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Are EMFs Safe?

by Raymond Francis

In November of '96, front page news screamed that a panel of "top scientists" have dismissed claims that electric fields from power lines can cause health problems. Charles Stevens, chairman of a National Research Council panel said, "The current body of evidence does not show that exposure to these fields presents a human health hazard."

While welcomed by the utility industry, this report sounds like a whitewash to me. Contradicting itself, the report concludes that children who live near high power lines have a significantly higher risk of leukemia. How then can they say that electromagnetic fields (EMFs) present no health hazard? The authors explain this by saying the leukemias must be caused by other "unknown" factors.

Here's the truth! Anything that carries electricity or runs on electricity is surrounded by an electromagnetic field. Biological systems are affected by EMFs, so when there is an exposure there will be an effect. The only question is what that effect may be in any particular situation. It's a safe bet that some of those effects to man-made fields are going to be harmful.

Laboratory experiments with EMFs are complex and difficult to interpret. Without getting too technical, the biological effects will differ depending on a large number of variables including the frequency, waveform, and the angle between the Earth's magnetic field and the applied field. Further, changes in exposure level may be more biologically important than the duration of exposure. As you can see there are many variables, and experiments with only one small change can contradict each other.

The NRC study confirmed metabolic changes in cells including changes in calcium and melatonin levels. These represent significant biochemical abnormalities. The study also reported "convincing evidence" that low frequency pulsed magnetic fields can heal broken bones in animals. This is certainly a biological effect!

Here's just a few examples of how EMFs can damage health. One prominent cancer theory is that cancer results from a breakdown in cell-to-cell communication. EMFs are known to affect the flow of messages between cells. Melatonin helps to maintain proper levels of intracellular communication, and EMFs decrease melatonin synthesis. Melatonin also inhibits breast, prostate, and skin cancers by inhibiting tumor-growth-enhancing hormones like prolactin and estrogen. EMFs alter the flow of calcium into cells. Calcium is critical to many biological responses involving muscles, hormones, and nerve and immune cell communication. EMFs can cause magnetic particles in cells to move in ways that damage the cell membranes, disrupt cell communications, and lead to absorption of toxic chemicals, especially into brain tissue, thereby causing mutations and cancer. Even extremely low intensity EMFs have been shown to affect DNA in a way that produces abnormal protein molecules in the cell.

Numerous studies have demonstrated relationships between EMFs and disease. A 1993 *American Journal of Epidemiology* study concluded that children who live within 50 meters of high-tension power line are 2.9 times more likely to develop childhood leukemia. A 1995 study in the same journal found that utility workers with the highest EMF exposures had a 2.5 times higher risk of brain cancer. A study at the University of Southern California Medical School showed that workers with high exposure were three to four times as likely to develop Alzheimer's Disease.

The September '96 issue of *Epidemiology* reported that women whose occupation exposed them to high levels of magnetic fields had a breast cancer risk 43% higher. They also found that female mainframe computer operators, who have substantial EMF exposures, had a 79% increase in breast cancer risk. The authors opined that daytime exposure to EMFs reduced the release of melatonin at night, and reduced melatonin allowed tumors to progress.

It is an established fact that EMFs alter normal cell chemistry and have an effect on human biology. However, the exact effects EMFs have on human health are extremely complex and difficult to determine. It's going to take a long time to sort it all out. Meantime, the prudent thing to do is to avoid EMFs as much as is practicable. Don't sleep under electric blankets. Move electric clocks away from the bed. Move the bed away from walls that carry substantial house wiring. Don't use hair dryers. Don't sit right beside or behind a video display terminal. Don't let the kids sit within six feet of the TV. Don't live in a house close to transtoreormers or high power lines. Until we know more, prudent avoidance is the best option.

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