

Children at Heightened Risk from Neurological Effects Induced by Wireless Communication

Children's Health Defense – Pennsylvania Chapter

The prevalence of wireless technologies over the past few decades has led to an explosion of technology-based curricula in education, leading inevitably to an increase in artificial electromagnetic magnetic field (EMF) exposure. In tandem, a large and increasing number of scientists and medical professionals worldwide acknowledge adverse health and behavioral effects induced by man-made EMFs, especially of radio frequency (RF) energy from wireless communication (WC)¹.

Unlike natural (non-polarized) EMFs that are essential for life, all types of man-made EMFs/electromagnetic radiation (EMR) are polarized and can trigger biological effects.² Due to the presence of electromagnetic receptors in the human brain, all humans are affected by EMR, but children are particularly vulnerable. Therefore, we appeal to you to consider the growing EMR-associated health impacts and take precautions to protect the most vulnerable among us (children) and prevent aggravation of counterproductive behaviors and future foreseeable harm.

I. Introduction

Although government authorities and scientific bodies have documented cases of microwave sickness from man-made EMR for over 60 years, this reached some notoriety in the news recently with approximately one thousand U.S. diplomats and intelligence agents affected by the “Havana syndrome”. A panel of medical experts for the U.S. Department of State concluded that their symptoms (including cognitive difficulties, memory loss, hearing noises, visual problems, and vertigo) were consistent with RF effects. The panel's findings expanded on a 2020 report by the National Academies of Sciences, Engineering, and Medicine (NASEM 2020), which also found that pulsed RF energy was the most plausible culprit.³

¹ WC includes mobile phones, smart meters, tablets, laptops, communication base stations, routers, WLAN (Wireless Local Area Network)/ WiFi, radar, satellite communication systems, tv broadcasts, and interactive radios.

² Panagopoulos, D. (Greece), Johansson, O. (Sweden) & Carlo, G. (USA). Polarization: A Key Difference between Man-made and Natural Electromagnetic Fields, in regard to Biological Activity. Scientific Reports 5, 14914 (2015). <https://pubmed.ncbi.nlm.nih.gov/26456585/>

³ National Academies of Sciences, Engineering, and Medicine. 2020. An Assessment of Illness in U.S. Government Employees and Their Families at Overseas Embassies. Washington, DC: The National Academies Press. <https://nap.nationalacademies.org/catalog/25889/an-assessment-of-illness-in-us-government-employees-and-their-families-at-overseas-embassies>.

Man-made RF emerged around WWII as radar began sending microwaves into the sky. In 1961, American neurologist Dr. Allen Frey documented that the microwaves from radar were interacting with the nervous system (includes the brain, spinal cord, and nerves), which became known as the “Frey Effect”.⁴ The NASEM 2020 report on the “Havana syndrome”/microwave sickness found that “as with the Frey effect, RF sources may trigger symptoms by transiently inducing alterations in brain functioning. Studies published in the open literature more than a half century ago...provide circumstantial support for this possible mechanism.”

It should be noted that there is some confusion caused by varying definitions and interchangeability of EMF terms. EMFs include a wide range of frequencies on the electromagnetic field spectrum. Microwave sickness occurs from RF energy, which includes radio waves and microwaves, that are near the middle of the EMF spectrum (generally defined at 300 MHz to 100 GHz)⁵. The term electrosensitivity (ES), while similar to microwave sickness, also includes intolerance to weak or even very weak EMFs. The topic of this paper is WC-associated RF radiation that is noxious to all humans, particularly children.

II. Children’s Distinct Vulnerability to Man-made EMR

Children’s bodies are more sensitive to RF radiation due to the lower bone density of their smaller bones. Relative to adults, children have less fluid in their brains, which may lead to a deeper penetration of the amounts of RF radiation into the brain.⁶ Children’s cells multiply more rapidly, so mutations induced by RFR are multiplied. Many children play on asphalt playgrounds that reflect RFR and magnify its intensity. The earlier age at which this involuntary RFR exposure begins, the greater the health risks.

