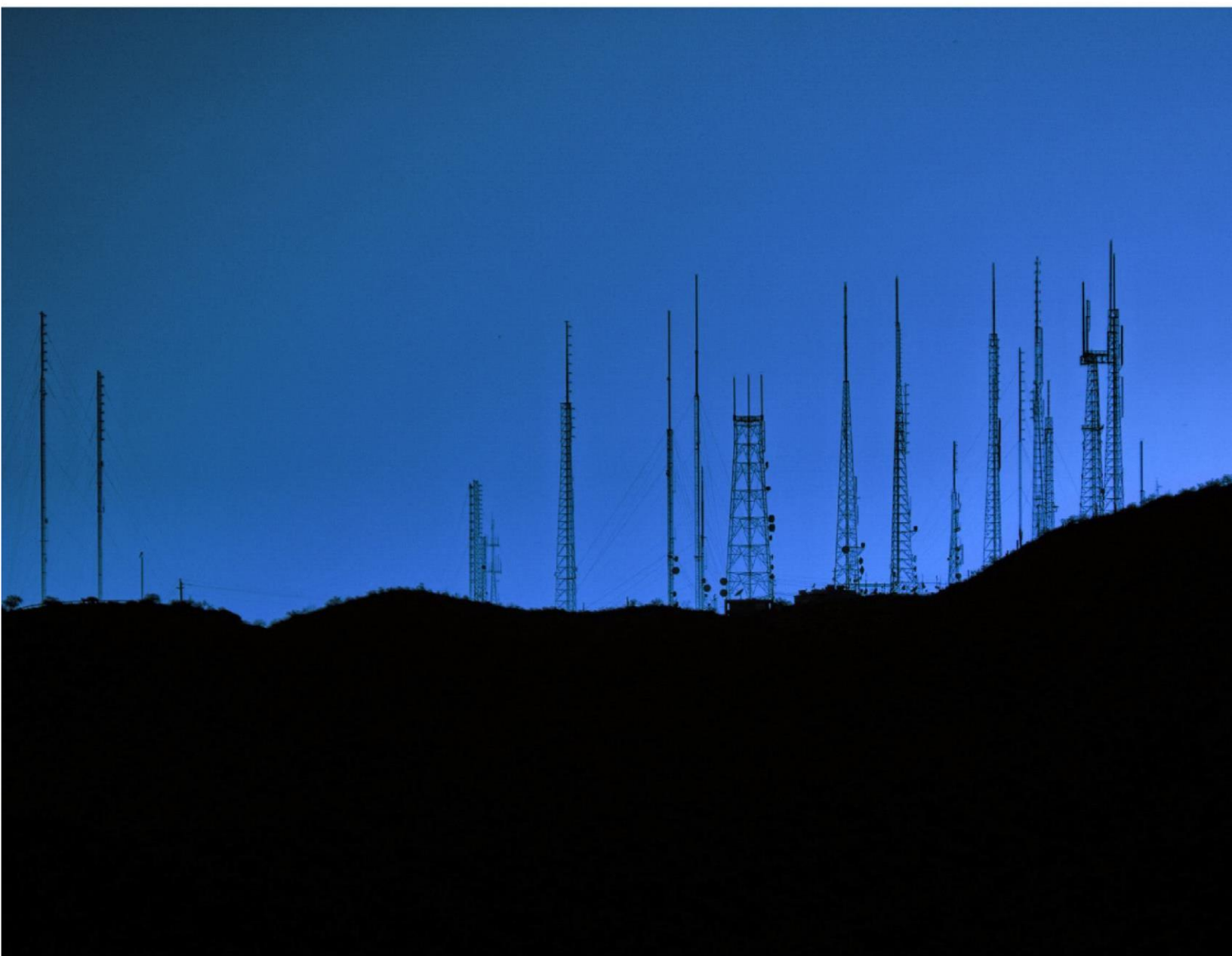


# Impact of Wireless Technology on Health: Proceedings from a Symposium for Ontario's medical community

Edited by Dr. Riina Bray and David Fancy, PhD  
Edited by Dr. Riina Bray MD and David Fancy PhD



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## BIOGRAPHIES

**Dr. Jennifer Armstrong** is Director of the Ottawa Environmental Health Clinic in Ottawa, Canada, for the last 22 years. The Clinic looks at the root cause of illness through the lens of environmental influences such as food allergies, chemical sensitivities, inhalant allergies, chemical and metal toxicities, and now electromagnetic radiation effects. Dr. Armstrong’s formal medical education is from the University of Toronto (1977), and further training is from the American Academy of Environmental Medicine with a Diplomat of Environmental Medicine (Equivalent to a Fellowship) obtained in 2009. She has taught courses in Environment and Health at Ottawa University.

**Dr. Riina Bray** is a chemical engineer and Doctor of Medicine with Masters degrees in addictions, toxicology, and public health. She is the Medical Director of the Environmental Health Clinic at Women’s College Hospital and Assistant Professor in the Department of Family and Community Medicine with cross appointment to the Dalla Lana School of Public Health, University of Toronto. She is heavily involved in academic medicine, research, and patient advocacy.

**Melissa Chalmers** was an airline pilot for 25 years. She was Captain on the A320 when she went on paid medical leave for EHS after being injured by cell towers built behind her home in 2010. Melissa has lived with severe EHS for nine years and had to refugee from her home for extended periods of time in West Virginia at the only zone in the world that legally prohibits wireless; the prohibition intends to protect telescopes, not people. Whenever able, she has worked to improve quality of life for hundreds of people and their families who contacted her for help. Melissa now works directly with government, utilities, and health care professionals/organizations on accommodations for all who have fallen ill from electromagnetic pollution so they can participate in society, access proper medical care, return to work, have safer homes, and relieve some of their sufferings.

