SANTA CLARA COUNTY MEDICAL ASSOCIATION

Recommendations for Best Practices for Safe Technology in Schools

Santa Clara County Medical Association
Environmental Health Committee
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Purpose: To educate physicians, school officials and teachers of the complex health risks and potential health hazards of digital and wireless technology in schools, highlighting precautionary measures and recommendations for safer use of this technology.

The support of preventative environmentally-related diseases and public health measures are prime goals and objectives of the Santa Clara County Medical Association (SCCMA). The SCCMA encourages and supports initiatives that promote the health and safety of both students and staff in the school environment. We have previously endorsed healthy school policies to reduce pesticides and protect children from toxic exposures. In 2014 we supported the CMA Resolution CMA Resolution 107-14 "Wireless Communications Safety Standards Reevaluation" to update public standards for exposure to wireless radiofrequency radiation such that it does "not cause human or environmental harm based on scientific research." In 2016 the SCCMA reprinted a 2014 Sonoma County Medical Association article, "What's the Diagnosis Doctor?" by hospice physician Dr. Scott Eberle about his electrosensitivity.

Recently we have examined the impacts of wireless and digital devices in the school setting with an SCCMA Webinar "Children and Technology" in 2021, highlighting the psychosocial impacts of social media including learning, addiction and mental health. In 2020 the CMA passed Resolution 105-20 "What is the Internet Doing to Us? Digital Wellbeing in the Modern Age", supporting research of internet and social media usage to address the "impacts on physical and mental health." Because of the now ubiquitous and expanding use of digital devices in both informal and formal learning environments, and with new scientific evidence of negative health outcomes and mechanistic links, there is valid concern that this could have significant real-world implications on students in the short and long term, especially neurobiologically (Hu 2021; Hutton 2020; Li 2020; Hutton 2019; Kim 2019; Belpomme 2018; Meo 2018)

Health

Our organization has studied the issue of wireless technology with regard to potential adverse human health impacts of radiofrequency radiation emissions, including neurologic, genotoxic, immunologic, reproductive, hormonal and blue light eye effects, in addition to mental health and psychosocial issues surrounding excessive digital media screen time. Scientific literature indicates that the mechanisms of harm include oxidative injury to critical molecules such as DNA/lipids/proteins (Gerner, XIie), membrane disruption, blood brain barrier disruption, and mitochondrial injury with much of the resultant cellular injury occurring at non-thermal levels which are well below current standards (BioInitiative Report 2022). We have become especially concerned with the dramatic increase in the use of this technology in schools resulting in exponentially higher levels of non-ionizing radiofrequency electromagnetic radiation (EMR) emitted by these wireless devices. This results in increased long-term exposures in children who

spend much of their formative years in school environments (Moon 2020). There is little to no regulation or monitoring of this technology for health effects in children.

Although wireless devices are convenient, this growing robust body of peer-reviewed research has shown that this radiofrequency radiation poses significant short and long-term health risks. (Attah 2022; Butler 2020; Miller 2019). Like tobacco or toxic chemical exposures, it takes decades of exposure, as well as decades of research, to strengthen the link between exposure and harm. Therefore, it takes decades to realize the magnitude of the public health threat before action is taken (NAS 2015). Conversely, considering so many lessons learned late with regards to toxic exposures, science, policy and political will (DDT, endocrine disruptors, flame retardants, BPA, nanotechnology and pesticides), a precautionary approach plays a critical role to manage public health hazards from rapidly emerging environmental exposures from modern innovations. (Gee 2013; EU 2017)

Eye Effects

There are also emerging scientific concerns with regards to eye damage and circadian rhythm disruption from blue light emitted from digital devices (ANES 2019). The reduction in levels of melatonin with blue light exposures effects not only circadian rhythms but is also implicated in oxidative damage to eye structures (Tok 2014), lowering of seizure thresholds (Lopez-Martin 2009; Kouchaki 2016; Cinar 2013: Azmy 2020) and the development of breast cancer due to an imbalance in internal physiologic oxidants and antioxidants (Yang 2021; Mortazavi 2018; Blask 2009).

Social Media

It has also become apparent that the excessive use of digital technology and social media in children can have adverse mental health effects including internet addiction, cyberbullying, deficient social skills, depression and lack of exercise. Uhls (2014) noted that five days at an outdoor education camp without screens improves preteen skills with nonverbal emotion cues. Studies have shown structural brain changes in children with excessive screen time (Hutton 2019), as well as those with internet addiction (Wang 2016; Hong 2013; Wang 2013; Weng 2012; Lin 2011).

Privacy

Privacy concerns of digital technology in schools are also emerging, and create a safety issue for children. A 2022 report "K-12 EdTech Safety Benchmark. National Findings Part 1. Dec 13, 2022. The findings "clearly show personal information safety risks to children and families are present and pervasive in the technology recommended and used by U.S. educational institutions, including: 1) Nearly all apps (96%) share children's personal information with third parties, 78% of the time with advertising and monetization entities, typically without the knowledge or consent of the users or the schools, making them unsafe 2) School apps (23%) expose kids to digital ads, which creates a risk that personal student data is being sent into advertising networks, with no way for the public to inspect where it goes or how it's used; more than half of those apps (13%) use retargeting ads, which use cookies, search and site history to serve up targeted advertising; this means even more personal student data is being sent into advertising networks to better serve the advertisers."

In 2014, the SCCMA supported the California Medical Association resolution which called for re-evaluation and strengthening of wireless safety standards to consider non-thermal biological effects. (Ref 1) There was enough evidence then to call for precaution, and now even more scientific literature links wireless radiation to health risks. This is especially true for the most vulnerable members of our population, our children. (Moon 2020; Heindel 2015; Landrigan and Goldberg 2011; Weiss 2000). Standards have still not be updated to include biological non-thermal effects or effects on vulnerable populations such as children, pregnant women, the elderly or those with comorbidities.

Mitigation Measures
Legislators, government agencies and organizations are increasingly recommending reducing wireless and digital devices as a preventative health strategy. These include the Parliamentary Assembly Council of Europe, Russian National Committee of Non-Ionizing Radiation Protection, Austrian Medical Association, German Parliament, The Cyprus National Committee on Environment and Children's Health, The Collaborative for High Performing Schools, The New Jersey Education Association and the American Academy of Pediatrics (Ref 22-37).

The development and use of digital technology creates a novel complex risk for children. Considering the burgeoning scientific evidence, outdated standards for radiofrequency radiation and variability of sensitivities in the population, precaution is warranted. Having a safe and healthy environment that promotes learning is essential for the performance and success of students. Positive outcomes in health and education have far reaching benefits and conversely negative outcomes affect all future generations and our society at large.

For these reasons, the SCCMA supports reducing exposures to radiofrequency radiation from wireless devices and encourages establishing safer school technology policies with regard to digital devices and infrastructure in order to promote the physical health, mental health and well-being of students and staff. Healthier children translate into healthier communities and a healthier society.

Best Practice Policy Recommendations to Improve Health, Safety and the Learning Environment for Students

Based on scientific research, attached addendums and references the SCCMA supports the following actions that can, singly or together, help to reduce wireless radiofrequency radiation exposures and create safer healthy learning environments in schools.

1. Create a "Safe Tech in Schools Program" to educate students and staff with materials including informational brochures, posters and/or lectures on potential health effects of wireless devices, how to use devices safely, reduce wireless use in the classrooms and reasons to prefer hardwire connections.

2. Educate students and staff about risks of carrying wireless devices in pockets or next to the body, where wireless radiation levels may exceed even FCC safety guidelines. Here are some examples below.

    a. Put devices on desks, not laps
    b. Text rather than call
    c. Prefer speaker phone
    d. Put devices in airplane mode when not in use. This suspends EMF transmission by the device
    e. Carry phones in backpacks, etc., not on the body
    f. Turn devices on airplane mode when not in use
    g. Avoid or strictly limit the use of Virtual Reality headsets

3. Educate the school nurse about potential health effects of radiofrequency radiation (RFR) in students, including blue light effects, posture, RFR effects, and in some students, electrosensitivity (headaches, dizziness, etc.) along with creating a monitoring and reporting program

4. Establish and promote school cell phone-free policies as authorized by the California Legislature in 2019. (Muratsuchi AB 272)

5. Promote tech free breaks in classrooms during each class.

6. Use blue light reduction methods such as apps, blue light computer covers or blue light glasses to reduce eye strain

7. Prefer and install hard-wired ethernet devices instead of wireless wherever possible. This includes hardwiring computers, tablets, whiteboards and cordless phones in the classroom. Disable devices so they are on airplane mode when on ethernet.

8. Reduce RF radiation on campus and in classrooms. Some examples to consider are below.
    a. Purchase Wi Fi routers which have access points that can be easily turned on or off at point of use and at multiple points, to reduce RF emissions, as well as energy use and to achieve ALARA (As Low As Reasonably Achievable) RF levels as per European Council Resolution 1815. Tech Safe Schools. Mitigation Techniques for Reducing RF Radiation in Classrooms. https://www.techsafeschools.org/_files/ugd/2cea04_9e0eac828f124de9ae4a956d81d1f802.pdf
    b. Turn off wireless devices, hotspots, printers “smart TV’s” and routers when not in use in the classroom with easy on-off access buttons or remote.
    c. Place routers as far away from students as possible and not overhead. Distance reduces RF exposure.

d. Decrease the power of the router. Typically the power can be reduced from 100% to 15-20% without interfering with function thus saving energy, as well as reducing RFR exposure. (c,d,e will likely allow the network to operate more efficiently with no interference and with good connectivity)
e. Disable 2.4 GHz Wi Fi and use only 5GHz for classrooms. This reduces energy use.
f. Increase the beacon frequency of the router so the signals are farther apart. This will also reduce energy use, as well as reduce interference with nearby routers. For beacon frequency one can increase from a default of a signal every 100ms to a signal every 1000ms or more without affecting connectivity.
g. Have timers on routers which can turn off routers at night and when not in use to reduce energy consumption
h. Choose routers which are only on-demand and are silent unless in use. These can also be controlled by teachers using their laptops.
i. Consult with an RF professional who can measure radiofrequency radiation (RFR) from Wi Fi, Bluetooth, cell phone frequencies, cell tower frequencies (600 MHz to 7 GHz and possibly select 5G millimeter bands). This includes peaks/maximum levels of radiation which are the most biologically active, not average exposures. It will be important to perform before and after Wi Fi adjustments, or before buying equipment. It is recommended that each school also purchase a professional grade EMF meter(s) to test for exposures. The teachers and students can measure and confirm the reduction in exposure. See Reducing Wireless Radiation. Safe Tech Schools Webinar for recommendations. https://www.techsafeschools.org/webinars

9. Consider a Wi Fi Dead Zone on campus with signs posted to turn off phones

10. Reduce wireless radiation and distractions in students by having them download materials first, then disable applicable wireless antennas (Bluetooth, GPS, cellular, and Wi Fi) by using airplane mode as much as possible.

11. Consider using books instead of computers or tablets whenever possible for improved learning and less distraction

12. Keep tablets and computers at least 8 inches from the body and on a table (not lap) when used as per Federal Communications Commission recommendations.

13. Keep children's heads away from routers, screens and antennas as much as possible.

14. Avoid installation of smart meters on school premises. (Lamech 2014)

15. Consider a policy to restrict installation of cell towers on school property. The recommendation is at least 1640 feet (500meters) distance from a cell tower to a school. (Balmori 2022; Pearce 2020)

16. Consider placing fiberoptic cables for broadband access as it is faster, safer, more reliable and cheaper in the long run, with no radiofrequency radiation emissions risks

17. Sponsor pilot demonstrations of the use and feasibility of safer technologies in classrooms, especially the feasibility of using fully hard-wired technologies without wireless function or devices in classroom settings.

18. Develop and distribute state-level policies and/or guidance for schools on wireless radiation and technology safety.

19. Give teachers flexibility with regards to use of technology and books

Sincerely,

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Addendum #1
Reasons to Support Safe Technology in Schools

a) **<u>Proliferation of wireless devices in Classrooms:</u>** The use of wireless devices in classrooms has mushroomed in the last 10 years. Devices that emit RFR now include computers, tablets, cell phones, cordless phones, virtual reality headsets and whiteboards. In addition, some children are wearing wireless watches and air buds that also emit radiation close to the body and are a distraction to students.

b) **<u>Wireless devices are placed closer to the body.</u>** Wireless devices such as laptops, tablets and cell phones are portable thus often used close to the body with increased exposure to reproductive organs and the brain (Fernandez 2018; Morgan 2014, Gandhi 2012). Some studies suggest that the levels of radiation may be close to or exceed ICNIRP guidelines (Belleini 2012) which have not been updated in over 20 years.

c) **<u>Research links manmade wireless exposures to many health risks.</u>** Mobile communications devices transmit and receive radiofrequency radiation to transfer data. Wireless radiation is invisible but passes through walls, windows and living bodies. Current standards only regulate thermal (heat) levels. Numerous studies show that non-thermal levels of wireless radiation exposure can create oxidative stress in the body, which can cause damage to DNA, lipids, proteins and cell membranes (BioInitiative Report 2022). This oxidative stress can lead to cellular and internal organ inflammation. Research has demonstrated a clear link connecting radiofrequency radiation (RFR) to cancer, neurological decline, sleep and memory disruption, cardiovascular harm, reproductive failure and immune dysfunction. (Attah 2020; Miller 2018) Studies also suggest that these health risks are cumulative, increasing with increased RF exposure. Professor Tom Butler, author of **On**

the Clear Evidence of the Risks to Children from Non-Ionizing Radio Frequency Radiation: The Case of Digital Technologies in the Home, Classroom and Society, describes the science and need for precaution. (Butler 2020)

d) **Children are more vulnerable.** Children are more vulnerable to wireless radiation's adverse neurological effects due to their thinner skulls and developmentally immature brains. (Morgan 2014; Fernandez 2018; Gandhi 2012). Pregnant women are also at risk due to the vulnerability of the developing fetus (Li 2017) with associations found in animal and epidemiologic studies between prenatal exposures and ADHD and behavior (Divan 2008; Sudan 2012; Li 2020). Humans are now exposed from pregnancy to childhood and through adulthood, a full lifetime of exposure.

e) **Neurologic effects identified**: The brain and nervous system are considered by many scientists to be the most sensitive target organ for microwave radiation as brain functioning depends on complex minute electrical signals. It is well established that neural development is complex and fragile. Prenatal toxic exposures to the brain can cause permanent and lifelong learning, memory and behavior disorders (Lanphear 2015; Landrigan 2011; Weiss 2000). The variable and sometimes subtle effects of toxins on the brain may not be evident until the child is older. Epidemiologic studies have shown prenatal exposure to wireless radiofrequency radiation causing postnatal neurologic changes. (Divan 2008; Sudan 2012; Li 2020).

Foerster et al (2018) published a prospective Swiss study of 700 adolescents over one year looking at **memory performance** and individual dose of RF radiation from wireless emissions. Their study found "that cumulative RF-EMF brain exposure from mobile phone use over one year may have a negative effect on the development of figural memory performance in adolescents, confirming results of their 2015 study. Other scientific research has shown consistent neurologic harm from RFR at non-thermal levels. **Ra et al (2018)** performed a longitudinal study examining the use of digital media in 2587 teens (15 and 16 year-olds) without attention-deficit/hyperactivity disorder (ADHD), in 10 Los Angeles schools, and found a significant increase in the development of ADHD symptoms over a 24 month period associated with higher digital media use.

Meo et al (2018) examined 300 students at 2 high schools over 2 years with different ambient RFR from cell tower radiation. One cell tower emitted 5-fold higher radiation than the other. The researchers found "a significant impairment in Motor Screening Task (MOT; $p = .03$) and Spatial Working Memory (SWM) task ($p = .04$) was identified among the group of students who were exposed to high RF-EMF produced by MPBSTs[mobile phone base stations]."

Deniz et al (2017) looked at the effects of cognitive performance as well as hippocampus structural changes in 60 medical students who use cell phones in the last 5 years a) less than 30 minutes a day versus b) Greater than 90 minutes a day. They found, "There was also no significant difference in terms of hippocampal volume between the groups

($p > 0.05$). In contrast, the results of the stroop and digit span (backward) neurocognitive tests of high exposure group for evaluating attention were significantly poorer from low exposure group". They concluded that, "a lack of attention and concentration may occur in subjects who talk on mobile phones for longer times, compared to those who use phones relatively less."

