



Questioning the Safety of Our Children's Exposure to Wireless Radiation in School

Shrewsbury, MA, March 25, 2019

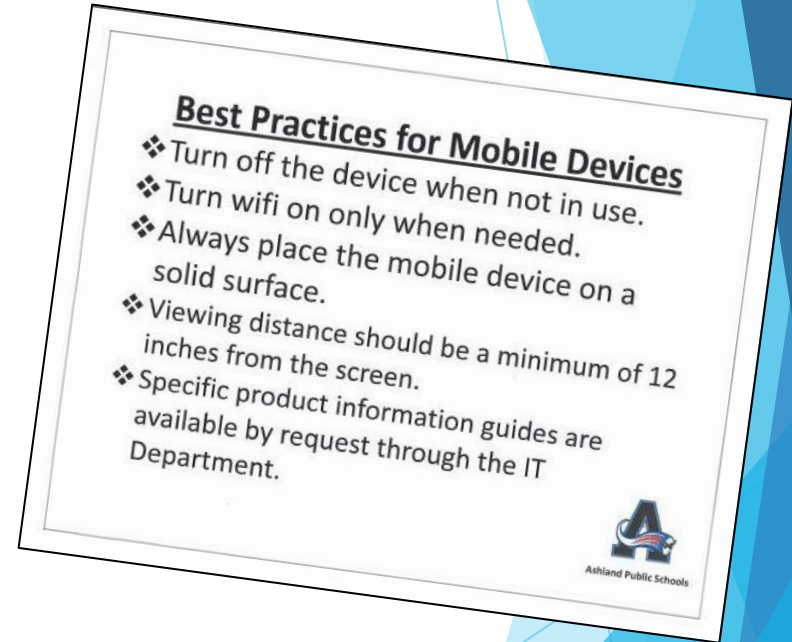


- ▶ Welcome!
- ▶ Program Overview
 - Expert Presentations
 - Solutions
 - Q&A: Index Cards



Cece Doucette, MTPW

- ▶ Education Services Director,
[Wireless Education](#)
- ▶ Former president, Ashland Education Foundation
 - Brought in wireless technology
 - Discovered biological effects
 - First in the nation to post
[Best Practices for Mobile Devices](#)

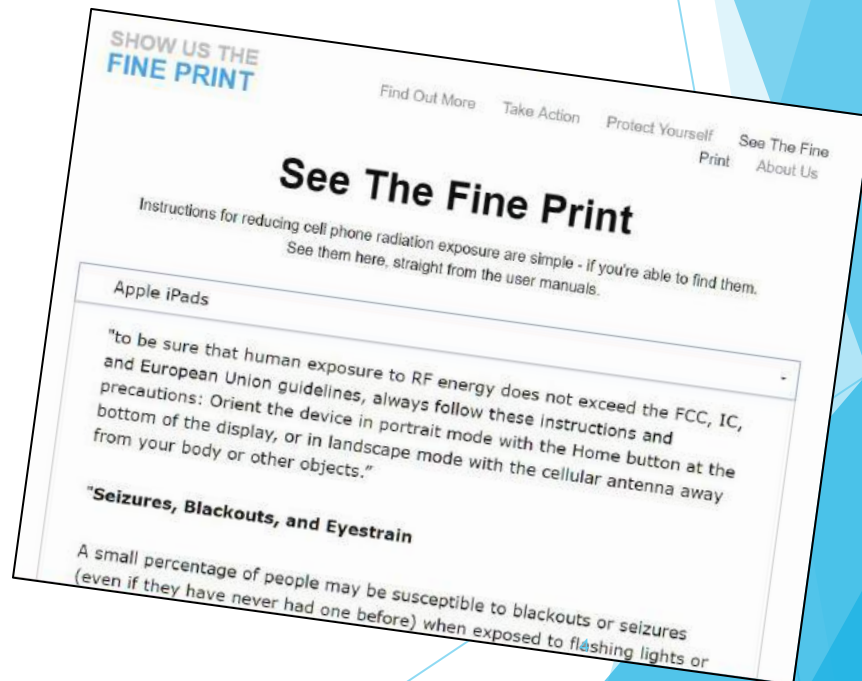


Legal Fine Print

- ▶ Settings
 - ▶ General
 - ▶ About
 - ▶ Legal
 - ▶ RF Exposure

Airplane Mode

- ▶ Cellular Off
- ▶ Wi-Fi Off
- ▶ Bluetooth Off
- ▶ Data Off
- ▶ Hotspot Off

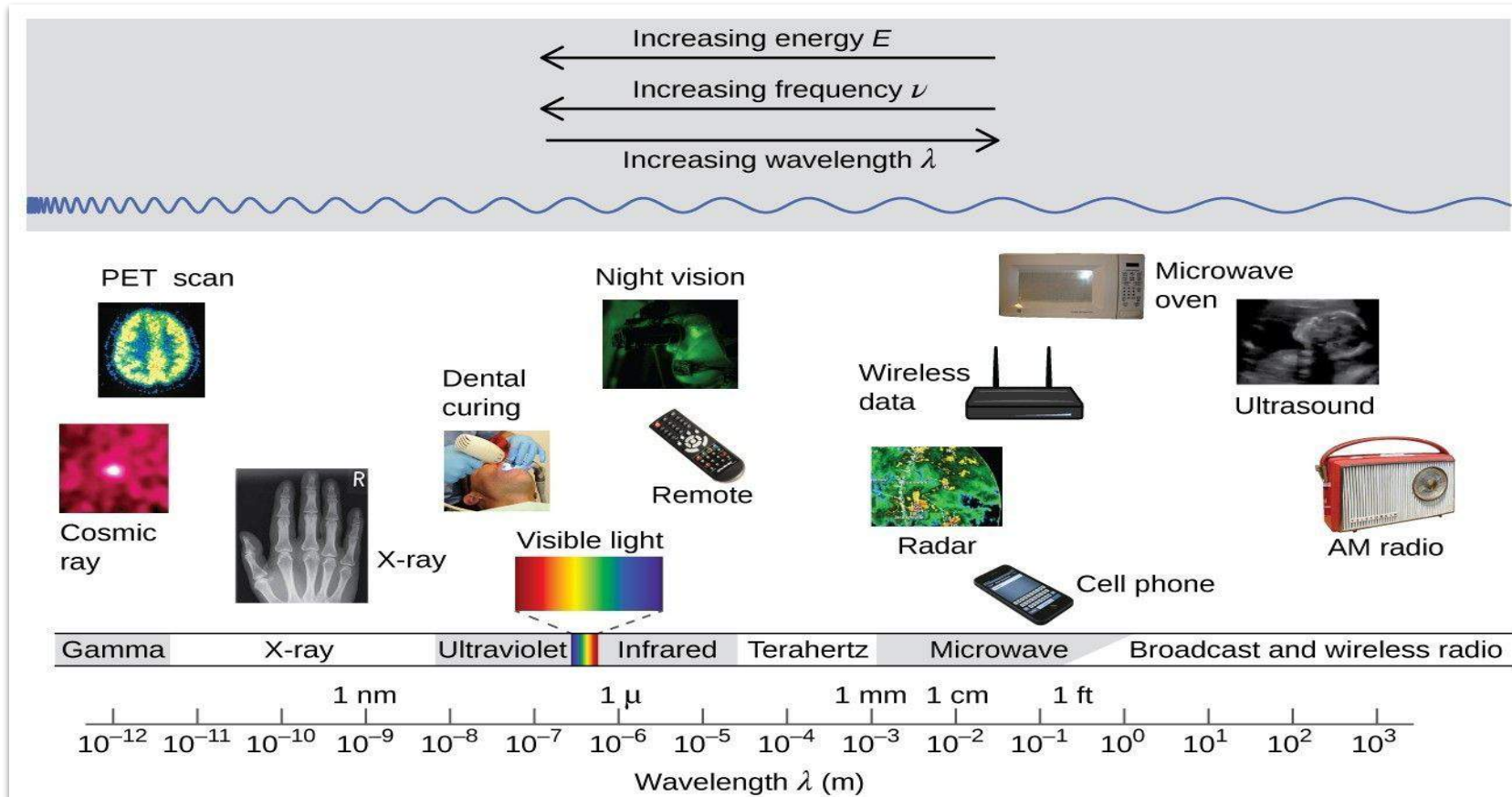


Dr. David O. Carpenter

- ▶ Public health physician, Harvard Medical School graduate
- ▶ [Director, Institute for Health and the Environment](#), a Collaborating Center of the World Health Organization
- ▶ Professor and former Dean, University at Albany School of Public Health
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Electromagnetic Spectrum



IARC CLASSIFIES RADIOFREQUENCY ELECTROMAGNETIC FIELDS AS POSSIBLY CARCINOGENIC TO HUMANS

Lyon, France, May 31, 2011 -- The WHO/International Agency for Research on Cancer (IARC) has classified radiofrequency electromagnetic fields as **possibly carcinogenic to humans (Group 2B)**, based on an increased risk for **glioma**, a malignant type of brain cancer¹, associated with wireless phone use.

Background

Over the last few years, there has been mounting concern about the possibility of adverse health effects resulting from exposure to radiofrequency electromagnetic fields, such as those emitted by wireless communication devices. The number of mobile phone subscriptions is estimated at **5 billion globally**.

From **May 24–31 2011, a Working Group of 31 scientists from 14 countries has been meeting at IARC in Lyon, France, to assess the potential carcinogenic hazards from exposure to radiofrequency electromagnetic fields**. These assessments will be published as Volume 102 of the IARC Monographs, which will be the fifth volume in this series to focus on physical agents, after **Volume 55** (Solar Radiation), **Volume 75** and **Volume 78** on ionizing radiation (X-rays, gamma-rays, neutrons, radio-nuclides), and **Volume 80 on non-ionizing radiation (extremely low-frequency electromagnetic fields)**.

The IARC Monograph Working Group discussed the possibility that these exposures might induce long-term health effects, in particular an increased risk for cancer. This has relevance for public health, particularly for users of mobile phones, as the number of users is large and growing, particularly among young adults and children.

The IARC Monograph Working Group discussed and evaluated the available literature on the following exposure categories involving radiofrequency electromagnetic fields:

- ¾ occupational exposures to radar and to microwaves;
- ¾ environmental exposures associated with transmission of signals for radio, television and wireless telecommunication; and
- ¾ personal exposures associated with the use of wireless telephones.

International experts shared the complex task of tackling the **exposure data, the studies of cancer in humans, the studies of cancer in experimental animals, and the mechanistic and other relevant data**.

¹ **237 913 new cases of brain cancers** (all types combined) occurred around the world in 2008 (gliomas represent 2/3 of these). Source: **globocan 2008**

- **May 2011, IARC included the entire range of RF Radiation (30 KHz -300 GHz) as a 2B possible Human carcinogen**
- **This frequency range also includes cellular phones, DECT cordless phones, wireless tablets, wireless enabled computers and Wi-fi presently operating@ 2.45 and 5 GHz etc.**
- **This is the same category as Lead and DDT**

IARC Press Release

:http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208_E.pdf

FCC says guidelines are not federally developed safety standards:



"While there is no federally developed national standard for safe levels of exposure to radiofrequency (RF) energy, many federal agencies have addressed this important issue....."

Wireless Devices and Health Concerns

Español

Current Exposure Limits

While there is no federally developed national standard for safe levels of exposure to radiofrequency (RF) energy, many federal agencies have addressed this important issue. In addition to the Federal Communications Commission, federal health and safety agencies such as the Environmental Protection Agency (EPA), the Food and Drug Administration (FDA), the National Institute for Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA) have been actively involved in monitoring and investigating issues related to RF exposure. For example, the FDA has issued guidelines for safe RF emission levels from microwave ovens, and it continues to monitor exposure issues related to the use of certain RF devices such as cellular telephones. NIOSH conducts investigations and health hazard assessments related to occupational RF exposure.

Federal, state and local government agencies and other organizations have generally relied on RF exposure standards developed by expert non-government organizations such as the Institute of Electrical and Electronics Engineers (IEEE) and the National Council on Radiation Protection and Measurements (NCRP). Since 1996, the FCC has required that all wireless communications devices sold in the United States meet its minimum guidelines for safe human exposure to radiofrequency (RF) energy. The FCC's guidelines and rules regarding RF exposure are based upon standards developed by IEEE and NCRP and input from other federal agencies, such as those listed above. These guidelines specify exposure limits for hand-held wireless devices in terms of the Specific Absorption Rate (SAR). The SAR is a measure of the rate that RF energy is absorbed by the body. For exposure to RF energy from wireless devices, the allowable FCC SAR limit is 1.6 watts per kilogram (W/kg), as averaged over one gram of tissue.

All wireless devices sold in the US go through a formal FCC approval process to ensure that they do not exceed the maximum allowable SAR level when operating at the device's highest possible power level. If the FCC learns that a device does not confirm with the test report upon which FCC approval is based – in essence, if the device in stores is not the device the FCC approved – the FCC can withdraw its approval and pursue enforcement action against the appropriate party.

