

Are EMFs Hazardous to Our Health?

Can electromagnetic fields (EMF) from power lines, home wiring, airport and military radar, substations, transformers, computers and appliances, cause brain tumors, leukemia, birth defects, miscarriages, chronic fatigue, headaches, cataracts, heart problems, stress, nausea, chest pain, forgetfulness, cancer and other health problems? Numerous studies have produced contradictory results, yet some experts are convinced that the threat is real.

Dr. David Carpenter, Dean at the School of Public Health, State University of New York believes it is likely that up to 30% of all childhood cancers come from exposure to EMFs. The Environmental Protection Agency (EPA) warns "*There is reason for concern*" and advises prudent avoidance.

Martin Halper, the EPA's Director of Analysis and Support says, "*I have never seen a set of epidemiological studies that remotely approached the weight of evidence that we're seeing with EMFs. Clearly there is something here.*"

Concern over EMFs exploded after Paul Brodeur wrote a series of articles in the New Yorker Magazine in June 1989. Because of Paul Brodeur's reputation his articles had a catalytic effect on scientists, reporters and concerned people throughout the world.

In November 1989, the Department of Energy reported that "*It has now become generally accepted that there are, indeed, biological effects due to field exposure.*"

The EMF issue gained more publicity in 1990 when alarming reports appeared in Time, the Wall Street Journal, Business Week and popular computer publications. ABC's Ted Koppel and CBS's Dan Rather both aired special segments on EMFs.

In addition to the long-term health concerns, buying a house with high EMF fields will be an economic disaster. In a few years, when power line radiation is as well known as asbestos and radon, a house with high EMF fields will be practically impossible to sell. Already there are hundreds of lawsuits regarding EMFs and property devaluation.

EPA Says the Threat Is Real

By 1990, over one hundred studies had been conducted worldwide. Of these, at least two dozen epidemiological studies on humans indicated a link between EMFs and serious health problems. In response to public pressure, the Environmental Protection Agency (EPA) began reviewing and evaluating the available literature.

In a draft report issued in March 1990, the EPA recommended that EMFs be classified as a Class B carcinogen, a "*probable human carcinogen*", joining the ranks of formaldehyde, DDT, dioxins and PCBs. After the EPA draft report was released, utility, military, and computer lobbyists came down hard on the EPA. The EPA's final revision did NOT classify EMFs as a Class B carcinogen. Rather, the following explanation was added: "*At this time such a characterization regarding the link between cancer and exposure to EMFs is not appropriate because the basic nature of the interaction between EMFs and biological processes leading to cancer is not understood.*"

Curiously, this rather unusual logic appears on the same page as the following: "*In conclusion, several studies showing leukemia, lymphoma, and cancer of the nervous system in children exposed – supported by similar findings in adults in several/ occupational studies also involving electrical power frequency exposures*

– *show a consistent pattern of response that suggest a causal link.* "

When questioned about the contradictory nature of these statements, the EPA responded that it was "not appropriate" to use the probable carcinogen label until it could demonstrate how EMFs caused cancer and exactly how much EMF is harmful. This explanation does not satisfy many critics who claim that the EPA's upper management was influenced by political and economic considerations exerted by utility, computer and military lobbyists.

How Are EMFs Measured?

A Gauss is a common unit of measurement of magnetic field strength. A Gauss meter is an instrument which measures the strength of magnetic fields. Inside a Gauss meter there is a coil of thin wire, typically with hundreds of turns. As a magnetic field radiates through the coil, it induces a current, which is amplified by the circuitry inside the Gauss meter. Gauss meters may vary in the strength of the magnetic field they are capable of measuring. A meter used for measuring EMFs from power lines, transformers, substations and appliances around the home, for example, should be able to measure as low as .1 mg.

Gauss meters vary widely in price and accuracy. Meters have either a single axis coil or a triple axis coil. Single axis meters are much simpler than triple axis meters to manufacture and thus, are less expensive.

To use a single axis meter you must point the meter's one sensor in three directions – the **X**, **Y** and **Z** axis. Then, you combine the three readings in a mathematical equation to calculate the combined field strength. Obviously, it is far easier and more accurate to use a 3-Axis Meter, but, Triple-Axis Gauss Meters are quite accurate, but they are also more expensive.

Another thing to watch out for when purchasing a Gauss meter is whether or not it is "*frequency weighted.*" Most meters will read the same EMF strength no matter what the frequency.

As the human body appears to be sensitive to both the field strength AND the frequency, Gauss meters used for biological purposes should be "*frequency weighted.*"

This means that if the field is different than 60 Hz the meter will consider the frequency and use it in calculating and displaying the EMF's strength. This feature is why frequency weighted meters will show a higher EMF reading than those meters typically used by electricians and engineers.

