From: Meg Sears PhD, Chair Prevent Cancer Now
meg@preventcancernow.ca

To: Standing Committee on Environment and Sustainable Development
Clerk, ENVI@parl.gc.ca

November 4, 2022

Amending the *Canadian Environmental Protection Act* for 2022 and Beyond
Bill S-5, Strengthening Environmental Protection for a Healthier Canada Act

Prevent Cancer Now is pleased to submit the following discussion and recommended amendments to Bill S-5, as amended by the Senate. We ask that the Committee update scientific scope for decision-making and environmental protection, to address the challenges of 2022 and beyond.

We also request the opportunity for Dr. Meg Sears to address the ENVI Committee.

Prevent Cancer Now (PCN) commends the Government of Canada for recognizing The Right to a Healthy Environment. Practically, morally and ethically we must target this goal, by enacting substantive measures to achieve this right.

Updating the science underpinning CEPA

CEPA is a central statute to address both accelerating environmental degradation, as well as increasing incidence of cancer, developmental disorders and chronic disease among Canadians.[1] We are vastly exceeding planetary capacity to absorb many pollutants,[2] and preeminent scientists state that substantial shifts are necessary to avoid a "ghastly future."[3] Pollution is degrading habitats, causing decline and extinction of many species including essential pollinators, and fuelling climate chaos. Substantial reductions in environmental releases and consumption are necessary to achieve the necessary limits on greenhouse gases and other pollutants.

The disastrous storms, forest fires, droughts and diminished crops of 2021 and 2022 demonstrate the inextricable linkages between environment, economy and health, with under-recognized, but prohibitive costs of pollution to Canadian families, businesses and governments now a stark, worsening reality. The International Institute for Sustainable Development reported $36 billion costs for smog impacts on well-being in Canada, and even greater costs from other toxicants (e.g., green-house gases and toxic metals) affecting human health, crops, forests, business and natural capital during 2015.[4] In 2021, Health Canada attributed 15,300 premature deaths, and $120 billion in costs (6% of Canada's GDP) to air pollution, during 2016.[5] The Canadian Climate Institute reported in September 2022 that climate change is costing Canadians billions of dollars annually (and increasing rapidly), and that governments have systematically under-estimated both future costs of impacts of climate change, and benefits of early response. *In other words, governmental economic analyses are biased against taking early action.*

The Right to a Healthy Environment requires amendments so that CEPA results in best practices to address climate chaos and diverse pollution

Environmental protection is increasingly urgent, at a greater scale and speed than recognized even when Bill S-5 was being drafted. Under Bill S-5, CEPA has to catch up with today's realities, emerging scientific knowledge and tools, and substantial challenges of the 2020s to curb and reverse declines in environmental and public health, as well as accelerating climate chaos.

CEPA is a framework for enforceable *choices* to protect human and environmental health. Prevent Cancer Now recommends amendments to Bill S-5, following discussion of each of four topics.

1. For Chemicals Assessment: Broaden characteristics of toxicities of concern for substances, and prioritize regulation of toxicants to be consistent with the ongoing rolling list of individual and groups of substances for restriction under REACH, in the European Union.[6]

Update endpoints to reflect current science and to address current human health trends

CEPA 1999, Section 44 has required research into endocrine disruption since 2007, but Canadians are still not protected against these chemical-induced harms and injuries.

CEPA S.44 states in part:

> **Hormone disrupting substances**
>
> (4) The Ministers shall conduct research or studies relating to hormone disrupting substances, methods related to their detection, methods to determine their actual or likely short-term or long-term effect on the environment and human health, and preventive, control and abatement measures to deal with those substances to protect the environment and human health.

Despite global calls by medical experts for action to counter worsening trends of early development and health, sexual development, fertility, metabolism, and cancer, inaction has resulted in ubiquitous contamination of the Canadian population and environment with endocrine disrupting chemicals, leading to widespread and often irreversible effects.

Protection of public health requires that substances causing receptor-mediated adverse effects, including endocrine disruption, be restricted under Bill S-5.

