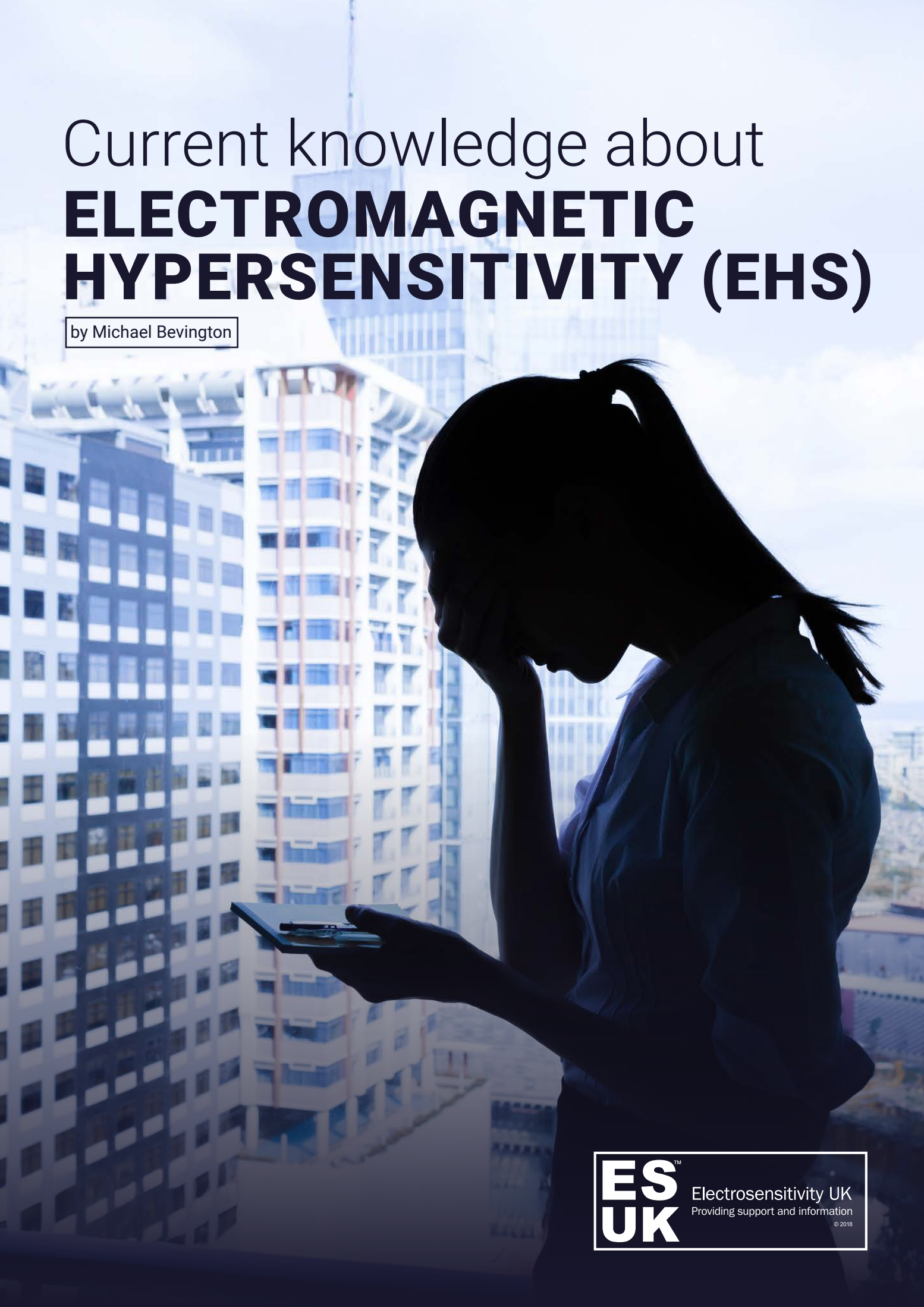
Current knowledge about **ELECTROMAGNETIC HYPERSENSITIVITY (EHS)**

by Michael Bevington



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INTRODUCTION:

Knowledge about Electromagnetic Hypersensitivity has grown enormously over the last 150 years, writes Michael Bevington, chair of Trustees at Electrosensitivity UK. However, this is one of the most varied and complex of human sensitivities. This booklet reviews the current knowledge about this rapidly advancing area of biophysics, so crucial for human health.

