

# SOURCES OF EMF EXPOSURE AND HOW TO AVOID THEM

## *EMF Environmental Health Initiative*

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This is a quick guide to the major sources of EMF in everyday life, and some suggestions about how to avoid unnecessary EMF. It is divided into ELF-EMF from things that run on electricity (power-frequency fields) and RF-EMF or things that run on wireless technologies like cell and cordless phones.

### **POWER FREQUENCY (Extremely low frequency [ELF] EMF)**

#### *Home*

- Appliances (magnetic induction stovetop, microwave oven, computers, washer/dryer, TV, radio, etc).
- Plasma TVs apparently have some adverse bioeffects on some people that are similar to exposures to wireless devices. *NOTE: LCD screen TVs have low or no EMF emissions.*
- Lighting (compact fluorescent bulbs, other fluorescent lighting).
- Where electricity enters the home (electrical main panel, subpanels in the home, electrical wiring in the walls – if improperly wired).
- Home grid systems (RF devices that use electrical wiring of home).
- Hybrid cars (their EMF levels vary widely, so check before buying).
- Copiers/faxes.
- Being alongside someone else's computer (even thru a wall).
- Being near an electrical main panel or subpanel or switchgear room. Think next to, above or below an electrical room.
- Personal data assistants (PDAs such as BlackBerry and Treo units). These also emit high levels of radiofrequency radiation just as cell phones do.
- Working near large electrical systems (large electric motors, generators, electric cables).
- Working with power saws, drills, welding, any induction motor (variable speed motor like a sewing machine)

#### *School*

- Lighting (fluorescent), in particular, compact fluorescent bulbs.
- Being close to overhead projectors, slide projectors, computer hard-drives (floor); any transformer for charging power (little black boxes that plug in); "boom boxes" for music that plug into an electrical wall plug; power strips with lots of wires plugged in.
- Computers, printers, nearly all appliances that plug into an electrical wall plug.

#### *Work*

- Lighting (fluorescent primarily).
- Computers and separate hard drives.
- Printers.

#### *Public spaces*

- Power lines, transmission lines, transformers, pad-mounted ground transformers (big green boxes labeled "High Voltage" that sit outside buildings).
- Broadband over power lines (BPL) – a new technology that will use the existing electrical power grid to transmit an RF signal (wireless) for internet access. BPL would expose all buildings with electrical wiring (which is ALL buildings with electricity) to constant RF, even if you do not buy the "black box" to decode and use it. You cannot "opt out."
- Electric transportation systems (trains) and light-rail.
- Electric and hybrid cars (exposures vary widely).

## **RADIOFREQUENCY EMF (wireless technologies)**

### ***Home***

- Cellular and cordless phones and base stations, pagers, Bluetooth.
- NEXTEL phones – These are really strong radios or RF emitters.
- IDEN cordless phones – new U.S. form of European DECT phone – which emits a strong RF signal and radiates full power 24/7, unlike a regular cordless phone, which only radiates when in use.
- Wireless networks, laptops, PDAs – any “wireless device.” Low level RF emissions are not necessarily much safer. We don’t know a lower limit for “safe.”
- Electric utilities that “read” your electric meter remotely will attach a wireless transmitter on your wall, which constantly transmits wireless RF. You can ask to “opt out” of this new service if you object to more wireless.
- Avoid wireless baby monitors (excessively high ELF and/or RF).

### ***School***

- Wireless networks (internet connection).
- Cell towers or antennas on campus (or adjacent to campus). *These may include hidden or “stealth” cell site installations on the roof, or inside a chimney or church steeple.*
- Cellular phones and antennas, pagers.... two-way radios on playgrounds.

### ***Work***

- Wireless devices (cellular phones, cordless phones and base stations, Bluetooth, pagers).
- Wireless laptops, PDAs such as

BlackBerry and Treo units.

- Wireless networks for internet.
- Cell antennas on next-door buildings radiating back to you.
- Cell antennas on your building above you, radiating toward a nearby building with glass windows that reflect the RF back to you.

### ***Public spaces***

- Cellular antennas, cell towers.
- Wireless systems installed by private businesses that crisscross commercial streets, and expose shoppers and pedestrians to invisible beams of RF.
- WI-FI hot-spots and municipal systems.
- WI-MAX (has a 10-mile radius, so very strong near the transmitters).
- Broadcast towers (AM, FM, television towers).
- Radar. Doppler radars for weather are tremendously strong RF sources – intermittent, sweeping exposure at very high peak power). *Hazardous for people and animals (one veterinarian we work with, whose office was about half a mile from a Doppler installation, lost all her pedigreed Dobermans to an aggressive, rare cancer).*
- Airports, military bases.
- Electronic Article Surveillance (EAS) systems. (Security Gates in stores are the flat white panels near the doors. These panels have some of the strongest known exposures in daily life. They can detect shoplifters who carry RF-tagged articles out of a store.
- Radiofrequency Identification (RFID) and metal detector systems (airports, stores, libraries and hospitals).