Power Lines

An enormous amount of electricity is created at power generating stations and sent across the country through wires that carry high voltages. All power lines radiate electromagnetic fields. The question is: how much are the power lines radiating that are near YOUR home? The amount of EMFs coming from a power line depends on its particular configuration. Power companies know which power line configurations are best for reducing EMFs, but most do not feel the evidence supports costly changes in the way they deliver electricity.

Substations

A substation is an assemblage of circuit breakers, disconnecting switches and transformers designed to substation have been blamed for causing cancer clusters among nearby residents. Paul Brodeur wrote about several such cancer clusters in the July 9, 1990 issue of the New Yorker Magazine.

Transformers

A key component of a utility's electrical distribution network depends upon numerous, small transformers mounted on power poles. A transformer looks like a small metal trash can, usually cylindrical.

Even when the electrical service is underground, you will often see a metal box (usually square) located on the ground near the street. Many people do not realize that when they see a transformer, the power line feeding the transformer is 4,000 to 13,800 volts. The transformer then reduces the voltage to the 120/240 volts needed by nearby homes. Since these transformers can be seen in almost every neighborhood, they are a source of concern.

EMFs near a transformer can be quite high, but due to its small structure, the field strength diminishes rapidly with distance, as it does from any point source. For this reason, having a transformer located near your home is usually not a major source of concern, although just to make sure, everyone should measure the field strength around it.

Home Wiring

If your home has high EMF readings, it is important to determine the sources of the EMF so that remedial action can be taken, if possible. Many times a particular room will have a higher EMF reading. Check to see if the electricity is coming into the house on the wall outside that room. When this is the case, it is usually a good idea to block off that room and only use it for storage purposes.

Sometimes, the source of a high magnetic field is incorrect wiring. If you suspect that your home is wired improperly, obtain the services of a licensed electrician. Warning: Do not touch electric wires, even if you think the current is turned off. If you need to disconnect electrical circuits to determine the source of magnetic fields, you should call a licensed electrician.

Computers

Computers are a complicated subject. Know this: EMFs radiate from all sides of the computer. Thus, you must not only be concerned with sitting in front of the monitor but also if you are sitting near a computer or if a computer is operating in a nearby room.

The Swedish safety standard, effective 7/11/90, specifies a maximum of 0.25 mG at 50 cm from the display. Many US manufactured computers have EMFs of 5 - 100 mG at this distance. Also, know this: the screens placed over monitors do NOT block EMFs. Not even a lead screen will block ELF and VLF magnetic fields.

Space does not permit a more thorough discussion of computers. If you use a computer, it is important that you measure your EMF exposure with a Gauss meter and review the literature concerning the health impacts of computer use.

Electric Blankets and Waterbeds

Electric blankets create a magnetic field that penetrates about 6-7 inches into the body. Thus it is not surprising that an epidemiological study has linked electric blankets with miscarriages and childhood leukemia.

This pioneering work was performed by Dr. Nancy Wertheimer and Ed Leeper, who originally discovered that magnetic fields were linked to childhood leukemia. Similar health effects have been noted with users of many electric blankets and waterbed heaters will emit EMFs even when turned off. The devices must be unplugged to delete the EMF exposure. Additionally, there is the issue regarding the vibrations that are generated by

sleeping on standing water. There is less hard data in this area but some experts are concerned about the consequences.

Electric Clocks

Electric clocks have a very high magnetic field, as much as 5 to 10 mG up to three feet away. If you are using a bedside clock, you are probably sleeping in an EMF equivalent to that of a powerline. Studies have linked high rates of brain tumors with chronic exposure to magnetic fields, so it is wise to place all clocks and other electrical devices (such as telephones and answering devices) at least 6 feet from your bed.

Fluorescent Lights

Fluorescent lights produce much more EMFs than incandescent bulbs. A typical fluorescent lamp from an office ceiling will have readings of 160 to 200 mg 1 inch away.

Microwave Ovens and Radar

Microwave ovens and radar from military installations and airports emit two types of radiation -- microwave and ELF. Microwaves are measured in milliwatts per centimeter squared (mW/cm²) As of 1/1/93, the U.S. safety limit for microwave exposure is 1 mW/cm² – down from a previous 10 mW/cm². The Russian safety limit is .01mW/cm². All microwave ovens leak and exceed the Russian safety limit. In addition, recent Russian studies have shown that normal microwave cooking converts food protein molecules into carcinogenic substances.

When measuring microwaves from military and airport radar sources, 100% accurate readings can only be found with extremely expensive digital peak-hold meters. Why? Because analog devices begin to drop their reading immediately after the radar sweep passes. Thus, while an analog meter can show whether or not you are being exposed to radar EMFs, analog meters can't show your true exposure. Although thousands of dollars to purchase, digital-hold meters capable of accurately detecting radar EMFs can be rented for several hundred to over a thousand dollars per month.