1. SENSITIVITY TO ELECTROMAGNETIC FIELDS (EMFs)

1 (a) What is EMF sensitivity?

Electromagnetic sensitivity, which includes Electromagnetic Hypersensitivity (EHS), is a physical reaction to radiofrequency radiation (RFR) and electromagnetic fields (EMFs). RFR comes from mobile phone masts, mobile phones, Wi-Fi, Bluetooth, smart meters, smart watches, smart glasses, trackers and similar devices. EMFs, in addition to RFR, include electric and magnetic fields and extremely low frequency, as from power lines, electric cables, inverters, transformers, electric motors and switched-mode power supply.

Specific physical short-term and long-term adverse symptoms have been established since 1733 (Table 1). Surveys show these for people living near phone masts compared with further away, as well as occurring close to mobile phones, smart meters and Wi-Fi. Adverse symptoms from 5G phone masts stop when people move away [1].

People sensitive to EMFs can also be affected by the EMFs retained in other people's bodies. Since 1730 it has been shown that the human body can hold electric charges induced wirelessly, where cellular water is especially sensitive [2].

Table 1:
Typical effects from electromagnetic field (EMFs)

Conscious Short-term	**Subconscious Long-term** (including contribution to)
* symptoms significantly more frequent near mobile phone base stations	
Anxiety	Autism and ADHD
*Depression	Early onset Alzheimer's, Dementia
*Disturbed sleep	*Cancers
*Dizziness	*Cardiovascular problems
*Fatigue	*Electromagnetic Hypersensitivity (EHS)
*Headaches	Infertility
*Irritability	Mitochondrial dysfunction
*Memory loss	*Neurological problems
Mental confusion	*Oxidative stress
*Vertigo	Respiratory and *Skin problems

Typical short-term symptoms are sometimes immediate and conscious, but they can also be delayed or subconscious. Common symptoms are headaches, memory loss, disturbed sleep and anxiety, but people can also experience muscle pains, heart palpitations, brain fog, dizziness, depression, nosebleeds, skin rashes and internal bleeding.

Long-term symptoms are often subconscious but some people sensitive to EMFs can feel the EMFs affecting their cancer sites. Long-term or delayed effects range from cancer and infertility to neurological and cardiovascular harm.

Short-term symptoms cease when the RFR and EMFs causing them are removed. Long-term symptoms can be irreversible. Both short-term and long-term symptoms can be affected by factors such as the incident angle of the EMFs, humidity, temperature and whether the body is healthy and rested or ill and tired. Younger and older people, the fetus, the ill and females can be more sensitive to EMFs than others, as can people with certain genetic traits, similar to other environmental sensitivities or allergens.

Hypersensitivity can be triggered by a sudden or gradual increase in exposures to man-made EMFs, among other precursors [3]. It was first recorded in scientists experimenting on electricity and workers in the electrical and radio industries. With the widespread increase in RFR and EMFs, hypersensitivity to EMFs can now affect all the population.

1 (b) How long has EMF sensitivity been known?

Physical sensitivity to electromagnetic fields (EMFs) has been known for almost three centuries [4]. Charles Du Fay, a scientist and Fellow of the Royal Society of London, reported typical EHS symptoms in 1733. Other Fellows reported symptoms of hypersensitivity from 1746 after the Leyden Jar was invented.

In 2021 thirty-two worldwide experts on EHS published the Scientific Consensus International Report [5]. This confirmed that hypersensitivity to EMFs is an established physical reaction, not psychological from fear.

Well-known people who have suffered EHS include Nikola Tesla, the electrical engineer, and Dr Gro Harlem Brundtland, the medical physician who was Norway's first female Prime Minister and Director-General of the World Health Organization (WHO).

1 (c) How many people does EMF sensitivity affect?

Every cell in the body is sensitive to EMFs. All humans require ultraviolet B EMF radiation to produce Vitamin D3. However, humans vary genetically in their sensitivity to these native EMFs. Some experience suntan. Only a few are hypersensitive, suffering sunburn or DNA damage and skin cancer.