Decades of research demonstrates overwhelming scientific evidence that substances termed "endocrine disruptors" may mimic or block hormone actions. Endocrine disruptors cause irreversible structural and functional effects on development, including alteration of metabolic set-points resulting in obesity and related chronic diseases; developmental disorders including sexual differentiation and reproduction; effects on neuro-behaviour and immune function; and various cancers. Embryonic and fetal exposures can lead to chronic conditions in adulthood, old age and in subsequent generations. This was vividly reported for the now-banned insecticide DDT, with increased risk of breast cancer in granddaughters of exposed women.[7] Chemicals may also interact with other receptors such as transient receptor proteins.[8]

Unlike some toxicological effects, chemicals causing receptor-mediated responses frequently demonstrate non-monotonic dose-response patterns, with disproportionately large effects occurring at low doses—i.e., exposures that are assumed to be "safe" using standard toxicological testing. Traditional toxicology research may not capture these modes of action, but testing methodologies have been developed and ever-stronger expert consensus statements have been published by the Endocrine Society[9,10] and others[11] that call for action on endocrine disrupting chemicals.

Limited pilot efforts to address classes of chemicals under Canada's Chemicals Management Plan have typically been narrowly scoped to single endocrine outcomes (e.g., phthalates were examined for androgenic but not estrogenic or other effects), often omit similar substances that are likely to exhibit effects, and generally omit important scientific information in the public domain (see Prevent Cancer Now responses to consultations on Naphthalene Sulfonic Acids, Phthalates, Fragrances, PFAS on food contact materials, Informed Substitution, Endocrine Disrupting Chemicals: A Roadmap for Action, and CEPA Review, available from: preventcancernow.ca/submissions/).

The scientific evidence is well established and demonstrates that it is vital to protect our health and the trajectory of human development from numerous, ubiquitous, toxicants in everyday products and the environment. Prevent Cancer Now has summarized how these effects mirror the spectrum of increasing rates of cancer and chronic disease and known adverse effects of chemicals,[1] and ethical approaches to validate effectiveness (or not) of environmental management.[12]

Additional endpoints are necessary to modernize assessments and to reduce animal testing

Reducing animal testing requires greater reliance on *in vitro* testing and modelling. These studies examine endpoints such as endocrine disruption, immunotoxicity and other toxic endpoints. While mutagenicity can be tested *in vitro*, carcinogenicity must be tested in animals and/or unfortunately, all too commonly, discerned with increasing disease in many humans, over decades or generations.

We can only move beyond animal testing if outcomes from other testing, as being advanced in Europe, are included as decision-points in Bill S-5.

Europe has taken a lead, with a stronger scientific basis and framework. Detailed Guidance on assessment of endocrine disruption, the result of extensive consultation by the European Commission, was published in 2018.[13] This stipulates that EATS (estrogenic, androgenic, thyroidal and steroidogenic) modes of action must be investigated. One case study demonstrating application of this guidance found that bisphenol AF (a BPA substitute) inhibited both estrogen and androgen receptors, causing reproductive dysfunction in both females and males.[14] Work is proceeding internationally on adverse effects and safer substitutes for endocrine-disrupting families of chemicals such as phthalates, bisphenols, and halogenated chemicals including anti-stick, anti-stain, waterproofing, and fire resistant products.

On April 25, 2022, the European Union released its proposed **Restrictions Roadmap under the Chemicals Strategy for Sustainability**,[6] prioritizing substances that, as in CEPA, are: carcinogenic, mutagenic and reprotoxic (CMR); persistent, bioaccumulative and toxic (PBT); and very persistent and very bioaccumulative (vPvB). ***In addition,*** **the EU is prioritizing endocrine disruptors, immunotoxicants, neurotoxicants, substances toxic to specific organs, and respiratory sensitizer substances *for (group) restrictions,* for all uses.**

Canadians and the environment are left at risk with ill-defined thresholds for "adverse" biological effects that must be met before triggering restrictions.

