

ELECTROMAGNETIC RADIATION

The Facts About Electromagnetic Radiation

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(Lengthy, but well worth reading)

In today's technology-filled world, we are surrounded by electromagnetic fields (EMFs), invisible energy fields that affect us up to 24 hours a day. With the growth of wireless technologies, there are more questions every day, with the main one being: Are they safe?

While the wireless companies and the US Federal Communications Commission (FCC) claim they are, there are more independent studies coming out confirming these fields carry severe health complications for society, as well as harm the environment. Moreover, further digging uncovers how corrupt the FCC is, and that the organization gave up its power to protect the people against EMFs a long time ago.

Since the wireless industry's growth has not stopped but sped up, it is time to arm ourselves with the knowledge to protect our families.

What we know today is that the World Health Organization (WHO) has classified EMFs as "group 2 carcinogenic: a possible carcinogen to humans," based on studies that link cellphone use to brain cancer. Some scientists say this is not enough and urge WHO to change EMFs to a "group 1: carcinogenic to humans."

"The evidence indicating wireless is carcinogenic has increased and can no longer be ignored," stated Dr. Anthony B. Miller, professor, cancer researcher and long-time advisor to WHO.

But it is not just cellphones we need to be concerned about, and the issue is associated with many diseases besides cancer. It is time to study the facts.

Introduction

Since the 1990s, the growing popularity and technological evolution of cellphones have brought an increasing concern for health issues related to the electromagnetic frequency (EMF) radiation they emit. From warnings against carrying phones in our pockets due to risks of infertility to recommendations on limiting daily cellphone use because of brain cancer risks, concerned consumers and activist groups have tried to warn society of the potentially high price we are paying to have and use this technology.

For the companies manufacturing smartphones and other smart devices (electronic devices that connect to the internet via Wi-Fi, 3G, 4G, 5G or other wireless protocols) this is largely about making money while avoiding and often purposely hiding the dangers.

Today, there are two opposing forces that are changing our technology-filled world. On one hand, the tech giants are pushing more smart devices to the average consumer. What started with smartphones and Smart TVs became an agenda for Smart Homes, creating an environment that will be fully run by and integrated with technology.

If having EMF radiation emitted from your cellphone, tablet, laptop, Smart TV, and Wi-Fi router is a huge health concern, can you imagine what happens if all home devices are connected to a wireless network? If Smart Homes succeed, you will be able to access your fridge while out shopping to see if you ran out of eggs. While it may be convenient for some people, the price for this convenience is more than anyone has bargained for.

That's why there is a second opposing force to this — scientists, doctors, consumers, and health activists who are trying to warn people about the damaging effects of this technology.

Brain cancers are on the rise, especially in children between the ages of 4 and 10 years, and their link to phone use is becoming impossible to ignore. Just last year Joel Moskowitz, Director and Principal Investigator at the Center for Family and Community Health at UC Berkeley's School of Public Health, has revealed that the university was

hiding scientific research linking cellphone use to brain tumors and infertility (the two biggest concerns about cellphones).

Moskowitz confirmed the wireless industry goes to great length to keep this kind of information out of the public eye. He also said that it reminds him of other truths that were hidden from the consumers for a long time in the past.

“They've done a very good job at [hiding it], essentially following the same playbook that the tobacco industry used,” Moskowitz said.

Until the truth about cellphones and smart, wireless technologies is fully out in the open, there are many trustworthy sources (experts such as Dr. Devra Davis of Environmental Health Trust as well as Dr. Joel M. Moskowitz,) to use to arm yourself with information on the dangers of EMFs and how to protect yourself, your home, and your family.

What is EMF radiation?

EMFs are electric and magnetic fields. Electric fields are created due to high and low voltage; magnetic fields are created with various electric currents. Invisible to the naked eye, EMFs are present everywhere in the environment from natural sources such as thunderstorms. What is a growing problem is a high concentration of these fields from man-made sources: X-rays, cellphone towers, and Wi-Fi enabled technology. EMFs have various wavelengths and frequencies; higher frequency corresponds to shorter wavelength or distance. Every one of them has a different effect on the human body, according to the World Health Organization (WHO), and they affect our pets and wild animals as well.

Both electric and magnetic fields are stronger closer to their source, which is why it is dangerous to live close to a cell tower or to place Wi-Fi routers in the bedroom or to keep a cellphone next to the head when sleeping. The farther we are from these EMF sources, the safer we are.

Different types of EMF radiation

Electromagnetic radiation (EMR) varies from low to high frequency. There are extremely low frequency (ELF) fields with frequencies up to 300 Hz, intermediate frequency (IF) fields – between 300 Hz to 10 MHz, and radiofrequency (RF) fields. The effect of these fields on human health depends on the level, type, and duration of exposure. The magnetic field is often measured in microtesla (μT) units or in Gauss (G). [1 Gauss is equal to 100 Microtesla].

ELF fields are created by electrical power supply and appliances; RF fields are created by cellphones, television, radio, and even microwaves. Bluetooth enabled-devices (used to provide communication between these devices) also create RFs, between 2.4 GHz and 2.4835 GHz, just like a microwave.

From the longest to the shortest wavelength of the electromagnetic spectrum, the sources are:

- subway systems
- power lines
- computer monitors
- ultrasound
- radio
- television
- cellphones
- airport full-body scanners
- microwave and satellites
- Bluetooth
- Wi-Fi GPS
- Suntan beds
- Dental curing devices
- X-rays
- PET Scans

Everything before suntan beds is considered to be non-ionizing radiation, everything after ionizing radiation. Ionizing radiation ionizes the molecules in the body, therefore setting electrons free. This has a potential to damage DNA. What about non-ionizing radiation? While many government agencies say there is not enough evidence to show harm, many scientists are proving them wrong.

