



Dear BC School Trustees,

Today, we are writing to advise you of the scientific grounds for taking action in your schools to mitigate student, teacher and staff exposures to non-ionizing electromagnetic fields. Wireless radio frequency (RF) electromagnetic (EMF) radiation and magnetic field/ extremely low frequency electromagnetic fields (ELF-EMF) are a relatively new and rapidly increasing environmental exposure in classrooms today. A substantial body of research has found these types of EMFs associated with numerous adverse effects including cancer, DNA damage, sleep impacts, reproductive damage and brain damage. Many of these effects could be irreversible with grave consequences for our children's future.

By eliminating unnecessary emission sources on school property, you can substantially mitigate the risk and lower exposure levels. A few specific examples of in-school sources are Wi-Fi, wireless networks, chromebooks, electronics, electrical systems, cordless phones, and cell phones. 5G is the latest technology and is already being field tested in [schools](#).¹ The wireless industry has long pushed Wi-Fi in schools nationwide and is now proposing expanding 5G into [classrooms](#),² [arguing](#)³ that "augmented reality" and "virtual reality" are "essential tools" in [classrooms](#).⁴

The peer-reviewed published research clearly shows that compliance with Federal Communications Commission (FCC) regulations regarding human exposure to radiofrequency does not ensure the safety of students and staff. Protective regulations to mitigate, monitor, investigate, and educate are moving forward in the U.S. and [internationally](#).⁵ In addition, teacher unions are responding to the strong recommendations by medical organizations, including the American Academy of Pediatrics, regarding wireless and other types of electromagnetic radiation emissions.

Both [magnetic field](#) (2002) and [radiofrequency radiation](#) (2011) were classified^{6,7} as a Group 2B possible carcinogen by the World Health Organization International Agency for Research on Cancer (IARC). However, since that date, the published peer-reviewed [scientific](#) evidence has significantly increased-- clearly showing these types of non-ionizing electromagnetic radiation have adverse [effects](#) at emissions [levels governments](#) currently allow.^{8,9,10,11} Published [research](#) has documented that the [evidence](#) has increased to where RF is a [human carcinogen](#).^{12,13,14} Numerous [published](#) scientific [reports recommend](#) that the public, especially children and pregnant women,

[reduce](#) their [exposure](#) to [non-ionizing](#) electromagnetic [radiation](#) from extremely [low frequency fields](#) to the higher frequencies in 5G in order to protect their health.^{15,16,17,18,19,20,21,22,23}

Research shows that this type of radiation penetrates deeper and more intensely into [children](#) due to their thinner skulls and unique physiology. Furthermore, RF has been shown to damage brain development and is associated with attention and behavioral problems. [The American Academy of Pediatrics](#) has repeatedly written to the FCC on the need for an update to regulations because children are more vulnerable to the exposure.^{24,25}

Electromagnetic radiation exposure presents occupational health issues for teachers and staff, which are especially critical for those who are pregnant or have medical conditions. [Yale research](#)²⁶ found thyroid cancer to be associated with cell phone use in people with genetic susceptibility, and prenatal radiofrequency radiation exposure led to higher hyperactivity, poorer memory, and [altered brain function](#) in mice,²⁷ corroborating prior published [research](#) findings of altered brain development after exposure. Kaiser Permanente researchers have published several studies where pregnant women's exposure to non-ionizing electromagnetic fields was associated with increased [miscarriage](#) as well as increased [ADHD](#), [obesity](#), and [asthma](#) in prenatally exposed children.

Due to the [scientific evidence](#) showing [adverse effects](#) from [wireless](#) and electromagnetic radiation at legally allowed levels,^{28,29,30,31,32} we have joined with hundreds of [doctors and scientists](#)³³ calling to [halt 5G](#)³⁴ and to reduce children's electromagnetic radiation exposure. We recommend practical and actionable measures to eliminate and reduce exposures in the school setting.

Safe alternative solutions exist to connect students to the Internet, bridge the digital divide, and ensure equal access. Corded connections in classrooms are safer, faster, more secure, and do not pose the serious liability risks posed by EMFs and RF radiation.