FCC suggests....."Some measures to reduce your RF Exposure include:

- ***Use a speakerphone, earpiece or headset to reduce proximity to the head (and thus exposure). While wired earpieces may conduct some energy to the head and wireless earpieces also emit a small amount of RF energy, both wired and wireless earpieces remove the greatest source of RF energy (the cell phone) from proximity to the head and thus can greatly reduce total exposure to the head.***
- ***Increase the distance between wireless devices and your body.***
- ***Consider texting rather than talking - but don't text while you are driving."***

<https://www.fcc.gov/consumers/guides/wireless-devices-and-health-concerns>



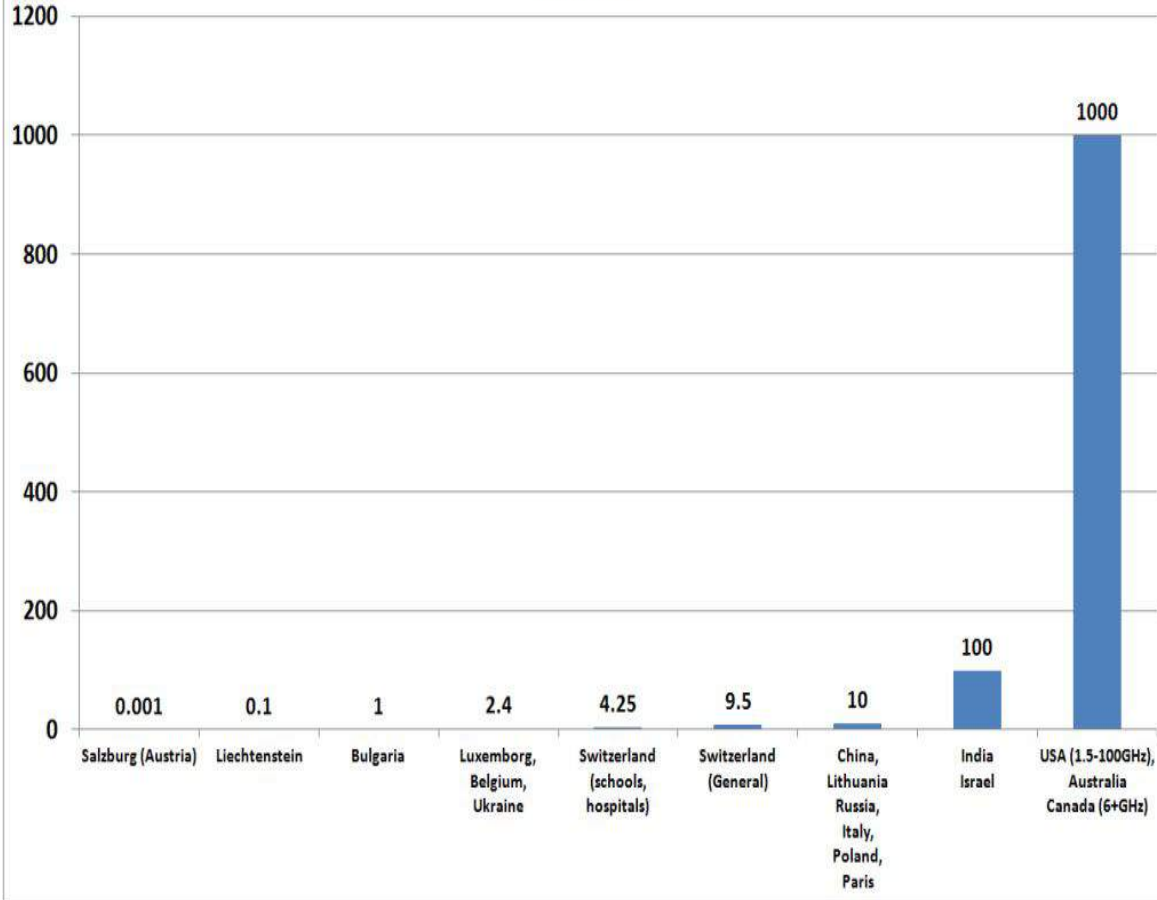
TELECOMMUNICATIONS: Exposure and Testing Requirements for Mobile Phones Should Be Reassessed

GAO-12-771: **Published: Jul 24, 2012.** Publicly Released: Aug 7, 2012.

[VIEW REPORT \(PDF, 46 PAGES\)](#) **Comments:** The Federal Communications Commission (FCC) is developing a record on mobile phone testing requirements with a Notice of Inquiry. In the Inquiry, FCC invited comment as to what steps, if any, FCC should take relative to its policies for testing of devices on the basis of an expectation of some separation from the body, including whether it is appropriate to consider "zero" spacing, or actual contact with the body when testing. Reply comments were due November 3, 2013. **FCC has not issued any further actions in Dockets 13-84 or 03-137 and does not have a schedule yet to resolve the issues in the open proceeding.**

Outdoor Pulsed RF Radiation Limits - Other Countries

($\mu\text{W}/\text{cm}^2$)



Current FCC RF Exposure Guidelines:

- FCC limit 1000 $\mu\text{W}/\text{cm}^2$ for 30 min.
- Adopted from ICNIRP & IEEE guidance (C.1996) NCRP(1986) ANSI(1992)
- *short-term exposure from thermal damage (tissue heating)*

[\(CFR-2002-title47-vol1-sec1-1310\)](#)

FCC Guideline Does Not Protect All

- *“Different groups in a population may have differences in their ability to tolerate a particular NIR (non-ionizing radiation) exposure. For example, children, the elderly, and some chronically ill people might have a lower tolerance for one or more forms of NIR exposure than the rest of the population. Under such circumstances, it may be useful or necessary to develop separate guideline levels for different groups within the general population, but it may be more effective to adjust the guidelines for the general population to include such groups.”*

ICNIRP Statement, General Approach to Protection Against Non-ionizing Radiation, ([HEALTH PHYSICS 82\(4\):540-548: 2002](#) p.546)

- “Recommendations to protect against harmful effects in human beings exposed to electromagnetic fields in the frequency range from 3 kHz to 300 GHz are provided in this standard. **These recommendations are intended to apply in controlled environments and for general population exposure. These recommendations are not intended to apply to the exposure of patients by or under the direction of physicians and medical professionals.”**

<https://ehtrust.org/wp-content/uploads/2015/11/IEEE-Standard-for-Safety-Levels-with-Respect-to-Human-Exposure-to-Radio-Frequency-Electromagnetic-Fields-3-kHz-to-300-GHz-September-1991-.pdf>



Lena Hedendahl*, Michael Carlberg and Lennart Hardell

Electromagnetic hypersensitivity – an increasing challenge to the medical profession

DOI 10.1515/reveh-2015-0012

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Published online September 15, 2015

Background: In 1970, a report from the former Soviet Union described the “microwave syndrome” among military personnel, working with radio and radar equipment, who showed symptoms that included fatigue, dizziness, headaches, problems with concentration and memory, and sleep disturbances. Similar symptoms were found in the 1980s among Swedes working in front of cathode ray tube monitors, with symptoms such as flushing, burning, and tingling of the skin, especially on the face, but also headaches, dizziness, tiredness, and photosensitivity. The same symptoms are reported in Finns, with electromagnetic hypersensitivity (EHS) being attributed to exposure to electromagnetic fields (EMF). Of special concern is involuntary exposure to radiofrequency (RF)-EMF from different sources. Most people are unaware of this type of exposure, which has no smell, color, or visibility. There is an increasing concern that wireless use of laptops and iPads in Swedish schools, where some have even abandoned textbooks, will exacerbate the exposure to EMF.

U.S. Department of Labor



Effective Accommodation Practices (EAP) Series

Job Accommodations for People with Electrical Sensitivity

Job Accommodation Network
PO Box 6080
Morgantown, WV 26506-6080
(800)526-7234 (V)
(877)781-9403 (TTY)
jan@askjan.org
askjan.org



A service of the U.S. Department of Labor's Office of Disability Employment Policy

There are people who report a sensitivity to electromagnetic fields. **Although it has been difficult for the environmental health and medical communities to define, *individuals with electromagnetic sensitivity report various symptoms including but not limited to fatigue, weakness, neurological issues, immunological issues, gastrointestinal issues, increased irritability, lack of ability to think clearly and quickly, sleep disturbance, overall malaise, and anxiety.***

Despite the medical community's difficulty in defining electromagnetic sensitivity, individuals with the condition may benefit from job accommodations.

Accommodation ideas for individuals with electromagnetic sensitivity

- Provide headset/handset extenders or alternate headsets to **lengthen the distance between devices that trigger symptoms and the employee's body**
- **Change the employee's shift to allow for less exposure to others' devices**
- **Relocate workplace away from areas where symptoms are triggered.** This may include limiting certain types of devices in the vicinity of the employee's workstation
- **Provide wired telephones and network connections**

<https://askjan.org/soar/other/electrical.html>



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Recommendations for Accommodations

TABLE OF CONTENTS

[Introduction](#)
[Operations and Maintenance](#)
[Recommended Actions](#)
[General Recommendations](#)
[References](#)
[Appendices—Detailed Recommendations](#)
[Additional Resources](#)
[Designated Cleaner Air Rooms](#)
[Recommendations for Accommodations](#)
[References & Resources](#)
[Appendices](#)
[Design & Construction](#)
[Recommendations](#)
[Appendices](#)
[References & Bibliography](#)
[Building Products & Materials](#)

People with chemical and/or electromagnetic sensitivities can experience debilitating reactions from exposure to extremely low levels of common chemicals such as pesticides, cleaning products, fragrances, and remodeling activities, and from electromagnetic fields emitted by computers, cell phones, and other electrical equipment.

The severity of sensitivities varies among people with chemical and/or electromagnetic sensitivities. Some people can enter certain buildings with minor accommodations while others may be so severely impacted that they are unable to enter these same spaces without debilitating reactions. Furthermore individual tolerances to specific exposures can vary greatly from one individual to the next. Meanwhile some exposures, such as the application of certain pesticides or extensive remodeling, for example, may be devastating to all chemically sensitive people and make a building or facility inaccessible for a substantial period of time.

According to the Americans with Disabilities Act (ADA) and other disability laws, public and commercial buildings are required to provide reasonable accommodations for those disabled by chemical and/or electromagnetic sensitivities. These accommodations are best achieved on a case-by-case basis.

Reasonable accommodations for a chemically sensitive and/or electromagnetically sensitive individual can include providing a space or meeting area that addresses one or more of the Cleaner Air criteria, upon request, such as

- Remove fragrance-emitting devices (FEDS)
- Delay or postpone indoor or outdoor pesticide applications, carpet cleaning, or other cleaning or remodeling until after the meeting
- Provide room or meeting area near exterior door or with window(s) that can be opened
- Require cell phones and computers be turned off
- Provide incandescent lighting in lieu of fluorescent lighting
- Provide at least one nonsmoking, fragrance-free person per shift to provide services (e.g. nurse, police officer, security guard, clerk)

For individuals who are unable to use or meet in a building or facility, or who are too severely impacted by chemical and/or electromagnetic exposures to use a designated Cleaner Air Room, accommodations may include:

- Meet an individual at the door or outside to conduct business
- Allow a person to wait outside or in car until appointment
- Provide a means, such as a phone, intercom, bell, or buzzer to summon staff to an outside door for assistance
- Permit business to be conducted by phone, fax, mail, or e-mail rather than in person
- Allow participation in a meeting by speakerphone

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“People with chemical and/or electromagnetic sensitivities can experience debilitating reactions from exposure [to.. and]from electromagnetic fields emitted by computers, cell phones, and other electrical equipment.

Some people can enter certain buildings with minor accommodations while others may be so severely impacted that they are unable to enter these same spaces without debilitating reactions.

Reasonable accommodations for electromagnetically sensitive individual can include providing a space or meeting area that addresses one or more of the Cleaner Air criteria, upon request, such as

- ***Require cell phones and computers be turned off***
- ***Provide incandescent lighting in lieu of fluorescent lighting...***

United States Access Board

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Dominique Belpomme, Christine Campagnac and Philippe Irigaray*

Reliable disease biomarkers characterizing and identifying electrohypersensitivity and multiple chemical sensitivity as two etiopathogenic aspects of a unique pathological disorder

Wireless Equipment In Schools Is Too Close To Students



Antennas very close to head/body of students



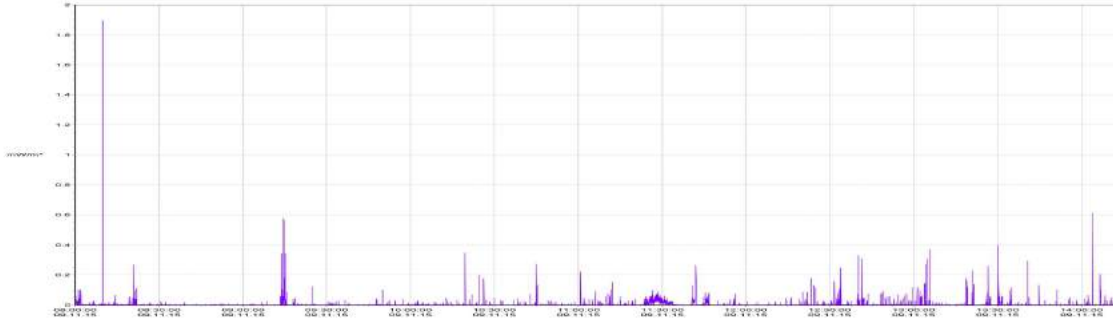
Antennas under the desks of students

- **Under current use patterns:** Students can be subject to levels of exposure higher than the FCC guideline (obsolete) because of the close proximity of wireless devices and Access Points (WAP's) to the body.
- Often Access points in school classrooms and dorms are against the FCC guidelines. **Per current guideline** Wi-Fi antennas must be **at least 20 cm /8 inches away from body**. In practice students are very close to antennas for many hours a day.

