

Unscientific attitudes to Electrosensitivity (ES) and Electromagnetic hypersensitivity (EHS)

This paper elucidates

- **unscientific attitudes** towards electrosensitivity (ES) and electromagnetic hypersensitivity (EHS),
 - **ignorance, or pretended ignorance, of 98% of the scientific studies** related to ES and EHS, and
 - **confusion between the two different conditions** of electrosensitivity and electrophobia,
- typical of members of pro-industry groups such as the ICNIRP, WHO, PHE, DHSC, DCMS and COMARE.

On June 7 2020 Frank de Vocht, a member of COMARE, proposed ([link](#)) a study on the “wellbeing and health of people with electrohypersensitivity (electrosensitivity) in the UK”.

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A. Flaws in psychological and epidemiological approaches to real ES and EHS

1. **Numerous robust studies from the 1930s onwards have proved convincingly and beyond reasonable doubt that real ES and EHS exist.** Mainstream evidence-based science now accepts the existence of real physiological ES and EHS. This is illustrated by the majority-viewpoint Bioinitiative Report 2012, the most authoritative and comprehensive scientific review of the ES literature to that date, and the International EMF Scientist Appeal representing over 250 of the leading world experts. This acceptance of real ES and EHS should be fundamental to any discussion of ES and EHS and the “wellbeing and health” of people with ES or EHS.
2. **Since the 1930s there have been thousands of mechanistic, observational and biological studies which have established real ES and EHS as proven physiological conditions.** Any discussion of ES and EHS must include them. The EMF Portal lists over 31,000 papers on the effects of electromagnetic fields; many or most of these focus on the non-thermal levels relevant to ES and EHS.

3. **Up to perhaps 98% of studies related to ES, EHS, their symptoms, mechanisms and associated effects, support the existence of non-thermal effects relevant to the conditions of real ES and EHS.** Only perhaps some 2% or fewer of similar studies may support electrophobia, the different psychological condition based on a placebo effect with prior cognitive conditioning. The condition of electrophobia affects about 1% of people with EHS.
4. Some invalidated claims about the supposed lack of proof for ES and EHS depend on **aspects of epidemiology which are flawed as regards ES and EHS**, especially as regards provocation studies. Valid provocation studies need to record results, not averages, for each individual and not as averages (the WHO definition of EHS states it is an individual or ideopathic condition and thus differs between individuals, known since 1873), cover subliminal as well as conscious effects, address the windows of frequencies and specific waveforms to which a particular person is especially sensitive, and include cumulative and/or delayed effects. A study needs to have 100 subjects or over if subjects are unscreened for having real EHS and the study is to have the power to detect a single subject with EHS if the condition affects 1% of the population. Where the provocation studies are conducted properly they can show 100% positive results, confirming that ES and EHS are real physiological conditions.
5. **The World Health Organization defines ES and EHS as an environmental intolerance.** All environmental intolerances, such as to allergens, animals like cats and dogs, chemicals, cigarette smoke, cleaning agents, moulds, perfumes, pollens, toxic fumes and vehicle exhaust, generate human responses in a varied intensity pattern depending on the individual person. When aggregated, the total responses match normal distribution or a bell-shaped curve. Thus, a few people show no conscious or only subliminal intolerance, most show moderate intolerance or to just a few environmental toxins, and a few show extreme intolerance which can trigger hyper-sensitivity in a small number of people. This well-established analysis of environmental intolerances is not accepted and applied by the few sceptics of real ES and EHS who are members of pro-industry groups such as the ICNIRP, WHO, PHE, DHSC, DCMS and COMARE, despite its proof in the scientific literature since 1932.
6. The few people still denying, or professing uncertainty about, the existence of real ES and EHS **often base their beliefs on Schwan's invalidated heating hypothesis of 1953.** This includes members of pro-industry groups like ICNIRP, WHO, PHE, DHSC, DCMS and COMARE. These people adopt the minority viewpoint denying non-thermal effects, although in mainstream science non-thermal effects were established as primary by 1930, with heating as a secondary effect.
7. **To deny real physiological ES and EHS symptoms** as caused by EMFs is **invalidated in the light of two common uses of such non-thermal EMFs:**
 - Adverse ES and EHS non-thermal effects are the basis of much modern **electronic warfare.**
 - Therapeutic ES and EHS non-thermal effects are the basis of many modern **medical procedures.**

