

**Emily Tarsell, LCPC**

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**Support with Amendment HB 40 (SB 201)  
Public Utilities – Transmission Lines – Advanced Transmission Technologies**

**House Environment and Transportation Committee**

Dear Chairman Koman, Vice Chair Guyton and E and T Committee  
Members:

I am a resident of northern Baltimore County and I have been supportive of proposed alternatives to the MPRP project. I am aware that the use of existing power lines with reconductor upgrades has been presented as one option to cost effectively increase power line capacity as an alternative to new MPRP construction. Clearly the proposals in this bill are meant to set the stage for such alternatives. However, while reconductoring is celebrated as a purely positive development, there is a downside.

As transmission lines are re-energized with higher current loads, the electromagnetic fields they generate intensify. There is concern and evidence that power line EMFs are linked to serious adverse health issues including cancer, particularly childhood leukemia. The International Agency for Research on Cancer classifies low level frequency EMF as a “possible carcinogen.” I have attached copies of articles relating to this issue.

Studies regarding health risks from EMFs were conducted prior to the proposed much higher current loads. They do however, suggest a relationship between amount of exposure, distance from the EMF and health outcomes. Yet this bill does not establish any limits on power line

capacity for existing power lines, no limits on EMF exposure, distance guidelines or any requirement to conduct such studies.

I live near one of those existing power lines which is quite visible from my home. There has been a helicopter flying back and forth along this power line for the past four weeks. At times it hovers directly over the tower with cables and something attached. I have tried to find out from BGE what is going on but the receptionist denies that anything is happening. Clearly BGE must know about the helicopter making repeated trips along this power line. I suspected that the trips by the helicopter were related in some way to the use of existing power lines to increase power line capacity. I recently contacted my Senator and learned that BGE has entered into a contract with PJM to upgrade the power line. This is all being done in advance of this bill, without any public hearing or attention to the risks and losses to residents who live along existing power lines.

It is very disturbing that HB 40 (SB 201) does not seem to offer the same safeguards for the use of existing power lines as it would for constructing new power lines. Ideally there should be hearings regarding the use of existing lines like there were for the MPRP project. Using existing lines has moved the MPRP project closer to more densely populated areas and human habitats. Barring that, there should minimally be amendments to the bill setting limits on power loads, EMF exposure and distances from power lines. I ask that requirements be added to the bill to ensure the safety and health of humans, wildlife and the environment of those living near existing power lines, especially where expansion of the power load is a possibility.

Finally, from a purely cost-effective perspective, just Google the downside of reconductoring for a whole list of structural concerns.

Thank you for your attention to this important matter.

**Please amend HB40 (SB 201) to include these protections.**

Sincerely,

Emily Tarsell  
chriscare@live.com

## Is living near power lines bad for our health?

Issue: BCMJ, vol. 50, No. 9, November 2008, Page 494 BC Centre for Disease Control

By: **Ray Copes, MD, FRCPC Prabjit Barn, MSc,**



The debate of whether there are adverse effects associated with electromagnetic fields from living close to high-voltage power lines has raged for years. While research indicates that large risks are not present, the possibility of a relatively small risk cannot be conclusively excluded.



Electromagnetic fields (EMFs) are produced by electrical appliances, electrical wiring, and power lines, and everyone is exposed to them at some level. Numerous studies have investigated EMF exposure and health.



Although earlier studies did suggest associations between exposure and a variety of health effects including brain cancer, breast cancer, cardiovascular disease, and reproductive and developmental disorders, most of these associations have not been substantiated by more recent research. One notable exception to this is the



association with childhood leukemia, which the International Agency for Research on Cancer regards as sufficiently well established to rate extremely low frequency magnetic fields as a “possible” human



carcinogen.<sup>[1]</sup>

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The first study to link childhood leukemia with residential EMF exposure was published in 1979<sup>[2]</sup> and since then, a number of studies have found weak associations to support this original finding. Studies investigating childhood leukemia as a health outcome of EMF exposure have used measured and calculated magnetic fields, as well as distance of homes to power lines, as an exposure measure. Studies using magnetic field strength as an exposure measure have found that exposures greater than the range of 0.3 to 0.4  $\mu\text{T}$  lead to a doubling risk of leukemia, with very little risk below this level. This exposure range is approximately equal to a distance of 60 m within a high-voltage power line of 500 kV.

