

WHO & ICNIRP; 75 studies on Electrosensitivity (ES) and Electromagnetic Hypersensitivity (EHS)

The WHO's 2005 claim on the aetiology of EHS is scientifically invalid and counter to legal judgements

Mainstream independent scientists like the International Commission on the Biological Effects of Electromagnetic Fields (ICBE-EMF) – not to be confused with the minority single-viewpoint pro-industry group ICNIRP – regard the WHO's Backgrounder of 2005 on Electromagnetic Hypersensitivity (EHS) as outdated and invalidated.

1. WHO not independent or primarily scientific: conflicts of interest

The World Health Organization (WHO), founded in 1948, is not independent or based primarily on scientific evidence. It is actually an agency of the United Nations (UN) which is concerned more with political factors such as economic growth than health. Since 1959, the WHO has been legally subject on radiation health to the veto of the IAEA and still invalidly denies harm from non-thermal radiofrequency radiation (RFR) against established scientific evidence.

The UN and WHO are composed of governments which have an inherent conflict of interest if they effectively put economics above health. Similarly, the UK government's COMARE, a committee under the DHSC on medical aspects of environmental radiation including RFR, still denies EHS RFR harm. Government employees have been told to deny non-thermal effects and have not been free to apply the scientific evidence for EHS and cancer from non-thermal EMF/RFR.

To avoid such conflicts of interest, other groups like the International Commission on the Biological Effects of Electromagnetic Fields (ICBE-EMF), the Environmental Health Trust and the World Council for Health have been founded. They aim at independence and prioritising science over economics and politics.

2. WHO's agency ICNIRP holds invalidated thermal hypothesis

The WHO's agency ICNIRP, on which the UKHSA still relies, is a private closed group based in Germany and set up by people sympathetic to the wireless industry. All its members hold the single-viewpoint hypothesis, based on Schwan's myth of 1953, that the only adverse effect of RFR is a thermal increase of one degree or more over 6 or 30 minutes. This arbitrary and invalidated claim rejects the many hundreds of peer-reviewed studies which have established numerous non-thermal adverse effects. It also ignores the use of non-thermal RFR in a growing number of medical procedures.

3. WHO/ICNIRP's claims regarded as biased

Under some legal jurisdictions, studies by WHO/ICNIRP have been rejected as invalid legal evidence on EMF/RFR for symptoms such as EHS and cancer. This is because the WHO/ICNIRP is regarded as heavily influenced by, and legally subject to, the radiation industry.

4. Ten reasons why the WHO's 2005 aetiological claim on EHS is invalid:

(a) Against scientific consensus study

The scientific consensus study of 2021 by 31 worldwide experts on EHS concluded that EHS is a real physiological condition. Physiological EHS is aetiologically distinct from the separate psychological condition of Electrophobia (EPh) with which the WHO confused it in 2005. The WHO's Backgrounder of 2005 needs to be corrected.

(b) Ignored existing science

The WHO's invalidated claim of 2005 ignored the adverse effects of RFR at non-thermal levels which have been known since 1893. In 1930 adverse RFR non-thermal effects were established scientifically as primary, with heating effects secondary. Following this, many countries have rejected the thermal myth, later used by Schwan and WHO/ICNIRP, and have adopted non-thermal RFR limits.

(c) Ignored existing evidence for EHS symptoms like cancer

The WHO/IARC classified EMF as 2B carcinogen in 2001. The WHO's Backgrounder of 2005 on the cause of EHS symptoms, one of which is cancer, omitted its own key carcinogenic classification of EMF.

(d) Not updated following the best scientific evidence

The WHO's invalidated claim of 2005 has failed to be updated to include the best available scientific evidence which confirms adverse non-thermal effects.

(i) In 2011 the WHO/IARC classified RFR as 2B carcinogen. Since 2013 leading experts have stated in peer-reviewed studies that the scientific evidence is now sufficient for non-thermal RFR to be reclassified as a class 1 certain carcinogen. The WHO's Backgrounder of 2005 has not been updated to include among symptoms the WHO/IARC's carcinogenic RFR classification.