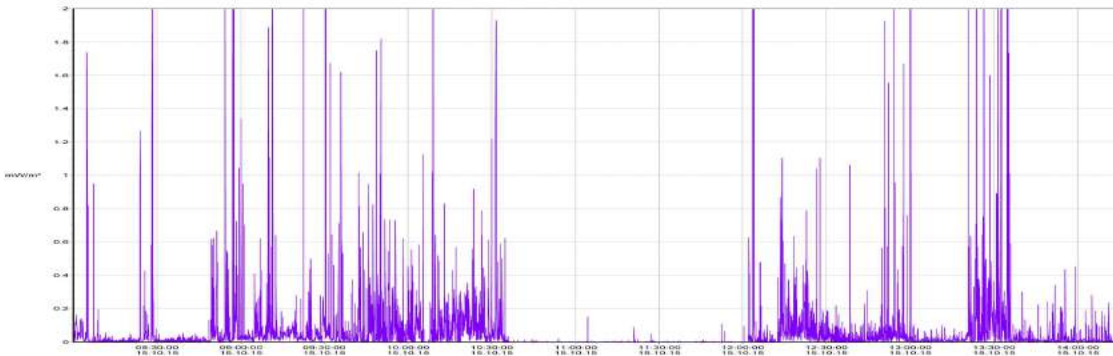
Above photos are examples of non-compliant Wi-fi Access Points (WAP's) in a private Massachusetts school where a student developed EHS

Dosimeter Measurements Confirm Schools Are Places of High Exposure to Microwave Radiation

School A: has active WiFi, no 1:1 initiative, & limited use of devices



School B: has active industrial/enterprise WiFi, 1:1 initiative, & heavy use of devices

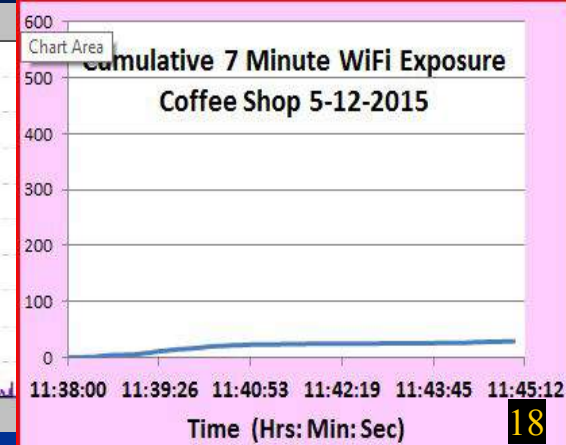
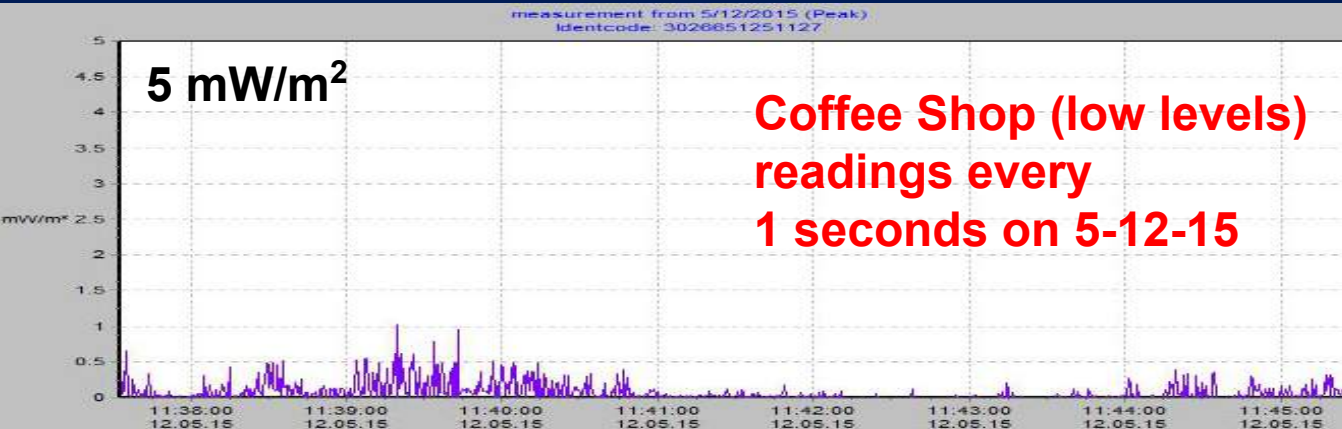
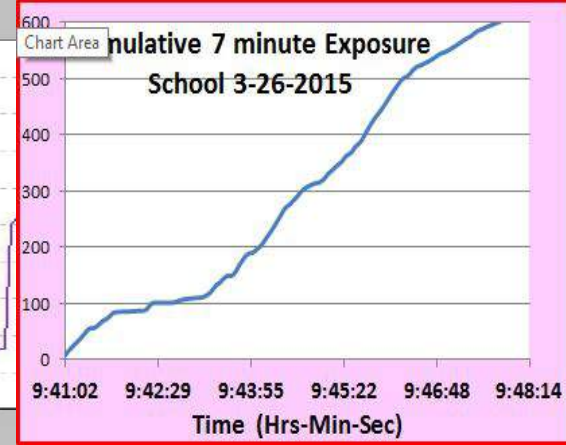
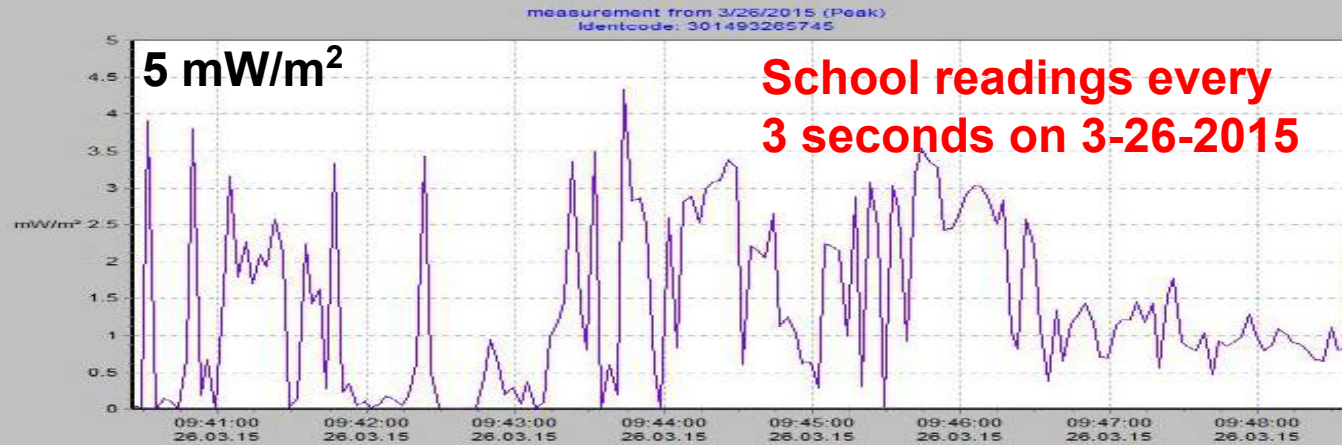


Above data obtained from testing local schools

Comparison of WiFi Exposure in School Setting

- Peaks (purple bars) represent exposure to 2.45GHz WiFi frequency as measured with personal body worn dosimeter
- Time frame: 8:00AM to 2:15PM
- Peaks represent sudden electrical field change
- While exposure levels are below FCC Guideline, the peer reviewed science indicates these levels can provoke biological effects

School WiFi versus Coffee Shop



Reported Biological Effects from Radiofrequency Radiation at Low-Intensity Exposure (Cell Tower, Wi-Fi, Wireless Laptop and 'Smart' Meter RF Intensities)

Power Density (Microwatts/centimeter ² - uW/cm ²)		Reference
As low as (10 ⁻¹³) or 100 femtowatts/cm ²	Super-low intensity RFR effects at MW resonant frequencies resulted in changes in genes; problems with chromatin conformation (DNA)	Belyaev, 1997
5 picowatts/cm ² (10 ⁻¹²)	Changed growth rates in yeast cells	Grundler, 1992
0.1 nanowatt/cm ² (10 ⁻¹⁰) or 100 picowatts/cm ²	Super-low intensity RFR effects at MW resonant frequencies resulted in changes in genes; problems with chromatin condensation (DNA) intensities comparable to base stations	Belyaev, 1997
0.00034 uW/cm ²	Chronic exposure to mobile phone pulsed RF significantly reduced sperm count,	Behari, 2006
0.0005 uW/cm ²	RFR decreased cell proliferation at 960 MHz GSM 217 Hz for 30-min exposure.	Velizarov, 1999
0.0006 - 0.0128 uW/cm ²	Fatigue, depressive tendency, sleeping disorders, concentration difficulties, cardio-vascular problems reported with exposure to GSM 900/1800 MHz cell phone signal at base station level exposures.	Oberfeld, 2004
0.003 - 0.02 uW/cm ²	In children and adolescents (8-17 yrs) short-term exposure caused headache, irritation, concentration difficulties in school.	Heinrich, 2010
0.003 to 0.05 uW/cm ²	In children and adolescents (8-17 yrs) short-term exposure caused conduct problems in school (behavioral problems)	Thomas, 2010
0.005 uW/cm ²	In adults (30-60 yrs) chronic exposure caused sleep disturbances, (but not significantly increased across the entire population)	Mohler, 2010
0.005 - 0.04 uW/cm ²	Adults exposed to short-term cell phone radiation reported headaches, concentration difficulties (differences not significant, but elevated)	Thomas, 2008
0.006 - 0.01 uW/cm ²	Chronic exposure to base station RF (whole-body) in humans showed increased stress hormones; dopamine levels substantially decreased; higher levels of adrenaline and nor-adrenaline; dose-response seen; produced chronic physiological stress in cells even after 1.5 years.	Buchner, 2012
0.01 - 0.11 uW/cm ²	RFR from cell towers caused fatigue, headaches, sleeping problems	Navarro, 2003

Stress proteins, HSP, disrupted immune function	Brain tumors and blood-brain barrier
Reproduction/fertility effects	Sleep, neuron firing rate, EEG, memory, learning, behavior
Oxidative damage/ROS/DNA damage/DNA repair failure	Cancer (other than brain), cell proliferation
Disrupted calcium metabolism	Cardiac, heart muscle, blood-pressure, vascular effects

Bioinitiative Report used by European Parliament to establish more protective guidelines than FCC current thermal guideline

Link to view full report:

<http://www.bioinitiative.org/reports/wp-content/uploads/pdfs/BioinitiativeReport-RF-Color-Charts.pdf>

Press Release re: European Parliament :

<http://www.marketwired.com/press-release/european-parliament-recommends-stricter-safetylimits-for-cell-phones-915886.htm>

Martha Herbert, MD, PhD

- ▶ Pediatric neurologist and neuroscientist
- ▶ Founder, Director Emeritus, [TRANSCEND Research Program](#) (Treatment Research and Neuroscience Evaluation of Neurodevelopmental Disorders), Massachusetts General Hospital, Harvard Medical School
- ▶ Founded [Higher Synthesis Foundation](#), directs [Higher Synthesis Health](#), a private whole systems-oriented clinic
- ▶ Principal investigator and scientific director of the [Documenting Hope Project](#)



The Human Brain is Electromagnetic



Electromagnetic properties of brain cells help explain
our brain's unique computing power.

Our vital biological functions - and especially our brains - derive from countless chemical-electrical interactions, and for us to be at our best they need to be optimized

- There is strong scientific support to argue that EMF/RFRs are important contributors to degrading the optimal chemical-electrical function of our bodies – thereby detuning our brains and nervous systems. (18)
- These brain waves that the brain uses to communicate within itself are electrical, or electromagnetic. So is EMF/RFR.
- It's not just the brain that uses electromagnetic signaling. The more sensitive our scientific measurement instruments become, the more we learn that every cell in our body uses electromagnetic signaling – many cellular processes, and even DNA, involve electromagnetic properties that change in meaningful ways. The main thing different about the brain is that it takes this electromagnetic activity to a dazzlingly high and complex level of organization. (16)

How Would EMF/RFR Do This Damage?

- **EMF/RFR stresses cells** *It leads to cellular stress, such as production of heat shock proteins, even when the EMF/RFR isn't intense enough to cause measurable heat increase. (19-21)*
- **EMF/RFR damages cell membranes**, *and make them leaky, which makes it hard for them to maintain important chemical and electrical differences between what is inside and outside the membrane. This degrades metabolism in many ways – makes it inefficient. (22-30)*
- **EMF/RFR damages mitochondria** *Mitochondria are the energy factories of our cells. Mitochondria conduct their chemical reactions on their membranes. When those membranes get damaged, the mitochondria struggle to do their work and don't do it so well. Mitochondria can also be damaged through direct hits to steps in their chemical assembly line. When mitochondria get inefficient, so do we. This can hit our brains especially hard, since electrical communication and synapses in the brain demands huge amounts of energy.*

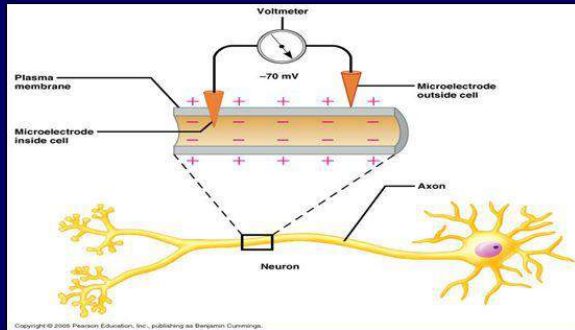
How Does EMF/RFR Damage (cont.)