However, a more recent study showed an elevated risk of leukemia among children living in homes with distances much greater than 60 m from high voltage power lines.<sup>[3]</sup> This study involved close to 30000 matched case-control pairs of children living in the United Kingdom. It was found that children living in homes as far as 600 m from power lines had an elevated risk of leukemia. An increased risk of 69% for leukemia was found for children living within 200 m of power lines while an increased risk of 23% was found for children living within 200 to 600 m of the lines.<sup>[3]</sup> This study was notable in that it found some elevation of risk at much greater distances than previous studies.

Although distance of homes from power lines can be considered a crude measure of exposure, the results of this study do merit attention. A limited understanding exists of how exposure to EMF can affect health. The underlying biological mechanism is unknown, making it difficult to determine which measure of EMF is most appropriate when evaluating health outcomes. Use of residential proximity may be a reasonable surrogate for direct measurements of EMF, but may also reflect other factors that are related to proximity to high voltage lines.

If the association found in the UK study does reflect a causal relationship, what are the potential impacts in BC? Using current BC leukemia rates<sup>[4]</sup> and assuming similar proportions of the population live near high voltage lines, on a statistical basis, there may be one additional leukemia in BC every 2 years. To eliminate this risk, one would need to achieve a separation distance of 600 m between every high voltage power line and the nearest residence. While this could be done, it would require substantial changes to existing land use patterns and would require significant resources. While it can be argued that this action is consistent with some forms of the precautionary principle, based on best available evidence, one can achieve much greater risk reduction or health benefits if resources are directed to other larger, better established risks.

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## References

1. World Health Organization. Extremely low frequency fields environmental health criteria monograph no. 238. 2007. [www.who.int/peh-emf/publications/elf\\_ehc/en/index.html](http://www.who.int/peh-emf/publications/elf_ehc/en/index.html) (accessed 12 September 2008).
  2. Wertheimer N, Leeper E. Electrical wiring configurations and childhood cancer. *Am J Epidemiol* 1979;109:273-284.
  3. Draper G, Vincent T, Kroll ME, et al. Childhood cancer in relation to distance from high voltage power lines in England and Wales: A case-control study. *BMJ* 2005;330:1290.
  4. BC Cancer Agency. Leukemia. 2008. [www.bccancer.bc.ca/NR/rdonlyres/AC6262BC-634F-4227-BF14-163182197EDF/259...](http://www.bccancer.bc.ca/NR/rdonlyres/AC6262BC-634F-4227-BF14-163182197EDF/259...) (accessed 24 September 2008).
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Dr Copes is the director of BCCDC's Environmental Health Services Division. Ms Barn is an environmental health scientist at BCCDC.

<https://www.ifm.org/articles/emf-health-reducing-exposures>

## EMF Fact Sheet

Power lines emit invisible electromagnetic fields (EMFs) that are strongest directly underneath and decrease rapidly with distance, often fading to background levels within a few hundred feet (around 100 meters), though higher voltage lines reach further, sometimes up to 700 feet or more, with levels dropping to ambient (like household appliances) at moderate distances. While strong evidence for health risks like cancer from typical residential EMF exposure is lacking, some studies suggest potential links to childhood leukemia at very close proximity (under 50 meters), prompting caution and distance as a primary way to reduce exposure.

No Federal Standards:

The U.S. EPA notes there are no federal EMF limits for power lines, though some states mandate right-of-way widths

### Potential Effects on Brain Structure & Function:

- **Blood-Brain Barrier (BBB) Permeability:**

RF-EMFs can increase BBB leakage, allowing substances like albumin to enter the brain.

- **Neuronal Damage:**

Studies show potential for neuronal loss (e.g., pyramidal cells) and changes in synaptic structure, particularly in the hippocampus.

- **Neurotransmitter & Calcium Levels:**

EMFs can alter neurotransmitter levels and impair calcium homeostasis, affecting cell signaling.

- **Oxidative Stress:**

Increased reactive oxygen species (ROS) and oxidative stress are noted mechanisms, potentially damaging cells and DNA.

