



For more information

- ✓ **"Job stress: Is it killing you?"** *NJEA Review*, May 2012. bit.ly/jobstress8
- ✓ **"As schools lift bans on cell phones, educators weigh pros and cons,"** Kinjo Kiema, *NEA Today*, Feb. 23, 2015. bit.ly/2b6eOr8
- ✓ **Be kind to your eyes,** *NJEA Review*, September 2012. bit.ly/2bdZnAp
- ✓ **Computer workstations eTool,** Occupational Safety and Health Administration (OSHA). bit.ly/2aJUeRw
- ✓ **"Stretching Exercises at Your Desk, 12 Simple Tips,"** WebMD. wb.md/2beOvUk
- ✓ **"Cell phone facts and tips,"** Grassroots Environmental Education. bit.ly/2bqpFQP
- ✓ **"Radiofrequency and microwave radiation,"** Occupational Safety and Health Administration (OSHA). bit.ly/2aR1TIY
- ✓ **"Report of Partial Findings from the National Toxicology Program (NTP) Carcinogenesis Studies of Cell Phone Radiofrequency Radiation in Hsd: Sprague Dawley SD Rats (Whole Body Exposure)."** bit.ly/2bqq8Cc
- ✓ **"Low EMF Best Practices,"** Collaborative for High Performance Schools (CHPS), 2014. bit.ly/2bs51Rx
- ✓ **Microsoft Accessibility Center:** www.microsoft.com/enable
- ✓ **Apple Accessibility Center:** www.apple.com/accessibility
- ✓ **Google/Android Accessibility Center:** www.google.com/accessibility/products-features.html



NEW JERSEY
EDUCATION ASSOCIATION

Cell phones and cancer

The National Toxicology Program (NTP) is conducting the largest set of laboratory rodent studies to date on cellphone RF radiation. The studies cost \$25 million and are designed to mimic human exposure. They are based on the cellphone frequencies and modulations currently in use in the United States. The NTP studies are designed to look at effects in all parts of the body.

On May 27, 2016, NTP released a report with partial results of the studies. They found increased occurrence of rare brain tumors called gliomas and increases in nerve tumors called schwannoma of the heart in male rats. The released results are partial because more rat studies and all of the mouse studies will be forthcoming by 2017. The cells that became cancerous in the rats were the same types of cells as those that have been reported to develop into tumors in human cellphone users.

The EMF produced by cellphones was classified as possibly carcinogenic to humans by the World Health Organization in 2011. They found that long-term use of a cell phone might lead to two different types of tumors, gliomas and acoustic neuroma, a tumor of the auditory nerve.

Minimize health risks from electronic devices

By Adrienne Markowitz and Eileen Senn

Desktops, laptops, tablets, eBook readers, printers, projectors, smart boards, smart TVs, cellphones, cordless phones and wireless networks (WiFi) have become ubiquitous in schools. At their best, they are powerful tools for education. At their worst, they threaten the physical and mental health of teachers, paraeducators, secretaries, librarians and other school staff members and students who spend numerous hours using the devices.

Physical health risks from electronic devices include pain and tingling from repetitive strain injuries to the hands and wrists; pain in the neck, shoulders and back; dry, burning, itchy eyes, blurred vision and headaches; altered sleep patterns and next-day fatigue from exposure to blue screen light; distracted driving; and various health problems from exposure to radiation.

Mental health risks arise from stress due to raised expectations for multitasking, productivity and proficiency with devices; dealing with malfunctioning devices; student and colleague distraction from and addiction to devices; and intrusion of devices into nonwork time.

WiFi devices emit radiation

Radio frequency (RF) electromagnetic frequency (EMF) radiation is sent and/or received by the antennae of phones, routers and other wireless devices. RF radiation is capable of causing cancer, reproductive, neurological and ocular effects. The amount of radiation exposure received depends on the amount of time exposed and distance from the source. Radiation levels fall off exponentially with distance from antennae. If you double the distance, the radiation is four times less. If you triple the distance, it is nine times less, and so on. Children and developing fetuses are particularly at risk because their bodies are still growing. People with implanted medical devices are at risk for device interference.

Hazards and solutions

The most straightforward ways to minimize health risks are to use electronic devices in moderation and to maximize your distance from them. There are also specific solutions to specific hazards listed below.

Local associations should work with their UniServ field representative to negotiate solutions that are in the control of district administrators such as providing training and ergonomic equipment and hard-wiring devices. Individuals should take steps within their control, such as:

For repetitive strain injuries

- Use voice control/speech recognition.
- Use ergonomic alternatives to traditional mice and keyboards.
- Use as many fingers as possible when typing and both thumbs when texting.