Many countries and schools are taking action. More than 20 countries clearly recommend children reduce cell phone radiation. Cyprus, Belgium, France, and Israel are among the countries banning and restricting Wi-Fi in classrooms and many private schools [world-wide](#)³⁵ have started reducing EMF exposures. [Oregon](#)³⁶ and [New Hampshire](#)³⁷ have launched investigations into the electromagnetic radiation health issues. In regards to ELF-EMFs, over a dozen countries already have some level of protective policy in place with a magnetic field radiation limit for "sensitive areas" that ensures ELF-EMF levels do not exceed levels associated with cancer in research studies. Aside from the California Department of Education [regulation](#) that requires distances between new schools and the edge of a transmission line "right-of-way", there exists little protections in the USA for schools as there is no federal limit for human exposure.

Our recommendations to you include:

1. Raise school community awareness about cell phone and other wireless radiation through new educational curriculum: Students, teachers, and their families should be given

information on how to reduce emissions and exposures to cell phone and other wireless radiation to protect their health.

2. Install a safe communication and information technology infrastructure in schools to meet educational needs: Solutions exist to eliminate Wi-Fi/5G/4G and reduce exposures to wireless emissions in classrooms. Educational needs can be met with safer wired Internet connections (instead of wireless connections).
3. Measure magnetic field and extremely low-frequency electromagnetic fields to reduce levels to as low as possible.
4. Ensure school property is not located close to 5G/cell towers, cell network antennas, or electricity substations of high-voltage power lines.

We are aware that many schools and colleges are opting for virtual and/or hybrid classes given the spread of COVID-19. During the time that students are not physically in school this coming year, 5G should not be installed due to its hazardous health effects. Instead, we recommend this as an opportunity to install wired technology while students are away from the buildings. In a world where our health is threatened by a rising pandemic, we must stop at nothing to mitigate any external health threats facing our youth. This means eliminating in-school sources of radiofrequency radiation, providing the necessary equipment for students to connect to online school with wires, and educating students on preventative measures they can take to reduce radiation themselves. Most importantly, however, this means taking steps toward a healthy school environment in which each student thrives.

Our suggestions that we have to reduce radiation exposure during the coming virtual and/or hybrid school year include:

- Ensure that students have the hardware and software to hardwire internet connections (instead of Wi-Fi or wireless hotspots) for virtual school at home.
- Educate students on how to hook up their devices with an ethernet connection and reduce cell phone and wireless exposures.
- Purchasing departments can request hardware to have devices that can be hardwired.

Wi-Fi, cell phones, and 5G in the classroom present serious liability issues. [Insurers](#) rank 5G and electromagnetic radiation as a “high” risk, comparing the issue to lead and [asbestos](#).^{38,39} In turn, most [insurance plans](#) have very clear “electromagnetic field exclusions” as the industry standard,⁴⁰ and wireless and EMFs are defined as a type of “pollution.” For example, the [Portland Oregon Public School Insurance](#)⁴¹ states, “This insurance does not apply to: Bodily injury, personal injury, advertising injury, or property damage arising directly or indirectly out of, resulting from, caused or contributed to by electromagnetic radiation....” A 2019 Report by [Swiss Re Institute](#), a world leading provider of insurance,⁴² classifies 5G mobile networks as a “high”, “off-the-leash” risk stating, “Existing concerns regarding potential negative health effects from electromagnetic fields (EMF) are only likely to increase. An uptick in liability claims could be a potential long-term consequence” and “[a]s the biological effects of EMF in general and 5G in particular are still being debated, potential claims for health impairments may come with a long latency.”

