 1997; Hocking et al., 1996; Maskarinec et al., 1994; Minder and Pfluger, 2001; Selvin et al., 1992). Moreover, the clinical consequences of being exposed to microwave radiation such as radar has been evaluated from military and occupational studies (Balode, 1996; Garaj-Vrhovac, 1999; Goldsmith, 1997; Johnson-Liakouris, 1998; Robinette et al., 1980).

A specific symptomatology, linked to radar exposure at low levels of RF, has been termed "microwave sickness" or "RF syndrome." (Johnson-Liakouris, 1998) With few exceptions, functional disturbances of the central nervous system have been typically described as a kind of radiowave sickness, neurasthenic or asthenic syndrome. Symptoms and signs include headache, fatigue, irritability, loss of appetite, sleepiness, difficulties in concentration or memory, depression, and emotional instability. **This clinical syndrome is generally reversible if RF exposure is discontinued...**

...There is a large and coherent body of evidence of biological mechanisms that support the conclusion of a plausible, logical, and causal relationship between RF exposure and neurological disease."

Source: <http://www.emf-portal.de/viewer.php?aid=13498&l=e>

### ***"Symptoms of Radio Wave Sickness" excerpt from 'No Place To Hide' April 2001***

**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.

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

**Others:** digestive problems; abdominal pain; enlarged thyroid, testicular/ovarian pain; dryness of lips, tongue, mouth, eyes; great thirst; dehydration; nosebleeds; internal bleeding; altered sugar metabolism; immune abnormalities; redistribution of metals within the body; hair loss; pain in the teeth; deteriorating fillings; impaired sense of smell; ringing in the ears."

Source: <http://www.electricalpollution.com/solutions.html>

## What are the key issues?

The main problem faced by EHS sufferers today in many countries around the world is there is a complete absence of government support. In addition, there are a number of other concerns that I have listed below that are by no means the complete story on this issue:

1. The general public as well as the medical profession as a whole appear to lack an understanding of what EHS is and its cause. Medical practitioners neither have the tools nor the methodology (training) to identify or treat those who are suffering. Although my doctor indicated that he had read some material on EHS, he suggested I was most likely suffering a migraine (exhibits similar symptoms – band of pressure around the head) and that I should take Ibuprofen (an anti-inflammatory/pain killer) which in my case is ineffective in treating the symptoms and certainly does not address the cause. Of greater concern is the chance of misdiagnosis and prescription of unnecessary medications that could result in further health complications due to unwanted side effects some medications may have as a result of prolonged usage.
2. There appears to be no consensus within the scientific community on Radio Frequency (RF) safety. Some scientists and scientific bodies are suggesting there is no proof of harm while others such as the WHO and IARC have classified all microwave transmitters as potentially carcinogenic. [3]
3. There is very little research being performed on EHS to validate it as a real condition or to confirm the cause.
4. While scientists debate whether EHS is a psychological and/or a physiological illness and whether sufficient proof can be established to link it to EMR, sufferers are left in limbo without any adequate protection, support or recognition of their health issues. It is unclear why a “diagnosis of exclusion” method cannot be adopted to verify EHS as a health impairment.
5. The burden of proof for the existence of EHS as an impairment, like proof of RF safety in general appears to be set unreasonably high. RF emitting devices are not handled in a manner which is consistent with the handling of other substances that may affect health, including drugs, medications and medical prostheses and devices, where manufacturers have to prove absence of health risk to the population and maintain post-marketing surveillance for years after a drug or device is first marketed.
6. Current testing methodology to verify sensitivity is often not biologically based and typically uses a provocation test, which I will describe in further detail on in this study, has some potentially serious flaws.
7. *‘Positive studies, studies showing effects of EMF, are being analysed in depth for the possible errors that lead to observation of effects. Negative studies are most commonly accepted for their face value and their quality is not being questioned because they provide evidence “as expected.”’* [4]

## My experience with EHS

I am 45 years of age and have been using computers all my adult life. I am an IT professional who has a Bachelor of Science degree in Biochemistry and Microbiology. I have always considered myself as an earlier adopter of technology and discovered quite by accident that I was sensitive to certain Electromagnetic Radiation (EMR) frequencies. My discovery also occurred well before I had learned through my subsequent research that there was a label for my condition, otherwise referred to as EHS or Electromagnetic Hypersensitivity.