### Key Distances & Guidelines:

- **For Health Concerns (EMFs):**

- >200 meters (650 ft): EMFs generally fade significantly.
- 700-1000+ ft: Recommended by some sources for reduced exposure.
- <50 meters: Expected to have typical magnetic fields, says Australia's health authority.
- ~300m: Some studies focus on childhood leukemia within this range.

- **For Physical Safety (Regulatory):**

- 12 meters (~40 ft): Minimum clearance for high-voltage lines (e.g., >66kV) from structures, primarily for preventing electric shock/fires, not EMFs

- **Factors to Consider:**

- **Voltage: Higher voltage means stronger EMFs, requiring greater distance.**

- Type of Line: Transmission lines (large towers) differ from neighborhood distribution lines (smaller poles).
- EMF Meters: You can rent meters to measure actual magnetic fields in a potential home.
- Secondary Concerns: Noise (sizzling in wet weather), visual blight, and potential property value impacts.



## [Electromagnetic Fields and Cancer - NCI](#)

Electric fields are produced whether or not a device is turned on, whereas magnetic fields are produced only when current is flowing, which usually requires a device to be turned on. Power lines produce magnetic fields continuously because current is always flowing through them. Electric fields are easily shielded or weakened by walls and other objects, whereas magnetic fields can pass through buildings, living things, and most other materials.

Electric and magnetic fields together are referred to as electromagnetic fields, or EMFs. The electric and magnetic forces in EMFs are caused by electromagnetic radiation. There are two main categories of EMFs:

- Higher-frequency EMFs, which include x-rays and gamma rays. These EMFs are in the ionizing radiation part of the electromagnetic spectrum and can damage DNA or cells directly.
- Low- to mid-frequency EMFs, which include static fields (electric or magnetic fields that do not vary with time), magnetic fields from electric power lines and appliances, radio waves, microwaves, infrared radiation, and visible light. These EMFs are in the non-ionizing radiation part of the electromagnetic spectrum and are not known to damage DNA or cells directly. Low- to mid-frequency EMFs include extremely low frequency EMFs (ELF-EMFs) and radiofrequency EMFs. ELF-EMFs have frequencies of up to 300 cycles per second, or hertz (Hz), and radiofrequency EMFs range from 3 kilohertz (3 kHz, or 3,000 Hz) to 300 gigahertz (300 GHz, or 300 billion Hz). Radiofrequency radiation is measured in watts per meter squared (W/m<sup>2</sup>).

## Why are non-ionizing EMFs studied in relation to cancer?

Power lines and electrical appliances that emit non-ionizing EMFs are present everywhere in homes and workplaces. For example, wireless local networks are nearly always “on” and are increasingly commonplace in homes, schools, and many public places.

No mechanism by which ELF-EMFs or radiofrequency radiation could cause cancer has been identified. Unlike high-energy (ionizing) radiation, EMFs in the non-ionizing part of the electromagnetic spectrum cannot damage DNA or cells directly. Some scientists have speculated that ELF-EMFs could cause cancer through other mechanisms, such as by reducing levels of the hormone melatonin. There is some evidence that melatonin may suppress the development of certain tumors.

Studies of animals have not provided any indications that exposure to ELF-EMFs is associated with cancer (10–13). The few high-quality studies in animals have provided no evidence that Wi-Fi is harmful to health (8).

Although there is no known mechanism by which non-ionizing EMFs could damage DNA and cause cancer, even a small increase in risk would be of clinical importance given how widespread exposure to these fields is.

## **What have studies shown about possible associations between non-ionizing EMFs and cancer in children?**

Numerous epidemiologic studies and comprehensive reviews of the scientific literature have evaluated possible associations between exposure to non-ionizing EMFs and risk of cancer in children (13–15). (Magnetic fields are the component of non-ionizing EMFs that are usually studied in relation to their possible health effects.) Most of the research has focused on leukemia and brain tumors, the two most common cancers in children. Studies have examined associations of these cancers with living near power lines, with magnetic fields in the home, and with exposure of parents to high levels of magnetic fields in the workplace. No consistent evidence for an association between any source of non-ionizing EMF and cancer has been found.

**Exposure from power lines.** Although a study in 1979 pointed to a possible association between living near electric power lines and childhood leukemia (16), more recent studies have had mixed findings (17–25). Most of these studies did not find an association or found one only for those children who lived in homes with very high levels of magnetic fields, which are present in few residences.