- **EMF/RFR creates “oxidative stress.”** *Oxidative stress is something that occurs when the system can't keep up with the stress caused by utilising oxygen, because the price we pay for using oxygen is that it generates free radicals. These are generated in the normal course of events, and they are “quenched” by antioxidants like we get in fresh fruits and vegetables; but when the antioxidants can't keep up or the damage is too great, the free radicals start damaging things.*
- **EMF/RFR is genotoxic and damage proteins** *with a major mechanism being EMF/RFR-created free radicals which damage cell membranes, DNA, proteins, anything they touch. When free radicals damage DNA they can cause mutations. This is one of the main ways that EMF/RFR is genotoxic – toxic to the genes. When they damage proteins they can cause them to fold up in peculiar ways. We are learning that diseases like Alzheimer's are related to the accumulation of misfolded proteins, and the failure of the brain to clear out this biological trash from its tissues and fluids.*
- **EMF/RFR depletes glutathione**, *which is the body's premier antioxidant and detoxification substance. So on the one hand EMF/RFR creates damage that increases the need for antioxidants, and on the other hand they deplete those very antioxidants. (4,18)*

Cellular Effects

Ion Channels – Membrane Potential

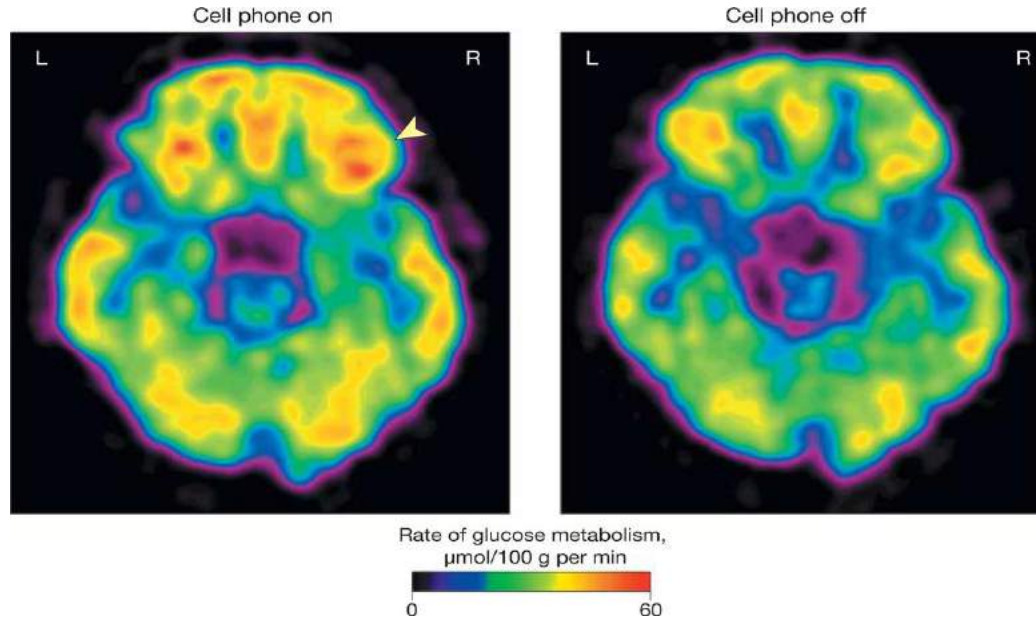
- Membrane potential is the voltage difference across a membrane
- Resting potential (when the cell is not firing) is a 70mV difference between the inside and the outside - the membrane is polarized
- When gated ion channels open, ions diffuse across the membrane following their electrochemical gradients.
- This movement of charge is an electrical current and can create voltage (measure of potential) energy change across the membrane.
- This electrical charge across the membrane is the membrane potential.



EMF/RFR can alter the function of calcium channels, which are openings in the cell membranes that play a huge number of vital roles in brain and body. (32-41)

- Chemical ions set up electrical voltage differences across cellular membranes, for example, that keep us alive.
- Recently it was found that people with lower voltage difference between the inside and outside of a membrane are more vulnerable to cancer, and if you increase the voltage difference between the inside and the outside of the cell, the vulnerability goes down and the cancer may improve. (17)

Impacts on Brain



Brain Glucose Metabolic Images Showing Axial Planes at the Level of the Orbitofrontal Cortex

Images are from a single participant representative of the study population. Glucose metabolism in right orbitofrontal cortex (arrowhead) was higher for the “on” than for the “off” condition (see “Methods” for description of conditions). Credit : JAMA Dr.

Nora D. Volkow [JAMA. 2011 Feb 23; 305\(8\): 808–813.doi: 10.1001/jama.2011.186](https://doi.org/10.1001/jama.2011.186)

Impacts on Brain (cont.)

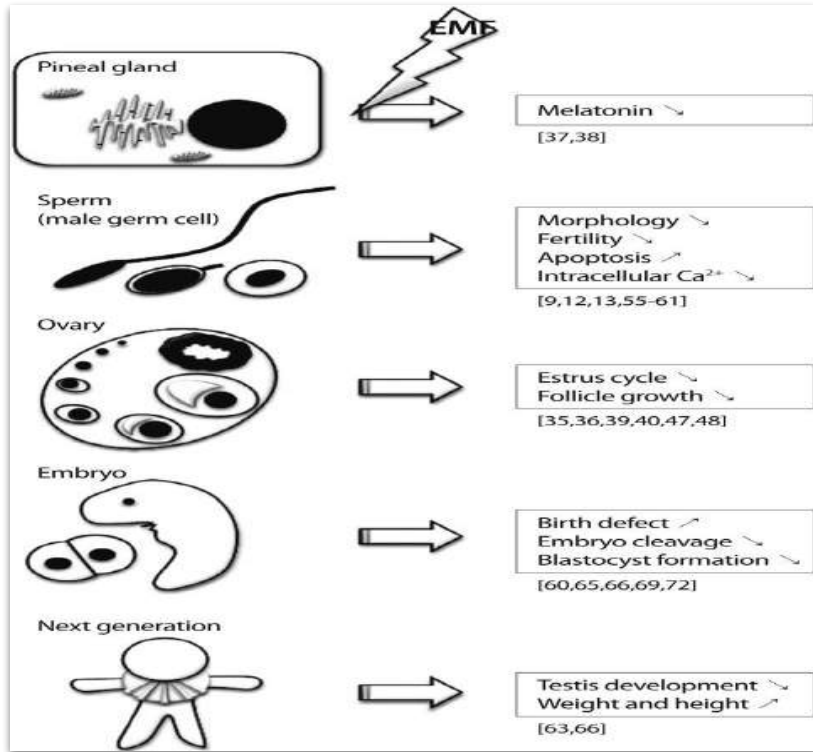
- **EMF/RFR damages vital barriers in the body**, *particularly the blood-brain barrier, which protects the brain from things in the blood that might hurt the brain. When the blood-brain barrier gets leaky, cells inside the brain suffer, be damaged, and get killed. (4,18,31)*
- **EMF/RFR degrades the rich, complex integration of brainwaves, and increase the “entropy” or disorganisation of signals in the brain** – *this means that brainwaves can become less synchronised or coordinated; this has been measured in autism. (13-15,42-51)*
- **EMF/RFR can interfere with sleep and the brain’s production of melatonin.** (52-54)
- **EMF/RFR can contribute to immune problems.** (55,56,57-61)
- **EMF/RFR contribute to increasing stress at the chemical, immune and electrical levels.** (62-68 31,69-73 74-79)

Impacts on Fertility

A study on exposure to electromagnetic fields from laptop use of "laptop" computers (LTC) revealed:

- **Laptops induce concerning currents:** “When close to the body, the laptop induces currents that are within 34.2% to 49.8% ICNIRP recommendations, but not negligible, to the adult's body and to the fetus (in pregnant women).
- **The power supply induces strong intracorporeal electric current** densities in the fetus and in the adult subject, which are respectively 182-263% and 71-483% higher than ICNIRP 98 basic restriction recommended to prevent adverse health effects.
- **It's not healthy to use laptops on your lap!** Laptop is paradoxically an improper site for the use of a LTC, which consequently should be renamed to not induce customers towards an improper use.” *

EMF Impacts Fertility



EMF impacts many levels of supports and stages of fertility:

- Pineal Gland
- Sperm
- Ovary
- Embryo
- Next generation

Effect of electromagnetic field exposure on the reproductive system - Scientific Figure *

https://www.researchgate.net/figure/Summary-of-the-effects-of-electromagnetic-fields-EMFs-on-reproduction-increase_fig2_224916025 [accessed 9 Mar, 2019]*

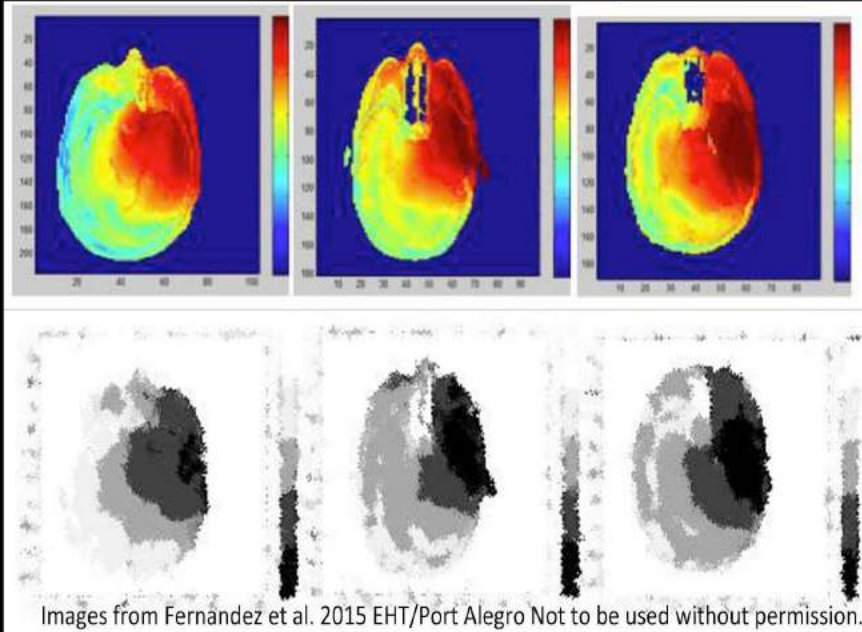
Children and Adolescents More Vulnerable

Peak Exposure to Cell Phone Radiation Occurs in Youngest Children (Image:SAR at Eyes Plane)

34 Yr old

6 yr old

3 yr old



*“Children, however, are not little adults and are disproportionately impacted by all environmental exposures, including cell phone radiation. In fact, according to the International Agency for the Research on Cancer, **when used by children, the average RF (radiofrequency) energy deposition is two times higher in the brain and 10 times higher in the bone marrow of the skull, compared with mobile phone use by adults.**”*

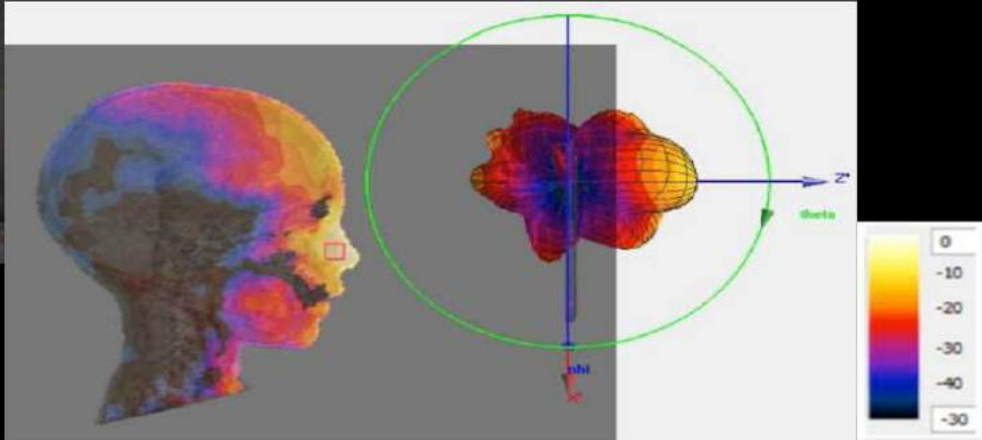
Dr. Robert Block, President of the American Academy of Pediatrics, 2012.

Derived from scans from Geometric Simulations of Brain Absorption of Mobile Phone Radiation—The Relationship Between SAR and Age

SAR in 6 Year Old from 2.45 GHz Wi-Fi Tablet



Tablet at 150 mm (5.9 inches)
from eye lens



JULIANA BORGES FERREIRA, AND ALVARO AUGUSTO ALMEIDA DE SALLES (2015)

Fig. 7. Radiation pattern normalized to $0.0132 \text{ W/g} = 0 \text{ dB}$, with a 30 dB color scale, and SAR averaged over 1g cube of tissue.

Specific Absorption Rate (SAR) in the head of Tablet user's

5/20/16

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Environmental Health Trust copy to info@ehtrust.org Slide courtesy of Environmental Health Trust <https://ehtrust.org/>

16

International guidelines for diagnosis and treatment of EMF related illnesses

Guideline of the Austrian Medical Association for the diagnosis and treatment of EMF related health problems and illnesses (EMF syndrome)



Consensus paper of the Austrian Medical Association's EMF Working Group (AG-EMF)

Adopted at the meeting of environmental medicine officers of the Regional Medical Association's and the Austrian Medical Association on 3rd March 2012 in Vienna

Click [here](#) for pdf

IDC 10 Nordic Countries 2000

<https://mail.google.com/mail/u/0/#search/seeden+disability+ehs+paper?compose=DmwnWsCRkGrxSqwCCHPvDzGttPhFhXFrgHRVVByLQMDZxbstZFclvsXIWgPmNLISlcCpzbhJSLB&projector=1>

Slide citation <https://magdahavas.com/austrian-medical-association-guidelines-to-diagnosing-and-treating-patients-with-electrohypersensitivity>

Solutions

Improve nutrient status: In many of the experimental studies with EMF/RFR, damage could be diminished by improving nutrient status, particularly by adding antioxidants and melatonin. (80-83)

Avoid unnecessary exposures: We live in a world full of new-to-nature substances and electromagnetic frequency combinations and intensities, many of which damage our cells, tissues and living processes in similar ways. So it is hard for me to believe that EMF/RFR is the ONLY contributor to ASD or other neuropsychiatric or health issues. On the other hand, its impact could be significant – and we can do a lot to reduce exposure and thereby reduce that impact. (84)

Meanwhile, given how much we have already learned about the subtle biological, cellular and electrical impacts of EMF/RFR, we need to:

- *update our out-of-date regulations to take into account of how exquisitely vulnerable we now know we are*
- *aim for safer ways of meeting our needs for communication and other devices that generate EMF/RFR.*
- *admit that we have a problem, and do something about it.*

Let's start with the most vulnerable - children and adolescents who are acutely exposed in schools- their exposure needs to be severely reduced or eliminated to protect their health and development.

Citations

Various content of slides adapted from paper : **HOW MIGHT EMF CONTRIBUTE TO AUTISM?** Written and copyrighted by Martha R. Herbert, Ph.D., M.D. http://www.marthaherbert.org/library/AutismConnection-EMF-2015Spring-Herbert-text_w_link.pdf (see link for full list of citations)

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Other studies / resources in fertility effects

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Ronald Melnick, Ph.D.

