(Q1)

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As an individual contributor, I submit the following responses to U.S. Department of Health and Human Services (HHS) Request for Information (RFI) on Electromagnetic Fields (EMFs), Radiofrequency (RF) Radiation, and Wireless Radiation Exposure and human health.

(Q2) Perspective as an Independent Researcher

I respond as an independent researcher of EMF science and mitigation and an advocate for safer tech. I am the founder of Project Plain Talk, an online interdisciplinary education and holistic well-being platform. My comments draw on my interdisciplinary academic research and books on the biological and behavioural impacts of RF-EMF on human health:

- Books: https://www.amazon.in/stores/author/B07JDFZM4B
- The Digital Pied Piper Effect (2018): https://projectplaintalk.wordpress.com/contact/
- Research: https://independent.academia.edu/SivaniSaravanamuttuPhD/
- Review Paper (2013): Impacts of radio-frequency electromagnetic field (RF-EMF) from cell phone towers and wireless devices on biosystem and ecosystem – a review: https://www.academia.edu/3245451/Impacts_of_radio_frequency_electromagnetic_field_RF_EMF_from_cell_phone_towers_and_wireless_devices_on_biosystem_and_ecosystem_a_review
- Project Plain Talk: https://projectplaintalk.wordpress.com
- Visual Representation of Project Plain Talk: https://www.instagram.com/sivani_sarav/
- Article: Health Risks of Technology addiction (2019) https://projectplaintalk.wordpress.com/digi-tech-debates/health-risks-of-technology-addiction/

(Q3) & (Q4) Public Experience and Professional Observation

One of my books is "The Digital Pied Piper Effect: How to address young people's addiction to wireless gadgets and for the young-at-heart overwhelmed by Big Tech" (June 2018, self-published, ISBN: 978-93-5321-152-3), a scholarly synthesis that cites peer-reviewed research, agency reports and expert declarations. This book addresses a wicked, systems-level problem that is not solvable by any single discipline or agency. It connects behavioural addiction (dopamine loops, constant connectivity, screen time, attention capture, sleep disruption, mental health correlates) with biological exposure concerns, namely non-thermal RF-EMF, electrohypersensitivity (EHS) symptoms such as headaches, fatigue, sleep problems, and the mismatch between adult-centric thermal standards and children's heavier use. Hence, it requires a coordinated response by all stakeholders, including researchers, clinicians, technologists, educators, government

regulators, law makers, police, road safety officers, parents and general public, rather than siloed responses. The book argues for dialogue among all of the stakeholders for the same reason.

There is data on mobile penetration, screen-time patterns, and observed behavioural shifts with concrete concerns about unsupervised early ownership of devices, preference for Wi-Fi, and the difficulty of reversing habit formation. The message is cautionary and not alarmist, highlighting technology's dual-use potential. It highlights electrosmog, standards (FCC, ICNIRP, IEEE, and India's Department of Telecommunications), and the call for more attention to biological rather than purely thermal limits, particularly for the young.

The book predates widespread 5G deployment, denser small-cell infrastructure, large-scale IoT, and several subsequent large animal studies and regulatory debates. Some exposure-pattern and technology-specific details are therefore dated, though the core behavioural and cumulative-exposure arguments remain relevant.

The point I would like to make is that exposure and behaviour cannot be separated. RF-EMF exposure is determined by behaviour such as how long a device is used, how close it is held to the body, where it sits at night, and how many devices a household runs at once. Any health outcome plausibly linked to RF-EMF, such as sleep, attention or mood, is also plausibly shaped by the same usage pattern through non-RF pathways. The exposure measure is partly a behaviour measure. Someone who reports "sensitivity" to a phone or router is also describing their relationship with the technology, not only the field.

Hence, to isolate RF you need designs that decouple the two:

- Blinded sham-versus-real exposure in the lab, with identical behaviour.
- Wired versus wireless versions of the same activity.
- Measured dosimetry instead of self-reported use.
- Comparisons between people with high ambient exposure and low personal use, and the reverse.