**Frank Clegg** is the founding CEO of Canadians for Safe Technology (C4ST), a national, not-for-profit, volunteer-based coalition of parents, citizens, and experts. C4ST's mission is to 1) educate and inform Canadians and policy makers about the dangers of the exposures to unsafe levels of radiation from technology; and 2) to work with all levels of government to create healthier communities for children and families. Mr. Clegg is co-Chair of the Business Advisory Group to the Environmental Health Trust. In addition to its education and advocacy work, EHT performs cutting edge research on exposure to cell phone and other wireless radiation. Mr. Clegg has spent his entire career in the technology industry. He retired from his most recent position as President of Microsoft Canada.

**David Fancy** PhD is Professor in the Department of Dramatic Arts, Marilyn I Walker School of Performing Arts, Brock University. He brings his theoretical and philosophical interests in immanentist thought to the intersection of a range of disciplines including philosophy, theatre studies, performance studies, science and technology studies, and critical disability studies. Dr. Fancy is co-founder (2005) of the Canadian Initiative to Stop Wireless, Electric, and Electromagnetic Pollution. He is a patient advocate who works with dozens of Canadians with electrical hypersensitivity.

**André Fauteux** is a former *Montreal Gazette* reporter (1988). He publishes and edits Canada's oldest magazine dedicated to Healthy and Sustainable Housing, *La Maison du 21e siècle*, which celebrates its 25th anniversary this year. For 30 years, André has written extensively about preventing and mitigating environmental health problems such as MCS and EHS, developing a vast international network of contacts in the field of EMFs and Health. Beginning in 1990, he was very close to Canada Mortgage and Housing Corporation (CMHC) researchers who launched a national Healthy Housing initiative. André organized CMHC's first Indoor Air Quality Investigators' training in Quebec, wrote research highlights, and trained Reno Depot employees in Healthy Renovations for the Crown Corporation responsible for housing.

**Magda Havas** PhD is Professor Emerita at Trent University in Peterborough, Canada. She is internationally recognized, both for her previous work on acid rain and metal pollution and for her current research on the biological effects of electromagnetic pollution and beneficial effects of electrotherapies. Dr. Havas works with people who have developed an intolerance to electromagnetic frequencies and advises health care providers on how to diagnose and treat people with this sensitivity. She has authored more than 200 publications, has given more than 360 invited talks in 30 countries, and is co-author of *Public Health SOS: The Shadow Side of the Wireless Revolution*. Dr. Havas serves as a science advisor to various government and non-government organizations and has provided expert testimony on the health effects of power lines, occupational magnetic field exposure, and radio frequency radiation.

**David McRobert** is an environmental lawyer based in southern Ontario, and retired Adjunct Professor. He was pro-bono counsel on the Board of the Wireless Radiation Safety Council of Canada from 2011 to 2013. He has worked with numerous clients on a range of wireless radiation safety, air pollution, water pollution, and chemical sensitivity issues. David served for 16 years as In-House Counsel and Senior Policy Advisor at the Environmental Commissioner of Ontario. David has a BSc in Biology and a Master's in Environmental Studies on Biological Conservation. He graduated from Osgoode Hall Law School, undertook graduate law studies, and was admitted to the Ontario Bar in 1990. David taught law to undergraduate and graduate students at York University, Osgoode Hall Law School, the University of Toronto, and Humber College between 1987 and 2011. He has published dozens of books, journal articles, and articles. Book titles include *Risky Business: A Guide to the Use, Handling and Transportation of Asbestos* and *My Municipal Recycling System Made Me Fat and Sick*.

**Dr. Anthony B. Miller** is Professor Emeritus, Dalla Lana School of Public Health, University of Toronto.

A physician-epidemiologist, Dr. Miller was trained in internal medicine. He was Director of the Epidemiology Unit of the National Cancer Institute of Canada, 1971–86 and Chair of the Department of

Preventive Medicine and Biostatistics, University of Toronto, 1992–6. He served as a special expert in the Division of Cancer Prevention, US National Cancer Institute, 1997, Senior Epidemiologist, International Agency for Research on Cancer 1998–9, Head, Division of Epidemiology, German Cancer Research Centre, Heidelberg, 2000–3, Associate Director, Research, Dalla Lana School of Public Health, University of Toronto, 2008–10. Dr. Miller has been a consultant to the World Health Organization and to its Eastern Mediterranean Region.

**Barbara Payne** is President of Electromagnetic Pollution Illnesses Canada Foundation (EPIC), a not-forprofit organization in support of persons affected by electromagnetic pollution, providing information about impacts on health, and promoting creation of healthy environments. EPIC raises awareness about everyday, artificial, biologically-active electromagnetic fields, aiming for significant reduction in emissions and exposures in indoor and outdoor environments.

**Meg Sears PhD** is a senior clinical research associate with the Ottawa Hospital Research Institute and chairs the civil society, science-based organization Prevent Cancer Now. She is a broad-based environmental health scientist, with knowledge of health effects of low-level environmental factors (including substances and electromagnetic radiation) and scientific methods for toxicant assessment, to make least-toxic choices for healthier populations and environment. Dr. Sears authored *Medical Perspectives on Environmental Sensitivities* for the Canadian Human Rights Commission. She also partnered in a broad CIHR-funded scoping review of arsenic, cadmium, lead, and mercury, including sources and routes of exposure, health effects, and responses for individuals, public health, and in clinical practice.

**Robert P. Steller** is the President of Breathing Easy. He is a certified Building Biology Environmental Consultant and Inspector. From 2004 to 2006 he was the Director of the International Institute for Building Biology in Clearwater, Florida. He has consulted on new home construction in Germany, USA, Brazil and Canada. Robert is an expert panel member for Healthy Indoors Partnership, which, together with Health Canada, CMHC, and the National Research Council, is creating a Buyer's Guide for products and services with low chemical emissions.

**Shelley Wright** has taught elementary students for 28 years. She is a political activist promoting inclusive spaces for environmentally sensitive teachers within her union.