This sensitivity to natural EMFs can also be seen in hospital admissions for cardiovascular conditions, where analysis shows correlation over many years with changes in the earth's magnetic field and the global electrical circuit caused by sunspots and solar flares, which also cause the northern lights. In 1801 Sir William Herschel deduced biological effects where the sunspot cycle coincided with variations in plant growth. Similar correlations have been found for the spread of viruses.

People are sensitive to man-made as well as natural EMFs. A higher incidence of chromosomal aberrations was found among those living near a mobile phone mast compared with those further away, with significantly higher numbers of single-strand DNA breaks [6]. These can cause long-term chromosomal damage.

Some people are hyper- (over) or hypo- (under) sensitive to EFMs, as recognised in 1885 [7]. This likewise applies to other sensitivities, allergies and intolerances. About 29% of the population are hypersensitive to EMFs, 50% average, and 21% EMF-hyposensitive (Table 2). However, the term 'hypersensitive' includes both the 29% above average and those with severe adverse reactions, 1.2% – 3.6% [8].

Table 2:
Levels of sensitivity to electromagnetic fields (EMFs) and numbers affected

Level of EMF Sensitivity		Percentage of population
Hypersensitive	Extreme	1.2 % - 3.6 %
	Above average	1.2 % - 29 %
Sensitive	Average	50 %
Hyposensitive	Below average	21 %

Sight is a conscious sensitivity to EMFs in the visible spectrum. Similarly, most humans also respond to invisible infrared radiation partly through photobiomodulation at non-thermal levels. In fact, human senses involving perception of many invisible environmental factors, such as hearing, touch, taste and smell, along with senses of pain, temperature, balance and movement, involve EMF sensitivity through ion flows along the nervous system. This makes the nervous system and perception especially sensitive to external EMFs.

2. EMF SENSITIVITY

2 (a) EMF sensitivity is physical, not psychological

The International Commission on the Biological Effects of Electromagnetic Fields (ICBE-EMF) has twelve independent Commissioners and nine independent Special Experts. In 2024 it issued a Position Statement: 'Electromagnetic Hypersensitivity (EHS) is a Humanitarian Crisis that Requires an Urgent Response'. This attributes 'the growth of EHS to the rapid expansion in anthropogenic (human-caused) electromagnetic fields', not to some unproven prior psychological conditioning [9]. The ICBE-EMF defines EHS as 'a multisystemic physical response, with symptoms that can vary among individuals due to anatomical and physiological differences'.

EHS cannot be psychological, of course, for at least three reasons. Firstly, unaware adults and children can become sensitive to EMFs without prior cognitive conditioning, meaning that they are affected physically, not psychologically. Secondly microwave radiation has been used in warfare since 1953 without the enemy's knowledge, again meaning the effects are not psychological but physical. Since 2017 microwave attacks were directed against embassy staff at Havana and elsewhere, producing physical symptoms and brain damage revealed by MRI scans, similar to people with EHS [10]. Thirdly, plants, animals and insects are sensitive to EMFs, where the cause is physical, not psychological.

2 (b) EMF sensitivity can increase cancer, infertility and neurological harm

Some people sensitive to EMFs are especially susceptible to cancers. It has been known that RF EMFs can cause cancer since 1953 when radar workers started to get cancers. ELF EMFs from power cables and wiring have been established as carcinogenic since 1979. The IARC classifies both RF and ELF EMFs as 2B carcinogens.

Cancer causation was confirmed conclusively by the $30m NTP study. The WHO review on animals also re-affirmed that RFR can cause cancer [11]. Experts say that there is now enough evidence for RFR to be reclassified as a group 1 known carcinogen [12, 13].

Studies link specific EMF exposures to specific cancers, such as for prostate cancer linked with the use of mobile phones with an increasing risk from increased use [14]. A dose–response relationship of length of mobile phone use was

also found for incident nonmelanoma skin cancer in men and women, and prostate cancer in men [15]. People with hypersensitivity to EMFs can feel the effect of EMFs on cancer sites, including nonmelanoma skin and prostate cancers.

Studies have also linked EMF exposures to infertility, diabetes, chronic fatigue and other neurological harm, including insomnia, depression, and autism or ADHD where pregnant mothers and their fetus have been exposed to EMFs. Moreover, children using tablets and exposed to high EFL-MF have increased central nervous system tumours [16].

