

# EMF and Health Information

**What is EMF?** “EMF” is an abbreviation for “electric and magnetic fields” and “electromagnetic fields.” Power lines, appliances, and home wiring all produce electric and magnetic fields. “EMF” is also often used by people as shorthand for just “magnetic fields,” which some people are concerned about, so that is what “EMF” refers to here.

**Is EMF “radiation” like medical X-rays or ultraviolet sunlight?** No. Radiation from medical X-rays and from the ultraviolet part of sunlight is strong enough to damage DNA, but EMF from power lines, appliances, and home wiring is not.

**What are the EMF levels from common sources?**

Examples of EMF Sources* (in milligauss)	
Coffee makers	7
Distribution line upper level of typical average	20
Dishwashers	20
500 kV transmission line typical average at edge of right-of-way	30
Distribution line typical maximum above underground line	40
Florescent lights	40
Distribution line typical maximum under overhead line	70
Blenders	70
500 kV transmission line typical average under the line	87
Toasters	100
Hair dryers	300
Can openers	600

\* People typically change activities and locations during a day, so we are exposed to a variety of sources of EMF and a wide range of field levels. In the table above, field levels are taken from the U.S. National Institute of Environmental Health Sciences (NIEHS) EMF Questions & Answers, pages 33-35 (median level at 6 inches from appliances), page 36 (distribution lines), and page 37 (transmission lines). As noted by NIEHS, field levels of transmission lines can approximately double during peak loads, which occur about 1% of the time.

**What conclusions have public health authorities reached about whether EMF causes health effects?** The EMF health research has been examined by governmental public health authorities and public health organizations in over 160 reports. The World Health Organization has examined the reports on the research and says on its website:

**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.**

(<http://www.who.int/peh-emf/about/WhatisEMF/en/index1.html>, section 2, “Conclusions from scientific research.”)

**Are there any EMF exposure guidelines?** Yes. Two international expert groups have issued exposure guidelines based on avoiding very high levels of exposure that can produce short-term biological responses, such as the perception of a faint flickering of light or a tingling on the skin. The international expert groups are the Institute of Electrical and Electronics Engineers (IEEE) and the International Commission on Non-Ionizing Radiation Protection (ICNIRP). Both groups of experts have concluded that no adverse health effects occur at EMF levels below their exposure guidelines.

As shown below, even the lowest EMF exposure guideline is more than 20 times higher than the typical average EMF levels under a 500 kV high voltage transmission line.

<b>Typical EMF Levels from Power Lines*</b> <i>compared to</i> <b>EMF Exposure Guidelines</b> (in milligauss)	
IEEE exposure guideline for general public	9,000
ICNIRP exposure guideline for general public	2,000
500 kV transmission line typical average under the line	87
Distribution line typical maximum under overhead line	70
Distribution line typical maximum above underground line	40
500 kV transmission line typical average at edge of right-of-way	30
Distribution line upper level of typical average	20

\* All power line levels above are taken from U.S. National Institute of Environmental Health Sciences (NIEHS) EMF Questions & Answers, pages 36 and 37. As noted by NIEHS, field levels of transmission lines can approximately double during peak loads which occur about 1% of the time.

### **How much research has been done on EMF and health?**

<b>EMF-Health Effects Research Totals *</b>		
<u>more than</u>		
<b>44 years</b>	<b>2,900 studies</b>	<b>\$490 million spent</b>

\* Repacholi M, "Concern that 'EMF' magnetic fields from power lines cause cancer." Sci Total Environ (2012), doi:10.1016/j.scitotenv.2012.03.030, page 3. [citing PubMed]