Due to their still-developing brains, transitioning away from screen activity can be difficult for many children. The exciting nature of screen time can trigger the release of dopamine, a feel-good neurotransmitter that makes us associate screens with pleasure and can lead to addiction. Also, screen time displaces social interactions that teach emotional regulation and may lead to childhood anger and frustration⁷. Addiction to and reliance on social media for social interaction needs to be connected to the explosion of gun violence between teens and young adults being experienced today.

⁴ [BBC News, “‘Havana syndrome’ and the mystery of the microwaves.” September 9, 2021.](#)

⁵ Explanation of units of frequency: 1 hertz is 1 cycle per second. 1 kilohertz is equivalent to 1000 hertz. 1 megahertz is equivalent to 1000 kilohertz and to 1,000,000 hertz. 1 gigahertz is equivalent to 1000 megahertz. These units are abbreviated as follows: hertz (Hz), kilohertz (kHz), megahertz (MHz), and gigahertz (GHz).

⁶ Christ A, Gosselin MC, Christopoulou M, Kühn S, Kuster N. Age-dependent tissue-specific exposure of cell phone users. *Phys Med Biol.* 2010 Apr 7; 55(7):1767-83. <https://pubmed.ncbi.nlm.nih.gov/20208098/>

⁷ <https://today.uconn.edu/2021/04/how-social-media-turns-online-arguments-between-teens-into-real-world-violence-2/>

III. Neurological Effects of Man-Made EMR

Over the past 50 years, extensive epidemiological studies collectively demonstrate that non-thermal RF exposure produces diverse neurological effects, including depression, fatigue, sleep disturbance, concentration/attention dysfunction, memory changes, dizziness, irritability, and anxiety. In the past few decades, the increase in provocation studies⁸ of healthy individuals also collectively show that man-made RF exposure negatively affects brain response during memory tasks, induces annoyance, alters well-being, and disrupts normal brain functioning.⁹

In international studies, neurologists have also found that the earlier onset of dementia and Alzheimer's disease and soaring death rates from these diseases may be caused by EMR exposure. The rise in dementia over 20 years (from 1990-2010) was particularly acute in the United States, where neurological deaths in men over 75 have nearly tripled and in women increased more than fivefold. The rate of increase in dementia cases over such a short period suggests an epidemic in which environmental factors, including EMR and chemical pollution, must play a major part.¹⁰

Alzheimer's disease (AD) is also striking younger people, with a rapid drop in the age of onset of cognitive decline, occurring more frequently around age 45, which is 15-20 years earlier than in previous generations. In some cases, people around age 30 have been diagnosed with AD, which was previously unheard of. A multitude of research studies collectively provide formidable evidence that EMFs cause Alzheimer's disease (Pall, 2022).¹¹ Dr. Pall's study shows that "rats exposed to pulsed EMFs every day are reported to develop universal or near universal very early onset neurodegeneration, including AD; these findings are superficially similar to humans with digital dementia". Several research studies cited by Dr. Pall find that digital dementia appears to be caused from "prolonged exposures to microwave frequency EMFs from Wi-Fi, tablets, and/or heavy cell phone usage in young people".

⁸ A provocation study entails a medical clinical trial whereby participants are exposed to either a substance or "thing" that is claimed to provoke a response, or to a sham substance or device that should provoke no response

⁹ Belpomme, D. (France), Irigaray, P. (Belgium). Why electrohypersensitivity and related symptoms are caused by non-ionizing man-made electromagnetic fields: An overview and medical assessment. [Env. Research, 212 \(2022\)](#).

¹⁰ Washington Post News, "People Are Developing Dementia Earlier and Dying of it More, A Study Shows." August 6, 2015. https://www.washingtonpost.com/world/people-are-developing-dementia-earlier-and-dying-of-it-mohre-a-study-shows/2015/08/06/599b16b8-3c0a-11e5-8e98-115a3cf7d7ae_story.html?wprss=rss_world.

¹¹ [Current Alzheimer Research, 2022, 19, 119-132](#). "Low Intensity Electromagnetic Fields Act via Voltage-Gated Calcium Channel (VGCC) Activation to Cause Very Early Onset Alzheimer's Disease: 18 Distinct Types of Evidence". Martin L. Pall; Professor Emeritus of Biochemistry & Basic Medical Services, Washington State University.