B. Study on the “wellbeing and health” of people with EHS (ES) proposed on June 7th 2020

1. The research proposal by Frank de Vocht and Beki Langford “to study wellbeing and health of people with electrohypersensitivity (electrosensitivity) in the UK” **lacks the necessary mainstream conceptual and evidence-based background**, if de Vocht’s writings so far are an accurate reflection of his viewpoint. Any such valid study should be founded on the established mainstream scientific evidence, where the majority viewpoint in the east since 1935 and in the west since 2008 has accepted non-thermal effects including “electrohypersensitivity (electrosensitivity)”. This mainstream conceptual scientific basis is essential for designing a valid study of people with ES and EHS where the expert physicians recommend avoidance of EMF toxins and pollution as the key protocol in reducing specific ES and EHS symptoms.
2. As explained above, there are many studies proving beyond reasonable doubt the existence of ES and EHS. There have already been a number of studies relating to the “wellbeing and health” of people with EHS (ES). See, for instance:
 - Bevington M: “The Prevalence of People with Restricted Access to Work in Manmade Electromagnetic Environments” (2019) [Article](#).
 - Carlsson F et al.: “Prevalence of annoyance attributed to electrical equipment and smells in a Swedish population, and relationship with subjective health and daily functioning” (2005) [Abstract](#).
 - Eltiti S et al.: “Development and evaluation of the electromagnetic hypersensitivity questionnaire” (2007) [Article](#).
 - Gibson PR et al.: “Unmet health care needs for persons with environmental sensitivity” (2018) [Article](#).
 - Johansson O: “Electrohypersensitivity: a functional impairment due to an inaccessible environment” (2015) [Article](#).
 - Kato Y et al.: “Reported functional impairments of electrohypersensitive Japanese: A questionnaire survey” (2012) [Abstract](#).

A new study would need to build on the information already available in such studies, based on the established existence of ES/EHS known since 1932.

See also: Further Information.

3. If the study intends to survey the “well-being and health” of **people with real ES and EHS**, it needs to **screen all its subjects to identify those with real physiological ES and EHS according to the existing established protocols for diagnosis of real ES and EHS**. Otherwise, anyone claiming to be ES or EHS will be accepted, whether they are or not, likely making the results unreliable or even meaningless.
4. If the study is intended to survey the “well-being and health” of **people with electrophobia, they do not need screening for having the condition since electrophobia is by definition self-diagnosed**, as opposed to people with ES and EHS who often need screening. Therefore any results drawn about the nature of the “wellbeing and health” of people with electrophobia would be valid without prior screening. However these results would be irrelevant to people with real ES and EHS, except for the 1% who also suffer from electrophobia.

5. **If the study confuses the two different conditions of ES/EHS and electrophobia, it will lack the conceptual apparatus to evaluate the effectiveness of protection from, or elimination of EMFs and RFR, for improving the “wellbeing and health” of people with ES and EHS caused by these environmental toxins.** This elimination or protection from EMFs and RFR is the key and essential element in any assessment of the “wellbeing and health” of a person with real ES and EHS. In contrast, this elimination or protection from EMFs and RFR is not an essential conceptual constituent for people with electrophobia, since the extent of their electrophobia is dependent on various elements in their conceptual framework and cognitive prior conditioning as regards the presence or absence, known or unknown, of EMFs and RFR. In addition their attitudes can be altered through cognitive behavioural therapy, something largely impossible with the different conditions of ES and EHS.
6. The proposed research seems to follow and update PHE/HPA’s flawed, damaging, and widely criticised **Irvine review** of 2005.
7. The seven fundamental points about ES and EHS listed above in section A are crucial to any study design on people with real physiological ES and EHS. **Any prior conceptual assumption denying the mainstream majority viewpoint accepting the existence of these two conditions of real ES and EHS** could compromise or invalidate any findings and conclusions as to the motivation, causation, activities, wellbeing, health and lifestyle recorded by most people with ES and EHS.

This is particularly true of the nature of ES and EHS as

 - (a) an **individual** condition, unique to a single person, where averaged conclusions may be irrelevant for that and other individuals,
 - (b) an **environmental intolerance, causing functional impairment**, not a disease as yet unrecognised and undefined, nor a psychological state dependent of prior cognitive conditioning, and
 - (c) **long-term non-thermal effects, sometimes with acute symptoms**, where the invalidated short-term heating hypothesis, still held by members of pro-industry groups such as the ICNIRP, WHO, PHE, DHSC, DCMS and COMARE, is irrelevant.
8. The survey where possible should relate the “wellbeing and health” of people with ES and EHS to **long-term non-thermal international safety guidelines**, such as Bioinitiative 2012, EUROPAEM EMF Guidelines 2016, IGNIR 2018 and Seletun 2010. Short-term (6 or 30 minutes), averages, and only heating effects, as used in the WHO’s obsolete ICNIRP guidelines are not protective for long-term non-thermal effects and are irrelevant to people with real ES and EHS, since these are long-term and non-thermal conditions.

There is a substantial difference between the two types of guidelines. In terms of power density measured in microWatts per metre squared, the international long-term guidelines safety limits are some ten million times lower than the obsolete ICNIRP short-term heating-only guidelines.