(ii) In 1999 the FDA commissioned the \$30 million NTP study, to determine whether RFR from mobile phones causes cancer. In 2018 this study found 'clear evidence', their highest category, that non-thermal RFR from mobile phones causes cancer. In fact, evidence for cancer being caused by RFR exposure has been known since 1945. The WHO's Backgrounder of 2005 has not been updated to include this significant evidence confirming this fact.

(e) Failed to prove 'safety' or electrophobia (EPh) hypothesis

The invalidated thermal hypothesis still held by the single-viewpoint clique of the private agency ICNIRP, on which the WHO Backgrounder of 2005 is based, is a minority opinion disproved by many hundreds of studies. The WHO and its ICNIRP have never proved and asserted that the hundreds of studies establishing physiological EHS are wrong and that EMF/RFR cannot cause EHS symptoms, but only electrophobia (EPh). Thus, the WHO/ICNIRP cannot scientifically prove or assert that non-thermal RFR is 'safe' and does not cause EHS symptoms, making the WHO Backgrounder misleading.

(f) Counter to best medical practice since 2012

The WHO's invalid claim of 2005 does not match best medical practice, unsurprisingly, since the WHO and ICNIRP have no medical experts on real EHS. EHS was first described in the scientific literature in 1746 and EPh as a different condition in 1903. Since 2012, some UK NHS consultants and GPs have diagnosed physiological EHS. Specialist centres and physicians around the world now regularly diagnose EHS as an environmental intolerance. In fact, the WHO's 2005 Backgrounder classified EHS as an environmental

intolerance but, based on their arbitrary hypothesis, invalidly attributed it to an unproven psychological cause without established evidence.

(g) Against practical application of UK laws since 2006

Since 2006, employers in the UK have removed Wifi and mobile phone radiation to allow employees with EHS to continue working, as legally required under the Health & Safety At Work Act 1974 and, subsequently, the Equality Act 2010. In 2022, a UK upper tier court recognised that a school pupil with EHS came under the Equality Act 2010. The court required that educational provision should be made for that pupil without Wifi, Bluetooth and mobile phone radiation.

(h) Counter to UK legal judgements since 2012

The WHO's invalidated claim of 2005 is counter to legal practice in the UK. In the UK, EHS has been recognised by the courts since 2012 as a real physiological condition and not as the different condition of the WHO's psychological electrophobia (EPh). People with EHS have also been awarded early retirement pensions on health grounds. This was based on real EHS and not the WHO/ICNIRP's 2005 invalidated hypothesis of EPh.

(i) Against worldwide legal judgements

Some legal jurisdictions have considered a person with EHS as an interested party in legal decisions on the siting of mobile phone masts. Others have required the removal of masts because of EHS symptoms in nearby residents or farm animals. Others have required shielding and protection for workers with EHS. Others have imposed fines on employers for not protecting employees from becoming EHS or for not doing so promptly.

(j) Against military use and against insurance risks

(i) The WHO's invalidated 2005 claim ran counter to the established non-thermal adverse effects of RFR. Military warfare has used these since 1950.

(ii) The WHO's invalidated claim of 2005 also ran counter to the insurance industry. Since the 1990s, the insurance industry has refused to underwrite non-thermal RFR harm except as high risk, like asbestos.

5. WHO/ICNIRP accepted EFM/RFR as unsafe in 2002

The WHO's ICNIRP in 2002 accepted that EMF/RFR is unsafe, and that some people are vulnerable to adverse effects at levels below the WHO/ICNIRP's heating limits, without hypothesising electrophobia (EPh) or confusing real EHS with EPh. Therefore, the WHO's invalidated hypothesis, denying the existence of real EHS in its Backgrounder of 2005, is inconsistent with the scientific evidence from 1746 and the WHO/ICNIRP's own conclusion in 2002.

