BEFORE THE
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
WASHINGTON, D.C.

HHS–OASH–2026–0397

REQUEST FOR INFORMATION ON ELECTROMAGNETIC FIELDS (EMFs), RADIOFREQUENCY (RF) RADIATION, AND WIRELESS RADIATION EXPOSURE

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I. INTRODUCTION

I submit this comment in response to the U.S. Department of Health and Human Services' Request for Information (RFI) on Electromagnetic Fields (EMFs), Radiofrequency (RF) Radiation, and Wireless Radiation Exposure, published September 21, 2026.

II. PUBLIC EXPERIENCES AND REPORTED POTENTIAL ADVERSE HEALTH EFFECTS

QUESTION 2 — PERSPECTIVE OF COMMENTER

My comment represents the following perspectives identified in the RFI: individual consumer and patient; researcher; advocate; and member of the public with direct experience of reported adverse health effects associated with wireless radio frequency radiation (RFR) exposure.

I have a medical diagnosis of electromagnetic radiation syndrome (EMR syndrome). I have personally experienced significant health effects associated with exposure to wireless RFR, as confirmed by my treating healthcare providers.

As a researcher, I have designed, conducted, and published federal grant-funded research studies involving human subjects. My comment is informed by direct personal observation, consultation with healthcare professionals, peer-reviewed research, and formal research training. I am not presenting this submission as a controlled clinical study.

QUESTION 3 — PERSONAL EXPERIENCE AND REPORTED POTENTIAL ADVERSE HEALTH EFFECTS

Over the past 15 years, I have experienced multiple periods of remission and regression in my chronic health conditions that were associated with changes in my exposure to wireless RFR. Relying upon prior experimental research training, I approached my chronic health conditions methodically by identifying, isolating, and manipulating variables in an attempt to identify potential confounding and causal factors.

3a. The exposure sources relevant to my symptoms have included cellular phones, wireless laptops, wireless tablets, wireless mouse, wireless communications facilities, cell tower antennas, smart meters, Wi-Fi network extender, cellular network extender, neighboring Wi-Fi routers, wireless cameras, wireless printers, and other wireless-emitting technologies that are common in today's contemporary environment.

3c. Before identifying RFR as a causal and exacerbating factor for my symptoms and chronic health conditions, I experienced insomnia, headaches, dizziness, tinnitus, chronic fatigue, erythromelalgia, chilblains, Raynaud's syndrome, inflammatory bowel disease (IBD), tachycardia, heart palpitations, orthostatic hypotension, unexplained weight loss, muscle wasting, photosensitivity, unexplained syncope with convulsions, neurovascular instability syndrome, hypohidrosis, skin rashes, spongiotic dermatitis, recurrent staphylococcal infections, atopic dermatitis, hair loss (telogen effluvium), nosebleeds, and chronic non-healing wounds.

3d. In 2002, I moved from a single-family home in a rural setting to an apartment in a metropolitan city. I began experiencing headaches, circulation abnormalities, Raynaud's syndrome, insomnia, nightmares, flu-like symptoms, heart palpitations, dizziness, fatigue, and anxiety. This was in contrast to my normal health and disposition, yet I could not identify the cause.

Between 2002 - 2009, I lived in multiple apartment buildings in a metropolitan city. I increased my usage of and proximity to my **cell phone** and **laptop** during this time. The aforementioned symptoms worsened between 2002 - 2009.

In 2009, I moved to a townhome in a metropolitan city and placed the **Wi-Fi router** directly beside my desk, where I used a **wireless laptop** and studied for long periods of time. I regularly slept near my **smartphone**. The aforementioned symptoms further increased and were joined by neurological challenges, brain fog, difficulty finding words, tachycardia, hypohidrosis, memory challenges, unexplained weight loss, inflammatory bowel syndrome, and hair loss.

In 2012, I moved to an apartment with the **Wi-Fi router** in my bedroom closet and multiple **smart meters** on the side of the building. I further increased usage of my **smartphone**, **wireless laptop**, and **wireless Bluetooth mouse**. I experienced a worsening of my circulation abnormalities, insomnia, heart rate abnormalities, blood pressure abnormalities, dizziness, unexplained syncope with convulsions, brain fog, fatigue, photosensitivitiy, unexplained weight loss, chilblains, erythromelalgia, Raynaud's syndrome, and hair loss. I was severely underweight, weak, and frail. My health deteriorated to the point of needing to resign from my job in 2013 and move in with my family, as I could no longer live independently.

My health began to improve while living in a single-family home, and I returned to work in 2014. I moved to an apartment building with the **Wi-Fi router** in the bedroom closet and multiple **smart meters** on the side of the building. I again experienced a sharp deterioration of the aforementioned symptoms.

In 2016, I resigned from my job and returned to live with my family in a single-family home. Again, my health improved in the single-family home until I installed a **Wi-Fi network extender** in my bedroom. The Wi-Fi network extender greatly increased my insomnia, nightmares, dizziness, fatigue, heart palpitations, tachycardia, IBD, and anxiety. I moved away from this home due to the aforementioned symptoms and began to improve after discontinuing use of the **Wi-Fi network extender**.

In 2018, I returned to work remotely and increased my reliance upon my **wireless laptop, wireless Bluetooth mouse, wireless tablet,** and **smartphone**. I experienced a worsening of erythromelalgia, IBD, chronic fatigue, insomnia, and orthostatic hypotension.

In October 2018, I experienced another deterioration of my health upon installing a **cellular network extender**. The cellular network extender triggered a flare-up of skin rashes, spongiotic dermatitis, brain fog, chronic non-healing skin, heart palpitations, anxiety, nightmares, tachycardia, and recurrent staphylococcal infections.

In April 2019, I moved to a single-family home and experienced an improvement in symptoms upon discontinuing use of the **cellular network extender**. In September 2019, I moved to a townhome with multiple **smart meters** on the side of the building and multiple **Wi-Fi networks** within the building. I experienced a sharp deterioration of my health and became unable to work in November 2019.

In March 2020, I identified wireless RFR as an exacerbating factor in my chronic health conditions and experienced significant improvements upon reducing my exposure. **See Question 3f.** for documented health improvements.

3e. Between 2008 - 2019, I sought medical care and consulted over 25 healthcare providers and specialists without experiencing improvements in my symptoms or chronic health conditions. I failed trials of over a dozen medications intended to treat my diagnosed medical conditions. I made substantial changes to my diet and reduced exposure to other toxic environmental factors, including artificial fragrances, artificial food dyes, volatile organic compounds, mold, pesticides, and harsh cleaning chemicals. Despite these efforts, my health did not improve, and I continued to experience significant health challenges. In November 2019, I became unable to work and experienced significant challenges in completing activities of daily living.

Relying upon my research training, I approached my health conditions methodically by identifying, isolating, and manipulating variables in an attempt to identify potential confounding and causal factors. I would systematically eliminate exposure to a certain variable, such as artificial fragrances, while keeping all other system inputs the same to assess potential changes stemming from the variable of interest. I repeated this process from 2008 - 2019 for multiple variables of interest. Despite these efforts, I did not identify a causal factor nor experience improvements in my symptoms or chronic health conditions.