We have attached to this letter the following resources and tools you can use to address these environmental exposure in schools:

- The Collaborative for High Performance Schools (the United States' first green building rating program especially designed for K-12 schools) developed [Best Practices](#) for Low-EMF classrooms in 2014, addressing both wireless and ELF-EMF.⁴³
- In 2017, the Maryland State Children's Environmental Health And Protection Advisory Council issued first ever [state recommendations](#) for reducing wireless exposure in schools by providing wired—rather than wireless—Internet connections.
- The New Jersey Education Association article, "[Minimize Health Risks from Wireless Devices](#)"⁴⁴ details several recommendations for reducing the health risks posed by wireless technology, such as "Keep devices away from the body" and "hard wire all devices, including printers, projectors and boards." Download [PDF](#).⁴⁵
- "[Guidelines for Safer Use of Wireless Technology in Classrooms](#)" were developed for the New York State United Teachers, who also passed a Resolution "[Hazards of Wireless Radiation Emission](#)."^{46,47}
- A [2019 publication](#) in the industry journal Building and Environment details best practices in buildings to reduce radiofrequency as including wired technology instead of Wi-Fi and corded phones.⁴⁸
- Environmental Health Trust has developed a [checklist](#) of actions for schools to reduce EMF.⁴⁹
- [The California Department of Public Health](#) issued [guidance](#) on how to reduce exposure to cell phone radiation which can be disseminated to students and staff.^{50,51}
- [Education modules](#) were developed in partnership with the Massachusetts Breast Cancer Coalition to teach high school and middle schoolers about why and how to reduce radiation from cell phones and wireless devices.⁵²

We offer our expertise to support you in making these changes. Please see the attached resources with additional documentation. We are available to meet with your leadership to present how to reduce and mitigate the risks of radiation exposure. Thank you for your consideration and action on this issue.



Devra Davis, PhD MPH
President and Founder
Environmental Health Trust
Visiting Professor of Medicine
The Hebrew University, Hadassah Medical Center
Associate Editor, Frontiers in Radiation and Health

Ehtrust.org

Dr. Anthony Miller,
Professor Emeritus of University of Toronto
Senior Advisor to Environmental Health Trust

Tom Butler PhD MSc
University College Cork
Ireland

David O. Carpenter, M.D.
Director, Institute for Health and the Environment
University at Albany

Paul Héroux, PhD
Professor of Toxicology and Health Effects of Electromagnetism
McGill University Medicine
Department of Surgery, McGill University Health Center

Theodora Scarato
Executive Director
Environmental Health Trust

Notes

¹ Talia Smart Young, [“A Cleveland School is the First to Receive Verizon 5G.”](#) 3BL Media, LLC, January 2, 2020.

² Emily Tate, [“5G Education is Finally Here. First Stop? Cleveland.”](#) EdSurge, September 28, 2019.

³ Matthew B. Gerst, Scott K. Bergman, Thomas C. Power, [“COMMENTS OF CTIA CTIA Submits These Comments in Response to the Federal Communications Commission’s \(Commission’s\) Notice of Proposed Rulemaking \(NPRM\) Seeking Comment on the 5G Fund,”](#) CTIA, June 25, 2020.

⁴ Sean McNicholas, [“ABC’s and 123’s: 5G and the Classroom.”](#) CTIA, August 27, 2019.

⁵ [“What’s Happening Internationally.”](#) Environmental Health Trust, accessed June 29, 2020.

⁶ [“Non-Ionizing Radiation, Part 1 : Static and Extremely Low-Frequency \(ELF\) Electric and Magnetic Fields](#) (IARC Official, World Health Organization, 2002).

⁷ Robert Baan et al., "[Carcinogenicity of Radiofrequency Electromagnetic Fields](#)," *The Lancet Oncology* 12, no. 7 (July 2011): 624–26.

⁸ Igor Yakymenko, Olexandr Tsybulin, Evgeniy Sidorik, Diane Henshel, Olga Kyrylenko, Sergiy Kyrylenko, "[Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation](#)," *Electromagnetic Biology And Medicine* 35, no. 2 (July 2015): 186-202.

⁹ Priyanka Bandara, David O Carpenter, "[Planetary electromagnetic pollution: it is time to assess its impact](#)," *The Lancet Planetary Health* 2, no. 12 (December 2018): 512-514.

¹⁰ Frank M. Clegg et al., "[Building Science and Radiofrequency Radiation: What Makes Smart and Healthy Buildings](#)," *Building and Environment* 176 (June 2020).

¹¹ Camille Carles, Yolande Esquirol, Maxime Turuban, Clément Piel, Lucile Migault, Camille Pouchieu, et al., "[Residential proximity to power lines and risk of brain tumor in the general population](#)," *Environmental Research* 185 (June 2020).

