



Fact Sheet – Wireless Technologies, 5G and Human Health

Introduction

5G stands for fifth generation mobile phone services. 5G will not only utilize current 3G and 4G wireless frequencies and infrastructure already in use but also add higher frequency — submillimeter and millimeter waves — in order to transmit more data.

This new mobile network will require millions of small cell antennas to be placed on lampposts and utility poles approximately every 6—10 houses. This will result in involuntary exposure to wireless radiation for everyone 24/7, whether they use the service or not. Wireless small cell antennas emit microwaves — non-ionizing radiofrequency radiation — and essentially function as cell towers.

Peer reviewed, published science indicates that cumulative daily exposure to wireless frequencies can increase cancer risk, alter brain development, damage DNA, and damage sperm. Wireless technologies such as cell phones and Wi-Fi have never undergone any pre-market safety testing, a fact admitted to by industry experts before the United States Congress in 2018.

The World Health Organization (WHO) classified wireless radiation as being possibly carcinogenic in 2011, putting it in the same category as lead and DDT. And in 2015, the Canadian House of Commons standing committee on health made recommendations for Health Canada to review all the literature with respect to electromagnetic fields and human health (which they currently do not do) and further investigate the problems.

Latest Evidence: Radiofrequency (RF) Radiation is a Human Carcinogen

- In 2009, the nomination for the National Toxicology Program (NTP) to study cell phone radiofrequency radiation was made by the U.S. Food and Drug Administration (FDA) because of “widespread human exposure” and “current exposure guidelines are based largely on protection from acute injury from thermal effects” while “little is known about potential health effects of long-term exposure to radiofrequency radiation.” ([Press release](#))
- The full results of the NTP study were published in 2018. The 25-million dollar U.S. government-funded study found statistically significant increases in cancer in the brains and hearts of rats exposed to cell phone signals for 2 years. During a rigorous peer-review process, some findings were upgraded from evidence of cancer to “clear evidence” of cancer. This is the largest study of its kind to date. <https://ntp.niehs.nih.gov/results/areas/cellphones/index.html>
- These findings were replicated in a study conducted by the prestigious Ramazzini Institute. <https://www.ncbi.nlm.nih.gov/pubmed/29530389>
- The NTP study and several other studies since 2011 warrant an upgrade from “possibly carcinogenic” to “carcinogenic to humans”. Two peer-reviewed, published reviews explain this well:
Miller, A.B., et al. (2018) [Cancer epidemiology update, following the 2011 IARC evaluation of radiofrequency electromagnetic fields \(Monograph 102\)](#)

Hardell, L, & Carlberg, M. (2018). [Using the Hill viewpoints from 1965 for evaluating strengths of evidence of the risk for brain tumors associated with use of mobile and cordless phones](#)

- If RF radiation is causing cancers, we should see an increase in related cancers in the population. In fact, the data is confirming this.

2019: In Denmark, [government data](#) shows a near doubling of the fatal brain tumor, glioblastoma multiforme (GBM), the deadliest type of brain tumor and linked to cell phone use, since the year 2000. Microwave News covered the issue in two reports: [GBM Rising in Denmark, Much as in England True Increases or Artifacts?](#) and [Danish Spike in GBM Is Back Information and Misinformation Vie for Attention](#)

2018: The US Center for Disease Control (CDC) presented new findings of **increasing brain, renal, hepatic, and thyroid cancers** among individuals under 20 years old in the USA (analyzing 2001–2014 data from 48 states covering 98% of the US population). [Siegel 2018](#)

The incidence of glioblastoma multiforme (GBM) **more than doubled in England between 1995 and 2015**, according to a new analysis of national statistics published in 2018 in the [Journal of the Environment and Public Health](#).

Please also see “[Cell Phone Radiation Associated Brain Tumor Rates Are Rising: Scientific Documentation](#)” on the Environmental Health Trust website.

Why not rely upon Health Canada and Safety Code 6?

