

Electromagnetic Fields (EMFs)

Fact Sheet



This fact sheet is designed to offer information and precautionary measures for using EMF-emitting technology more safely.

WHAT ARE MAN-MADE EMFS?

Today's telecommunications technologies that send and receive data wirelessly emit man-made low-frequency microwave radiation, referred to here as radiofrequency electromagnetic fields (EMFs). Other electronics, appliances and wiring emit a related type of electrical and/or magnetic field called extremely low frequency electrical or magnetic field (ELF EMF).

Common Sources of EMFs

- Cell phones
- Cordless DECT phones
- iPads, Chromebooks and other tablets
- Wireless printers, mice and keyboards
- Wearables
- Baby monitors
- Gaming devices
- Routers and access points
- TV streaming devices, Chromecast, Roku
- Virtual Reality Glasses
- Bluetooth
- Wireless headsets
- Microwave ovens
- Utility "smart" meters
- "Smart" appliances
- Cell mast antennas
- Poorly grounded electricity

IS EXPOSURE TO EMFS HARMFUL?

Humans and the earth have weak, naturally occurring EMFs much lower than man-made EMFs. In 2011 the World Health Organization (WHO) classified radiofrequency electromagnetic fields as 2B: "Possibly Carcinogenic to Humans."

Until recently, it was generally believed that to cause harm a device had to emit enough heat to raise the temperature of body tissue (known as the thermal effect). In 2016, findings from a U.S. National Toxicology Program peer-reviewed study showed evidence that EMFs may cause biological

harm at the non-thermal level. The rodent study designed to mimic human exposure found a positive statistically significant association between certain non-thermal EMF exposure levels and cancer and pre-cancerous cells in the brain and heart.

IS CANCER THE ONLY CONCERN?

Other EMF studies in the U.S. and around the world have identified additional risks including:

- Damage to sperm and reproductive systems
- Brain function impairment
- Effects on Autism and Alzheimer's
- Electrohypersensitivity (EHS)
- DNA and genetic damage
- Heart irregularities
- Neurological disorders
- Learning and memory deficits
- Behavioral issues
- Sleep disruption

WHAT IS ELECTROHYPERSENSITIVITY?

Electrohypersensitivity (EHS) is a physical reaction or allergy to EMF exposure. The Austrian Medical Association indicates, "Patients may experience sleep problems, fatigue, exhaustion, lack of energy, restlessness, heart palpitations, blood pressure problems, muscle and joint pain, headaches, depression, difficulty concentrating, forgetfulness, anxiety, urinary urgency, anomia [word recall failure], dizziness, tinnitus [ringing or buzzing in the ears] and sensations of pressure in the head and the ears."

The health problems may range in severity from benign, temporary symptoms, such as slight headaches or paraesthesia [tingling or prickling] in the head [or hand] when using a cell phone, to severe, debilitating symptoms that drastically impair physical and mental health."

Science indicates that children, fetuses, those with existing health conditions and those sensitive to fluorescent lights (another form of EMF) may be especially vulnerable.

HOW CAN YOU REDUCE YOUR EXPOSURE?

All wireless devices when left in active mode continuously pulse EMFs. Even in sleep mode, if the antennas are on, EMFs are emitted to seek/maintain a "handshake" with the nearest cell tower or wi-fi router. Often, devices have multiple types of antennas that each emit EMFs, such as cellular, wi-fi, Bluetooth, data, and location antennas.

Simple changes to how we use our devices will allow us to still access technology but significantly reduce EMF exposure.

Standard Best Practices

The fine print that comes with each device includes manufacturers' recommendations for keeping active devices at a distance from one's body. Additional precautions include:

- Use hard-wired technology when possible.

Your hard-wired connection not only reduces EMF exposure, but is more secure and provides a faster and more reliable connection.

- Plug tablets, laptops and cell phones into an Ethernet cable, then select airplane mode. This will typically disable the wi-fi, data, Bluetooth, and cellular antennas; if not, turn off each one individually.
- Turn off the location antenna if it remains on.
- If your device does not have an Ethernet jack, adapters are available.
- Use hard-wired accessories like keyboards, mice and printers.
- Even when hard-wired and in airplane mode, use devices on a surface other than the body.

While in airplane mode you can still use the clock, camera, alarms, calculator and any downloaded games, music, movies or e-books without radiation exposure.

When you need to use a device in wireless mode:

- Keep the device off your body. Opt for speaker phone or use a hollow-tube/air-tube headset for phone calls. Radiation is highest while a call is connecting.
- Download what you need then set it back to airplane mode. Check periodically for messages.
- Never give a child a device with antennas on.

