Why do I find conflicting information on the Internet?

The Internet contains conclusions from many individuals and groups. Some of them do not follow the scientific method described earlier, thus, their conclusions may not be scientifically valid. That is why it is highly recommended to rely upon the conclusions of the independent panels organized by health and scientific agencies.

Are there any exposure limits for EMF?

In the United States, there are no national guidelines to limit EMF from the use of electricity. Scientific agencies, however, such as the International Commission on Non-Ionizing Radiation Protection and the International Committee on Electromagnetic Safety, have established exposure limits to prevent short-term acute effects (e.g., muscle and nerve stimulation) that may occur at very high exposures. Such high exposures are not encountered in our everyday environment, including those near high-voltage power lines. These agencies also concluded that there are no established effects of long-term exposure below the established guideline values. The WHO recommends compliance with these exposure guidelines to protect the public and workers from established adverse effects. Duquesne Light Company abides by these international exposure guidelines endorsed by the WHO.

Are any precautions necessary?

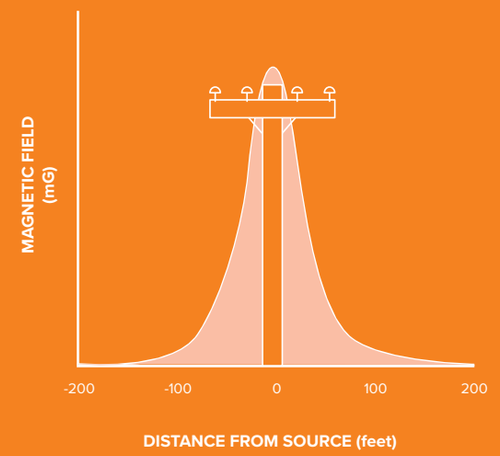
Given that no short- or long-term adverse effects have been confirmed with exposure to EMF at levels commonly found in communities, including around power lines, the WHO only recommends precautionary measures that are not very costly or cost nothing at all.

What is EMF? Where does EMF come from?

Electric and magnetic fields, often referred to as EMF, surround anything that generates, transmits or uses electricity, such as appliances, electrical equipment and power lines.

While these fields share some similarities, they have differences as well. Magnetic fields are directly related to the flow of electrical current in wires and devices. Electric fields are directly related to voltage, which creates the force to make electrical current flow. Both fields decrease quickly with distance from the source, just as the heat from an oven decreases with distance. Electric fields are easily blocked by ordinary objects, magnetic fields are not. For this reason, among others, magnetic fields have been the focus of most health research. Thus the information in this handout focuses on magnetic fields.

The Magnetic Field Around Transmission Lines and Other Sources with Distance



Where can I find more information on what independent scientists are saying?

National Cancer Institute
http://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/electromagnetic-fields-fact-sheet#q6

World Health Organization
http://www.who.int/peh-emf/about/WhatisEMF/en/

Health Canada
http://healthycanadians.gc.ca/healthy-living-vie-saine/environment-environnement/home-maison/emf-cem-eng.php

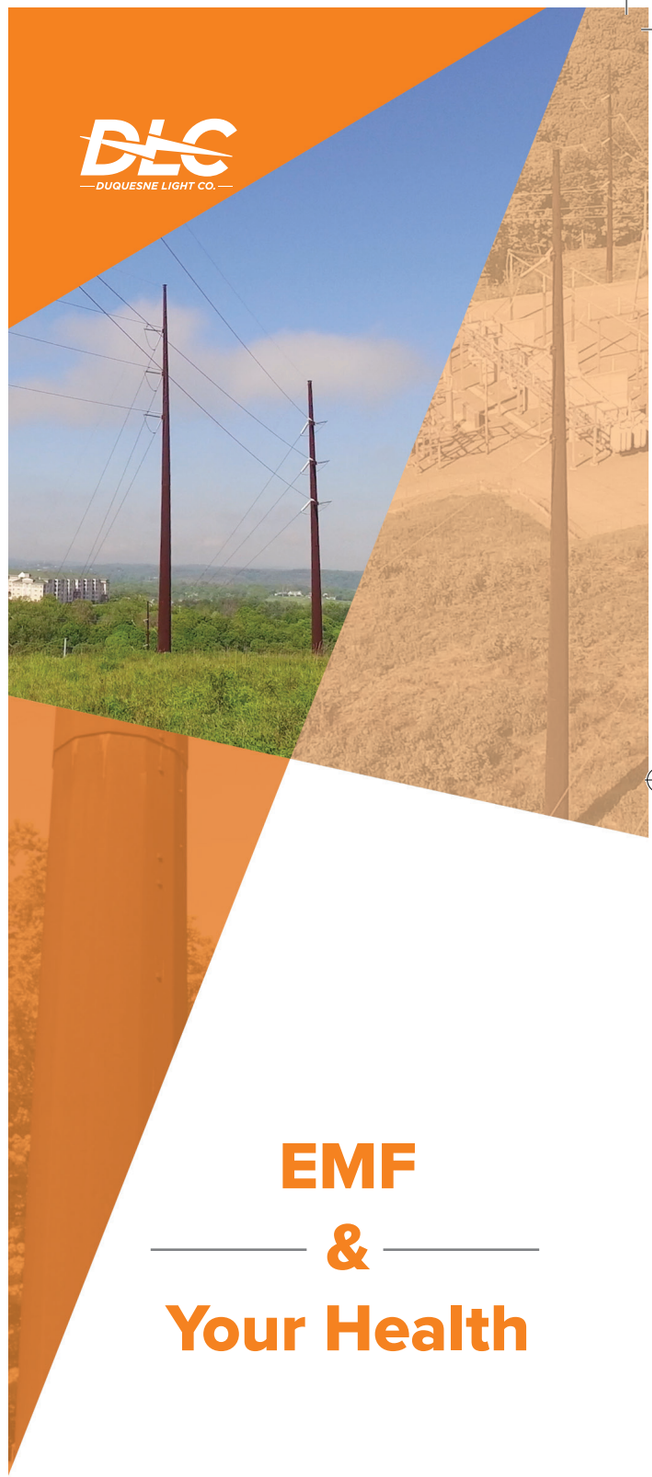
European Commission, Scientific Committee on Emerging and Newly Identified Health Risks
http://ec.europa.eu/health/scientific_committees/docs/citizens_emf_en.pdf

DUQUESNE LIGHT CO.