Beginning in March 2020 and over a period of approximately four years, I isolated and manipulated wireless RFR as an independent variable in my unresolved medical case. I observed a repeated pattern in which my cluster of symptoms *improved* when I reduced RFR exposure and *worsened* when my exposure to RFR increased. This pattern of remission and regression in my chronic health conditions in response to RFR was documented by my treating healthcare providers.

The severity and duration of my symptoms correlated with the severity and duration of my exposure to RFR. I utilized a Safe and Sound Pro II RF meter and a Safe and Sound Pro mmWave meter to measure RFR exposure while noting changes in my health symptoms. I observed that the severity and duration of my symptoms were associated with the severity and duration of RFR exposure.

During this time, I also measured electric fields, magnetic fields, and electromagnetic interference (EMI) with consumer meters, yet I did not observe an association between these forms of EMFs and my symptoms and chronic health conditions, as I did with wireless RFR.

3f. The following steps were taken to reduce exposure to RFR. Given their efficacy in alleviating over a decade of severe suffering and unresolved medical challenges, I urge HHS to explore these mitigating efforts and consider creating official recommendations for the general public and vulnerable populations, such as children, to reduce unnecessary exposure to RFR. Strategies to reduce exposure to RFR should follow the ALARA principle, which is currently applied to ionizing radiation. The ALARA principle in radiation safety stands for "As Low As Reasonably Achievable." The existing body of scientific evidence supports applying the ALARA principle to non-ionizing radiation as well.

In March 2020, I began reducing RFR by turning off my Wi-Fi router overnight and placing my smartphone in Airplane Mode when not in use. I disabled the wireless antennas on my smartphone, including Wi-Fi, mobile data, and Bluetooth. I utilized a tripod phone stand when operating my smartphone to avoid holding the phone directly in my hand. With these simple changes to reduce exposure to RFR, my circulation abnormalities, heart rate abnormalities, chronic non-healing skin, chilblains, erythromelalgia, Raynaud's syndrome, staphylococcal infections, skin rashes, tinnitus, brain fog, insomnia, headaches, photosensitivity, and neurovascular abnormalities began to improve.

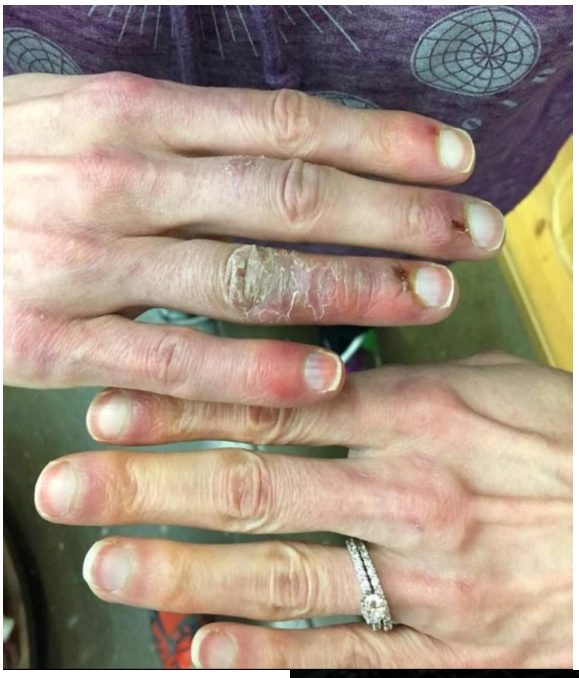
I continued to reduce my exposure to RFR by purchasing a bed canopy made of RFR-shielding fabric, eliminating use of the WiFi router, hardwiring my laptop and phone to Ethernet, switching to a voice-over-IP (VOIP) phone number that functions with Ethernet, and opting out of the smart meter in exchange for a non-RF-transmitting electric utility meter. I minimized my exposure to all voluntary sources of RFR.

Notable improvements upon reducing RFR exposure include:

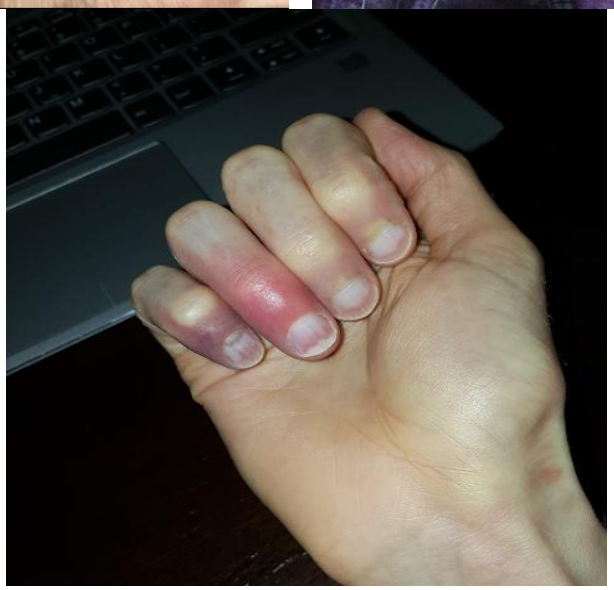
- Within 48 hours of disabling the Wi-Fi router overnight and sleeping under a bed canopy made of RFR-shielding fabric, my insomnia, nightmares, anxiety, heart palpitations, and headaches resolved on their own.
- Within four months of minimizing exposure to RFR, my recurrent staphylococcal infections, spongiotic dermatitis, atopic dermatitis, chilblains, and chronic non-healing skin lesions had fully resolved.
- Within six months of minimizing exposure to RFR, I achieved remission of inflammatory bowel disease, erythromelalgia, Raynaud's syndrome, hair loss, and neurovascular instability syndrome.
- Within one year of minimizing exposure to RFR, my weight returned to a healthy range for the first time in 12 years, and my hair loss reversed with new hair growth.

Although I experienced significant health improvements after minimizing RFR, I continue to experience flare-ups of my medical conditions when seeking essential services due to involuntary RFR exposures. The adverse effects from RFR extend beyond the disabling symptoms themselves. I am unable to work in research laboratories and commercial office environments due to involuntary RFR exposure in those settings. I have experienced prolonged regressions of my chronic health conditions upon obtaining essential services, including medical and dental care, due to involuntary exposure to RFR while in the healthcare environment.

3g. SUPPORTING DOCUMENTATION: See below for photographs documenting the condition of my hands between 2013 - 2022.







It is important to note that the affected, diseased hand in the above photographs is my **nondominant hand**, which puzzled doctors for years, as patterns of inflammation tend to be worse in one's dominant hand. The distinguishing factor is that my non-dominant hand had higher exposure to RFR, as it is the hand that held my **smartphone** and **wireless Bluetooth mouse**. It is also the hand that operated the **wireless laptop trackpad**.