6. WHO/ICNIRP should set non-thermal limits to safeguard people with EHS

The international scientific consensus study from 2021 has confirmed the scientific evidence since 1746 and the WHO/ICNIRP's assertion of 2002, that EHS does exist and is a real physiological condition. It rejected the WHO's denial of 2005 and the substitution of the different condition EPh as the cause of EHS symptoms. Indeed, two recent studies showed EHS symptoms from 5G masts.

The WHO should return to its 2002 ICNIRP statement that some people can suffer EHS symptoms caused by EMF/RFR at non-thermal levels. The WHO should reiterate its 2002 requirement of the need for non-thermal limits.

SECTIONS

1. 3d fMRI brain scans, cerebral blood flow, ultrasonic cerebral tomosphygmography
2. Challenge to medical profession
3. Co-morbidity
4. Definition: Electrosensitivity different from Electrophobia (nocebo response)
5. Diagnosis and markers
6. Ecological and Environmental studies
7. Genetics
8. Guidelines: long-term, biological, precautionary principle
9. Mechanisms
10. Prevalence
11. Proof from conscious symptoms
12. Proof from subconscious markers
13. Socio-economic effects
14. Specific symptoms
15. Subconscious effects
16. Treatment, management
17. Consensus and collected studies

Established scientific evidence for physiological EHS

The following sections provide some idea of the range of studies firmly establishing many aspects of the condition of EHS and EHS symptoms.

- *All living organisms, including human cells, are sensitive to electricity and magnetic fields. Human sensitivity can be at the level of a single photon upwards. There is a wide spectrum of human sensitivity, from the subconscious to conscious hypersensitivity; this varies continuously.*
- *Variations in sensitivity depend on numerous factors, including genetic haplotypes, previous exposures, cumulative effects, hormesis, duration, intensity, modulation, frequency, atmospheric electricity, grounding etc.*
- *Government surveys show that up to 1.5% of the population is severely sensitive and up to 3.6% moderately, but most do not know the cause.*
- *Diagnosis is by clinical history. Some biological markers and 3d fMRI etc. can help, but there is a wide variety of effects on all cells and nerves.*
- *Mechanisms and pathways include membrane depolarisation, ionic flux, cryptochromes, oxidative stress, primary cilia, DNA and epigenetic effects.*
- *Ecological and environmental provocation studies show EHS symptoms.*
- *Large-scale surveys show human sensitivity to natural RFR/EMFs from, e.g. solar cycles, sferics and non-thermal geomagnetic disturbances.*

1. 3d fMRI Brain Scans, cerebral blood flow, ultrasonic cerebral tomosphygmography

- Greco F: "Technical Assessment of Ultrasonic Cerebral Tomosphygmography and New Scientific Evaluation of Its Clinical Interest for the Diagnosis of Electrohypersensitivity and Multiple Chemical Sensitivity" *Diagnostics (Basel)*. (2020) [PMID: 32599757](#). [PMC7345985](#).
- Heuser G et al.: "Functional brain MRI in patients complaining of electrohypersensitivity after long term exposure to electromagnetic fields" *Rev Environ Health*. (2017) [PMID: 28678737](#); [Article](#). Heuser G et al.: "Corrigendum" *Rev Environ Health*. (2017) [PMID: 29206645](#). [Article](#).
- Irigaray P et al.: "How Ultrasonic Cerebral Tomosphygmography can Contribute to the Diagnosis of Electrohypersensitivity" *J Clin Diagn Res*. (2018) [Abstract](#). [Article](#).

2. Challenge to medical profession

- Hedendahl L et al.: "Electromagnetic hypersensitivity - an increasing challenge to the medical profession" *Rev Environ Health* (2015) [PMID: 26372109](#). [Article](#).

3. Co-morbidity: e.g. chemicals, mercury

- Hardell L et al.: "Increased concentrations of certain persistent organic pollutants in subjects with self-reported electromagnetic hypersensitivity - a pilot study" *Electromagn Biol Med*. (2008) [PMID: 18568937](#).
- Mortazavi G et al.: "Increased mercury release from dental amalgam restorations after exposure to electromagnetic fields as a potential hazard for hypersensitive people and pregnant women" *Rev Environ Health*. (2015) [PMID: 26544100](#).