Cell Tower Neurologic and Cancer Effects

Dozens of international studies show neurologic and other health effects in residents who live in proximity to cell towers. This is dependent on the distance from the towers, with symptoms including:

- Headaches
- Insomnia
- Dizziness
- Irritability
- Fatigue
- heart palpitations
- nausea
- loss of appetite
- feeling of discomfort
- loss of libido
- poor concentration
- memory loss

Santini (2002) looked at a multitude of symptoms and distance from the tower. The most common symptom was fatigue followed by insomnia, headache, poor concentration, memory loss, irritability, heart palpitations and skin effects. These symptoms were noted when cell towers were within 200- 300 meters to homes. A follow up study Santini in 2003 revealed that older subjects reported more symptoms and were more sensitive. The authors noted that the duration of exposure of 1 to 5 years did not have an effect on frequency of symptoms but after 5 years there was a significant increase in irritability reported.

Other studies point to longer term health problems which can occur but would not be recognized for several years after towers are placed. This would require rigorous monitoring and surveys. The newest article by A. Balmori, (2022), **Evidence for a health risk by RF on humans living around mobile phone base stations: from radiofrequency sickness to cancer**, reviews the previous studies highlighting both short-term and long-term health effects of living near cell towers. Balmori concludes, "Overall results of this review show three types of effects by base station antennas on the health of people: radiofrequency sickness (RS), cancer (C) and changes in biochemical parameters (CBP)**.** Considering all the studies reviewed globally (n = 38), 73.6% (28/38) showed effects: 73.9% (17/23) for radiofrequency sickness, 76.9% (10/13) for cancer and 75.0%

(6/8) for changes in biochemical parameters...**Of special importance are the studies performed on animals or trees near base station antennas that cannot be aware of their proximity and to which psychosomatic effects can never be attributed."**

Dodd (2011) performed a 10-year study (1996-2006) examining the distance from cell towers and cancer clusters. He and his colleagues found a highly significant increase in cancers in those living within 500 meters of the cell tower. They noted "The largest density power was 40.78 μW/cm2, and the smallest was 0.04 μW/cm2." The current guidelines are about 1000 μW/cm2. The authors conclude "Measured values stay below Brazilian Federal Law limits that are the same of ICNIRP. The human exposure pattern guidelines are inadequate. More restrictive limits must be adopted urgently."

Shinjyo and Shinjyo (2011) in an independent cell tower study from Japan, looked at health effects of residents living in a condominium complex from 1998-2009. The authors surveyed the resident health symptoms before placement of cell towers, during cell tower functioning and after removal of different antennas on the rooftops. They found a significant development of symptoms with placement of the cell towers and a significant reduction in symptoms after removal.

Zothansiama (2017) studied DNA damage and antioxidant status of those residing within a perimeter of 80 meters of mobile base stations and found "significantly ($p < 0.0001$) higher frequency of micronuclei when compared to the control group, residing 300 m away from the mobile base station/s. The analysis of various antioxidants in the plasma of exposed individuals revealed a significant attrition in glutathione (GSH) concentration ($p < 0.01$), activities of catalase (CAT) ($p < 0.001$) and superoxide dismutase (SOD) ($p < 0.001$) and rise in lipid peroxidation (LOO)"

Pearce (2019) looked at health effects of cell towers, publishing a peer reviewed industry paper, **Limiting liability with positioning to minimize negative health effects of cellular phone towers**, which recommends a 500 Meter buffer recommended around schools, hospitals and homes to limit liability.

Critical Windows of Neurodevelopmental Toxicity

It has been known since the 1900's that children are also particularly vulnerable to neurotoxic exposures, as seen with lead poisoning from paint, followed by mercury, arsenic and PCBs (Lanphear 2015). Lanphear notes a 17% increase in developmental disabilities in the last 2 decades and writes, "By the end of the twentieth century the "new morbidities of childhood"—attention deficit hyperactivity disorder (ADHD), autism, asthma, obesity, and preterm birth—had emerged. Learning disabilities and mental disorders are now two of the most prevalent morbidities in children." We now know there are critical windows of neural development making different parts of the brain more susceptible to injury, continuation of brain development postnatally in the mid-twenties, and lifelong exposures to a host of toxins that may have synergistic effects (Li 2021). It appears wireless exposure is also a neurotoxin

and could act synergistically with other toxic exposures (BioInitiative 2022; Kim 2018; Consales 2012; Balmori 2022; Bouji 2020; Shahain 2018; Othman 2017; Aldad 2012; Sudan 2012; Hu 2012; Pritchard:2015; Golomb 2019; Karimi 2018; Zhou 2007; Salford 2003).

Mechanisms
Basic science and epidemiologic studies show an array of adverse effects on the nervous system and brain function from RFR. Wireless radiofrequency radiation has been shown to increase the permeability of the blood brain barrier, impair intracellular calcium homeostasis, alter neurotransmitter regulation, cause oxidative stress, and cause neuronal loss, especially in the hippocampus which is the initial memory center of the brain (Karini 2018; Fragopoulos 2018; Shahain 2018)

Seizure Threshold and Cognitive Decline
There is some evidence that Wi Fi radiation exposure can reduce the threshold for seizures. (Azmy 2020; Kouchaki 2016; Cinar 2013; Goldberg-Stern H 2012; Lopez-Martin 2006 & 2009) Cell tower studies show cognitive decline closer to cell towers (Balmori 2022: Meo 2018). A paper on industry liability considered the health effects of cell towers and recommended a 500 meter (1640 ft) distance between a cell tower and schools, hospita**ls** and homes (Pearce 2020).

Prenatal Effects
With regards to prenatal effects, a study was performed by Dr. Hugh Taylor, Chair Obstetrics, Gynecology, and Reproductive Sciences at Yale School of Medicine, on fetal radiofrequency exposure to pregnant mice. Dr. Taylor found that prenatal exposure to cell phone radiation resulted in behavioral effects in their offspring. (Aldid T et al. Nature. Scientific Reports 2013). Dr. Taylor, in an interview, emphasized the obligation of physicians to identify potential insults to the developing fetus. The study was well-designed and removed confounding factors. The researchers had cell phones muted and silenced or on active mode for variable amounts of time. Cell phones in one group were on and over the cage and in the control group were off and on the cage. They tested the offspring after maturity. The mice exposed to cell phones had decreased memory and were more likely to be hyperactive. There was a clear dose response effect noted in this study.

Nervous system effects from microwave radio frequency radiation which have been demonstrated in studies include:

- Oxidative Stress
- Hippocampus alterations (memory center)
- Alternation of neurotransmitters
- Hormonal changes
- Neurodegeneration
- Opening of the Blood brain barrier
- Memory loss
- Demyelination of nerves
- Reduction in Seizure threshold

f) Reproductive Effects Identified

An enlarging body of research shows effects on sperm, ovaries, embryos, miscarriage, as well as neurologic postnatal effects on the fetus. A systematic review of the literature on effects of RFR during pregnancy supported an association with miscarriage, fluctuations in the fetal temperature and heart rate variability (Jaffar 2022). Magras in 1997 published his study of his long-term healthy lab mice which his lab has been successfully reproducing and studying for decades. He placed these mice in an isolated area of cell tower antennas and found, "A progressive decrease in the number of newborns per dam was observed, which ended in irreversible infertility." The study ended as there was ultimately complete reproductive failure.

Sperm Damage

Almost all studies of sperm and RFR exposure have found harmful effects. Kesari (2018) noted the increasing rate of infertility and reviewed the research on radiofrequency radiation from wireless devices and sperm damage. Dr. Kesari concludes that, "the RF-EMF may induce oxidative stress with an increased level of reactive oxygen species, which may lead to infertility. This has been concluded based on available evidences from in vitro and in vivo studies suggesting that RF-EMF exposure negatively affects sperm quality."

Ovary Effects

Ovarian effects of RFR have also been studied with oxidative injury found. Saygan looked at the impact of electromagnetic radiation (2.45 GHz, Wi-Fi) on the female reproductive system and the role of vitamin C to protect the cells from oxidation. The authors conclude, "These results indicate that prolonged EMR exposure induced pathophysiological changes in the ovarian, fallopian tubal, and uterine tissues due to oxidative damage. Under the conditions of this study, Vitamin C may have protective effects on female reproductive system against oxidative damage." Alchalabi (2017) performed a similar study with variable times of exposure revealing abnormalities in the ovaries including lipid peroxidation, decreased antioxidant enzyme activity, micronuclei formation, vacuolation, degeneration and impaired folliculogenesis, all indicating impaired ovarian function.

Fertilization

A study by Chen (2017) showed reduced "fertilization rate in mice, and reduce the blastulation rate, thus reducing the possibility of embryo implantation." Several studies have shown similar results.

Fetal growth

Boileau (2020) performed a prospective, longitudinal follow-up study of a cohort from Haute-Vienne looking at intrauterine development to the age of 18 years. He focused on fetal growth in children born between April 2014 and April 2017. The authors found that," Using a mobile phone for calls for more than 30 min per day during pregnancy may have a negative impact on fetal growth."

Miscarriage

Dr. DK Li, a Kaiser researcher performed a rigorous prospective study of 913 pregnant women examining the association between high MF exposure and miscarriage risk. This was published in Scientific Reports in 2017. The women had everyday exposures to electromagnetic radiation sources which was measured with an exposometer. He followed these women to term. He found with the highest level of everyday radiation exposure an approximately 3-fold increase in miscarriage, despite the source of the exposure. "Exposure to Magnetic Field Non-Ionizing Radiation and the Risk of Miscarriage: A Prospective Cohort Study". Dr. Li previously looked at magnetic fields and pregnancy outcomes in 2002, "A population-based prospective cohort study of personal exposure to magnetic fields". Researchers found, "miscarriage risk increased with an increasing level of maximum magnetic field exposure with a threshold around 16 milligauss (mG)."

Placental Effects

Vafaei (2020) exposed pregnant mice to Wi-Fi signal (2.4 GHz) for 2 and 4 hr. Placenta tissues were examined showing lipid peroxidation, SOD activity (oxidative stress), apoptosis and gene overexpression.

g) **<u>Electrosensitvity (EHS)</u>** to electromagnetic wireless radiation is increasingly recognized as a disability and environmental illness in both children and adults (Bevington 2019). Variable symptoms which occur in some individuals in the presence of wireless devices include, headaches, fatigue, dizziness, nausea, and heart palpitations. Predisposing factors include chemical sensitivities, prior toxic exposures, infections, impaired immune systems and genetic variation. It is estimated that 5%-30% of the population has mild EHS and 0.65% have a severe disability and cannot work or go to school due to wireless devices and infrastructure present. In the UK a student has recently received accommodation their disability.

Dr. Scott Eberly, a hospice physician, developed EHS after a carbon monoxide poisoning and relates his story and how he finally figured out that he had become sensitive to his wireless devices and how disabling that had been for him. His two articles are **What's the Diagnosis Doctor?** (Eberle 2014), **An underworld journey: Learning to cope with electromagnetic hypersensitivity**. (Eberle 2017). Jeromy Johnson, a Silicon Valley engineer, participated in a 2016 Ted Talk, **"Wireless Wake-up Call"** after he developed electrosensitivity from a bank of Smart Meters placed near his bedroom. While he admits there are wonderful advantages to wireless technology he calmly discusses his own personal story and why it is critical to protect children. A new article by Hardell and Carlberg (2022) discuss the development of Electrosensitivity in 2 individuals after a cell tower was placed.

Multiple Chemical Sensitivities and Electrohypersensitivty Links

Belpomme and colleagues have looked at multiple chemical sensitivities (MCS) and Electrosensitivities (EHS) and found a crossover in symptoms of 30% with MCS and

EHS and in 37% of patients MCS preceded EHS. The researchers identified the presence of oxidative inflammatory biomarkers that can be used diagnostically and are common in both conditions.

Electrosensitivity as a Disability

The United States Access Board (USAB) recognizes electromagnetic sensitivity as a disability. The USAB, whose role is to advance "Full Access and Inclusion for All", issued a guideline recommending inclusion of both chemical sensitivity as well as electromagnetic sensitivity as disabilities. They stated in a review, "The Board recognizes that multiple chemical sensitivities and electromagnetic sensitivities may be considered disabilities under the ADA if they so severely impair the neurological, respiratory or other functions of an individual that it substantially limits one or more of the individual's major life activities."

The Canadian Human Rights Commission (CHRC) commissioned a research project, Accommodation for Environmental Sensitivities", in 2007, which examined legal assessments of accommodation for environmental sensitivities, including relevance of building codes and standards. The authors note, ""Individuals with environmental sensitivities experience adverse reactions to environmental agents that are prevalent throughout the built environment and include electromagnetic fields and the chemicals found in building materials, furniture, cleaning and copying products, fragrances and pesticides."

h) <u>Distraction: Cell Phones and computers can be a distraction to learning in class</u>.

Studies have shown that cell phones are a distraction when on and even if turned off (Ward 2017). Many K-12 schools have banned cell phones in class with beneficial results in learning and behavior. California passed AB 272 in 2019 to encourage schools to formulate their own bans in classrooms. Schools across the nation have generally found good outcomes from this. San Mateo High School in California invested in a pouch system whereby the kids keep their phone in a locked pouch that can easily and quickly be opened by a device at the front of the room when kids leave. France banned cell phones in classrooms in 2018.

In addition, some college professors and law schools are banning computers during lectures and having students take notes by hand supporting current evidence that learning is improved. When Colorado schools banned cell phones they found 7 years later the student were happier and less stressed.

Veteran teacher Joe Clemens, co-author of **Screen Schooled** has observed with the introduction of digital technology in schools, "a significant difference in the ability of kids to focus, to interact socially, to think critically, to solve problems. They have all taken a noticeable dive over the past five to ten years."

i) **Increased Digital Media Use Correlates with Increased Mental Health Problems.** Since the release of smartphones, studies have found significant increases in depression and other mental illness symptoms among children and young adults. Between 2008 and 2017, rates of depression, anxiety, psychological distress, low self-esteem and suicidal thoughts increased in these age groups. Those who spent more time on wireless devices and/or social media showed higher risks of such symptoms (Twenge 2006; Twenge 2017; Twenge 2019; Lissak 2018; Boers 2019). In 2017, the American Academy of Pediatrics published a special pediatrics supplement journal discussing the range of issues with digital media. (AAP 2017)

In January 2023 the Seattle School District, the largest in the state with 50,0000 students, sued a number of high-profile tech companies including META, Facebook, Instagram, Tik Tok, Google, You Tube for harm to students. The lawsuit alleges that the companies "have successfully exploited the vulnerable brains of youth" to maximize how much time users spend on their platforms in order to boost profits. The actions taken by the platforms, according to the suit, have "been a substantial factor in causing a youth mental health crisis, which has been marked by higher and higher proportions of youth struggling with anxiety, depression, thoughts of self-harm, and suicidal ideation."

j) **Internet addiction affects brain physiology and structure.** Increased use of wireless devices has enabled increased internet addiction, which now spans the globe to affect millions of youths. Studies looking at structural brain changes in internet-addicted teenagers and college students have consistently found atrophy of both the gray and white matter in the brain with shrinkage of tissues on the surface of the brain as well. (Lin 2011; Yuan 2022; Weng 2012; Wang 2013; Hong 2013; Wang 2016)The longer the addiction, the worse the effects. Such brain abnormalities could impair learning, cognition, concentration, memory, and/or emotional control.

k) **Eye Effects: Wireless and digital devices add to excess blue light exposures and retinal damage.** Studies have found health risks to eyes linked not only to wireless radiation, but also to blue light exposures. Blue light reduces melatonin levels which can cause circadian rhythm disruption and impair sleep. Melatonin is also an important internal antioxidant. Excessive blue light exposure has been found to be a cause of retinal photoreceptor damage and now lens damage due to oxidative stress.[12]. Adults as well as students spend most of the waking day now and much of the night on screens. Homework is done online adding to screen time.

French Report on Blue Light and Eye Health

In 2014 ANES, the French Agency for Food, Environmental and Occupational Health & Safety, convened a Working Group and later published a report assessing the **effects on human health and the environment of systems using light-emitting diodes (LEDs).** Their goal was to measure current real life levels of blue light exposure of children, the general public and workers to blue light and then to assess risks. This was in response to policies developed to remove halogen and incandescent lighting to reduce energy consumption. They found that blue light has phototoxic, circadian rhythm and sleep effects. Blue light produces more glare and there is also more variation in light intensity

depending on the power supply. Their report found the risks of exposure to blue light to be significant and proven to be related to Age Related Macular Degeneration (ARMD). They also reported that the exposure limits (ELs) selected by ICNIRP for the retinal toxicity of light are not sufficiently protective They recommended limiting exposure of blue light to children, establishing appropriate and effective blue light protective glasses and screens and reducing light pollution.