CEPA 1988 replaced and in many ways improved upon the *Environmental Contaminants Act (ECA, 1975)*. The ECA, however, had a less equivocal metric for evaluation, acting upon a biological "change" without the ill-defined, ambiguous requirement for the change to be "adverse." This century has seen long delays and inaction despite knowledge of biological effects, while equivocating whether known effects are "adverse." Actions on triclosan, bisphenols, and fluorinated and brominated substances were delayed and limited following such debates. We recommend amending CEPA to include the previous *Environmental Contaminants Act* definition of "class" of substances, and

to give weight to biological *changes* resulting from environmental exposures whether or not they meet a bar of "adverse".

PCN recommends amending CEPA (additions in bold text) to match priority characteristics of chemicals applied in the European Union to identify and to restrict *classes of substances* that are:

> carcinogenic, mutagenic and reprotoxic substances (CMR), **endocrine disruptors**, persistent, bioaccumulative and toxic (PBT), and very persistent and very bioaccumulative (vPvB) substances, **immunotoxicants, neurotoxicants, substances toxic to specific organs, and respiratory sensitizer substances, for all uses**.

DEFINITION [as in ECA]

> **"class of substances"** means any two or more substances that:
> (a) contain the same chemical moiety, or
> (b) have similar chemical properties and include the same type of chemical structure.
>
> *Ref. ECA: …* To require data and to investigate as to the nature, presence, dispersal, accumulation, persistence, methods of control and testing, as well as **the ability of the substance or of any class of substances of which it is a member to become incorporated and to accumulate in biological tissues or to cause biological *change***.

2. Support the *Right to a Healthy Environment* with *alternatives assessment* considering *essentiality*, *life-cycle toxicities* and a *climate lens*, to implement *substitution*

Among its roles to protect the environment, CEPA is used to limit or proscribe uses of substances or technologies. To date CEPA has been used to set a maximum bar to address the most toxic substances. PCN broadly supports Bill S-5 amendments proposed by the Canadian Environmental Law Association (CELA), and we recommend clarifications regarding alternatives.

Implementing the Right to a Healthy Environment requires *a shift to broader requirements for best practices*. Greenhouse gas emissions reduction requires absolute reductions in substances in commerce, with rapid improvements in durability, waste reduction and elimination, and resilience.

Alternatives may be identified at different levels, such as a *drop-in substitute* (this can result in unfortunate substitutes as seen for example with bisphenols, halogenated chemicals and phthalates), a *functional substitute* (e.g. non-halogenated water-proofing options to replace PFAS), a *fundamental design change* (e.g. use of non-flammable substances for insulation products instead of flame retardants), *improvements in durability and recyclability* to lower life cycle impacts, or *prohibition* such as for plastic microbeads in personal care products.

This could formalize Canada's approach to plastics and broaden applicability to other non-essential, potentially wasteful and polluting substances and items in commerce. Alternatives assessment would operationalize regulation of classes of chemicals, and prevent regrettable, harmful substitutions (e.g., substitution of the endocrine disrupting plastic BPA with another endocrine disruptor, BPS). Alternatives assessment could also guide reducing the chemicals portfolio, consistent with Europe's goal to reduce the number, quantities and toxicities of chemicals in commerce.[6]

"Essentiality"/ "Essential Use" is a provocative, potentially game-changing and, in the context of climate imperatives, essential criterion for effective and equitable reductions of Canadians' greenhouse gas footprint, and to become a global environmental leader.

Applications of "highest and best use" and "essential use" are powerful tools and are not new concepts. The Montreal Protocol to limit ozone-depleting substances is an early example, and now reduction and elimination of single-use plastic items is another. Canada has done it before and must ramp up such actions. It would be helpful to codify these concepts in CEPA.

Alternatives assessment, including consideration of essentiality and substitution would apply to substances and durable goods, as well as to telecommunications technologies to minimize "wireless" emission of radiofrequency electromagnetic radiation (RF-EMR) (see below).