C. Some unscientific claims or omissions with comments

	<i>Unscientific claim or omission</i>	<i>Comment</i>
1	ES/EHS is a 'disease'.	There is no evidence for how ES/EHS is an infectious, hereditary, deficiency or physiological disease. Since the 1960s mainstream evidence-based science has regarded ES/EHS as a multi-systemic condition affecting the central nervous system etc. where the body's homeostasis is upset by an exogenous toxic insult.
2	ES/EHS is a communicable disease. It can be communicated by watching a video on health harm from Wiifi or by seeing a 5G transmitter.	ES/EHS is not a disease and is not communicable. ES/EHS is an intolerance of an environmental toxin. 'Communicable' applies only to electrophobia.
3	ES/EHS is not an intolerance.	The World Health Organization defines ES/EHS as an 'intolerance'.
4	ES/EHS is not dependent on the physical environment for people who are ES/EHS, but instead on psychological prior cognitive conditioning.	ES/EHS is established as dependent on the physical environment for people with ES/EHS. People with ES/EHS who are, for instance, also blind, or unaware of their environmental EMF, or are children without prior cognitive conditioning, can suffer ES/EHS. Therefore ES/EHS cannot be psychological or the same as electrophobia or IEI-EMF because it depends on the impact of established environmental toxins. The World Health Organization defines ES/EHS as environmental.
5	ES/EHS is not a systemic condition related to alterations of the central nervous system etc.	It has been known since the 1960s that ES/EHS is a systemic condition related to alterations of the central nervous system etc.
6	ES/EHS is never genetic.	Scientific studies have shown that people with real ES and EHS are nearly 10 ten more likely than others to have a particular genetic haplotype. Established genetic effects include DNA alterations and breaks, genomic instability, and gene expression as relating to and causing ES symptoms.
7	ES/EHS is probably psychological in origin.	There is no convincing, consistent or conclusive evidence that ES/EHS has a psychological origin, although in about 1% of cases people with ES/EHS also have electrophobia (EPH).

		Studies have proven that ES is not a nocebo effect and that it is a real physiological condition not related directly to heating. In contrast, EPh is by definition psychological in origin.
8	ES/EHS and Electrophobia are the same condition.	ES/EHS and Electrophobia are two separate conditions. All humans are physically electrosensitive since being electrosensitive is a prerequisite to being alive. Humans vary in their degree of sensitivity, as known since 1873, with some becoming hyper-sensitive, discovered in 1932. In contrast, some people can also suffer the different condition of psychological electrophobia, known since 1903.
9	ES/EHS has always been the same as electrophobia.	Electrosensitivity has been known and described as a physical condition since the 18 th century. Electrophobia has been described as a separate condition from ES/EHS since 1903. The two conditions were deliberately confused in 2004 at a conference under Repacholi, then working for the WHO but a long-term supporter of the wireless industry and part of the small cartel trying to deal with 'the EMF problem' by denying ES/EHS to help the wireless industry.
10	Electrosensitivity occurs only if there are conscious symptoms, not with subconscious symptoms.	Electrosensitivity can have conscious and/or subconscious symptoms. Some 79% of the population can show subconscious objective symptoms if they live close to a phone mast as opposed to living far away from a mast.
11	The number of people with Electrosensitivity is very small.	Up to 79% of the population (53 million in the UK) can show conscious or subconscious electrosensitivity symptoms near a mast. 800,000 people in the UK (1.2%), according to government-sponsored surveys, are seriously affected by EM exposure, such as from phone masts, Wifi, smart meters, mobile and cordless phones and Bluetooth.
12	Electrosensitivity symptoms are only immediate and short-term, such as headaches, heart palpitations, nosebleeds, and incontinence.	Electrosensitivity symptoms can be conscious and immediate. They can also be subconscious, delayed – often for 12-24 hours – and long-term, such as cancers, cardiovascular damage, infertility, and neurological illness.
13	Electrosensitivity is not included under ICD-10.	Since 2000 international classifications of ICD-10 have included Electrical Allergy and harm from non-ionizing radiation, as well as the different condition of psychological electrophobia.

14	Electrosensitivity was discovered in the 1980s among people suffering ill health from visual display units (VDUs).	Electrosensitivity symptoms have been recorded since 1762 among scientists experimenting with electricity, and since 1873 it has been known that individuals have differing levels of sensitivity. Since 1889 symptoms have been generally recognised with electromagnetic hypersensitivity first described in 1932 in Germany. EHS was established through detailed surveys of thousands of sufferers in the 1960s and early 1970s. VDUs were later just one of many causes of ES/EHS.
15	The first generalised experiments on human sensitivity, such as ES/EHS, to wireless electric fields were provocation studies from 1991.	The first recorded experiment on human sensitivity to wireless electric fields was in 1729. The first small-scale frequency-specific provocation study was by Smith before 1989, achieving 100% success, and the first large-scale blinded provocation study was by Rea et al. of 1991, which again showed 100% positive effects of human sensitivity to wireless electric fields for people with ES/EHS.
16	The first study on the effects of RF radiation from masts was in 2006.	The first study on the ES/EHS effects of RF radiation from radio masts was in 1932, when the specific symptoms of ES/EHS were recorded. In 1996 higher cancer rates were found nearer to a TV mast as opposed to further away. In 1998 ES/EHS symptoms were shown from mobile phones handsets. In 2002 ES/EHS symptoms were shown closer to phone masts as opposed to further away. In 2004 higher cancer rates were found nearer to phone masts rather than further away.
17	Electrosensitivity symptoms are not related to electronic warfare or covert use against civilians.	Since 1953 electrosensitivity symptoms have been a key factor in electronic warfare, and since the 1980s they have been used in covert operations, such as against UK citizens at Greenham Common and in Northern Ireland. All middle eastern wars since the 1990s have made extensive use of electronic devices causing electrosensitivity symptoms. The USA army instituted a research programme to see if it could reduce these electrosensitivity symptoms among its own troops.