- ▶ Retired Senior Toxicologist, National Institute of Environmental Health Sciences, National Institutes of Health; [Ramazzini Institute Fellow](#)
- ▶ Managed NIEHS Experimental Toxicology Unit, Carcinogenesis and Toxicology Evaluation Branch, and group leader of the NIEHS Toxicokinetics and Biochemical Modeling Group, in the Laboratory of Computational Biology and Risk Analysis
- ▶ Assessed research needs for White House Office of Science and Technology on health risks of environmental
- ▶ Served on International Agency for Research on Cancer (IARC) and the U.S. Environmental Protection Agency
- ▶ Received the American Public Health Association's 2007 David P. Rall Award for science based advocacy in public health
- ▶ Lead Designer: National Toxicology Program's \$30M Studies on Cell Phone Radiation: Utility for Assessing Human Health Risks



National Toxicology Program, HHS

(Headquartered at the NIEHS)

Assistant Secretary for Health

Policy Oversight

NTP Executive Committee

- CPSC
- EPA
- FDA
- NCEH/ATSDR
- DoD
- NCI
- NIEHS
- NIOSH
- OSHA

Director
NIEHS and NTP

Science Oversight (External)

- NTP Board of Scientific Counselors
- Scientific Advisory Committee on Alternative Toxicological Methods

FDA

NIH
NIEHS

CDC
NIOSH

National Toxicology Program Nomination Process



FDA Nominated to NTP Cell Phone Radiofrequency Radiation Emitted from Wireless Communication Devices

- **Request: toxicity and carcinogenicity studies in experimental animals to provide the basis to assess the risk to human health**
- **Reason - exposure guidelines are based on protection from acute injury from thermal effects and may not be protective against any non-thermal effects of chronic exposure**

FCC Exposure Guidelines (1997) for Radiofrequency (RF) Radiation

- Designed to protect against adverse effects that might occur due to increases in tissue or body temperature of 1°C (measured in monkeys, SAR of 4 W/kg averaged over the whole body)
 - SAR: rate of RF energy absorbed per unit mass
- Exposure limits for general population
 - 0.08 W/kg averaged over whole body ($\div 50$)
 - 1.6 W/kg averaged over any 1 gram of tissue

Why do Health Agencies Use Animal Studies to Assess Human Cancer Risk?

- **Similar biological processes of disease induction**
- **Unethical to intentionally test for carcinogenicity in humans**
- **Every known human carcinogen is carcinogenic in animals when adequately tested**
- **Controlled exposures eliminate potential confounders**
- **Animal studies can eliminate the need to wait for sufficient human cancer data before implementing public health protective strategies**

Objectives of NTP Studies

- 1) Test (challenge) the hypothesis/assumption that cell phone RF radiation at non-thermal exposure intensities is incapable of inducing adverse health effects**
- 2) Provide data on tissue dose and incidence of response that can be used to assess potential human health risks for any detected adverse effects**

Design of NTP Studies

- **Demonstrate field uniformity of 900 MHz and 1900 MHz radiation in reverberation chambers**
- **Thermal pilot study: to determine the effects of modulated cell phone RFR (GSM and CDMA modulations used by networks for multiple access) exposures on body temperature ($<1^{\circ}\text{C}$) of rats and mice**
- **Prechronic study: to determine power levels for each species, sex, and modulation to be used in the chronic toxicity/carcinogenicity studies**
- **Chronic studies: to determine chronic effects including carcinogenicity of GSM- and CDMA-modulated cell phone RFR (90 animals per group); SARs in rats (whole body and in brain) = 0, 1.5, 3, and 6 W/kg. Exposures began on gestation day 5 and continued until necropsy at 108-110 weeks of age**

NTP Levels of Evidence of Carcinogenic Activity

- **Clear evidence:** dose-related increase of malignant tumors, increase of combination of malignant and benign tumors, or marked increase of tumors that have ability to progress to malignancy*
- **Some evidence:** agent-related increase of malignant, benign or combined incidence of tumors*
- **Equivocal evidence:** marginal increase of tumors that may be agent related

* Other factors can influence the evaluation, e.g., uncommon tumors, or proliferative lesions (hyperplasia) at same site

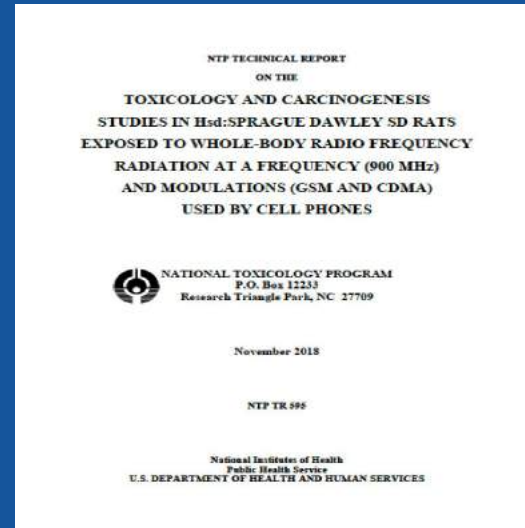
Evidence of Carcinogenic Activity in Rats

Tumor site	Male rat	Female rat
Heart, schwannoma	Clear: GSM* Clear: CDMA*	Equivocal: GSM Equivocal: CDMA
Brain, glioma	Some: GSM* Some: CDMA*	Equivocal, CDMA*
Adrenal gland	Some: GSM	Equivocal: CDMA
Prostate gland	Equivocal: GSM	
Pituitary gland	Equivocal: GSM Equivocal: CDMA	
Pancreas	Equivocal: GSM	
Liver	Equivocal: CDMA	

* Hyperplasias also occurred

Key Findings from the NTP Studies

- Cell phone radiation caused
 - cancers and preneoplastic lesions in the heart and brain
 - DNA damage in brain cells of rats and mice
 - heart muscle disease
 - reduced birth weights
- The assumption that non-ionizing radiation cannot cause cancer or other health effects, other than by tissue heating is wrong.



Concordance Between Rats and Humans in Cell Types Affected

- NTP: cancers in the heart (schwannoma) and brain (glioma)
- International Agency for Research on Cancer: radiofrequency radiation is possibly carcinogenic to humans based largely on increases in glioma and acoustic neuroma (vestibular schwannoma) in both the Interphone and Swedish case-control studies



Expected Next Steps

- FDA needs to fulfill intent of their nomination to the NTP and conduct a quantitative risk assessment so that the FCC can develop health-protective exposure standards.

Because of the widespread use of cell phones, even a small increase in cancer risk would have a serious public health impact

- Precautionary principles should be promoted by health and regulatory agencies, especially for children and pregnant women. Cancer risks may be greater for children than adults due to increased penetration of cell phone radiation within brains of children, and because the developing nervous system is more susceptible to tissue damaging agents.

Lesson Learned

We should no longer assume that any current or future wireless technology, including 5G, is safe without adequate testing

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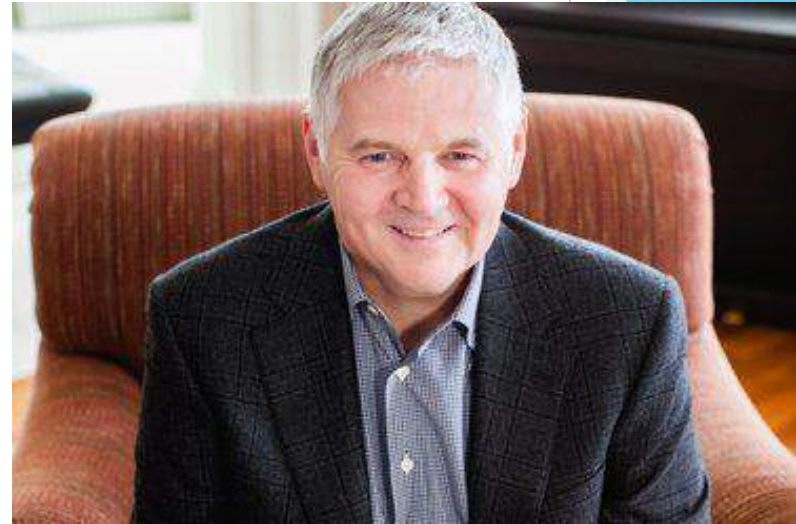
Melnick, Ronald “Commentary on the utility of the National Toxicology Program study on cell phone radiofrequency radiation data for assessing human health risks despite unfounded criticisms aimed at minimizing the findings of adverse health effects” Environmental Research, Volume 168, January 2019, Pages 1-6

Melnick, Ronald “There is a clear cell phone cancer link, but the FDA is downplaying it.” The Hill, Washington DC, 11/13/2018

[Video from the NIH National Toxicology Program Peer Review of the NTP Cell Phone Radiation Studies](#)

Frank Clegg

- ▶ Former long-time president of Microsoft Canada
- ▶ CEO of [Canadians for Safe Technology \(C4ST\)](#)
- ▶ Proponent for safer use of technology in schools
- ▶ Working with Canadian Parliament toward advancing safe and updating obsolete Health Canada Guidelines for Radiofrequency non - ionizing radiation



Current Efforts



C4ST: Canadians for Safe Technology (CEO and Chairman)

- Not-for-profit, volunteer-based, national coalition of parents, citizens and experts
- To educate and inform Canadians about the dangers of the exposures to unsafe levels of radiation from wireless
- To work with all levels of government to create healthier communities for children and families from coast to coast to coast

Environmental Health Trust (Co-Chairman Business Advisory Group)

The only nonprofit in the world today that both:

- Carries out high-level critical research on controllable environmental health hazards
- Works directly with local communities, teachers, parents, students and policy makers to understand and mitigate these hazards through research, education and advocacy

Manufacturer's *Fine Print* warnings are not followed

Samsung 3G Laptop Manual - Keep safe distance from pregnant woman's stomach or from lower stomach of teenagers ([page 6](#))
Body worn operation: Important safety information regarding radiofrequency radiation (RF) exposure. To ensure compliance with RF exposure guidelines the Notebook PC must be used with a minimum of 20.8 cm antenna separation from the body" ([page 8.](#))

APPLE iPad Users Guide - to be sure that human exposure to RF energy does not exceed the FCC guidelines: orient the device in portrait mode with the Home button at the bottom of the display, or in landscape mode with the cellular antenna (located under the black edge at the top of the device) away from your body or other objects...

[Read More of the Fine Print Warnings at EHTrust.org](#)



Manufacturer's High Density Wi-Fi Design Guidelines

Cisco - advantages of under seat mounting: “The users themselves attenuate the signals. Second, this can generally provide a great way to hide AP’s (access points).”

Aerohive Networks: “Installing AP’s on the ***opposite side of a wall, beneath the floor, at low height (< 6 feet), or underneath seating*** can accomplish high density Wi-Fi.”

Netgear: “In high density environments, the demands on throughput are often exacerbated by users carrying two or three devices using multiple applications that consume network resources simultaneously”

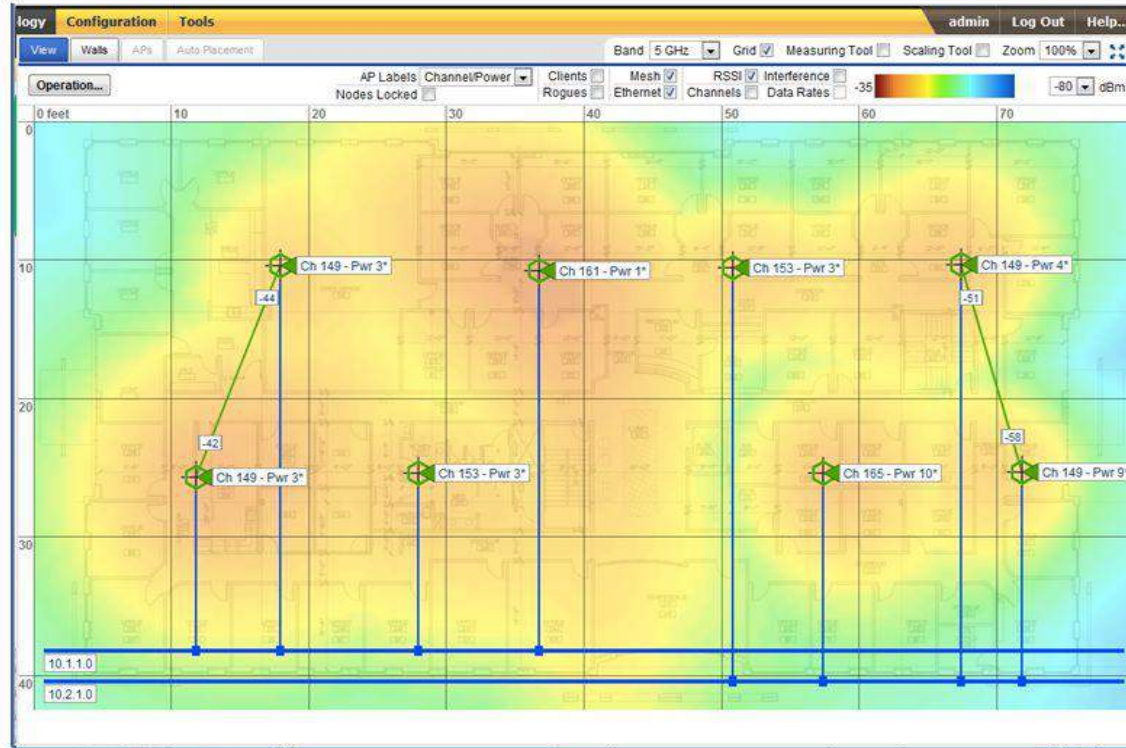
Securedge: “Never try and use access points that were made for residential environments”

Extreme Networks: “Wi-Fi system satellites use mesh technology to talk to the router and to each other. Each node (Access Point) serves as a hop point for other nodes in the system. This helps the nodes farthest from the router to deliver a **strong Wi-Fi signal** as they are talking to other nodes and not relying on one-to-one communications with the router.” * **Radar antennas** can be integrated to upgrade

<https://d2cpnw0u24fjm4.cloudfront.net/wp-content/uploads/Aerohive-High-Density-Wi-Fi-Design-Configuration-Guide-v2.pdf>

Common In-School Coverage (High Density/Mesh Wi-fi system used)

Topology Floor Plan View



Insurance companies have disclaimed liability for wireless providers

EXCLUSIONS

We will not

- a) make any payment on **your** behalf for any **claim**, or
- b) incur any **costs and expenses**, or
- c) reimburse **you** for any **loss, damage**, legal expenses, fees or costs sustained by **you**, or
- d) pay any **medical expenses**:

GENERAL INSURANCE EXCLUSIONS:

32. Electromagnetic fields

directly or indirectly arising out of, resulting from or contributed to by electromagnetic fields, electromagnetic radiation, electromagnetism, radio waves or noise.