Microwave energy between 30-300 GHz (which is non-ionizing) is used as a mainstream cancer “treatment,” which we know negatively affects the cells, and it doesn’t differentiate between healthy cells and cancer cells. According to a study published in the International Journal of Oncology, these non-ionizing EMFs have “multiple biological effects.”

While all EMFs are harmful in some way, knowing the frequency of radiation is important when analyzing the risks. Power lines, for example, were one of the first ELF sources to blip on the radar of public concern. They can measure at 20 μ T when standing underneath them. As early as 1979, researchers pointed out a possible link between living near power lines and leukemia in children. Another study has found that any long-term exposure higher than 0.4 μ T can potentially double the risk of leukemia. (This was later confirmed by the International Agency for Research of Cancer (IARC), a subsidiary of WHO).

Even without power lines, EMFs at home can easily reach 0.2 μ T, and the number will keep growing based on how many new smart technologies we are introducing. And let's not forget that 5G cellphone towers are now in place.

In big cities, there are even more challenges and EMF hazards. For example, in Vancouver, there is Cathedral Square Park, which stands above an underground substation. Anyone walking in the park is exposed to radiation between 0.2 μ T to 10 μ T – way above the radiation levels linked to leukemia. Can you imagine that some parents might take their children to this park on a regular basis without any idea what it is doing to their health?

Then walking back home they are exposed to cellphone towers, and then at home to EMFs from different devices.

How is this permitted? Sadly, most official safety guidelines are based on outdated science that does not even come close to predicting the increasingly negative effect all of the new technology brings.

Besides the ELF, IF, and RF, many devices at home produce thermal radiation: radiation emitted by all objects with a temperature above absolute zero. Thermal radiation often leads to burns, sometimes bad enough to require hospital treatment.

According to a study published by Case Reports in Emergency Medicine:

Aerodigestive tract burns represent a rare but potentially devastating injury pattern throughout the world. Although the majority of these injuries do not require intervention, these burns have potential for poor outcomes. Traditionally this disease has been caused by superheated gases found in explosions or fire-related injury. However, as technology advances, it brings novel methods for an injury that require physician awareness of potential hazards. We describe a case of laryngeal and esophageal thermal burn caused by a microwave heated food bolus.

Cancers are the major concern about EMFs, followed by fertility issues. But there are many more health problems that are not often talked about.

Health risks of EMF-emitting technology

It has been well established that short-term exposure to high levels of EMFs above 100 μ T is dangerous, but now scientists are coming to a conclusion that there is no safe limit of EMFs in cases of long-term exposure of at least ten years.

In 2012, the BioInitiative Working Group (BWG) released a 1,557-page report on low-frequency EMFs and their health dangers based on the work of many independent scientists, researchers, and experts in this field. The main reason for health issues, as they explain in detail, is because humans are “bioelectrical systems.” Our bodies are functioning based on internal bioelectric signals, and artificial EMFs can disrupt any and all of the body’s normal processes.

“There may be no lower limit at which exposures do not affect us. Until we know if there is a lower limit below which bioeffects and adverse health impacts do not occur, it is unwise from a public health perspective to continue “business-as-usual” deploying new

technologies that increase ELF and RF exposures, particularly involuntary exposures,” the report concludes.

Involuntary exposure includes inserting Wi-Fi and Bluetooth capabilities in devices that one may not need connectivity for: cameras, television sets, refrigerators. It also includes cellphone towers that can be placed close to homes.

It’s bad enough to chance health risks while doing something you choose to do; it’s another issue when it is done to you without your knowledge or permission...especially when the health risks are this severe. (With proper knowledge of the issue, however, you can protect yourself and your loved ones).

“For the first time in our evolutionary history, we have generated an entire secondary, virtual, densely complex environment — an electromagnetic soup — that essentially overlaps the human nervous system,” said Michael Persinger, Ph.D., a neuroscientist at Laurentian University.

Electromagnetic hypersensitivity

Besides a huge list of known disorders that EMFs may trigger or even cause, EMFs are also the culprit for a new type of diagnosis with symptoms that do not fit any disease, yet are life-altering. This diagnosis is accepted by the medical community and is best described by WHO.

Electromagnetic hypersensitivity or EHS is a disorder characterized by various symptoms related to EMF exposure. These can be:

- Skin issues: redness, burning
- Fatigue
- Concentration problems
- Dizziness
- Nausea
- Heart palpitations
- Digestive issues

WHO, however, fails to consider all of the research done and suggest these individuals protect themselves from EMFs. Instead, as always, they are only focused on treating the symptoms.

A court case in France, however, has recognized EHS as a disability when granting a 39-year-old woman a pension for her debilitating symptoms. After winning the case, the plaintiff said: “We know how to make much less polluting technologies. That said, it’s a political choice,” suggesting that the tech companies can make safer technologies; they just don’t care to.

In her case, her symptoms changed her life but were not life-threatening. In other cases, EMF can increase the risk of very severe diseases.

EMFs and brain tumors and cancers

“While the government has deemed RF radiation to be safe, there is no current significant research to make this claim,” a Swedish study stated.

More than a dozen independent studies have linked RF radiation from cellphones and other EMF-emitting devices to increased risk for brain tumors. It has been shown that those who used a cellphone for at least 10 years had higher rates of tumors. The risk was magnified if they usually talked on the same side of the head. When they switched sides, the risk was increased by 20 percent, but when they talked on one side only — the risk increased by 200 percent.

Another study linked brain tumors to professions who receive EMF exposure such as electrical workers.

