

[IMAGE]

## The Basics of EMF Emissions

By Claudia Anrig, DC

Since the industrial revolution began around 1750, we have become more and more reliant on machines. Cars, televisions and coffee makers graduated to computers and cellular devices. With these electronics has come an increase in EMF emissions, and while their perceived danger is open for debate, their existence is not, making it an important topic to understand more about and discuss with your doctor.

### What Are EMF Emissions?

Depending upon the source, *EMF* can represent either "electromagnetic fields" or "electrical and magnetic forces"; however, when discussing EMF emissions, the World Health Organization (WHO) relies on the former – electromagnetic fields.<sup>1</sup> It's important to note these fields exist everywhere in nature. It is the Earth's magnetic field that causes a compass needle to always point north and helps birds fly south for the winter. However, an EMF can also be man-made, created when an electrical current flows, for example. The greater the current, the stronger the magnetic field.<sup>1</sup>

EMF emissions, also known as electromagnetic radiation, are produced in varying degrees by different sources, according to the WHO:<sup>1</sup>

- *Electric* – anything powered by electricity, but also including power lines and transformers (household or kitchen appliances, lighting, electric heaters, hair dryers or curlers, electronic devices such as computers and cell phones, stereos and televisions, etc.)
- *Magnetic* – created by moving electric currents or electron motion (previously mentioned electrical sources, gas-powered engines, air conditioning units, etc.)
- *Wireless* – anything that sends a signal without wires is creating an EMF (Wi-Fi, radio frequency, cellular devices, network devices such as printers, cell towers, broadband towers, GPS, baby monitors; in some areas, even electrical meter reporting has gone wireless)
- *Ionizing* – most dangerous (UV rays, X-rays, gamma rays, etc.)

The level of electromagnetic radiation is clearly going to vary from one source to another. Items that plug in transfer VLF (very low frequency) and A/C (alternating current), and will create a smaller, less dangerous EMF, while power lines and transformers will be moving more electricity much faster, creating a higher EMF. Of course, X-rays and gamma rays are the highest and thus most dangerous.<sup>1</sup>

### **EMF Emissions and Your Body**

Due to the chemical reactions that take place as part of normal bodily functions, tiny electrical currents exist within the body. Nerves relay signals by transmitting electric impulses. Messages travel down the spinal cord from the brain to the muscles, organs and glands. Synapses in the brain fire and send signals between neurons. All of these and more constitute little electrical currents within the body.<sup>1</sup>

According to the World Health Organization, "Low-frequency magnetic fields induce circulating currents within the human body. The strength of these currents depends on the intensity of the outside magnetic field. If sufficiently large, these currents could cause stimulation of nerves and muscles or affect other biological processes."<sup>1</sup> In other words, outside electrical currents can create electromagnetic fields (EMF) that can actually affect those same internal electrical currents.

The typical exposure to EMF on a daily basis is not equivalent to X-ray exposure, but it is believed damaging effects at a cellular level may occur with extended exposure to EMF emissions.<sup>1</sup> For instance, the director of the Institute for Health and the Environment at the University at Albany, Dr. David Carpenter, believes up to 30 percent of all childhood cancers likely come from exposure to EMF emissions.<sup>2</sup>

Several studies have been conducted to see if there is a link between high-voltage overhead power lines and childhood leukemia. In 1997, the U.S. National Cancer Institute (NCI) published a study in *The New England Journal of Medicine* that suggested no statistically significant increase in childhood cancer in children exposed to power lines.<sup>3</sup> However, some have questioned those negative findings and actually suggest the study does indicate a potential connection.<sup>4</sup> And findings published in the *British Journal of Cancer* in 2013, based on a five-year study of pediatric leukemia patients in France, concluded, "The present study, free from any participation bias, supports the previous international findings of an increase in [childhood acute leukemia] incidence close to [power lines]."<sup>5</sup>

Other health problems that may be associated with high exposure to EMF emissions include neurological and behavioral changes; altered cell growth or cell mutations (potentially linked to miscarriages);

fibromyalgia; chronic fatigue; weakened immune system; forgetfulness or dementia; depression; and nausea.<sup>1,6</sup>

### **An Era of Increased Exposure**

As mentioned, exposure to EMF emissions has been commonplace since the advent of electrical appliances, lighting and other devices. The concern has grown in concert with the increase of man-made electromagnetic fields due to the advancement of technology.<sup>7</sup> The fact is, exposure to EMF emissions has grown exponentially over the past 10 years as cellular devices and wireless technology has brought a marked change in telecommunications and broadcasting.

EMF meters or magnetometers are available that can measure the electromagnetic fields in a home or business. Created by Carl Friedrich Gauss in 1833, the gaussmeter or Gauss meter can be purchased through most online retailers. There's even a "Gauss Meter" app available at iTunes.

The problem is there are no limits in place; no standards set. In the U.S., there are "no federal standards limiting occupational or residential exposure," while in the United Kingdom, "there are, so far, no statutory exposure limits." Most other countries follow the guidelines created in 1998 by the International Commission on Non-Ionizing Radiation Protection (ICNIRP); however, those guidelines have no actual limits in place and unfortunately, there is no governing body to protect the public.<sup>8-9</sup>

### **General Recommendations**

Although no actual standards exist, the typical reference level for public exposure (according to the ICNIRP) is less than 100µT, but this may be higher than is actually safe. Consider the following recommendations made by Vicki Warren, former executive director of the Bau-Biologie Group, during an interview with Joseph Mercola, DO:<sup>10</sup>

- Cordless telephone bases should not be placed on a nightstand, desk or end table. Since the radiation emitted by wireless communications decreases linearly, there should be a significant distance between the user and the source to sufficiently reduce exposure.
- Computer and phone chargers are typically ungrounded, so ideally these should only be used when running on batteries and never while plugged in. Additionally, laptops should not be placed directly on the lap, but should be used with a lap pad available at most computer or office supply stores. If possible, also use a shield against the electric field. This can be accomplished by adding a reflective

material to the lap pad.

- Sleeping with the head of the bed against a wall with electrical outlets creates an eight-hour-or-more exposure to EMF emissions. Consider moving the bed to another wall or at least 3 feet away from the wall. Another option is to sleep with the head at the foot of the bed.

### **A Need for Research in the Prenatal and Pediatric Population**

Despite a growing concern about the impact of EMF emissions, there is minimal research in the prenatal and pediatric population. Although the World Health Organization has focused some attention on EMF and this special population, little research has been published.<sup>11</sup>

"Investigation on Wireless Impacts on Children – Cell Phones, Wi-Fi and Cordless Phones," an article published by EMFWise, a site dedicated to safety advice regarding electromagnetic fields, provides an overview of cancer and mental health studies that may be related to prenatal and pediatric EMF exposure.<sup>12</sup>

Despite a lack of government recommendations for avoiding EMF emissions, it's important to understand that, for many reasons, children may be at a higher risk.<sup>10,13</sup> Some conservative recommendations to reduce or avoid EMF exposure include the following:

- Cell phone usage by children can be a concern.
- Children's beds should be against a wall without electrical outlets.
- Alarm clocks or portable radios should be battery powered / operated at night.

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