The fourth and fifth digits of my nondominant hand had greater circulatory abnormalities than my other fingers. These are the fingers I would balance the bottom portion of my **smartphone** upon while operating the device. Subsequent testing with the Safe and Sound Pro II RF meter confirmed the RFR emissions were highest at the bottom of my smartphone.

The medical conditions underlying the above-photographed hands were diagnosed as chilblains, erythromelalgia, and Raynaud's syndrome. The burning sensation of erythromelalgia was significantly worse in my nondominant hand. These medical conditions persisted from 2013 - March 2020 while I continued to use my **wireless smartphone**, **wireless Bluetooth mouse**, and **wireless laptop**.



In October 2018, after installing a **cellular network extender**, I developed persistent skin rashes and staphylococcal infections, which were again worse on my nondominant hand. The medical conditions in the photographs above were diagnosed as spongiotic dermatitis, atopic dermatitis, chilblains, and staphylococcal infection.

It is important to note that between March 2020 - October 2026, I continued to use my **smartphone** and **laptop** by placing these devices in Airplane Mode with all wireless antennas disabled. I connected each device to the internet using an **Ethernet cord** and a **USB-to-Ethernet adapter**. This helped disentangle and identify the sources of EMF that are associated with my symptoms and chronic health conditions. I continued to be exposed to digital screen lighting and other forms of EMFs (including electric fields, magnetic fields, and EMI) without a recurrence of symptoms. Upon repeated re-exposure to wireless RFR, my symptoms and chronic health conditions would repeatedly worsen.

After realizing RFR was negatively affecting my health in March 2020, I minimized my exposure to wireless-emitting devices and other sources of RFR. By the time I saw my doctor in December 2020, my hands and skin lesions had fully healed for the first time since 2011. My chronic health conditions, including IBD, erythromelalgia, chilblains, Raynaud's syndrome,

tachycardia, and orthostatic hypotension, had gone into remission. Many of my symptoms resolved within 48 hours after minimizing RFR, including insomnia, headaches, nightmares, heart palpitations, and anxiety.

Photo of my healed hands after reducing RFR:



I have experienced two flare-ups of atopic dermatitis and circulation abnormalities affecting my hands since 2022. One flare-up occurred after using a smartphone for approximately 10 minutes. The second flare-up occurred after needing to use a wireless tablet to complete new patient paperwork at a medical clinic for approximately 10 minutes.

The pattern of remission and regression in my symptoms and chronic health conditions (specifically including IBD, heart palpitations, Raynaud's syndrome, tachycardia, severe fatigue, photosensitivity, brain fog, and orthostatic hypotension) has repeated 11 times between March 2020 and September 2026 following involuntary RFR exposure. Nine of these health regressions occurred in response to involuntary exposure to RFR while obtaining medical and dental care. This has resulted in postponing or canceling necessary medical care to avoid flaring my health conditions.

The RFI specifically asks individuals to describe exposure patterns, potential adverse health effects, timing, and changes following exposure reduction. The repeated pattern of my medical conditions regressing upon exposure to RFR and improving upon a reduction in RFR

established a strong recurring temporal pattern indicative of causation. I relied upon my prior research training to isolate and manipulate RFR as an independent variable in my unresolved medical case. I documented changes in my health outcomes alongside measurements from RF/EMF meters and in consultation with my treating healthcare providers. Although these observations are not a substitute for a controlled clinical study, their recurrence and impact on my daily functioning are notable.

I urge HHS to consider personal experiences as part of the factual record to assess the adverse health effects of wireless radiation, identify patterns to inform research priorities, and develop practical strategies to reduce unnecessary RF/EMF exposure where feasible. This is particularly important for environments where vulnerable populations spend longer periods of time, such as schools, homes, and long-term care facilities.

III. EXPOSURE STANDARDS AND RISK ASSESSMENTS

QUESTION 5 — EXPOSURE STANDARDS, RISK ASSESSMENT, AND REAL-WORLD EXPOSURE

HHS should consider existing federal and international RF/EMF exposure guidelines in combination with independent RF/EMF exposure guidelines, such as those of the **BioInitiative Working Group**, **Building Biology Evaluation Guidelines**, and **EUROPAEM EMF Guidelines**.

In 2009, an international gathering of scientists in Seletun, Norway brought together researchers to discuss the scientific evidence and recommendations for protecting public health. The Seletun Statement called for a more precautionary approach to EMF exposure and for exposure guidelines informed by the broader scientific literature.

These discussions were reflected in the following peer-reviewed publication:

Fragopoulou, A., Grigoriev, Y., Johansson, O., Margaritis, L. H., Morgan, L., Richter, E., & Sage, C. (2010). Scientific panel on electromagnetic field health risks: Consensus points, recommendations, and rationales. *Reviews on Environmental Health, 25*(4), 307–317. **https://pubmed.ncbi.nlm.nih.gov/21268443**

I recommend HHS review the above publication, its supporting evidence, and subsequent developments in the scientific literature.

There is an urgent need to develop modern, biologically-based RF/EMF exposure standards that consider how people are actually exposed in contemporary environments. The most scientifically useful federal research agenda is not limited to asking whether RF/EMF has potentially adverse biological effects. Decades of existing research have established that RF/EMF can have adverse biological effects. The federal research agenda should evaluate and develop RF/EMF exposure standards that adequately characterize and protect against long-duration, cumulative, localized, intermittent, modulated, and multi-source RF/EMF exposures, both for the general population and specifically for vulnerable populations, including children.

Despite the exponential increase in RFR exposure since 1996, the FCC RF exposure guidelines remain unchanged, and new wireless technologies continue to be introduced. Current

exposure standards, risk assessments, and testing methodologies do not adequately account for real-world exposure to RFR.

Wireless exposure today can arise from cellular phones, cellular antennas and towers, Wi-Fi networks, Bluetooth devices, smart meters, computers, tablets, wireless earbuds, smart watches, wireless cameras, wireless medical devices, wireless-emitting technology inside vehicles and other forms of transportation, smart appliances, smart homes, satellites, wireless infrastructure, and other wireless-emitting devices and toys. A person typically encounters multiple sources throughout the day rather than a single source used intermittently. Wireless-emitting devices are often held directly against the body for prolonged periods of time. Multi-source and cumulative exposure is currently not evaluated within the FCC RF exposure guidelines.

5o. Practical Strategies to Reduce Unnecessary RF/EMF Exposure

HHS should evaluate and support practical strategies to reduce unnecessary RF/EMF exposure in homes, schools, healthcare facilities, workplaces, and other public settings.

Initial priorities should include implementing wired alternatives to wireless networking where feasible; developing practical guidance to inform the public of simple ways to reduce voluntary RF/EMF exposure; providing clear information about device wireless settings and transmission behavior; assessing whether unnecessary transmitters can be disabled or reconfigured; and identifying network and environmental designs that reduce RF/EMF exposure while preserving reliable connectivity, accessibility, and essential communications.