Virtual Reality Headsets and Excess Exposure to RFR

Virtual Reality use is rapidly increasing in homes, schools and even hospitals. While it may have limited value in some circumstances, the prolonged exposure of a powerful wireless device close to the eyes increases risks for injury including cataracts. Fernandez et al in 2018 looked at the absorption of FRF into adult and child brains demonstrating much deeper absorption of the RF radiation in the brains and eye of children. The article, **Absorption of wireless radiation in the child versus adult brain and eye from cell phone conversation or virtual reality", concludes,** "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."

l) <u>Learning: Pro and Cons of Digital Learning versus Book Learning</u>

Digital technology and internet learning are tools. There are pros and cons to using this technology in schools. While there is easy access to information it is argued by many experts this could lead to poor memory retention, cheating, distraction, access to inappropriate content, lack of movement and poor social interaction.

Evidence suggests that digital technology is processed in the brain differently than books and promotes "skim reading" rather than deep reading. Digital technology may compromise critical analysis, especially in younger grades.

Australian School Bans Tablets

In 2019 a private school in Sydney Australia suburbs banned Ipads and went back to regular textbooks as the teachers agreed that the IPads did nothing to improve students skills. In the past the school had regularly appeared on the HSC top-ten honors list, the school reported that iPads were found to hinder learning. (Hambleton 2021, This School Banned iPads, Went Back to Regular Textbooks). The Principal felt that searching and note-taking was easier for students with hard copy textbook and this was also backed up by student's responses. The article notes that it is a cost savings to buy books as digital technology needs constant upgrading which is expensive. Concerns about constant student surveillance, privacy, commodification and commercial exploitation concerns have also been raised by parents and other non-profit organizations (Fairplay: Childhood Beyond Brands).

Cameras On Adds Stress to Students

Dr Ann Marcus-Quinn, a lecturer in Technical Communication and Instructional Design at the University of Limerick authored "Technostress: How Covid is straining teaching and learning noted that "Cameras on" policies in some schools exert pressure on teachers and students." (The Irish Times. April 20, 2021)

m) <u>Policy Recommndations: Several agencies and organizations recommend reducing wireless exposures.</u> Previous advisories and reports from a number of agencies have cautioned about wireless radiation health risks and advised reducing EMF exposures. Among those who have issued advisories and recommendations are the:

a. European Commission Parliamentary in their 2011 Resolution 1815 Council of Europe has proposed restrictions on the Internet access and cell phone usage in all schools to protect the teenagers from potentially harmful EMFs [
b. California Department of Health.
c. American Academy of Pediatrics
d. The German Federal Government recommended in 2007 report "to prefer conventional wired connections"
e. The Russian Committee on Non-Ionizing Radiation Protection in 2008 warned that cell phones are unsafe even for short conversations. Children under 16, pregnant women, epileptics, and people with memory loss, sleep disorders and neurological diseases
f. Bavaria, Germany's Parliament recommends against Wi-Fi in schools. https://www.icems.eu/docs/deutscher_bundestag.
g. Austrian Medical Association
h. Collaborative for High Performing Schools : Low EMF Environment (2014)
i. The New Jersey Education Association. (2016)

n) Schools are adopting policies to restrict the use of cell phones including in <u>California schools.</u> In the findings of Assembly Bill 272, the California Legislature recognized the "growing evidence" of harm associated with "unrestricted use of smartphones" by students at schools. Lower pupil performance, interference with teaching, and increases in depression, anxiety, and suicide were cited. The bill authorized schools to adopt policies that "limit or prohibit" smartphone use by students. **<u>Other schools- Restricting devices works.</u>** Smartphone limits have already succeeded in many schools. When San Mateo High School established a phone-free policy, response was overwhelmingly positive. Schools are having students place their phones in a pouch at the front of the class so they do not have access in the classrooms.

o) <u>Many believe the U.S. Federal Communications Commission's wireless safety guidelines are outdated and inadequate.</u> Current standards are thermally based, however, current robust scientific evidence reveals that there are broad biologic non-thermal effects on human health and the environment. In 2021, a court ruled that the FCC's decision to continue using outdated wireless safety guidelines was "arbitrary and capricious." These guidelines were originally written in 1996. Experts believe these standards outdated since

they have not incorporated more than 20 years of research documenting wireless radiation health risks and exclude non- thermal effects, sensitive populations such as children, the elderly, those with chronic illness or those who are electrosensitive. A recent publication by **International Commission on the Biological Effects of Electromagnetic Fields** thoroughly examines the flaws in health assumptions underlying the FCC and ICNIRP exposure limit determinations for radiofrequency radiation

p) Schools have an obligation to provide a safe learning environment

q) Schools have an obligation to accommodate students who may have sensitivities or limitations to the use of wireless devices.

Addendum #2
REFERENCES

Note: Reviews are highlighted in each section and may be beneficial for those who are less familiar with the subject. Research in this field as in all other scientific issues will continue and can be updated. This list is only an introduction to the vast amount of research available.

Numbered General Supporting References

1) **CMA Resolution 107-14**
WIRELESS COMMUNICATIONS PUBLIC SAFETY STANDARDS REEVALUATION

Resolved: That CMA supports efforts to reevaluate microwave safety exposure levels associated with wireless communication devices, including consideration of adverse non thermal biologic and health effects from non-ionizing electromagnetic radiation used in wireless communications; and be it further

Resolved: That CMA support efforts to implement new safety exposure limits for wireless devices to levels that do not cause human or environmental harm based on scientific research.

2) **SCCMA Environmental Health Webinar Series 2021.**
Children and Technology: Schools, Screens and Covid 19. May 6, 2021.
Author and addiction specialist Nicholas Kardaras, PhD,LCSW; integrative Psychiatrist and author Dr. Victoria Dunckley and 2 veteran teachers and authors of "Screen Schooled", Joe Clement and Matt Miles. 60 min.
https://www.youtube.com/watch?v=2dWd4OsFsKQ&t=25s

3) **CMA Resolution 105-20 What is the Internet Doing To Us? Digital Wellbeing in the Modern Age.** Type: Board Action
Date Adopted: 09/13/2021
RESOLVED: That CMA support further research on the health impacts of Internet and social media usage in all demographics; and be it further
RESOLVED: That CMA acknowledge the digital aspects of modern life and support evidence-based guidelines for the supervision of screen time for children; therefore be it
RESOLVED: That CMA support the use of evidence-based clinical and public health interventions such as advertisement campaigns and recommendations, that target social media usage and address its impacts on physical and mental health.

4) **NAS (2015) Public Health Implications of Raising the Minimum Age of Legal Access to Tobacco Products.**
The Effects of Tobacco Use on Health. National Academies of Sciences. 2015. https://www.ncbi.nlm.nih.gov/books/NBK310413/

5) Heindel JJ et al. **Developmental Origins of Health and Disease: Integrating Environmental Influences.** Endocrinology. Volume 156, Issue 10, 1 October 2015, Pages 3416–3421. https://academic.oup.com/endo/article/156/10/3416/2351139?login=false

6) Weiss B. **Vulnerability of children and the developing brain to neurotoxic hazards.** Environ Health Perspectives. 2000 Jun; 108(Suppl 3): 375–381. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1637834/

7) Lanphear BP (2015) **The Impact of Toxins on the Developing Brain**. Annual Review of Public Health. Vol. 36:211-230 https://pubmed.ncbi.nlm.nih.gov/25581143/

8) Landrigan and Goldman (2011). **Children's Vulnerability to Toxic Chemicals: A Challenge and Opportunity to Strengthen Health and Environmental Policy**. Health Affairs. Vol 30 No. 5. May 2011. Environmental Challenges for Health. https://www.healthaffairs.org/doi/10.1377/hlthaff.2011.0151

9) **The Precautionary Principle: Decision-making under uncertainty**. EU. 2017. Produced for the European Commission DG Environment by the Science Communication Unit, UWE, Bristol. https://op.europa.eu/en/publication-detail/-/publication/1c737cfe-beb8-11e7-a7f8-01aa75ed71a1

10) **Late lessons from early warnings: Science, precaution, innovation. European Environment Agency. 2013.** David Gee, Philippe Grandjean, Steffen Foss Hansen, Sybille van den Hove, Malcolm MacGarvin, Jock Martin, Gitte Nielsen, David Quist and David Stanners. https://www.eea.europa.eu/publications/late-lessons-2

11) **The Media and Young Minds**. American Academy of Pediatrics. Nov 2016. https://publications.aap.org/pediatrics/article/138/5/e20162591/60503/Media-and-Young-Minds?autologincheck=redirected?nfToken=00000000-0000-0000-0000-000000000000

12) **What doctors wish patients knew about cutting down on screen time.** American Medical Association. Sept 24, 2021. https://www.ama-assn.org/delivering-care/public-health/what-doctors-wish-patients-knew-about-cutting-down-screen-time

13) **Public responses to precautionary information from the Department of Health (UK) about possible health risks from mobile phones. (2007)** Barnett J et al. Health Policy. Volume 82, Issue 2. July 2007, Pages 240-250. https://www.sciencedirect.com/science/article/abs/pii/S0168851006002272?via%3Dihub

14) Clegg F et al. **Building science and radiofrequency radiation: What makes smart and healthy buildings**. Building and Environment. Vol 176. June 2020, 106324. https://www.sciencedirect.com/science/article/pii/S0360132319305347

15) **BioInitiaitve Report 2022.** A Rational for Biologically-Based Exposure Standard for Low-Intensity Electromagnetic Radiation. https://bioinitiative.org

16) Carpenter DO and Bandara P. **Planetary electromagnetic pollution: it is time to assess its impact.** (2018) The Lancet Planetary Health. Dec 1, 2018. Volume 2, Issue 12. https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(18)30221-3/fulltext

17) Schuermann D and Mevissen M. 2021. **Manmade Electromagnetic Fields and Oxidative Stress—Biological Effects and Consequences for Health**. Int J Mol Sci. 2021, 22(7), 3772. https://www.mdpi.com/1422-0067/22/7/3772

18) Moon JH. **Health effects of electromagnetic fields on children.** Clinical Experiments in Pediatrics. 2020 Nov; 63(11): 422–428. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7642138/

19) Panagopoulos DJ (Ed.). (Dec 30, 2022). **Electromagnetic Fields of Wireless Communications: Biological and Health Effects (1st ed.).** CRC Press. doi: 10.1201/9781003201052. https://www.routledge.com/Electromagnetic-Fields-of-Wireless-Communications-Biological-and-Health/Panagopoulos/p/book/9781032061757

20) Panagopolous DJ et al**. Human-made electromagnetic fields: Ion forced-oscillation and voltage-gated ion channel dysfunction, oxidative stress and DNA damage (Review).** INTERNATIONAL JOURNAL OF ONCOLOGY 59: 92, 2021. https://www.researchgate.net/publication/355106132_Human-made_electromagnetic_fields_Ion_forced-oscillation_and_voltage-gated_ion_channel_dysfunction_oxidative_stress_and_DNA_damage_Review

21) **The FCC Keeps Letting Me Be: Why Radiofrequency Radiation Standards Have Failed to Keep Up With Technology**. Pittsburgh Law Review. Vol 83. No.1 (2021) https://lawreview.law.pitt.edu/ojs/lawreview/article/view/826

22) Massey K. **The Challenge of Non-Ionizing Radiation: A Proposal for Legislation**. Duke law Journal. Duke law Journal. Vol 105. 1979. https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=2692&context=dl j

23) **Re-Inventing Wires: The future of Landlines and Networks**. (2018) http://electromagnetichealth.org/wp-content/uploads/2018/01/ReInventing-Wires-1-25-18.pdf

24) **ICBE-EMF .International Commission on Biological Effects of Electromagnetic Fields.** https://icbe-emf.org

25) **International Commission on the Biological Effects of Electromagnetic Fields (ICBE-EMF). Scientific evidence invalidates health assumptions underlying the FCC and ICNIRP exposure limit determinations for radiofrequency radiation: i**mplications for 5G. Environ Health 21, 92 (2022). Published Oct 18, 2022. https://ehjournal.biomedcentral.com/articles/10.1186/s12940-022-00900-9/

Governments, Agencies and Medical Organizations Recommending Reducing Wireless Exposures

26) **Parliamentary Assembly Council of Europe. Resolution 1815: The Potential Dangers of electromagnetic Fields and Their Effect on the Environment.** (2011). http://assembly.coe.int/nw/xml/XRef/Xref-XML2HTML-en.asp?fileid=17994

27) AAP 2013. **American Academy of Pediatrics Letters to the FCC and Legislators**. https://ehtrust.org/wp-content/uploads/American-Academy-of-Pediatrics-Letters-to-FCC-and-Congress-.pdf

28) **Germany warns citizens to avoid using Wi-Fi.** Independent UK. Sept 7, 2011. https://www.independent.co.uk/climate-change/news/germany-warns-citizens-to-avoid-using-wifi-5329224.html

29) **Radiation exposure due to wireless Internet-Networks (WLAN). Lower House of the German Parliament [Bundestag]** printed matter 16/6117. July 23, 2007. The German Parliament examined WiFi in 2007 and recommended reducing exposures to WLAN and wireless computers and laptops. They also recommended further studies. https://www.icems.eu/docs/deutscher_bundestag.pdf

30) **Russian National Committee for Non-Ionizing Radiation Protection.** 2008. https://www.radiationresearch.org/wp-content/uploads/2018/06/021235_grigoriev.pdf

31) **The New Jersey Education Association**. Minimize health risks from electronic devices. September 2, 2016. https://www.njea.org/minimize-health-risks-from-electronic-devices/

32) **The Collaborative for High Performing Schools Best Practices for Low EMF.** https://mdsafetech.files.wordpress.com/2019/03/collaborative-of-high-performing-schools-best-practices-for-low-emf.pdf

33) **Collaborative for High Performing Schools. Reducing EMF in Schools.** Healthy Building Science. https://healthybuildingscience.com/2015/01/21/emf-in-schools/

34) **Collaborative for High Performing Schools. Scorecard for Schools.** https://oceancs.org/wp-content/uploads/2016/11/A_2014CA-CHP.pdf

35) **Bavaria, Germany's Parliament recommends against Wi-Fi in schools**. https://www.icems.eu/docs/deutscher_bundestag.

36) **Russian National Committee on Non-Ionizing Radiation Protection and EMF RF standards. New conditions of EMF RF exposure and guarantee of the health to population.(2008)** Federal Medical Biophysical Centre, FMBA, Moscow, Russia. 2008. https://www.radiationresearch.org/wp-content/uploads/2018/06/021235_grigoriev.pdf

37) **Russian National Committee of Non-Ionizing Radiation Protection. "Mobile Communication and Children`s Health". (**2008) https://mdsafetech.org/wp-content/uploads/2021/05/russian-national-committee-of-non-ionizing-radiation-protection-2008-report.-mobile-communication-and-childrens-health.-russia.pdf

38) **The Stewart Report-Power Density: Radio Frequency Non-Ionizing Radiation.** May 2007. HESE UK. Non-Thermal Effects. https://www.ofcom.org.uk/__data/assets/pdf_file/0019/62515/cavi_society_attachmen

39) **The Cyprus National Committee on Environment and Children's Health Guide on Safe Internet Connection**. http://paidi.com.cy/guide-on-safe-internet-connection-especially-for-children-and-distance-learning/?lang=en

40) **Radiofrequency Electromagnetic Radiation and the Health of Canadians. Report of the Standing committee on Health of the House of Commons in the Canadian Parliament.. (2015).** http://www.ourcommons.ca/DocumentViewer/en/41-2/HESA/report-13 and https://www.saferemr.com/2015/06/canadian-parliament-committee-calls-for.html

41) **National Institute of Building Sciences (NIBS).** U.S. Acess Board. Recognizing multiple Chemical Sensitivities and Electrosensitivity. https://www.access-board.gov/research/building/indoor-environmental-quality/

42) **The Canadian Human Rights Commission. Accommodation for Environmental Sensitivities: Legal Perspective**. Wilke and Baker. May 2007. https://mdsafetech.org/wp-content/uploads/2020/06/canadian-human-rights-commission-on-ehs-accomodation-chrc-legal_sensitivity-.pdf

43) **California Department of Public Health (CDPH) Issues Guidelines on How to Reduce Exposure to Radio Frequency Energy from Cell Phones**. https://www.cdph.ca.gov/Programs/OPA/Pages/NR17-086.aspx

44) **Government Accountability Office (GAO). Report to Congressional Requesters. Telecommunications. Exposure and Testing Requirements for Mobile Phones Should Be Reassessed.** July 2012. https://www.gao.gov/assets/600/592901.pdf

45) **NASA Report – Electromagnetic Field Interactions with the Human Body: Observed Effects and Theories**. April 1981. Jeremy Raines, PhD. https://ntrs.nasa.gov/search.jsp?R=19810017132

46)**Naval Military Research Institute. Bibliography of Reported Biologic Phenomenoa("Effects") and Clinical Manifestations to Microwave and Radiofrequency Radiation**. October 4, 1971. With supplement 2,300 studies are included. EMFAnalysis Link to Naval Research Naval Research 1971

47) **EPA Letter to Janet Newton**. July 16, 2002. https://www.house.mi.gov/sessiondocs/2017-2018/testimony/Committee416-12-5-2017.pdf

48) **Tech Safe Schools. Mitigation Techniques for Reducing RF Radiation in Classrooms**. https://www.techsafeschools.org/_files/ugd/2cea04_9e0eac828f124de9ae4a956d81d1f802.pdf

49) **Safe Tech Schools Webinar. Recommendations for Reducing Wireless Radiation in Schools.** https://www.techsafeschools.org/webinars

50) **Why 2 Seattle area school districts are suing 5 social media companies. The school districts allege that the companies' practices have led to increased anxiety, depression, eating disorders and bullying among children**. NPR. Jan 13, 2023. https://www.npr.org/2023/01/13/1148970506/why-2-seattle-area-school-districts-are-suing-5-social-media-companies#:~:text=Why%202%20Seattle%20area%20school%20districts%20are%20suing%205%20social%20media%20companies,-Listen%C2%B7%203%3A51&text=Transcript-

,The%20school%20districts%20allege%20that%20the%20companies'%20practices%20have%20led,social%20media%20companies%20to%20court.