Telephones and Answering Machines

Telephones can emit surprisingly strong EMFs, especially from the handset. This is a problem because we hold the telephone so close to our head. Place the Gauss meter right against the ear piece and the mouth piece before buying a phone.

Some brands emit no measurable fields and others emit strong fields that travel several inches....right into your brain. Answering machines, particular those with adapter plugs (mini-transformers), give off high levels of EMFs.

Electric Razors and Hair Dryers

Electric razors and hair dryers emit EMFs as high as 200 to 400 mG. This seems alarming, but we don't know if this is worse (or better) than a chronic exposure to a 2-3 mG field. Some EMF consultants recommend that hair dryers not be used on children as the high fields are held close to their rapidly developing brain and nervous system.

Prudent Avoidance

Electricity is an inseparable part of our modern day society. This means that EMFs will continue to be all

around us. But, as Discover Magazine postulated, aside from making our life easier, is electricity also making our lives shorter?

Most experts agree that limited, non-chronic exposure to EMFs is not a threat. For example, it is probably acceptable for a person to be near a toaster in the morning.

BUT, it is not advisable for a person to sleep under an electric blanket, live near a powerline/substation, and sleep in a room where the power enters the home. This person is under an extreme case of chronic exposure. This condition, unfortunately, applies to millions of Americans.

If you wish to follow the EPA's advice and practice "prudent avoidance" then the following advice is offered:

- Measure your home, work and school environments with a Gauss meter. Measure EMFs both inside and outside your home. Don't let your children play near power lines, transformers, radar domes and microwave towers.
- Avoid areas where the field is above 1 mG. Measure the EMFs from appliances both when they are operating and when they are turned off. Some appliances (like TVs) are still drawing current even when they are off.
- Don't sleep under an electric blanket or on a waterbed. If you insist on using these, unplug them before going to bed (don't just turn it off). Even though there is no magnetic field when they are turned off, there may still be a high electric field.
- Don't sit too close to your TV set. Distance yourself at least 6 feet away. Use a Gauss meter to help you decide where it is safe to sit.
- Rearrange your office and home area so that you are not exposed to EMFs from the sides/back of electric appliances and computers. In the home, it is best that all major electrical appliances, such as computers, TVs, refrigerators etc, be placed up against outside walls. That way you are not creating an EMF field in the adjoining room.
- Don't sit too close to your computer. Computer monitors vary greatly in the strength of their EMFs, so you should check yours with a meter. Don't stand close to your microwave oven. Move all electrical appliances at least 6 feet from your bed. Eliminate wires running under your bed. Eliminate dimmers and 3-way switches.
- Be wary of cordless appliances such as electric toothbrushes and razors. You may choose not to wear a quartz-analog watch because it radiates pulsating EMFs along your acupuncture meridians. An older mechanical windup watch would be an acceptable alternative. It is also recommended to wear as little jewelry as possible and to take it off at night. Many people have metal sensitivity which can be aggravated by placing it right on the skin. Measure with a gauss meter to be sure.
- And last, but not least, always, always, always remember that EMFs pass right through walls. The EMF you are reading on your Gauss meter could be radiating from the next room...or from outside your home.

Additional Radiation Info:

Eyeglass frames should ideally be made from plastic with no wires in them, otherwise they can serve as an antenna to focus the radio and cellular phone waves directly into your brain.

What EMF Level Is Safe?

There's a heated debate as to what electromagnetic field (EMF) level is considered safe. Since the experts have not come to a consensus, you'll have to decide for yourself... Many government and utility documents report the usual ambient level of 60-Hz magnetic field to be 0.5 mG.

Thus, any reading higher than 0.5 mG is above the "usual" ambient exposure. Many experts and public officials, as well as the few governments that have made an effort to offer public protection, have adopted the

3 mG cutoff point. The EPA has proposed a safety standard of 1 mG. Sweden has set a maximum safety limit of 1 mG.

Dr. Robert Becker, an MD, who has been studying the effects of EMFs for 20 years, states an 1mG safety limit in his book *Cross Currents*. When electricians try to solve a magnetic field problem they do their best to drop the level to 1 mG or below.

Dr. Nancy Wertheimer, a Ph.D. epidemiologist who has been studying EMFs for 20 years, has been looking at the epidemiological data in a different way -- she is trying to associate EMF levels with health, rather than disease. The level she is coming up with is a cut-off of 1 mG. Russian researchers claim that 1/1000ths of a mG should be the standard.

The BioElectric Body believes that there are several stages of health between "*optimum wellness*", "*degenerative disease*" and "*Cancer*". Thus, we maintain our own living and sleeping quarters at 0.5mG and below.

