A dialogue on electric and magnetic fields



ALTALINK®



Let's Talk EMF

AltaLink recognizes that people may have concerns about exposure to Electric and Magnetic Fields (EMF). EMF are encountered everywhere electricity is used in our society, including near power lines.

EMF Research

Most research studies have focused on magnetic field exposure, since electric fields are easily shielded. After more than 45 years of research that has included hundreds of studies and reviews by national and international health agencies, none have concluded that exposure to EMF from power lines is a demonstrated cause of any long-term adverse health effects to human health. These agencies have concluded there is not enough evidence to support guidelines to limit long-term exposure to low levels of EMF, such as those produced by power lines.

If you are concerned about EMF, we can suggest reliable scientific sources that have evaluated the potential effects of EMF to human health as well as provide you with information about ways you can minimize your exposure to EMF.

About EMF

EMF at frequencies below 3 kilohertz (kHz), including the 60 Hertz (Hz) fields generated by household wiring, power lines and electrical appliances, are referred to as extremely low frequency (ELF). ELF EMF is different than higher frequency electromagnetic waves, such as radio waves, visible light, ultraviolet light and X-rays. Exposure to ELF EMF at levels we may encounter in our environment cannot damage cells or heat tissue, because ELF EMF has too little energy to break apart molecules or to heat cells.

Electric fields

Electric fields are created by the voltage on a wire and are produced even without a current flowing. For example, a hair dryer that is plugged in produces an electric field, even if it is turned off. Electric fields are easily blocked by objects and materials, such as buildings, fences, trees and other vegetation. High levels of power line electric fields can result in nuisance shocks, so guidelines have been established to limit exposure to avoid these effects. High magnitude electric fields at the surface of transmission line conductors, or wires, can also produce low levels of audible noise and radio interference. Regulations are in place to ensure noise and interference are within acceptable levels.

Magnetic fields

Magnetic fields are generated only when a current is flowing in a wire. Using the previous example, when the hair dryer is switched off, there is no magnetic field. When it is turned on, a magnetic field is produced. At a higher setting, the hair dryer draws more current and produces a stronger magnetic field than when operating on a lower setting. Unlike electric fields, magnetic fields pass through most objects and materials and cannot be easily shielded. Exposure to very high magnetic fields can result in acute (immediate) stimulation of nerves and muscles, so guidelines have also been established to limit exposure to avoid these effects. These acute effects occur at magnetic field levels much higher than those near transmission lines.

According to Health Canada, the International Commission on Non-Ionizing Radiation Protection has issued guidelines for limiting exposure to ELF EMF, which help ensure that exposure to ELF EMF do not create electric currents that are stronger than the ones made naturally in your body.

Field strength

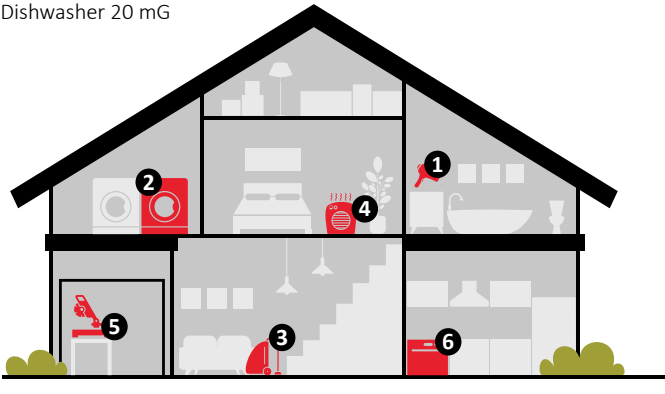
The strength of both electric and magnetic fields decreases quickly as you move away from the source. For example, at 20 metres (65 feet) from a transmission line, the fields may be only 25 per cent as strong as directly under the line. Beyond 200 metres, the field strength is usually too low to distinguish it from other sources of ELF EMF.

The strength of ELF EMF from electrical appliances also diminishes quickly with distance. At 1 to 1.5 metres from the source, these fields are typically reduced to very low levels and indistinguishable from background levels. The illustration below shows typical magnetic field exposure levels near common household electrical appliances, taken at 15 cm from the appliance. Electricity Canada reports an average level of 1 milligauss (mG) is expected in the centre of each room in a typical Canadian home.