4. Definition: Electrosensitivity different from Electrophobia (nocebo response)

- Belpomme D et al.: "Why the psychogenic or psychosomatic theories for electrohypersensitivity causality should be abandoned, but not the hypothesis of a nocebo-associated symptom formation caused by electromagnetic fields conditioning in some patients" *Environ Res*. (2022) [PMID: 36423669](#).
- Bogers RP et al.: "Individual variation in temporal relationships between exposure to radiofrequency electromagnetic fields and non-specific physical symptoms: A new approach in studying 'electrosensitivity'" *Environ Int*. (2018) [PMID: 30227317](#). [Article](#).
- Bolte JFB et al.: "Ecological momentary assessment study of exposure to radiofrequency electromagnetic fields and non-specific physical symptoms with self-declared electrosensitives" *Environ Int*. (2019) [PMID: 31288182](#).
- Dieudonne M: "Does electromagnetic hypersensitivity originate from nocebo responses? Indications from a qualitative study" *Bioelectromagnetics* (2016) [PMID: 26369906](#). [Article](#).
- Redmayne M et al.: "Redefining electrosensitivity: A new literature-supported model" *Electromagn Biol Med*. (2021) [PMID: 33492997](#).

5. Diagnosis and markers

- Austrian Medical Association: "Guideline of the Austrian Medical Association for the diagnosis and treatment of EMF related health problems and illnesses (EMF syndrome)" (2012) [Article](#).

- Belpomme D et al: "Reliable disease biomarkers characterizing and identifying electrohypersensitivity and multiple chemical sensitivity as two etiopathogenic aspects of a unique pathological disorder" *Rev Environ Health* (2015) [PMID: 26613326](#). [Article](#).
- Belpomme D et al.: "Electrohypersensitivity as a Newly Identified and Characterized Neurologic Pathological Disorder: How to Diagnose, Treat, and Prevent It" *Int J Mol Sci.* (2020) [PMID: 32168876](#). [PMC7139347](#).
- Belpomme D et al.: "The Critical Importance of Molecular Biomarkers and Imaging in the Study of Electrohypersensitivity. A Scientific Consensus International Report" *Int. J. Mol. Sci.* (2021) [PMID: 34298941](#). [PMC8304862](#).
- Belpomme D et al.: "Why electrohypersensitivity and related symptoms are caused by non-ionizing man-made electromagnetic fields: An overview and medical assessment" *Environ Res.* (2022) [PMID: 35537497](#).
- Bray RI: "Clinical Practice Guidelines in the Diagnosis and Management of Electromagnetic Field Hypersensitivity (EHS)" *Environmental Health Clinic, Women's College Hospital.* (2020) [Article](#).
- Fragopoulou AF et al.: "Hippocampal lipidome and transcriptome profile alterations triggered by acute exposure of mice to GSM 1800 MHz mobile phone radiation: An exploratory study" *Brain Behav.* (2018) [PMID: 29786969](#). [PMC5991598](#).
- Havas M et al.: "Original Findings Confirmed in Replication Study: Provocation with 2.4 GHz Cordless Phone affects the Autonomic Nervous System (ANS) as measured by Heart Rate Variability (HRV)" *Medical Research Archives.* (2021) [Abstract](#). [Article](#).
- Irigaray P et al.: "How Ultrasonic Cerebral Tomosphygmography can Contribute to the Diagnosis of Electrohypersensitivity" *J Clin Diagn Res.* (2018) [Abstract](#). [Article](#).
- Irigaray P et al.: "Oxidative stress in electrohypersensitivity self-reporting patients: Results of a prospective in vivo investigation with comprehensive molecular analysis" *Int J Mol Med.* (2018) [PMID: 30015864](#). [PMC6108880](#).
- Kaszuba-Zwolińska J et al.: "Electromagnetic field induced biological effects in humans" *Przegl Lek.* (2015) Review. [PMID: 27012122](#). [Article](#).
- Piras C et al.: "Metabolomics and psychological features in fibromyalgia and electromagnetic sensitivity" *Sci Rep.* (2020) [PMID: 33235303](#).
- Piras C et al.: "Metabolomics analysis of plasma samples of patients with fibromyalgia and electromagnetic sensitivity using GC-MS technique" *Sci Rep.* (2022) [PMID: 36535959](#).
- Tuengler A et al.: "Hypothesis on how to measure electromagnetic hypersensitivity" *Electromagn.Biol. Med.* (2013) [PMID: 23301924](#). [Article](#).
- Yang L et al.: "Functional and network analyses of human exposure to long-term evolution signal" *Environ Sci Pollut Res Int.* (2020) [PMID: 32974829](#).