My earliest memory of being sensitive to radiofrequencies was in late 2001 when wireless networking was beginning to become popular. I had no preconceived ideas or fears about the technology nor was I aware that RF could be potentially harmful. I was looking forward to the freedom it would afford me. No more wires cluttering the desk, free to do my work on my laptop at the kitchen table while I had breakfast. Being IT savvy, I had decided to buy the most powerful wireless Wi-Fi router available at the time, capable of transmitting 108Mbps per second and having an effective range of 100m+, which was twice as fast and twice the range of the cheaper more common wireless routers at the time. On first using my wireless router I began to feel pressure in my head, pressure in my chest, tingling sensations in my hands and face within a few minutes of use. I also noted (and so did my wife) that my temperament changed from my normally relaxed manner to being more agitated and short tempered when using my Wi-Fi enabled router. After turning off my wireless router I was left with a headache that persisted for several hours. At first, I thought nothing of it and did not immediately associate it to my use of wireless. It was only on subsequent usage that I felt the same symptoms. If I persisted for longer durations I found that on top of the symptoms mentioned above I felt a burning sensation in my intestinal region and the pressure on my chest would sometimes lead to my heart beating irregularly (arrhythmia) followed by stronger than normal heart beats (like my heart was trying to jump out of my chest).

I soon realised that a consistent pattern was developing when using my wireless router and symptoms that I was feeling. This was no placebo effect – it was real, consistent and most unpleasant. It was at this point that I had made a conscious decision to not use a wireless network to connect to the internet.

Definition of **nocebo effect**:

Firstly, the word **nocebo** (Latin for "I shall harm") is a harmless substance that creates harmful effects in a patient who takes it. The **nocebo effect** is the negative reaction experienced by a patient who receives a nocebo. These reactions result from a subject's expectations about how the substance will affect him or her. Though they originate exclusively from psychological sources, nocebo effects can be either psychological or physiological. Source Wikipedia

In 2007, I purchased a Sony PlayStation 3 (PS3). I did not use the inbuilt wireless network feature because I had a hard wired LAN that I could connect to. The PS3 controller however is a wireless Bluetooth device operating at 2.4 GHz, same as my router but at a significantly lower power density (the PS3 controller is a class 2 Bluetooth device so it'll only be kicking out a maximum of 2.5mW). I found that I did not get the same feelings that I felt with the router (not completely absent but barely noticeable and easily tolerable). Realising that I could possibly use low powered wireless devices without major issues I decided to purchase a Nintendo Wii for my children for Christmas several years later but after using the Wii a couple of times I had to dispose of it as I will now explain. The Wii controllers also use Bluetooth 2.4GHz (documentation on the internet suggests they operate with a maximum of 3.83mW output) which is the same frequency as the PS3, yet the all too familiar EHS symptoms reappeared and they were not pleasant. The difference in the levels of transmission power could be a potential cause and cannot be completely ruled out but I would say it is very unlikely. Instead, there is a noticeable difference in the amount of data being transmitted. My PS3 controller will only occasionally send information such as when a button is pressed which is a lot more infrequent than a Wii controller which is practically always transmitting as it needs to send telemetry data to indicate the position and movement of the controller through space and time. The amount of information being passed does seem to be a key in my sensitivity because I have a very similar issue with regards to 3G USB modems when compared to 3G mobile phones. A person can be 3 - 5 m away talking on a mobile phone and I do not feel anything significant as compared to someone using a laptop at the same distance that is connected to a 3G USB internet stick downloading streaming video which can be quite

intense. The amount of data being packed onto the signal appears to be a differentiating factor. This of course does not mean I am not sensitive to mobile phones – I most certainly am. I can only use a mobile phone near my head for 30 seconds or so before I find myself swapping the phone to my other ear due to severe discomfort that I feel. Today I rarely use my mobile phone and only keep it for emergencies. I switch it to flight mode most of the time, but if I do need to use it, I operate it using hands free.

Prior to the rollout of smart meters in my street, but subsequent to me finding out that I am sensitive to certain RF frequencies, I took precautionary measures in my home by ensuring that I only used wired connections for internet connectivity and that all wireless capable devices had said features configured to disabled. I was able to function normally and had no major issues with sleep or health. I did not suffer any further headaches or heart palpitations. I could say I was in good health. However in late August/early September 2011, Powercor rolled out wireless enabled smart meters in my street. I resisted the installation of a smart meter. However, not having a smart meter installed on my property did not help me as I became severely affected by my neighbours' 2 smart meters that were installed next to my bedroom 3m away. It was soon after installation that I found I was waking at specific times every night. Sometimes I felt like someone had taken a long sharp needle and quickly pushed it into my head. Once awoken, I found it very difficult to fall back to sleep. The timings were falling in a fairly consistent range in the early hours of the morning. Every morning I would wake up with a serious headache which would last all day and make concentration and performing simple duties quite difficult. On a number of occasions I would wake up with a feeling of pressure on my chest and my heart beating irregularly. I was feeling the very same symptoms that I had previously experienced with my wireless router.

