From: Giacinto, Joseph
Sent: Tuesday, May 25, 2021 2:06 PM
To: AdvancedReactors-GEISDocsPEm Resource
Subject: NIEH - Electric and Magnetic Fields
Attachments: NIEHS 2020 EMFs.pdf

Health & Education

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Introduction

Electric and magnetic fields (EMFs) are invisible areas of energy, often referred to as

Radiation, that are associated with the use of electrical power and various forms of natural and man-made lighting. EMFs are typically grouped into one of two categories by their frequency:

- **Non-ionizing**: low-level radiation which is generally perceived as harmless to humans
- **Ionizing**: high-level radiation which has the potential for cellular and DNA damage

Radiation Type	Definition	Forms of Radiation	Source Examples
Non-Ionizing	Low to mid-frequency radiation which is generally perceived as harmless due to its lack of potency.	• Extremely Low Frequency (ELF) • Radio Frequency (RF) • Microwaves • Visual Light	• Microwave ovens • Computers • House energy smart meters • Wireless (wifi) networks • Cell Phones • Bluetooth devices • Power lines • MRIs
Ionizing	Mid to high-frequency radiation which can, under certain circumstances, lead to cellular and or DNA damage with prolonged exposure.	• Ultraviolet (UV) • X-Rays • Gamma	• Sunlight • X-Rays • Some Gamma Rays

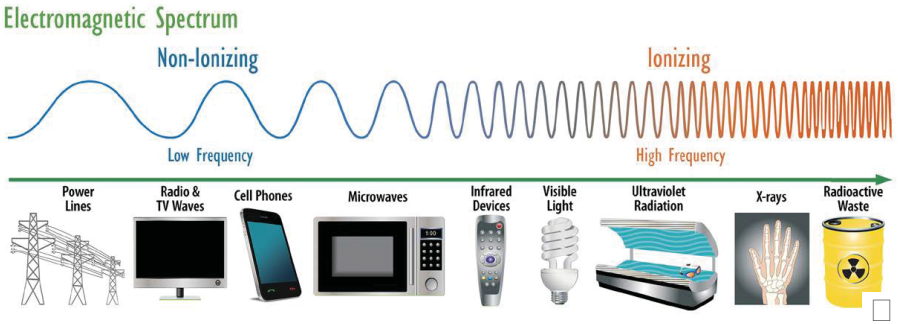
Radon

Safe Water and Your Health

Soy Infant Formula

Styrene

Weather Extremes



Can EMFs be harmful to my health?

During the 1990s, most EMF research focused on extremely low frequency exposures stemming from conventional power sources, such as power lines, electrical substations, or home appliances. While some of these studies showed a possible link between EMF field strength and an increased risk for childhood Leukemia, their findings indicated that such an association was weak. The few studies that have been conducted on adults show no evidence of a link between EMF exposure and adult cancers, such as leukemia, brain cancer, and breast cancer.

Now, in the age of cellular telephones, wireless routers, and the Internet of things, all of which use EMF, concerns persist about possible connections between EMF and adverse health effects. These exposures are actively being studies by NIEHS recommends continued education on practical ways of reducing exposures to EMFs.

Does my cell phone emit EMF radiation?

Cell phones emit a form of radio frequency radiation at the lower end of the non-ionizing radiation spectrum. Currently, scientific evidence has not conclusively linked cell phone use with any adverse human health problems, although scientists admit that more research is needed.

The National Toxicology Program (NTP), headquartered at NIEHS, just completed the largest animal study, to date, on

cell phone radio frequency exposure. For a summary of the findings, please visit our press release and the NTP webpage .

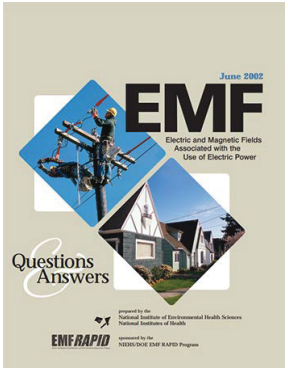
What if I live near a power line?

It is important to remember that the strength of a magnetic field decreases dramatically with increasing distance from the source. This means that the strength of the field reaching a house or structure will be significantly weaker than it was at its point of origin.

For example, a magnetic field measuring 57.5 milligauss immediately beside a 230 kilovolt transmission line measures just 7.1 milligauss at a distance of 100 feet, and 1.8 milligauss at a distance of 200 feet, according to the World Health Organization in 2010.

For more information, see the NIEHS educational booklet, "EMF: Electric and Magnetic Fields Associated with the Use of Electric Power ". This booklet, prepared in 2002, contains the most recent NIEHS research on health and powerline electric and magnetic fields.

EMF: Electric and Magnetic Fields Associated with the Use of Electric Power Booklet



NIEHS educational booklet, "EMF: Electric and Magnetic Fields Associated with the Use of Electric Power"

How can I find out if I'm being exposed to EMFs?

If you are concerned about EMFs emitted by a power line or substation in your area, you can contact your local power company to schedule an on-site reading. You can also measure EMFs yourself with the use of a gaussmeter, which is available for purchase online through a number of retailers.

What is NIEHS Doing?

NIEHS Research Efforts

- NIEHS Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields: Prepared in Response to the 1992 Energy Policy Act (PL 102-486, Section 2118) (751KB) - Prepared in Response to the 1992 Energy Policy Act (PL 102-486, Section 2118)

Further Reading

Additional Resources

- Electromagnetic Fields and Cancer - National Cancer Institute
- Extremely Low Frequency Fields - Environmental Health Criteria Monograph No.238 from the World Health Organization (WHO)
- IARC Classifies Radiofrequency Electromagnetic Fields as Possibly Carcinogenic to Humans - The WHO/International Agency for Research on Cancer (IARC) has classified radio frequency electromagnetic fields as possibly carcinogenic to humans (Group 2B), based on an increased risk for glioma, a malignant type of brain cancer1, associated with wireless phone use.
- Questions and Answers about Biological Effects and Potential Hazards of Radiofrequency Electromagnetic Fields - Federal Communications Commission Office of Engineering & Technology
- Radiofrequency Background - U.S. Food and Drug Administration
- RadTown - Learn about radiation in your town: where it is and how it's used. Explore the Burbs, Countryside, Downtown or Waterfront. Just pick and click! From the U.S. Environmental Protection Agency
- Workplace Safety and Health Topics: EMF (ELECTRIC AND MAGNETIC FIELDS) - The National Institute for Occupational Safety and Health (NIOSH)

Related Health Topics

- Cell Phone Radio Frequency Radiation

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Last Reviewed: May 14, 2020