18	Provocation studies have not proved the existence of ES/EHS.	<p>Provocation studies have proved the existence of ES/EHS.</p> <p>Epidemiology with small-scale studies involving short-term and immediate conscious effects often cannot assess ES/EHS. It requires over 100 unscreened subjects to find one subject with a condition with a prevalence of 1%. No single laboratory study has had this power in the UK yet.</p> <p>In the USA in 1991 Rea et al. found in a provocation study of 100 subjects 100% positive reactions from all their consistent ES subjects. To do this they had to test each person individually and record their results individually and then eliminate the 84% who claimed to be ES but did not react consistently to EMF provocations at the frequency and signal format to which they were sensitised.</p>
19	Many provocation studies have proved the existence of electrophobia or a nocebo effect.	<p>So far, there has possibly been only one provocation study confirming the existence of electrophobia or a nocebo effect as opposed to real ES/EHS. Many claims about the existence of electrophobia or a nocebo effect are invalid assumptions derived without specific evidence from negative ES/EHS findings, not from positive evidence of the effects of prior cognitive conditioning.</p> <p>So far, there has been no provocation study to assess any overlap between people with real ES/EHS and people with electrophobia.</p> <p>Hospitals specialising in real ES/EHS report that about 1% of people with real ES/EHS also have psychological electrophobia.</p>
20	EMFs and RFR do not have long-term effects.	<p>Up to about 79% of the population are ES. They show changes in objective biomarkers when living in close proximity to phone masts compared with living further away.</p> <p>Studies have also shown that living close rather than far from a mobile phone mast increases the risk of cancers by up to 10 times.</p>
21	ES/EHS cannot exist since they would be non-thermal effects and adverse non-thermal effects cannot exist, since the only adverse effect is the risk of heating.	<p>This is scientifically completely wrong.</p> <p>By 1930 it was established in the USA that adverse non-thermal effects are primary, and heating is only a secondary effect.</p> <p>Many countries, such as Russia in 1935, adopted non-thermal safety guidelines.</p> <p>Now electronic warfare depends on adverse non-thermal effects, and many hospital</p>

		<p>procedures now depend on therapeutic non-thermal effects.</p> <p>Members of ICNIRP, WHO, PHE, DHSC, DCMS and COMARE still cling to Schwan's 1953 mistake in holding the minority viewpoint that heating is the only adverse effect. Mainstream and majority-viewpoint scientists have long accepted adverse non-thermal effects.</p>
22	ES/EHS do exist since non-thermal exposure does not cause cancer and therefore non-thermal exposure is unlikely to cause ES/EHS.	<p>Non-thermal exposure can and does cause cancer. This has been known since 1953 and confirmed for mobile phones by animal studies in the 2018 NTP \$30 million study which showed 'clear evidence', its top category, that mobiles cause cancer. Also in 2018 it was confirmed in the Ramazinni Institute study that phone masts can cause cancer. Epidemiological studies confirmed in 1996 that TV masts can cause cancer and in 2004 that phone masts can cause cancer.</p>
23	ES/EHS cannot be diagnosed except through self-diagnosis.	<p>ES/EHS can be diagnosed with the help of reference to objective biomarkers.</p> <p>Objective biomarkers for ES/EHS include cerebral blood perfusion, grey matter changes evident in 3d fMRI scans, levels of melatonin, histamine degranulation, oxidative stress etc.</p> <p>In contrast with ES/EHS, electrophobia by definition has to be diagnosed through self-diagnosis.</p> <p>In contrast, by definition electrophobia has to be diagnosed through self-diagnosis, since it requires prior cognitive conditioning.</p>
24	There are no mechanisms for ES/EHS.	<p>There are confirmed mechanisms for ES/EHS, VGCs were discovered in 1974, reduced melatonin and cryptochromes were confirmed by animal and human studies since then, along with numerous other established mechanistic pathways for both ES and EHS.</p>
25	ES/EHS does not occur, or ES/EHS symptoms are not triggered, in natural, non-manmade, EMF environments.	<p>ES/EHS does occur, and ES/EHS symptoms are triggered, in natural non-manmade environments. It has been known since 1970 that the human circadian rhythm depends on natural environmental EM exposures. Since then computer analysis has shown numerous effects related to geomagnetic disturbances, from cardiovascular to suicides, births and deaths. Some can occur in 5-20% of the population, a similar proportion of the population as those with symptoms of ES/EHS</p>