Electrosensitivity varies greatly in its impact among people. There is a cumulative response that can occur over time in the presence of even low energy EMFs¹². Efforts to reduce exposure in environments where people congregate such as classrooms and workplaces should be encouraged. Educating individuals on how they can reduce daily exposures needs to rise to the same levels of health protective awareness that became ubiquitous during the Covid-19 crisis.

IV. Conclusion

While a plethora of peer-reviewed research studies demonstrate adverse health effects from EMR exposure, the Federal Communication Commission's disregard for this serious health hazard has given it the label of a "captured agency" that does not serve the public interest.¹³ The current FCC Maximum Permitted Exposure (MPE) limits are so high that they provide no protection for the public from the biological effects found in any of the 67 studies cited by Dr. Ronald M. Powell, PhD in Applied Physics from Harvard University (see Appendix).¹⁴ Even more stunning is that the FCC has never considered the actual and recurring dosage a person receives from combined daily EMR exposure.

Children's Health Defense sued the FCC last year for their failure to update their safety guidelines. These guidelines were last updated in 1996 and only measured for thermal effects, i.e. skin and tissue damage. The judges ruled in our favor citing numerous instances of the FCC's arbitrary and capricious failures to respond to the evidence of harm, including to evidence that exposure to EMR radiation at levels below current limits may cause negative health effects; the inadequacy of testing procedures particularly related to children, to long-term exposure to EMR, to pulsed and modulated EMR radiation; and the implications of technological developments that have occurred since 1996. The court also noted the agency's complete failure to respond to comments about environmental harms¹⁵.

The FCC has never established a safety standard for children. As children are most vulnerable to this growing volume of EMR output, it is critical that school districts and teachers' unions take measures to mitigate children's EMR exposure in schools. School administrators and staff have a fiduciary duty to ensure children's health and safety while in your care at school.

¹² Electrohypersensitivity as a Newly Identified and Characterized Neurologic Pathological Disorder: How to Diagnose, Treat, and Prevent It <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7139347/>

¹³ Alster, Norm. Captured Agency: How the Federal Communication Commission is Dominated by the Industries It Presumably Regulates. Harvard University Center for Ethics (2015).

¹⁴ Powell, Ronald M. (2013). "Biological Effects from RF Radiation at Low-Intensity Exposure, based on the BioInitiative 2012 Report, and the Implications for Smart Meters and Smart Appliances."

¹⁵ <https://childrenshealthdefense.org/press-release/historic-win-by-childrens-health-defense-in-case-against-fcc-on-safety-guidelines-for-5g-and-wireless/>

The FCC's failure to respond to EMR exposure, does not absolve legal responsibility for schools and public institutions to safeguard children's health from EMR effects. As the credible body of evidence of adverse health effects from EMR exposure continues to expand globally, civil suits for WC RF injuries have also escalated.

This year, the U.S. government substantially compensated employees suffering from microwave sickness/"Havana syndrome"¹⁶ and the U.K. Upper Tribunal court set a precedent in ruling that a school in the U.K. is legally mandated to transition to a low-EMF environment.¹⁷ In 2020, New Hampshire issued a state report on health and environmental effects of 5G and wireless radiation, in which the following recommendations were given that pertain to schools.¹⁸

- New Hampshire schools and libraries should replace Wi-Fi with hardwired connections.
- Require setbacks for new wireless antennas from residences, businesses, and schools.
- Establish RF-radiation free zones in commercial and public buildings