2012 was a very difficult year for me because for 6 months I had to travel interstate every Sunday night to work on an IT project for an interstate customer. I would be put up in hotels that had DECT (Digital Cordless Telephones) that transmit constantly, even when not in use, as well as being irradiated by the hotel wireless internet. The office I worked at was located under a mobile phone tower and also had wireless access points for staff with wireless notebooks to access the corporate network. I would fly with a domestic airline that began to allow their business class passengers to use iPads with wireless enabled. By the time I got home I was in a terrible state which was further exacerbated by smart meter emissions. To make matters worse, I had become sensitised to things that normally did not bother me. Standing near transformers (phone charges, laptop power modules, light dimmers) left me feeling the same very symptoms I felt when exposed to wireless RF. Standing near my electric hotplate and range hood also affected me. I became allergic to my deodorant which I had been using for 10 years without issue and suggests RF was interfering with my immune system. I had constant headaches, felt extremely lethargic and completely lost motivation to do anything with the family. I would wake up feeling just as tired when I got out of bed in the morning as I had before I went to bed. I even found that I had become a rudimentary mobile phone base station detector. I could sense a mobile phone tower well before I even saw it. I can no longer drive through suburbs where smart meters have just been rolled out without developing a serious headache that can last for days. I have been to my local GP many times and he is at a loss to explain what is wrong with me. Blood tests, ECG tests all come back as normal. Of course an ECG will only show heart beat irregularities in my case if I am being exposed to high levels of EMR (but still within ARPANSA's RF Standard basic restrictions), which was absent in the doctor's office at that time. Pain killers were prescribed but offered very little relief. I was referred to a neurologist who indicated he had never heard of EHS, said he did not fully understand wireless technology so could not give me an informed opinion. He suggested I have an EEG and MRI to verify that I do not have any brain disorders or tumours. Of course the results came back negative.

It is important to understand that when I say I feel a headache, it is not a normal headache where sudden movements cause sharp pain such as when you are having a hangover or are dehydrated. Instead, it is a constant pressure and dull ache in my head. My face feels drained like I have been doing a 24 hour shift and sometimes can be accompanied by a prickling feeling over my skin (head and face) when in the presence of microwave RF frequencies.

EHS is not restricted to certain age groups. I was 32 when I determined I was sensitive to wireless. My condition has been getting progressively worse as the amount of man-made RF in our environment increases. I know without a doubt that wireless RF is causing these issues because when I go to remote areas where there is very low EMR I feel fine after several days. A recent trip away from large population centres for a few weeks, proved to me that my health issues were EMR related. It is important to understand that it does take time for the effects to dissipate in some people i.e. there is no instantaneous relief. I have recently painted my house with RF shielding paint and installed RF blocking curtains and my sensitivity has greatly reduced. I can now sleep better, stand near transformers and electric hot plates without feeling off, but mobile phone usage and wireless network usage is still a problem for me and something that I avoid as much as possible.

Despite taking precautionary measures in my own home at great expense, I am deeply concerned at the lack of support, care and understanding by the power utilities and the various government departments that I have contacted over this issue. I am forced to sleep at the back of the house because the master bedroom on the first floor is still getting RF penetration through the floor which is not shielded. Effectively the front parts of my house are denied to me if I don't want my health to substantially decline.

## **What other sufferers have said:**

Case 1: "I feel extremely isolated and marginalized by the community in which I live. My husband and mother both think that I am simply making the symptoms up, or that they are psychosomatic in nature. The condition seems very hard to grasp for people who do not hear the ringing, have the headaches or the sleeplessness, and even when people do have these symptoms."

Case 2: "It was unlike the occasional headache I have experienced in the past where the slightest movement produced a pounding sensation. This headache consisted of a pressure over my entire skull with a tingling sensation on my scalp.....My zest for life faded."

Case 3: "I experience intense ear ringing and burning/searing sensations on sides of my head since moving to our neighbourhood"

Case 4: "Fatigue, Depression, Excessive Sleep, Stress, Sometimes Anger, Aches, Hard to Focus, Inability to Concentrate, Housework also hard to do" [5]

There are countless example cases on the internet all over the world. Stop Smart Meters Australia has been maintaining a EHS register and has documented close to 200 cases as of January 2014.

## How do scientists try to verify whether a person is EHS?

Most scientists will perform what is called a provocation test. The provocation test is performed using a radio transmitting device that is usually operating at a specific frequency i.e. 914MHz to simulate a mobile phone.

Such tests are usually conducted in a double blind fashion. What this means is the scientist performing the test and the person who is subject to the test do not know whether the box is transmitting or not. The box will typically have a readout with some numeric codes that can be recorded and used later by the tester to work out whether the transmitter was active or not and then correlate this with the subject's "feelings".