Famous brain cancer stories and cellphone radiation

The case of US Senator John McCain’s death from brain cancer (glioblastoma) has raised questions on whether his disease was linked to cellphone use. Like most politicians, he spent much time talking on the phone. Scientists have calculated that brain tumors caused by radiation can take 10-15 years to develop; since many people started using smartphones

around that time, it is possible that we will see an increase of brain cancers in the future (we already have seen in it in children and one study suggests that cellphone use doubles the risk).

A 2017 study found a significant correlation between cellphone use and glioma (McCain's cancer is a type of glioma). Another study found that when male rats are exposed to nine hours of daily cellphone radiation for two years, they develop malignant tumors, including gliomas. Finally, a 2010 paper confirmed that using a cellphone on one side of the head leads to cancer. After 10-years of talking on the phone for just 30 minutes a day, study subjects had a 40 percent increase in glioma risk. Most of us talk on the phone more than that, and McCain likely spoke on the phone for longer than 30 minutes a day.

Another famous brain cancer story is of Johnnie Cochran, a prominent US attorney known for the O.J. Simpson trial. Cochran passed from a brain tumor and his doctor suggested that it may have been linked to his cellphone use. Dr. Keith Black, the head of neurosurgery at Cedars-Sinai Medical Center, has told CNN that he believes cellphones do indeed cause cancer and that scientific research will show what he is already seeing in his patients.

“One of the studies that is very concerning has been a study out of Europe that looked at a long-term exposure to the use of cellphones over a period of 10 years,” he states. “And when patients or people were exposed to over 2,000 hours of cellphone use — which is about an hour a day for 10 years — that study reported about a 3.7-fold increase in the risk of developing brain cancer.”

Cochran used his cellphone on one side of his head — the left — side and his tumor was on the left. This is not only confirmed by the 2010 study described above, but also seen in real life in Dr. Black's patients.

“There have been some studies that show a correlation between the side that you use a cellphone on [and] the side that you develop a brain tumor on... We see tumors developing in the location – close to the location that people do use cellphones,” he said.

These two famous cases remind us to keep our phone use to a minimum and switch which sides of the head we use when talking.

EMFs and childhood leukemia

When it comes to cancers, EMFs affect more than adults — children are also at risk, maybe an even bigger risk because their bodies are more vulnerable.

As previously discussed, there has been evidence that living near power lines has been associated with higher risk of childhood leukemia, a blood cancer and the most common cancer in children.

A 2015 report by the European project ARIMMORA, after looking at the data associating leukemia with EMFs, recommended that all child centers, kindergartens, and schools be built away from high voltage power lines.

Since power lines are low-frequency EMFs, other ELF's were also classified as possible human carcinogens by WHO.

Another study has shown that these ELF's increase the risk of leukemia at much lower levels than the safety standard allows. A WHO report concluded, based on two pooled analyses, that at a 0.3 to 0.4 μT EMF exposure two times more children may get leukemia than at lower exposures.

This level of exposure is not rare. For example, if a child (or an adult) sleeps with an electric blanket, he or she will be exposed to between 1 μT to 2.5 μT . A television produces a field of 2 μT . Talking on the phone can reach a 3 μT exposure.

Today, more than ever, it is important to keep EMF emitting devices away from where the child sleeps and turned off at night. These include cellphones, tablets, computers and laptops, Wi-Fi routers, and video game consoles.

“There is little doubt that exposure to ELF causes childhood leukemia,” the BWG report stated.

Childhood leukemia is on the rise, which is why we need to guard children against EMF exposure. Even when the exposure is too low to cause cancer as a child, many years of early exposure for a not-fully-developed organism can lead to other cancers as an adult.

EMFs and other cancers

Adult leukemia: While children are at the highest risk of cancer when living near power lines, it was also found that adults who live within 300 meters of a power line were also at a higher risk for leukemia. The 2007 study in the Internal Medicine Journal points to the conclusion that living near a power line as a child can cause cancer as an adult.

Breast cancer: The occurrence of breast cancer was increased in numerous studies -- not only in women, but also in men when they were exposed to EMFs.

“The evidence from studies on women in the workplace rather strongly suggests that ELF is a risk factor for breast cancer for women with long-term exposures of 10 mG and higher,” according to the MWG report.

Studies have shown that EMFs between 6 and 12 mG can damage melatonin’s protective effect on the body, therefore permitting the growth of breast cancer cells. Long-term exposure to ELFs reduces melatonin in the body, leaving it vulnerable.

Prostate cancer: Workers who were exposed to higher frequencies were reported twice as likely to die from prostate cancer as those exposed to lower levels of EMFs.

Non-Hodgkin’s lymphoma: Chances of non-Hodgkin’s lymphoma were also increased for workers exposed to EMFs.

Skin cancer: Living next to power lines was reported to increase the chance of malignant melanoma. EMFs also have been linked by some studies to thyroid, stem cell, lymph node, and eye cancers.

EMFs and DNA damage: EMF radiation may damage DNA. DNA damage may lead to cancer cells multiplying rapidly and not dying. DNA damage can be caused by many

environmental factors, including exposure to toxic chemicals. Some studies have provided evidence that both ELF and RF can negatively affect the genes, therefore disrupting the body's biological processes.

When the European research program called REFLEX did tests on DNA, they found significant changes in biological functions. They documented altered genes and genotoxic effects in the cells. "Genotoxic effects and a modified expression of numerous genes and proteins after EMF exposure could be demonstrated with great certainty," the researchers found.

Most importantly, while some claim that EMFs from cellphones are too low to do harm, this research has shown that cells react negatively to RF exposure of SAR levels 0.3-2 W/kg. Most cellphones fall within these numbers. For example, one phone measures at 1.18 W/kg when 5mm away from the body (talking distance).