The biological and behavioural questions are therefore entangled, and studies that treat them separately risk misattributing effects in either direction.

(Q5) Exposure Assessment and Standards

A 2025 review by Panagopoulos et al. (*Front. Public Health* 13:1585441) argues that one mechanism, which the authors call IFO-VGIC, explains the biological and health effects they attribute to man-made electromagnetic fields. It is a theory-and-literature review, not a new experiment. The argument is that the wireless signals are not just microwave carriers, but are modulated and pulsed at extremely low frequencies (for example 217 Hz for 2G, 100 Hz for 3G to 5G) and vary randomly at ultra-low frequencies. The authors state that this low-frequency content, combined with the polarisation and coherence of man-made fields, causes the non-thermal effects, not the microwave carrier. They propose that weak low-frequency fields force the mobile ions inside voltage-gated ion channels to oscillate. The force on the channel's voltage sensors then rises steeply at nanometre distances, so the channels gate irregularly, even at fields of roughly 10^{-5} to

10^{-4} V/m. The resulting ion imbalance activates the cell's reactive-oxygen-producing systems (mitochondria, NADPH oxidases, nitric oxide synthases). Peroxynitrite and hydroxyl radicals then damage DNA, which they link to cancer, infertility, neurodegeneration and EHS. On this view, purely unmodulated RF would only heat tissue. The authors rely on their own tallies of other reviews, which they say found oxidative effects in 124 of 131 RF studies and genotoxic effects in 144 of 207. They also cite the NTP and Ramazzini rat studies, power-line leukaemia studies, phone and brain-tumour studies, and "microwave syndrome" reports. They state that over 95 percent of real-life exposure studies find effects, and they criticise ICNIRP for ignoring non-thermal effects. They call for precaution, stricter limits and a 5G moratorium.

My book (2018) and review paper (2013) have comparisons of reference levels, the adult-male SAR phantom basis, and the gap for non-thermal/long-term/pulsed exposures.

(Q6) Emerging Evidence

My 2013 peer-reviewed review summarized literature indicating that RF-EMF exposure can alter neurotransmitter functions, blood-brain barrier permeability, morphology, electrophysiology, cellular metabolism, calcium efflux, and gene/protein expression even at lower intensities. This paper was previously submitted as Exhibit 19 in the EMRadiation Policy Institute's 30 August 2013 comment to the FCC in ET Docket No. 13-84 (reassessment of RF exposure limits).

A June 2026 editorial introducing a ten-paper collection from the 2024 Expert Forum at Yale (Ben Ishai et al., *Front. Public Health* 14:1856852) argues that current limits rest on a thermal-only premise and that non-thermal pathways, notably calcium-channel disruption leading to oxidative stress, are biologically plausible. Its authors state that the debate is not closed and that knowledge gaps remain, particularly in long-term ecological research and exposure assessment.

On cancer, Moon et al. (*Environ Health* 23:82) report an association between long-term, high cumulative mobile phone use and ipsilateral brain tumours. It also cites a UK Biobank analysis (Zhang et al., *Cancer Epidemiol Biomarkers Prev* 33:88–95) reporting associations with some other cancers, and a rise in glioblastoma incidence in England from 1995 to 2015 (Philips et al., *J Environ Public health* 24:2018:7910754).

I therefore request HHS to do three things. First, treat the calcium and oxidative-stress mechanism as a hypothesis requiring replication under controlled, well-characterized exposure. Second, commission an independent comparison of why recent systematic reviews on cancer reach different conclusions, including exposure metrics and outcome definitions. Third, consider precaution, meaning low-cost exposure reduction without waiting for certainty, as a governance principle alongside existing limits.