Limitations of the provocation test are numerous and include:

1. Probably the most important fact that people need to realise is that the provocation test is not a biologically based test, instead it requires the subject to respond with how they feel which of course is very subjective.
2. Some provocation tests require the subject to give feedback as to the severity of the symptoms and rate it against previous exposures (provocation tests are usually conducted as a series of sequential staggered exposure tests) – again this is very subjective and cannot be considered objective as most people cannot remember exactly how something felt hours or days later. If we could remember what pain felt like, along with the intensity, I would seriously doubt women would choose to willingly get pregnant and opt for a natural birth more than once! Pain is a private, emotional experience. Pain intensity cannot be directly measured; responses to putatively painful stimuli can be measured, but not the experience itself.
3. They are set to a specific frequency of operation that the subject may not actually be sensitive to. Testers claim that the device simulates a mobile phone but this is debateable as it is not communicating to one or more cell towers nor is it clear what kind of data is being sent (simulation of a voice call – low data rate vs data/video streaming – high data rate or just a carrier signal), the modulation pattern used to send the data or if even data transmission is simulated at all. My EHS experience has shown that the amount of information being transmitted is a key contributor to my feelings of ill health.
4. Tests often do not simulate the environment that the person claims is affecting them. We are surrounded by EMF's from a variety of sources every day. When I was suffering from my router's RF emissions I was also using a computer which was also emitting RF (from the wireless card and to a lesser extent from the CPU due to its internal clock speed), I was also sitting in front of a 19" CRT monitor, there was also a number of power transformers present in the room. Using these devices without the wireless enabled did not cause me any issues. However the effects of EMR from multiple devices is additive.
5. The test procedure is often poorly defined due in part to those conducting the test not fully understanding the subject's EHS condition i.e. delayed reaction and delayed recovery times not always considered. EHS is not like flicking on a light switch resulting in an instant reaction, although there are some sufferers who can feel emissions shortly after they are switched on. There can be considerable delay times between signal transmission start and onset of symptoms. The same is true for the recovery time which can take hours to several days. One can see where a situation may arise where a subject has not fully recovered from an active signal and is then tested with a sham signal and asked how they feel. Guess what? They will give an answer indicating they are still suffering leading to a conclusion that EHS is not real or at least not related to EMR. Some



provocation test protocols do try to take this into account by having the subject try to rate the intensity against past experiences which is of dubious value as I have previously mentioned (see point 2 above).

6. Each subject is unique (body mass, current health ailments, medications, allergies, age, immune system sensitivity, genetic predisposition etc.) and so a set of standard tests with set exposure times and time intervals between exposures may not be sufficient or appropriate.
7. There is a definite psychological component that is going to influence test results and reinforce the belief that EHS is a Nocebo effect (psychosomatic). An analogy would be to conduct a test with a mouse by connecting electrodes to it and shocking it whenever a light is turned on. After sometime the mouse will be conditioned so that just switching the light on will result in the mouse reacting the same as though it was actually feeling electric shock effects. The same is true with humans. Use a phone a lot and get serious headaches and then present the user with a phone like device and tell them you are testing their sensitivity to mobile frequencies without them knowing whether the transmitter is active or not and you can bet that there is a good chance that they will develop some form of reaction. This reaction is natural and a result of conditioning as we try to avoid situations where we feel uncomfortable/pained by applying learned behaviour through experience as a result of previous painful episodes. Refer to “Nocebo effect or real deal” detailed further in this case study. A similar experiment as described above on mice was reported on the BBC recently and can be viewed by clicking on the link provided <http://www.bbc.co.uk/news/science-environment-23447600>
8. For those who are suffering EHS, the provocation test is a form of torture. It creates unnecessary anxiety which in itself can lead to the onset of similar symptoms that can interfere with the test leading to a confounding result.
9. Depending on where the test is conducted, the results can be contaminated by other EMR sources which can include nearby computers or wireless routers, DECT phones, mobile phone towers, EMR from transformers, fluorescent lights etc. Even the device itself may not actually be emitting RF but while it is powered on it is certainly creating EM fields that can interfere with the test particularly when performing a test with a sham signal.
10. When conducting group studies, people who have to pull out of the test prematurely due to the disabling effects they are experiencing are often not included in the study results.

Current methodology to test sensitivity is inconsistent and often based on poorly defined test protocols. This is partly due to the fact that there appears to be a general poor understanding of people's electrical sensitivity by the scientific community and the fact that most tests are not biologically based - i.e. the provocation test, which we know is very subjective can be manipulated to show inconclusive results.

Even though the provocation test is typically performed as a double blind study – that is the scientist and the study participant are not aware if the device is transmitting or in sham mode – the testing protocol can be set-up such that an insufficient recovery time is allowed before conducting the next test. Subjects can through learned behaviour also affect the results particularly in the case where the testing protocol requires the subject to compare feelings of a current exposure test with previous exposures.