HHS should fund pilot programs in schools, healthcare facilities, housing units, long-term care facilities, and other relevant settings to measure RF/EMF and investigate experimental outcomes before and after implementation of practical strategies to reduce RF/EMF. Such programs should use documented measurement protocols, calibrated instruments, clearly defined exposure reduction interventions, repeated measurements under representative operating conditions, and validated pre- and post-intervention assessments to permit study replication.

Where health outcomes are studied, exposure reduction and health effects should be evaluated as distinct outcomes. Prospective studies should use prespecified outcome measures, appropriate comparison groups, and methods to identify and account for potential confounding variables.

HHS should use pilot program results to identify RF/EMF reduction interventions that are practical, reproducible, and appropriate for public guidance, with particular attention to environments occupied by children and other vulnerable populations. Pilot program results can also help identify patterns and guide future research priorities.

Practical Strategies to Reduce Unnecessary RF/EMF Exposure and Evaluate Their Effectiveness.

Tier 1 — Low-cost measures

- Configure Wi-Fi access points to be powered down and/or switched off when wireless connectivity is not needed, including during overnight periods where feasible.

- Encourage speakerphone use, wired headsets, and increased distance between wireless-transmitting devices and the body.
- Provide clear information about Airplane Mode, wireless settings, and the fact that some functions may continue transmitting RFR unless separately disabled.
- Avoid unnecessary wireless accessories and redundant transmitters when wired alternatives meet the same need.
- Measure and monitor RF/EMF exposure in classrooms, sleeping areas, patient rooms, and other areas of prolonged occupancy.
- Evaluate policies that limit wireless use and permit wired alternatives without reducing educational access, clinical functionality, or emergency communications.

Tier 2 — Medium-cost measures

- Provide wired Ethernet or other wired network connections where practical.
- Establish wired-first network designs for new construction and renovations.
- Equip school staff members, students, healthcare workers, and other relevant populations with a Faraday bag for personal devices. This would significantly reduce exposure to RF/EMF while maintaining proximal access to communication in the event of an emergency.
- Assess the costs, feasibility, trade-offs, and unintended consequences of alternative network designs that do not use wireless radiation.
- Assess changes in Wi-Fi access-point placement, transmit power, and network configuration to determine optimal settings to reduce RF/EMF while maintaining essential service in environments where wired connections are not feasible.
- Develop reasonable accommodation procedures for people who report RF/EMF exposure-related symptoms, including advance communication and feasible alternative arrangements. This could include the option for tele-services, separate waiting areas, separate exam rooms, and other accommodations based on the ALARA framework for RF/EMF.

Tier 3 — Targeted research and safe standards development

- Investigate RF/EMF exposure-reduction interventions with calibrated instruments and replicable experimental conditions.
- Investigate which interventions produce the greatest reduction in RF/EMF exposure under ordinary operating conditions.
- Investigate which interventions produce the greatest improvement in post-intervention outcome measurements. For example, researchers could investigate changes in pre- and post-mitigation assessments for neurocognitive, neuropsychological, behavioral health, symptomatology, and clinical outcomes following an intervention to reduce RF/EMF exposure for specified durations.
- Investigate whether RF/EMF exposure reductions are associated with changes in health outcomes for specific cohorts (including potentially vulnerable populations) within a variety of environments and experimental conditions.
- Use the findings to inform public health guidance and to develop biologically-based RF/EMF exposure standards reflective of real-world exposure conditions.

Real-World Exposure: Synergistic Effects

An important aspect to consider with real-world exposures to RF/EMF is that the potential adverse effects do not occur in isolation. Research has found RF/EMF to have **synergistic effects** with other toxins, such as mold, lead, heavy metals, air pollution, formaldehyde, and pesticides. See **APPENDIX B** for a list of scientific references discussing synergistic effects of non-ionizing EMR.

Modern biologically-based RF/EMF exposure guidelines should take into account the real-life potential for common synergistic effects, such as with mold, air pollution, and metals. Further research is needed to identify the extent to which these synergistic effects apply to the general population and potentially vulnerable populations, such as individuals with neurological disorders, individuals with mold illness, individuals with heavy metal toxicity, individuals who have received vaccines with metal-based adjuvants, individuals with multiple chemical sensitivities, individuals with elevated occupational exposures, individuals who are immunocompromised, individuals in the military, individuals in areas of high air pollution, individuals with dental work containing metal-based compounds, and individuals with implanted medical devices.

Research has found RF/EMF negatively affects the permeability of the blood-brain barrier (BBB), as well as alters the expression of microRNA within the brain. Researchers have cautioned that an increased permeability of the BBB could lead to long-term adverse effects, such as neurodegenerative disease. When the BBB becomes increasingly permeable, a greater amount of toxins circulating in the blood can reach the brain. For published research investigating the effects of RF/EMF on the BBB, visit: **https://ehtrust.org/wi-fi-wireless-radio-frequency-radiation-can-damage-the-blood-brain-barrier/**

Given the current prevalence of both RF/EMF and environmental toxins, it is essential for RF/EMF exposure evaluations and risk assessments to take into account the potential synergistic effects and BBB effects. It is also essential to educate clinicians on the potential adverse effects of RF/EMF and potential synergistic effects. RF/EMF is often a missing piece in one's medical case history, as it was in mine.

5p. A classification system should include relevant exposure-related characteristics, including operating frequency, power density, specific absorption rate (SAR), electric- and magnetic-field strength, modulation and pulse characteristics, duty cycle, beamforming, simultaneous exposure to multiple frequencies, duration, distance, proximity to the body, and cumulative exposure over time. These aspects should be reported and evaluated in combination, where appropriate, to assess real-world characteristics of RF/EMF exposure and permit study replication.

QUESTION 6 — EVIDENCE CONCERNING CURRENT EXPOSURE LIMITS

There is a significant body of scientific research demonstrating potential adverse health effects within the current exposure limits. See **APPENDIX A** for a list of scientific references pertaining to QUESTION 6. Of particular relevance is the following citation:

International Commission on the Biological Effects of Electromagnetic Fields. (2022). Scientific evidence invalidates health assumptions underlying the FCC and

ICNIRP exposure limit determinations for radiofrequency radiation: Implications for 5G. *Environmental Health, 21*(1), 92. **https://doi.org/10.1186/s12940-022-00900-9**

Over 11,000 pages of evidence were submitted to the U.S. Court of Appeals for the D.C. Circuit in *Environmental Health Trust v. FCC*, 9 F.4th 893 (D.C. Cir. 2021). The volumes of submitted evidence are linked below:

Volume 1; Volume 2; Volume 3; Volume 4

Volume 5; Volume 6; Volume 7; Volume 8

Volume 9; Volume 10; Volume 11; Volume 12

Volume 13; Volume 14; Volume 15 ; Volume 16

Volume 17; Volume 18; Volume 19; Volume 20

Volume 21; Volume 22; Volume 23; Volume 24

Volume 25; Volume 26; Volume 27

IV. MEASURING HUMAN EXPOSURE AND PUBLIC HEALTH SURVEILLANCE

QUESTION 8 — IMPROVING EXPOSURE ASSESSMENT METHODOLOGIES TO BETTER EVALUATE REAL-WORLD EXPOSURE CONDITIONS

A meaningful RF/EMF exposure assessment must account for the difference between a technically precise test and a test that represents real-world exposure and real-world use conditions. HHS should support exposure characterization that can capture individual and population-level exposure over realistic time periods with multiple exposure sources, rather than relying exclusively on short-duration measurements for an isolated wireless-transmitting device. Exposure logging should, where feasible, record frequency, power density, field strength, duty cycle, modulation, pulse characteristics, source identity, distance, proximity to the body, and simultaneous exposures, so research findings and health observations can be evaluated against actual exposure conditions.