(Q7) Methods that Capture Population-level RF Radiation Exposure

Lee et al., "Real-World Assessment of RF-EMF Exposure From 3G, 4G, and 5G Mobile Networks Across Different Urbanization Levels" (*IEEE Access* 14, 2026), is a measurement-plus-dosimetry study from South Korea. From a moving vehicle they

measured base-station (downlink) field strength in three areas (two urban, one rural). In parallel, they measured the phone's uplink transmit power during calls and data tests on three Korean operators. They converted both into whole-brain SAR using a 6-year-old child model and an adult model.

What they observed:

- Downlink fields were lower in the rural area than in the urban ones. Adding 5G signals raised the downlink E-field by about 23 percent relative to a 3G+4G baseline.
- Urban–rural differences in whole-brain SAR reached 6.2 dB for the child model and 5.7 dB for the adult. Age differences were smaller, with the child 3.2–4.3 dB higher in voice-call scenarios.
- Brain SAR from base stations was comparable to or exceeded that from the phone in most scenarios tested, challenging the assumption that the handset dominates.
- Handset power varied by more than 25 dB between operators, and viewing a screen gave much lower SAR than holding the phone to the ear, though viewing lasts longer.
- Everything was far below ICNIRP and IEEE limits, with whole-brain SAR in the microwatts per kilogram.

Where to be cautious:

- The downlink and uplink were measured separately and combined by modelling. Downlink was outdoor field strength, not personal exposure, and the authors say so.
- The SAR estimates rest on a few reference frequencies and average anatomical and handset models.
- The 5G uplink result comes from one operator on a non-standalone network and may reflect that deployment, not 5G itself.
- It reports exposure, not health outcomes, and the authors note that whole-brain SAR is not a regulated quantity.

(Q8) Real-World Exposure Assessments

Laboratory SAR testing at a fixed position does not capture real conditions of use: signal strength, network mode, data load, body position and duration. Exposure assessment should reflect actual patterns of use, not merely whether a person owns a device or how many hours they report using it. Research could combine usage diaries or device logs with measurements or validated estimates of RF exposure, taking account of transmission activity, distance from the body, device position and network conditions. In the case of RF-EMF emissions from mobile-phone base stations, proximity to a tower alone is insufficient to characterise individual exposure. Relevant factors include antenna configuration and direction, signal levels at occupied locations, surrounding structures, exposure duration and contributions from other RF sources.

In the case of EHS, a multifactorial environmental and lifestyle assessment is key. In addition to characterising RF-EMF exposure, appropriate studies may need to assess relevant indoor and outdoor air pollutants, volatile organic compounds (VOCs) from building materials and furnishings, dampness and mould, ventilation, dietary patterns, sleep and other health-related factors. These factors should not be presumed to cause EHS, nor should their possible contribution be overlooked. Where relevant, researchers should investigate whether they independently contribute to symptoms, act as aggravating factors, interact with other exposures or confound observed associations.

Transparent exposure assessment and appropriately designed studies could help distinguish these possibilities, improve clinical understanding and identify practical interventions for affected individuals.

Leszczynski (*Rev Environ Health*, 2021: https://doi.org/10.1515/reveh-2021-0038) reviews 30 years of research on electromagnetic hypersensitivity (EHS). It is a narrative review of surveys, provocation studies and biomarker studies. Nocebo studies show expectation can produce symptoms, but not that all EHS is nocebo. Cohort studies like INTERPHONE and COSMOS use minutes of calling as the exposure measure. A phone transmits more when reception is poor, so equal minutes can mean very different doses. It proposes studying individuals rather than groups, combining blinded provocation with transcriptomic and proteomic measurements, and keeping people with pre-existing conditions in the samples but analysing them separately.

I request HHS to support development and validation of real-use exposure metrics, including body-worn and personal dosimetry, and to consider plain-language disclosure of use-condition exposure and body-distance guidance for consumers. The exposure metrics should also record pulsing, modulation and low-frequency signal content, not only carrier frequency and average power.