## **Introduction: Impacts of Wireless Technology on Health Proceedings from a May 31<sup>st</sup>, 2019 Symposium**

**Riina Bray MD**

I'd like to begin with a series of statements that are substantiated by the literature, together comprise the justification of why we are here today:

- There is a range of evidence that adverse health effects can result from increased exposure to interconnected wireless devices and infrastructures that emit nonionizing microwave or radiofrequency radiation (MW/RFR).
- Such effects can include: impairment of reproduction, increased inflammation, immunological disturbances, amplification of effects of other toxic agents, and contribution to chronic disease.
- Additionally, at exposure levels of MW/RFR commonly tolerated by the general population, some patients experience acute and chronic symptoms including fatigue, tinnitus, headaches, as well as neurological and cardiac dysfunction, related to electromagnetic fields (EMF).
- There is significant evidence to suggest that existing safety standards for a whole range of electromagnetic emissions are too lax for both the those affected, as well as the general population.

The presenters gathered here today have extensive experience as clinicians, researchers, advocates, contributors to policy and have lived experiences of electromagnetic injury. We are grateful for the collaboration of my colleagues here today, as well as to Women's College Hospital for providing the venue, and the CME and the Continuing Professional Development Centre of the Faculty of Medicine at University of Toronto.

My intention as the conveyor of this symposium—and I believe I can speak on behalf of the entire organizing committee—is to provide up-to-date and convincing evidence, drawn from the literature, that suggests that we need:

- To continue to improve our detection and treatment of electrical sensitivities and other forms of electromagnetic injury.
- To bring up-to-date science to bear on discussions of what constitutes reasonable safety standards for electromagnetic emissions moving forward.
- To build capacity and increase knowledge transmission across disciplinary boundaries within the patient care continuum.
- To intensify and strengthen ties between researchers, clinicians, patient advocates, and policy makers, all of whom approach this complex issue from different angles.

We have been advised by the Ontario Public Health Association, in response to news of today's symposium, that: "Public Health Ontario's position remains the same as 2010 that there is no conclusive evidence of adverse effects on health at RF levels below Health Canada's SC-6 guidelines." "As public health agencies are required to use evidence-informed decision-making in our practice, whether health promotion, risks communication or policy development, we rely on our sciences researchers at PHO and Health Canada (our own internal specialists) to review the evidence. With respect to RFs, while

individual studies may present conflicting results, we rely on a weight of evidence approach as PHO explains in their 2010 report. As pointed out in the Royal Society of Canada's Expert Panel Report, additional research is important, but I believe it is equally important to convey the current scientific understanding in terms of the weight of evidence."

In his paper entitled 'Health Canada's Safety Code 6 and Global Trends Regarding Radiofrequency/Microwave Radiation Safety,' Frank Clegg with Canadians for Safe Technology and the Environmental Health Trust makes a case for 'A moratorium on 5G and other deployment of microwave radiation infrastructure to which the public is exposed is required until the sciences shows it is safe.' He draws on studies and proclamations from scientists and physicians globally to call for a 'shift (of) responsibility to industry to prove technology is safe before it is released to the market.'

André Fauteux, Editor/Publisher, *La Maison du 21e siècle* magazine traces in his contribution the emergence of notable regulatory EMF standards across the globe from the last 40 years. His chapter, entitled 'Wireless Justice from Precaution to Prevention' demonstrates the laxity of Canadian standards for EMF exposure in the global context.

In his paper, lawyer David McRobert provides a comprehensive analysis of legal protections available in Canada for those living with electromagnetic hypersensitivity, as well as analyzes the relationship between law, scientific advances, and the role of metapolicy in developing policies that do or do not protect vulnerable persons and overall populations. His paper, entitled 'Using Law and Advocacy to win Accommodations for Clients with Electro-Hyper-Sensitivity (EHS)' deals, amongst other things, with the role played by medical doctors in providing accommodation for EHS.

Barb Payne, President of Electromagnetic Pollution Illnesses Canada Foundation (EPIC), a not-for-profit organization in support of persons affected by electromagnetic pollution, provides an outline of the advocacy terrain in 'National NGOs in Ontario & Advocacy.' She reminds medical audiences of the important advocacy role that physicians have played in calling for more protective exposure standards in a Canadian context.

Patient advocate David Fancy, PhD, describes in 'Electrical Hypersensitivity (EHS) and the 'Social Model' of Disability' how physicians can benefit from not simply conceiving of disability to be a biological phenomenon and product. Instead, adopting many aspects of the social model of disability can provide for a much better care experience for the patient.

School teacher Shelley Wright and former Microsoft Canada and C4ST president Frank Clegg contribute perspectives from and for the secondary school system in their contribution, 'Impacts on Learning Institutions, Students and Teachers.' Wright provides a patient testimonial of her experience living with electromagnetic hypersensitivity, and she and Clegg provide an analysis of what constitutes accessible hospital and secondary school environments for vulnerable and general populations.

Robert Steller is a certified Building Biology Environmental Consultant and Inspector. In his contribution, 'The Invisible Made Visible: No Place to Hide, A Global Phenomenon, Systems and Mitigation,' he provides outlines for mitigation strategies for electromagnetic pollution for residential and other structures.

Melissa Chalmers, a former Commercial Airline pilot affected by electromagnetic hypersensitivity shares perspectives in her testimonial, 'Patient Advocacy Driven by Personal Experience.' She speaks eloquently of the ways diagnosing physicians can best assist patients living with electromagnetic hypersensitivity.



Meg Sears, PhD, points out that the 5G roll out violates human rights and is even akin to human experimentation which would never have been able to achieve ethical approval because it does not attain consent of its subjects (human population) at the very least.

Magda Havas, PhD, emphasizes the need for us to make wise, educated choices about how we use wireless technology and that knowledge is key to being empowered to say “no” as necessary.

Riina Bray, MD, has created clinical practice guidelines from her immense experience dealing with patients with EHS since 2005 and is now a world expert in the field.

Jennifer Armstrong, MD, shares her experiences as a medical doctor in the community seeing more and more patients whose strange illnesses are connected to MW/RFR exposure.