¹² Michael Carlberg, Lennart Hardell, "[Evaluation of Mobile Phone and Cordless Phone Use and Glioma Risk Using the Bradford Hill Viewpoints from 1965 on Association or Causation](#)," *BioMed Research International* (March 2017).

¹³ Michael Peleg, Or Nativ, Elihu D. Richter, "[Radio Frequency Radiation-Related Cancer: Assessing Causation in the Occupational/Military Setting](#)," *Environmental Research* 163 (February 2018): 123–33.

¹⁴ Anthony B. Miller, L. Lloyd Morgan, Iris Udasin, Devra Lee Davis, "[Cancer Epidemiology Update. Following the 2011 IARC Evaluation of Radiofrequency Electromagnetic Fields \(Monograph 102\)](#)," *Environmental Research* 167 (November 2018): 673–683.

¹⁵ Cindy L. Russell, "[5G wireless telecommunications expansion: Public health and environmental implications](#)," *Environmental Research* 165 (August 2018).

¹⁶ Dominique Belpomme, Lennart Hardell, Igor Belyaev, Ernesto Burgio, David O. Carpenter, "[Thermal and non-thermal health effects of low intensity non-ionizing radiation: An international perspective](#)," *Environmental Pollution* 242 (July 2018): 643-658.

¹⁷ Claudia Roda, Susan Perry, "[Mobile phone infrastructure regulation in Europe: Scientific challenges and human rights protection](#)," *Environmental Science & Policy* 37 (March 2014): 204-214.

¹⁸ Anthony B. Miller, Margaret E. Sears, L Lloyd Morgan, Devra L. Davis, Lennart Hardell, Mark Oremus, Colin L. Soskolne, "[Risks to health and well-being from radio-frequency radiation emitted by cell phones and other wireless devices](#)," *Frontiers In Public Health* 7 (August 2019).

¹⁹ Gadi Lissak, "[Adverse physiological and psychological effects of screen time on children and adolescents: Literature review and case study](#)," *Environmental Research* 164 (July 2018): 149-157.

- ²⁰ Lena K. Hedendahl, et al., [“Measurements of Radiofrequency Radiation with a body-borne exposimeter in Swedish schools with Wi-Fi.”](#) *Frontiers in Public Health* 5 (2017): 279.
- ²¹ Ronald N. Kostoff, Paul Heroux, Michael Aschner, Aristides Tsatsakis, [“Adverse health effects of 5G mobile networking technology under real-life conditions.”](#) *Toxicology Letters* 323 (May 2020): 35-40.
- ²² Beatrice Siervo et al., [“Numerical evaluation of human exposure to WiMax patch antenna in tablet or laptop.”](#) *Bioelectromagnetics* 39, no. 5 (July 2018).
- ²³ JinKyung Park, EunHye Jeong, GyeongAe Seomun, [“Extremely Low-Frequency Magnetic Fields Exposure Measurement during Lessons in Elementary Schools.”](#) *International Journal of Environmental Research and Public Health* (July 2020).
- ²⁴ C. Fernández, A.A. de Salles, M.E. Sears, R. Morris, D.L. Davis, [“Absorption of wireless radiation in the child versus adult brain and eye from cell phone conversation or virtual reality,”](#) *Environmental Research* 167 (November 2018): 694-699.
- ²⁵ Thomas K. McInerney et al., [American Academy of Pediatrics Letters](#), April 7, 2020.
- ²⁶ Jiajun Luo et al., [“Genetic susceptibility may modify the association between cell phone use and thyroid cancer: A population-based case-control study in Connecticut.”](#) *Environmental Research* 182 (March 2020).
- ²⁷ Karen N. Peart, [“Cell phone use in pregnancy may cause behavioral disorders in offspring,”](#) *YaleNews*, March 15, 2012.
- ²⁸ Conrado Avendaño, Ariela Mata, César A. Sanchez Sarmiento, Gustavo F. Doncel, [“Use of laptop computers connected to internet through Wi-Fi decreases human sperm motility and increases sperm DNA fragmentation,”](#) *Fertility And Sterility* 97, no. 1 (November 2011): 39-45.
- ²⁹ Jessica A. Adams, Tamara S. Galloway, Debapriya Mondal, Sandro C. Esteves, Fiona Mathews, [“Effect of mobile telephones on sperm quality: A systematic review and meta-analysis,”](#) *Environment International* 70 (September 2014): 106-112.
- ³⁰ Ronald N. Kostoff, Clifford G.Y. Lau, [“Modified health effects of non-ionizing electromagnetic radiation combined with other agents reported in the biomedical literature,”](#) *Microwave Effects On DNA And Proteins* (March 2017): 97-157.
- ³¹ Dominique Belpomme, Lennart Hardell, Igor Belyaev, Ernesto Burgio, David O. Carpenter, [“Thermal and non-thermal health effects of low intensity non-ionizing radiation: An international perspective,”](#) *Environmental Pollution* 242 (November 2018): 643-658.
- ³² Martin L. Pall, [“Wi-Fi is an important threat to human health,”](#) *Environmental Research* 164 (July 2018): 405-416.
- ³³ Elizabeth Kelley, Henry Lai, Martin Blank, Magda Havas, Joel M. Moskowitz, [“International Appeal: Scientists call for protection from non-ionizing electromagnetic field exposure,”](#) *European Journal Of Oncology* 20 (December 2015): 180-182.