EMF and the immune system

Just as ELF and RF can damage the cells on the DNA level, they can also mess with the immune system. When our natural defense system encounters an unwanted exposure, be it a chemical, a virus or EMFs, it sends out signals and produces responses to warn the body of the threat and get rid of it. When constantly exposed to these environmental hazards, there is a constant production of stress responses without an actual way to fix the problem. This leaves the body in a vulnerable state that leads to inflammation and a heightened risk of allergic responses. It's no wonder that Electromagnetic Hypersensitivity is sometimes referred to as EMF-allergy.

The body releases inflammatory substances to try to fight EMFs, and this can lead to allergy-like reactions: skin issues and allergic hypersensitivity.

EMFs and fertility issues

The other big issue is cellphones harming reproductive health. There has been a growing concern that men carrying a cellphone in a pants pocket (without an EMF-protective case)

have a lower sperm count. This has been confirmed by at least ten different studies on humans, according to the Environmental Working Group (EWG).

All of these studies conclude that cellphones stored in pants pockets lead to:

- Lower sperm count
- Decreased sperm vitality
- Sperm damage
- Oxidative stress
- DNA damage

This is a growing issue as currently about 15 percent of couples of reproductive age cannot conceive, and in half of the cases it's due to low fertility in men.

A study in the Fertility and Sterility Journal found that one-quarter of sperm stop swimming after being exposed to Wi-Fi for just four hours. “We speculate that keeping a laptop connected wirelessly to the internet on the lap near the testes may result in decreased male fertility,” researchers said.

Other studies suggest that not only carrying a cellphone but also talking on the phone lowers the sperm count. A 2005 study has shown that men who talk on the phone for longer than an hour a day have 17 percent fewer sperm than men who talk for less than 15 minutes.

There have not been good studies done to look at the reproductive health of women and cellphones, but many studies have shown how it negatively affects the fetus and its development.

EMFs and suicides

EMF exposure affects physical and mental health (brain function) and emotional health is also disturbed. Studies have found a link between EMFs and depression and suicides.

A study published in The Western Journal of Medicine looked at 140,000 male electricity workers and found a strong association between their exposure to EMFs and suicides. Other studies point to the same conclusion: “Low-intensity, non-thermal microwave EMFs produce widespread neuropsychiatric effects.”

These effects include depression and anxiety. Suicides are more common with severe exposures, such as of those working on power lines; living under one may also increase the risk.

EMFs and children health: ADHD, autism

Not only are FCC guidelines not strict enough, they are also based on studies done on 200 adults 20 years ago. Children are likely to be more severely affected by the same devices all around us.

The American Academic of Pediatrics wrote a letter to the FCC urging them to look into the issue, saying the “current standards do not account for the unique vulnerability and use patterns specific to pregnant women and children.”

Children’s bodies are more susceptible to any type of harm, including EMFs. They are more vulnerable than adults; therefore we need to be even more cautious exposing children to EMFs.

We have already discussed children’s leukemia, but this is not the only life-altering disease to worry about. Some studies have suggested that in some cases ADHD and even autism can be linked to EMF exposure.

ADHD has similar symptoms to electromagnetic hypersensitivity, a condition acknowledged by the WHO as a new diagnosis caused by EMFs. Both conditions cause:

- Problems concentrating
- Memory problems
- Anxiety
- Behavioral problems

- Sleep issues

A 2008 Danish study looked at 13,000 children and their mothers' phone use, both during the mothers' pregnancies and after birth. What was found is that cellphone exposure increases the risk of emotional problems in children by 80 percent.

Studies have also found a correlation with autism.

A 2009 study by Dr. Dietrich Klinghardt discovered that mothers exposed to EMFs during their pregnancies and children exposed to EMFs when sleeping are both contributing (and maybe even causative) factors to neurological issues in children, including autism.

Protecting children from EMFs is of utmost importance. This starts before the child is born by shielding the mother from radiation while pregnant. When the child is born, make sure the baby gets the room with the lowest EMF levels (measure it yourself), turn off Wi-Fi when you are not using it (choose corded internet), and keep cellphones, tablets and even baby monitors away from children.

Brain Function and the Nervous System: EMF exposure has been linked to Alzheimer's disease and Parkinson's disease (nervous system disorders), according to a report on "Extremely Low Frequency Fields" by WHO. As with breast cancer, melatonin can protect the brain from these two diseases, and ELF exposure reduces melatonin, therefore increasing the risk of disease. Long-term ELF exposure also changes the body's calcium levels and produces oxidative stress, which then damages the body because of toxicity.

Laboratory studies have shown that the nervous system is sensitive to ELF exposure (and that is true for humans and animals). One of the studies confirming this was led by Dr. Nora D. Volkow, a brain imaging scientist. She and her team found that even the lowest levels of EMFs affect the brain. Changes in the brain could be seen in PET scans after just a 50-minute phone call.

This and other studies have confirmed that cellphone use can alter brain activity and brain function; it can also affect memory and abilities to learn and think fast. This issue can have one of the biggest consequences on society. If the larger population is at risk for decline in

cognition, no matter how small, the sheer number of people affected would produce immeasurable harm on our health and our nation's economy.

Other health effects:

Migraines and vertigo: A 2009 Danish study examined 420,095 adults and found that long-term cellphone use contributed to 10-20 percent increased risk of being hospitalized for migraines and vertigo episodes.

Asthma: A 2011 study found that children born to mothers who were exposed to strong EMFs have three times more risk of developing asthma.

Enzyme issues: A 2014 study on cows has shown that EMF exposure can decrease or even disable functions of some enzymes.

Vision loss: A study on rabbits who were exposed to common electronics has shown that thermal waves can damage the cornea.

Insomnia: When airport surveillance operators were studied in 2013, it was found that their exposure to high-frequency EMFs led to insomnia, as well as anxiety and depression.