It would be useful for RF/EMF meters to become a regular part of environmental health assessments for schools, libraries, healthcare facilities, businesses, homes, and other public locations. My medical case history illustrates the importance of measuring exposure in the environments in which people actually live, learn, seek care, and work. Since many of my chronic health symptoms (such as IBD, neurovascular abnormalities, and skin rashes) tend to emerge 24-48 hours after elevated RF/EMF exposure, RF/EMF meters have become a useful proxy to reduce my exposure where feasible. At times, this is as simple as changing my location within a building to be farther from wireless-emitting technologies. I utilized a Safe and Sound Pro II RF meter and Safe and Sound Pro mmWave meter while tracking changes in my RF/EMF

exposure and documented correlating symptoms upon exposure changes. These are consumer-level devices that could be made available at public libraries and schools.

HHS should identify and support methods capable of measuring individual and population-level exposure under realistic conditions, including separate exposure assessments for vulnerable populations, such as children, pregnant women, older adults, individuals with preexisting medical conditions, individuals with EMR syndrome, individuals with elevated occupational exposures, individuals with dental work containing metal-based compounds, and individuals with implanted medical devices.

The most important limitation of the current exposure assessment methodologies is that they do not assess real-world RF/EMF exposure patterns. Wireless devices are tested in isolation on a large Standard Anthropomorphic Mannequin (SAM) representing approximately 3% of the population. HHS should evaluate and develop exposure assessments to adequately include different ages, body sizes, anatomies, device positions, and usage patterns.

The FCC's 1996 RF exposure guidelines were not assessed with regard to children, who are uniquely vulnerable to RF/EMF. Research has found children absorb more RF/EMF radiation than adults due to their smaller body sizes and physiological distinctions, including thinner skulls and a greater proportion of conductive fluid in brain tissue. See **APPENDIX C** for scientific references pertaining to pediatric RF/EMF effects.

IMPROVING EXPOSURE ASSESSMENT METHODOLOGIES

HHS should develop RF/EMF exposure assessment methodologies to adequately capture:

- multiple wireless sources operating simultaneously;
- exposure over prolonged periods;
- devices used directly against or near the body;
- exposure during sleep and other extended-use periods;
- distances between transmitting devices and users;
- background RF exposure from wireless infrastructure and neighboring sources rather than only personal devices;
- the aggregate exposure produced by a connected wireless environment rather than a single isolated transmitter;
- multiple wireless transmitters encountered sequentially throughout a day;
- changes in device power and transmission behavior under changing network conditions;
- different frequencies, modulation schemes, duty cycles, and transmission characteristics used by contemporary systems;
- children's body size, anatomy, developmental stage, and use patterns;
- cumulative exposure over time; and
- changes in wireless technology and patterns of use.

Real-world baseline exposure assessments

Future research should include a baseline of real-world RF/EMF exposure, where feasible, in homes, schools, workplaces, healthcare settings, and public environments using calibrated

instruments with documented frequency ranges, detection limits, environmental conditions, time and date, and appropriate spatial sampling.

Replace simple exposure proxies with measurements reflective of real-world exposure

It would be useful for RF/EMF exposure assessment methodologies to capture the following information, which would enhance aggregate data surveillance and the feasibility of study replication. Scientific studies should report enough information to permit independent assessment of RF/EMF exposure, including (where applicable):

- frequency;
- exposure duration;
- proximity;
- orientation;
- network type;
- incident field strength or power density;
- SAR (W/kg);
- duty cycle;
- modulation;
- distance;
- source characteristics;
- pulse characteristics;
- beamforming;
- simultaneous exposure to multiple frequencies;
- cumulative exposure sources;
- measurement instrumentation;
- calibration;
- time and date; and
- environmental conditions.

Characterize near-field exposure

Body-worn and handheld devices can produce RF/EMF exposure patterns that fundamentally differ from distant environmental sources. Future research should evaluate handheld, body-worn, and nearby transmitting devices separately from more distant environmental sources.

Exposure assessments should distinguish:

- near-field from far-field exposure;
- localized from whole-body exposure;
- short-term from long-term;
- source-specific from aggregate exposure.

Characterize temporal variation

RF/EMF exposure is not constant. It varies with network demand, device operation, distance from transmitters, movement, building penetration, physiological characteristics, and other factors. Future research should include both longitudinal monitoring and isolated measurements, where feasible, in order to assess average, peak, and max RF/EMF exposure. It would be helpful for research to document sufficient temporal and spectral information to characterize variation, distinguish relevant signal sources where technically possible, and identify short-duration peaks as well as longer-term exposure patterns.

HHS should develop and evaluate exposure assessment methodologies that include:

- short-duration measurements under defined operating conditions;
- repeated measurements during ordinary daily activities;
- personal monitoring over multiple representative days, including weekdays and weekends;
- overnight monitoring and measurements during other extended periods of occupancy;
- longitudinal monitoring in prospective studies, with repeated assessments as devices, networks, and usage patterns change;
- separate reporting of arithmetic time averages, relevant peaks, duration above defined measurement levels, and frequency-specific contributions; and
- methods to address missing data, detection limits, and measurement variability.

For long-term studies, researchers should distinguish measured exposure from estimated historical exposure. A current RF/EMF measurement cannot, by itself, establish a participant's exposure in the months or years prior, as exposure and wireless technologies change rapidly.

Measure multiple frequencies simultaneously

Modern environments contain multiple RF sources operating at different frequencies. A future improved RF/EMF exposure methodology should permit evaluation of simultaneous exposure to multiple frequencies and proximity to wireless-emitting technologies that reflect real-world exposures, including emerging technologies such as 5G and 6G.

Improve dosimetry

HHS should support the development and validation of anatomical computational models for RF/EMF-emitting technologies representing:

- children;
- pregnant women;
- older adults;
- individuals with different body sizes;
- individuals with implanted medical devices;
- individuals with dental work containing metal-based compounds;
- different body locations;
- different tissue properties;
- different wireless device/transmitter positions;
- different proximity to the user; and

- multiple wireless-emitting devices.

Dosimetry and other anatomical computational models should also address frequencies and exposure patterns associated with emerging technologies, such as 5G and 6G.