(Q9) Environmental Monitoring and Public disclosure

India has a dedicated web portal called Tarang Sanchar that was launched in 2017 by the Department of Telecommunications (DoT) to share technical information about mobile towers and address public concerns regarding radiation safety. The platform provides citizens with an interactive, map-based interface to track local base stations, check their real-time EMF compliance, and access verified educational content designed to dispel health misconceptions. Additionally, users can request customized on-site radiation testing by the DoT's field units for a nominal fee, ensuring civic trust and smoother digital infrastructure development across the country.

Other such agencies include Cartoradio in France, Antenneregister in Netherlands, Bundesnetzagentur EMF database in Germany, ARPANSA and RFNSA in Australia, and Safety Code 6 in Canada. The goal should be to make exposure information not only publicly available, but also interpretable and independently scrutinised. A comparative review of existing systems could help identify disclosure gaps and inform a consistent, evidence-based approach to communicating RF-EMF exposure to consumers, residents, schools, workers, healthcare providers and local governments.

(Q10) Research Gaps and Surveillance

The highest priority gaps are the following:

- Longitudinal cohorts, beginning in pregnancy or infancy, that measure RF exposure and behaviour together (usage patterns, sleep, screen time) so their effects can be separated. Intervention studies where ethical and feasible, such as reducing bedside or on-body device use, or wired versus wireless school environments.
- Researchers on smartphone use and adolescent depression have likewise called for randomised trials to address causality.
- Real-use dosimetry, as described above, so cohort exposure estimates are credible.

- Evidence syntheses that grade confidence transparently, in keeping with the RFI's aim of distinguishing established evidence from emerging findings and uncertainty. Especially for EHS, this approach should distinguish evidence about reported symptoms from evidence about their causes, including whether RF-EMF exposure itself contributes. This would help identify robust conclusions, uncertainties and research gaps without either overstating preliminary findings or dismissing unresolved questions.

(Q11) Exposure Assessment for Children and Sensitive Individuals

Sensitive populations are addressed in my review paper (2013), and my book presents evidence on early and heavy device use, continuous ambient exposure near schools/homes, and the mismatch of adult-derived limits.

The argument is that children's thinner skulls and higher tissue water and ion content may raise absorption, and notes ANSES's call to reduce children's exposure to wireless devices. Dosimetry findings differ between studies, and that uncertainty is itself a reason to assess children and pregnant women separately rather than extrapolate from adult models. Children who start using phones earlier also face a longer lifetime of exposure, which current standards do not explicitly consider. Children's exposure assessment may need to account for age, device placement, usage patterns and the settings in which exposure occurs, including bedrooms, schools and childcare environments. Researchers should assess whether these patterns lead to meaningfully different exposure levels and whether age-specific risk assessment is warranted.

Behaviour is the exposure variable. How long a phone is used, how close it is held to the body, and whether it sits on the bed at night determine the RF-EMF dose. Consumers keep the phone within reach and also on their body, even at night. So biological and behavioural effects cannot be cleanly separated in exposure assessment or in outcome studies.

Leszczynski's January 2025 opinion piece (*Front. Public Health* 12:1543818) argues that individual sensitivity to wireless radiation, including EHS, should be studied with proteomics. Proteomics measures changes in large numbers of proteins at once. People differ in how they respond to the same agent, whether UV, ionizing radiation, chemicals or allergens, so he states wireless radiation likely does too. He argues that provocation studies have failed to detect sensitivity because they ask subjects how they feel, pool people together, use short exposures and recovery times, and rarely collect biological measurements. He also says that a subject being unable to tell when a transmitter is on proves little, since nobody can feel ionizing or UV radiation either. The biomarkers proposed so far for EHS (histamine, S100B, Hsp70 and others) appear in only a minority of patients. He proposes blinded studies of self-declared sensitive and non-sensitive volunteers, exposed ethically, with proteomic, transcriptomic and metabolomic profiling, so that real molecular targets of exposure can be identified. He notes only two proteomics studies have used human volunteers, and the rest are in cells or animals with mixed results.