6. Ecological and Environmental studies

- Balmori A: "Evidence for a health risk by RF on humans living around mobile phone base stations: From radiofrequency sickness to cancer" *Environ Res.* (2022) [PMID: 35843283](#).
- Dömötör Z et al.: "An idiographic approach to Idiopathic Environmental Intolerance attributed to Electromagnetic Fields (IEI-EMF) Part II. Ecological momentary assessment of three individuals with severe IEI-EMF" *Heliyon.* (2022) [PMID: 35607495](#). [PMC9123209](#).

- Eger H et al.: "Specific Health Symptoms and Cell Phone Radiation in Selbitz, Bavaria, Germany: Evidence of a Dose-Response Relationship" *Um Medizin Gesellschaft* (2010) [Article \(trans\)](#).
- Hardell L et al.: "Case Report: The Microwave Syndrome after Installation of 5G Emphasizes the Need for Protection from Radiofrequency Radiation" *Annals of Case Reports*. (2023) [Abstract](#). [Article](#).
- Nilsson M et al.: "Development of the Microwave Syndrome in Two Men Shortly after Installation of 5G on the Roof above their Office" *Ann Clin Case Rep*. (2023) [Article](#).

7. Genetics

- De Luca C et al: "Metabolic and genetic screening of electromagnetic hypersensitivity subjects as a feasible tool for diagnostics and intervention" *Mediators Inflamm*. (2014) [PMID: 24812443](#). [Article](#).

8. Guidelines: long-term and biological: immediate action needed

The FCC's and ICNIRP's short-term (6 or 30 minutes) heating-only guidelines were based on Schwan's 1953 mistake that heating is the only health effect.

In fact, exercise can also cause a rise in body temperature of one degree but without the specific cancer, cardiovascular, fertility and neurological damage, including electrosensitivity, caused by man-made EMFs.

- Belyaev I et al.: "EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses" *Rev Environ Health* (2016) [PMID: 27454111](#). [Article](#).
- [BioInitiative Report](#): "A Rationale for Biologically-based Public Exposure Standards for Electromagnetic Fields (ELF and RF)" (2012).
- Fragopoulou A et al.: "Scientific panel on electromagnetic field health risks: consensus points, recommendations, and rationales" *Rev Environ Health*. (2010) [PMID: 21268443](#). [Article](#).
- Havas M: "Electrohypersensitivity (EHS) is an Environmentally-Induced Disability that Requires Immediate Attention" *J Sci Discov*. (2019) [Article](#).
- International Commission on the Biological Effects of Electromagnetic Fields (ICBE-EMF): "Scientific evidence invalidates health assumptions underlying the FCC and ICNIRP exposure limit determinations for radiofrequency radiation: implications for 5G" *Environ Health*. (2022) [PMID: 36253855](#). [Article](#).
- Ishai PB et al.: "Problems in evaluating the health impacts of radio frequency radiation" *Environ Res*. (2023) [Abstract](#).
- Lai H et al.: "The roles of intensity, exposure duration, and modulation on the biological effects of radiofrequency radiation and exposure guidelines" *Electromagn Biol Med*. (2022) [PMID: 35438055](#).