For neck, shoulder and back pain

- Ensure an ergonomic workstation.
- When using a hand-held device, support it and the forearms.
- Avoid bending the head down or jutting it forward.
- Take frequent, short breaks from the device.
- Ensure good posture and change positions frequently.
- Stand and do stretching exercises.

For eye pain, blurred vision and headaches

- Use sufficient, but not excessive, lighting.
- Use assistive technology built into Apple, Android and Windows devices.
- Enlarge and darken the cursor and pointer.
- Enlarge the font; magnify the text.
- Use text-to-speech instead of reading.
- Use special computer glasses.
- Relax the eyes on a minibreak.

For altered sleep patterns and next-day fatigue

- Stop using devices at least one hour before bedtime.

For distracted driving

- Use hands-free devices, preferably speakerphones.
- Pull over and park.
- Let someone else drive.

For radiation exposure

- Keep devices away from the body and bedroom.
- Carry phones in briefcases, etc., not on the body.
- Put devices on desks, not laps.
- Hard wire all devices that connect to the internet.
- Hard wire all fixed devices such as printers, projectors and boards.
- Use hard-wired phones instead of cell or cordless phones.
- Text rather than call.
- Keep conversations short or talk in person.
- Put devices in airplane mode, which suspends EMF transmission by the device, thereby disabling Bluetooth, GPS, phone calls, and WiFi.
- Use speaker phone or ear buds instead of holding the phone next your head.
- Take off Bluetooth devices when not using them.

For stress

- Training in device use, assistive technology.
- Easy access to user manuals.
- Easily available technical support. 📞

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HOW TO ELIMINATE AND REDUCE ELECTROMAGNETIC FIELD (EMF) EXPOSURE IN THE CLASSROOM: A GUIDE FOR SCHOOLS

EHT recommends eliminating sources of EMF radiation inside school buildings by the installation of corded/wired (instead of wireless) internet/phone/tech connections. Corded/wired connections will significantly reduce hourly and overall exposures to students, teachers and staff.

HEALTHY TECH ROUTINES IN THE CLASSROOM

- At start of class, remind students to power off cell phones and Personal Digital Devices.
 - Regularly remind students about phones and wireless PDD: Distance devices away from body and,
 - If cell phones are needed for photos or video remind students to turn transmitting antennas off: Select “airplane mode” and disable all wireless antennas including Cellular, Wi-Fi, Mobile hotspot, Mobile data, Siri, Bluetooth and Location.
- Post policy and best practices signs in every classroom and prominently at room entrances.

CURRICULUM PLANNING

- When curricula requires internet connectivity, limit it to specific times rather than interspersed throughout class. For example, curricula should not require students to use phones to look up things during class. Instead, have a plan that includes time when students organize their research questions and, subsequently, a separate time when students research online.
- When internet or other electronic connections are needed, use hardwire connections (cords/cables/wires/adapters) for all equipment (personal computer, any size electronic screen, printer, audio speakers, headphones, microphone, smartboard, printer, mouse, keyboard, and other devices and accessories).
- If hardwire connections are not available in the school, minimize use of cloud and other wireless network services and instead use applications and content that are pre-downloaded onto devices.
- Download and install files for curriculum prior to students’ use. This will eliminate the need for Wi-Fi during class.
- Teach students to turn OFF wireless antennas when not in use (Wi-Fi, Bluetooth, Data, Cellular) and to select Airplane Mode for their personal devices including on cell phones, laptops, and other wireless devices. Note that students may need to go to Settings to fully disable Wi-Fi and Bluetooth.*

- Store laptop carts outside of the classroom, and avoid recharging laptops near students/staff.
- Instead of virtual reality “field trips,” show movies and video in class on a large screen.

** Wi-Fi “OFF when not in use” will still result in radiation exposures to students and staff during Wi-Fi use and continuously from WLAN access points. EHT recommends the installation of wired networks.*

COMMUNITY EDUCATION

- Regularly schedule parent, teacher and community education sessions about safer use of technology, e.g.:
 - Strategies and practical advice on how to minimize health risks of cell phones, screens, and wireless digital devices.
 - Hands-on workshops that explain and demonstrate how to hardwire home electronics and create a low-EMF computer workstation.
- Regularly hold discussion forums about strategies to address the challenges of parenting in the digital age.
- Hold student forums about how to reduce radiation, reduce eye strain, and minimize adverse psychosocial impact.

SCHOOL POLICY

- Create and regularly update policies for cell phone and digital device use in classrooms that includes medical recommendations for children’s health and safety related to eyes, posture, addiction, and radiation.
- Institute a ban on personal cell phones and personal hotspot devices. Prohibit use of all internet-connected devices in classrooms unless during supervised use for specific instructional purpose. Such a policy may help prevent students from rushing through schoolwork to go online for gaming or other non-school purposes.
- PDD bans (unless wireless transmissions are OFF) should be extended to school buses. Prohibit Wi-Fi and cell phone network use in buses because EMF radiation is intensified inside metal vehicles.