- Safety Code 6 was created in 1979 to protect federal workers on federal job sites from radiofrequency (RF) radiation. It is for a 6 minute exposure for a 6 foot, 200 pound male mannequin, representing the top 10% of military recruits at that time. It is one of the least protective standards in the world.
- China, Russia, Italy and Switzerland have wireless radiation safety limits 100 times safer than Canada. 40% of the world’s population lives in countries with codes safer than Canada.
- Safety Code 6 is only relevant for thermal effects (tissue heating); it is irrelevant to non-thermal, biological health effects which occur at levels many orders of magnitude lower intensity. It has not had a major revision in 30 years.
- Please see the Canadians for Safe Technology’s [webpage on Safety Code 6](#) for much more information about problems with Safety Code 6. (Canadians for Safe Technology was founded by Frank Clegg, former President of Microsoft Canada, who has dedicated his retirement to raising awareness and lobbying governments on these issues.)
- Dr. Martin Pall points out that “there are thousands of studies apparently falsifying [the] position [that only thermal effects need to be considered for Safety Code 6]” in his published study examining the assumptions of the Canadian safety code.

Pall, M.L., [Scientific evidence contradicts findings and assumptions of Canadian Safety Panel 6: microwaves act through voltage-gated calcium channel activation to induce biological impacts at non-thermal levels, supporting a paradigm shift for microwave/lower frequency electromagnetic field action](#)

Major Organizations Update Their Thinking

- Based partly on the results of the game-changing studies listed above, a number of prominent organizations have urged caution and a need to update safety standards to protect health. Examples include the Institute of Electrical and Electronics Engineers (IEEE) and the Workers Health and Safety Centre (WHSC).

Institute of Electrical and Electronics Engineers (IEEE), IEEE Microwave Magazine, Sept/Oct 2018: [Clear Evidence of Cell-Phone RF Radiation Cancer Risk](#)

Workers' Health and Safety Centre bulletin, May 8, 2019: [Radiation from cell phones a human carcinogen, new review finds](#)

Expert Scientists and Doctors are Sounding the Alarm

- [EMF Appeal to the World Health Organization](#): 250 scientists, who have published peer-reviewed papers on the biological or health effects of non-ionizing electromagnetic fields, have urgently appealed to the UN and WHO to address the global public health concerns related to EMF exposure.

Dr. Joel Moskowitz, [in a recent op-ed published in Scientific American](#) stated: *"The scientists who signed this appeal arguably constitute the majority of experts on the effects of nonionizing radiation. They have published more than 2,000 papers and letters on EMF in professional journals."*

- [5G Appeal to the EU](#): As of September 17, 2019, 253 scientists and medical doctors have signed an appeal to the EU for a moratorium on 5G "until potential hazards for human health and the environment have been fully investigated by scientists independent from industry."
- [Dr. Hugh Scully](#) (Past-President of Ontario Medical Association, Past-President of Canadian Medical Association, Past-President of Canadian Cardiovascular Society) in his testimony to the City of Toronto urging the city not to roll-out Wi-Fi in public places, said *"As a physician leader in Canada with a great commitment to the health of Canadians, I am very concerned about the increasing evidence internationally that EMR is creating increasing health problems in our population... This is particularly true among children and young Canadians, and teachers and nurses who are continuously exposed to WiFi routers in schools. As a cardiac specialist, I am concerned that approximately 20% of people have detrimental cardiac rhythm sensitivity to EMR."*
- [Media Release - Ontario Doctors Warn of Rising Health Care Costs after 5G Roll Out](#) (video): At a recent health conference at the esteemed Women's College Hospital in Toronto, a panel of experts reviewed the peer-reviewed science showing adverse health effects from EMF and warned of an impending health care crisis. Dr. Anthony Miller (Professor Emeritus, University of Toronto), a former national health scientist for the Canadian government, awarded the medal of honour by the International Agency for Research on Cancer (IARC), advised that there is now enough evidence to classify radiofrequency radiation from EMFs as Class 1, or known carcinogen. Dr. Miller served on the original IARC committee in 2011 that advised the WHO to classify EMFs as a Class 2B, or possibly carcinogenic.