2 (c) Mechanisms, pathways and genetic factors

Recent years have greatly extended our knowledge of the basic mechanisms and downstream pathways by which electric, magnetic and electromagnetic fields cause health effects [17, 18]. These effects on living cells are complex and can be negative or positive. Although sensed by living organisms, EMFs can be challenging to measure with machines.

A basic mechanism for magnetoreception is through iron and biogenic magnetite, as found in the human brain. This may explain an intrinsic sense of direction detected by men in the presence of blue light, suggesting a quantum mechanical mechanism [19]. In the radical pair mechanism two unpaired electrons on separate molecules can share a correlated spin state which is quantum mechanically entangled, and highly sensitive to weak external magnetic fields. This can occur in cryptochrome molecules, found in humans and birds which navigate by the earth's geomagnetic field and visible light. Biological systems can sense pulses of both man-made radiofrequency waves and light at similar intensities [20].

Current knowledge of the numerous downstream pathways includes ion flux, especially calcium and sodium in cell membranes, DNA and chromosomal changes, epigenetic expression, signalling pathways, phosphorus levels and apoptosis. Effects apply to mitochondria, myelin found in the nervous system and brain, melatonin which is both an antioxidant against cancer and a controller of circadian rhythms, mast cells related to allergic and skin responses and many other cells and systems. A key factor for people with EHS is oxidative stress [21]. This is associated with mitochondrial dysfunction, chronic inflammation, neurodegenerative conditions and many cancers. People with EHS are often also sensitive to chemicals, where oxidative stress is also a central mechanism.

People extremely sensitive to EMFs can perceive other people's EMFs. Magnetic fields from the heart reach the rest of the body and can be detected by Superconducting Quantum Interference Devices (SQUIDs) a meter away. Electro-Photon Imaging, Gas Discharge Visualization and Meridian Energy Analysis Devices have made progress in visualising subtle energies and each human's biofield.

People with EHS are nearly ten times more likely to have certain genetic haplotypes than others [22]. Other genetic factors include insufficient repair genes for DNA damaged by the EMFs, and compromised myelin. Myelin develops in the body from conception until over 20 years of age and is especially susceptible to RFR damage. This is a special concern for children if there is radiation from Wi-Fi, Bluetooth and phone signals in homes and schools.

3. ELECTROMAGNETIC HYPERSENSITIVITY (EHS)

3 (a) Diagnosis of EMF Hypersensitivity

All humans are sensitive to extremely low frequency EMFs, such as the Schumann Resonance which influences brain waves. All humans are also sensitive to higher frequencies, such as infrared, visible light and ultraviolet, aiding sensitivity to heat, sight and vitamin D production.

Since this sensitivity to EMFs is a primary perception, it does not require tests for verification. Similarly, sensitivities to other invisible environmental stimuli such as sound or taste do not require blinded studies or secondary

Table 3:
Long-term, non-thermal RF limits, for sensitive and other people (simplified)

Guidelines	Sensitivity	*Electric Field	**Power Density	Notes
Bioinitiative	**Sensitive**	0.03 V/m	3 µW/m2	Children
	Others	0.05 V/m	6 µW/m2	Adults
EUROPAEM	**Sensitive**	0.006 – 0.19 V/m	0.1 – 100 µW/m2	According to type of signal, for > 4 hours
	Others	1.9 – 19 V/m		Night – Day, for > 4 hours
IGNIR	**Sensitive**	< 0.02 V/m	< 1 µW/m2	Averages should be at the next lower limit
	Others	0.06 – 0.2 V/m	10 – 100 µW/m2	Night – Day

NOTES: *V/m: Volts per meter. **µW/m2: microWatts per metre squared. SAR: 0.0003 W/kg [34].

experiential evidence for third-party validation. Secondary and tertiary evidence, such as meta-analyses averaging secondary experiments, are by definition inferior to primary experience.

Valid external verification of EHS depends on the correct evidential parameters, including screening all subjects for whether they have EHS or not. Factors can include identifying the subject's sensitivity to specific frequencies and modulations, compensating for variations in the geomagnetic field or the experimenter's own bodily EMFs, and allowing for effects delayed by 6-24 hours for short-term, or days and years for long-term effects. Biomarkers can help, such as decreased melatonin, increased mast cells and activated heat-shock proteins, along with scans using ultrasonic cerebral tomosphygmography (UCTS) for reduced brain blood perfusion [23] and fMRI scans for brain damage [24]. Surveys of EMF workers, residents near masts and individual ecological surveys are also useful indicators [25]. Such surveys have been used to identify people with EHS since the 1930s.