Establish standardized exposure databases

A national RF/EMF exposure database could facilitate clinical, epidemiological, and environmental research by integrating:

- fixed monitoring;
- personal monitoring;
- network infrastructure;
- device measurements;
- frequency;
- modulation;
- source power;
- geographic information;
- wireless transmitter information (including multiple transmitters, where applicable);
- reported symptoms and other adverse effects; and
- time-of-day information.

A standardized exposure database should establish common data standards and privacy-protective logging for exposure measurements, health outcomes, and associated metadata. This resource should facilitate comparison across studies, assessment of population-level exposure patterns, replication of findings, and the evaluation of exposure-reduction interventions over time.

QUESTION 9 — INFORMATION THAT SHOULD BE DISCLOSED

Consumers, residents, workers, schools, healthcare providers, and local governments should have access to understandable technical information that permits them to identify and evaluate RF/EMF exposure sources and assess potential risks in their environments.

Utility customers should **always** have the option to opt-out of a RF-transmitting smart meter for an analog meter, given the current body of evidence demonstrating potential adverse effects from RF/EMF.

Public-facing information should be disclosed to identify relevant RF/EMF operating characteristics, exposure conditions, proximity considerations, potential risks, and the presence of multiple RF/EMF sources, where applicable.

QUESTION 11 — SENSITIVE POPULATIONS

HHS should separately evaluate exposure assessment and risk evaluation for populations that may experience different exposure circumstances and/or potentially different adverse effects. Sensitive populations that warrant specific exposure assessment and risk evaluation include: children, pregnant women, older adults, individuals with implanted medical devices, individuals with dental work containing metal-based compounds, workers with elevated occupational exposure, individuals with preexisting medical conditions, and other populations that may

uniquely experience potential adverse health effects in response to RF/EMF, such as individuals with EMR syndrome.

The FDA notes that cell phones and smart watches may affect some implanted medical devices and recommends appropriate separation in relevant circumstances. Research and regulation should distinguish between the biological effects of RFR exposure and electromagnetic interference with different types of implanted medical devices. This research should extend to dental work containing metal-based compounds.

Children warrant particular attention because exposure may occur over a longer lifetime (starting with prenatal exposure), and children may be exposed to multiple wireless technologies while their bodies and nervous systems are developing. Peer-reviewed research has demonstrated that children are uniquely vulnerable to the potential adverse effects of RF/EMF exposure.

Children absorb higher levels of wireless RFR deeper into their brains because they have:

- Thinner skulls, which allow RFR to penetrate deeper into the brain.
- Higher water content in brain tissue, which is more conductive.
- Smaller heads, which result in a shorter distance for the RFR to travel from the skull to critical brain regions important for learning, memory, and behavior.

Children are uniquely vulnerable to the impacts of wireless RFR because:

- Their brains and nervous systems are still developing.
- Children have greater lifetime cumulative exposure to RFR, often commencing before they are born.
- Children's nervous systems are not fully myelinated and are thus less protected.
- Children's smaller bodies mean that organ systems are more superficial and are at an increased risk of RF/EMF exposure and intensities that might not reach adult organs.

Peer-reviewed research has reported statistically significant associations and experimentally observed changes in children and adolescents following or in relation to RF/EMF exposure, including adverse effects involving behavior, cognition, brain activity, hearing, brain-volume measures, headaches, and other symptoms. See **APPENDIX C** for scientific references regarding pediatric RF/EMF effects.

The **American Academy of Pediatrics** states that children are more vulnerable to cell phone radiation and has long called for an update to government regulations because current safety limits do not consider long term exposure, children's unique vulnerability, nor the way children use devices today, close to the body.

The **International Agency for Research on Cancer** states that children can absorb up to 10 times more wireless radiation in the bone marrow of their skull compared to adults.

A **replication study** on teenagers found memory damage to the area of the brain most exposed to cell phone radiation when the phone is held close to the head (**Foerster et al., 2018**).

A 2021 study analyzed the findings of tumors and heart damage from the U.S. National Toxicology Program study and concluded that FCC limits on cell phone radiation exposure are inadequate to protect against identified health impacts. The study used benchmark-dose modeling of selected animal-study findings and proposed substantially lower RFR exposure limits, especially for children. The scientists recommend that the RFR limits be strengthened by 200 to 400 times to protect children according to current risk assessment guidelines. (**Uche & Naidenko, 2021**).

Computational dosimetry studies have estimated higher localized absorption in pediatric tissues than in adult models, with results depending on anatomy, device position, frequency, and modeling assumptions (**Fernández et al., 2018**; **Gandhi et al., 2012**).

The abstract from **Fernández et al., 2018** states as follows:

"Children's brains are more susceptible to hazardous exposures, and are thought to absorb higher doses of radiation from cell phones in some regions of the brain. Globally the numbers and applications of wireless devices are increasing rapidly, but since 1997 safety testing has relied on a large, homogenous, adult male head phantom to simulate exposures; the "Standard Anthropomorphic Mannequin" (SAM) is used to estimate only whether tissue temperature will be increased by more than 1 Celsius degree in the periphery. The present work employs anatomically based modeling currently used to set standards for surgical and medical devices, that incorporates heterogeneous characteristics of age and anatomy. Modeling of a cell phone held to the ear, or of virtual reality devices in front of the eyes, reveals that young eyes and brains absorb substantially higher local radiation doses than adults'. Age-specific simulations indicate the need to apply refined methods for regulatory compliance testing; and for public education regarding manufacturers' advice to keep phones off the body, and prudent use to limit exposures, particularly to protect the young."

A first-of-its-kind study published by *Physics in Medicine & Biologist* used 550 computer simulations to compare wireless radiation absorption rates in child and adult body models across 15 frequencies spanning 5G and 6G wireless technologies. Wydaeghe et al. (2026) found that the child models had 1.5–1.9 times higher whole-body wireless radiation absorption rates than adult models at frequencies below 6 GHz. The child models also showed higher brain-to-skin wireless radiation absorption rates than adults at the higher frequencies just below 6 GHz.

Simulated 5G beamforming, which focuses 5G signal into a narrow, directed beam, created wireless radiation "hotspots" in the body. At some frequencies, these exceeded absorption limits in both child and adult models, even though the radiation reaching the body met the external exposure limit. The article states, "Our findings suggest that compliance assessment may need to account for factors such as beamforming and body size, particularly as new frequency bands are considered for future wireless networks." (**Wydaeghe et al., 2026**).

HHS has recently taken a proactive stance on screen time in children. It would be useful for future studies to investigate the potential adverse effects of screen time with a hard-wired device that does not emit RFR versus screen time on a wireless-emitting device. This would help

elucidate the mechanisms of harm and the extent to which screen time and RFR independently contribute to potential adverse effects.

QUESTIONS 10 — DATA SURVEILLANCE OF RF/EMF HEALTH EFFECTS

I support the development and coordination of systematic data collection concerning reported adverse health effects from exposure to RF/EMF. Research should distinguish exposure characteristics and should include sufficiently detailed information to permit meaningful analysis of duration, intensity, proximity, multiple simultaneous sources, cumulative exposure, and changes in technology.