51) **Seattle public schools sue social media companies for allegedly harming students' mental health.** January 9, 2023. Samantha Kelly. CNN. https://www.cnn.com/2023/01/09/tech/seattle-school-district-social-media-lawsuit/index.html

52) **As Seattle schools sue social media companies, legal experts split on potential impact**. Jan 17, 2023. https://www.chalkbeat.org/2023/1/17/23554378/seattle-schools-lawsuit-social-media-meta-instagram-tiktok-youtube-google-mental-health

Categorized Non-numbered References

ADA Accommodation

Education Health Care Plan (EHCP) awarded (July 2022) for UK child on the basis of Electromagnetic Hypersensitivity (EHS). August 2022. https://phiremedical.org/education-health-care-plan-ehcp-awarded-aug-2022-for-uk-child-on-the-basis-of-electromagnetic-hypersensitivity-ehs/

National Institute of Building Sciences (NIBS). U.S. Access Board. Recognizing multiple Chemical Sensitivities and Electrosensitivity. https://www.access-board.gov/research/building/indoor-environmental-quality/

Accommodation for Environmental Sensitivities. Canadian Human Rights Commission. 2007– https://www.chrc-ccdp.gc.ca/sites/default/files/legal_sensitivity_en_1.pdf

A CSIRO scientist has won compensation for crippling headaches, nausea and dizziness caused by using Wi-Fi at work, in a landmark case. 9/29/13. https://www.news.com.au/technology/csiro-scientist-dr-david-mcdonald-wins-compensation-for-wifi-pain/news-story/0a2abc1814dca200d9e54b05f810c8f5

Biologic Effects Reviews

Review Article
Attah (2022) **Biological Effects of High Radiofrequency Radiation on Wistar Rats: A Literature Review**. Attah TA et al. Journal of Public Health International - 5(2):1-31. Vol 5 Issue 2. 2022. Open Access. https://oap-journals.org/jphi/article/1832

Review of literature. High quality in vivo Wistar rat studies. 2.4 GHz and above Wi Fi. Of 1870 studies only 36 were included in the review.

"This review identified numerous biological changes in Wistar rats exposed to high RFR including variations in biochemical, cholinergic, genetic, histopathologic, psychological, optical, and dermatological parameters. In this review, studies identified variations in protein and liver enzymes while high RFR was found to induce oxidative stress and cellular damage of exposed wistar rats compared to the unexposed groups. This was seen in the changes in protein, lipids, enzymatic and non-enzymatic antioxidants. Studies also identified changes in expression of genes and neurotransmitters with imbalance in hormones. In addition, this review identified structural changes of cells, tissues and organs indicative of apoptosis, damage and death. Exposed rats were identified to have behavioral changes indicative of anxiety and memory decline while studies identified optical and dermatologic changes in exposed rats compared to the unexposed."

Review Article

Butler T (2020) **On the Clear Evidence of the Risks to Children from Non-Ionizing Radio Frequency Radiation: The Case of Digital Technologies in the Home, Classroom and Society.** Professor Tom Butler. University of Cork, Ireland. May 2020. https://www.radiationresearch.org/articles/on-the-clear-evidence-of-the-risks-to-children-from-non-ionizing-radio-frequency-radiation-the-case-of-digital-technologies-in-the-home-classroom-and-society/ or 5G Professor Tom Butler On the Clear Evidence of the Risks to Children from Non-Ionizing Radio Frequency Radiation or here

Review Article

Moon JH**. Health effects of electromagnetic fields on children.** Clinical Experiments in Pediatrics. 2020 Nov; 63(11): 422–428. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7642138/

Attah (2022) **Biological Effects of High Radiofrequency Radiation on Wistar Rats: A Literature Review**. Attah TA et al. Journal of Public Health International - 5(2):1-31. Vol 5 Issue 2. 2022. Open Access. https://oap-journals.org/jphi/article/1832

Belpomme D et al. **Thermal and non-thermal health effects of low intensity non-ionizing radiation: An international perspective.** Environ Pollut. 2018 Nov;242(Pt A):643-658. https://pubmed.ncbi.nlm.nih.gov/30025338/

BioInitiaitve Report 2022. A Rational for Biologically-Based Exposure Standard for Low-Intensity Electromagnetic Radiation. https://bioinitiative.org

Gerner C et al. **Increased protein synthesis by cells exposed to a 1,800-MHz radio-frequency mobile phone electromagnetic field, detected by proteome profiling**. Int Arch Occup Environ Health. 2010; 83(6): 691–702. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2902737/

Moon JH**. Health effects of electromagnetic fields on children.** Clinical Experiments in Pediatrics. 2020 Nov; 63(11): 422–428. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7642138/

Miller AB et al. **Risks to Health and Well-Being From Radio-Frequency Radiation Emitted by Cell Phones and Other Wireless Devices.** Front. Public Health, 13 August 2019 Sec. Radiation and Health. https://www.frontiersin.org/articles/10.3389/fpubh.2019.00223/full

Oceania Radiofrequency Scientific Advisory Association. (2015) Independent database of all peer-reviewed studies and articles to the science relating to electromagnetic radiation and human exposure. Australia. https://www.orsaa.org/about-us.html

Panagopoulos DJ et al. **Human-made electromagnetic fields: Ion forced-oscillation and voltage-gated ion channel dysfunction, oxidative stress and DNA damage (Review)**. INTERNATIONAL JOURNAL OF ONCOLOGY 59: 92, 2021 July 9, 2021. https://pubmed.ncbi.nlm.nih.gov/34617575/

Panagopoulos D. **Electromagnetic Interaction Between Environmental Fields and Living Systems Determines Health and Wellbeing. Electromagnetic Fields: Principles,Biophysical Effects.** Nova Science Publishers, Inc. http://www.wendywalksfores.com/uploads/1/3/9/0/13908728/panagopoulos-nova-2013- emfs-chapter-1.pdf

Xie W et al. **900 MHz Radiofrequency Field Induces Mitochondrial Unfolded Protein Response in Mouse Bone Marrow Stem Cells.** Front. Public Health, 26 August 2021 Sec. Radiation and Health. https://www.frontiersin.org/articles/10.3389/fpubh.2021.724239/full

Yuksel M et al. **Long-term exposure to electromagnetic radiation from mobile phones and Wi-Fi devices decreases plasma prolactin, progesterone, and estrogen levels but increases uterine oxidative stress in pregnant rats and their offspring**. Endocrine. 2016 May;52(2):352-62. https://www.ncbi.nlm.nih.gov/pubmed/26578367

Review Wi Fi Devices Studies. California State University Northridge. https://northridgewest.org/wp-content/uploads/2016/01/WiFi-Device-Studies-Updated.pdf

Cancer

IARC Monograph 2011. WHO. Radiofrequency Radiation listed as Possibly Carcinogenic. Group 2B
https://monographs.iarc.who.int/wp-content/uploads/2018/06/REF_Poster2012.pdf

Baan, R. et al. **Carcinogenicity of radiofrequency electromagnetic fields**. The Lancet. Oncology 12, 624–626 (2011). https://www.thelancet.com/journals/lanonc/article/PIIS1470-2045(11)70147-4/fulltext

Blask DE et al. **Circadian stage-dependent inhibition of human breast cancer metabolism and growth by the nocturnal melatonin signal: consequences of its disruption by light at night in rats and women.** Integr Cancer Ther. 2009 Dec;8(4):347-53. https://pubmed.ncbi.nlm.nih.gov/20042410/

Chou CK et al. **Long-Term Low-Level Microwave Radiation of Rats. (1992) Bioelectromagnetics.** 13:469- 496. 1992. https://www.ncbi.nlm.nih.gov/pubmed/1482413 https://ecfsapi.fcc.gov/file/60002060833.pdf

Delen K et al. **Effects of 2600 MHz Radiofrequency Radiation in Brain Tissue of Male Wistar Rats and Neuroprotective Effects of Melatonin.** Bioelectromagnetics. 2021 Feb;42(2):159-172. https://pubmed.ncbi.nlm.nih.gov/33440456/

Falcioni L et al. **Report of final results regarding brain and heart tumors in Sprague-Dawley rats exposed from prenatal life until natural death to mobile phone radiofrequency field representative of a 1.8 GHz GSM base station environmental emission**. Environmental Research. Ramazzini Institute. 2018 Aug;165:496-503. https://pubmed.ncbi.nlm.nih.gov/29530389/

Lai H. **Genetic effects of non-ionizing electromagnetic fields.** Henry Lai. Electromagnetic Biology and Medicine. Published online: 04 Feb 2021. https://www.tandfonline.com/doi/abs/10.1080/15368378.2021.1881866

Lin J. **Incongruities in recently revised radiofrequency exposure guidelines and standards.** Environmental Research. James C Lin. Frontiers in Public Health. Oct 31, 2022; 10: 1042478. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9660325/

Hardell and Carlberg. **Comments on the US National Toxicology Program technical reports on toxicology and carcinogenesis study in rats exposed to whole-body radiofrequency radiation at 900 MHz and in mice exposed to whole-body radiofrequency radiation at 1,900 MHz.** (2019) Hardell and Carlberg. Int J Oncol. 2019 Jan;54(1):111-127. https://www.ncbi.nlm.nih.gov/pubmed/30365129

Markova E et al. **Microwaves from Mobile Phones Inhibit 53BP1 Focus Formation in Human Stem Cells More Strongly Than in Differentiated Cells: Possible Mechanistic Link to Cancer Risk.** Environ Health Perspect. 2010 Mar; 118(3): 394–399. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2854769/

Miller A et al. **Cancer epidemiology update, following the 2011 IARC evaluation of radiofrequency electromagnetic fields (Monograph 102).** Environmental Research. Vol 167,

Nov 2018. Pg 673-683.
https://www.sciencedirect.com/science/article/abs/pii/S0013935118303475

Mortazavi SAR et al. **Women with hereditary breast cancer predispositions should avoid using their smartphones, tablets, and laptops at night.** Iran J Basic Med Sci. 2018 Feb;21(2):112-115. https://pubmed.ncbi.nlm.nih.gov/29456806/

Panagopoulos, D. J. **Comparing DNA damage induced by mobile telephony and other types of man-made electromagnetic fields**. Mutation Research/Reviews in Mutation Research, Vol 781, July–September 2019, Pages 53-62. https://doi.org/10.1016/j.mrrev.2019.03.003

Portier C. **Review of Literature and Expert Report of Cancer and Cell Phones** . Christopher Portier in Murray vs Motorola. 2021. Expert report Christopher J Portier Murray v Motorola 3-1-2021

Qin F et al. **Effects of 1800-MHz Radiofrequency Fields on Circadian Rhythm of Plasma Melatonin and Testosterone in Male Rat**s. Journal of Toxicology and Environmental Health Part A. September 2012.
https://www.researchgate.net/publication/230670327_Effects_of_1800-MHz_Radiofrequency_Fields_on_Circadian_Rhythm_of_Plasma_Melatonin_and_Testosterone_in_Male_Rats

Smith-Roe, S. L et al**. Evaluation of the genotoxicity of cell phone radiofrequency radiation in male and female rats and mice following subchronic exposure**. NTP. NIH. Environmental and Molecular Mutagenesis. 2020 Feb;61(2):276-290. https://doi.org/10.1002/em.22343
https://www.ncbi.nlm.nih.gov/pubmed/31633839

Wyde, M. et al. **Report of Partial findings from the National Toxicology Program Carcinogenesis Studies of Cell Phone Radiofrequency Radiation in Hsd: Sprague Dawley® SD rats (Whole Body Exposure),** http://biorxiv.org/content/early/2016/06/23/055699 (2016). 2. National Toxicology Program. Media Telebriefng: NTP Cell Phone Radiofrequency Radiation Study: Partial Release of Findings,
http://www.niehs.nih.gov/news/newsroom/releases/2016/may27/

Yang A et al. **Melatonin inhibits triple-negative breast cancer progression through the Lnc049808-FUNDC1 pathway.** Nature. Cell Death Dis 12, 712 (2021)
https://www.nature.com/articles/s41419-021-04006-x

Cell Phone and Device Bans/Distraction

Baker 2019. **Major distraction: school dumps iPads, returns to paper textbooks**. Jordan Baker. March 31, 2019. https://www.smh.com.au/education/major-distraction-school-dumps-ipads-returns-to-paper-textbooks-20190329-p5191r.html

Caron 2015. **Princeton/UCLA Study: It is time to Ban Laptops in Law School Classrooms.** Paul Caron. Nov 10, 2015. https://taxprof.typepad.com/taxprof_blog/2015/11/princetonucla-study-it-is-time-to-ban-laptops-in-law-school-classrooms.html

Chen 2022. **Should Public Schools Ban Cell Phones? (2022)** Public School Review. Grace Chen. https://www.publicschoolreview.com/blog/should-public-schools-ban-cell-phones

Dynarski **2017. For Note Taking, Low-Tech Is Often Best. In college lecture halls, evidence suggests it's time to put down the laptop and pick up a pen**. Aug 2017. Susan Dynarski. Harvard Graduate School of Education. https://www.gse.harvard.edu/news/uk/17/08/note-taking-low-tech-often-best

Straumsheim **2016. Leave It in the Bag. West Point finds students perform better academically when laptops and tablets are banned from the classroom**. Carl Straumsheim. Inside Higher Ed. May 13, 2016. https://www.insidehighered.com/news/2016/05/13/allowing-devices-classroom-hurts-academic-performance-study-finds

Ward A F et al. **Brain Drain: The Mere Presence of One's Own Smartphone Reduces Available Cognitive Capacity.** Journal of the Association for Consumer Research, 2017; 2 (2): 140. https://www.journals.uchicago.edu/doi/full/10.1086/691462

Worland J. **How Your Cell Phone Distracts You Even When You're Not Using It**. Dec 4, 2014. https://time.com/3616383/cell-phone-distraction/

New Law Asks California Schools To Ban Smartphones In Classroom. AB272. July 8, 2019. CBS News Sacramento. https://sacramento.cbslocal.com/2019/07/08/california-school-smartphone-ban/

California high school becomes largest public school in the country to ban phones. Aug 20, 2019. KTRK Houston. https://www.yahoo.com/news/california-high-school-becomes-largest-113254629.html

A California high school found students' cellphones too distracting, so they're locking the devices up. Aug 20, 2019. NBC News. https://www.nbcnews.com/news/education/california-high-school-found-students-cellphones-too-distracting-so-they-n1044636

Locked Pouches Keep Cellphones Out Of Students' Hands At San Mateo High School. August 19, 2019. CBS News. Devin Fehely. https://sanfrancisco.cbslocal.com/2019/08/19/locked-pouches-keep-cellphones-out-of-students-hands-at-san-mateo-high-school/

'Major distraction': school dumps iPads, returns to paper textbooks. Jordan Baker. March 31, 2019. https://www.smh.com.au/education/major-distraction-school-dumps-ipads-returns-to-paper-textbooks-20190329-p5191r.html

This School Banned iPads, Went Back to Regular Textbooks—But What Does the Science Say? https://secretlifeofmom.com/school-banned-ipads/?t=rel

France bans smartphones in school. July 31, 2018. Hamza Shaban. https://www.washingtonpost.com/technology/2018/07/31/france-bans-smartphones-school/?noredirect=on&utm_term=.d58aff6e9244