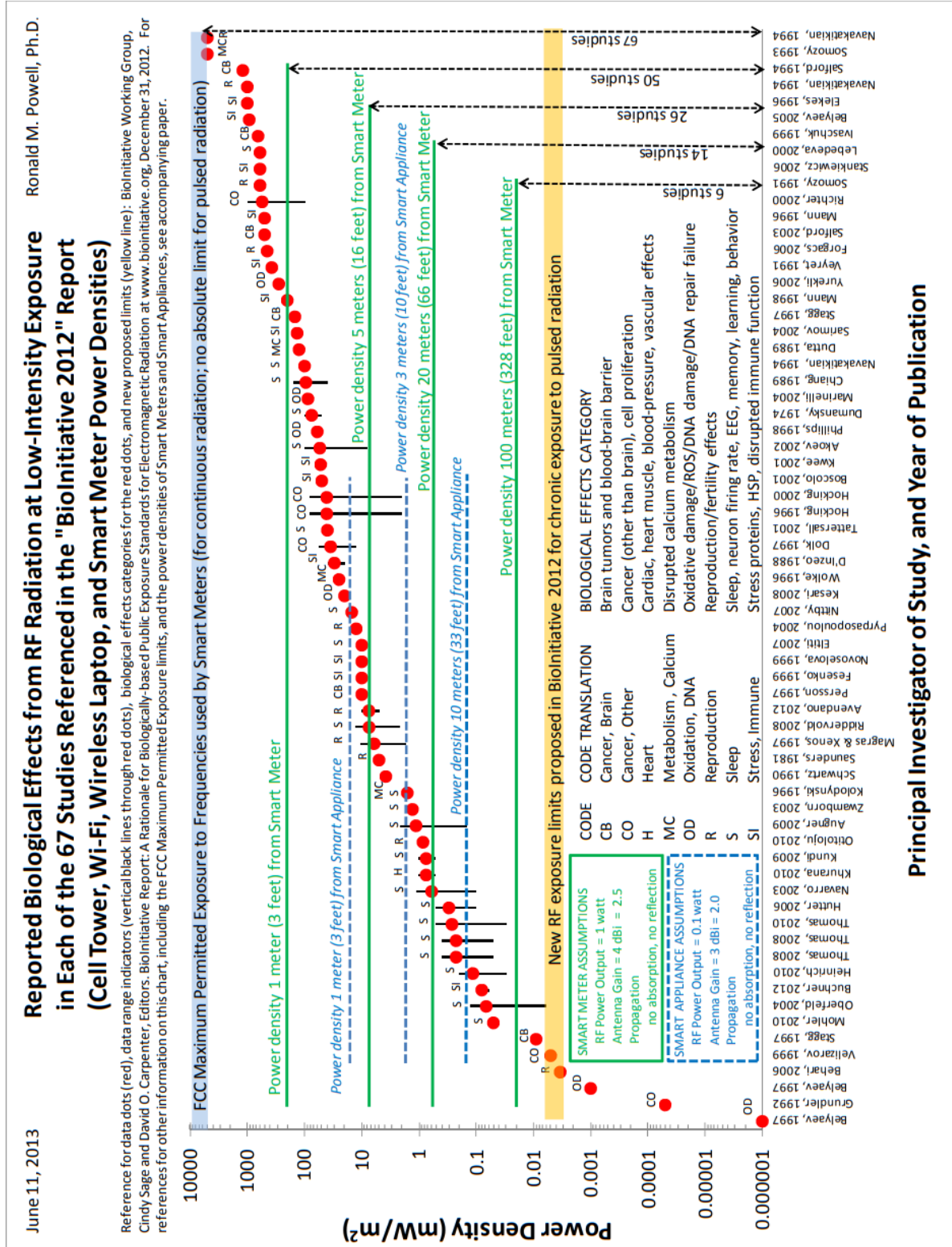
Schools are in the vanguard in seeking to reduce EMR exposures and in educating today's youth of the harms of cell phone use and over engagement with this powerful and unprecedented technology. Any opportunity to reduce exposures to EMR in the classroom and during the school day should be taken.

¹⁶ CNN News, "Biden administration to compensate some 'Havana syndrome' victims up to \$187,000." June 24, 2022.

¹⁷ Physicians' Health Initiative for Radiation and Environment. "Education Health Care Plan (EHCP) awarded (July 2022) for UK child on the basis of Electromagnetic Hypersensitivity (EHS)." Press Release August 2022

¹⁸ State of New Hampshire. Final Report of the Commission to Study The Environmental and Health Effects of Evolving 5G Technology. November 1, 2020.

Appendix



Principal Investigator of Study, and Year of Publication

For more information please contact:
Vince Feldman
Children's Health Defense
President - Pennsylvania Chapter
pa.vince.feldman@childrenshealthdefense.org