# Clinical Practice Guidelines in the Diagnosis and Management of Electromagnetic Field Hypersensitivity (EHS)

**Dr. Riina Ines Bray BSc, MSc, MD, FCFP, MHSc Medical Director, Environmental Health Clinic, Women's College Hospital Assistant Professor, Department of Family and Community Medicine and Dalla Lana School of Public Health, University of Toronto [riina.bray@wchospital.ca](mailto:riina.bray@wchospital.ca)  
[www.womenscollegehospital.ca/care-programs/environmental-health-clinic/](http://www.womenscollegehospital.ca/care-programs/environmental-health-clinic/)**

**October, 2020**

## Introduction

Environmental health is the study of effects upon human beings of external physical/ electromagnetic, chemical and biological factors impacting on the general population as well as genetic aberrations and psychosocial stressors. It is a public health-based discipline which is a determinant of health and is compounded by socioeconomic, social-justice and equity issues. It is an especially important part of our public health domain.<sup>1</sup> Electromagnetic field hypersensitivity (EHS) is a spectrum disorder in which there is an awareness and or adverse response to electromagnetic fields.<sup>2 3</sup> EHS is recognized as a disability under the Canadian Human Rights Commission (Federal and Provincial).<sup>4</sup>

## Demographics

EHS can occur in all age groups. Since 2005, the Environmental Health Clinic at Women's College Hospital has seen many patients who, due to co-morbid condition and chronic exposures to electromagnetic fields (radiofrequency radiation and microwaves, electric fields, magnetic fields, dirty electricity and electrosmog), have become unwell and many disabled, some losing their jobs or becoming homeless. Exposures of this sort cause functional impairments in individuals and a huge burden of suffering.<sup>5</sup>

## Etiology and Pathophysiology

It leads to a functional impairment the degree of which is dependent on genetic polymorphisms which predisposes the individual having poor detoxification profile and therefore an increased total body burden (Figure 1); and co-morbid illnesses such as Multiple Chemical Sensitivities (MCS), nervous, cardiac and immune (infectious diseases) systems. Most commonly, patients have had prolonged chronic exposures to radio and microwave radiation, electrical or magnetic fields from either wired or wireless technology. Patients can react to electric fields (measured in volts per meter), magnetic fields (measured in milligauss or nano Tesla), dirty electricity, radiofrequency radiation and/or ground currents.

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<sup>1</sup> Electromagnetic hypersensitivity: fact or fiction? Genuis SJ. Lipp CT. Sci Total Environ. 2012; 414:103-12.

<sup>2</sup> Idiopathic environmental intolerance attributed to electromagnetic fields (IEI-EMF): A systematic review of identifying criteria. Baliatsas C. Van Kamp I. Lebre E. et al. BMC Public Health. 2012; 12(1).

<sup>3</sup> Electrosensitivity and electromagnetic hypersensitivity. Leitgeb N. Schrottner J. Bioelectromagnetics. 2003; 24(6):387-94.

<sup>4</sup> Sears, Margaret E. "The Medical Perspective on Environmental Sensitivities" Canadian Human Rights Commission. 2007. <sup>5</sup> Johansson O. Electrohypersensitivity: a functional impairment due to an inaccessible environment. Reviews on environmental health. 2015 Dec 1;30(4):311-21.

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The severity of the impact also depends upon the nature, dose, and timing of exposures, as well as a person's allostatic load which is the maximum tolerated dose for combined environmental stressors.<sup>5</sup> Patients can be identified as "EMF sensitive" or "EMF susceptible" rather than "hyper" to decrease stigmatization potential. Central Sensitization Syndrome explains why both MCS and EHS often exist comorbidly in the patient population.

Radiofrequency radiation can cause the following adverse biological effects<sup>6 7</sup> •

- cerebral **hypoperfusion/ hypoxia-related neuroinflammation** may occur • Oxidative stress in biological systems, histamine release causing rashes.
- Peroxidation, DNA damage, changes to antioxidant enzymes.
- Voltage gated calcium channel dysregulation affecting the cardiac and nervous system
- Peroxynitrite formation which causes chronic inflammation, damage to mitochondrial function and structure and reduction of ATP. Reduced glutathione and CoQ10 can also occur causing fatigue and pain.

Radiofrequency radiation and microwaves can cause thermal (heat related) or non-thermal effects. Under the non-thermal category, we see DNA damage, an immune system suppression, increased blood-brain barrier permeability, and thickening of blood viscosity with rouleaux formation. cognitive problems, fatigue, tinnitus, headaches, ECG abnormalities, and disruption of sleep with alpha wave intrusions and reduced REM.<sup>8</sup>