PROPOSED AMENDMENTS

PCN supports amendments proposed by CELA, and highlights the following recommendations [*PCN italics are added to CELA recommendations]*:

4(2) Subsection 3(1) of the Act is amended by adding the following:

> **analysis of alternatives** means an assessment of whether safer, suitable alternative substances or technologies are available including: (a) whether the transition to an alternative would result in reduced overall risks to human health and the environment, taking into account the appropriateness and effectiveness of risk management or risk removal measures; (b) the technical and economic feasibility of the alternatives; *and (c) total life-cycle resource use, greenhouse gas releases and exergy analyses associated with alternative substances, products or technologies. Alternatives include the null alternative, based upon the essentiality of the substance, product or technology.*
>
> ***essentiality assessment*** *means an assessment of the extent to which benefits associated with the substance, product or technology are essential for human or environmental health, in particular applications. Essentiality is a consideration for selecting the null alternative, in alternatives assessment.*
>
> **safer alternative** means an option that includes input substitution as well as including a change in chemical, material, product, process, function, system or other action, whose adoption to replace a toxic substance *or technology* would be the most effective in comparison with another chemical, material, product, process, function, system, or other action*,* and the phrase "alternatives that are safer" has the same meaning;
>
> **substitution principle** means toxic substances listed in Schedule 1 *and technologies that pose risks to human or environmental health* are progressively replaced by non-hazardous or less hazardous *alternatives*, including non-chemical alternatives or safer technologies where these are technically and economically feasible;
>
> **technically feasible** means that the technical knowledge, equipment, materials and other resources available in the marketplace are expected to be sufficient to develop and implement a safer alternative, and the phrase "technically viable" has the same meaning;

Add development of alternatives assessment, essentiality and substitution with an additional clause in Bill S-5 implementation framework.

Implementation framework

5.1 (1) For the purposes of paragraph 2(1)(a.2), the Ministers shall, within two years after the day on which this section comes into force, develop an implementation framework to set out how the right to a healthy environment will be considered in the administration of this Act.

(a) the principles to be considered in the administration of this Act, such as principles of environmental justice [e.g., equal protections, and prevention of exposures that affect populations that are vulnerable as a result of location, age and stage of development, poverty, local food sources, occupation, life history, among many factors], and the principle of non-regression;

(b) research, studies or monitoring activities to support the protection of the right to a healthy environment referred to in paragraph 2(1)(a.2); and

(c) the balancing of that right with relevant factors, including social, economic, health and scientific factors

ADD

(d) *research and implement alternatives assessment, including consideration of essentiality and implemented via substitution, to improve transparency and to advance and support best practices for a healthy environment, in scientific assessments and pollution prevention.*

3. Initiate examination of radiofrequency electromagnetic radiation in amendments to CEPA S. 44, for data collection and study

There is no law, regulation, or involvement of Environment and Climate Change Canada to address environmental effects of radiofrequency electromagnetic radiation (RF-EMR). RF-EMR used for telecommunications is managed to protect human health according to Health Canada's "Safety Code 6" guidelines.[15] A briefing note[16] summarizes legislation, regulations and policies pertaining to RF-EMR. Neither data collection, research, assessment, nor regulation of environmental impacts is contemplated in other Canadian statutes or ancillary documents.[16]

The issue of environmental effects of RF-EMF is described thoroughly with scientific references in our White Paper, "Protect Birds, Bees and Trees. Include Anthropogenic Radiofrequency Electromagnetic Radiation in Canadian Environmental Protection Act Amendments" (Updated April 2022).[17,18]

Summary points are as follows:

Human health

- Health Canada's Safety Code 6, "Limits for human exposure to radiofrequency electromagnetic energy" guidelines are implemented by Innovation, Science and Economic Development (ISED) to protect humans from "established" adverse effects, specifically nerve stimulation at lower frequencies and over-heating of tissue at frequencies used for telecommunications. This guidance is referenced in legal documents regarding telecommunications equipment/infrastructure.

RF-EMR is an environmental pollutant, affecting flora and fauna

- Scientific research reports that RF-EMR is an environmental pollutant that affects all biota that have been adequately studied, including birds, insects and trees.[19,20,21] Effects have been observed at ambient and low-intensity levels, including cell towers (base stations) at a distance.