Headache: A 2017 report linked cellphone use to headaches in forty different studies.

Long-term exposure to EMFs has caused people to have the following symptoms:

- grogginess
- dizziness
- problems concentrating
- tinnitus
- fatigue
- problems with balance
- pain
- inflammation
- aging rapidly

- hormonal issues
- liver damage

Human body is electric

The human body is a conductor of electricity, and it allows electricity to flow through it. It also produces electricity to communicate between cells. Even the heart wouldn't beat without this electricity! The body relies on electricity for survival, so it comes as no surprise that being affected by electromagnetic fields on a daily basis damages its normal functions.

Dr. Robert Becker, called "the father of electromedicine," spent his lifetime studying the human body and its connection to electricity. At first, he was laughed at, but after he succeeded at using electricity to grow bones his research began to be noticed.

As early as the 1970s, he started warning people that EMFs are harmful, and yet few listened. Today, his research – decades ahead of its time - is extremely timely.

"The greatest polluting element in the earth's environment is the proliferation of electromagnetic fields. I consider that to be a far greater threat on a global scale than warming, or the increase of chemical elements in the environment," he wrote.

Variables that heighten health risk

There are many variables that come into play when calculating the risk of EMFs affecting your health.

The first one is age. Children and teens are more susceptible to both DNA damage and radiation disturbing the body's natural processes and causing inflammation. Unborn fetuses are at high risk of developmental issues when exposed to EMFs. Children absorb radiation more and accumulate it over time.

Pregnant women should guard themselves against EMFs, not just for the health of their unborn child, but also to prevent miscarriage.

Other populations that are more vulnerable to EMFs include the elderly and people who are already sick or malnourished. Because EMFs affect the body on the cellular level, these groups of people do not have enough strength in their bodies to protect from DNA damage and inflammation. If DNA damage happens, their bodies do not have enough energy to repair the damage.

A group with more risk is workers who are constantly around electromagnetic fields: subway workers, cellphone network operating technicians, power line technicians, and many others. For everyone else, the risk factors include levels of exposure, time and frequency of exposure, and location and distance from the source of radiation.

Using electrical items also increases risk: cellphones, computers, cooking appliances, hair dryers, and sewing machines.

The worst personal and household items for EMR

The USA Environmental Protection Agency recommends to not exceed EMF exposure of more than .5-2.5mG (Milgauss) for safety. However, most home appliances measure much higher than that when standing close to them. Whenever possible, stand at least one metre away from any electronics and devices.

Believe it or not, one of the worst sources is hair dryers. At 100mm from the body, you can be exposed to between 60 and 20,000 mG. When choosing a hairdryer or any other item for your home, do your research and choose the ones with the lowest possible levels of EMF.

Other items with highest mG include:

- Fluorescent lamp: 400-4,000 mG
- Vacuum cleaner: 230-1,300 mG
- Microwave oven: 100-500 mG
- Blender: 50-220 mG
- Washing machine: 8-200 mG
- Television: 5-100 mG

- Airplane: 50 mG
- Coffee maker: 6-29 mG
- Computer: 4-20 mG

These EMF measurements are of simple appliances and have not even taken Wi-Fi or Bluetooth into account.

Here are some of the worst items in your home, and how to minimize your risk when using them.

EMF source: Cellphones and smartphones

Cellphones are becoming one of the most severe hazards of the 21st century. For starters, we use them constantly. Statistics show that the average person looks at the phone about 46 times every day, spending up to five hours on it. But even when not using it, the phone is likely next to us, in our pocket, and even next to our heads when sleeping (it is so important to keep your phone in another room or even turned off when sleeping!)

Studies have shown that sleeping next to a cellphone leads to poor sleep and impaired memory and learning ability. Phone radiation easily penetrates the head. This is even more dangerous for children, whose skull is still much thinner than adult skulls.

Studies show that talking on a phone for at least thirty minutes per day can increase the risk of brain cancer, and also lead to:

- Cardiovascular stress
- Changes in brain activity
- DNA damage
- Eye problems
- Fatigue
- Headaches
- Melatonin insufficiency
- Memory problems

To protect yourself while using a cellphone, the experts recommend:

- Use hand-free options such as speakerphone, regular headphones (not Bluetooth), or video call – anything that will keep the phone away from your head.
- Never put the phone in your pocket unprotected. Get an EMF-blocking case for it. Keep it as far away from your body as possible.
- Avoid using the cellphone when it only has one bar. To compensate for low-signal, the device will emit more radiation.
- Never put your cellphone next to your head when sleeping. Keep it as far away as possible.
- Switch the side of the head you are using to talk on the phone. Studies have shown that switching it up has ten times less negative effect than using the phone always on the same side of the head.
- Choose texting over talking.
- Do not encourage children to start using cellphones young. Their bodies are not fully developed and have fewer barriers that protect them from environmental dangers including EMF radiation.
- Buy a cellphone with the lowest SAR rating (Specific Absorption Rate).

Carrier network plays a role in radiation exposure

There is growing evidence that the type of the carrier one uses affects the levels of EMFs emitted by the phone as much as the type of phone itself.

“Network technology plays a major role in determining the level of radiation to which a mobile device user may be exposed,” revealed the EWG. Yet the FCC is hiding the information from the consumers.

No matter what phone and carrier you have, there are ways to minimize your EMF exposure coming from that phone.

EMF-protection for the phone

No matter how low the SAR level is, each phone still emits various amounts of radiation — much worse if the phone is using a 4G network, is connected to Wi-Fi, or is using a GPS.

To minimize your exposure to EMFs while using or even just carrying the phone, you may want to purchase a protective sleeve or case.