9. Mechanisms

- Pall ML: "Electromagnetic fields act via activation of voltage-gated calcium channels to produce beneficial or adverse effects" *J Cell Mol Med*. (2013) [PMID: 23802593](#). [PMC3780531](#).
- Panagopoulos DJ et al.: "Human-made electromagnetic fields: Ion forced-oscillation and voltage-gated ion channel dysfunction, oxidative stress and DNA damage (Review)" *Int J Oncol*. (2021) [PMID: 34617575](#).

- Puri BK et al.: "The effect of successful low-dose immunotherapy ascertained by provocation neutralization on lymphocytic calcium ion influx following electric field exposure" *J Complement Integr Med.* (2019) [PMID: 31421039](#). [Article](#).
- Sherrard RM et al.: "Low-intensity electromagnetic fields induce human cryptochrome to modulate intracellular reactive oxygen species" *PLoS Biol.* (2018) [PMID: 30278045](#). [Article](#).
- Stein Y et al.: "Electromagnetic hypersensitivity (EHS, microwave syndrome) - Review of mechanisms" *Environ Res.* (2020) [PMID: 32289567](#).
- Yakymenko I et al.: "Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation" *Electromagn Biol Med.* (2015) [PMID: 26151230](#).

10. Prevalence

- Bevington M: "The Prevalence of People with Restricted Access to Work in Manmade Electromagnetic Environments" *J Environ Health Sci.* (2019) [Article](#).

11. Proof from conscious symptoms

- Abdel-Rassoul G et al.: "Neurobehavioral effects among inhabitants around mobile phone base stations" *Neurotoxicology.* (2007) [PMID: 16962663](#).
- Belpomme D et al.: "Why scientifically unfounded and misleading claim should be dismissed to make true research progress in the acknowledgment of electrohypersensitivity as a new worldwide emerging pathology" *Rev Environ Health.* (2021) [PMID: 34390636](#).
- Bevington M: "'Proof of EHS beyond all reasonable doubt'. Comment on: Leszczynski D. Review of the scientific evidence on the individual sensitivity to electromagnetic fields (EHS). *Rev Environ Health* 2021; doi: 10.1515/reveh-2021-0038." *Rev Environ Health.* (2021) [PMID: 34343421](#). [Article](#).
- Cohen A et al.: "Sensitivity to mobile phone base station signals" *Environ Health Perspect.* (2008) [PMID: 18288297](#). [PMC2235218](#).
- Eger H et al.: "Specific Health Symptoms and Cell Phone Radiation in Selbitz, Bavaria, Germany: Evidence of a Dose-Response Relationship" *Um Medizin Gesellschaft* (2010) [Article \(trans\)](#).
- Hardell L et al.: [Microwave radiation from base stations on rooftops gave medical symptoms consistent with the microwave syndrome] [Swedish] *Medicinsk Access.* (2022) [Article](#).
- Hardell L et al.: "Electromagnetic hypersensitivity close to mobile phone base stations - a case study in Stockholm, Sweden" *Rev Environ Health.* (2022) [PMID: 35238501](#).
- McCarty DE et al.: "Electromagnetic hypersensitivity: evidence for a novel neurological syndrome" *Int J Neurosci.* (2011) [PMID: 21793784](#). [Article](#).
- Navarro E et al.: "The Microwave Syndrome: A preliminary study in Spain" *Electromagn Biol Med.* (2003). [Abstract](#). [Article](#).
- Nilsson M et al.: "Development of the Microwave Syndrome in Two Men Shortly after Installation of 5G on the Roof above their Office" *Ann Clin Case Rep.* (2023) [Article](#).
- Raz-Steinkrycer LS et al.: "ELF-MF Exposure, Actual and Perceived, and Associated Health Symptoms: A Case Study of an Office Building in Tel Aviv-Yafo, Israel" *Sustainability.* (2022) [Abstract](#). [Article](#).
- Rea WJ et al.: "Electromagnetic field sensitivity" *J Bioelectricity* (1991) [Abstract](#). [Article](#).