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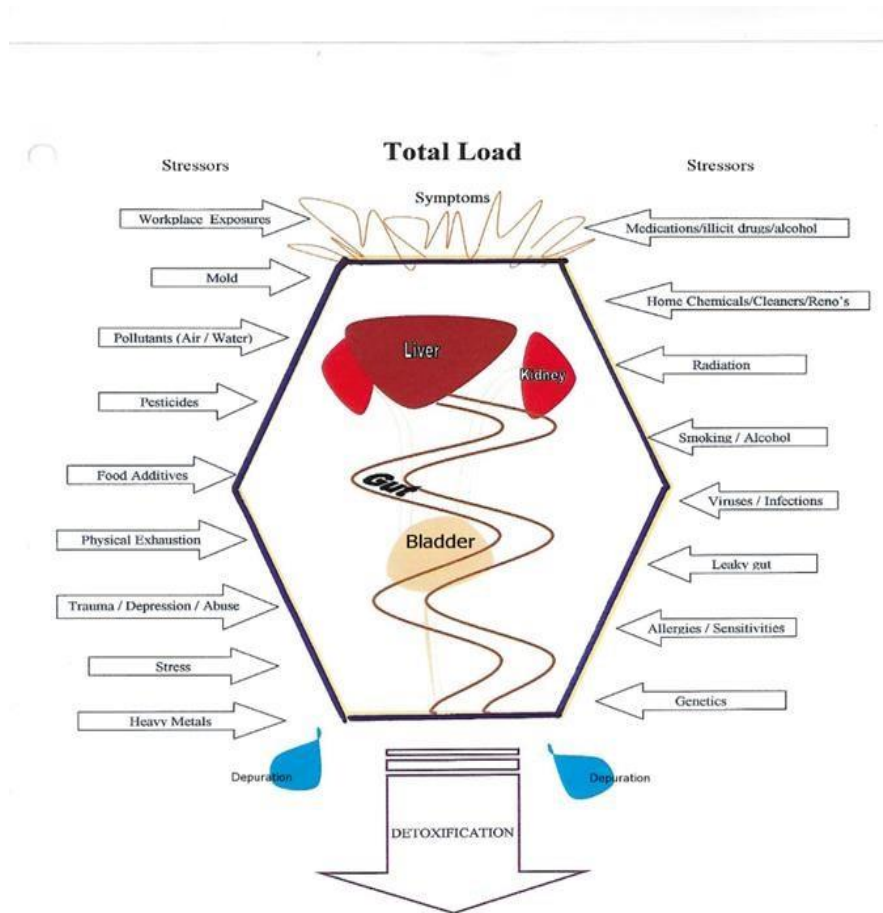
<sup>5</sup> Selye H. (1946). The general adaptation syndrome and the diseases of adaptation. *The Journal of clinical endocrinology and metabolism*, 6, 117–230. <https://doi.org/10.1210/jcem-6-2-117>

<sup>6</sup> Martin Pall; De Luca/ Herbert and Sage

<sup>7</sup> Belpomme, Dominique, Philippe Irigaray. "Electrohypersensitivity as a Newly Identified and Characterized Neurologic Pathological Disorder: How to Diagnose, Treat, and Prevent It" *Int. J. Mol. Sci.* 2020; 21,1915.

<sup>8</sup> EUROPAEM Guideline 2015 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses. Belyaev I. Dean A. Eger H. Hubmann G. Jandrisovits R. et al. *Rev Environ Health.* 2015; 30(4):337-371.

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**Figure 1: Total Toxic Load (Bray and Marshall, 2005)**

## History

The clinician is advised to:

Conduct a complete exposure history using the CH2OPD2 mnemonic<sup>9 11</sup> to determine total toxic load in the form of EMF/ RFR exposure, toxic metal exposure sources (diet, water, prosthetics, implants, gadolinium), immune issues causing candida, gut dysbiosis and possible MCAS.

1. Community
2. Home
3. Hobby
4. Occupation
5. Personal habits
6. Diet

<sup>9</sup> Marshall et al, 2002 <sup>11</sup>

Bray, 2020

<https://static1.squarespace.com/static/593f8894e3df288fc64b6cf0/t/598bbabdf14aa18c52a6dcce/1502329836033/Environmental+Health+Clinic+Pre-Visit+Questionnaire.pdf>

## 7. Drugs

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Determine community, work, school and home exposures – proximity of cell phone towers, routers, DECT cordless phones, any other wireless technology. Most importantly determining if the sleeping area is affected.<sup>10 11</sup>

A helpful mnemonic to determine the parameters of exposure is (F.I.N.D.)<sup>12</sup>

**F- frequency (Hertz)**

**I- intensity (Power in  $\mu\text{W}/\text{m}^2$ ) N- nearness D- duration**

### **Symptoms Commonly Occurring Singularly or in Combination:**

- Irritability, lack of appetite, memory problems, vertigo, visual, skin and vascular problems.<sup>13</sup>
- Tinnitus, sleep disorders (disrupted stage 4 sleep) and therefore mood and personality changes (anxiety, depression, irritability).<sup>14</sup>
- Headache, weakness, pressure in the head, racing or fluttering heart.<sup>15</sup>
- Dermatological: Itch, pain, edema, erythema, Morgellons disease secondary to transthyretin concentrations.<sup>16</sup>
- Neurasthenic and vegetative symptoms: fatigue, tiredness, concentration difficulties, dizziness, nausea, heart palpitations, and digestive disturbances.<sup>17</sup>
- Blurry vision
- Adrenalin surges.

### **Etiology of Common Clinical Presentations**

#### **Category I**

Patients can present with a toxic metal body burden, most commonly mercury, due to the overconsumption of aquatic, contaminated seafood. Methyl mercury (half-life of 27 years from the brain) is neurotoxic causing axonal demyelination and inflammation. Zinc/ nickel/ mercury dental amalgams also release elemental mercury vapour which enters the brain through the olfactory bulb, and then is converted to methyl mercury, which is neurotoxic. Those people present with cardiac and neurological manifestation. Those with metallic hardware implants such as Harrington rods, braces, wire meshes, pins and screws can potentially be affected. Those with excessive Gadolinium from multiple contrast studies are also at risk. Other potential sources of metals are nickel (jewelry, cookware), lead (old water pipes), cadmium (smokers) and arsenic (rice, fish, almonds), all of which increase total load. First Nations at high risk given exposure to contaminated fish with methylmercury. Patients present with headaches (lancinating and heaviness), brainfog, fatigue and anxiety when exposed to EMFs.

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<sup>10</sup> Maes B. Standard of building biology testing methods. Inst. Building Biol.+ Sustainability IBN, Rosenheim, Germany, Tech. Rep. SBM-2008. 2008.

<sup>11</sup> Maes B. Building Biology Evaluation Guidelines. Inst. Building Biol.+ Sustainability IBN, Rosenheim, Germany. SBM-2015. 2015.

<sup>12</sup> Havas, M. (2014). Electrosmog and Electrosensitivity: What Doctors Need to Know to Help their Patients Heal. Anti-Aging Therapeutics Volume XV.