HOW TO ELIMINATE AND REDUCE ELECTROMAGNETIC FIELD (EMF) EXPOSURE IN THE CLASSROOM: AN INTRODUCTORY GUIDE FOR SCHOOLS

- Institute a policy that allows for convenient, non-wireless methods for students to communicate with parents about last-minute scheduling issues. Non-wireless methods could include: corded phones, electronic bulletin board, and other practical, accessible ways to get messages to/from students.
- Incorporate a Technology Curriculum into other curricula. For example,
 - In the health curriculum, include information about why and how to reduce exposure to wireless radiation, including step-by-step instructions how to disable wireless on their personal devices.
 - In the environmental science curriculum, review current and historical regulatory policies on EMFs, including international approaches.
- Educate administrators, staff, and volunteers at least annually and when newly hired, about the safer use of technology. This might include:
 - Reviewing school policies and how to reinforce them in the school setting,
 - Explaining how to eliminate/minimize health risks of cell phones, screens, and wireless digital devices with hands-on workshops that explain and demonstrate how to hardwire electronics and create a low-EMF computer workstation.

LOW-EMF INFRASTRUCTURE IN SCHOOL BUILDINGS

- Install wired rather than wireless LAN and communication services in schools.
- Only purchase or use computers, tablets, and other school and personal technology devices that can be ethernet-connected and allow all wireless applications (including locators) and antennas to be disabled.
- Locate computer stations and ethernet ports throughout school for convenient internet access.
- Hard wire all technology devices. This includes: fixtures such as printers, projectors, scoreboard controls, and boards; computer accessories such as audio speakers, mouse, keyboard, microphone, headphones, etc.; all locations at school (auditorium, gymnasium, library, office, indoor and outdoor lounge or activity areas, daycare facilities, etc.). Always include a step to disable Wi-Fi/Bluetooth antennas via settings in the device, because otherwise even when the device is connected with wires, its antennas will often continue to emit EMF radiation.

- Operate laptops and tablets only in battery mode and not when plugged into an electrical outlet.
- Place corded phones in every room and in common areas so students and staff can communicate without cell phones. No cordless phones.
- Hardwire security systems.
- Do not use fluorescent lights. If fluorescents are already installed, consider improvements and perhaps optimizing natural daylight.
- Do not use RFID systems for persons or property.
- Install wired charging systems instead of wireless charging systems.
- Do not place microwave ovens in classrooms or schools. If you must use microwaves, then ensure ovens are checked for leaks and damaged seams. Teach students and staff to distance themselves from ovens.
- Replace utility smart meters with analogue meters.
- Replace wirelessly communicating environmental sensors with non-wireless alternatives.
- Ensure the electrical wiring in all school rooms complies with U.S. National Electrical Code and applicable state electrical code and local jurisdiction regulations. Have an electrician evaluate, and remediate if necessary, to ensure:
 - Student- and staff-occupied areas have no common wiring errors,
 - ELF magnetic field exposure is not above 1 mG (100 nT).
 - Classrooms are not above electrical panels, electronics, or facility equipment/appliances that generate high EMFs.
- Ensure cell network towers, antennas, and boosters are not located on, in, or near school property.

For documentation and references please see [EHT's Question and Answer on Wi-Fi in Schools](#)



HOW TO ELIMINATE AND REDUCE WIRELESS RADIATION AND EVERYDAY ELECTROMAGNETIC FIELD (EMF) EXPOSURE IN DORMITORIES



LOW-EMF INFRASTRUCTURE IN SLEEPING AREAS

Internet Connections

- Install wired (instead of wireless, and instead of cordless) LAN and communication services in each building.
- Ensure every room has multiple ethernet ports near desks in each room (at least 2 per resident).
- Wi-Fi routers, access points, boosters, smart speakers, wireless electronics, wireless charging systems, wireless video games and Bluetooth devices should not be in sleeping areas and should not be in hallways near sleeping areas.
- At minimum, Wi-Fi routers can be turned off at night to support a healthier sleep.

Telephones

- Ensure every dorm room has a wired telephone, preferably with caller ID.
- Cell phones can be forwarded to this corded phone for voice calls in the dorm room.
- Students can plug their cell phones into the internet with ethernet cords instead of cellular or Wi-Fi for most applications.