Clinicians such as Neil Nathan, MD, group self-reported EHS with mold toxicity, Lyme disease, multiple chemical sensitivity (MCS) and mast-cell activation, using Robert

Naviaux's cell danger response (CDR) as a unifying metabolic model in which mitochondria shift from energy production to defense and remain stuck in that state. This parallels Dominique Belpomme et al. reports that EHS and MCS share biomarkers and may represent two aspects of one disorder. However, Dariusz Leszczynski's 2021 review of the EHS literature noted that Belpomme's biomarker studies did not expose subjects to EMF or test whether EMF altered the markers, relying instead on self-report. Naviaux's CDR is a metabolic hypothesis triggered by various chemical, physical or biological threats. While later writings reference electromagnetic pollution conceptually as part of the modern exposome that may lower activation thresholds, the CDR cascade has not been directly experimentally tested for non-ionizing RF-EMF. These frameworks highlight individual sensitivity and overlapping environmental triggers but remain hypotheses, requiring controlled studies to evaluate any causal role of RF-EMF exposure below current limits, particularly in sensitive individuals.

(Q12) Scientific Evidence for Health Impacts Below Current Limits

Key findings from my 2013 review (cellular and organism-level changes; IARC 2B context). My book discusses children, potential differences in exposure and biological concerns.

As for EHS, in most of the Global South, it is largely unrecognized and has very low public or medical salience. Idiopathic environmental intolerance attributed to EMF (IEI-EMF) shows marked variation in prevalence across countries, ranging from roughly 1.5 to 13 percent in available surveys, almost all of which come from high-income settings (Huang et al., *Environ. Health* 17:5, 2018). Differences appear even between neighboring Northern European countries and have been linked in part to societal factors such as public awareness, media attention, and what symptoms people attribute to EMF. Cultural emphasis on the practical benefits of wireless technology, combined with different healthcare priorities, keeps the issue marginal in Global South compared with its visibility in parts of the Global North.

The relative contributions of environmental, psychological, and possible genetic/epigenetic factors remain open research questions requiring better comparative and longitudinal data.

(Q13) Cumulative Exposure Patterns

The 2026 HERMES3 cohort study (*Environ. Res.* 304:124775) measured the real-world RF-EMF exposure among 143 Swiss adolescents between June 2023 and January 2025, using personal exposimeters worn for ~72 hours each. The goal was to understand how exposure looks in the 5G era across different environments and sources.

It is part of project GOLIAT (5**G** exp**O**sure, causa**L** effects, and r**I**sk perception through citizen eng**A**gemen**T**) *aiming to understand the relationship of eMedia use, RF-EMF exposure, and transportation noise exposure with cognitive, behavioral, sleep and mental health, as well as non-specific symptoms of Swiss adolescents.*

Overall exposures were found to be low and not changed much with 5G. The mean daily RF-EMF was 0.09 mW/m^2 and median 0.06 mW/m^2 — comparable to pre-5G

measurements. At 35 percent of total exposure, Wi-Fi/Bluetooth was the single biggest source, more than downlink signals from cell towers. This reflects how close people hold their own devices. *Where you are matters more than what network you are on*. Exposure was highest in transport (0.47 mW/m^2), likely due to denser networks and devices in confined spaces, and lowest at home (0.07 mW/m^2) and school (0.08 mW/m^2).

Of note, personal exposimeters underestimate exposure from sources very close to the body (like a phone held to the ear). The 0.09 mW/m^2 figure is best understood as a background ambient exposure, not a total body dose. The regulatory limits are set per-source (e.g., from a single antenna mast), while the study measures cumulative personal exposure from all sources at once.

Chapter 3 of my book documents the growth of wearables and connected devices for infants, including baby monitors, placed close to sleeping children. Wi-Fi routers, printers, wearables and IoT devices add sources within one household.

I request research on cumulative exposure pay particular attention to the sleeping environment and to devices designed for infants.