For EHS testing to be meaningful and realistic, scientists should be looking at establishing biological tests that are used in conjunction with a provocation device which can measure heart rate variability, heart palpitations (as Dr Magda Havas recently demonstrated this in 2010 and reconfirmed in a repeat experiment <http://www.ncbi.nlm.nih.gov/pubmed/23675629> ), brain responses (EEG), brain scans, immune response, sleep studies, live blood chemistry etc.

Dr. Dominique Belpomme, Professor of Oncology at Paris Descartes University, is conducting research on electro hypersensitivity with the Association for Research and Treatments Against Cancer (ARTAC) in Paris. The ARTAC group has been following several hundred patients with EHS over the last four years, and has documented that these patients have clear and consistent changes in oxidative metabolism, and also in blood flow to the limbic system (as measured by Doppler studies). Dr. Belpomme considers these changes in the limbic system to directly correlate with many of the cognitive changes (memory problems, difficulty with concentration, etc.) that are experienced by these patients. The ARTAC group expects to publish a series of papers on their findings during the next year (Dart, 2012) [6]. I am looking forward to his research results when they are published, which will demonstrate and confirm that EHS is real and not a nocebo effect as some scientist would have us believe.

The big question I have is whether we need to find biological markers before we accept that this is real? There is enough evidence to make a diagnosis on the symptoms' pattern alone – this is what I believe happens in Sweden. While scientist squabble over test methodology and the industry demands proof, people are left to suffer.

It is also interesting to note that an email I received from an Australian scientist who offered to test me with a provocation test device for EHS indicated the following:

*“I would require you to sign a consent form as the testing is likely to generate symptoms that you would find uncomfortable.”* This to me is a tacit acknowledgment that EHS is likely to be real and linked to EMR.

## Nocebo effect or the real deal

It is readily known by scientists that we learn to withdraw from, or alter our behaviour in response to, a conditioned stimulus.

Definition of conditioned stimulus

*“A previously neutral stimulus that, after repeated association with an unconditioned stimulus, elicits the response effected by the unconditioned stimulus itself.”*

In the context of EHS, an analogy I would suggest is an inactive mobile phone, router or provocation test device (physical object) being considered as the neutral stimulus and RF that it emits when switched on as the unconditioned stimulus which causes pain or results in some form of health impact.

It is therefore very plausible for EHS sufferers, through learned behaviour, to visually and aurally (hearing nearby people talking on a mobile phone or the phone ringing) associate items capable of emitting RF such as a mobile phone, iPad, mobile telephone base station mast and other aerials with their condition and leading to their bodies reacting accordingly. Such behaviour reinforces the belief held by some scientists that EHS is a nocebo affect.

What scientists need to understand is the original mechanism that triggered off this learned behaviour in the majority of cases is real and not a psychologically based induced condition. People only need to review my particular case history to see evidence of this, which is as follows:

1. I work in IT and embrace technological advancements and was looking forward to freedom that wireless offers.

2. I had no pre-conceived ideas and was completely uninformed of potential health impacts when I first used Wi-Fi.
3. The physiological reaction I experience in the presence of Wi-Fi is real and reasonably consistent with each exposure. I say “reasonably consistent” because depending on my state of health (did I have a cold? Did I get a good night’s sleep? Am I still recovering from a previous exposure etc.), the duration and intensity of exposure will see the type of symptoms varying within a common set that I have experienced previously. One hour of exposure does not always induce heart palpitations. But they have only ever occurred when I am exposed to (pulsed) wireless RF.
4. Symptoms disappear when I go to remote locations away from wireless transmitters suggesting that an underlying health issue is not the cause.
5. RF Shielding alleviated my symptoms suggesting other environmental concerns or stress are not a significant factor.

I mentioned “majority of cases” above because I do not doubt that there may be instances where there are some people who have a neurotic disposition, may have read an article suggesting harm, become obsessed and anxious to the point where they experience a real nocebo event. Such cases are the exception rather than the norm.

## Smart Meters and EHS

Unfortunately some authorities assume that because Smart Meter radiation emissions are short in duration and apparently lower in power density than other wireless devices typically found in and around people’s homes, they are therefore safe. What many people are unaware of is the number of times these meters are actually communicating. We are told that the smart meter transmits SMS like messages 4 -6 times a day (depends on your service provider), which may be true for your personal house hold data, but what is not being said is that for mesh networks, the average duty cycle also includes transmissions to maintain the network, time sync and network message management (i.e. pass on other houses’ data). This can lead to anywhere from 10,000 transmissions to 190,000 transmissions or more per day. Nobody sends this many SMS messages on their mobile phone. Many of these devices are situated on a wall/in wall cavities where people spend a significant amount of time (i.e. bedroom/lounge room walls).