This Colorado Middle School Banned Phones 7 Years Ago. They Say Students Are Happier, Less Stressed and More Focused. Nov 5, 2019. Jennie Brundin. CPR News. https://www.cpr.org/2019/11/05/this-colorado-middle-school-banned-phones-seven-years-ago-they-say-students-are-happier-less-stressed-and-more-focused/

Banning Cellphones In Classrooms Is Helping Students Be Less Distracted, Other School Districts Find Success In Letting Their Teachers Decide Staff Say. Wisconsin. Sept 7, 2018. Elizabeth Dohms. https://www.wpr.org/banning-cellphones-classrooms-helping-students-be-less-distracted-staff-say

The mere presence of your smartphone reduces brain power, study shows. June 23, 2017. University of Texas at Austin. https://www.sciencedaily.com/releases/2017/06/170623133039.htm

Laptops and Law Students: A Bad Combo? Think carefully about your laptop use in the classroom, as it can be a tool or a hindrance. July 26, 2016. https://abovethelaw.com/2016/07/laptops-and-law-students-a-bad-combo/

Marcus-Quinn A. **Technostress: How Covid is straining teaching and learning: "Cameras on" policies in some schools exert pressure on teachers and students.** The Irish Times. April 20, 2021 https://www.irishtimes.com/news/education/technostress-how-covid-is-straining-teaching-and-learning-1.4536271

Fairplay: Childhood Beyond Brands
https://fairplayforkids.org

Cell Tower Health Effects

Balmori A. **Evidence for a health risk by RF on humans living around mobile phone base stations: from radiofrequency sickness to cancer**. Environmental Research. 2022 Nov;214(Pt 2):113851. https://pubmed.ncbi.nlm.nih.gov/35843283/

Dode A et al. **Mortality by neoplasia and cellular telephone base stations in the Belo Horizonte municipality, Minas Gerais state, Brazil. (**2011) Science of The Total Environment. Volume 409, Issue 19, September 2011 , Pages 3649-3665 http://www.sciencedirect.com/science/article/pii/S0048969711005754

Levitt B and Lai H. **Biological effects from exposure to electromagnetic radiation emitted by cell tower base stations and other antenna arrays.** (2010)Page 374- Biological Effects at Low intensity) Blake Levitt and Henry Lai. Environmental Reviews, 2010, 18(NA): 369-395. http://www.nrcresearchpress.com/doi/full/10.1139/A10-018#.WYUlOHeZNo4

Meo SA et al. **Mobile Phone Base Station Tower Settings Adjacent to School Buildings: Impact on Students' Cognitive Health**. Meo SA et al. American Journal of Men's Health. December 7, 2018. https://journals.sagepub.com/doi/10.1177/1557988318816914

Pearce M **"Limiting liability with positioning to minimize negative health effects of cellular phone towers.**" (2019) Pearce M. Environmental Research, Nov 2019; https://www.sciencedirect.com/science/article/abs/pii/S0013935119306425

Santini R **[Symptoms experienced by people in vicinity of base stations: II/ Incidences of age, duration of exposure, location of subjects in relation to the antennas and other electromagnetic factors]. (2003)** Santini R. Pathol Biol (Paris). 2003 Sep;51(7):412-5. http://www.ncbi.nlm.nih.gov/pubmed/12948762

Santini R **[Investigation on the health of people living near mobile telephone relay stations: I/Incidence according to distance and sex]. (2002)** Santini R. Pathol Biol (Paris). 2002 Jul;50(6):369-73. http://www.ncbi.nlm.nih.gov/pubmed/12168254

Shinjyo and Shinjyo. **Significant Decrease of Clinical Symptoms after Mobile Phone Base Station Removal –An Intervention Study.** (2014). Tetsuharu Shinjyo and Akemi Shinjyo. https://mdsafetech.org/wp-content/uploads/2021/10/shinjyo-t-and-shinjyo-a.-2014-significant-decrease-of-clinical-symptoms-after-mobile-phone-base-station-removal-e28093an-intervention-study.-.pdf

Zothansiama et al. **Impact of radiofrequency radiation on DNA damage and antioxidants in peripheral blood lymphocytes of humans residing in the vicinity of mobile phone base stations.** (2017) Zothansiama et al. Electromagn Biol Med. 2017;36(3):295-305. https://www.ncbi.nlm.nih.gov/pubmed/28777669

Children's Health Effects

Arundell L. **A systematic review of the prevalence of sedentary behavior during the after-school period among children aged 5-18 years.** J Behav Nutr Phys Act. 2016

Aug 22;13:93. https://www.ncbi.nlm.nih.gov/pubmed/27549588

Birks L et al. **Maternal cell phone use during pregnancy and child behavioral problems in five birth cohorts.** (2017) Birks L et al. Environ Int. 2017 Jul;104:122-131. https://www.ncbi.nlm.nih.gov/pubmed/28392066

Borges Ferreira J et al. **Specific Absorption Rate (SAR) in the head of Tablet user's. 7th Latin American Workshop On Communications** – 2015. https://ceur-ws.org/Vol-1538/paper-02.pdf

Broom KA et al. **Early-Life Exposure to Pulsed LTE Radiofrequency Fields Causes Persistent Changes in Activity and Behavior in C57BL/6 J Mice**. (2019) Broom KA et al. Bioelectromagnetics. 2019 Oct; 40(7): 498–511. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6790696/

Chiu CT et al. **Mobile phone use and health symptoms in children.** Journal of Formosan Medical Association. Vol 114. Issue 7. July 2015. https://www.sciencedirect.com/science/article/pii/S0929664614002071

Christ A et al. **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/

Christ A et al, "**The Virtual Family – devolopment of surface-based anatomical models of two adults and two children for dosimetric simulations",** Physics in Medicine and Biology, Zurich, v. 55, p. 23-28, Oct. 2010. https://pubmed.ncbi.nlm.nih.gov/20019402/
Divan HA et al. **Prenatal and postnatal exposure to cell phone use and behavioral problems in children**. Epidemiology. 2008 Jul;19(4):523-9. https://pubmed.ncbi.nlm.nih.gov/18467962/

Demir YP and Sumer MM. **Effects of smartphone overuse on headache, sleep and quality of life in migraine patients.** Neurosciences (Riyad). 2019 Apr; 24(2): 115–121. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8015465/

Farashi S et al. **Mobile phone electromagnetic radiation and the risk of headache: a systematic review and meta-analysis**. Int Arch Occup Environ Health. 2022 Sep;95(7):1587-1601. https://pubmed.ncbi.nlm.nih.gov/35064837/

Fernandez C et al. **Absorption of wireless radiation in the child versus adult brain and eye from cell phone conversation or virtual reality. (2018)** Environmental Research. June 5, 2018. https://www.sciencedirect.com/science/article/abs/pii/S0013935118302561

Forster M et al. **A Prospective Cohort Study of Adolescents' Memory Performance and Individual Brain Dose of Microwave Radiation from Wireless Communication.** (2018) Forster M et al. Environ Health Perspect. 2018 Jul 23;126(7):077007. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6108834/

Frey AH. **Headaches from Cellular Telephones: Are They Real and What Are the Implications?** Environmental Health Perspectives. Volume 06,Number3, March1998. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1533043/pdf/envhper00526-0027.pdf

Gandhi OP et al. **Exposure limits: the underestimation of absorbed cell phone radiation, especially in children.** Electromagn Biol Med. 2012 Mar;31(1):34-51. https://pubmed.ncbi.nlm.nih.gov/21999884/

Heindel JJ et al. **Developmental Origins of Health and Disease: Integrating Environmental Influences.** Endocrinology. Volume 156, Issue 10, 1 October 2015, Pages 3416–3421. https://academic.oup.com/endo/article/156/10/3416/2351139?login=false

Hutton J et al. **Associations Between Screen-Based Media Use and Brain White Matter Integrity in Preschool-Aged Children.** Hutton J et al. JAMA Pediatr. 2020;174(1). https://jamanetwork.com/journals/jamapediatrics/fullarticle/2754101

Landrigan and Goldman 2011. **Children's Vulnerability to Toxic Chemicals: A Challenge and Opportunity to Strengthen Health and Environmental Policy**. Health Affairs. Vol 30 No. 5. May 2011. Environmental Challenges for Health. https://www.healthaffairs.org/doi/10.1377/hlthaff.2011.0151

Lanphear BP. **The Impact of Toxins on the Developing Brain**. Annual Review of Public Health Vol. 36:211-230. https://www.annualreviews.org/doi/full/10.1146/annurev-publhealth-031912-114413

Li et al. **Association Between Maternal Exposure to Magnetic Field Nonionizing Radiation During Pregnancy and Risk of Attention-Deficit/Hyperactivity Disorder in Offspring in a Longitudinal Birth Cohort.(2020)** Li DK et al. JAMA Netw Open. 2020;3(3):e201417. https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2763232?guestAccessKey=cda77a0a-bfb6-4f74-99e0-0bdd2909bdb2&utm_source=silverchair&utm_medium=email&utm_campaign=article_alert-jamanetworkopen&utm_term=mostread&utm_content=olf-widget_03302020

Li J et al. **CNS critical periods: implications for dystonia and other neurodevelopmental disorders.** JCI Insight. Feb22, 2021. https://insight.jci.org/articles/view/142483

Ma J et al. **Is handheld screen time use associated with language delay in infants?** (2017) Ma J et al. Abstract published in AA.P http://www.aappublications.org/news/2017/05/04/PASScreenTime050417

Madigan S et al. **Association Between Screen Time and Children's Performance on a Developmental Screening Test.** Madigan S et al. JAMA Pediatr. 2019;173(3):244-250. https://jamanetwork.com/journals/jamapediatrics/fullarticle/2722666

Meo SA et al. **Mobile Phone Base Station Tower Settings Adjacent to School Buildings: Impact on Students' Cognitive Health.** Meo SA et al. American Journal of Men's Health. December 7, 2018. https://journals.sagepub.com/doi/10.1177/1557988318816914

Morgan L et al. **Why children absorb more microwave radiation than adults: The consequences. Journal of Microscopy and Ultrastructure**. Vol 2, Issue 4.December 2014. Pg 197-204. https://www.sciencedirect.com/science/article/pii/S2213879X14000583

Moon JH. **Health effects of electromagnetic fields on children.** Clinical Experiments in Pediatrics. 2020 Nov; 63(11): 422–428. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7642138/

Redmayne M et al. **The relationship between adolescents' well-being and their wireless phone use: a cross-sectional study.** Environmntal Health. 12, Article number: 90 (2013) https://ehjournal.biomedcentral.com/articles/10.1186/1476-069X-12-90

Rogers K. **Smartphones may make your headaches worse, study finds.** CNN. March 4, 2020. https://www.cnn.com/2020/03/04/health/smartphone-headache-wellness/index.html

Schoeni A**. Memory performance, wireless communication and exposure to radiofrequency electromagnetic fields: A prospective cohort study in adolescents.** (2015) Schoeni A. Environ Int. 2015 Dec;85:343-51. https://www.ncbi.nlm.nih.gov/pubmed/26474271

Stalin P et al. **Mobile Phone Usage and its Health Effects Among Adults in a Semi-Urban Area of Southern India.** J Clin Diagn Res. 2016 Jan; 10(1): LC14–LC16. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4740623/

Straker L et al. **Computer Use and Habitual Spinal Posture in Australian Adolescents**. Public Health Rep. 2007 Sep-Oct; 122(5): 634–643. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1936962/

Sudan M et al. **Prenatal and Postnatal Cell Phone Exposures and Headaches in Children.** Open Pediatr Med Journal. 2012 Dec 5;6(2012):46-52. https://pubmed.ncbi.nlm.nih.gov/23750182/

Vermeeren G et al. **Spatial and temporal RF electromagnetic field exposure of children and adults in indoor micro environments in Belgium and Greece (2013)** Prog Biophys Mol Bio. 2013 Nov;113(2):254-63. https://pubmed.ncbi.nlm.nih.gov/23872299/

Weiss B. **Vulnerability of children and the developing brain to neurotoxic hazards.** Environ Health Perspectives. 2000 Jun; 108(Suppl 3): 375–381. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1637834/

Zarei S (2019) **Mother's Exposure to Electromagnetic Fields before and during Pregnancy is Associated with Risk of Speech Problems in Offspring**. Journal of Biomedical Physics and

Engineering 9(1):61-68
(2019). https://www.ncbi.nlm.nih.gov/pubmed/30881935

Distraction, Learning and Note Taking

Beland LP and Murphy R. **Ill Communication: Technology, Distraction & Student Performance.** Center for Economic Performance. CEP Discussion Paper No 1350 May 2015 https://cep.lse.ac.uk/pubs/download/dp1350.pdf

Caron 2015. **Princeton/UCLA Study: It is time to Ban Laptops in Law School Classrooms.** Paul Caron. Nov 10, 2015. https://taxprof.typepad.com/taxprof_blog/2015/11/princetonucla-study-it-is-time-to-ban-laptops-in-law-school-classrooms.html

Dynarski **2017. For Note Taking, Low-Tech Is Often Best. In college lecture halls, evidence suggests it's time to put down the laptop and pick up a pen**. Aug 2017. Susan Dynarski. Harvard Graduate School of Education. https://www.gse.harvard.edu/news/uk/17/08/note-taking-low-tech-often-best

Straumsheim **2016. Leave It in the Bag. West Point finds students perform better academically when laptops and tablets are banned from the classroom**. Carl Straumsheim. Inside Higher Ed. May 13, 2016. https://www.insidehighered.com/news/2016/05/13/allowing-devices-classroom-hurts-academic-performance-study-finds

Ward AF et al. **Brain Drain: The Mere Presence of One's Own Smartphone Reduces Available Cognitive Capacity.** (2017) Journal of the Association of Consumer Research.April 2017. https://www.journals.uchicago.edu/doi/full/10.1086/691462

Laptops and Law Students: A Bad Combo? Think carefully about your laptop use in the classroom, as it can be a tool or a hindrance. July 26, 2016. https://abovethelaw.com/2016/07/laptops-and-law-students-a-bad-combo/

Electrosensitivity

Bamdad K et al. **Consequences of 2.4-2.48 Ghz non-ionizing radiation of Wi-Fi router devices on the information processing speed in adolescents.(2018)** Journal of Psychology and Cognition. January 08, 2018. https://www.alliedacademies.org/articles/consequences-of-24248-ghz-nonionizing-radiation-of-wifi-router-devices-on-the-information-processing-speed-in-adolescents-9612.html#14

Belpomme D and Irigary P. **Why electrohypersensitivity and related symptoms are caused by non-ionizing man-made electromagnetic fields: An overview and medical assessment.** Environ Res. Vol. 212. September 2022. https://www.sciencedirect.com/science/article/pii/S0013935122007010

Belpomme D et al **The Critical Importance of Molecular Biomarkers and Imaging in the Study of Electrohypersensitivity. A Scientific Consensus International Report.**. International Journal of Molecular Sciences. July 7, 2022. Open Access. https://www.mdpi.com/1422-0067/22/14/7321/htm

Belpomme D **Reliable disease biomarkers characterizing and identifying electrohypersensitivity and multiple chemical sensitivity as two etiopathogenic aspects of a unique pathological disorder. (2015)** . Rev Environ Health. 2015;30(4):251-71. https://www.ncbi.nlm.nih.gov/pubmed/26613326

Belyaev, I. et al. **EUROPAEM EMF Guideline 2016 for EMF-related health problems and illnesses.** Reviews on Environmental Health, 31(3) . 2016 https://www.degruyter.com/view/j/reveh.2016.31.issue-3/reveh-2016-0011/reveh-2016-0011.xml

Bevington M. **The Prevalence of People with Restricted Access to Work in Manmade Electromagnetic Environments. (2019)** Bevington M. Journal of Environment and Health Science. Vol 5:1, 01-12. ResearchGate- https://www.researchgate.net/publication/331378367_The_Prevalence_of_People_With_Restricted_Access_to_Work_in_Man-Made_Electromagnetic_Environments or https://www.ommegaonline.org/article-details/The-Prevalence-of-People-With-Restricted-Access-to-Work-in-Man-Made-Electromagnetic-Environments/2402 or Prevalence-of-Electromagnetic-Sensitivity.