<sup>13</sup> Gomez-Perretta et al. Subjective symptoms related to GSM radiation from mobile phone base stations, BMJ, 2014

<sup>14</sup> Bhat, Kumar and Gupta. Effects of mobile phone and mobile phone tower radiations on human health. 2013

<sup>15</sup> Park and Knudson. Medically Unexplained Physical Symptoms. Statistics Canada 2007

<sup>16</sup> Johnansson O, Disturbances 2009

<sup>17</sup> WHO, Electromagnetic Fields and Public Health, December 2005

## **Category II**

Another group of patients fall into this category if they suffer from infectious diseases such as Lyme disease, co-infections of Lyme and other infections which affect the nervous system. These patients have central or peripheral nervous system vulnerability, neuroborreliosis cerebral vasculitis, polyneuropathy, chronic encephalomyelitis and cranial neuropathy (all late manifestations of Lyme). They present with tremor, dysarthria, ataxia, extreme fatigue, headache, cognitive dysfunction, presyncope and mood disturbances. It is important to reduce body burden through detoxification in order to decrease

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inflammation. Oxygen therapy is useful in order to help with hypoxia from compromised cerebral blood flow to the bi-frontal cortices and temporal lobes but provides only short, temporary relief. It helps confirm the diagnosis. fMRI and SPECT scan, PET scan can help further reveal pathology. Treatment of Lyme with antibiotics potentially can decrease EHS symptoms.<sup>18</sup>

## **Category III**

This category of patients suffer from lesions of the brain (including tumours such as pituitary adenomas), demyelination, microangiopathic changes, diffuse ischemia, inflammation (from neurotoxic pesticides) and neurodegenerative diseases (multiple sclerosis, ALS for example).<sup>19</sup> Nonspecific white matter findings due to simple aging and dementia should also be considered.

They present with headaches, brain fog, fatigue, restlessness and low mood, tinnitus(+/-) and potentiation of their already pre-existing signs and symptoms related to their disease. The mechanism of action is associated with the impact of EMFs on VGCC integrity causing increases in intracellular calcium and thus increase of oxidative stress from ONOO<sup>-</sup> formation.<sup>20</sup>

## **Category IV**

These patients suffer from heart rhythm disturbances: either exacerbations of existing conditions or new onset caused by radio and microwaves.<sup>21</sup> There are periods of poor blood circulation at the capillary level due to rouleaux formation and there is disturbance of heart conduction because of effects on VGCC. Tachycardic spells, especially at night, can occur. People also experience premature ventricular contractions, premature atrial contractions, atrial flutter and fibrillation. Those with Wolff Parkinson white syndrome are especially at risk for sudden cardiac death.<sup>24</sup> Conduction problems also affect the autonomic nervous system causing increased sympathetic tone. A Holter monitor will show rhythm disturbances near cellphone towers and in areas with much Wi-Fi usage. These symptoms are very alarming to the patient and causes severe, prolonged anxiety. Sleep time can be also particularly difficult causing frequent awakenings due to hypervigilance with tachycardic spells or PAC/ PVCs.

## **Category V**

These patients include students and teachers. University, college, high school, and grade school students are all being exposed to high levels of radiation. They frequently work under fluorescent lights. They get eyestrain, and sometimes develop rashes related to exposure of this radiation. The epidemic of anxiety, depression, suicide at universities and colleges being fueled by the increased level of agitation and anxiety caused by radio and microwave radiation on mood.

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<sup>18</sup> Belpomme, Dominique, Philippe Irigaray. "Electrohypersensitivity as a Newly Identified and Characterized Neurologic Pathological Disorder: How to Diagnose, Treat, and Prevent It" *Int. J. Mol. Sci.* 2020; 21,1915.

<sup>19</sup> De Luca C, Thai JC, Raskovic D, et al. Metabolic and genetic screening of electromagnetic hypersensitive subjects as a feasible tool for diagnostics and intervention. *Mediators Inflamm.* 2014;2014:924184. doi:10.1155/2014/924184

<sup>20</sup> Pall, Martin L. "Wi-Fi Is an Important Threat to Human Health." *Environmental Research* 164 (July 1, 2018): 405–16. <https://doi.org/10.1016/j.envres.2018.01.035>

<sup>21</sup> Havas M. Radiation from wireless technology affects the blood, the heart, and the autonomic nervous system. *Reviews on Environmental Health.* 2013 Nov 1;28(2-3):75-84.

<sup>24</sup> Reversed reciprocating paroxysmal tachycardia controlled by guanethidine in a case of Wolff-Parkinson-White syndrome. Harris WE. Semler HJ. Griswold HE. *American heart journal* 67.6 (1964): 812-816.

Students have extremely high levels of nighttime exposure to RFR or electric fields/ dirty electricity. Before prescribing methylphenidate or amphetamines, reducing EMFs in the workspace is critical.

### **Category VI**

Phobias (minority 1%)

- Nocebo: inert substances or mere suggestions of substances actually bring about negative *effects*.
- Understandable given the ubiquitous nature of electrical devices in our everyday lives which is un-natural. • Can feel better with wearable jewellery, stickers on cellphones, rocks.

### **Physical Examination**

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Do a complete physical looking for dental amalgam load, metal appliances in the mouth, rashes on the face, hands, signs of inflammation and edema, arrhythmias, autoimmunity.

Abdomen may be tender due to peristaltic abnormalities and bacterial dysregulation.

Usually a physical exam will reveal neurological, dermatological or cardiac signs in the way of arrhythmia, poor circulation. Tremor of the tongue and hands may be indicative of mercury overload. There is no gold standard for EHS diagnosis except for elimination of the source and reintroduction/ provocation to confirm if the signs and symptoms are reproduced.