- The cataclysmic worldwide decline of populations of birds, insects and other biota makes this an urgent issue. According to scientists who specialize in this field, exposure to RF-EMR at ambient levels represents an important co-factor, along with pesticides, habitat loss and climate change.
- RF-EMR also magnifies the toxicity of chemicals, according to numerous laboratory studies, as well findings of interaction between mobile phone use and lead on child neurodevelopment.[22,23]
- Unlike toxic chemicals, RF-EMR from modern technologies is not addressed as a risk to the environment under CEPA, or other national laws, regulations, policies, or guidance.[16]

Magnitude and diversity of RF-EMR for telecommunications

- Natural background levels of RF-EMR are very low, but peak ambient levels have increased over recent decades about 1,000,000,000,000,000,000 times natural background levels for frequencies used in telecommunications, according to a 2018 report in *The Lancet Planetary Health*.[24]
- The rollout of novel technologies is increasing RF-EMR levels, as well as introducing frequencies and modulations not previously employed.
- Increasing numbers of structures with multiple cellular network antennas, specifically designed to emit RF-EMR, are being installed across Canada, in urban, rural and wilderness areas. These antennas will support the operation of hundreds of thousands of additional smaller antennas (e.g., 4G, 5G) being mounted on existing non-tower structures (e.g., street furniture, buildings, lamp-posts and other utility poles). At the same time, tens of thousands more telecommunications satellites are being launched to receive and to emit RF-EMR.

PROPOSED AMENDMENTS for data collection and research re. RF-EMF:

6.1 Section 43 of the Act is amended by adding the following after the last definition in the section:

"radiofrequency electromagnetic radiation" means:

> radiated energy arising from accelerating electrical charges, having the form of electromagnetic waves and a stream of photons, that travels at the speed of light. The rate of oscillation of the waves is in the range between 3 kilohertz (kHz) to 300 gigahertz (GHz), corresponding to the frequency of non-sinusoidal radio waves typically used in telecommunications.

7 Section 44 of the Act is amended by adding the following after subsection (4):

Radiofrequency electromagnetic radiation

(5) The Ministers shall conduct research or studies relating to radiofrequency electromagnetic radiation, methods related to its detection, methods to determine its actual or likely short-term or long-term effect on the environment and human health, and preventive, control and abatement measures to deal with it, and alternatives to its use, to protect the environment and human health.

Include review of RF-EMR in the Implementation Framework

4. Develop capacity for data collection, analyses and early detection of harms resulting from environmental exposures regulated under CEPA

Decisions made under CEPA to allow releases of and exposures to environmental agents are based on available information, which is initially (necessarily) incomplete. For example, residues from new and existing substances and their uses may take time to accumulate, effects may be delayed, interactions with other exposures may occur locally or more broadly, and harms may not be detected for considerable time. As such, initial decisions addressing novel exposures are essentially *hypotheses*.

Having proposed hypotheses in the course of administering CEPA, ethically it is incumbent upon the government to require data and research to examine hypotheses that environmental agents in Canada are indeed not causing harm.

Findings of long-term or delayed effects and/or harms, often seen first in susceptible or vulnerable populations, may eventually result in decisions being amended and substitutes coming into commerce. This typically occurs many years following initial introduction of the agent, following repeated cases of harms that eventually come to public attention. Awareness and evidence in scientific publications using data from jurisdictions with richer data resources may be of limited or delayed impact as Canadian applicability of the research is contested.

Thus, there is an ethical imperative to ensure that:

1) initial information from proponents is provided at early stages (e.g., at lower quantities in commerce) and is as robust as possible;
2) precautionary approaches are utilized in order to prevent harms; and
3) when adverse effects occur, that regrettable consequences are detected and addressed as rapidly, effectively and efficiently as possible.

This requires data, systematic and ongoing and routine analyses, and "forensic analysis" to piece together causal pathways and potential points of intervention for prevention and remediation.