(Q14) Scientific Evidence for Environmental Effects of RF Radiation

My book The Digital Pied Piper Effect (2018) argues that the consequences of wireless technology cannot be understood or managed through the actions of any single group. Research into RF-EMF exposure, clinical and public-health practice, technology design, education, regulation and public awareness address different parts of a connected problem. A coordinated approach should distinguish demonstrated effects from unresolved questions, improve exposure assessment under real-world conditions, identify research gaps and evaluate proportionate measures to reduce unnecessary exposure where appropriate.

(Q15) Schools and Infrastructure

Cyprus has issued a decree restricting wireless in kindergartens and elementary schools, and Maryland (US State) has issued directives favoring wired rather than wireless installations in schools, as described in Chapter 4 of my book. I request federal agencies to support evaluation of wired versus wireless school policies, with outcomes covering both measured exposure and health or learning measures.

As for cumulative exposure, environmental effects and wireless infrastructure, book raises issues around pervasive wireless exposure and includes material on environmental and biological impacts. However, for newer technologies, cumulative exposure patterns, neighbourhood infrastructure and environmental effects need more targeted evidence, especially for towers, Wi-Fi, devices and behavioural drivers that increase time-weighted exposure.

(Q16) Highest Priority Research Gaps

A research priority is to study RF exposure and digital-use behaviour together while distinguishing their respective effects. Longitudinal studies could combine objective

exposure estimates, usage patterns, sleep and other relevant outcomes, alongside potential confounders such as stress, mental health, socioeconomic conditions and nighttime light exposure.

Phone use is both an RF exposure and a behaviour. This is evident in the review (*J Expo Sci Environ Epidemiol*, 2026) entitled "A systematic review of mobile phone use and pregnancy and fetal outcomes." A study of 423 adults linked greater cell phone use to more sedentary behaviour. High sedentary behaviour is itself associated with reduced gestational age, hypertensive disorders and restricted fetal growth. The authors stated that the phone use may be "a proxy for a sedentary lifestyle" and name this as a limitation of many included studies.

My book connects patterns of everyday phone use with questions about RF exposure, while also considering behavioural and social consequences.

The strongest formulation is not that biological and behavioural effects cannot be separated. It is that they should be investigated together, but not conflated. This gives researchers a better chance of identifying which factors matter, through which pathways, and under what conditions. EHS is exactly where that distinction becomes especially important. A study should measure RF-EMF exposure appropriately, but it should also investigate whether a person's symptoms are temporally and reproducibly associated with that exposure.

Henshaw and Philips (*Int J Radiat Biol* 101:186–204, 2025) in their narrative review argue that EHS may be a real physiological response, not just a nocebo effect. Their research draws on what is known about how animals sense magnetic fields:

- Many species sense very weak magnetic fields, and RF noise has been shown to disrupt bird compass orientation.
- They describe two candidate sensing routes in humans: magnetite particles in the brain and light-sensitive cryptochrome proteins acting through the radical pair mechanism.
- Two human lab studies (Wang 2019, 36 volunteers; Chae 2022, 34 men) report responses to Earth-strength fields. Their findings point to different mechanisms.
- Geomagnetic storms are linked to cardiovascular and mood effects, and the authors treat these as a parallel to EHS.
- They conclude that most provocation studies fail because they use relatively high exposures, poorly screened participants, short washout times, and unscreened "sham" conditions.

Their recommendations is to measure objective outcomes such as heart-rate variability, EEG and oxidative-stress markers; triage participants, use shielded low-EMF test rooms, and allow days between exposures; and request WHO to reevaluate its position on EHS: https://www.who.int/teams/environment-climate-change-and-health/radiation-and-health/non-ionizing/hypersensitivity

The highest-priority gaps, in my view, are these:

1. Longitudinal cohorts, beginning in pregnancy or infancy, that measure RF exposure and behaviour together (usage patterns, sleep, screen time) so their effects can be separated.