### **Laboratory and Diagnostic Tests**

Studies have shown that approximately 30% of patients with EHS have no abnormal laboratory biomarkers (Belpomme 2020), but genetic polymorphisms are likely prevalent and need further investigation. Some blood tests are expensive and not sensitive or specific but can help guide management if deficiencies or other disease states exist that must be corrected.<sup>22</sup> The following laboratory tests will help deal with the total toxic load and detoxification profile, and it is the **combination** that allows for the best management of the patient:

- essential mineral and toxic metal panel
- GGT
- bilirubin,
- ALP
- chromogranin A
- Tryptase.<sup>26</sup>
- vitamin D2-D3,
- **IgE**, IgG, IgM, IgA
- Inflammation (ESR, hsCRP, CRP, interleukins)
- Histamine
- Autoimmune markers (thyroid antibodies)
- Presence of infectious diseases – screen for Lyme and co-infections (ELISA and Western blot)
- Mitochondriopathy (intracellular ATP)
- Oxidative stress lipid peroxidation markers
- Anti-myelin-O Abs
- nitrotyrosin (NTT) - Nitric oxide production increasing BBB permeability
- melatonin (hydroxy-melatonin sulfate – 6-OHMS)

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<sup>22</sup> Europaem 2015/ Oberfeld, 2016/ Belpomme, 2015 <sup>26</sup>

Belpomme, et al, 2015



- SPEP – effects on bone marrow
  - salivary cortisol
  - alpha-amylase
  - transthyretin
  - blood sugar levels after provocation
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Biomarker	Normal range
High-sensitivity C reactive protein (hs-CRP)	$\leq 3$ mg/L
Vitamin D2-D3	$\geq 30$ ng/mL
Histamine	$\leq 10$ nmol/L
IgE	$\leq 100$ UI/mL
Protein S100B	$\leq 0.105$ $\mu$ g/L
Nitrotyrosine (NTT)	$\geq 0.6$ $\mu$ g/L and $\leq 0.9$ $\mu$ g/mL
Heat shock protein 70 (HSP70)	$\leq 5$ ng/mL
Heat shock protein 27 (HSP27)	$\leq 5$ ng/mL
Anti-O-myelin autoantibodies	Negative
Hydroxy-melatonin sulfate (6-OHMS)	$\geq 5$ ng/L and $\leq 40$ ng/L
6-OHMS/creatinine	$\geq 0.8$ and $\leq 8$

**Figure 2: (Belpomme et al., 2015)**

To further aid in diagnosis:<sup>23</sup>

- Genetic testing to determine SNPs related to detoxification<sup>24</sup>
- Hypoperfusion in limbic system and thalamus (weighted MRI)
- Temporal lobe hypoperfusion due to decreased flow in the middle cerebral artery (ultrasonic cerebral tomography (UCTS), Transcranial Doppler US (TDU)).<sup>25</sup>
- BP and heart rhythm monitoring for 24 hours (night-time changes) for heart rate variability and heart rate abnormalities.<sup>26</sup>
- Sleep study – will likely be abnormal due to wireless technology in the sleep labs. Alpha wave intrusions and reduced REM sleep are most likely finding.<sup>27</sup>

### Diagnoses and Co-Morbid Conditions

1. Toxic metal overload – mercury
2. Infectious diseases causing neural inflammation – ie. Lyme disease
3. Toxic Mold Syndrome
4. Cardiac conduction abnormalities – PVC, PAC, atrial fibrillation
5. Neurodegenerative diseases

<sup>23</sup> Havas, 2010

<sup>24</sup> The DNA Company. <https://www.thednacompany.com/>

<sup>25</sup> Belpomme, Dominique, Philippe Irigaray. "Electrohypersensitivity as a Newly Identified and Characterized Neurologic Pathological Disorder: How to Diagnose, Treat, and Prevent It" *Int. J. Mol. Sci.* 2020; 21,1915.

<sup>26</sup> Havas M. Radiation from wireless technology affects the blood, the heart, and the autonomic nervous system. *Reviews on Environmental Health.* 2013 Nov 1;28(2-3):75-84.

<sup>27</sup> Andrianome S, Hugueville L, de Seze R, Hanot-Roy M, Blazy K, Gamez C, Selmaoui B. Disturbed sleep in individuals with idiopathic environmental intolerance attributed to electromagnetic fields (IEI-EMF): Melatonin assessment as a biological marker. *Bioelectromagnetics.* 2016 Apr;37(3):175-82.

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## Management

- *Allopathic*

All co-morbid conditions need to be investigated further and treated. Referrals to specialists may be required to address medical issues that may have been overlooked.

- *Pharmacological*

Sleep restoration is paramount and pharmaceuticals can be used if natural remedies are not effective. Antihistamines with sedative effects are the drug of choice. For heart palpitations and arrhythmias, especially those occurring at night, bisoprolol 1.25-2.5mg qhs helps. For sudden tachycardic spells and wave of anxiety and sympathetic overdrive, propranolol 2.5-5mg po QID prn also is helpful. Daily baby ASA prevents coagulation secondary to high intensity effects due to the close proximity of routers, DECT base stations and other potent emitters and combination thereof. A calcium channel blocker, diltiazem 150mg daily prn, could help reduce symptoms. Gentle chelation therapy may be required if toxic metal load is too high<sup>28</sup>.

- *Remediation*

Health care providers need to encourage patients to seek help from building biologists. These technicians can assess the degree of EMF exposure a person is receiving in their home and make sensible recommendations. The impacts of cell phone towers, smart meters and hydro wires on living spaces can be determined as well as anything internally generating EMFs. Voltage, power density and magnetic fields, as well as dirty electricity can be measured. Proximity to wind turbines which, due to poor enforcement of safety standards, emit ground currents that increase symptoms of EHS, can be identified. Advise patients to use only corded phones without any electronic features. DECT cordless phones emit RFR and need to be removed altogether.

Metallic paint on interior walls or externally can be used to reflect radiation coming in from neighbours, cell towers or other emitting devices. Any other type of shielding using metallic reflective surfaces can help attenuate the signals.

Advise patients to turn off all wireless devices in the home and replace with ethernet cables or hardwire everything where possible. Smartmeter removal or shielding installed by a technician is recommended.

- *Integrative*

A diet rich in antioxidants and low in pro-inflammatory foods is strongly recommended.