Canada makes limited health data public, and replacements for some online resources that were cut during a previous government are not as rich as decades ago. More data, data sources and electronic infrastructure is needed to support and validate decisions under CEPA. Prevent Cancer Now has assembled an overview of some current data sources, and describes linking of health information with data addressing exposures, to gain capacity to discern effects.[12]

AMENDMENT TO THE IMPLEMENTATION FRAMEWORK:
SCOPE AND DEVELOP ENHANCED DATA COLLECTION, AND DEVELOP INFORMATION AND ANALYTICAL INFRASTRUCTURE, TO TRACK HEALTH AND ENVIRONMENTAL EXPOSURE RELATED OUTCOMES

In conclusion, the International Panel on Climate Change reported in April 2022 that the world must urgently *reverse* the ongoing increases in greenhouse gases by 2025 – less than three years from today – to have an even odds for a liveable world for today's children (1.5 to 2 degrees Celsius warming).[25] The world our descendants inherit will be shaped by measures we implement ***today***, and by the leadership to achieve urgent, rapid action in everyone's best interests.

About Us Prevent Cancer Now is Canada's national non-governmental organization focused on primary cancer prevention—"stopping cancer before it starts." This includes actions to reduce and eliminate exposures that contribute to development of cancer, many of which are regulated under

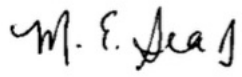
CEPA. Over more than a decade we have been directly involved with actions and programs under *Canadian Environmental Protection Act, 1999* (CEPA):

- participating in and observing numerous consultations and meetings;
- following pollution and public health topics both in the scientific literature and regulatory contexts in Canada and internationally;
- making numerous submissions to consultations under the Chemicals Management Plan and Parliamentary studies of CEPA and Safety Code 6; and
- advancing the science and ethics for regulatory decision-making, including laboratory studies, epidemiology and methodology to detect and to prevent harms from environmental exposures.

Please do not hesitate to ask for clarification or further information, or if we may be of further service.

On behalf of Prevent Cancer Now, I would be grateful for the opportunity to assist the ENEV Committee in person.

Respectfully Submitted,



Meg Sears PhD
Chairperson, Prevent Cancer Now
meg@preventcancernow.ca
613-297-6024

References

1. Prevent Cancer Now. Hazard-based regulation to curb environmental impacts on health. 2022.: https://preventcancernow.ca/hazard-based-regulation-to-curb-environmental-impacts-on-health/
2. Diamond et al. Exploring the planetary boundary for chemical pollution. 2015 https://www.sciencedirect.com/science/article/pii/S0160412015000288
3. Bradshaw CJA, et al. Underestimating the Challenges of Avoiding a Ghastly Future. Frontiers in Conservation Science. 2021 https://www.frontiersin.org/article/10.3389/fcosc.2020.615419
4. Smith R, McDougal K. Costs of Pollution in Canada: Measuring the impacts on families, businesses and governments. International Institute for Sustainable Development. www.iisd.org/publications/costs-pollution-canada-measuring-impacts-families-businesses-and-governments
5. Health Canada. Health Impacts of Air Pollution in Canada 2021 Report. 2021 Mar [cited 2021 Sep 13]. Report No.: ISBN: 978-0-660-37331-7.: https://www.canada.ca/en/health-canada/services/publications/healthy-living/2021-health-effects-indoor-air-pollution.html
6. European Commission. COMMISSION STAFF WORKING DOCUMENT Restrictions Roadmap under the Chemicals Strategy for Sustainability. 2022 [cited 2022 Apr 25].: https://ec.europa.eu/docsroom/documents/49734
7. Cohn BA, et al. DDT Exposure in Utero and Breast Cancer. https://academic.oup.com/jcem/article/100/8/2865/2836085
8. Molot J, Sears M, Marshall LM, Bray RI. Neurological susceptibility to environmental exposures: pathophysiological mechanisms in neurodegeneration and multiple chemical sensitivity. 2021. https://www.degruyter.com/document/doi/10.1515/reveh-2021-0043/html