		<p>from man-made exposures such as from phone masts, mobiles and Wifi.</p> <p>ES symptoms have often been shown as associated with geomagnetic disturbances involving EMFs and RFR.</p>
26	If real ES/EHS exists, as opposed to electrophobia, it must be a linear dose-dependent condition.	<p>Real ES/EHS does exist.</p> <p>It is both a linear and non-linear condition.</p> <p>It is both a dose-dependent and not a dose-dependent condition.</p> <p>ES/EHS is relevant to established quantum biophysical EM effects such as windows, frequency, amplitude, modulation, polarisation, VGCs, oxidative stress, cryptochromes, magnetic bystander effects, delayed and cumulative effects. Some effects relate to the body's photonic information systems.</p>
27	There is no difference between ES and EHS.	<p>There are probably many differences between the relevant mechanisms, pathways and effects responsible for the differences between ES and EHS, but this distinction has been very little studied so far.</p>
28	The specific symptoms of ES and EHS are MUS (medically unexplained symptoms).	<p>The specific symptoms of ES and EHS are not MUS (medically unexplained symptoms). It is impossible for them to be MUS because they have been established as specific symptoms caused by EMFs since 1762 and since 1974 have been related to established mechanisms such as VGCs and oxidative stress. Therefore many or most of the symptoms of ES/EHS are now explained medically.</p>
29	ES/EHS could not exist because the UK follows ICNIRP's Guidelines and these protect everyone.	<p>The ICNIRP guidelines are for only short-term and heating effects.</p> <p>The ICNIRP guidelines are some 10 million times higher than the long-term non-thermal guidelines needed for long-term safety (over 6 or 30 minutes) and protection from symptoms such as cancer, cardiovascular and neurological harm, electrosensitivity and infertility.</p> <p><i>(See table below.)</i></p> <p>The ICNIRP's guidelines were voted as obsolete by the European Parliament in 2008.</p> <p>Even the ICNIRP's Principles from 2002 admit that not all people are protected by their short-term heating guidelines and state that governments need to adopt long-term and non-thermal guidelines to protect such people.</p>
30	ES/EHS could not exist since insurance would not cover masts and Wifi installations if	<p>Many underwriters refuse to cover EM devices such as mobile phones, phone masts, Wifi and smart metres.</p>

	these caused ES/EHS symptoms.	If insurers do cover them, they rate them in the highest risk category along with other carcinogens such as asbestos.
31	The lawcourts do not recognise ES/EHS.	Since 2012 UK courts and tribunals have recognised electrosensitivity. They have made awards for its resulting functional impairment and fined employers slow to make the reasonable adjustments necessary to remove radiation from the environment.
32	Members of ICNIRP, WHO, PHE, DHSC, DCMS and COMARE do not need to study the thousands of studies on effects relevant to ES/EHS, since non-thermal effects have been disproved.	In rejecting non-thermal effects members of ICNIRP, WHO, PHE, DHSC, DCMS and COMARE are also rejecting the mainstream majority-viewpoint based on the established scientific evidence of hundreds of relevant studies proving non-thermal effects. This renders such refusal to study the relevant evidence as unscientific and the conclusions derived from such a refusal to study the relevant evidence as unprotective.
33	Members of ICNIRP, WHO, PHE, DHSC, DCMS and COMARE rely on evidence-based science to promote their thermal hypothesis.	This claim is invalid. The weight of mainstream robust scientific evidence has convincingly and consistently shown since the 1930s both ES/EHS and general health risks from RFR at non-thermal levels.
34	Members of ICNIRP, WHO, PHE, DHSC, DCMS and COMARE include experts on ES/EHS.	This claim appears invalid according to the published evidence. No member of ICNIRP, WHO, PHE, DHSC, DCMS and COMARE is apparently either (a) a medical doctor experienced in diagnosing real ES/EHS, as opposed to a psychologist with experience in diagnosing EPh, or (b) a person with ES/EHS who has expertise in personally coping with the functional impairments caused by the current very high levels of electrosmog.
35	The ICNIRP can distinguish between 'health effects' and harmless biological effects. However, the ICNIRP admits: <i>"it is not always easy to draw a clear distinction between biological and adverse health effects, and indeed this can vary depending on individual susceptibility to specific situations"</i>	(a) This attempt by the ICNIRP to allow people to suffer harmful health and biological effects on the grounds that they are merely <i>"discomfort and annoyance"</i> goes against the WHO's definition of health. The WHO defines health as: <i>"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."</i> (b) The ICNIRP admits that adverse health effects can depend on <i>"individual susceptibility"</i> but its guidelines are set at thermal levels which makes it impossible for them to protect

<p>The ICNIRP even claims: <i>"ICNIRP does not consider discomfort and annoyance to be adverse health effects by themselves, but, in some cases, annoyance may lead to adverse health effects by compromising well-being"</i></p>	<p>everyone, including people with individual susceptibility to ES/EHS. (c) Since the ICNIRP still invalidly claims that only heating causes adverse effects, as mistakenly suggested by Schwan in 1953, its flawed hypothesis already rules out all the established non-thermal health effects anyway, both adverse and beneficial.</p>
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D. ES/EHS: long-term non-thermal and short-term heating only guidelines

- Only the current long-term non-thermal guidelines aim to protect against ES/EHS and all other established symptoms and effects.
- In contrast, obsolete short-term heating-only guidelines do not protect against ES/EHS and all the other established non-thermal effects including cancer, infertility, and cardiovascular and neurological harm.