³⁴ Ronald N. Kostoff, Paul Heroux, Michael Aschner, Aristides Tsatsakis, "[Adverse health effects of 5G mobile networking technology under real-life conditions](#)," *Toxicology Letters* 323 (May 2020): 35-40.

³⁵ "[Schools Worldwide Removing the Wi-Fi and Reducing Exposure](#)," Environmental Health Trust, accessed July 1, 2020.

³⁶ [SB283 2019 Regular Session](#), Oregon Legislative Information System, accessed July 1, 2020.

³⁷ [Commission to Study the Environmental & Health Effects of Evolving 5G Technology](#), New Hampshire General Court, accessed July 1, 2020.

³⁸ "[White paper explores risks that could become 'the next asbestos.'](#)" Business Insurance, May 17, 2011.

³⁹ "[Electromagnetic Fields: More than Just an Eye Sore.](#)" Willis, March 2012.

⁴⁰ "[Electromagnetic Fields \(Utilities\) Liability Insurance.](#)" CompleteMarkets, INSOMIS Corp., accessed July 1, 2020.

⁴¹ [THE SCHOOL POLICY®](#), Genesis Insurance Company, 2014.

⁴² [New Emerging Risk Insights](#), Swiss Re Institute, May 2019.

⁴³ [Low-EMF Best Practices](#), The Collaborative for High Performance Schools. 2014.

⁴⁴ Adrienne Markowitz, Eileen Senn. "[Minimize Health Risks from Electronic Devices.](#)" New Jersey Education Association, September 2, 2016.

⁴⁵ Adrienne Markowitz, Eileen Senn. "[Minimize Health Risks from Electronic Devices.](#)" New Jersey Education Association, September 2, 2016 (PDF).

⁴⁶ "[Guidelines for Use of Wired and Wireless Technology in Classrooms](#)," Grassroots Environmental Education, Inc., New York State, and United Teachers (NYSUT), 2016.

⁴⁷ Ibid.

⁴⁸ Frank M. Clegg, et al., "[Building Science and Radiofrequency Radiation: What Makes Smart and Healthy Buildings.](#)" *Building and Environment* 176 (June 2020).

⁴⁹ "[Checklist on How to Reduce EMF and Wireless Radiation for Schools](#)," Environmental Health Trust, accessed September 11, 2020.

⁵⁰ "[CDPH Issues Guidelines on How to Reduce Exposure to Radio Frequency Energy from Cell Phones.](#)" California Department of Public Health, December 13, 2017.

^{51.} [“How to Reduce Exposure to Radio Frequency Energy from Cell Phones,”](#) California Department of Public Health, accessed July 1, 2020.

^{52.} [“Let’s Talk Prevention: Actions You Can Take Classroom Modules,”](#) Massachusetts Breast Cancer Coalition, accessed July 1, 2020.