3 (b) Prevention of EMF Hypersensitivity – 'a humanitarian crisis'

The International Commission on the Biological Effects of Electromagnetic Fields (ICBE-EMF) is seriously concerned that EHS is an escalating humanitarian crisis. They want to see EHS 'formally recognized as an EMF-induced external cause of injury by public health agencies worldwide, and greater recognition of the needs of those who are EHS-disabled, so they have access to safer homes, healthcare, education, employment, opportunities, amenities, and equity of access in all public domains' [9].

The first requirement is for regulators to replace unprotective RF heating exposure limits [26]. Those set by the ICNIRP and FCC are 200 times too high [27]. For EMF genotoxic effects, comparative limits for RFR are set 45,000 times less stringently than those for gamma rays radiation [28]. Regulators should set appropriate international long-term and non-thermal limits [29], such as Bioinitiative [30], EUROPAEM [31] and IGNIR [32], where 'sensitive' includes people with EHS, children, pregnant women, the elderly and the ill [33].

Health harm from EMFs can trigger hypersensitivity. This causes functional impairment, including the loss of jobs, homes, family and friends [35]. This contravenes health and safety legislation and equality rights, while underwriters refuse to insure EMF dangers except as high risk like asbestos. People with severe EHS deserve full and equal access to schools,

hospitals, public spaces, shops, transport and homes like other people [36].

3 (c) Denial of EMF Hypersensitivity, misinformation and 'captured' agencies

The denial of the established scientific evidence on the adverse effects of EMFs is one of the longest running denials in the history of science. This misinformation, especially on non-thermal RF harm, has continued for over 70 years, longer than the denials of harm for smoking, asbestos and lead in petrol. There are similar reasons, such as industry profits, government taxes and user addiction [37].

The scientific evidence for non-thermal effects of RF EMFs, established since the 1880s, has been denied since 1953 in a 'conspiracy' by the military-industrial complex, according to mainstream researchers. That year Schwan arbitrarily denied the existence of primary non-thermal adverse effects; heating is a secondary effect. In 1972 the World Health Organization (WHO), an agency of the United Nations fostering economic development, arbitrarily denied the scientific evidence for non-thermal effects without supplying any proof.

In 2004, soon after its Director General and its ICNIRP admitted to EHS, the WHO arbitrarily denied the scientific evidence for non-thermal EHS, again without any proof. Instead, it claimed that only thermal effects existed and all non-thermal health effects were now psychological (IEI-EMF), despite the blatant impossibility for children and unaware adults. This unscientifically confused two separate conditions, sensitivity to EMFs known since 1733, and electrophobia, known since 1904. It thus ignored the military use of non-thermal adverse effects of EMFs since 1953, the discoveries in 1953 and 1979 that RF and ELF EMFs were associated with cancers, and non-thermal physical effects on plants and animals, along with hundreds of convincing and consistent studies.

This serious problem of misinformation and denial about sensitivity to EMFs from groups 'captured' by the industrial-military complex still continues, in opposition to the independent scientific evidence as represented by, for instance, the ICBE-EMF. Captured groups still fail to exercise their duty of care to prevent people being harmed by non-thermal RF-EMFs. They still promulgate their myth of psychological not physical sensitivity and still promulgate their thermal myth that the only adverse effect of RFR is short-term heating by 1 or 5 degrees within 6 or 30 minutes. They thus fail to warn against long-term non-thermal effects like EHS and cancer [38].

In 2021, the United States Court of Appeals for the District of Columbia Circuit ruled that the FCC's decision to keep its 1996 thermal limits unchanged was 'arbitrary and capricious'. It ordered the agency to re-assess long-term non-thermal health risks from long-term exposure, reproductive and neurological effects, children's heightened vulnerability, and environmental impacts. In 2026 the FCC's re-assessment is still awaited.