SafeSleeve makes anti-radiation cases for phones (as well as tablets and laptops) that block up to 99 percent of all radiation as tested by FCC-accredited labs. It uses a military-grade material to block radiation so you can talk on the phone safely. It also protects you from radiation when the phone is in your pocket or lying next to you.

LessEMF also collects great items for sale to protect consumers from cellphones, EMFs and other sources. You can purchase an air tube headset to use when talking; a shielding phone pouch to protect your head during phone calls and your body when carrying the phone, or a shielded cellphone holster – useful for men who do not want to keep carrying the phone in a pocket.

Using Wi-Fi is now the most popular way to connect to the internet. At home, most of us no longer have corded internet. Coffee shops, airports, and even major supermarkets offer free Wi-Fi to their customers. (France has Wi-Fi in most public parks around Paris). Wi-Fi, like other EMF sources, promotes tumors and cancers, and lead to other diseases.

“Wi-Fi could have a variety of negative health effects,” Moskowitz said, “especially in neurodevelopmental and reproductive areas.”

While escaping it in public places may be an impossible task, at home, there are ways to protect ourselves from it. If you cannot get or do not choose to get wired internet (while it is still possible!) there are ways to use Wi-Fi more safely.

- Keep your Wi-Fi router as far away from living spaces as possible.
- Turn it on only when you are using it.
- Absolutely turn it off at night.

- Disable Wi-Fi on your phone, tablet, laptop, Smart TV, printer, and other devices when not using them.

Smart Meters:

Smart Meters are one of the newest additions to our home EMFs, and until a few years ago not many knew of their existence. Smart Meters are a part of a “smart grid,” a wireless utility grid that allows data to be transported from each household to the utility companies.

This switch from older meters (which were not wireless) caused a lot of controversy when these meters started catching on fire.

The Smart Meter is as bad as a cellphone, but you cannot turn it off, and you never asked for one. Locate the smart meter and measure its field, and try to avoid these areas in your house. You can also buy a Smart Meter shield to block the microwave signals it emits.

Computers, Laptops and Tablets:

Computers, laptops, and tablets emit EMFs in various ways.

In a desktop computer, the radiation is coming from the computer tower, which you can cover with a magnetic foil wrap to reduce EMFs. It comes from the desktop, which can be protected with a screen shield. Lastly, any wireless parts, a keyboard or a mouse, cause extra unnecessary radiation. Be sure to purchase wired ones instead (and choose low EMF options).

In a laptop, a high electromagnetic field is emitted from underneath it. Never put your laptop on your lap without a protective pad that blocks radiation. Radiation also comes from the keyboard. You may want to choose to shield the keyboard completely and buy a safer USB to connect to it.

Tablets and iPads should be placed in a protective pouch when not in use, and the pouch can be used to place it between you and that tablet when it is on your lap. As with laptops, you do not want to place any EMF sources directly on your body.

Personal care devices:

What may come as a surprise to many is that some of the most hazardous EMF sources are a few personal care products: hair dryers, electric shavers, and electric toothbrushes. According to WHO, the first two are the top sources of EMF radiation in the home, primarily because they are used so close to the head.

The only solution to this is to avoid using these products whenever possible. Let your hair dry naturally. Use a regular shaver, and a good no-dye toothbrush.

Home appliances:

At home, there are many appliances that emit EMFs, such as your TV, toaster oven and stereo. The main thing to do is keep as much distance as possible from these items when they are in use. The level of radiation is lower the farther you are from the source.

It is important to stay away from a microwave when using it or, better yet, throw it out. Microwaves use radio waves between 300 MHz and 3 GHz. With age, they can leak radiation through the door, according to WHO. If you use a microwave, replace it when needed, or get a convection oven instead. Stand at least 3m away from it when it is on.

It is also wise to stay away from all smart electronics, such as smart refrigerators, voice-controlled virtual assistants, smart security cameras, smart thermostats, smart pet cameras and any devices you can access with your phone. They have a wireless connection that emits unnecessary radiation.

Measuring and minimizing EMFs in your home:

Every home is different based on the surrounding area, your neighbors, and devices you have at home. Do you live close to a cell tower? Do you live in an apartment complex with only thin walls between you and your neighbors and their electronics? Do you use Wi-Fi or a Smart TV at home? Do you have a Smart Meter? All of these factor into how much radiation you are exposed to at home.

Given all the variables, the best way to know is to purchase devices to measure EMF levels yourself. There are two devices commonly used for this task. The first is the Trifield Flat Frequency Meter, which measures magnetic, electric, and analog radiation from house wiring, microwaves, light switches, cars, TVs, computers, and other electronics. To get a sense of how your household devices affect your body compare the radiation measurement at different distances: stand with the measuring device close to the object, then step back to see how far you need to be to minimize the exposure while it is in use.

The second popular measurement device is Acoustimeter. This measures RFs from Wi-Fi routers, laptops, cellphones, tablets, smart meters, and other smart technology. As an experiment, measure the radiation coming from your cellphone when it is on, but every connectivity it has is off (WiFi, wireless network, Bluetooth, and GPS). Then play with turning on just one at a time to see which is the worst.

Phones are the safest in airplane mode, but that only works if you are keeping a phone around to make calls (have to exit the plane mode), not to receive them. We recommend keeping the phone on, but turning off all of its other functions: most importantly, Wi-Fi and 4G. This is the safest compromise we have found. The phone then loses its smart functions, but radiation is minimized. Whenever you need to use the smart functions, only then should you turn 4G or Wi-Fi on, but try to limit that also to do only what is absolutely necessary, then turn everything off again.

EMF exposure outside your home:

It is possible to protect your home from EMFs. But when you go outside, you are confronted with forces you cannot control.