Several studies have analyzed the combined data from multiple studies of power line exposure and childhood leukemia:

- A pooled analysis of nine studies reported a twofold increase in risk of childhood leukemia among children with exposures of 0.4  $\mu\text{T}$  or higher. Less than 1% of the children in the studies experienced this level of exposure (26).

- A meta-analysis of 15 studies observed a 1.7-fold increase in childhood leukemia among children with exposures of 0.3  $\mu\text{T}$  or higher. A little more than 3% of children in the studies experienced this level of exposure (27).
- More recently, a pooled analysis of seven studies published after 2000 reported a 1.4-fold increase in childhood leukemia among children with exposures of 0.3  $\mu\text{T}$  or higher. However, less than one half of 1% of the children in the studies experienced this level of exposure (28).

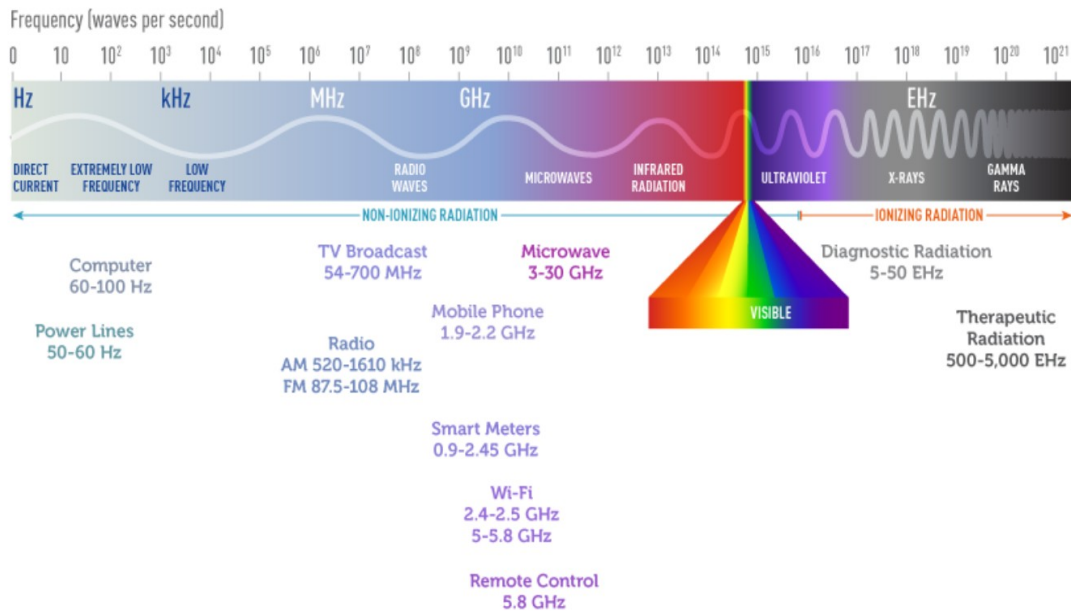
For the two pooled studies and the meta-analysis, the number of highly exposed children was too small to provide stable estimates of the dose-response relationship. This means that the findings could be interpreted to reflect linear increases in risk, a threshold effect at 0.3 or 0.4  $\mu\text{T}$ , or no significant increase.

The interpretation of the finding of increased childhood leukemia risk among children with the highest exposures (at least 0.3  $\mu\text{T}$ ) is unclear.

## What do expert organizations conclude about the cancer risk from EMFs?

In 2002, the International Agency for Research on Cancer (IARC), a component of the World Health Organization, appointed an expert Working Group to review all available evidence on static and extremely low frequency electric and magnetic fields (13). The Working Group classified ELF-EMFs as “possibly carcinogenic to humans,” based on limited evidence from human studies in relation to childhood leukemia. Static electric and magnetic fields and extremely low frequency electric fields were determined “not classifiable as to their carcinogenicity to humans” (13).

# ELECTROMAGNETIC SPECTRUM



The electromagnetic spectrum represents all of the possible frequencies of electromagnetic energy. It ranges from extremely long wavelengths (extremely low frequency exposures such as those from power lines) to extremely short wavelengths (x-rays and gamma rays) and includes both non-ionizing and ionizing radiation.

[BACK TO TOP](#)