Carpenter DO. **The microwave syndrome or electro-hypersensitivity: historical background**. Rev Environ Health. 2015;30(4):217-22. https://pubmed.ncbi.nlm.nih.gov/26556835/

Eberle S. **An underworld journey: Learning to cope with electromagnetic hypersensitivity.** (2017) . Ecopsychology; June 2017; 9 (2): 106-111. http://online.liebertpub.com/doi/pdf/10.1089/eco.2016.0036

Eberle S. **What's the Diagnosis Doctor?** SCCMA Bulletin. December 2016. http://www.sccma.org/Portals/19/Whats%20the%20Diagnosis%20Doctor.pdf?ver=2016-12-09-152046-290

Hardell L and Nilsson M. **Case Report: The Microwave Syndrome after Installation of 5G Emphasizes the Need for Protection from Radiofrequency Radiation.** Annals of Case Reports. 8: 1112. 10 January 2023. https://www.gavinpublishers.com/assets/articles_pdf/Case-Report-The-Microwave-Syndrome-after–Installation-of-5G-Emphasizes-the-Need-for–Protection-from-Radiofrequency-Radiation.pdf

Hendendahl L et al. **Electromagnetic hypersensitivity - an increasing challenge to the medical profession**. Reviews n Environmental Health. Vol 30(4).Sept 2015. https://pubmed.ncbi.nlm.nih.gov/26372109/

Johnson, Jeromy. **Wireless Wake-up Call.** TEDx. (2016) https://www.youtube.com/watch?v=F0NEaPTu9oI

Kaszuba-Zwinska J et al. **Electromagnetic field induced biological effects in humans**. Przegl Lek. 2015;72(11):636-41. https://pubmed.ncbi.nlm.nih.gov/27012122/

Schoeni A et al. **Symptoms and Cognitive Functions in Adolescents in Relation to Mobile Phone Use during Night.** PLoS ONE. July 29, 2015. https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0133528

Stein Y et al. **Electromagnetic hypersensitivity (EHS, microwave syndrome) – Review of mechanisms.** Environmental Research. Vol 186, July 2020. https://www.sciencedirect.com/science/article/abs/pii/S0013935120303388

Stein Y and Udasin IG. **Electromagnetic hypersensitivity (EHS, microwave syndrome) - Review of mechanisms.** Environ Res. 2020 Jul;186:109445. https://pubmed.ncbi.nlm.nih.gov/32289567/

Interview with Solveig on Electrosensitivity and Wireless Radiation
2021 EHS video of young teen with EHS symptoms due to Wi Fi Router. https://www.youtube.com/watch?reload=9&time_continue=25&v=imhLJqkd530&feature=emb_logo

Annelie Fitzgerald PhD. English Literature and Language teacher at the University of Toulouse (Jean-Jaurès) WIRELESS TECH: TIME TO THINK AGAIN?
Risk around radio frequency radiation. April 29, 2018. https://www.alumni.ox.ac.uk/quad/article/wireless-tech-time-think-again

EHS Accommodation

The Canadian Human Rights Commission (CHRC). Accommodation for Environmental Sensitivities. May 2007.
https://mdsafetech.org/wp-content/uploads/2020/06/canadian-human-rights-commission-on-ehs-accomodation-chrc-legal_sensitivity-.pdf

THE UPPER TRIBUNAL (ADMINISTRATIVE APPEALS CHAMBER)

UPPER TRIBUNAL CASE NO: UA-2022-000328-HS [2022] EAM V EAST SUSSEX COUNTY COUNCIL. July 11, 2022. RE: Requiring Schools to provide an Education, Health and Care Plan for those with Electrosensitivity.
https://assets.publishing.service.gov.uk/media/62f3997ed3bf7f5c11330ea3/ua-2022-000328-hs__002_.pdf

A CSIRO scientist has won compensation for crippling headaches, nausea and dizziness caused by using Wi-Fi at work, in a landmark case. 9/29/13.
https://www.news.com.au/technology/csiro-scientist-dr-david-mcdonald-wins-compensation-for-wifi-pain/news-story/0a2abc1814dca200d9e54b05f810c8f5

Energy Reduction

8 reasons to turn down the transmit power of your Wi-Fi. Metis. Nov. 2017.
https://metis.fi/en/2017/10/txpower/

Reducing power and beacon frequency. Safe Tech Schools.
https://www.techsafeschools.org/reducing-power

What is Beacon Interval and What Should I Set it to? https://homenetworkadmin.com/what-is-beacon-interval/

Ways to decrease power consumption in wireless network infrastructures. Nov 18, 2022.
https://www.arrow.com/en/research-and-events/articles/ways-to-decrease-power-consumption-in-wireless-network-infrastructures

Energy Efficiency in Wireless Networking Protocols. Washington University in Saint Louis. 2014
https://www.cse.wustl.edu/~jain/cse574-14/ftp/energy/index.html

Energy Consumption in Wired and Wireless Access Networks. 2011, University of Melbourne. https://people.eng.unimelb.edu.au/rtucker/publications/files/energy-wired-wireless.pdf

Energy Consumption in Wired and Wireless Access Networks. Baliga J et al. July 2011. IEEE Communications
Magazine. https://www.researchgate.net/publication/224240247_Energy_Consumption_in_Wired_and_Wireless_Access_Networks

JRS Eco Wireless. Low EMF, low radiation Wi Fi routers- Example only.
https://www.jrseco.com/pcat/low-radiation-wifi-routers-jrs-eco-wifi/

Eye Effects

ANES. Effects on human health and the environment (fauna and flora) of systems usinglight-emitting diodes (LEDs). (2019) French Agency for Food, Environmental and Occupational Health & Safety. https://www.anses.fr/en/system/files/AP2014SA0253EN.pdf

AAP- Give Your Child's Eyes a Screen-Time Break: Here's Why. AAP. https://www.healthychildren.org/English/health-issues/conditions/eyes/Pages/What-Too-Much-Screen-Time-Does-to-Your-Childs-Eyes.aspx

How blue light affects your eyes, sleep, and health. UC Davis. Aug 3, 2022. https://health.ucdavis.edu/blog/cultivating-health/blue-light-effects-on-your-eyes-sleep-and-health/2022/08

Algvere PV et al. **Age-related maculopathy and the impact of blue light hazard.** Acta Ophthalmol Scand. 2006 Feb;84(1):4-15. https://www.ncbi.nlm.nih.gov/pubmed/16445433

Balci M et al. **Effects of computer monitor-emitted radiation on oxidant/antioxidant balance in cornea and lens from rat**s. Mol Vis. 15:2521-2525, 2009. https://pubmed.ncbi.nlm.nih.gov/19960068/

Chen P et al. **Retinal Neuron Is More Sensitive to Blue Light-Induced Damage than Glia Cell Due to DNA Double-Strand Breaks.Cells**. 2019 Jan 18;8(1). Chen p. et al. https://www.ncbi.nlm.nih.gov/pubmed/30669263

Crosby PA. **MICROWAVES AND OCULAR PATHOLOGY A REVIEW**. Australian Journal of Ophthalmology. 1979. P 163-166. https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1442-9071.1979.tb01416.x

Fernandez C et al. **Absorption of wireless radiation in the child versus adult brain and eye from cell phone conversation or virtual reality.** Environmental Research. Vol 167. November 2018, Pages 694-699. https://www.sciencedirect.com/science/article/abs/pii/S0013935118302561

Lipman RM et al. **Cataracts induced by microwave and ionizing radiation**. Survey of Ophthalmology. Vol 33, Issue 3. November–December 1988, Pages 200-210 https://www.sciencedirect.com/science/article/abs/pii/0039625788900884

Lohr HR et al. **Multiple, parallel cellular suicide mechanisms participate in photoreceptor cell death.** Exp Eye Res. Aug;83(2):380- 9.https://www.ncbi.nlm.nih.gov/pubmed/16626700

Mortazavi SAR. **Blocking Short-Wavelength Component of the Visible Light Emitted by Smartphones' Screens Improves Human Sleep Quality. (2018)** J Biomed Phys Eng. 2018 Dec 1;8(4):375-380. https://www.ncbi.nlm.nih.gov/pubmed/30568927

Tao JX et al. **Mitochondria as Potential Targets and Initiators of the Blue Light Hazard to the Retina.** Oxid Med Cell Longev. 2019 Aug 21;2019:6435364. https://pubmed.ncbi.nlm.nih.gov/31531186/

Tök L et al. **Effects of melatonin on Wi-Fi-induced oxidative stress in lens of rats**. Indian J Ophthalmol. 62(1):12-15, 2014. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3955064/

Tosini G et al. **Effects of blue light on the circadian system and eye physiology.** Mol Vis. 2016; 22: 61–72. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4734149/

Wang KJ et al. **[Effects of different dose microwave radiation on protein components of cultured rabbit lens]** Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi. 25(4):208-210, 2007.[Article in Chinese. https://www.emf-portal.org/en/article/47197

West KE et al. **Blue light from light-emitting diodes elicits a dose-dependent suppression of melatonin in humans**. J Appl Physiol. 2011 Mar;110(3):619-26. https://pubmed.ncbi.nlm.nih.gov/21164152/

Yao K et al. **Low power microwave radiation inhibits the proliferation of rabbit lens epithelial cell by upregulating P27Kip1 expression**. Mol Vis. 10:138-143, 2004. https://pubmed.ncbi.nlm.nih.gov/14990889/

Light emitted from digital screens can cause irreversible damage to eyes, research shows. Jan 27, 2017. News Medical and Life Sciences. https://www.news-medical.net/news/20170127/Light-emitted-from-digital-screens-can-cause-irreversible- damage-to-eyes-research-shows.aspx

China bans mobile phones in classrooms: Primary and middle school students in Shandong province will not be allowed to use cellphones or tablets in classrooms starting from Nov 1, according to a new regulation. China Daily/Asia News Network. Oct 10, 2018. https://www.asiaone.com/china/china-bans-mobile-phones-classrooms?fbclid=IwAR1t8vFda5UzHH8oAHkA6k30jFFDzus6TI7DzaEcZgScGPzXCwuWhV3o8X8

Learning

Computers 'do not improve' pupil results, says OECD. Sept 15, 2015. BBC News. https://www.bbc.com/news/business-34174796

Does Educational Technology Help Students Learn?

An analysis of the connection between digital devices and learning. Reboot. Elevating Critical Thinking. https://reboot-foundation.org/does-educational-technology-help-students-learn/

This School Banned iPads, Went Back to Regular Textbooks—But What Does the Science Say? Julie Hambleton. July 21, 2021. https://secretlifeofmom.com/school-banned-ipads/?t=rel

Karsenti T et al. **The iPad in Education: uses, benefits and challenges.** A survey of 6057 students and 302 teachers in Quebec, Canada. December 2013. https://www.researchgate.net/publication/266672409_The_iPad_in_Education_uses_benefits_and_challenges_A_survey_of_6057_students_and_302_teachers_in_Quebec_Canada

Long D and Szabo S. **E-readers and the effects on students' reading motivation, attitude and comprehension during guided reading**. (2016) https://www.tandfonline.com/doi/full/10.1080/2331186X.2016.1197818

Madigan S et al. **Association Between Screen Time and Children's Performance on a Developmental Screening Test.** JAMA Pediatr. 2019;173(3):244-250. https://jamanetwork.com/journals/jamapediatrics/fullarticle/2722666

Mangen A et al. **Reading linear texts on paper versus computer screen: Effects on reading comprehension**. (2013) InternationalJournalofEducationalResearch58:61– 68. https://insights.uksg.org/articles/10.1629/uksg.236/

Marcus- Quinn A. **How Should Second-Level Schools Respond in an Era of Digital Learning?** Education Matters. https://irelandseducationyearbook.ie/irelands-yearbook-of-education-2019-2020/second-level/how-should-second-level-schools-respond-in-an-era-of-digital-learning/

May C. **A Learning Secret: Don't Take Notes with a Laptop Students who used longhand remembered more and had a deeper understanding of the materia**l. June 3, 2014. https://www.scientificamerican.com/article/a-learning-secret-don-t-take- notes-with-a-laptop/

Moreno M (2017) **Your Child's First Cell Phone.** Dr. Megan Moreno. JAMA Pediatr. 2017;171(6):608. https://jamanetwork.com/journals/jamapediatrics/fullarticle/2630160

Mueller and Oppenheimer (2014) **The Pen Is Mightier Than the Keyboard: Advantages of Longhand Over Laptop Note Taking.** Psychological Science. April 23, 2014. https://journals.sagepub.com/doi/abs/10.1177/0956797614524581

O'Malley P et al. **Effectiveness of Using iPads to Increase Academic Task Completion by Students with Autism**. Kennedy Krieger Institute,. Baltimore Maryland. https://files.eric.ed.gov/fulltext/EJ1053911.pdf

Pardede P. (2017) **Factors Attributed to Contradictory Research Findings in Print Reading vs. Digital Reading Effectiveness: A Literature Review**. Oct 2017. Proceedings of the EED Collegiate Forum.
https://www.researchgate.net/publication/336220982_Factors_Attributed_to_Contradictory_Research_Findings_in_Print_Reading_vs_Digital_Reading_Effectiveness_A_Literature_Review

Singer L. and Alexander P. (2016) **Reading Across Mediums: Effects of Reading Digital and Print Texts on Comprehension and Calibration**.
https://www.researchgate.net/publication/297716778_Reading_Across_Mediums_Effects_of_Reading_Digital_and_Print_Texts_on_Comprehension_and_Calibration

Singer LM and Alexander PA. **Reading on Paper and Digitally: What the Past Decades of Empirical Research Reveal.** American Educational Research Association. Vol 87. Issue 6.
https://journals.sagepub.com/doi/abs/10.3102/0034654317722961

E-books versus Print: Which do we Retain Better? Terri Frank Nov 2017.
https://diymfa.com/reading/e-books-versus-print-retain-better

Print Versus Digital: What Does the Latest Research Tell Us? 11/19/18
https://foreword.mbsbooks.com/print-versus-digital-what-does-the-latest-research-tell-us-1#gsc.tab=0

Does replacing textbooks with tablets impact student learning? STUDY INTERNATIONAL. 24 APR 2019
https://www.studyinternational.com/news/does-replacing-textbooks-with-tablets-impact-student-learning/

Concern over reliance on technology in schools. Emma O Kelly. RTE News. April 17, 2019.
https://www.rte.ie/news/education/2019/0417/1043092-technology-schools/

Evidence Shows Students Still Learn More Effectively from Print Textbooks Than Screens. Patricia Alexander. April 8, 2018. https://www.sciencealert.com/do-students-learn-better-from-screens-or-print-textbooks-science-education

The Case Against E-readers. Chicago Tribune. Jan 13, 2015.
https://www.chicagotribune.com/opinion/commentary/sns-wp-washpost-bc-kindle- comment12-20150112-story.html

lustrated story books are better for kids' brains than video or text, study finds.
https://www.cbc.ca/radio/asithappens/as-it-happens-friday-edition-1.4678180/illustrated- story-books-are-better-for-kids-brains-than-video-or-text-study-finds-1.4678195

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Melatonin

Blask DE et al. **Light during darkness, melatonin suppression and cancer progression.** Neuro Endocrinol Lett. 2002 Jul;23 Suppl 2:52-6. https://www.ncbi.nlm.nih.gov/pubmed/12163849

Bonmati-Carrion MA et al**. Melatonin and Cancer: A Polyhedral Network Where the Source Matters.** Antioxidants 2021, 10(2), 210. https://www.mdpi.com/2076-3921/10/2/210

Das NK and Samanta S. **The potential anti-cancer effects of melatonin on breast cancer (2022)** Das NK and Samanta S. Explor Med. 2022;3:112–127. https://www.explorationpub.com/Journals/em/Article/100178

Glickman et al. **Ocular input for human melatonin regulation: relevance to breast cancer. (2002)** Neuro Endicrinol Lett.2002 Jul;23 Suppl 2:17-22. https://pubmed.ncbi.nlm.nih.gov/12163843/

Shih YW et al. The Association Between Smartphone Use and Breast Cancer Risk Among Taiwanese Women: A Case-Control Study. (2020) Shih YW et al. Cancer Manag Res. 2020;12:10799–807. https://pubmed.ncbi.nlm.nih.gov/33149685/

Stevens, Brainard, Blask **Breast Cancer and Circadian Disruption from Electric Lighting in the Modern World.** Stevens, Brainard, Blask. CA Cancer J Clin. 2014. May; 64(3): 207-218. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4038658/

Tan DX et al. Melatonin as a Potent and Inducible Endogenous Antioxidant: Synthesis and Metabolism.. Molecules. 2015 Oct 16;20(10):18886-906. https://www.ncbi.nlm.nih.gov/pubmed/26501252

Touitou Y et al. **Association between light at night, melatonin secretion, sleep deprivation, and the internal clock: Health impacts and mechanisms of circadian disruption.**. Life Sci. 2017 Mar 15;173:94-106. https://www.ncbi.nlm.nih.gov/pubmed/28214594

West JG et al Multifocal Breast Cancer in Young Women with Prolonged Contact between Their Breasts and Their Cellular Phones. (2013) West JG et al. Case Rep Med. 2013;2013:354682 http://www.ncbi.nlm.nih.gov/pubmed/24151509

Mitochondrial Effects

Burlaka A et al. **Changes in mitochondrial functioning with electromagnetic radiation of ultra high frequency as revealed by electron paramagnetic resonance methods.**

(2014) Burlaka A et al. Int J Radiat Biol. 2014 May;90(5):357-62. https://www.ncbi.nlm.nih.gov/pubmed/24597749

Gupta SK et al. **2450 MHz EMR exposure causes cognition deficit with mitochondrial dysfunction & activation of intrinsic pathway of apoptosis in rats.** (2018) J Biosciences. June 2018, Vol 43, pg 263. https://link.springer.com/article/10.1007/s12038-018-9744-7

Lasalvia M et al. **Exposure to 1.8 GHz electromagnetic fields affects morphology, DNA-related Raman spectra and mitochondrial functions in human lymphs-monocytes.** (2018) PLoS One. 2018 Feb 20;13(2):e0192894. https://www.ncbi.nlm.nih.gov/pubmed/29462174.