Other Precautionary Measures

- When making a call, use only the cell antenna. Turn off the data, Bluetooth, wi-fi and location antennas to reduce radiation exposure.
- Download new texts, emails, etc., in active mode, then go back into airplane mode to read them. Compose messages off-line, go back into active mode to transmit, then resume airplane mode.
- When using a navigation application, secure directions then go into airplane mode but turn on the location antenna. It uses a lower-emission technology and will guide you to your destination without your device emitting two-way radiation. (If you take a wrong turn, you may need to go back into active mode temporarily to correct your course.)
- Wait until you are on a hard-wired device to do non-essential activities like surfing the



internet, checking social media, etc.

- Radiation amplifies around metal, so keep devices in airplane mode while in vehicles, elevators, trains, airplanes, etc.
- Turn off vehicle Bluetooth and wi-fi antennas where possible otherwise they emit EMFs constantly.
- Before placing a cell phone in your pocket or elsewhere on your body, set it to airplane mode. If you must leave it in active mode create distance by storing it in a purse, briefcase, backpack, etc.
- Use a corded landline phone at home and work.
- You can forward cell phone calls to your landline while at home or work, and leave your cell phone in airplane mode or turn it off.
- Be mindful of exposing others to your devices' second-hand radiation.

ENVIRONMENTAL SOURCES OF EMFS

Cell Towers and Antennas

- If you live in line of site of a cell tower or a mounted antenna, you may wish to consider shielding materials and/or consultation with a building biologist certified in EMFs.

Routers and Access Points

- Wireless routers and wireless access points have antennas that continuously emit EMFs. Choose hard-wired routers and access points.
- Remote controls and timers are available at hardware stores to turn wireless routers off and on as needed.

- Keep wireless routers as far away from people as possible, and turn them off during sleeping hours.
- If you have a router through your Internet service provider, customer service can instruct you on how to easily turn off the antennas to use it just as a hard-wired router. There will usually be a 2.4 and a 5 GHz antenna to disable.
- Some Internet service providers include public wi-fi hotspots on home routers. Ask to have that disabled as well.

Protect Your Sleep

EMFs may disrupt our body's ability to repair and regenerate cells while we sleep. Keep devices out of the bedroom, or put your device in airplane mode if serves as your alarm clock.

Utility Meters and Appliances

- Utility "smart" meters (gas, water, electric, solar) emit EMFs that pulse through homes and offices, through walls, floors and ceilings. If a digital meter has been installed, avoid spending prolonged time in the area near it. Consider installing shielding materials to deflect the signal away from the building.
- Ask your utility company to keep or reinstall analog meters.
- For individuals experiencing EHS, poorly grounded appliances and household wiring can trigger symptoms. Consider seeking the services of a building biologist certified in EMFs to assess and remediate your spaces if you are concerned.



- Purchase wired appliances and turn off any wireless antennas to reduce EMF exposure.

CHILDREN AND EMFS

Children and fetuses may be more sensitive to the potential risks of EMF radiation. Studies have demonstrated EMFs penetrate a child's skull and brain even more deeply than an adult's.

- As advised by the Baby Safe Project, when planning to have children, limit EMF exposures to protect your reproductive systems and fetus.
- Choose hard-wired technology connections over wireless at home and in your vehicles, including baby monitors.
- Keep your own devices in airplane mode around children and fetuses, including cell phones, tablets, fitness trackers and "smart" watches.
- If you give a small child a cell phone or a tablet to use, or store a device on a baby stroller, ensure it is in airplane mode.
- Teach older children safe technology practices. When apart, establish check-in times so they can leave their cell phones in airplane mode the rest of the time.

TESTING FOR EMF EXPOSURE

Since EMFs are invisible energy waves, we cannot generally see or hear them. There are, however, EMF detection meters available in a range of prices that allow you to do so.

- Seek those that detect digital technology's spiked pulses to identify greatest emissions, not just average exposures.
- Some meters provide both a visual display and an audio cue, which is helpful in

identifying EMF sources.

- Meters can be rented or purchased.

The American Academy of Environmental Medicine advises schools use hard-wired computers and disconnect the wi-fi.

WHERE CAN I OBTAIN MORE INFORMATION?

U.S. National Toxicology Program Carcinogenesis Studies of Cell Phone Radiofrequency Radiation: <http://biorxiv.org/content/early/2016/06/23/055699>

American Academy of Environmental Medicine: <https://www.aeemonline.org/>

Guideline of the Austrian Medical Association for the diagnosis and treatment of EMF related health problems and illnesses: <http://electromagnetichealth.org/wp-content/uploads/2012/04/EMF-Guideline.pdf>

European Academy of Environmental Medicine's *EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses*: <http://www.degruyter.com/view/j/reveh.ahead-of-print/reveh-2016-0011/reveh-2016-0011.xml?format=INT>

International Institute for Building-Biology & Ecology: <http://hbelc.org/>

Environmental Health Trust printable education resources: <http://ehtrust.org/resources-to-share/printable-resources/>

BabySafe Project: <http://www.babysafeproject.org/>

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