9. Diamanti-Kandarakis E, et al. Endocrine-Disrupting Chemicals: An Endocrine Society Scientific Statement. 2009 Jun https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2726844/
10. Gore AC, et al. EDC-2: The Endocrine Society's Second Scientific Statement on Endocrine-Disrupting Chemicals. Endocrine Reviews. 2015;36(6):E1–150. academic.oup.com/edrv/article/36/6/E1/2354691
11. Alofe, et al. Determining the endocrine disruption potential of industrial chemicals using an integrative approach: Public databases, in vitro exposure, and modeling receptor interactions. http://www.sciencedirect.com/science/article/pii/S0160412018326722
12. Prevent Cancer Now. Data and analyses to detect harms from toxic exposures in Canadians. 2022. https://preventcancernow.ca/data-and-analyses-to-detect-harms-from-toxic-exposures-in-canadians/
13. Andersson, et al. Guidance for the identification of endocrine disruptors in the context of Regulations (EU) No 528/2012 and (EC) No 1107/2009. efsa.onlinelibrary.wiley.com/doi/abs/10.2903/j.efsa.2018.5311
14. Escrivá L, Zilliacus J, Hessel E, Beronius A. Assessment of the endocrine disrupting properties of bisphenol AF: a case study applying the European regulatory criteria and guidance. Environmental Health. 2021;20:1–19.: https://www.proquest.com/docview/2528905384/abstract/DE27A60C1C3D4646PQ/1
15. Health Canada. Safety Code 6: Health Canada's Radiofrequency Exposure Guidelines. 2015 http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio_guide-lignes_direct/index-eng.php
16. Prevent Cancer Now & Canadians for Safe Technology. Radiofrequency Electromagnetic Radiation investigation belongs in CEPA. 2022. https://preventcancernow.ca/wp-content/uploads/2022/09/EMRinS5-CEPAScopeBrief-2022-Jn-27.docx
17. Prevent Cancer Now. Canadians and residents need due process and science in national law, to assess and regulate "wireless radiation". 2022 https://preventcancernow.ca/canada-has-no-due-process-in-law-to-assess-and-regulate-wireless-radiation/
18. Prevent Cancer Now, Canadians for Safe Technology. Protect Birds, Bees and Trees. Include Anthropogenic Radiofrequency Electromagnetic Radiation in Canadian Environmental Protection Act Amendments. 2022. https://preventcancernow.ca/wp-content/uploads/2022/04/RF-EMRinCEPA-WhitePaper-inclAmendments-PCNC4ST-UPDATED2022April7.pdf
19. Levitt BB, Lai HC, Manville AM. Effects of non-ionizing electromagnetic fields on flora and fauna, part 1. Rising ambient EMF levels in the environment. Reviews on Environmental Health. 2021 http://www.degruyter.com/document/doi/10.1515/reveh-2021-0026/html
20. Levitt BB, Lai HC, Manville AM. Effects of non-ionizing electromagnetic fields on flora and fauna, Part 2 impacts: how species interact with natural and man-made EMF. 2021 http://www.degruyter.com/document/doi/10.1515/reveh-2021-0050/html
21. Levitt BB, Lai HC, Manville AM. Effects of non-ionizing electromagnetic fields on flora and fauna, Part 3. Exposure standards, public policy, laws, and future directions. 2021 http://www.degruyter.com/document/doi/10.1515/reveh-2021-0083/html
22. Byun YH, et al. Mobile Phone Use, Blood Lead Levels, and Attention Deficit Hyperactivity Symptoms in Children: A Longitudinal Study. PLOS ONE 2013 https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0059742
23. Choi KH et al. Neurodevelopment for the first three years following prenatal mobile phone use, radio frequency radiation and lead exposure. 2017 http://www.sciencedirect.com/science/article/pii/S0013935117302372
24. Bandara P, Carpenter DO. Planetary electromagnetic pollution: it is time to assess its impact. The Lancet Planetary Health. 2018 https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(18)30221-3
25. Tollefson J. IPCC's starkest message yet: extreme steps needed to avert climate disaster. Nature. 2022 https://www.nature.com/articles/d41586-022-00951-5