Santini SJ et al. **Role of Mitochondria in the Oxidative Stress Induced by Electromagnetic Fields: Focus on Reproductive Systems.** (2018) Oxid Med Cell Longev. 2018 Nov 8;2018. https://www.ncbi.nlm.nih.gov/pubmed/30533171

Neurologic Effects

Review Article

Narayanan SN et al **Radiofrequency electromagnetic radiation-induced behavioral changes and their possible basis.** Review. Environmental Science and Pollution Research. Volume 26, pages 30693–30710 (2019) . https://link.springer.com/article/10.1007/s11356-019-06278-5

Neurologic- Addiction and Structural Brain Changes

Hong (2013) **Decreased Functional Brain Connectivity in Adolescents with Internet Addiction.** Hong SB et al. PLOS One. Feb 23, 2013. https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0057831

Hutton JS et al. (2019) **Associations Between Screen-Based Media Use and Brain White Matter Integrity in Preschool-Aged Children.** (2019) JAMA Pediatrics. 2019 Nov 4:e193869. https://www.ncbi.nlm.nih.gov/pubmed/31682712

Lin (2011)-**Abnormal White Matter Integrity in Adolescents with Internet Addiction Disorder: A Tract-Based Spatial Statistics Study**. Lin F et al. PLOS ONE. Oct 4, 2011. https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0030253

Wang (2016) **Altered Gray Matter Volume and White Matter Integrity in College Students with Mobile Phone Dependence.** Wang Y et al. Front Psychol. 2016; 7: 597. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4855531/

Weng (2012) [**A voxel-based morphometric analysis of brain gray matter in online game addicts**]. Weng CB et al. Zhonghua Yi Xue ZA Zhi. 2012 Dec 4;92(45):3221-3. https://www.ncbi.nlm.nih.gov/pubmed/23328472

Weng (2013) **Gray matter and white matter abnormalities in online game addiction**. Weng CB et al. European Journal of Radiology. August 2013. Vol 82. Issue 2, Pg 1308- 1312. https://www.ejradiology.com/article/S0720-048X%2813%2900073-9/abstract

Yuan (2011) **Microstructure Abnormalities in Adolescents with Internet Addiction Disorder.** Yuan K et al. PLOS One. June 3, 2011. https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0020708

Zhou (2011)**Gray matter abnormalities in Internet addiction: A voxel-based morphometry study.** Zhou Y et al. European Journal of Radiology. July 2011. Vol 79. Issue 1, Pg 92-95. https://www.ejradiology.com/article/S0720-048X%2809%2900589- 0/abstract

Neurologic- Cognitive, Memory, Behavior and Anxiety

Abramson MJ et al. Mobile Telephone Use Is Associated with Changes in Cognitive Function in Young Adolescents. Bioelectromagnetics 30:678 ^ 686 (2009) https://onlinelibrary.wiley.com/doi/pdf/10.1002/bem.20534.

Aldad TS, Taylor H, et al. **Fetal Radiofrequency Radiation Exposure From 800-1900 Mhz-Rated Cellular Telephones Affects Neurodevelopment and Behavior in Mice.** Sci Rep. 2012; 2: 312. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3306017/
* Author and Yale Professor Dr. Hugh Taylor discussing hisYale research showing ADHD like behavior and brain changes from cell phone exposure in mice. https://vimeo.com/73431739

Yale Chief of OBGYN Dr. Hugh Taylor Explains Study: Cell Phone Radiation and ADHD. You Tube. 2014. https://www.youtube.com/watch?v=5nxDOf8Yv94&t=317s

Balmori A. **Evidence for a health risk by RF on humans living around mobile phone base stations: from radiofrequency sickness to cancer**. Environmental Research. 2022 Nov;214(Pt 2):113851. https://pubmed.ncbi.nlm.nih.gov/35843283/

Bouji M et al. **Impact of Cerebral Radiofrequency Exposures on Oxidative Stress and Corticosterone in a Rat Model of Alzheimer's Disease.** J Alzheimer's Disease. 2020;73(2):467-476. https://pubmed.ncbi.nlm.nih.gov/31796670/

Buchner K and Eger H. **Changes of Clinically Important Neurotransmitters Under the Influence of Modulated RF Fields- A Long-term Study Under Real-life Conditions.** (2011) https://www.avaate.org/IMG/pdf/Rimbach-Study-20112.pdf

Cabre-Reira A et al. **Association between estimated whole-brain radiofrequency electromagnetic fields dose and cognitive function in preadolescents and adolescents.** International Journal of Hygiene and Environmental Health. Volume 231. January 2021, 113659. https://www.sciencedirect.com/science/article/abs/pii/S1438463920306052

Consales C et al. **Electromagnetic Fields, Oxidative Stress, and Neurodegeneration**. **(2012)** International Journal of Cell Biology. Volume 2012 (2012). Article ID 683897. https://www.hindawi.com/journals/ijcb/2012/683897/

Deniz OG et al. **Effects of short and long term electromagnetic fields exposure on the human hippocampus.** Journal of Microscopy and Ultrastructure. 5 (2017) 191–197. https://www.sciencedirect.com/science/article/pii/S2213879X17300524

Divan HA et al. **Prenatal and postnatal exposure to cell phone use and behavioral problems in children**. Epidemiology. 2008 Jul;19(4):523-9. https://pubmed.ncbi.nlm.nih.gov/18467962/

Forster M et al. **Prospective Cohort Study of Adolescents' Memory Performance and Individual Brain Dose of Microwave Radiation from Wireless Communication. (2018)** Environ Health Perspect. 2018 Jul 23;126(7):077007. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6108834/

Fragopoulou AF. **Hippocampal alterations triggered by acute exposure of mice to GSM 1800 MHz mobile phone radiation.** Brain Behav. 2018 May 22:e01001. https://www.ncbi.nlm.nih.gov/pubmed/29786969

Golomb BA. **Diplomats' Mystery Illness and Pulsed Radiofrequency/Microwave Radiation. (2018)** Golomb BA. Neural Comput. 2018 Sep 5:1-104. https://www.ncbi.nlm.nih.gov/pubmed/30183509

Hardell L and Nilsson M. **Case Report: The Microwave Syndrome after Installation of 5G Emphasizes the Need for Protection from Radiofrequency Radiation.** Annals of Case Reports. 8: 1112. 10 January 2023. https://www.gavinpublishers.com/assets/articles_pdf/Case-Report-The-Microwave-Syndrome-after–Installation-of-5G-Emphasizes-the-Need-for–Protection-from-Radiofrequency-Radiation.pdf

Hermawati D. **Early electronic screen exposure and autistic-like symptoms**. Intractable Rare Dis Res. 2018 Feb; 7(1): 69–71. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5849631/

Hossman KA and Hermann DM. **Effects of electromagnetic radiation of mobile phones on the central nervous system.** Bioelectromagnetics. 2003 Jan;24(1):49-62. https://pubmed.ncbi.nlm.nih.gov/12483665/

Hu C et al. **Effects of Radiofrequency Electromagnetic Radiation on Neurotransmitters in the Brain.** Front. Public Health, 17 August 2021
Sec. Radiation and Health. https://www.frontiersin.org/articles/10.3389/fpubh.2021.691880/full

Hutton J et al. **Associations Between Screen-Based Media Use and Brain White Matter Integrity in Preschool-Aged Children**. Hutton J et al. JAMA Pediatr. 2020;174(1). https://jamanetwork.com/journals/jamapediatrics/fullarticle/2754101

Karimi N et al. **2.45 GHz microwave radiation impairs learning, memory, and hippocampal synaptic plasticity in the rat**. (2018) Karimi N et al. Toxicology and Industrial Health 34(12): 873-883 (2018). https://www.ncbi.nlm.nih.gov/pubmed/30345889

Kim JH et al. **Possible Effects of Radiofrequency Electromagnetic Field Exposure on Central Nerve System.** Biomol Ther (Seoul) 2019 May; 27(3): 265–275. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6513191/

Kim JH et al **Long-term exposure to 835 MHz RF-EMF induces hyperactivity, autophagy and demyelination in the cortical neurons of mice.** (2017) Kim JH et al. Sci Rep. 2017 Jan 20;7:41129. https://www.nature.com/articles/srep41129

Lamech F. **Self-reporting of symptom development from exposure to radiofrequency fields of wireless smart meters in victoria, australia: a case series.** Altern There Health Med. 2014 Nov-Dec;20(6):28-39. https://www.ncbi.nlm.nih.gov/pubmed/25478801

Landrigan and Goldman (2011). **Children's Vulnerability to Toxic Chemicals: A Challenge and Opportunity to Strengthen Health and Environmental Policy.** Health Affairs. Vol 30 No. 5. May 2011. Environmental Challenges for Health. https://www.healthaffairs.org/doi/10.1377/hlthaff.2011.0151

Lanphear BP. The Impact of Toxins on the Developing Brain. Annual Review of Public Health. Vol. 36:211-230. 2015. https://pubmed.ncbi.nlm.nih.gov/25581143/

Li DK et al. **Association Between Maternal Exposure to Magnetic Field Nonionizing Radiation During Pregnancy and Risk of Attention-Deficit/Hyperactivity Disorder in Offspring in a Longitudinal Birth Cohort**.(2020) JAMA Netw Open. 2020;3(3):e201417. https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2763232?guestAccessKey=cda77a0a-bfb6-4f74-99e0-0bdd2909bdb2&utm_source=silverchair&utm_medium=email&utm_campaign=article_alert-jamanetworkopen&utm_term=mostread&utm_content=olf-widget_03302020

Meo SA et al. **Mobile Phone Base Station Tower Settings Adjacent to School Buildings: Impact on Students' Cognitive Health**. Meo SA et al. American Journal of Men's Health. December 7, 2018. https://journals.sagepub.com/doi/10.1177/1557988318816914

Narayanan SN et al **Radiofrequency electromagnetic radiation-induced behavioral changes and their possible basis.** Review. Environmental Science and Pollution Research. Volume 26, pages 30693–30710 (2019) . https://link.springer.com/article/10.1007/s11356-019-06278-5

Othman H et al **Exposure to 2.45 GHz Radiation Triggers Changes in HSP-70, Glucocorticoid Receptors and GFAP Biomarkers in Rat Brain.**. Int J Mol Sci. 2021 May 12;22(10):5103. https://pubmed.ncbi.nlm.nih.gov/34065959/

Othman H et al. **Postnatal development and behavior effects of in-utero exposure of rats to radiofrequency waves emitted from conventional Wi Fi devices.** Environ Toxicol Pharmacol. 2017 Apr 22;52:239-247. https://www.ncbi.nlm.nih.gov/pubmed/28458069

Pearce M. **500 Meter buffer recommended around schools, hospitals and homes. "Limiting liability with positioning to minimize negative health effects of cellular phone towers."** Environmental Research, Vol 181. February 2020, https://www.sciencedirect.com/science/article/abs/pii/S0013935119306425

Pritchard C et al. **Are rises in Electro-Magnetic Field in the human environment, interacting with multiple environmental pollutions, the tipping point for increases in neurological deaths in the Western World?** (2019) Pritchard C et al. Medical Hypotheses 127: 76-83

Qiu C et al. **Occupational exposure to electromagnetic fields and risk of Alzheimer's disease. (2004)** Epidemiology. 2004 Nov;15(6):687-94. https://www.ncbi.nlm.nih.gov/pubmed/15475717

Ra CK et al. **Association of Digital Media Use With Subsequent Symptoms of Attention-Deficit/Hyperactivity Disorder Among Adolescents**. JAMA July 17, 2018. https://jamanetwork.com/journals/jama/article-abstract/2687861

Raefsky SM et al. **Delayed-Onset multiphasic demyelinating lesions after high dose radiofrequency electromagnetic field exposure: A multiple sclerosis (MS) mimic.** Mult Scler Relat Disord. 2020 Jun 20;45:102318. https://pubmed.ncbi.nlm.nih.gov/32622299/

Salford LG et al. **Nerve cell damage in mammalian brain after exposure to microwaves from GSM mobile phones.** Environ Health Perspect. 2003 Jun;111(7):881-3. https://www.ncbi.nlm.nih.gov/pubmed/12782486

Santini R **[Symptoms experienced by people in vicinity of base stations: II/ Incidences of age, duration of exposure, location of subjects in relation to the antennas and other electromagnetic factors]. (2003)** Santini R. Pathol Biol (Paris). 2003 Sep;51(7):412-5. http://www.ncbi.nlm.nih.gov/pubmed/12948762

Santini R **[Investigation on the health of people living near mobile telephone relay stations: I/Incidence according to distance and sex]. (2002)** Santini R. Pathol Biol (Paris). 2002 Jul;50(6):369-73. http://www.ncbi.nlm.nih.gov/pubmed/12168254

Sharma A et al. **Evidence of the radiofrequency exposure on the antioxidant status potentially contributing to the inflammatory response and demyelination in rat brain.** Environmental Toxicology and Pharmacology. 11 June 2022. 103903. https://www.sciencedirect.com/science/article/pii/S1382668922000965?via%3Dihub

Sharma S et al. **Effect of electromagnetic radiation on redox status, acetylcholine esterase activity and cellular damage contributing to the diminution of the brain working memory in rats.** J Chem Neuroanat. 2020 Mar 20:101784. https://pubmed.ncbi.nlm.nih.gov/32205214/

Shahain S et al. **2.45-GHz Microwave Radiation Impairs Hippocampal Learning and Spatial Memory: Involvement of Local Stress Mechanism-Induced Suppression of iGluR/ERK/CREB Signaling.** Toxicol Sci. 2018 Feb 1;161(2):349-374. https://www.ncbi.nlm.nih.gov/pubmed/29069439

Shinjyo and Shinjyo. **Significant Decrease of Clinical Symptoms after Mobile Phone Base Station Removal –An Intervention Study.** (2014). Tetsuharu Shinjyo and Akemi Shinjyo. https://mdsafetech.org/wp-content/uploads/2021/10/shinjyo-t-and-shinjyo-a.-2014-significant-decrease-of-clinical-symptoms-after-mobile-phone-base-station-removal-e28093an-intervention-study.-.pdf

Singh KV et al. **Acute radiofrequency electromagnetic radiation exposure impairs neurogenesis and causes neuronal DNA damage in the young rat brain**. Neurotoxicology. Vol 94. JanuRY 2023. PG 46-58. https://www.sciencedirect.com/science/article/abs/pii/S0161813X22001747

Sudan M et al. **Prenatal and Postnatal Cell Phone Exposures and Headaches in Children.** Open Pediatr Med Journal. 2012 Dec 5;6(2012):46-52. https://pubmed.ncbi.nlm.nih.gov/23750182/

Weiss B. **Vulnerability of children and the developing brain to neurotoxic hazards.** Environ Health Perspectives. 2000 Jun; 108(Suppl 3): 375–381. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1637834/

Zhao TY et al. **Exposure to cell phone radiation up-regulates apoptosis genes in primary cultures of neurons and astrocytes.** Neurosci Lett. 2007;412:34–38. https://pubmed.ncbi.nlm.nih.gov/17187929/ https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2713174/

Neurologic- Seizures

Azmy (2020) **Effects of mobile phones electromagnetic radiation on patients with epilepsy: an EEG study.** Azmy R et al. Egypt J Neurol Psychiatry Neurosurg 56, 36 (2020). https://ejnpn.springeropen.com/articles/10.1186/s41983-020-00167-2#article-info

Bonilla-Jaime H et al. **Sleep Disruption Worsens Seizures: Neuroinflammation as a Potential Mechanistic Link**. In J Mol Sci. 2021 Nov 20;22(22):12531. https://pubmed.ncbi.nlm.nih.gov/34830412/