First step to reducing exposure in schools

Re-orient the mindset of developers, designers and installers to meet consumer demand with minimal radiation exposure

- Use hardwired connections whenever possible. They are:
 - 100 times faster, more economical in the long run, more reliable, less vulnerable to security and privacy problems and safer.¹
- If hardwired connections are unavailable, turn off Wi-fi Access Points and devices when not in use
- Content for teaching can be downloaded to tablet or device prior to lesson
- Prohibit cell phones and other wearables in the classroom
- Ask industry to provide devices and software with hardwired features
- Provide a safe environment at home to allow for rejuvenation and repair

¹ Schoechle, Timothy, [Re-Inventing Wires: The Future of Landlines and Networks](#), National Institute for Science, Law & Public Policy Washington, DC

Theodora Scarato, MSW

- ▶ Executive Director, [Environmental Health Trust \(EHT\)](#)
- ▶ Clinical psychotherapist, former Director of Intensive Therapy Program in Montgomery County Special Education School, Maryland
- ▶ Policy analyst and researcher for the largest database of international policy actions on wireless and health
- ▶ Develops educational campaigns for the public and policymakers in the US and internationally
- ▶ Coordinates EHT's scientific programs and conferences
- ▶ EHT is one of the leading environmental health organizations publishing and raising awareness on the issue of wireless radiation



My Assumptions: The US Government Ensures Safety

When I first learned about this issue years ago.

They safety tested wireless before tech came on the market.

EPA defunded. No pre-market testing.

They are constantly researching RF to ensure no harm.

No. Only the NTP and NIH studies which found effects.

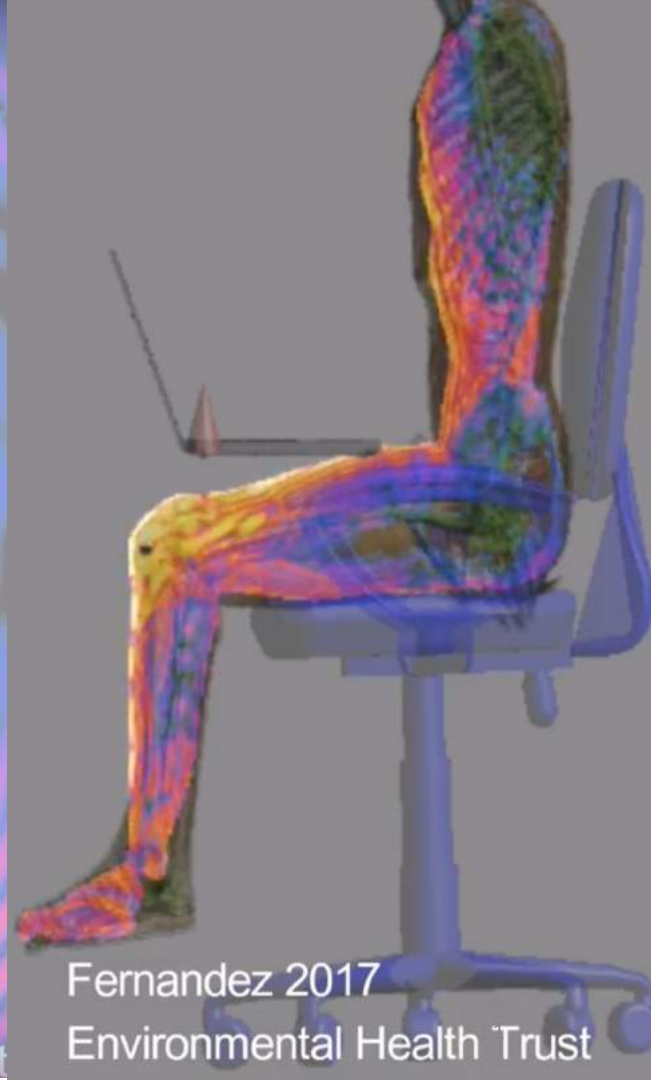
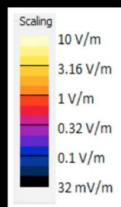
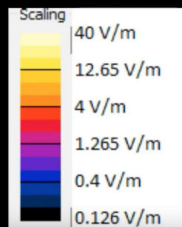
They have scientists with EMF expertise tasked to systematically review and report on the science to ensure safety.

No.

Low levels have no effect and can't harm us.

Effects found at very low levels- far lower than FCC limits.

2.45 GHz (Wi-Fi)
34 Year Old Male
Notebook on Lap



St. Augustine School Italy: Councilor Belboni Removes Wi-Fi Router

[2014 NewsCiro Lazzarini](#)



[Protective Policy Actions In Italy at EHTrust.org](#)

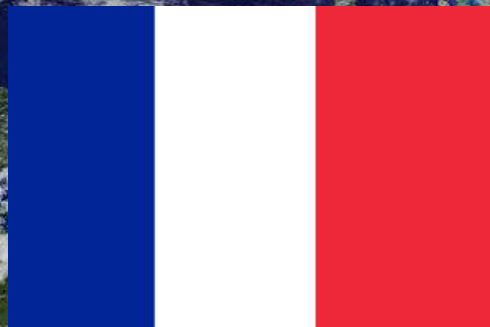
Bans and Restrictions on Wi-Fi in Schools



Belgium



Schools Worldwide.



France



Israel

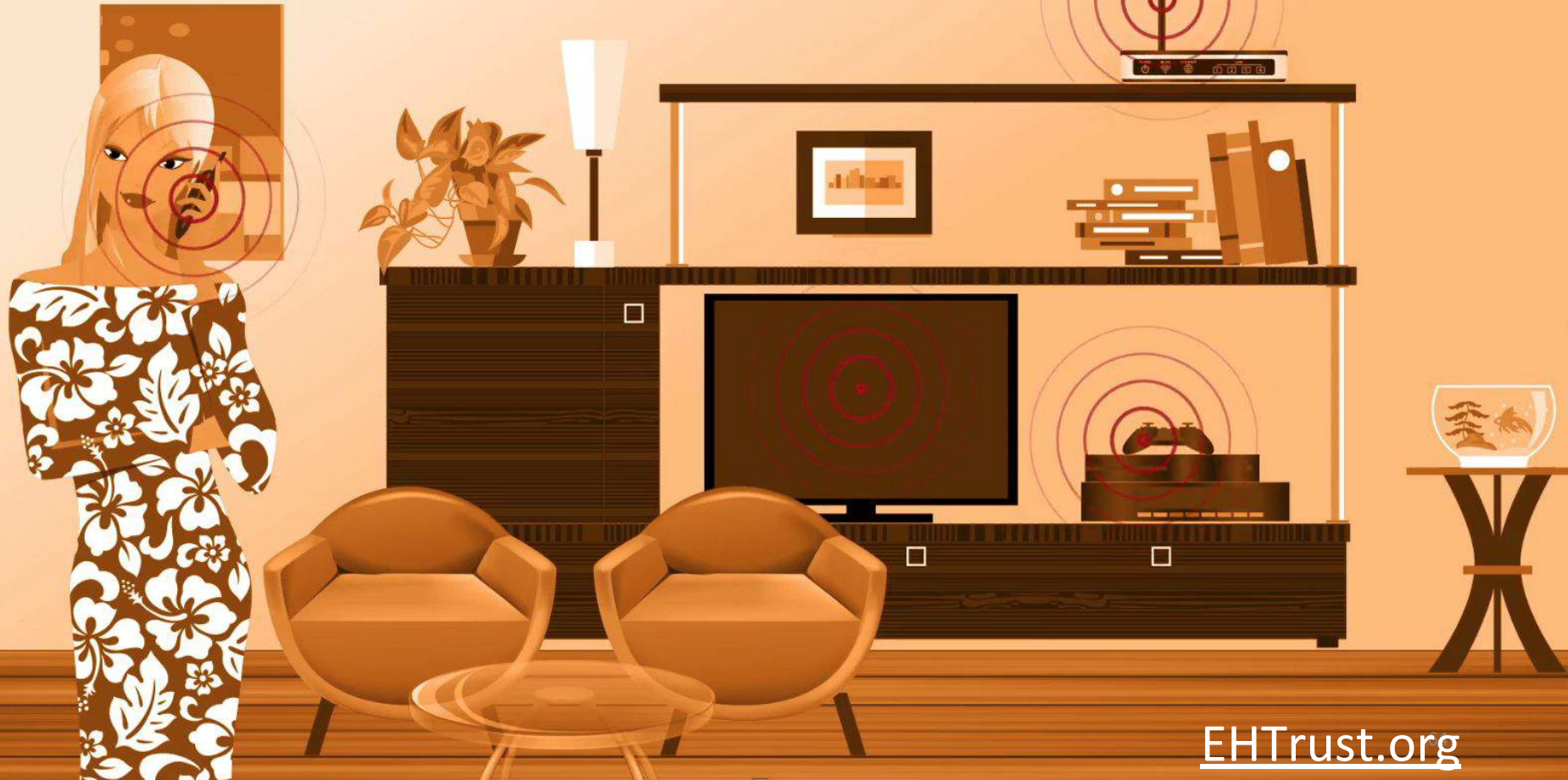


Cyprus



French Polynesia

[French Polynesia Public Education Campaign](#)





especially at home and at school.

MORE VIDEOS

[Watch full video from Cyprus online](#)

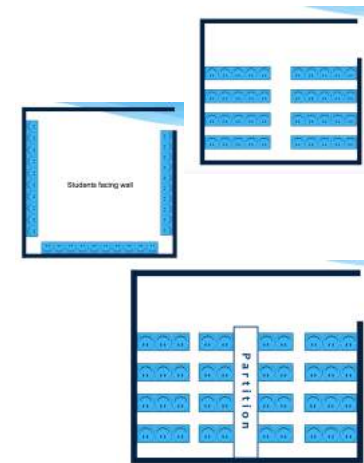
EHTrust.org

Translation by Environmental Health Trust full screen (f)

Haifa Israel: Wired Internet Systems in All Schools

“if there is doubt- there is no doubt. We must take extra precaution.”

[Haifa Mayor Yona Yahav.](#)



Haifa School Floor Plans

“We developed an in-house capacity on how to develop wired in schools, for computer rooms, classes and in every space.”

- Reuben Kurman, Haifa Head of IT [\(Watch Video of his 2017 presentation at Hebrew University\)](#)

COUNCIL OF EUROPE



CONSEIL DE L'EUROPE

"For children in general, and particularly in schools and classrooms, **give preference to wired Internet connections,** and strictly regulate the use of mobile phones by school children on school premises."

[The Parliamentary Assembly of the Council of Europe Resolution 1815, 2011](#)





Maryland State Children's Environmental Health and Protection Advisory Council, 19 Members (pediatricians & MD government)

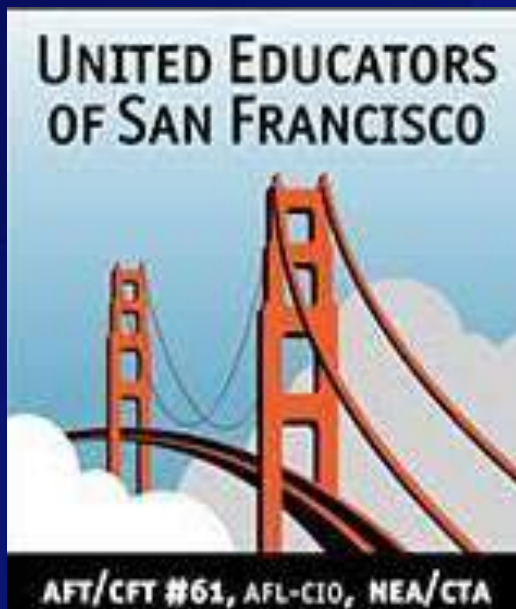
"The Council recommends limiting exposures as much as feasibly practical."

The Maryland State Department of Education

- "Should consider using wired devices in classrooms"
- "If a new classroom is to be built... network cables can be added at the same time, providing wired network access."

"The Maryland Department of Health and Mental Hygiene should provide suggestions to the public on ways to reduce exposure."