Recommended Reading:

Cross Currents, The Perils of Electropollution, The Promise of Electromedicine, by Robert O. Becker, M.D. Jeremy P. Tarcher, Inc., 1990

Currents of Death: The Attempt to Cover Up the Threat to Your Health, by Paul Brodeur. Simon and Schuster, 1989

Electromagnetic Man, Health & Hazard in the Electrical Environment, by Cyril W. Smith & Simon Best. St. Martin's Press. Inc. 1989

Cell Phone Index

The controversy over whether or not cell phones are safe to use is still going strong. The links below cover many of the hot issues and will help you to make an informed decision about cell phone use for yourself.

[Cellular Phone Industry Just as Health-Harming as Big Tobacco?](#)

Learn the amazing parallels between the big tobacco and cell phone industry and how they both seek to deceive you about the harm they cause.

[Cellular Phones Linked to Cellular DNA Damage](#)

If you think cell phones are the best invention since sliced bread, think again. Using a cell phone could permanently damage cells (and DNA) in your body.

["If Mobile Phones Were a Type of Food, They Simply Would Not be Licensed"](#)

This statement was not uttered by some uneducated anti-technology activist, but rather was written by a prominent British physicist and was printed in the prestigious medical journal, *The Lancet*.

[Long-Term Cell Phone Use Spurs Tumor Growth](#)

Racking up minutes on your mobile phone might leave you with more than a large bill. Discover how 10 years

or more of mobile phone use could increase your risk of developing a benign tumor on the auditory nerve.

[Cell Phones May Harm Blood Cells](#)

Studies are showing that radiation given off by cell phones may be linked to cancer. Discover how experts are researching the possibilities of the link between cell phone radiation and the increased risk of cancer.

[Study Links Cell Phones to Brain Cancer Risk](#)

Read about the European study that documented the danger of cell phones. Practical alternatives are provided.

[Cell Phones 'May Trigger Alzheimer's Disease'](#)

Rats exposed to two hours of cell phones had an abundance of dead brain cells several weeks later, a finding that may be applicable to humans. The study adds to the long-time controversy over mobile phone safety.

[Cell Phones and Brain Tumors](#)

People who spend more than an hour a day talking on a cell phone are almost one-third more at risk of developing a rare form of brain tumor.

[Mobile Telephones and Brain Tumors](#)

The dangers of mobile phones are apparent, as using them regularly can more than double one's risk of developing brain cancer.

[Next Generation Cell Phones May Cause Nausea, Headaches](#)

Radio signals from the newest cell phone base stations have caused side effects ranging from tingling sensations to nausea. Find out what to expect from these powerful new electromagnetic fields.

[Hands-Free Mobile Phones Cut Radiation Risk More Than 90%](#)

In the midst of continued reports of adverse effects of radiation from cell phones, several consumer groups are promoting the use of hands-free devices, which reduce the amount of radiation that the brain is exposed to by 90%.

[Hands-Free Mobile Phones May Increase Radiation Exposure](#)

Contrary to previous assumptions, hands-free mobile phone kits can significantly boost the brain's exposure to radiation, according to research conducted by a British consumer research magazine.

[Cell Phones the Newest Teen Addiction](#)

A report claims that cigarettes are slowly being replaced by an equally addictive obsession--the mobile phone. Although the decline in smoking is certainly a good thing, the fact remains that NO ONE has studied the long-term effects of cell phone radiation on your brain.

[Federal Report States Data on Cell Phone Does Not Address Safety](#)

Americans' cell phone use has skyrocketed--from 16 million users in 1994 to some 110 million today. This rapid increase has been accompanied by fears that heavy use of the devices could lead to brain cancer or other health problems.

[Cancer Cell Study Revives Cell Phone Safety Fears](#)

Find out what you need to know to protect yourself from this potential cause of brain tumors.

[Cell Phones to Carry Radiation Labels](#)

This is a good thing as reducing radiation exposure is very important. The best option of all however, is to avoid the use of cell phones completely.

[Electromagnetic Fields and Cell Phones](#)

Electromagnetic fields too weak to heat up the body, including those of cell phones, have been linked to cancer and other illnesses since the 1960s. However, the current 'safety' limits are still inadequate to protect workers and the public from the effects of these fields. This article exposes the bad science at the center of the controversy.

[Mobile Telephones Can Cause Dizziness, Nausea and Headaches](#)

Five other article links on the dangers of cell phones and what you can do to protect yourself from them.

[Mobile Phone Companies to Face Lawsuits Over Brain Tumors](#)

Mobile phone companies are facing legal action from brain tumor victims in the United States. If you are a frequent cell phone user, please take the time to review the evidence on this issue and I think you will conclude that the convenience is simply not worth the risk.

[More Mobile Phone Users Report Symptoms](#) A significant percentage of mobile phone users are reporting symptoms, especially after longer phone conversations.