12. Proof from subconscious markers

- Buchner K et al.: "Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields - A Long-term Study under Real-life Conditions" *Umwelt-Medizin-Gesellschaft* (2011) [Article](#).
- Havas M et al.: "Dirty electricity and electromagnetic hypersensitivity: five case studies" *World Health Organization Workshop on Electrical Hypersensitivity, Prague* (2004) [Article](#).
- Havas M: "Radiation from wireless technology affects the blood, the heart, and the autonomic nervous system" *Rev Environ Health*. (2013) [PMID: 24192494](#). [Article](#).
- von Klitzing L: "Artificial EMG by WLAN-Exposure" *Journal of Biostatistics and Biometric Applications*. (2021) [Article](#).
- von Klitzing L: "Healthy disorders by WLAN-exposure" *J Clin Images Med Case Rep*. (2022) [Article](#).

13. Socio-economic consequences, functional impairments

- Gibson PR et al.: "Unmet health care needs for persons with environmental sensitivity" *J Multidiscip Healthc*. (2015) [PMID: 25670904](#). [Article](#).
- Johansson O: "Electrohypersensitivity: a functional impairment due to an inaccessible environment" *Rev Environ Health* (2015) [PMID: 26613327](#); [Article](#).
- Kato Y et al.: "Reported functional impairments of electrohypersensitive Japanese: A questionnaire survey" *Pathophysiology*. (2012) [PMID: 22458999](#).

14. Specific symptoms

- Hutter H et al.: "Subjective symptoms, sleeping problems, and cognitive performance in subjects living near mobile phone base stations" *Occup Environ Med*. (2006) [PMID: 16621850](#).
- Medeiros LN et al.: "Tinnitus and cell phones: the role of electromagnetic radiofrequency radiation" *Braz J Otorhinolaryngol*. (2016) [PMID: 26602000](#). [Article](#).
- Pall ML: "Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression" *J Chem Neuroanat*. (2015) [PMID: 26300312](#). [Article](#).
- Stein Y: "Symptoms reported by Electrohypersensitive (EHS) patients -first-year summary from a specialized Pain Research Clinic" *Israeli Society of Anesthesiologists Ann Confer 2019*. (2020) [Abstract](#).

15. Subconscious effects

- Marshall TG et al.: "Electrosmog and autoimmune disease" *Immunol Res*. (2017) [PMID: 27412293](#). [Article](#).
- Meo SA et al.: "Mobile Phone Base Station Tower Settings Adjacent to School Buildings: Impact on Students' Cognitive Health" *Am J Mens Health*. (2018) [PMID: 30526242](#).
- Nishimura T et al.: "A 1- μ T extremely low-frequency electromagnetic field vs. sham control for mild-to-moderate hypertension: a double-blind, randomized study" *Hypertension Res*. (2011) [PMID: 21248759](#). [Article](#).

16. Treatment, management

- Bray RI: "Clinical Practice Guidelines in the Diagnosis and Management of Electromagnetic Field Hypersensitivity (EHS)" *Environmental Health Clinic, Women's College Hospital*. (2020) [Article](#).
- Tresidder A et al.: "Electrosensitivity: Sources, Symptoms, and Solutions" in Rosch PJ (ed.) *Bioelectromagnetic and Subtle Energy Medicine*; CRC Press, (2014) 2nd ed.: 567-585. [Article](#).

17. Consensus and collected studies

- Belpomme D et al.: "The Critical Importance of Molecular Biomarkers and Imaging in the Study of Electrohypersensitivity. A Scientific Consensus International Report" *Int. J. Mol. Sci.* (2021) [PMID: 34298941](#). [PMC8304862](#).
- Bray R and Fancy D (eds.): "Clinical Practice Guidelines for Electromagnetic Hypersensitivity (EHS) - Proceedings from a Symposium on the Impacts of Wireless Technology on Health. Based on Presentations made at Women's College Hospital held on May 30, 2019" *Environmental Health Clinic, Women's College Hospital, University of Toronto, Canada*. (2021). [Article](#). 134 pages.
- Fragopoulou A et al.: "Scientific panel on electromagnetic field health risks: consensus points, recommendations, and rationales" *Rev Environ Health*. (2010) [PMID: 21268443](#). [Article](#).

M. Bevington
4th March 2023