The biggest issue in the outside world today is cellphone towers.

With the increase of cellphone use and new phone carriers popping up, there is also an increase of cell towers that are being built to keep the signal strong. These towers are used for Wi-Fi, wireless 4G networks, and Bluetooth devices. While it may be good for making phone calls, it is definitely bad for your health.

Each tower has different heights, and the tallest ones can reach as far as 70 km over level terrain. The closer you are to a tower, the worse it is for your health. While harder to avoid when driving (especially in big cities), it is important to live and work as far away from one as possible.

You can locate cell towers in your neighborhood by going to www.telcoantennas.com.au. This site also shows cell towers that are planned to be built for the future, so that if you are moving, you can do your research and know what to expect.

Cell Tower Politics: FCC corruption and wireless lobbying

Reports have shown for years that cell towers may not be as “safe” as the industry claims they are. A 2010 review published by Harvard University found that “some research does exist to warrant caution in infrastructure siting.” One of the studies reviewed found that the closer people live to a cell tower, the worse their symptoms of nausea, eye problems, depression, problems concentrating, dizziness, lower libido, and even difficulties moving. A study in Egypt had the same findings. Indian scientists Sivani Saravanamuttu and D. Sudarsanam reported changes on the cellular level that lead to these health issues.

These studies are dismissed and ignored by the wireless industry and the FCC. The FCC, due to high levels of lobbying, are closing their eyes to any potential problems, and letting the wireless companies do what they want. Starting with The Telecommunication Act of 1996, “the most lobbied bill in history,” the FCC has started to give their power away. Corruption is at the heart of the cell tower take-over.

High-radiation 5G cellphone towers:

When the 3G towers first came to Europe in the early 2000s, many people started feeling ill. Then came the 4G LTE network that gave the users more capabilities for a faster internet and a way to stream videos. The new technology came with a price; 4G cell towers had higher power and therefore higher radiation levels.

Now we see the newest trend: 5G towers. They have even more powerful signals, thus even more radiation. And most concerning is that there are more of them, and they will be able to be legally installed close to people's homes.

The new 5G grid is set to be completed by 2025. California already has seen its share of towers in the plans — 50,000 of them, and people have been protesting. “Neighborhoods would be seeing something the size of refrigerators going up on street poles and could say nothing to stop it,” said San Jose Mayor Sam Liccardo.

Multiple bills have been popping up in the US Senate: some to allow 5G towers to be built without the residents' permission, while other bills attempt to protect the public. The best thing you can do now is be aware of the bills that are being passed and voice your opinion about them.

Full-body scanners at the airport:

The last EMF source outside your home to be aware of is full-body scanners at the airport. These machines have been installed at every airport after 9/11 to see through clothing. The machines (that to date have not caught a single terrorist) are not only “unreliable,” according to TSA itself, but they also subject everyone who flies to a high dose of radiation.

The TSA claims they are safe, and yet they refuse to make these scanners available for independent testing. Scientists and cancer experts are questioning the machines' health safety.

“There's no real data on these machines, and in fact, the best guess of the dose is much, much higher than certainly what the public thinks,” said John Sedat, a biochemistry and biophysics professor at the University of California, San Francisco. When flying, ask to “opt-out” of the scanner and request a manual pat-down instead.

Signs of EMF pollution in the environment:

The signs of EMF-caused destruction in our world are visible in human and animal health, and in the environment.

Have you seen birds that “forgot” to migrate during the winter? Birds use the Earth’s natural magnetic field to help their annual migration, to know where to go and when to go. German researchers found that today birds are confused by the electromagnetic “noise” in their environment. Their natural navigation functions start making mistakes. This has led to birds either not migrating at all or migrating in the wrong, random direction.

“It’s significant because we found a very clear, repeatable effect of electromagnetic noise made by electrical equipment that prevents a bird, in this case, a European robin, from using its magnetic compass,” said Henrik Mouritsen, one of the study’s co-authors. This is not the only negative effect the birds are experiencing.

A 2005 study looked at storks that suddenly exhibited aggressive behavior as well as reproductive issues, and problems with coordination. The study linked it to EMF exposure from phone masts. Some researchers found other studies with the same conclusion but for different bird species.

While birds fly long distances and are exposed to different levels of EMFs depending on their location, what about animals who stay in the same spot all of their lives? When exposed to cellphone radiation during pregnancy, 32 percent of calves developed cataracts caused by oxidative stress, according to a Swiss study.

Chicks, when hatched after exposure to microwave radiation, developed deformities.

Tadpoles lost coordination and experienced a high mortality rate of 90 percent after being exposed to EMFs from three sources 140 meters away. Antarctic krill, like birds, were found completely disoriented. Ants lost their memory. It has also been suggested that the fast disappearance of bees may be partly due to the EM pollution. Also affected are: butterflies, cockroaches, and flies.

Finally, even plants show the damaging effect of EMFs.

Duckweed was observed to produce a stress response when exposed to 400 and 900 MHz radiation (microwaves). Same happened to tomato plants. Rose bushes growth was stunted. A 2016 study concluded that EMF exposure affects the plants' ability to grow and fight off diseases, pests, and fungus because radiation changes their metabolism, thus disturbing normal functions.

It's evident that EMF pollution is hurting humanity and our environment. So why is our government not doing anything?

Concerned scientists and activists speak out:

In 2015, almost 200 scientists from all over the world signed an open letter to the United Nations urging them to enact stricter regulations regarding cellphones, Wi-Fi, and other devices emitting EMFs.

“We are scientists engaged in the study of biological and health effects of non-ionizing electromagnetic fields (EMF). Based on peer-reviewed, published research, we have serious concerns regarding the ubiquitous and increasing exposure to EMF generated by electric and wireless devices.”