-CEHPAC Wi-Fi In Schools Report 2017



2018 United Educators of San Francisco (UESF) “Resolution on Enhancing Technology Safety”

- The development and dissemination of best practices for mobile devices to reduce radiofrequency radiation in San Francisco schools
- Inform students and parents through the student/family handbook.
- Posting cell phone radiofrequency radiation safety guidelines in every classroom

UESF “Resolution on Enhancing Technology Safety in San Francisco Unified School District” and press release

UESF Webinar with Physicians for Safe Technology online at EHTrust.org
Environmental Health Trust Website on PTA and Union Actions

PTAs, Teacher Unions & Educational Organizations

Resolutions, Reports, Information: United Federation of Teachers, New York State Teachers Union, United Teachers of LA, Canadian Teacher Federation, Ontario English Catholic Teachers Association, BC Teachers Federation, BC Confederation of Parent Advisory Councils, Greater Victoria Teachers' Association

- Reduce exposure to pregnant women.
- Inform staff about exposures
- Label Wi-Fi routers
- Reduce Wi-Fi via on/off switches, use ethernet and wired tech
- Wi-Fi free zones/Wi-Fi free classrooms
- Corded phones
- Hardwire all devices including projectors and boards

[Environmental Health Trust Website on PTA and Union Actions](#)





“We could go on and on citing studies and appeals from scientists.. but the bottom line is this

- There is evidence that exposure to current wireless radiation causes harm*
- There are too many unknowns about the full impact of wireless technology...”*

- [Hillsmere Elementary School PTA 2017 Letter To Anne Arundel County](#)



New Jersey Educational Association

HEALTH & SAFETY

Minimize health risks from electronic devices

By Adrienne Markowitz and Eileen Senn

Desktops, laptops, tablets, eBook readers, printers, projectors, smart boards, smart TVs, cellphones, cordless phones and wireless networks (WiFi) have become ubiquitous in schools. At their best, they are powerful tools for education. At their worst, they threaten the physical and mental health of teachers, paraeducators, secretaries, librarians and other school staff members and students who spend numerous hours using the devices.

Physical health risks from electronic devices include pain and tingling from repetitive strain injuries to the hands and wrists; pain in the neck, shoulders and back; dry, burning, itchy eyes, blurred vision and headaches; altered sleep patterns and next-day fatigue from exposure to blue screen light; distracted driving; and various health problems from exposure to radiation.

Mental health risks arise from stress due to raised expectations for multitasking, productivity and proficiency with devices; dealing with malfunctioning devices; student and colleague distraction from and addiction to devices; and intrusion of devices into

Local associations should work with their UniServ field representative to negotiate solutions that are in the control of district administrators such as providing training and ergonomic equipment and hard-wiring devices. Individuals should take steps within their control, such as:

For repetitive strain injuries

- Use voice control/speech recognition.
- Use ergonomic alternatives to traditional mice and keyboards.
- Use as many fingers as possible when typing and both thumbs when texting.

For neck, shoulder and back pain

- Ensure an ergonomic workstation.
- When using a hand-held device, support it and the forearms.
- Avoid bending the head down or jutting it forward.
- Take frequent, short breaks from the device.
- Ensure good posture and change positions frequently.
- Stand and do stretching exercises.

For eye pain, blurred vision and headaches

- Use sufficient, but not excessive, lighting.
- Use assistive technology built into Apple, Android and Windows devices.
- Enlarge and darken the cursor and pointer.
- Enlarge the font; magnify the text.
- Use text-to-speech instead of reading.
- Use special computer glasses.
- Relax the eyes on a minibreak.

For altered sleep patterns and next-day fatigue

- Stop using devices at least one hour before bedtime.

For distracted driving

- Use hands-free devices, preferably speakerphones.
- Pull over and park.
- Let someone else drive.

For radiation exposure

- Keep devices away from the body and bedroom.
- Carry phones in briefcases, etc., not on the body.
- Put devices on desks, not laps.
- Hard wire all devices that connect to the internet.
- Hard wire all fixed devices such as printers, projectors and boards.
- Use hard-wired phones instead of cell or cordless phones.
- Text rather than call.

“For Radiation Exposure

Keep devices away from the body and bedroom. Carry phones in briefcases, etc., not on the body. Put devices on desks, not laps.

Hard wire all devices that connect to the internet. Hard wire all fixed devices such as printers, projectors and boards.

Use hard-wired phones instead of cell or cordless phones.

Text rather than call.

Keep conversations short or talk in person.

Put devices in airplane mode, which suspends EMF transmission by the device, thereby disabling Bluetooth, GPS, phone calls, and WiFi.

Use speaker phone or ear buds instead of holding the phone next your head.

Take off Bluetooth devices when not using them.

What You Need To Know About Pregnancy and Wireless Radiation



- Avoid carrying your cell phone on your body (e.g. in a pocket or bra).
- Avoid holding any wireless device against your body when in use.
- Use your cell phone on speaker setting or with an "air tube" headset.
- Avoid using your wireless device in cars, trains or elevators.
- Avoid cordless phones, especially where you sleep.
- Whenever possible, connect to the Internet with wired cables.
- When using Wi-Fi, connect only to download, then disconnect.
- Avoid prolonged or direct exposure to Wi-Fi routers.
- Unplug your home Wi-Fi router when not in use (e.g. at bedtime).
- Sleep as far away from wireless utility meters (i.e. "smart" meters) as possible.

BabySafe: Over 270 doctors, educators and experts are signatories to the appeal.

"As a research scientist and physician...I am deeply concerned about the growing exposure to cell phone and other wireless radiation."

-Hugh Taylor, MD PhD, Chief Obstetrics at Yale New Haven Hospital

[The BabySafe Project](#)

[Video of the Press Conference that includes Dr. Taylor, Dr. Davis, Dr. Shetreat-Klein](#)

PARENTS CONCERNED AS FOURTH CHILD DIAGNOSED WITH CANCER WHILE ATTENDING CALIFORNIA SCHOOL WITH CELL PHONE TOWER ON CAMPUS



[March 23, 2019: School District Announces Sprint will move the tower](#)

Medical Experts Worldwide Recommend Reducing Exposure

American Academy
of Pediatrics



DEDICATED TO THE HEALTH OF ALL CHILDREN®

"If you plan to watch a movie on your device, download it first, then switch to airplane mode while you watch in order to avoid unnecessary radiation exposure." - AAP



"It is wise to reduce exposure..."
-Connecticut Department of Health



Over 250 scientists who have appealed to the United Nations for Action



Athens Medical Association



Swiss Physicians Association of
Doctors for Environment⁺ -
Protection



[Health Agencies of over 20 Countries](#)



Cyprus National Committee
on Environment and Children's Health



Vienna Medical Association



Cyprus Medical Association

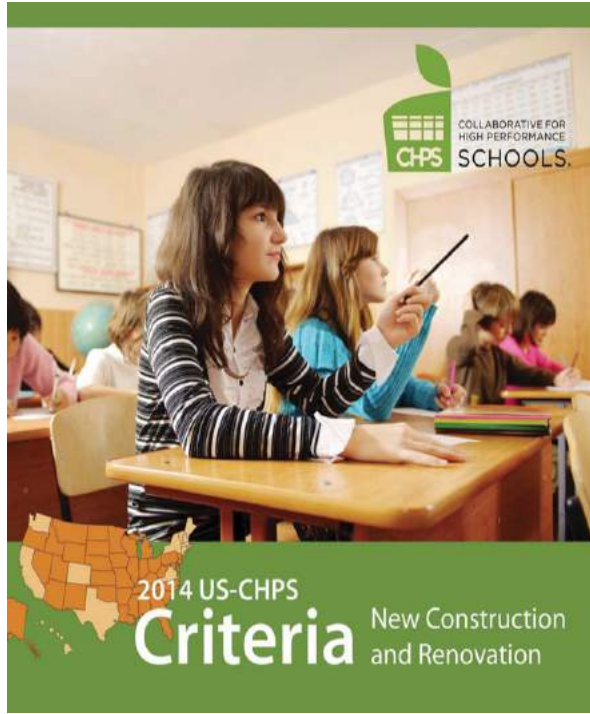
[EHT Compilation of Country Action](#)

[EHT Compilation of Medical Organization Action](#)



Collaborative For High Performance Schools

Low EMF Classroom Criteria 2014



EQ 15.1 to EQ 15.2.3

- Correct school wiring errors.
- ELF limit: 1 mG (new const) and 2 mG (existing)

Low EMF Best Practices for Technology

- Wired not wireless network.
- Hardwired phones (not cordless)
- Devices on desk; operation on lap/body prohibited
- Ensure devices have wired capability & physical switch to disable Wi-Fi.
- Prohibit the use of cell phones/PDA in instructional areas.

[CHPS Low EMF Criteria:](#)

[ABOUT](#)[KEY ISSUES](#)[POLICY](#)[SCIENCE](#)[EDUCATE YOURSELF](#)[TAKE ACTION](#)[RESOURCES TO SHARE](#)[MEDIA & PUBLICATIONS](#)

EHTrust.or

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COUNTRIES WORLDWIDE ARE TAKING ACTION
PHONES

[Learn More](#)

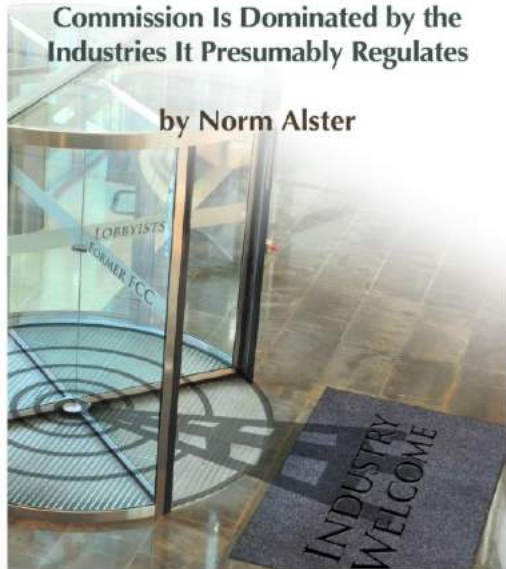


HARVARD UNIVERSITY
Edmond J. Safra
Center for Ethics

Captured Agency:

How the Federal Communications
Commission Is Dominated by the
Industries It Presumably Regulates

by Norm Alster



www.ethics.harvard.edu

Why is the Public Confused?*

Harvard Investigative Report

Documents Industry Influence on the FCC Regarding RF Radiation & Health

Norm Alster's report documents the US Congress receives millions from industry and there is no accountability by a US health agency to protect public health on RFR.

In addition, published reports on EMF research has found:

- Industry money affects the quality of results ([Prasad 2017](#))
- Existence of sponsorship and publication biases ([Valentini 2011](#))
- Industry funded science is substantially less likely to report statistically significant effects ([Huss 2007](#))

The consulting firms of Big Tobacco are now now protecting cell phone companies. The same scientists/lawyers/PR firms.

[The Harvard Press Book "Captured Agency: How the Federal Communications Commission is Dominated by the Industries it Presumably Regulates"](#)

[Learn more about investigative reports on industry influence in wireless.](#)

EHTrust.org

*Slide added post-forum

Environmental Health Trust Resources

EHTrust.org Click on links to Download



Postcards for printing

Do's and Don'ts for Safe Technology		
Technology	Do's	Don'ts
Cell Phones	- Use a headset or speakerphone. - Turn the power off if you aren't using a phone in your car. - Use a wired phone when you can, especially in the car. - Get a wired phone. Oh, with Wi-Fi? Great, more often. - Turn off cell phones in a bus, train, airplane, elevator.	- When using the phone, don't start or head off with the phone. - Don't use a cell phone when the network signal is weak, because the radiation from the phone is higher. - Don't carry a cell phone in your belt. Don't carry a cell phone in your pocket. - Don't sleep with a cell phone on a nightstand or in your bedroom.
Home Phones	- Get a Cordless Phone for your home. - Use a cordless phone. - Put cordless phones in the rooms where you sleep or work. - Use a cordless phone system.	Do not use a cordless phone. The DECT (Digital Enhanced Cordless Telecommunications) standard is a digital standard, but many people have found that it sends out a lot of radiation, and this is a significant source of microwave radiation to be removed from sleep areas.
Printers	- Use cordless to connect to Wi-Fi. - Use a Wi-Fi printer. Use the Wi-Fi function to connect to Wi-Fi. - Use a Wi-Fi printer.	Don't place a wireless printer in your office near your computer. Wireless printers constantly send out radiation, and this is a significant source of microwave radiation to be removed from sleep areas.
Tablets and Laptops	- Use tablets and laptops with ethernet connections. Use the Wi-Fi to connect to the internet. - Use a Wi-Fi router. Use the Wi-Fi function to connect to Wi-Fi.	Don't use wireless routers. If you must use a wireless router, don't use it when you are sleeping.
Internet Routers	- Get a Wi-Fi router. Use the Wi-Fi function to connect to Wi-Fi. - Use a Wi-Fi router. Use the Wi-Fi function to connect to Wi-Fi.	Don't use a Wi-Fi router. Use the Wi-Fi function to connect to Wi-Fi.

Do's and Don'ts for Safe Technology at Home

Questions and Answers about Wi-Fi in Schools

Why are doctors concerned about cell phones and all other types of wireless in schools?

All wireless devices (including cell phones, cordless landline phone, any item with Wi-Fi or bluetooth capability, etc.) generate and emit an invisible electromagnetic radiation called radiofrequency (RF) or electromagnetic fields (EMF). A growing amount of scientific research links this wireless radiation to serious effects on health—such as memory and sleep problems, headaches, cancer, and damage to reproduction, brain development, and DNA. The radiation penetrates deeper into children's brains due to their thinner skulls. Children's brains and immune systems are still developing, therefore they are more vulnerable to the effects.

Where can I find expert opinions about wireless effects on health?

Physician groups such as the American Academy of Pediatrics, the Vienna Medical Association, and the American Medical Association are among the many international medical organizations that have issued recommendations to the public to reduce exposure to cell phone radiation. Countries such as France, Cyprus, and Israel have banned wireless in young children's classrooms. In several letters sent to school districts, physicians strongly recommended wired connections for technology in classrooms to eliminate unnecessary wireless radiation exposures.

Questions and Answers on Wi-Fi and Cell Phones in Schools



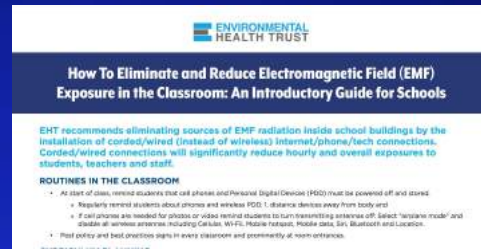
New Jersey Educational Association PDF



What Parents Need to Know About Safe Technology



Posters on Safe Technology



Checklist on How to Reduce EMF and Wireless Radiation for Schools



Social Media Graphics to Share



Scientific Documentation and Resources on Wi-Fi In Schools

Theodora Scarato MSW

[Peer Reviewed Published Science on Wireless Radiation](#)

[Published Science on Wi-Fi Radiation](#)

[Questions and Answers on Wi-Fi and Cell Phones in Schools:](#) This two pager is filled with links and resources on why and how to reduce wireless radiation exposure at schools.

