



Why do Wireless Digital Technologies Pose a Clear Risk to Children?

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Children's health is at risk from everyday wireless digital technologies. Why? The past 15 years witnessed the proliferation of near-field microwave Radio Frequency Radiation (RFR) devices in the home, school and society. However, far-field RFR from Wifi routers and 2, 3, 4 and 5G cellular telecommunications antennae, also pose significant risks. The cumulative body of research, which includes scientific findings from laboratory experiments and epidemiological studies, provides *clear evidence* of the threats to children's health and well-being.¹ In light of this, the prestigious American Academy of Pediatrics (AAP) issued specific recommendations to reduce wireless and cell phone exposure to children in order to mitigate the risk of ill-health. However, this may not be sufficient given the findings of several recent studies.

The telecommunications industry and the Big Tech sector, related industry associations, regulators on both sides of the Atlantic, and standards bodies such as the Institute of Electrical and Electronics Engineers (IEEE), and the International Commission on Non-ionizing Radiation Protection (ICNIRP), focus exclusively on providing safety standards for the thermal effects of RFR. They effectively ignore or deny the existence of non-thermal effects.^{2,3} In 1976, the US Naval Medical Research Institute published a bibliography of 370 scientific papers on the thermal and non-thermal biological effects of RFR⁴: this was the last of a series of supplements to the original report in 1972.⁵ The body of scientific evidence has grown exponentially since.

It is interesting to find that independent scientific studies are two and a half times more likely to find evidence of biological effects and health risks than industry-funded studies.⁶ They also have greater scientific validity. Furthermore, Dr. Henry Lai, Professor Emeritus at the University of Washington, reports that studies conducted between 1990 and 2017 find significant effects of health risks such as DNA damage (64%), neurological effects (72%), and oxidative stress (90%).⁷ Thus, the weight of objective scientific evidence has always indicated significant risks to human health—these risks are magnified significantly where children are concerned. The problem is that because of the commercial and economic value of wireless technology (est. > \$2 trillion) and the risk of litigation, the industry 'captured' regulatory agencies,⁸ engaged in disinformation and manipulated the press,⁹ and was responsible for the 'institutional corruption' of scientists, their universities, and governments.¹⁰ The net result is that humans are unknowingly exposed to health risks that governments should have prevented in the first place. The economic stakes and related health risks have risen significantly with the emergence of 5G.

In 2018, the criterion of causation,^{3,11} where brain and heart tumours are concerned, was clearly and unambiguously met when the final report of a 10-year \$30m comprehensive study by the US National Institute of Environmental Health Sciences' National Toxicology Program (NTP) was released. This study confirmed that RFR from Smartphones caused cancer in animals.¹² This is just the latest in a long line of experimental research studies to confirm this link. That is the 'clear evidence' that the EU's Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) had called for in its 2015 'Opinion' to "to clarify the remaining uncertainties."¹³

Risk is defined in terms of threats, vulnerabilities and impact. It is easy to understand why smoking, asbestos and other carcinogens are considered Class 1 carcinogenic threats. In spite of the forces aligned against the non-thermal view, WHO's International Agency for Research on Cancer (IARC)¹⁴ classified RFR as a Class 2B carcinogen, alongside lead, for example. Following the release of NTP study findings on nearfield RFR in 2018, and that

of the Ramazzini Institute study on far-field RFR also in 2018, scientists are calling for the IARC to re-categorize RFR as a Class 1 carcinogen.¹⁵ That being so, regulators have not budged from the thermal view, despite increasing evidence that RFR is as toxic as lead or tobacco smoke. Note how health and safety regulations have long banned lead from children's toys and furniture, even from digital devices. In contrast, children widely use RFR-enabled digital devices, which are more than possible carcinogens. This seems wholly illogical.

How then are children extremely vulnerable to RFR? Electromagnetic fields (EMF) such as RFR are an energy source. The thermal mechanism in RFR results in the heating of human flesh, dependent on the power of the RFR source and the distance from it. Given that (1) most RFR devices operate at levels in breach of existing standards¹⁶ and (2) devices are generally operated by children in breach of the health and safety provisions, then children are at especial risk of both thermal effects and non-thermal effects, specifically as their bodies are immature and growing.