2. Intervention studies where ethical and feasible, such as reducing bedside or on-body device use, or wired versus wireless school environments. Researchers on smartphone use and adolescent depression have likewise called for randomised trials to address causality.
3. Real-use dosimetry, so cohort exposure estimates are credible.
4. Evidence syntheses that grade confidence transparently, in keeping with the RFI's aim of distinguishing established evidence from emerging findings and uncertainty.

(Q17) Coordination

Because the problem is both biological and behavioural, no single agency can address it alone. FDA's role in device exposure and testing, NIH's in biological research and cohorts, and CDC's in surveillance and behavioural and school health need a shared research framework, with structured input from clinicians, educators, industry and families, and attention to non-US evidence. There is a need for long-term human and environmental studies, better exposure assessment that includes real-world modulation and cumulative multi-source exposure, and coordinated work across FDA/NIH/CDC, along with education/telecom counterparts.

Leszczynski, "The lack of international and national health policies to protect persons with self-declared electromagnetic hypersensitivity" (*Rev Environ Health*, online 2022), is a survey of what official bodies say and do about EHS. He quotes documents from the WHO, ICNIRP, IEEE-ICES, the EU, the Nordic countries and 17 individual countries. The findings are the following:

- None of the countries examined has an official health policy on EHS. The only formal recognition is as a handicap in the Nordic countries, and it is not treated as a disease.
- The WHO accepted in 2004 that the symptoms are real and can be severe, but it does not link them to EMF. National agencies largely follow that line, and ICNIRP says there is no benefit in setting limits specifically for EHS.
- Courts have ruled both ways. A 2021 California appeals court held that EHS may qualify as a disability under state law even without medical recognition.
- Some governments simultaneously say there is no harm below limits and advise reducing exposure. Germany's BfS recommends choosing a low-SAR phone (if its SAR value at the ear does not exceed 0.50 W/kg).

Of note, In India, the SAR limit is 1.6 W/kg:
(https://tarangsanchar.gov.in/EMFPortal/DoT/SARLimitsforMobileHandsets).
India is set to permit an EMF exposure limit of up to 10 W/m^2 for 5G base stations from 5 W/m^2 in 2026.

Whatever causes EHS, the admitted suffering justifies a uniform health policy, with diagnosis and mitigation. The nocebo as the main explanation is scientifically weak, and low-quality evidence cannot support claims of safety. It is proposed that governments adopt policies and fund molecular-level research.

(Q18) Additional Evidence

RF-EMF exposure should be assessed in the context of real-world behaviour. The duration and timing of device use, proximity to the body, device placement, transmission

activity and network conditions can influence exposure. For children, these factors may be particularly relevant because wireless devices are used in homes, bedrooms, schools and other everyday settings.

However, device-use behaviour can also influence health through pathways that are distinct from RF exposure. For example, nighttime phone use may affect sleep through screen light, notifications and psychological stimulation, while RF exposure may constitute a separate exposure variable requiring its own assessment. Studies that investigate health outcomes should therefore measure relevant behavioural and exposure variables together, while distinguishing their potential contributions.

Nevoit et al., "Human Bioelectromagnetism and the Environment: Introduction to the Problem" (*Appl. Sci.* 16:3627, 2026), is a 58-page "perspective piece" from a Lithuanian-Ukrainian group of cardiology and medical researchers. It is a narrative literature review. The authors start from the premise that the body is an electromagnetic system. Cell membranes, the heart's conduction system and the nervous system all run on electrical activity, so they say it must couple with external fields. They cover Earth's natural field, biological fields, and man-made fields, then mechanisms and consequences, including oxidative stress, DNA damage and biophoton signalling.

Research priorities should include more realistic exposure assessment, particularly for children; appropriate measurement or estimation of exposure under everyday conditions; and study designs capable of examining the relationships between RF exposure, device-use behaviour and health outcomes. This approach would support better exposure assessment, more informative research on potentially sensitive populations, and stronger identification of research gaps.

Thank you for the opportunity to comment. I am willing to provide the full book – The Digital Pied Piper Effect – to HHS staff on request.