Cinar N et al. **What is the impact of electromagnetic waves on epileptic seizures?** Med Sci Monit Basic Res. 2013; 19: 141–145. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3659130/

Goldberg-Stern H et al. **Effect of melatonin on seizure frequency in intractable epilepsy: a pilot study**. J Child Neurol. 2012 Dec;27(12):1524-8. https://pubmed.ncbi.nlm.nih.gov/22378657/

Kouchaki (2016) **Effect of mobile phone radiation on pentylenetetrazole-induced seizure threshold in mice**. **(2016)** Kouchaki E et al. Iran J Basic Med Sci. 2016 Jul;19(7):800-3. https://pubmed.ncbi.nlm.nih.gov/27635206/

Lopez-Martin E et al **The action of pulse-modulated GSM radiation increases regional changes in brain activity and c-Fos expression in cortical and subcortical areas in a rat model of picrotoxin-induced seizure proneness. (2009)** Lopez-Martin E et al. J Neurosci Res. 2009 May 1;87(6):1484-99. https://pubmed.ncbi.nlm.nih.gov/19115403/

López-Martín E et al. GSM radiation triggers seizures and increases cerebral c-Fos positivity in rats pretreated with subconvulsive doses of picrotoxin. Neurosci Lett. 2006;398:139–44. https://pubmed.ncbi.nlm.nih.gov/16448750/

Oxidative Stress-Cellular and Biologic

Çelik Ö et al. **Oxidative stress of brain and liver is increased by Wi-Fi (2.45GHz) exposure of rats during pregnancy and the development of newborns. (2015)** J Chem Neuroanat. 2015 Oct 28. pii: S0891-0618(15)00074-5. https://pubmed.ncbi.nlm.nih.gov/26520617/

Grigoriev YG et al. **Autoimmune processes after long-term low-level exposure to electromagnetic fields part 4. Oxidative intracellular stress response to the long-term rat exposure to non-thermal RF EMF.** 2010;55:1054–8. https://link.springer.com/article/10.1134/S0006350910060308

Kıvrak EG et al.**Effects of electromagnetic fields exposure on the antioxidant defense system. (2017)** Kıvrak EG et al. J Microsc Ultrastruct. 2017 Oct-Dec;5(4):167-176. https://www.ncbi.nlm.nih.gov/pubmed/30023251

Pall, ML. **Electromagnetic fields act via activation of voltage-gated calcium channels to produce beneficial or adverse effects. (2013).** J Cell Mol Med. 2013 Aug;17(8):958-65. http://www.ncbi.nlm.nih.gov/pubmed/23802593

Schuermann D and Mevissen M. **Manmade Electromagnetic Fields and Oxidative Stress—Biological Effects and Consequences for Health**. International Journal of Molecular Sciences. 2021, 22, 3772. University of Basel. Basel,Switzerland

Sharma A et al. **Evidence of the radiofrequency exposure on the antioxidant status potentially contributing to the inflammatory response and demyelination in rat brain. (2022) Environmental Toxicology and Pharmacology**. 11 June 2022. 103903. https://www.sciencedirect.com/science/article/pii/S1382668922000965?via%3Dihub

Yakymenko et al. **Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation. (2016)** Electromagn Biol Med. 2016;35(2):186-202. https://www.ncbi.nlm.nih.gov/pubmed/26151230

BioInitiative Summaries. Dr. Henry Lai. - Oxidative Stress. https://bioinitiative.org/research-summaries/

Antioxidation

Shekoohi-Shooli F et al. **Evaluation of the Protective Role of Vitamin C on the Metabolic and Enzymatic Activities of the Liver in the Male Rats After Exposure to 2.45 GHz Of Wi-Fi Routers. (2016)** J Biomed Phys Eng. 2016 Sep 1;6(3):157-164. https://www.ncbi.nlm.nih.gov/pubmed/27853723

Privacy

K-12 EdTech Safety Benchmark. National Findings Part 1. Dec 13, 2022. https://internetsafetylabs.org/wp-content/uploads/2022/12/2022-k12-edtech-safety-benchmark-national-findings-part-1.pdf

SANTA CLARA COUNTY MEDICAL ASSOCIATION

Psychosocial Effects

Review Article

Twenge JM **Associations between screen time and sleep duration are primarily driven by portable electronic devices: evidence from a population-based study of U.S. children ages 0-17.** Sleep Med. 2019 Apr;56:211-218. https://www.ncbi.nlm.nih.gov/pubmed/30639033

AAP 2017. **American Academy of Pediatrics Digital Media Journal Supplement 2017**. Volume 140. http://pediatrics.aappublications.org/content/140/Supplement_2

Anderson J and Raine L. **The Pew Research Center's Internet & American Life Project. Feb 2012. Millennials will benefit and suffer due to their hyperconnected lives** http://www.pewinternet.org/2012/02/29/millennials-will-benefit-and-suffer-due-to-their-hyperconnected-lives/

Boers E et al. **Association of Screen Time and Depression in Adolescence.** JAMA Pediatr. 2019;173(9):853-859. https://jamanetwork.com/journals/jamapediatrics/fullarticle/2737909

Bosker, Bianca. **The Binge Breaker.** The Atlantic.. November 2016. https://www.theatlantic.com/magazine/archive/2016/11/the-binge-breaker/501122/

Carr N. **The Shallows: What the Internet Is Doing to Our Brains.** (2010)

Clement J and Miles M. **Screen Schooled: Two Veteran Teachers Expose How Technology Overuse Is Making Our Kids Dumber.** Chicago Review Press. (2017)

Dunkley, Victoria. **Reset Your Child's Brain: A Four-Week Plan to End Meltdowns, Raise Grades and Boost Social Skills by Reversing the Effects of Electronic Screen-Time.** New World Library. (2015)

Gregory C. **Internet Addiction Disorder Signs, symptoms, diagnosis, and treatments for those who may be addicted to the Web on their PC or smart phone.** https://www.psycom.net/iadcriteria.html

Harris, Tristan. **How Technology Hijacks People's Minds—from a Magician and Google's Design Ethicist**.. May 19, 2016. http://www.tristanharris.com/essays/

Tristan Harris on Persuasive Technology. - US Senate Hearings, June 25, 2019. https://www.youtube.com/watch?v=WQMuxNiYoz4&amp=&feature=youtu.be

Kuznekoff J et al. **Mobile Phones in the Classroom: Examining the Effects of Texting, Twitter, and Message Content on Student Learning.** Communication Education. 64(3) · May 2015 .
https://www.researchgate.net/publication/277010062_Mobile_Phones_in_the_Classroom_Examining_the_Effects_of_Texting_Twitter_and_Message_Content_on_Student_Learning

Lissak G. **Adverse physiological and psychological effects of screen time on children and adolescents:** Literature review and case study.(2018) Environ Res. 2018 Jul;164:149-157.
https://www.ncbi.nlm.nih.gov/pubmed/29499467

Mosher D High Wired: **Does Addictive Internet Use Restructure the Brain? Brain scans hint excessive time online is tied to stark physical changes in the brain**. Scientific American. 17, 2011.
https://www.scientificamerican.com/article/does-addictive-internet-use-restructure-brain/#:~:text=The%20work%2C%20published%20June%203,the%20duration%20of%20online%20addiction.

Redmayne M et al. **The relationship between adolescents' well-being and their wireless phone use: a cross-sectional study. (2013)** BMC Environmental Health. **12**, Article number: 90 (2013). https://ehjournal.biomedcentral.com/articles/10.1186/1476-069X-12-90

Sherman L et al. **The effects of text, audio, video, and in-person communication on bonding between friends.** Cyberpsychology. Journal of Psychosocial Research on Cyberspace. Dept Psychology UCLA. https://cyberpsychology.eu/article/view/4285/3330

Steiner-Adair C. **The Big Disconnect: Protecting Childhood and Family Relationships in the Digital Age**. Published 2014.

Taheri E. **Association of Physical Activity and Screen Time with Psychiatric Distress in Children and Adolescents: CASPIAN-IV Study**. J Trop Pediatr. 2019 Aug 1;65(4):361-372.
https://www.ncbi.nlm.nih.gov/pubmed/30561678

Turkle S. **Alone Together: Why We Expect More From Technology and Less From Each Other.** Published 2011.

Twenge JM **Associations between screen time and sleep duration are primarily driven by portable electronic devices: evidence from a population-based study of U.S. children ages 0-17.** Sleep Med. 2019 Apr;56:211-218. https://www.ncbi.nlm.nih.gov/pubmed/30639033

Twenge, Jean. **Have Smartphones Destroyed a Generation? More comfortable online than out partying, post-Millennials are safer, physically, than adolescents have ever been. But they're on the brink of a mental-health crisis.** Atlantic monthly. Sept 2017.
https://www.theatlantic.com/magazine/archive/2017/09/has-the-smartphone-destroyed-a-generation/534198/

Twenge JM . **Generation Me: Why Today's Young Americans Are More Confident, Assertive, Entitled and More Miserable Than Ever Before**. Free Press. 2006

Uhls Y T et al **Five days at outdoor education camp without screens improves preteen skills with nonverbal emotion cues.**. Computers in Human Behavior. October 2014, Pages 387-392

- Fifty-one preteens spent five days at an overnight nature camp where television, computers and mobile phones were not allowed; this group was compared with school-based matched controls (*n* = 54) that retained usual media practices
- Implications are that the short-term effects of increased opportunities for social interaction, combined with time away from screen-based media and digital communication tools, improves a preteen's understanding of nonverbal emotional cues.

Williams F. **The Nature Fix: Why Nature Makes us Happier, Healthier, and More Creative.** (2017)

Young K. **Cognitive Behavior Therapy with Internet Addicts: Treatment Outcomes and Implications.** Cyber Psychology and Behavior. Oct 10, 2017.
https://www.liebertpub.com/doi/abs/10.1089/cpb.2007.9971
Nature deficit disorder

Zhang J et al. **Does cognitive-behavioral therapy reduce internet addiction? Protocol for a systematic review and meta-analysis**. Medicine (Baltimore). 2019 Sep; 98(38).
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6756623/

Reproduction- Male and Female

Review Article

Jaffar FHF et al. **Adverse effects of Wi-Fi radiation on male reproductive system: A systematic review.** (2019) Tohoku J Exp Med. 2019;248(3): 169-179.
https://www.jstage.jst.go.jp/article/tjem/248/3/248_169/_html/-char/en

Alchalabi AS et al. **Histopathological changes associated with oxidative stress induced by electromagnetic waves in rats' ovarian and uterine tissues.** (2016) Asian Pacific Journal of Reproduction. Vol 5, Issue 4, July 2016. Pg 301-310. https://www.sciencedirect.com/science/article/pii/S2305050016300422

Avendaño C et al. **Use of laptop computers connected to internet through Wi-Fi decreases human sperm motility and increases sperm DNA fragmentation.** Fertil Steril. 97(1):39-45, 2012. https://pubmed.ncbi.nlm.nih.gov/22112647/

Bellieni CV et al. **Exposure to electromagnetic fields from laptop use of "laptop" computers.** Arch Environ Occup Health. 67(1):31-36, 2012. https://pubmed.ncbi.nlm.nih.gov/22315933/

Boileau N et al. **Mobile Phone Use During Pregnancy: Which Association With Fetal Growth?** J Gynecol Obstet Hum Reprod. 2020 Jul 2;101852. https://pubmed.ncbi.nlm.nih.gov/32623065/

Chen H. **Effects of Simulated Mobile Phone Electromagnetic Radiation on Fertilization and Embryo Development.** (2017) Fetal Pediatr Pathol. 2017 Apr;36(2):123-129. https://www.ncbi.nlm.nih.gov/pubmed/27983879

El Jarrah I et al. **Impacts of smartphone radiation on pregnancy: A systematic review.** Heliyon.Vol8. Issue 2. Feb 1, 2022. https://www.cell.com/heliyon/fulltext/S2405-8440(22)00203-1

Li DK et al. **Exposure to Magnetic Field Non-Ionizing Radiation and the Risk of Miscarriage: A Prospective Cohort Study**. (2017) Li et al. Sci Rep. 2017 Dec 13;7(1):17541. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5727515/

Li DK et al. **A population-based prospective cohort study of personal exposure to magnetic fields during pregnancy and the risk of miscarriage**. Epidemiology. 2002 Jan;13(1):9-20. https://pubmed.ncbi.nlm.nih.gov/11805581/

Jaffar FHF et al. **Adverse effects of Wi-Fi radiation on male reproductive system: A systematic review.** (2019) Tohoku J Exp Med. 2019;248(3): 169-179. https://www.jstage.jst.go.jp/article/tjem/248/3/248_169/_html/-char/en

Kesari KK et al. **Radiations and male fertility**. (2018) Reprod Biol Endocrinol. 2018 Dec 9;16(1):118. https://www.ncbi.nlm.nih.gov/pubmed/30445985

Magras I, Xenos T. **Radiation-Induced Changes in the Prenatal Development of Mice.** (1997) . RF Bioelectromagnetics 18:455-461, 1997. https://www.ncbi.nlm.nih.gov/pubmed/9261543

Mortazavi S et al. **Male reproductive health under threat: Short term exposure to radiofrequency radiations emitted by common mobile jammers**. J Hum Reprod Sci. 2013 Apr;6(2):124-8. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3778601/

Safari M et al. **Thermal mapping on male genital and skin tissues of laptop thermal sources and electromagnetic interaction.** (2017) Bioelectromagnetics. 2017 Aug 11. 10.1002/bem.22068. https://www.ncbi.nlm.nih.gov/pubmed/28799651

Santini SJ et al. **Role of Mitochondria in the Oxidative Stress Induced by Electromagnetic Fields: Focus on Reproductive Systems.** (2018) Oxid Med Cell Longev. 2018 Nov 8;2018. https://www.ncbi.nlm.nih.gov/pubmed/30533171

Saygin M et al. **The impact of electromagnetic radiation (2.45 GHz, Wi-Fi) on the female reproductive system: The role of vitamin C.** (2018) Tocicology and Industrial health. https://journals.sagepub.com/doi/abs/10.1177/0748233718775540

Vafaei H et al. **Wi-Fi (2.4 GHz) affects anti-oxidant capacity, DNA repair genes expression and, apoptosis in pregnant mouse placenta**.Iran J Basic Med Sci. 2020 Jun;23(6):833-840.https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7351435/

Sleep

Christensen MA et al. **Direct Measurements of Smartphone Screen-Time: Relationships with Demographics and Sleep.** PLoS One. 2016 Nov 9;11(11):e0165331. https://pubmed.ncbi.nlm.nih.gov/27829040/

Hale L. **Screen time and sleep among school-aged children and adolescents: a systematic literature review.** Sleep Med Rev. 2015 Jun;21:50-8. https://www.ncbi.nlm.nih.gov/pubmed/25193149

Edwards K and Hoover V. **Insomnia and Heart Disease. American College of Cardiology.** Aug 2, 2016. https://www.acc.org/latest-in-cardiology/articles/2016/08/02/07/25/insomnia-and-heart-disease

NIH News Release. (2013) **Brain may flush out toxins during sleep. NIH-funded study suggests sleep clears brain of damaging molecules associated with neurodegeneration**. Oct 17, 2013. https://www.nih.gov/news-events/news-releases/brain-may-flush-out-toxins-during-sleep

Circadian Rhythm. NIH. https://www.nigms.nih.gov/education/pages/factsheet_circadianrhythms.aspx

Legal responsibility

Letter from Lawyers Committee on Wireless Radiation and Children's Health regarding federal and state policies mandating safe learning environments in schools. Winter 2022. https://www.techsafeschools.org/_files/ugd/2cea04_9edd62aa69d7475d87fc4ef20d56348a.pdf

News Articles

SEATTLE SAYS ENOUGH IS ENOUGH- The Seattle Public School system has filed a lawsuit against Big Tech. Marianne Williamson. Politics and Society. Jan 14, 2023. https://mariannewilliamson.substack.com/p/seattle-says-enough-is-enough?utm_source=post-email-title&publication_id=392587&post_id=96586886&isFreemail=true&token=eyJ1c2VyX2lkIjoxMDcyNzE5NDAsInBvc3RfaWQiOjk2NTg2ODg2LCJpYXQiOjE2NzM3MTc1NDMsImV4cCI6MTY3NjMwOTU0MywiaXNzIjoicHViLTM5MjU4NyIsInN1YiI6InBvc3QtcmVhY3Rpb24ifQ.sGP9HQx7UOS80_7GWf-Qyzp1i9w2S_jHzY52iQguj2E&utm_medium=email

Nov 10, 2022. **How the FCC Shields Cellphone Companies From Safety Concerns.** Peter Elkind. **ProPublica**. https://www.propublica.org/article/fcc-5g-wireless-safety-cellphones-risk