Health agencies of six nations (United Kingdom, Germany, France, Switzerland, Finland, and Israel) have also spoken for the reduction of EMF exposure, especially of children. The Vienna Medical Association has cautioned children under 16 years of age against using cellphones at all.

All of this led to the European Parliament to pass a resolution urging countries to change their safety standards – lower allowed exposure limit. A few locales around the world have proposed safer, stricter laws regarding cellphone radiation. However, this is still not enough. The tech companies are creating more and smarter technologies, all of which emit EMFs. The U.S. agencies have also mainly ignored any concerns. Actually, the FCC has already removed warnings about EMFs from their sites completely.

Investigative journalist Norm Alster published a report called “Captured Agency” in 2015 to show that the FCC is completely in the hands of the wireless industry, which is why regulations set in place are not to protect the consumer. Therefore, we, as consumers, need to learn how to protect ourselves.

How to minimize EMF risks:

- Eliminate as many radiation sources as possible
- Fix wiring issues in your home.
- Unplug cords and cables when not using them.
- Move furniture on which you sit away from walls – there is almost always some level of EMF coming from inside the walls.
- Get rid of light dimmers; they produce unnecessary EMFs.
- If you ever use a microwave (it’s better to use a conventional oven), stand at least 3m away from it.
- Disable Bluetooth devices when not using them.
- Use headphones to talk on the phone.
- Try to avoid using artificial light. Instead, wake early with the sun, and go to bed when it’s dark.
- When you do use artificial light, avoid EMF-emitting (and mercury-emitting) CFL light bulbs. Instead, purchase Incandescent bulbs.
- During evening hours, blue light from screens can negatively affect your melatonin level, which disrupts your sleep cycle. Wear blue-light blocking glasses after dark when you watch TV or work on your laptop or phone. Alternatively, you can install www.justgetflux.com on your computer. This will make the screen emit less blue light during dark hours.
- Stay away from modern gadgets that require electricity, when there are manual alternatives. (Use a mop instead of a vacuum, go for a bike ride).
- Avoid using electric blankets, heaters, fans, and other electric products.
- Buy protective shielding for your bedroom (sheets, canopy, floor mats, and other products with built-in EMF-shielding materials).

Lifestyle changes to protect yourself

- Make sure to get enough nutrients and sleep to keep your body in shape to protect itself from EMFs and other environmental hazards.
- Keep your body clean by eliminating toxins from your diet and home; and detox regularly.
- Eat foods that are high in antioxidants to fight off free radicals.
- Avoid mold; it grows faster in EMF-filled environments.
- Use Epsom salt baths to ground yourself.

Protect yourself when you sleep

- Keep your bedroom as EMF-free as possible. That means turning off Wi-Fi when you sleep (even if it is on the other side of the house); turning off all electronics in the room, and turning off your cellphone, or putting it on airplane mode and placing it far away from your head.
- You need to make sure that your bed is in a safe location.
- Do not sleep with your head close to an electrical outlet.
- Never sleep on the other side of the wall of a powerful EMF source, such as a computer, a fridge, or a smart meter.
- If you live in an apartment and your bedroom wall separates you and your neighbors, use an EMF measuring device to see the RF reading around your bed. You want to make sure your neighbors do not have a Smart TV or another EMF source on the other side of your bed, without you realizing. If the EMF measurements are high where you sleep, it is time to move your bed, and if needed, the entire bedroom.

Dirty electricity in the home

EMF pollution in the home creates dirty electricity: all of the power lines and wiring inside the home create fields that radiate your home space.

Like other EMF related hazards, this can lead to headaches, sleep issues, fatigue, heart issues, a weakened immune system, mood swings, and an increased risk for chronic illness.

The main causes of dirty electricity are smart meters, LED light bulbs, light dimmers, wiring, and of course, electrical and wireless devices in the house.

The best way to reduce dirty electricity is to buy filters you plug into the wall outlets, such as the ones made by Stetzer and Greenwave.

How to detox from EMFs

Because it is becoming impossible to avoid all EMF radiation at home and outside, it is important to detox your body from it. One way to do so is to unplug completely for as long as you can – turn off your phone for a week and take a camping trip out into the woods, where there is no signal.

It has been shown that stress caused by EMFs can disappear when the body is in an EMF-free space. However, long-term EMF exposure will not be fixed by one hike. Instead, it is best to take frequent breaks to unplug from technology and its EMFs.

Another way to detox is to use grounding or earthing techniques. Earthing is connecting to Earth energies by walking barefoot on the earth, and when needing shoes, wearing shoes with natural soles. Dr. Stephen Sinatra has explained that because the earth is negatively charged, it gets rid of any free radicals from the body, including the ones caused by EMF damage.

What seems to be quite simple can carry great benefits, and these have been proven in numerous studies. A 2012 review in the Journal of Environmental and Public Health concluded that earthing is an effective way to defeat stress, and help heal from inflammation, pain, insomnia, cardiovascular disease, and many other common disorders.

When unable to go outside, you can use earthing products that have a similar effect on the body. There are grounding wrist straps, socks, gloves, and mats, as well as earthing

sandals and other types of shoes. This world might be full of health hazards, but with the right tools and information, nothing is impossible, and great health is very reachable.

Frequencies that are good for you

To end this article on a high note, let's talk about EM frequencies that are actually good for you. Because Earth has a magnetic field of its own, there are frequencies that are not only safe but beneficial for human health. Earthing using Earth's frequency is just one example.

Another example is Schuman Resonance, a frequency that is used to protect against harmful EMFs that is commonly used by NASA for their astronauts. They made the Schumann Simulator, which created a magnetic pulse similar to Earth's natural frequency. This mitigates the negative effects from outer space.