It has been shown in a recent Victorian medical report entitled “SELF-REPORTING OF SYMPTOM DEVELOPMENT FROM EXPOSURE TO WIRELESS SMART METERS’ RADIOFREQUENCY FIELDS IN VICTORIA, AUSTRALIA - A CASE SERIES” that smart meters appear to be causing people who were not previously sensitive to RF frequencies to become EHS. Additionally, people who were previously self-diagnosed as being EHS found their condition was made dramatically worse. This medical report has been written by a medical doctor using de-identified data obtained from an EHS register that was being independently maintained by Stop Smart Meters Australia. Close to 200 people have registered their health complaints. The case study only looks at those who were fully identifiable and agreed to have their de-identified data made publically available in a medical report which amounts to a total of 92 people.

As I described in my introduction, I am self-diagnosed as being EHS having identified my sensitivity over 13 years ago. In terms of the medical report findings mentioned above I fit into the second category where my condition (despite being able to manage it previously quite successfully) has been made worse after mesh networked wireless smart meters were installed in my neighbourhood. My condition has also been aggravated by the deployment of other non-consensual microwave transmitters in the community

especially mobile phone base stations with 4G towers being worse in their ability to affect me than 3G, 2G etc.

Below I have listed my specific smart meter EHS symptomatology:

1. Constant headaches - pressure encompassing my head
2. Insomnia – I find it very difficult to get a good uninterrupted night's sleep
3. Lethargy and concentration difficulties
4. Sharp pains like a hot spike being driven into my head and occasionally in my intestinal region
5. Burning pain in intestinal region
6. Joint pain particularly my elbows, fingers and sometimes my knees
7. Irritability and feelings of anxiousness – I find I am more prone to angry outbursts when exposed to smart meter RF. My wife can certainly attest to that!
8. Heart beat irregularities and occasionally heart palpitations when in close proximity to a smart meter for a long duration

The problem I am faced with now is that I have effectively become a prisoner in my own home. To venture out of my house to an environment that has ever increasing EMR leaves me feeling drained, pained and trapped. Moving interstate where there currently are no smart meters is an option, but if there continues to be rollouts of new mobile phone towers, high speed wireless networks as part of the NBN rollout and other states follow Victoria's lead of mandating the rollout of wireless enabled smart meters I will eventually run out of places to go and will become an EMR refuge as I move to increasingly more remote locations. Career options will diminish and my job is already under threat as I struggle to continue working in the IT industry where wireless networks and smart wireless devices are becoming common place. I am being faced with the dilemma of how do I support my family? What kind of life will they have and what kind of opportunities are they missing out on as we move to isolated locations to escape this manmade threat to mine and my families health and wellbeing?

## What measures can you take to protect yourself?

The most important actions one can take to protect oneself from exposure to ubiquitous manmade RF emissions are as follows:

- 1) Turn off all wireless devices in the home – avoidance is the best protective measure. It is important to understand that the effects of wireless are additive when exposed to multiple frequencies and the damage caused is accumulative over a lifetime. ARPANSA's RF standards say "*In situations of simultaneous exposure to fields of different frequencies and depending upon the nature of exposure and the distribution of RF absorption within the body, the combined effects of exposure to multiple frequency exposure sources may be additive.*" (rps3 page 18). [7]  
If you must use wireless enabled devices then at least turn them off before you go to bed at night.
- 2) Replace digital cordless (DECT) phones with corded phones. Most DECT base units transmit all the time irrespective of whether you are on a call or not. Again, if your cordless phone is precious to you then make sure it is not in your bedroom.
- 3) Turn your iPad to flight mode when you do not need internet access. Additionally, do not rest it on your lap when using wireless as "*epidemiological studies of men assessed for infertility were consistent in demonstrating decreased sperm motility associated with use of mobile phones. Most of the in vitro (laboratory) studies, which involved exposing human semen samples to controlled mobile phone RF exposure, generally noted a decrease in sperm motility, among other adverse*

*effects. Similar findings were noted in animal studies of a specific type of rat. Oxidative stress or decreased antioxidants are suggested as plausible mechanisms for these non-thermal effects from RF exposure.*"[8]