A gauss is a unit of measurement for magnetic fields. One mG is 1/1,000 of a gauss.

Typical magnetic field levels in the home

1 Hairdryer 300 mG
2 Washing machine 20 mG
3 Vacuum 300 mG
4 Portable heater 100 mG
5 Power saw 200 mG
6 Dishwasher 20 mG



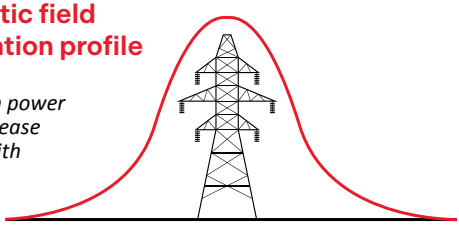
Source: National Institute of Environmental Health Science (NIEHS)

The Bottom Line

Everyone in our society is exposed to ELF EMF from many sources, including electrical wiring in buildings, power lines and electrical appliances. Many scientific studies of animals, humans and cells have been conducted over the last 45 years and this body of scientific evidence does not support a cause-and-effect relationship between long-term ELF EMF exposure and any adverse health outcome. Research efforts continue with more robust and informative studies underway that are better able to assess exposure and potential risk. As ongoing research continue to confirm these findings there is greater scientific certainty that there are no adverse health effects. National and international health agencies continuously conduct thorough reviews of the literature on ELF EMF and health and routinely conclude that it is not necessary for the general public to limit their everyday exposure to ELF EMF.

Magnetic field dissipation profile

EMF from power lines decrease rapidly with distance



FAQs

What information does AltaLink use to form its guidance on ELF EMF?

AltaLink relies on the consensus of national and international scientific and health organizations such as Health Canada and the World Health Organization (WHO) and other organizations around the world. These organizations provide guidance based on thorough reviews of the literature on ELF EMF and health. The organizations evaluate published research studies on ELF EMF and health using a rigorous scientific approach, taking into account the quality of each study and the weight of evidence to develop an overall consensus.

What is the position of Health Canada?

Health Canada regularly monitors ELF EMF research and has provided the following guidance:

The potential health effects of extremely low frequency EMF have been studied extensively. While some people are concerned that long-term exposure to extremely low frequency EMF may cause cancer, the scientific evidence does not support such claims.

Extremely low frequency exposures in Canadian homes, schools and offices are far below the limits recommended in the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines. You don't need to take precautions to protect yourself from these kinds of exposures.

Source: Government of Canada

These conclusions are consistent with those reached by the Federal Provincial Territorial Radiation Protection Committee.

What is the position of the World Health Organization (WHO)?

The WHO established the International EMF Project in 1996 to provide scientifically sound and objective answers to public concerns about possible hazards of ELF EMF. Despite extensive research, spanning nearly 30 years, the WHO indicates there is no evidence to conclude that exposure to ELF EMF is harmful to human health.

Source: World Health Organization

What do other scientific agencies say?

The conclusions of the other health agencies are similar to those of Health Canada and the WHO. Many other national and international organizations responsible for public health have convened groups of scientists to review existing ELF EMF research. Such organizations include the U.S. National Institute of Environmental Health Sciences, the International Agency for Research on Cancer, Public Health England, the Health Council of the Netherlands, the Swedish Radiation Safety Authority, the Scientific Committee on Emerging and Newly Identified Health Risks and the European Health Risk Assessment Network on Electromagnetic fields.

Can you eliminate powerline ELF EMF by burying lines underground?

No. The ground will block the electric field, but the magnetic field will still be present near the line.

Should I take steps to reduce my exposure to ELF EMF?

No health agency has suggested that your health would benefit from reducing your exposure to ELF EMF. Health Canada indicates you don't need to take precautions to protect yourself from exposure to ELF EMF, including fields produced by power lines. Please contact AltaLink for more information about ELF EMF including to request measurements at your home at no cost to you.

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ALTALINK

Headquartered in Calgary, with offices in Edmonton, Red Deer and Lethbridge, AltaLink is Alberta's largest electricity transmission provider. AltaLink is partnering with its customers to provide innovative solutions to meet the province's demand for reliable and affordable energy. A wholly-owned subsidiary of Berkshire Hathaway Energy, AltaLink is part of a global group of companies delivering energy services to customers worldwide.

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