For sleep, herbal remedies and supplements are helpful. Magnesium glycinate 100mg po qhs, increasing by 100mg weekly to bowel tolerance can help with palpitations and shock sensations.

Omega-3 (balanced DHA:EPA 1:1) 2-3 tablespoons daily will help with inflammation and neural health.

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<sup>28</sup> Sears ME. Chelation: harnessing and enhancing heavy metal detoxification—a review. The Scientific World Journal. 2013 Jan 1;2013.

Vit D3 is also neuroprotective and should be taken at a dose of at least 4000IU per day.

Electrolytic imbalances for whatever reason (ie low K<sup>+</sup>, Na<sup>+</sup>, Cl<sup>-</sup> etc) need to be corrected with rehydration solutions.

Natural detoxification strategies (sauna therapies (depuration), MBSR, balanced, diet, supplements, exercise), avoidance of excessive electromagnetic emissions, currents, vibrations, toxins and toxicants, shielding.

Reduce body burden<sup>29</sup>

- Detoxification – mercury, lead, solvents (CNS) – ALA, NAC, glutathione, vit C, selenium, sauna therapies, proper hydration, exercise

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- Correct any dental work with toxic or immunoreactive materials – mercury, lead oxide, gold, titanium. (zirconium dioxide is acceptable)
  - Mercury amalgam: mercury (50%), silver (~22–32%), tin (~14%), copper (~8%) needs to be removed using proper protocol<sup>30</sup>
  - BEWARE OF POSSIBLE GENETIC POLYMORPHISMS

Enhance Natural Detoxification

- Eat a diet rich in antioxidants, organic if possible.
- To decrease body burden of oxidative stress (peroxynitrite ONOO<sup>-</sup>) take antioxidants vit E, C, alpha-LA, NAC, B complex, zinc, resveratrol, CoQ10, selenium, turmeric
- protect with Ca, protein, iron, chromium
- Selenium, Zn, Cu, Mg protect against MeHg toxicity
- high fibre diet >30%
- Remove all harmful substance use in personal care products, cleaning products, unnecessary medications.
- To manage adrenal fatigue adaptogen herbs and MBSR can be useful.
- Homeopathic treatments are useful for those with chemical sensitivities.

Other treatments include hydration, sauna therapy, enhanced antioxidant reserves through nutritional supplementation, and improved excretion through the bowel and renal function. One should be very well nourished in order to do the job. If you cannot get what you need, either due to genetic compromise, or just due to lack and imbalance of diet, then supplements are helpful. If you cannot afford supplements, then we have to rely on an excellent diet. The natural methods of detoxification, soluble and insoluble fibres, breathing, relaxation nutritional supplements, sweating, sauna and exercise, all help enhance the battle of elimination. I caution against fasting because it does not work for some people if they don't have adequate supplies of vitamins, minerals and other antioxidant substrates in their body.<sup>31</sup> Food sensitivities/intolerances must be addressed.

Correct any sleep disorders using natural remedies and shielding.

- *Lifestyle*

Tell patients to hold the cell phone away from their heads when in use and keep it in airplane mode when not in use. The Bluetooth, data and Wi-Fi functions should be off if they are not being used. Extended

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<sup>29</sup> De Luca, 2014

<sup>30</sup> Institute for Functional Medicine. Textbook of Functional Medicine. 2010.

<sup>31</sup> Institute for Functional Medicine. Textbook of Functional Medicine. 2010.

videogaming and high electronic equipment use can exacerbate symptoms and must be curtailed. Laptop use in wireless mode needs to be switched to ethernet cable connectivity to decrease exposure.

Clothing (including the lining of hats) made of cotton fabric with copper or silver weave provides relief during travel at airports, in hotels, etc, when shielding the torso and head. This can reduce palpitations and headaches. Blankets/ sheets with similar construction can be used to block out in-coming radiation into habitable spaces during travel or at work.

A Faraday cage (canopy) can be used at night to reduce radiation on the body which can seriously interfere with sleep quality.

Grounding practices are important to balance out the electron shifts. This should not be done under hydro wires, where magnetic fields are extraordinarily strong. There will be a depletion of electrons. The aim is to replenish lost electrons. Therefore, placing one's bare feet on a special grounding mat, walking barefoot on grass, sand, lake shallows, pools or a bath tub can help. Grounding can be important to balance out the electrons, replenish the electrons that have been depleted from the body.

Apple products, such as AirPods should not be used due to the proximity and intensity of the radiation to the brain.

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- ***Psychological***

Finally, patients need a lot of psychosocial support in dealing with and removing stress triggers. Mindfulness Based Stress Reduction, and a little CBT can be useful to decrease sympathetic nervous system overdrive.

Connecting with support groups – C4ST, EPIC, WEEP (Canadian Based), can decrease social isolation.

### **Advocacy for Public Health Protection**

- Accommodation at work, school or any learning institution should be supported thereby respecting a person's right work and live in a space that is free of any potentially harmful EMF exposure impacting on a person's biopsychosocialspiritual well-being.
- Students should be given letters/notes informing teachers of the need to be at a maximal distance from routers and that laptops need ethernet access.
- People must be able to exercise their rights to refuse harm from EMFs (created by IT companies for material gain) impacting themselves, their children and loved one's or their fetus/ embryo if that be the situation. Each person, including those carrying the unborn fetus/ embryo, should know exactly how much and what sort of radiation is impacting on their bodies.<sup>32</sup>
- Recommendations presented in the HESA report to the House of Commons – Radiofrequency Electromagnetic Radiation and the Health of Canadians, 2010 and 2015, can be used for guidance in community events.
- Ontario wide, OMA-run (possibly PHO) mandatory physician survey of how many patients MDs have in their roster who complain of possible EMF-related signs and symptoms should be implemented.
- Validated screening tools need to be developed through further research studies. • Physician education through CME is critical.

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<sup>32</sup> Right to Know, CCOHS <https://www.ccohs.ca/oshanswers/legisl/responsi.html>