Appeals and Recommendations to Health Canada

- Canada's 41st Parliament Standing Committee on Health (HESA) studied Safety Code 6 and issued a report in 2015 (HESA-58) urging a precautionary approach [to wireless technologies], more study/research and "that the Government of Canada continue to provide reasonable accommodations for environmental sensitivities, including electromagnetic hypersensitivity, as required under the Canadian Human Rights Act".
<http://www.ourcommons.ca/Content/Committee/412/HESA/Reports/RP8041315/hesarp13/hesarp13-e.pdf>
- In total HESA made 15 recommendations to the Government of Canada at the conclusion of the term of Prime Minister Stephen Harper. Although incoming Prime Minister Justin Trudeau promised to implement the recommendations when elected, he did not.
- There have been two recent appeals to Health Canada:
[Declaration: Doctors Call for Protection from Radiofrequency Radiation Exposure](#) – Signed by 22 Canadian physicians. July 9, 2014

[Declaration: Scientists call for Protection from Radiofrequency Radiation Exposure](#) – Signed by 53 international scientists who are experts in EMFs and health effects. July 9, 2014

Economic Interests Prevail over Precautionary Approaches

- The Harvard Edmund J. Safra Center for Ethics published an exposé by investigative journalist [Norm Alster](#) on the financial ties between the US federal government's Federal Communications Commission (FCC) and how, as a result, the wireless industry has bought inordinate access to—and power over—a major US regulatory agency. Alster describes how the FCC is a "captured agency" meaning it is controlled by the industry it is supposed to be regulating.

The report [Captured Agency](#) compares the wireless industry to the tobacco industry in terms of the lobbying and the strategies used to influence public perception. It describes how the telecom industry is using the same playbook as tobacco.
- Economic interests of big telecom are now worth over \$3.4 trillion US. ([Forbes 2018](#))
- Investigative journalists Mark Hertsgaard and Mark Downie wrote an exposé for the Nation entitled [How Big Wireless Made Us Think That Cell Phones Are Safe: A Special Investigation. The disinformation campaign—and massive radiation increase—behind the 5G rollout.](#)
- We have been here before with our Public Health agencies: tobacco, asbestos, glyphosate, BPAs, CFCs, toxins in cosmetics, and the list goes on. Public Health agencies, like Health Canada, often take DECADES to respond after the science clearly indicates harm. Many times our Public Health agencies have had to bow to pressure from people and organizations who work tirelessly to make sure someone is standing up for public health when government and industry have not. The founder of the [Environmental Health Trust](#), world-renowned epidemiologist Dr. Devra Davis, was a key player in having smoking banned from airplanes. Her organization is now raising awareness about radiofrequency radiation as a major health concern.

People are Getting Sick; Illnesses Related to Radiofrequency Radiation are Increasing

- [Common symptoms of exposure to radiofrequency radiation include](#) headaches, insomnia, fatigue, difficulty concentrating, heart arrhythmias and palpitations, skin rashes, ringing in the ears, nosebleeds, dizziness, depression, and infertility.
- Well-established in the scientific literature are the following negative health effects due to 2G/3G/4G technology:
 - Lowered fertility (18 reviews)
 - Neurological/neuropsychiatric effects (25 reviews)
 - Cellular DNA damage (21 reviews)
 - Apoptosis, programmed cell death (13 reviews)
 - Oxidative stress/free radical damage (19 reviews)
 - Endocrine/hormonal effects (12 reviews)
 - Excessive intracellular calcium, causing insomnia (15 reviews)
 - Cancer (35 reviews)

Please note that the numbers refer to literature reviews, not individual studies. The above summary is taken from Dr. Martin Pall's presentation to the "Health in Buildings Roundtable" sponsored by the National Institutes of Health and co-organized by the US CDC and several other organizations ([video](#))

- Due to the adverse health effects experienced by Californian firefighters who worked in fire-halls with cellular antennas in close proximity, they were able to pass ordinances allowing fire-halls to refuse cell towers to be placed close to their premises. (See [this letter](#) for background as well as [this position statement](#) on the health effects from radiofrequency/microwave radiation by the International Association of Fire Fighters.)
- The adverse effects of radiofrequency radiation on male fertility are well established and recent population studies reveal an alarming decline in male fertility:
 - Adverse Effects of Wi-Fi Radiation on Male Reproductive System: A Systematic Review (2019)
https://www.ijstage.ist.go.jp/article/tjem/248/3/248_169/html-char/en
 - Effect of mobile telephones on sperm quality: A systematic review and meta-analysis (2014)
<https://www.sciencedirect.com/science/article/pii/S0160412014001354>
 - [Research by the University of Geneva \(UNIGE\)](#) found that only 38% of the men it studied in Switzerland had sperm above the standard the World Health Organisation (WHO) considers men to be fertile.
- Dr. Riina Bray, the Medical Director of the Environmental Health Clinic at Women's College Hospital in Toronto, who visited Kingston recently for an Expert Panel Discussion at Kingston City Hall, [told the Whig Standard](#) *"that peer-reviewed scientific research demonstrates that 'the link is there' when it comes to electromagnetic influences on biological function. She said three per cent of the population is severely affected, and that the number is growing."*
- With respect to "three percent", Dr. Bray is referring to individuals with Electromagnetic Hypersensitivity. While 3% may seem like a small figure, [a 2016 study](#) found that the number of community-dwelling Canadians who use a wheelchair is 1%. The prevalence of peanut allergies, the most common food allergy, is about 2% [according to a recent study](#).