Back-ground (safe) levels	Majority mainstream guidelines			Minority 'industry' guidelines		
	Protective of ES/EHS: Yes, mainly			Protective of ES/EHS: No		
	Majority of expert scientists			ICNIRP, WHO, PHE, DHSC, DCMS, COMARE		
	Basis: majority scientific evidence			Basis: arbitrary invalidated thermal hypothesis		
	<i>Long-term and short-term</i>			<i>Short-term only</i>		
	<i>Non-thermal and heating</i>			<i>Heating only</i>		
	<i>Peak</i>			<i>Averaged over 6 or 30 minutes</i>		
$\mu W/m^2$	Date		$\mu W/m^2$	Date		$\mu W/m^2$
0.000001	1935	USSR	100,000	1953	US: Schwan's mistake	100,000,000
	1972	Poland	1,000	1998	ICNIRP	10,000,000
	2012	Bioinitiative	3	2020	ICNIRP	40,000,000

E. Unrecognised conscious and subconscious ES/EHS symptoms

- Many or most **conscious ES/EHS symptoms are unrecognised as caused by EMF exposure**. This is often true of effects such as poor sleep near a phone mast, digestive problems close to someone using a mobile phone, memory loss near a tablet in use, or results of an immune system weakened by Wifi radiation.
- Other people have only **subconscious ES/EHS symptoms**. They are therefore **unaware of their ES/EHS sensitivity** to EMF exposure. Subconscious symptoms can include changes in heart rate variability, decreased cerebral blood flow, increased oxidative stress and impaired thyroid function.
- Some ES/EHS symptoms have been reported in the literature by members of the sceptic groups such as the ICNIRP, WHO, PHE, DHSC, DCMS and COMARE but **not always identified as ES/EHS symptoms**:
 e.g.:
 - "vertigo, metallic taste, and concentration problems" from inducing ES symptoms by moving quickly through the magnetic fields of MRI scanners, DOI: [10.1002/jmri.20485](https://doi.org/10.1002/jmri.20485),
 - reduced "hand coordination and near visual contrast sensitivity" from inducing ES symptoms by moving quickly through the magnetic fields of MRI scanners, DOI: [10.1002/mrm.10604](https://doi.org/10.1002/mrm.10604)
 - for over 0.25 million births in Manchester from 2004 to 2009, there was an average increase of 10% births at supermoon (160 compared with a daily average of 145 births), regarded as significant.
<https://oehscience.wordpress.com/2015/02/05/witches-prince-george-of-cambridge-other-babies-and-the-full-moon/>

F. Numbers of people with ES/EHS

Percentage and numbers of people with ES/EHS in the UK					
	ES subconscious effects	ES/EHS mild conscious symptoms	ES/EHS moderate conscious symptoms	EHS severe conscious symptoms	EHS restricted work and education
ES/EHS Percentage (UK population)	79 %	29 %	3.6 %	1.2 %	0.65 %
ES/EHS Number (UK: 67 million)	53 million	19 million	2.4 million	804,000	435,500

Subconscious and conscious symptoms, recognised and unrecognised as caused by EMF and RFR exposure, can include:

- cancers
- cardiovascular harm
- electrosensitivity and electromagnetic hypersensitivity (ES/EHS)
- infertility
- neurological harm and illnesses.

Numbers of people with ES/EHS in the UK, compared with other conditions causing functional or social impairment		
	Percentage	Number (UK, 67 million)
Crohn's disease	0.15 %	103,000
Multiple Sclerosis	0.16 %	107,000
Parkinson's	0.2 %	145,000
Reg'd deaf and hard of hearing (2010)	0.34%	212,900
Registered blind, partially sighted	0.54 %	360,000
Epilepsy	1.0 %	600,000
Autism	1.04 %	700,000
EHS: severely affected by EMF/RFR	1.2 %	804,000
Dementia	1.3 %	850,000
Wheelchair users	1.87 %	1,184,000

G. Statements and Comments

Statement	Comment
<p>De Vocht, June 3 2020: https://www.gsma.com/gsmadeurope/wp-content/uploads/2020/06/GSMA-ETNO-EU-presentation-5G-and-health_June3-3030-upd-1.pdf</p> <p><i>Electrohypersensitivity Idiopathic Environmental Intolerance attributed to Electromagnetic Fields (IEI-EMF):</i></p> <ul style="list-style-type: none"> ▪ 1%-10% of the population self-diagnoses as suffering from IEI-EMF ▪ Remains unclear whether IEI-EMF should be attributed to <ul style="list-style-type: none"> - electromagnetic radiation - entirely psychosomatic - combination of both ▪ Conceivable some people may be more susceptible to radiation <p><i>5G: visible small cell networks and knowledge of MIMO technology likely to create obvious, and regular, triggers for nocebo effects</i></p>	<p>The term '<i>Electrohypersensitivity Idiopathic Environmental Intolerance attributed to Electromagnetic Fields (IEI-EMF)</i>' is used confusingly to cover two separate conditions:</p> <p>(a) real physiological ES and EHS and also (b) psychological radiophobia or electrophobia.</p> <p>These two different conditions and should be distinguished properly.</p> <ul style="list-style-type: none"> • ES was described in 1889 and EHS in 1932. • Radiophobia was described in 1903 and renamed electrophobia in 1980 and IEI-EMF in 2004. <p>'Remains unclear': this is scientifically wrong; it is perfectly clear. It has been scientifically established since 1932 that some people suffer real ES or EHS and since 1903 that some people have radiophobia or electrophobia.</p> <p>'Conceivable some people may be more susceptible to radiation': it has been scientifically established since 1889 that some people are more susceptible to EM radiation.</p> <p>'5G: visible small cell networks ... likely to create ... triggers for nocebo effects': this refers to people with electrophobia. People with ES and EHS are affected directly by the RFR, not by their eyesight. The NTP study found 'clear evidence' (its top category) that the RFR causes cancer, known since 1953. RFR also causes ES and EHS, known since 1889 and 1932. RFR from masts like 5G can also weaken the immune system, known since 1960.</p>