## WHAT CAN WE DO? MAKING WISE CHOICES

### *Cell phones, cordless phones and other wireless devices*

- Use a corded phone (land-line) as your regular telephone.
- If you need to use a cordless phone or cell phone, use a *wired* headset (*not* wireless) and/or use it on speakerphone. Brain tumor risk (glioma) starts at only 260 hours of cumulative, lifetime exposure. Risks more than double when phones have been used for 10 years or longer, with ipsilateral use (phone mainly used on one side of the head) and 2000 or more hours of lifetime use. Risks are highest for the 20-29 age group.
- Children should not use cell phones or cordless phones AT ALL.

In general, everyone who does use a cell phone or cordless phone should try to:

- Use a land-line for all calls (and absolutely for lengthy calls).
- Limit cell and cordless calls (both in number and length of call).
- Use speaker phone mode.
- Use a wired headset (preferably with hollow cord at the ear but all types of cords that put distance between your head and the phone are useful).
- Avoid Bluetooth-type wireless headsets because of both the chronic exposure from the wireless headset and from the phone you carry (recent testing of the phones themselves show that 3 of 4 phone types do not meet even the current (and inadequate) public safety limits when used with a wireless headset).
- Avoid wearing a cell phone or PDA (BlackBerry- or Treo-type unit) when “ON” because the battery-switching ELF emissions are excessively high (in addition to the RF emissions).
- Avoid using a cordless or cell phone or PDA when pregnant, or when carrying an infant or small child.
- Avoid using a cell phone in the car with children riding along – RF levels will be unacceptably high in the back seat during cell phone use in the front seat.
- Avoid DECT or IDEN cordless phones. The “base” is always “ON” and transmitting. They are a large, continuous source of RF compared to other cordless phones in the home and office.
- Avoid wireless baby monitors - or at least place them more than 10 feet from the crib or bed.

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### *What can we do about cell phones and driving?*

- Hang up and drive. safe spot.
- Do not allow young drivers to use a phone in the car. *Effective July 1, 2008, illegal for teens in California to use cell phones or other wireless devices while driving.*
- Do not return calls while driving.
- Do not take calls while driving.
- Turn the phone off while in the car.
- Collect messages when you arrive at a
- Remember, some studies report more brain tumors in rural areas, perhaps because of weaker RF signals.
- Select your next cell phone with a low Specific Absorption Rate or SAR value. You can choose between 0.2 - 1.46 SAR (choose the lowest). To learn more, see <http://www.sarvalues.com>
- Get a built-in, hands-free car-phone jack. Get the antenna hookup outside

the car, if possible.

### ***Wireless networks, hotspots, WI-FI and WI-MAX***

- Promote wired (not wireless) alternatives for internet access in your city. City-wide WI-FI and WI-MAX will cause involuntary exposures for everyone.
- Avoid hotels that have WI-FI (wireless hotspots) if you want to sleep well.
- Avoid Starbucks and MacDonalds (and other wireless hotspots), particularly with children in tow.
- Let restaurants, internet cafes, stores and hotels know if you object to involuntary exposure from “wireless hotspots” when you shop or travel.
- Choose wired internet (Ethernet cable modems) at home, instead of wireless systems. At a minimum, plug them in only when in actual use. Unplug them during sleeping hours. Install the wireless access points as far as possible from occupied space (your desk) and never in a child’s bedroom.
- Be aware of your school district’s intentions – do not support “wireless.”
- Educate yourself and your community about ALTERNATIVES to wireless – we don’t have to do without internet access. We can have communications and data access on the internet, by taking some reasonable precautions.
- Do not use a laptop (a computer notebook) in your lap. If you use a laptop computer in your lap, and it has a wireless card (for wireless internet), the strength of the emission is very high, similar to having a cell phone transmitting in your lap.
- Avoid multiple trips thru security gates in stores. Never let children play between the panels, or linger near them. These panels create huge RF exposures.
- Avoid quasi-necessary medical procedures (MRI, ultrasound during pregnancy) to avoid unnecessary fetal exposures to strong electromagnetic fields.
- Use LED (Liquid crystal display) light bulbs for energy efficiency.
- Avoid compact fluorescent bulbs (sorry, Al Gore!). Use LED or incandescent light bulbs. They emit no “dirty power” or low-kilohertz frequency RF back onto your electrical wiring. Dirty power is reported to cause symptoms of electrosensitivity very quickly in many people (headache, fatigue, ringing in the ears [tinnitus], sleep disruption, immune dysfunction, worsened asthma symptoms, and interference with normal blood metabolism).
- Avoid dimmer switches (rheostat lighting) for the same reasons.

### **Additional Resources**

[www.bioinitiative.org](http://www.bioinitiative.org)  
[www.powerwatch.org](http://www.powerwatch.org)  
[www.emrpolicy.org](http://www.emrpolicy.org)

[http://www.healthandenvironment.org/working\\_groups/emf](http://www.healthandenvironment.org/working_groups/emf)  
<http://www.healthandenvironment.org/>