This brochure was created by epidemiologists and biological scientists in the Health Group at the scientific and engineering firm

Exponent®

to summarize the current status of EMF research as reflected in reviews of research by national and international health agencies.



EMF & Your Health

How are magnetic fields measured? What are typical levels in our everyday environment?

You cannot feel, hear or see magnetic fields, but they are measured easily in units of milligauss (mG) with an instrument called a gaussmeter. Magnetic-field levels vary greatly depending on the sources of magnetic fields nearby at any moment. Magnetic fields are present when traveling on electric trains and in occupational settings from anything that uses electricity, including power tools, electrical equipment, and machinery. Sources of magnetic fields in our homes include:

- electrical appliances and equipment
- electrical wiring and grounding system in our homes
- nearby power distribution and transmission lines

A large measurement survey of almost 1,000 homes in the United States found that a typical household has an average magnetic-field level of approximately 1 mG, and that well over 90 percent of homes have an average magnetic-field level of about 5 or 6 mG or lower when measured away from appliances. Much higher magnetic-field levels, typically in the range of tens to hundreds of mG, may be measured near appliances (e.g., hair dryers, electric shavers, microwave ovens) when they are in use.

Magnetic-field exposure is usually summarized as the average of all sources encountered throughout a day. Simple math indicates that brief exposure to high magnetic-field levels for short periods will contribute little to 24-hour average exposure. For example, using a hair dryer briefly in the morning for a few minutes has minimal effect on the person's average 24-hour exposure. A person who works as a welder or an electrician will likely have a higher 24-hour average exposure.

How do scientists study potential effects of magnetic fields?

Since the late 1970s, scientists across the world have extensively studied whether long-term exposure to magnetic fields has the potential to cause health effects, such as cancer and other diseases. Over the years, hundreds of studies have been conducted and reported in scientific literature. These studies can be grouped broadly into three categories.

Epidemiology studies of humans. Do people with disease have higher estimates of EMF exposure? Or, do highly exposed workers have more disease than the general population?

Experimental studies in laboratory animals. Do animals exposed to very high EMF levels have higher rates of disease than animals with no exposure?

Experimental studies of cells and tissues. Do cells or tissues exposed to high EMF levels display signs of a process that could lead to disease?

Each type of study has advantages and disadvantages. Epidemiological studies evaluate humans, clearly, the species of most interest to potential health effects. Epidemiological studies, however, are observational studies, and, therefore, the investigators are not in control of factors that may also influence health status (e.g., diet, genetics). In studies of laboratory animals, the investigators can control all aspects of the experiment, and may expose the animals to magnetic-field levels much higher than encountered in the environment. Findings in animals, however, may not be directly relevant to humans due to differences in size, metabolism and genetic background. While experimental studies of cells and tissues can be informative about potential mechanisms, the behavior and response of cells and tissues in a glass dish may be very different than in an intact human organism. Thus, findings from these studies need to be interpreted with caution and are generally considered by health and scientific agencies as supplementary information.

What have scientists concluded about magnetic fields?

Scientists in relevant fields have reviewed the large body of research on behalf of many national and international health and scientific agencies, including the U.S. National Institute of Environmental Health Sciences, the International Agency of Research on Cancer, the World Health Organization (WHO) and the European Union's Scientific Committee on Emerging and Newly Identified Health Risks. These agencies' conclusions have been consistent and can be summarized as follows:

- The research results overall do not confirm the existence of any long-term adverse health effects of exposure to magnetic fields.
- The only confirmed effects of EMF are stimulation of nerves and muscles, and small responses to spark discharges that can occur at very high levels typically not found in our everyday environments, including areas near high-voltage transmission lines. The utility industry abides by standards to prevent this type of effect.
- While some epidemiological studies reported statistical associations between estimated high, average magnetic fields and childhood leukemia, none of the agencies has concluded that magnetic fields is a cause of childhood leukemia.
- Studies conducted by the U.S. National Toxicology Program and other laboratories have not found increased cancer in animals exposed to high magnetic-field levels, even after a lifetime of exposure.
- There is no known biological process that explains how magnetic fields could cause cancer.

How were these conclusions reached?

The scientific method used to evaluate whether an exposure may cause adverse health effects is the weight-of-evidence approach. No single study or a selected group of studies can be used to draw a valid scientific conclusion; rather, conclusions are drawn based on all the studies evaluated. Scientists look for patterns in the available evidence. They look to see if studies within the same field (e.g., epidemiology) tend to show similar results, and whether results from studies in different fields (e.g., epidemiology and animal studies) support or contradict each other. This process also is more transparent than a simple narrative review.

- Scientists at the WHO inform the public about EMF as follows:
- Based on a recent in-depth review of the scientific literature, the WHO concluded that current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields. However, some gaps in knowledge about biological effects exist and need further research.
- Other health and scientific agencies, as noted earlier, have expressed similar conclusions.