	<p>Most RFR health experts say 5G should be halted immediately.</p>
<p>de Vocht F et al., March 29 2016: Review of Dirty Electricity or High-Frequency Voltage Transients PMC4810027.</p> <p><i>"The available evidence for DE as an exposure affecting human health at present does not stand up to scientific scrutiny ..."</i></p> <p><i>Although the above does not exclude DE as an explanation, it seems much more likely that distributions and changes in known lifestyle risk factors explain the observed differences.</i></p> <p><i>Moreover, this does not require the invention of a hitherto unknown, new exposure....</i></p> <p><i>further discussion on whether DE has any effects on human health is meaningless</i></p> <p><i>The work was supported by a grant from the Electrical Power Research Institute (EPRI)"</i></p>	<p><i>"The available evidence for DE as an exposure affecting human health at present does not stand up to scientific scrutiny"</i> Yet other scientists have scrutinised the same evidence and found that it does point to DE as a causal agent of ill health, suggesting hidden presumptions by the author.</p> <p><i>"it seems much more likely that distributions and changes in known lifestyle risk factors explain the observed differences":</i> A study showed that cows avoided DE of 150 Hz at 21 V/m. For 150 Hz, ICNIRP guidelines are 1,667 V/m, over 80 times too high. This suggests the scientists accepting DE as a cause of ill health are correct and those denying the evidence or postulating other causes are wrong. (Buesink F et al., IEEE Xplore, 2018. https://ieeexplore.ieee.org/document/8485158)</p> <p><i>"Moreover, this does not require the invention of a hitherto unknown, new exposure"</i> It is not apparent how a new exposure is to be introduced scientifically without inventing appropriate meters and metrics, which has been done for DE.</p> <p><i>"further discussion on whether DE has any effects on human health is meaningless"</i> Further discussion on the established ill health caused by DE can have meaning even if not all aspects have yet been fully analysed.</p> <p>The power industry EPRI's funding may explain the review's hostile tenor.</p>
<p>De Vocht, October 2015 http://www.funpolice.eu/october%202015.htm</p> <p><i>"I think what the author and I agree on is that electrohypersensitivity is a form of MUS"</i></p>	<p>ES and EHS cannot be 'a form of MUS (medically unexplained symptoms)'</p>

<p><i>(medically unexplained symptoms) which they attribute to electromagnetic fields, without much evidence that this is the case...</i></p> <p><i>But I guess this is what the majority of researchers in the field believe (I'd say 97%, but that would get this muddled up with climate change).</i></p> <p><i>As also previously mentioned by many people, that does not mean this is not an illness; it's not great suffering from this (and that is an understatement).</i></p> <p><i>Luckily, it seems cognitive behavioural therapy can help. ...</i></p> <p><i>What it really looks like is that this is a group of people not that dissimilar from the general population, who attribute things everybody is occasionally inconvenienced by to a specific exposure (electromagnetic fields in this case).</i></p> <p><i>Having said that, as a group they could do with better sleep!"</i></p>	<p>since the existence and symptoms of ES/EHS were established in the scientific literature from 1889 and 1932. Since then studies have proved the existence of ES and EHS beyond all reasonable doubt.</p> <p><i>'the majority of researchers in the field'</i> hold that real ES and EHS exist. Some 98% of scientific studies support real physiological ES and EHS, whereas only 2% of studies support psychological electrophobia, which, anyway, is defined as a separate condition.</p> <p><i>'an illness'</i>: ES and EHS are not an illness or disease. They are an environmental intolerance (WHO).</p> <p><i>'cognitive behavioural therapy can help'</i>: applies to Eph, not ES/EHS.</p> <p><i>'not that dissimilar from the general population'</i>: about 79% of people suffer ES symptoms close to a phone mast compared with being further away.</p> <p><i>'they could do with better sleep!'</i> Sleep is altered by EMFs and RFR.</p>
<p>De Vocht, July 2015 http://www.funpolice.eu/blog%20july15.htm <i>"Electrohypersensitivity (EHS) is an, I suspect, pretty well known condition in which a person's wellbeing is negatively affected by exposure to electromagnetic radiation. I believe it is recognized as an established medical condition in Sweden.</i></p> <p><i>That's pretty straightforward, except that there are quite a lot of problems with this disease. Not so much with the adverse effects on health and wellbeing; these are real and can cause real problems for those affected. Some people are affected so badly that they basically have to exclude</i></p>	<p>Sweden recognised EHS specifically as a functional impairment in 2000, as have Canada and the USA since then. From 2012 the UK courts and pension companies have recognised the existence of real ES and EHS and made financial awards to them, or fined employers not providing adjustments for people sensitive to EM exposures. NHS doctors and consultants since 2012 have diagnosed EHS.</p> <p><i>'this disease'</i>: as above, ES and EHS are not a disease but an environmental intolerance (WHO). If it were a disease</p>