[Checklist on How to Reduce EMF and Wireless Radiation for Schools:](#) A list of actionable steps every school can take to eliminate and reduce EMF exposure at school.

[CHPS Low EMF Criteria:](#)The Collaborative for High Performance Schools has developed Best Practices for LOW EMF classrooms that details how schools can replace wireless networks with wired networks.

[Letter on School Wi-Fi and Health for Principal](#)

This draft letter compiles the latest research to start the conversation on safe technology.

[Letters by Scientists on Wireless and Cell towers for School Administrators:](#) This webpage has a compendium of letters (downloadable PDF's) written to school officials regarding wireless in schools and cell towers at schools.

Scientific Documentation on Wi-Fi Health Effects

Theodora Scarato MSW

* Latest published review

Pall M., Wi-Fi is an important threat to human health, Environmental Research Volume 164, July 2018, Pages 405-416

Avendaño, C., et al. "Use of laptop computers connected to internet through Wi-Fi decreases human sperm motility and increases sperm DNA fragmentation." Fertility and Sterility, vol. 97, no. 1, 2012, pp. 39-45.

Isabel Wilke, (Review Paper) "Biological and Pathological Effects of the 2.45 GHz on Cells. Fertility, Brain and Behavior", Umwelt-Medicine-Gesellschaft (2018)

Hedendahl, Lena K., et al. "Measurements of Radiofrequency Radiation with a body-borne exposimeter in Swedish schools with Wi-Fi." Frontiers in Public Health 5 (2017): 279.

Akdag, M.Z., et al. "Does prolonged radiofrequency radiation emitted from Wi-Fi devices induce DNA damage in various tissues of rats?" Journal of Chemical Neuroanatomy, vol. 75, pt. B, 2016, pp. 116-22.

Dasdag, S., et al. "Effects of 2.4 GHz radiofrequency radiation emitted from Wi-Fi equipment on microRNA expression in brain tissue." International Journal of Radiation Biology, vol 91, no. 7, 2015, pp. 555-61.

Papageorgio, C.C., et al. "Effects of Wi-Fi signals on the p300 component of event-related potentials during an auditory hayling task." Journal of Integrative Neuroscience, vol. 10, no. 2, 2011, pp. 189-202.

Oni, M.O., D.B. Amuda and C.E. Gilbert. "Effects of radiofrequency radiation from WiFi devices on human ejaculated semen." International Journal of Recent Research and Applied Studies, vol. 9, no. 2, 2011, pp. 292-4.

Shahin, S., et al. "2.45 GHz Microwave Irradiation-Induced Oxidative Stress Affects Implantation or Pregnancy in Mice. Mus musculus." Applied Biochemistry and Biotechnology, vol. 169, 2013, pp. 1727-51.

Lerchl, Alexander, et al. "Tumor promotion by exposure to radiofrequency electromagnetic fields below exposure limits for humans." Biochemical and Biophysical Research Communications, vol. 459, no. 4, 2015, pp. 585-90.

[More Research at EHTrust.org](http://ehtrust.org)



Theodora Scarato MSW
Click on webpage to go to site

[10 Tips To Reduce Cell Radiation](#)

[10 Steps to Safe Tech at Home](#)

[Autism, ADHD, and Wireless Electromagnetic Fields](#)

[Cell Phones and Breast Cancer](#)

[Cell Phone Survivors & Non-Survivors](#)

[Fine Print Warnings in Wireless Device Manuals](#)

[Wi-Fi In Schools, Health Risks and Solutions](#)

[Screens and Sleep](#)

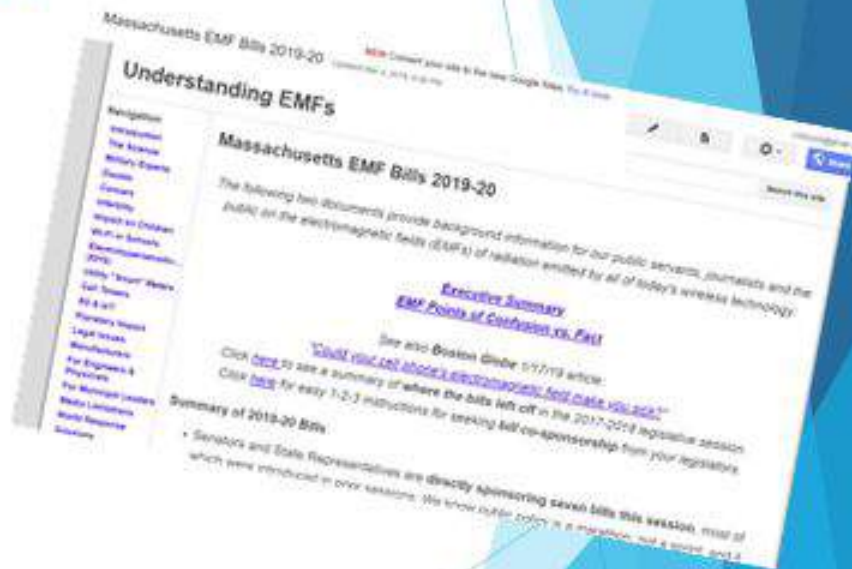
[Telecom and Insurance Companies Warn of Liability and Risk](#)

[5G and the Internet of Things](#)



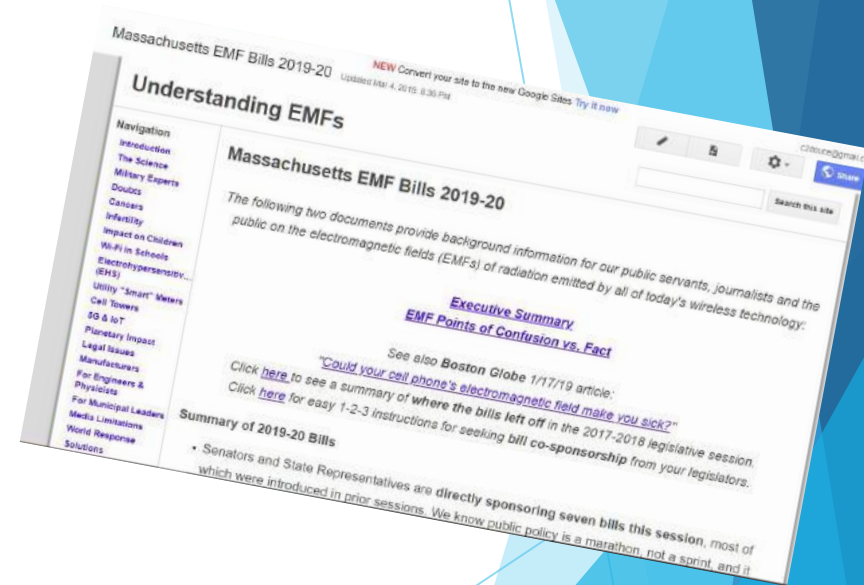
Solutions: Massachusetts Policy-Level

- ▶ MA [EMF bills](#)
- ▶ MA [DPH fact sheets](#) & [Worcester guidance](#)
- ▶ Department of [Elementary & Secondary Education](#)
- ▶ Department of [Public Utilities](#)
- ▶ Attorney General's Office



Solutions: Massachusetts Policy-Level

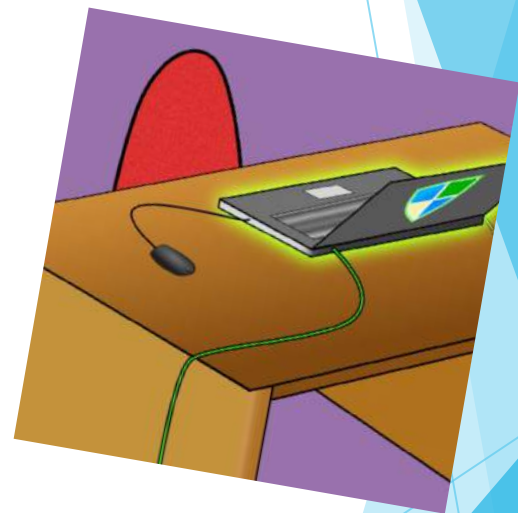
- ▶ 19 MA [EMF bills](#)*
- ▶ MA [DPH fact sheets](#) & [Worcester guidance](#)
- ▶ Department of [Elementary & Secondary Education](#)
- ▶ Department of [Public Utilities](#)
- ▶ Attorney General's Office



* See also [Bills in Other States](#)

Protect Children in School Now

- ▶ Measure exposures
- ▶ Safe technology is easier than you think
 - ▶ Router
 - ▶ Ethernet cable
 - ▶ Adapter
 - ▶ Turn off antennas
- ▶ Measure again: no microwave radiation?



Protect Children in School Now

- ▶ Transition
 - ▶ Timers
 - ▶ Kill-switches
 - ▶ Reduce power consumption in networks
 - ▶ Reduce beaconing signal
 - ▶ Ask vendors for sleep mode
 - ▶ Disable 5 GHz band
 - ▶ Decommission obsolete systems
 - ▶ Turn off devices/unused antennas



Protect Children in School Now

- ▶ Excessive screen time
 - ▶ [AAP recommendations](#)
 - ▶ 21st Century Classroom Campaign
 - ▶ [New York Times](#): Silicon Valley execs banning screens from their children



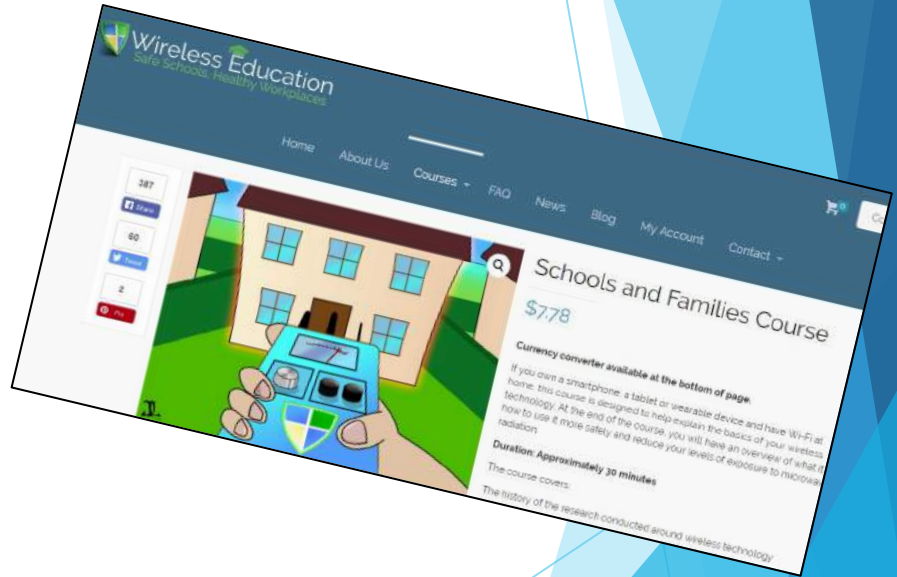
Protect Children in School Now

- ▶ Recommendations by child psychologists
 - ▶ Dr. Victoria Dunkley, [Reset Your Child's Brain](#)
 - ▶ Dr. Catherine Steiner-Adair, [The Big Disconnect](#)

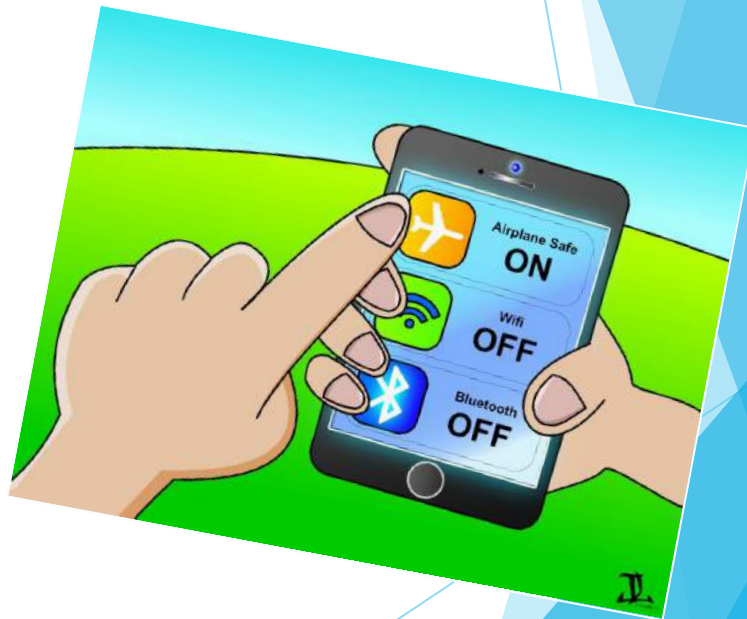


Next Steps: Educate Schools & Families

- ▶ Start conversation with parents, schools & [public servants](#)
- ▶ Take non-profit Wireless Education's half-hour [Schools & Families Course](#)
 - ▶ Individual or bulk rates
- ▶ See award-winning film [Generation Zapped](#)
 - ▶ Belmont Public Library tomorrow, March 26, 6:30 p.m.
 - ▶ Bolton Public Library April 9, 6:30 p.m.
- ▶ Share video of tonight's event
 - ▶ Sign-in sheet, please print neatly



*On behalf of all
our children,
thank you for
transitioning to
safe technology!*





*There is very little funding for
technology safety education at present.*

*If you find our efforts helpful, we would be most
grateful if you would consider making a
donation to help continue our work:*

[Wireless Education](#)
[Environmental Health Trust](#)
[Grassroots Environmental Education](#)

Thank you!