- 4) Distance is your friend as the intensity of the wireless signal drops following the inverse square rule i.e. Intensity = 1/Distance<sup>2</sup>. Put as much distance between yourself and transmitters including smart meters. This may mean moving your bed to another room if the smart meter is located on your bed room wall.
- 5) Rooms can be shielded with special carbon based paint and windows can be covered with RF shielding curtains.
- 6) Install bed canopies made of the same RF shielding materials as the curtains mentioned above.
- 7) Fortify your body by doing regular exercise and eating good healthy foods that are high in natural anti-oxidants. This will put less stress on your body giving it a chance to deal with the manmade, potentially damaging, RF emissions. Although the energy from RF is not sufficient to damage DNA directly it has been shown by independent researchers to cause damage through indirect pathways. *"A large body of research has shown that microwave RF causes an increased production of free radicals and reactive oxidant species in living tissues, and that this increased oxidant stress damages DNA. This damage can and does occur at power levels well below those levels that could produce damage by thermal mechanisms."* [6] Special note: damage to DNA can potentially lead to cancer.
- 8) Try to maintain regular sleeping habits by not varying the time you go to bed too much if possible. Ensure that all sources of EMF (including radiofrequency) are not close to the bedhead. This would include clock radios, small appliance transformers, mobile phones, and cordless phones. And remember to turn off electric blankets before you lay down in bed to go to sleep, if used. Do not have the bed located immediately behind or close to where the power meter is installed.
- 9) Despite the medical profession generally not knowing what EHS is or how to treat it, a visit to the doctors is essential to confirm that other possible serious causes of your symptoms are excluded with appropriate medical tests.

In my case, I have no wireless devices in my house. My master bedroom was located at the front of the house on the first floor. My neighbour had 2 smart meters fitted on his garage which is 3m from my bedroom. I moved my bed to back of the house on the ground floor. My home office is also located at the front of the house and was unusable, as an 8 hour shift would see me suffering major headaches, concentration issues and extreme lethargy. To reclaim these rooms I decided to have the front rooms painted with carbon paint. By coupling the carbon paint with RF shielding curtains it is possible to reduce RF penetration into a room to negligible levels. Carbon paint works by reflecting most of the signal. However, shielding paint needs to be applied with caution because it is conductive and so needs to be grounded properly. Another issue is that because of the carbon paint's reflective qualities it is important that you do not use wireless devices in these rooms, otherwise the majority of the RF is not able to escape and will bounce around and will therefore increase your exposure. After taking these protective measures I am able to use my office again but I am reluctant to move in to my master bedroom as the RF emissions from the smart meter can infiltrate my room through the floor which has no shielding (I was living in a 2-story house). Heart palpitations and endless headaches are not something I would want to endure every day of my life.

## What I believe needs to happen

First and foremost, governments need to recognise that EHS is real and can be a serious health impairment, like Sweden does. Furthermore, medical professionals need to be educated on what EHS is, how to diagnose it and how to treat it. Education programs need to be established at Universities that cover this topic. The public also needs to be educated and informed of the risks of using wireless devices clearly and without prejudice or unwanted influence from those who market these devices. The media often portrays those who are suffering in a poor light leading to hurtful comments and ridicule from unformed members of the public, this needs to change. Scientist often weigh in on the argument suggesting that EHS is a psychosomatic illness based on what I believe to be faulty scientific studies that use only the provocation test as the basis for their claims. Further research maybe required but those who are suffering should not be held hostage by wrangling scientists and politician's as they argue the validity of EHS and testing techniques. The symptomology and causative factors of EHS is known and has been known for years.

I urgently request all the World RF Standard Bodies/ Health Advisory Bodies (ICNIRP, FCC, IEEE, WHO, ARPANSA etc.) to take this issue seriously and investigate claims made by people who are self-diagnosed as EHS rather than simply capturing statistics. There should be more funding to research EHS that includes biological tests as well as conducting a post smart meter rollout surveillance study with a focus on health rather than emission levels against a RF Standard or guideline.

It is also recommended that regulatory bodies in each country implement a precautionary principle, especially now that the IARC released its monograph last year justifying why RF is categorised as a Group 2B possible carcinogen. As there has been no research performed since this announcement that seriously contests this finding and Dr Lennart Hardell, one of the scientists whose research was a key contributor to the classification of microwaves as a Group 2B Possible Carcinogen, releasing further studies that re-affirms his original findings, we should apply caution when it comes the rollout of new wireless technologies.

There should be no wireless access points and mobile phone towers located near or within schools, libraries or hospitals. All schools should be required to adopt a wireless free policy and use hard wired inter/intranet connections until Wi-Fi can be proven without any doubt that it is safe. We should not be risking our children's health at any cost.

Governments should provide more funds to independent research scientists (and not those who have ties with the Industry as appears to occur today) to further investigate the potential biological effects RF may have. This is particularly important when leading scientists suggest that there are still gaps in our knowledge with respect to wireless biological effects especially in the area of non thermal interactions. Are they real or are they artefacts of the testing process? Let's make a concerted effort to find out as the future health of billions of people depends on it.

Prior to installation of mobile phone base stations or rollout of smart meters in our towns and cities, a health surveillance study should be conducted that measures the current state of health of householders to create a baseline reference point and to avoid potential issues of recall bias. Further surveillance studies should be conducted after the installation of the radio transmitters at set intervals to determine whether there have been any noticeable changes in public health.