- Electromagnetic Hypersensitivity or EHS meets the test according to the Canadian Human Rights Commission as a "disability". Their policy on Environmental Sensitivities refers to them as "disabilities". Supporting documents such as "The Medical Perspective on Environmental Sensitivities" states that "electromagnetic phenomenon" are included in the environmental agents to which people are "sensitive".
https://www.chrc-ccdp.gc.ca/sites/default/files/policy_sensitivity_0.pdf
- EHS is also recognized in the International Classification of Diseases. <https://icd.codes/icd10cm/W90>
- The City of Peterborough has developed an "[Electromagnetic Hypersensitivity Tip Sheet](#)" to accommodate individuals with EHS.

Mechanisms of Harm are now Known

- One of the major mechanisms of health effects from electromagnetic field was identified in a highly cited, award-winning research paper by Dr. Martin Pall in the Journal of Cellular and Molecular Medicine – Cited well over 200 times.

Pall, M.L. (2013). [Electromagnetic fields act via activation of voltage-gated calcium channels to produce beneficial or adverse effects](#)

No Studies Show 5G is Safe, no Pre-market Safety Testing has Been Done

- [US Senator Blumenthal Raises Concerns on 5G Wireless Technology Health Risks at Senate Hearing](#) (Video) Telecom representatives admit that no safety studies have been done on 5G and that there is no plan to carry out these studies.
- [5G Wireless Expansion: Public Health and Environmental Implications](#) is a 5G research review that documents the range of reported adverse effects of RF and millimeter waves—effects range from cancer to bacteria growth changes to DNA damage. The study concludes that "a moratorium on the deployment of 5G is warranted" and "the addition of this added high frequency 5G radiation to an already complex mix of lower frequencies, will contribute to a negative public health outcome ... from both physical and mental health perspectives" ([Russell 2018](#)).
- [Towards 5G communication systems: Are there health implications?](#) is a research review that details how research has found that millimeter waves can alter gene expression, promote cellular proliferation and synthesis of proteins linked with oxidative stress, inflammatory and metabolic processes." The researchers conclude, "available findings seem sufficient to demonstrate the existence of biomedical effects, to invoke the precautionary principle" ([Di Ciaula 2018](#)).

Insurers Won't Insure; Who Holds the Liability?

- Who holds the liability - the City or the telecoms - if or when 5G small cells cause personal injuries and reduce property values? In the US, state streamlining bills are being used to target and erode municipalities' basic contractual rights to indemnification. [See this page about Streamlining Bills](#).
- [Exclusion clauses are the industry standard](#): Lloyd's of London stopped insuring wireless and cell companies in the late 1990's (under exclusion 32) and Aviva will also not insure against liability from electromagnetic fields.

- Swiss Re, one of the world’s leading insurers, lists “the spread of 5G networks” as one of the top 5 emerging risks in its [SONAR 2019 report](#) citing possible negative health effects and privacy and security risks.

Violation of International Human Rights Law, Nuremberg Code

- [The Precautionary Principle](#) is embedded in many international conventions and occupational safety and environmental laws:

“When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically. In this context the proponent of an activity, rather than the public, should bear the burden of proof. The process of applying the Precautionary Principle must be open, informed and democratic and must include potentially affected parties. It must also involve an examination of the full range of alternatives, including no action.”

- Written statement submitted to the UN Human Rights Council by the Planetary Association for Clean Energy, Inc. a non-governmental organization in special consultative status.