The WHO's RFR reviews which used inappropriate meta-analyses for disparate evidence have been rejected as unscientific by independent mainstream scientists [39]. In early 2026, a prominent Swiss toxicologist professor, whose team produced a commissioned review on RF and cancer for the WHO, reported that the WHO tried to manipulate their assessment in line with the WHO's denial of cancer risks, against her review confirming the cancer risk [40]. Until this interference ceases and the scientific evidence is upheld, people with EHS will continue to face misinformation and denial.

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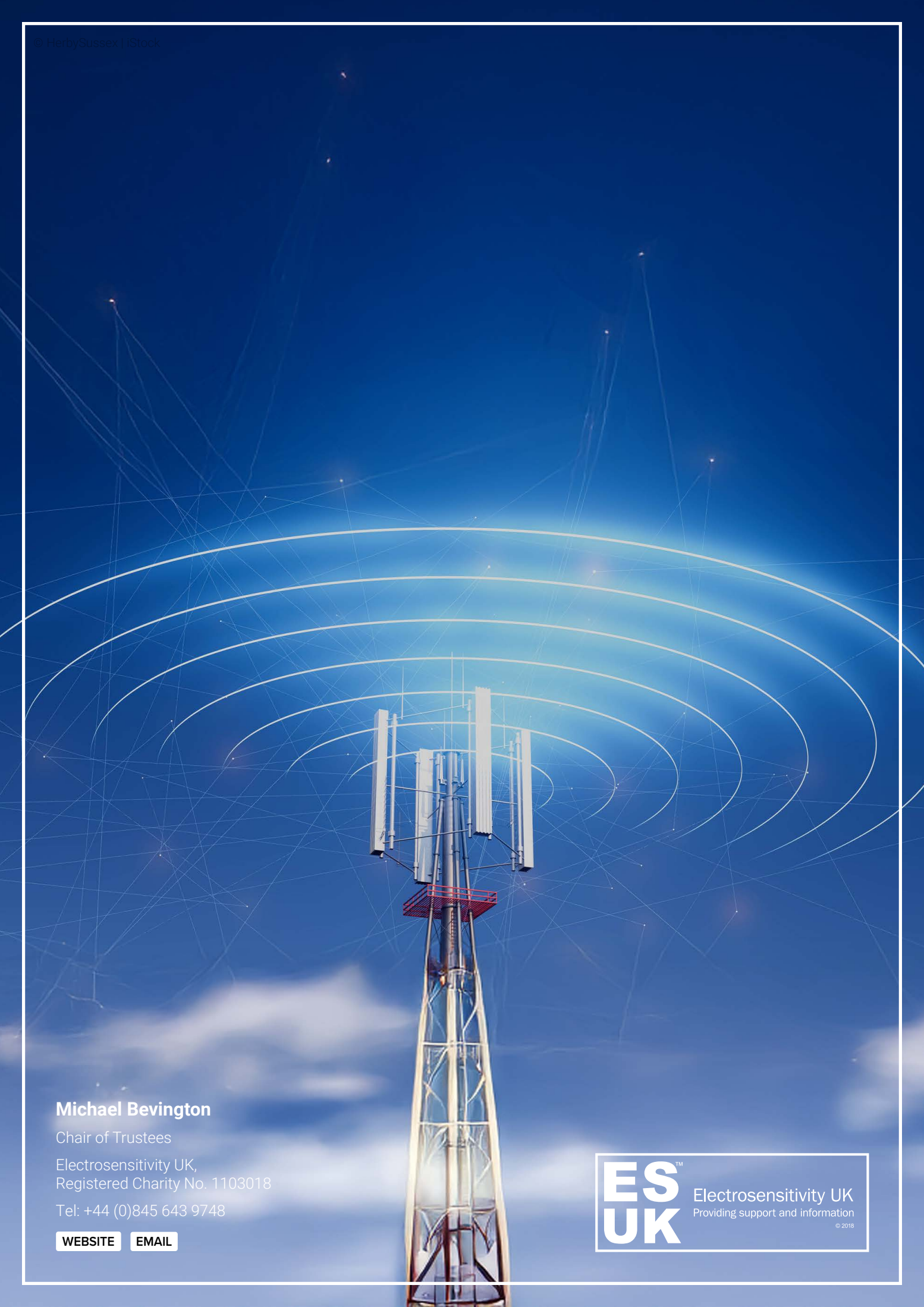
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