Telecommunication companies should be required to rationalise their deployment of mobile phone base stations such that resources are shared between service providers where capacity is undersubscribed, especially as our neighbourhoods are being ringed by base stations without any due consideration to the

IARC and WHO announcement. Public health should have a higher priority than technological conveniences particularly when there is no proof of safety and lots of people are complaining of insomnia, headaches, neurological disturbances and other disabling symptoms.

***“Strange times are these in which we live when old and young are taught falsehoods in school. And the person that dares to tell the truth is called at once a lunatic and fool.”*** Plato 427 B.C.

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# Glossary

The majority of the definitions provided in this glossary were sourced from Wikipedia.

<b>Acronym/Term</b>	<b>Definition</b>
2G/3G/4G	Short for second/third or fourth generation wireless telephone technology
ARPANSA	The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) the main government body dealing with ionizing and non-ionizing radiation and publishes material regarding radiation protection
Bluetooth	Bluetooth is a wireless technology standard for exchanging data over short distances using short-wavelength UHF radio waves in the ISM band from 2.4 to 2.485 GHz) from fixed and mobile devices.
CPU	A central processing unit (CPU) (formerly also referred to as a central processor unit) is the hardware within a computer that carries out the instructions of a computer program by performing the basic arithmetical, logical, and input/output operations of the system
CRT	Cathode ray tube, a type of vacuum tube used for information displays such as computer monitors or TVs.
DECT	Digital Enhanced Cordless Telecommunications (Digital European Cordless Telecommunications), usually known by the acronym DECT, is primarily used for creating cordless phone systems
DNA	Deoxyribonucleic acid (DNA) is a molecule that encodes the genetic instructions used in the development and functioning of all known living organisms and many viruses
ECG	Electrocardiography (ECG or EKG from Greek: kardia, meaning heart) is the recording of the electrical activity of the heart.
EEG	Electroencephalography (EEG) is the recording of electrical activity along the scalp. EEG measures voltage fluctuations resulting from ionic current flows within the neurons of the brain. In clinical contexts, EEG refers to the recording of the brain's spontaneous electrical activity over a short period of time
EHS	Electromagnetic Hypersensitivity is an idiopathic environmental intolerance attributed to electromagnetic fields is a descriptive term for symptoms caused by exposure to electromagnetic fields. Other terms include electro-sensitivity and electrical sensitivity (ES).
EMF	An electromagnetic field (also EMF or EM field) is a physical field produced by electrically charged objects. It affects the behaviour of charged objects in the vicinity of the field.
EMR	Electromagnetic radiation (EM radiation or EMR) is a form of radiant energy, propagating through space via electromagnetic waves and/or particles called photons.
FCC	The Federal Communications Commission (FCC) is an independent agency of the United States government, created to regulate interstate and international communications by radio, television, wire, satellite, and cable.
IARC	The International Agency for Research on Cancer (IARC; French: CIRC) is an intergovernmental agency forming part of the World Health Organisation of the United Nations.

GHz	Gigahertz (GHz), a unit of frequency
ICNIRP	The International Commission on Non-Ionizing Radiation Protection (ICNIRP) is an international commission specialized in non-ionizing radiation protection
IEEE	The Institute of Electrical and Electronics Engineers
IT	Information Technology is the application of computers and telecommunications equipment to store, retrieve, transmit and manipulate data, often in the context of a business or other enterprise.
LAN	A local area network (LAN) is a computer network that interconnects computers within a limited area such as a home, school, computer laboratory, or office building using network media
MHz	Megahertz (MHz), a unit of frequency
Microwave	Microwaves are a form of electromagnetic radiation with wavelengths ranging from as long as one meter to as short as one millimetre, or equivalently, with frequencies between 300 MHz (0.3 GHz) and 300 GHz
PS3	The PlayStation 3 (PS3) is a home video game console produced by Sony Computer Entertainment.
RF	Radio frequency (RF) is a rate of oscillation in the range of around 3 kHz to 300 GHz, which corresponds to the frequency of radio waves. The term "radio frequency" or its abbreviation "RF" are also used as a synonym for radio – i.e. to describe the use of wireless communication, as opposed to communication via electric wires.
RPS3	Radiation Protection Series No. 3 is published by ARPANSA and specifies limits of human exposure to radiofrequency fields in the range 3kHz to 300GHz to prevent adverse effects.
USB	Universal Serial Bus (USB) is an industry standard developed in the mid-1990s that defines the cables, connectors and communications protocols used in a bus for connection, communication, and power supply between computers and electronic devices.
WiFi	Wi-Fi, also spelled Wifi or WiFi, is a technology that allows an electronic device to exchange data or connect to the internet wirelessly using microwaves in the 2.4 GHz and 5 GHz bands.
WHO	The World Health Organization (WHO) is a specialized agency of the United Nations (UN) that is concerned with international public health. It was established on 7 April 1948, with its headquarters in Geneva, Switzerland.