The human body is bioelectromagnetic in form and function, as electrical and electromagnetic fields are produced by living cells and tissues. If, for example, a person presents with neurological or cardiac issues to a doctor, then the physician will conduct an electroencephalogram (EEG) or an electrocardiogram (ECG) for an initial diagnosis. Thus the human brain and heart are clearly electrosensitive organs due to the fact that cells are electrochemical in function. There is a significant body of scientific research which demonstrates causality in non-thermal RFR effects, in that exposure to relatively low-levels of RFR from near-and far-fields trigger calcium ion efflux/influx, via voltage-gated calcium channel (VGCC) activation.¹⁷ This non-thermal effect or mechanism in turn leads to the production of reactive oxygen species (ROS) in cells and a reduction in antioxidants, such as melatonin.¹⁸ Usually this imbalance results in an increase in the probability that a person will develop cancers and other chronic conditions—this explains the findings of extant scientific experiments and epidemiological studies.^{1,3,6,12,13} Specifically, such research demonstrates the presence of non-thermal-related mechanisms that increase the risks of DNA strand breaks, chromosome aberrations, immune system malfunction, and impaired cardiac and neurological functioning. In terms of the latter, reported neuropsychiatric effects are sleep disturbance or insomnia, headache, depression, fatigue, dysesthesia, attention dysfunction, memory changes, dizziness, irritability, loss of appetite and body weight, restlessness and anxiety, nausea, and in extreme cases skin-burning tingling and EEG changes.¹⁹ Interestingly, many of these effects were identified in the 1973 report published by the US Naval Medical Research Institute.

In summary, children are at growing risk of present and future ill-health due to weak governments, captured government departments and agencies, corrupt institutions, a compliant press, and unethical or ignorant academics. As with tobacco smoking and climate change, the scientific evidence has existed for some time and is growing by the year. The problem is that the industry is winning the *battle for hearts and minds* by 'war-gaming' academics,⁷ corrupting governments,⁸ manipulating the press,⁹ and 'leading the public by the nose.' The losers are, as is always the case with adult misconduct, the current generation of children.

¹ Belpomme, D., Hardell, L., Belyaev, I., Burgio, E., & Carpenter, D. O. (2018). Thermal and non-thermal health effects of low intensity non-ionizing radiation: An international perspective. *Environmental pollution*, 242, 643-658.

² Guideline, ICNIRP (1998). Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz). *Health phys*, 74(4), 494-522.

³ Cherry, N. J. (2002). Criticism of the health assessment in the ICNIRP guidelines for radiofrequency and microwave radiation (100 kHz-300 GHz). Invited submission to the Ministry of Health/ Ministry for the Environment of New Zealand on the adoption of the ICNIRP guidelines.

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- ⁴ <https://ehtrust.org/wp-content/uploads/Naval-MRI-Glaser-Report-1976.pdf>
- ⁵ Glaser, Z. (1972). Bibliography of reported biological phenomena (“effects”) and clinical manifestations attributed to microwave and radio-frequency radiation. Naval Medical Research Institute – National Naval Medical Center, Bethesda, USA.
- ⁶ Huss, A., Egger, M., Hug, K., Huwiler-Müntener, K., & Rössli, M. (2006). Source of funding and results of studies of health effects of mobile phone use: systematic review of experimental studies. *Environmental health perspectives*, 115(1), 1-4.
- ⁷ <https://bioinitiative.org/research-summaries/>
- ⁸ Alster, N. (2015). Captured agency: How the Federal Communications Commission is dominated by the industries it presumably regulates. Edmond J. Safra Center for Ethics, Harvard University.
- ⁹ <https://www.thenation.com/article/how-big-wireless-made-us-think-that-cell-phones-are-safe-a-special-investigation/>
- ¹⁰ <https://today.law.harvard.edu/at-center-for-ethics-event-cell-phone-radiation-and-institutional-corruption-addressed-video/>
- ¹¹ Schünemann, H., Hill, S., Guyatt, G., Akl, E. A., & Ahmed, F. (2011). The GRADE approach and Bradford Hill's criteria for causation. *Journal of Epidemiology & Community Health*, 65(5), 392-395.
- ¹² National Toxicology Programme (2018). Cell Phone Radio Frequency Radiation Studies. https://www.niehs.nih.gov/health/materials/cell_phone_radiofrequency_radiation_studies_508.pdf.
- ¹³ https://ec.europa.eu/health/scientific_committees/emerging/docs/scenihr_o_041.pdf
- ¹⁴ Morgan, L. L., Miller, A. B., Sasco, A., & Davis, D. L. (2015). Mobile phone radiation causes brain tumors and should be classified as a probable human carcinogen (2A). *International journal of oncology*, 46(5), 1865-1871.
- ¹⁵ Miller, A. B., Morgan, L. L., Udasin, I., & Davis, D. L. (2018). Cancer epidemiology update, following the 2011 IARC evaluation of radiofrequency electromagnetic fields (Monograph 102). *Environmental research*, 167, 673-683.
- ¹⁶ https://ntp.niehs.nih.gov/ntp/about_ntp/bsc/2018/june/publiccomm/phonegatealert_20180612_508.pdf
- ¹⁷ Pall, M. L. (2018). Wi-Fi is an important threat to human health. *Environmental research*, 164, 405-416.
- ¹⁸ Chauhan, P., Verma, H. N., Sisodia, R., & Kesari, K. K. (2017). Microwave radiation (2.45 GHz)-induced oxidative stress: Whole-body exposure effect on histopathology of Wistar rats. *Electromagnetic Biology and Medicine*, 36(1), 20-30.
- ¹⁹ Pall, M. L. (2016). Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression. *Journal of Chemical Neuroanatomy*, 75, 43-51.