<p><i>themselves from society, which is awash with electromagnetic radiation.</i></p> <p><i>No the problems lies with the fact that the factor that is supposed to cause these effects is self-attributed; in other words, people who Ie these adverse effects say that it comes from mobile phones, Wifi, etcetera.</i></p> <p><i>Again, that in itself is not a problem, but scientific studies of the best kind (double-blinded, randomized, controlled trials) have been done to determine if radiation was the real exposure that causes these effects, and in summary EHS people cannot distinguish when they get exposed or not (so in other words, they do experience these adverse effects with the same intensity and probably regardless of whether they are really exposed or received sham exposure). ...</i></p> <p><i>And indeed, it has been shown that the disease pattern is, to a large extent psychopathological and that therapies like cognitive behavioural therapy can help to reduce or completely remove the symptoms. This indicates that the trigger for the effects is, at least in part, psychological in nature.</i></p> <p><i>IEI-EMF (or electrohypersensitivity) really does seem to have a significant psychological component and that it seems quite unlikely that electromagnetic fields are the real trigger.</i></p> <p><i>This does not make the adverse effects any better, but a cure should probably be sought in some form of cognitive therapy rather than removal of all equipment that generates EMF or to remove oneself from society."</i></p>	<p>up to some 79% of the UK population could be permanently diseased.</p> <p><i>'the factor that is supposed to cause these effects is self-attributed':</i> Since 2012 there have been international objective protocols for diagnosing ES/EHS along with objective biological markers, genetic DNA sequencing, 3d fMRI scans and cerebral blood perfusion scans, all used by expert physicians and at national centres of excellence for ES/EHS.</p> <p><i>'scientific studies of the best kind (double-blinded, randomized, controlled trials) have been done to determine if radiation was the real exposure that causes these effects, and in summary EHS people cannot distinguish when they get exposed or not':</i> this is wrong and appears to be cherry-picking a few studies through ignorance or bias. There are robust and convincing studies proving EHS beyond reasonable doubt, according to the weight of the best scientific evidence.</p> <p><i>the disease pattern:</i> see above on 'disease'. There is no evidence that ES or EHS is a 'disease'.</p> <p><i>'IEI-EMF (or electrohyper-sensitivity) really does seem to have a significant psychological component':</i> true, if IEI-EMF is electrophobia; wrong, if it refers to ES/EHS.</p> <p><i>'some form of cognitive therapy rather than removal of all equipment':</i> correct for Eph, wrong for real ES/EHS.</p>
<p>De Vocht F et al., March 13 2015 https://link.springer.com/article/10.1007%2Fs00330-015-3629-z <i>"These results support previous findings that routine work with MRI is associated with reporting of a specific set of symptoms</i></p>	<p><i>"specific set of symptoms [... 'slight dizziness ... 'slight headache' ... 'eye strain/dizzy'. Magneto-phosphenes</i></p>

<p><i>[more specifically 'slight dizziness after cleaning bore', 'dizzy feeling for 30 s', 'slightly dizzy, but busy', 'slight headache', 'very mild headache', and 'eye strain/dizzy'. Magneto-phosphenes were not reported.] and that these occur in roughly 4 % of shifts with 1.5 – 3 T systems.</i></p> <p><i>Our results further suggest that in our survey, reporting of these specific symptoms is primarily related to duration of work with MRI systems and not to the strength of the systems or the shift-average magnetic field exposure, indicating that shift duration and perceived stress not related to the MRI system were important contributing factors."</i></p>	<p><i>were not reported.] and that these occur in roughly 4 % of shifts":</i> The nature and prevalence of these specific ES symptoms are typical of what would be expected in the vicinity of MRI magnetic fields.</p> <p><i>"... indicating that shift duration and perceived stress not related to the MRI system were important contributing factors.":</i> It has long been established that ES symptoms relate to cumulative exposure or 'shift duration', so it does not follow that the stress was not the EM stress caused by the magnetic fields.</p>
<p>De Vocht, March.28.2014 https://oehscience.wordpress.com/2014/03/28/a-medieval-hermit-a-religious-nut-and-a-mobile-phone-enter-a-pub/</p> <p><i>"I don't even know enough about the subject [MCS and EHS] to make a useful educated guess about causality. I know things can get quite heated when MSC and EHS are discussed, so I will stay away from any claims."</i></p>	<p><i>'I don't even know enough about the subject [MCS and EHS] to make a useful educated guess about causality.':</i> Sadly, apparently true.</p>
<p>De Vocht, March 24 2010 https://www.nature.com/articles/jes20108.pdf</p> <p><i>"methodological problems in published studies prohibit the valid assessment of its biological activity ...</i></p> <p><i>Most notably, none of these case studies were blinded to the exposure. Generally, this tends to increase treatment effects compared to blinded studies, and is especially problematic in these studies where the cases were self-reported EHS patients."</i></p>	<p>Blinding works best for vaccination or drug trials. For conscious neurological studies, which depend on stress pathways common both to exogenous stress, such as from EM exposure, and to endogenous stress, such as from psychological perception of possible exogenous stress, blinding is less effective. Blinding has been recognised since 1784 as a potentially misleading artefact in EM studies based on a binary hypothesis of which the subject is aware. This can tend to make it a study of the subject's own conscious psychological assessment based on their own conceptual hypothesis of stress, both psychological and physical, rather than one based solely on the actual physical stress.</p>

H. Further information

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