[5G is cruel, inhuman and degrading treatment under resolution 39/46](#)

Supporting References (89 pages):

<https://whatis5g.info/wp-content/uploads/2019/04/References.pdf>

Jurisdictions Taking Action

- On June 24, 2019 [Cyprus launched a cell phone and wireless radiation campaign](#). In his address, the Minister of Health expressed his full support for the work of the Committee and stressed that “the Ministry of Health recognizes that the results of research on the health effects of the electronic cloud (i.e from EMF/RF) and other negative environmental phenomena are no longer considered as hypotheses.”
- [Plans for 5G have been halted in Brussels](#). Environment minister Céline Fremault said, “The people of Brussels are not guinea pigs whose health I can sell at a profit. We cannot leave anything to doubt.”
- [Geneva has stopped the erection of 5G antennas](#) “motivated by uncertainty on the potential health effects of the new technology”.
- Thousands recently protested in Switzerland against 5G installations: [Thousands of Anti-5G Swiss Protest At Their Capital](#)
- Freedom Mobile withdrew their application for a single small cell antenna in South Surrey, BC when residents launched an awareness campaign in their neighbourhood. Common Ground Magazine (BC): [Pushback against 5G wireless grows](#)
- [A court in France has ordered the removal](#) of 13 Linky wireless transmitting smart meters after they were linked to a variety of health issues.

- Websites documenting **many more** jurisdictions taking action:
Environmental Health Trust - [International Actions to Halt and Delay 5G](#)
[Scientists for Wired Technology](#)
[5G Crisis](#)

Other Reasons to Oppose 5G

- Climate/Energy consumption: The next generation of wireless infrastructure could consume one fifth of global electricity by 2025.
<https://www.climatechangenews.com/2017/12/11/tsunami-data-consume-one-fifth-global-electricity-2025/>
- Environment: Scientists are warning about a “wireless silent spring”.
https://mdsafetech.files.wordpress.com/2018/11/wireless-silentspring_sccma-oct-2-2018.pdf
- Colony collapse disorder is linked to EMF pollution.
<http://www.bioinformation.net/014/97320630014521.pdf>
- Populations of flying insects have declined by 75-80 per cent since 1989, which also coincides with early deployments of cellular networks; 5G radiation could have catastrophic effects worldwide.
<https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0185809&type=printable>
- Privacy Rights: 5G networks will allow massive amounts of data collection. What safeguards are in place to protect citizens? Experts are warning that 5G networks - which will rely heavily on 4G networks - will be susceptible to cyber-attacks and surveillance.

New Yorker Magazine: [The Terrifying Potential of the 5G Network](#)

Solutions for Innovation

- Wired fiber-to-the-premises (FTTP) networks are faster and far more efficient than wireless networks. Fibre-optic networks do not emit radiofrequency radiation. They are also more future proof and resilient in the face of extreme weather. Frank Clegg, former President of Microsoft Canada, agrees. In the introduction of “[Re-Inventing Wires: The Future of Landlines and Networks](#)”, Clegg says that there are “indisputable technical, economic, and sustainability reasons why wired technologies portend the best and highest future.”
- The Electronic Frontier Foundation (EFF), a digital rights advocacy organization, has just published a [whitepaper](#) entitled “The Case for Fiber to the Home, Today: Why Fiber is a Superior Medium for 21st Century Broadband” which contends that “The debate over the best infrastructure to deliver fixed last-mile broadband service in the 21st century is settled, and fiber is the undisputed winner. Fiber-to-the-home deployments are a better option for consumers today, and they are the only option that will allow expansive, efficient upgrades to America’s networks for a generation.”
- The website [Connected-Communities.ca](#) has an excellent page for local governments who wish to pursue community-owned, fibre-to-the-premises infrastructure.

- A US-based organization called the “Institute for Local Self-Reliance” provides [resources and toolkits for municipalities](#) who want to invest in telecommunications infrastructure to serve public facilities, local businesses, and even residences. They have ‘fact sheets’ on topics such as [Economic Development](#) and [Public Savings](#) on the benefits of municipal networks and offer real world examples from other communities.

Policy Recommendations for Public Health

Frontiers in Public Health (2019): [Risks to Health and Well-Being From Radio-Frequency Radiation Emitted by Cell Phones and Other Wireless Devices](#)

*“Based on the accumulated evidence, we recommend that IARC re-evaluate its 2011 classification of the human carcinogenicity of RFR, and that WHO complete a systematic review of multiple other health effects such as sperm damage. In the interim, **current knowledge provides justification for governments, public health authorities, and physicians/allied health professionals to warn the population that having a cell phone next to the body is harmful, and to support measures to reduce all exposures to RFR.**” [emphasis added]*