Individual case reports of potential adverse effects should be systematically collected and evaluated to help identify patterns and signals for further research, while maintaining appropriate scientific standards for causal inference. Future research priorities should consider appropriate expertise from federal health agencies and independent researchers and scientists in the relevant disciplines. All RF/EMF research should be free from telecom industry influence.

A national, standardized RF/EMF surveillance database should include the following:

- **Common data standards:** Standard units, metadata fields, instrument identifiers, calibration information, frequency bands, sampling intervals, and consistent definitions of exposure metrics.
- **Privacy protections:** De-identification, controlled access to sensitive location histories, clear consent procedures, and safeguards for personally identifiable information (PII) or personal health information (PHI).
- **Interoperability and reproducibility:** Compatible data formats, documented analytical methods, version-controlled processing procedures, and access to de-identified data where ethically and legally appropriate.
- **Validation and representativeness:** Standardized quality control and sampling strategies that cover different ages, occupations, geographic settings, building types, and patterns of wireless use.

QUESTION 14 — SCIENTIFIC EVIDENCE OF POTENTIAL ADVERSE ENVIRONMENTAL EFFECTS FROM RF/EMF

HHS asks what scientific evidence exists regarding potential adverse environmental effects associated with RF radiation and what evidence should be considered when evaluating RF exposure associated with wireless infrastructure. A list of scientific evidence pertaining to the environmental effects of RF/EMF can be found in **APPENDIX E** and at the following webpage: **https://www.wildlifeandwireless.org/list-of-scientific-studies**

I urge HHS to include environmental and ecological evidence in its research agenda. Research should consider wildlife, plants, trees, birds, pollinators, ecosystems, and other environmental components that are vital to ecosystems on Earth. Environmental and ecological research contributes to the investigation of biological mechanisms of RF/EMF effects.

QUESTION 16 — FEDERAL RESEARCH PRIORITIES

Federal research priorities should include improved characterization of real-world exposure; longitudinal studies of cumulative exposure; evaluation of potential effects below existing RF/EMF exposure limits; research involving children and other vulnerable populations; and the establishment of methods for integrating individual case reports with clinical, epidemiological, experimental, and environmental evidence.

QUESTION 17 — FEDERAL COORDINATION

HHS should coordinate RF/EMF research across federal agencies and independent research organizations with complementary expertise. The RFI identifies the FDA, NIH, and CDC as potential participants. Coordination should also include independent researchers and scientists with appropriate expertise in epidemiology, medicine, biology, toxicology, exposure science, environmental health, and other relevant fields.

The FCC's role in RF engineering and spectrum management is distinct from the medical, epidemiological, biological, and public-health disciplines needed to evaluate potential health effects. Federal health agencies, therefore, have an important role in evaluating health questions, establishing research priorities, improving surveillance, and translating evidence into information that can be understood by the public and policymakers.

QUESTION 18 — ADDITIONAL INFORMATION AND RECOMMENDATIONS

Schools

Schools are one example of a real-world environment with vulnerable populations that is typically high in RF/EMF. Schools are typically equipped with Wi-Fi mesh networks with multiple Wi-Fi routers; have multiple smart meters; utilize wireless laptops and/or tablets; allow students to carry smartphones and other wireless devices; and may lease school grounds for wireless communications facilities, such as cell towers and antennas. Research has found RF/EMF to interfere with attention, memory, and behavior, which is particularly problematic for a learning environment. **See APPENDIX C.**

Students with autism spectrum disorder (ASD) or other neurodevelopmental disorders are often issued wireless tablets for learning applications at school and at home, thus further increasing their RF/EMF exposure in close proximity to the developing body and brain.

As an environmental pollutant, RF/EMF can contribute to the total toxic load while increasing the permeability of the blood-brain barrier. RF/EMF is associated with multilevel biological disturbances, including oxidative stress, mitochondrial and immune system dysfunction, inflammation, and calcium channel dysregulation. See **APPENDIX D** for research pertaining to RF/EMF, ASD, and neurodevelopmental disorders.

HHS should prioritize schools and vulnerable populations when developing practical strategies to reduce unnecessary real-world RF/EMF exposure. Internet connections can be hard-wired to mitigate the risk of adverse effects from RF/EMF. Educational content can be pre-downloaded and accessed with the device in Airplane Mode with all wireless transmitters disabled. Students could be issued a Faraday bag for personal devices, which would reduce

exposure to RF/EMF and distractions while maintaining access to cell phone communications in the event of an emergency.

TechSafeSchools.org provides resources to reduce unnecessary RF/EMF in school environments. Here are instructions for creating a wired, high-performance school: **https://www.techsafeschools.org/_files/ugd/2cea04_d44b8519e1c84efda7eaec6cffb6e063.pdf**

Healthcare Facilities

Healthcare facilities are another environment with vulnerable populations, including children, pregnant women, older adults, individuals with preexisting medical conditions, individuals with implanted medical devices, and individuals who report adverse health effects from RF/EMF (such as those with EMR syndrome).

For individuals who report adverse health effects from RF/EMF, seeking medical and dental care can be a disabling challenge. I have experienced prolonged flares of my symptoms and chronic health conditions after involuntary RFR exposure while seeking medical and dental care, which resulted in postponing or discontinuing follow-up care.

It would be useful for HHS to develop ALARA guidelines for non-ionizing RF/EMF specific to healthcare environments:

- Measure RF/EMF exposure in waiting rooms, examination rooms, treatment areas, and other relevant locations.
- Identify RF/EMF sources and distinguish essential clinical equipment from optional or redundant sources.
- Offer non-electronic and/or wired alternatives for patient registration, questionnaires, and other routine tasks.
- Develop reasonable accommodation guidelines for individuals who report adverse health effects from RF/EMF.
- Develop ALARA guidelines to reduce RF/EMF exposure in healthcare settings. Ensure that exposure-reduction measures do not interfere with clinical monitoring or emergency communications.
- Fund research to evaluate changes in health outcomes and other experimental metrics for patients and staff following RF/EMF exposure-reduction interventions. This research could help inform policies and practical strategies for healthcare facilities to reduce unnecessary RF/EMF exposure and accommodate patient needs while preserving essential healthcare functions.

Housing and Employment

A growing subset of the population is reporting adverse health effects from RF/EMF. A 2026 peer-reviewed study found **1 in 8 U.S. adults** (12.5%) reported adverse health effects from wireless radiation (**McCredden et al., 2026**). Wireless infrastructure continues to increase in density and proximity to environments where people spend their time.

Prior to identifying RFR as a causal and exacerbating factor for my health conditions, I moved 13 times as a result of my home environment worsening my health. I repeatedly experienced health regressions in multi-unit housing and towns/cities with a higher density of wireless-emitting technology and infrastructure. I repeatedly experienced health improvements in single-family homes and towns with a lower density of wireless-emitting technology and infrastructure.

After identifying RFR as deleterious to my health in 2020, I have moved five times and changed my vocation specifically to reduce involuntary exposure to RFR from cell towers, antennas, smart meters, neighboring Wi-Fi routers, and other wireless-emitting devices. Minimizing exposure to RFR has become increasingly difficult because wireless technologies are incorporated into homes, workplaces, medical facilities, businesses, transportation corridors, public spaces, and other aspects of daily life.

A **2019 study by Michael Bevington** estimated the prevalence of people restricted in their access to work in a man-made electromagnetic environment to be 0.65% of the general population and approximately 18% of the general population with moderate Idiopathic Environmental Intolerance attributed to Electromagnetic Fields (IEI-EMF), also known as Electromagnetic Hypersensitivity (EHS) or EMR syndrome (Bevington, 2019). As of September 2026, the U.S. Bureau of Labor Statistics reported that approximately 275.6 million people aged 16 and older are eligible to work in the U.S. The Bevington estimate of 0.65% of 275.6 million equates to an estimated **1,791,400** people who may be restricted in their access to work in a man-made electromagnetic environment in the U.S. This figure is an extrapolation from a cited estimate and is not a direct measurement of the number of affected people in the U.S.

There is a need for designated low-RF/EMF communities in the United States, wherein individuals who need or want minimal exposure to RF/EMF can seek housing, employment, and access to basic services. These communities could be equipped with hardwired internet services, non-RF-transmitting utility meters, VOIP and landline phone services, and policies for wireless-emitting devices.

Individuals who report adverse health effects from RF/EMF can face dire housing challenges. Many individuals with EMR syndrome move repeatedly to live farther from sources of involuntary RFR, only to need to move again or live within a shielded room or vehicle when new wireless infrastructure is installed near their home. These individuals often fail to find representation or reasonable accommodations under the Americans with Disabilities Act or the Fair Housing Act. It would be useful for HHS and other federal agencies to evaluate voluntary low-RF/EMF housing and workplace models, reasonable accommodations for accessibility, and the implications for essential services.

Summary Recommendations

1. Develop RF/EMF exposure guidelines that are a scientifically and technically adequate proxy for the real-world exposure environment, which includes repeated and prolonged exposure, multiple transmitting devices, wireless infrastructure, pulsed and modulated emissions, devices used directly against the body, emerging technologies and signal characteristics, and sleep-time exposure.

2. Develop specific RF/EMF exposure guidelines for vulnerable populations, including children and pregnant women.
3. Advise the public of potential adverse effects from RF/EMF based on information gathered from the RFI and the existing body of scientific evidence.
4. Develop ALARA guidelines and practical strategies for a RF/EMF exposure-reduction framework.
5. Establish appropriate methods for investigating reported RF/EMF health concerns and community illness clusters.
6. Evaluate RF/EMF exposure modeling for existing and emerging technologies for the general public and vulnerable populations.
7. Establish minimum-distance guidelines for wireless infrastructure (such as cell towers, antennas, and smart meters) near schools, homes, playgrounds, parks, healthcare facilities, commercial buildings, and transportation corridors.
8. Fund research to investigate RF/EMF exposure-reduction interventions and their effects on exposure measurements, health outcomes, and trade-offs in costs, practicality, and feasibility.
9. Fund pilot programs that investigate outcomes of RF/EMF exposure-reduction interventions in a variety of settings, demographics, and cohorts.
10. Require prominent warning labels on all wireless devices to include disclosure of potential adverse health effects from RF/EMF exposure and safe-use instructions.
11. Establish federal oversight of the proliferation of embedded wireless transmitters in consumer products, including children's toys, infant equipment, wireless cameras, vehicles, wireless appliances, and smart home systems. Consumers should have the option to opt-out of wireless transmitters, given the existing scientific evidence of adverse biological effects.

V. CONCLUSION

HHS has invited the public to provide information concerning RF/EMF exposure, reported health effects, exposure standards, measurement methods, sensitive populations, environmental effects, surveillance, and research priorities. I have provided this comment as an individual consumer and patient, as a researcher, as an advocate, and as an individual diagnosed with EMR syndrome.

My life is profoundly affected by exposure to RFR. I have systematically and repeatedly observed changes in my health associated with changes in exposure to RFR, including acute and chronic health symptoms. I have altered my living and working circumstances in an effort to reduce exposure and safeguard my health. Ubiquitous and involuntary RFR continues to limit my ability to participate in ordinary social, professional, religious, and community activities. For myself and many others with EMR syndrome, the United States is becoming inaccessible. For individuals who are disabled by EMR syndrome, there are rarely reasonable accommodations for housing or essential services.

I urge HHS to review the existing scientific evidence and develop biologically-based RF/EMF exposure guidelines for the general public and vulnerable populations, such as children and pregnant women, that reflect contemporary, real-world, multi-source exposure.

Current and emerging technologies, such as 5G, 6G, and beyond, should not be deployed without independent assessment of relevant exposures and transparent evaluation of potential risks and adverse effects, including specifically for vulnerable populations.

The general population is currently the test demographic for the short- and long-term effects of modern wireless-emitting technologies. There is no informed consent. The widespread deployment of wireless technologies, including satellites, means that exposure may occur without individuals having meaningful opportunities to understand or avoid it. This raises important questions of public transparency, informed consent, accessibility for disabled individuals, and the ethical responsibility to evaluate potential risks and adverse effects before and after deployment.

Given the ethical concerns of exposing humans and animals to RF/EMF, I support HHS funding research to investigate potential improvements following a reduction of RF/EMF, relative to previous levels of exposure. This type of research is especially appropriate for schools, homes, healthcare facilities, wildlife centers, businesses, and other settings where humans or animals spend prolonged periods of time. Pilot programs can become replication models for future RF/EMF exposure-reduction studies while informing guidance to reduce exposure in ways that are found to be most beneficial.

While I support robust continued research, it should be noted that there is a substantial body of research showing adverse effects from RF/EMF. This research spans decades and is more than sufficient to embrace the ALARA principle, develop practical strategies to reduce unnecessary RF/EMF exposure, and increase public awareness of the potential adverse effects of wireless radiation.

I respectfully ask HHS to use the RFI responses to identify and address the practical strategies necessary to protect public health. Our future depends on it.

Respectfully submitted,

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ATTACHMENTS

APPENDIX A—SCIENTIFIC REFERENCES OF POTENTIAL ADVERSE EFFECTS OF CURRENT RF/EMF EXPOSURE GUIDELINES

APPENDIX B—SCIENTIFIC REFERENCES OF SYNERGISTIC RF/EMF EFFECTS

APPENDIX C—SCIENTIFIC REFERENCES OF PEDIATRIC RF/EMF EFFECTS

APPENDIX D—SCIENTIFIC REFERENCES REGARDING RF/EMF, AUTISM SPECTRUM DISORDER, AND NEURODEVELOPMENTAL DISORDERS

APPENDIX E—SCIENTIFIC REFERENCES OF ENVIRONMENTAL RF/EMF EFFECTS