STUDENT EDUCATION

- Why and how to reduce cell phone radiation exposure and other electromagnetic fields (EMFs).
- How to turn off the wireless antennas of cell phones and other tech so they are not always transmitting wireless radiofrequency radiation. For example, if Bluetooth is not in use, it can be turned off. If cellular is not in use, it should be turned off. Students should not sleep with transmitting cell phones near their heads or with phones resting on their body. Students can learn about how to use Airplane Mode to decrease unnecessary exposure.
- Practical information on how to ethernet plug in their computers and cell phones with adapters so they can access the internet without Wi-Fi.
- Safer charging: Using a phone while it is charging increases EMF exposure. Students need to know why they should distance themselves from chargers and unplug chargers when not in use. Laptops and cell phones should not be charged while resting on soft materials like a bed or couch.
- Safer technology Informational posters can be placed and maintained throughout the dormitory to provide this information.

Additional Important Ways to Minimize EMF Exposure

- Ensure every student receives a battery powered alarm clock.
- Ensure every student has a wired speaker to hear music/audio in their own room instead of Wi-Fi connected speakers or virtual assistants.
- Do not use fluorescent lights.
- Do not provide wireless charging.

Magnetic Field Exposure

- Ensure appliances, utility meters, electronics, or electrical machinery are not on the walls of sleeping areas, and are not on walls adjacent to sleeping areas, and are not on or near ceilings below sleeping areas.
- Extension cords and electrical wiring should not be under or near beds.
- Small dorm refrigerators also emit high levels of EMF and should not be placed near beds and not directly behind bedroom walls.
- Microwaves also emit high magnetic fields. They should be distanced from beds and preferably not in bedrooms at all. Replace microwave ovens with toaster ovens as a best step. If a microwave oven is absolutely necessary, it must not be in a bedroom nor in a room adjacent to a bedroom, and should be distanced as far as possible from all bedrooms.

Purchasing

- Schools can request non wireless corded telephones. Some phones have screens and are internet connected so students can text etc.
- Intentionally purchase or use only computers, tablets, and other school and personal technology devices that can be ethernet-connected and can successfully connect when all wireless applications (including locators) and antennas are disabled.
- Schools can purchase ethernet adapters for the various make and models of devices so students have the technology they need to connect.
- Contract and purchase building equipment, systems, and services that do not rely on using or generating wireless signals/emissions during regular operating or standby conditions (e.g., vending machines, HVAC, security, pest control, bank machines, laundry facilities, furnishings and equipment in common areas/washrooms/bathrooms/fitness areas/etc.).
- Minimize blue light as much as possible with both software programs and external protective screens for all screens supplied by the school.

HOW TO ELIMINATE AND REDUCE WIRELESS RADIATION AND EVERYDAY ELECTROMAGNETIC FIELD (EMF) EXPOSURE IN DORMITORIES

LOW EMF POLICY IN DORMS

Schools need to develop, implement, and enforce personal devices policies that minimize emissions and eliminate sources in the dormitory.

- Students need practical and ongoing education on how to reduce EMFs.
- Safe alternatives for playing music, accessing the Internet, and communicating must be accessible so students and staff can have needs met with low-EMF technology or non-EMF alternatives.
- Student and staff culture needs to shift so it is accepted that reducing EMF is important and behaviors that reduce emissions and exposures are valued.
- Dormitories without Wi-Fi and with low EMF need to be available in every school.
- Measure EMFs in dormitories, both wireless radiofrequency as well as magnetic fields and compare to Collaborative for High Performance Schools identified threshold.

COMPUTER ROOMS & WORKSPACES

- A dedicated computer room in a dormitory with wired technology, printers, electronic accessories, and other technology is an important component of a low-EMF building — to create a separation between sleeping areas and work areas and to ensure people have access to information and communication technologies.
- Connect all technology devices (printers, computers, fax machine etc. with wires, cords, or cables, and use non-wireless adapters.

RESOURCES

- New Jersey Educational Association “Minimize health risks from electronic devices”
- Massachusetts Breast Cancer Coalition Let’s Talk Prevention Classroom Modules Download Module 3 on Cell Phones
- Alliance of Nurses for Healthy Environments Textbook of Environmental Health in Nursing 2nd Edition Includes Cell Phone, Cell Tower and Wi-Fi Radiation and EMF
- Collaborative for High Performance Schools Low EMF Criteria

SCIENTIFIC RESEARCH

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Maryland Children's Environmental Health and Protection Advisory Council

Introduction

The Maryland Children's Environmental Health and Protection Advisory Council (CEHPAC) identifies environmental health issues that impact children and seeks to protect them from exposure to environmental hazards. Under Md. Code Ann., Health-General §13-1506, CEHPAC is directed to:

(4) Gather and disseminate information to the public, including the research and medical communities, community-based organizations, schools, and State agencies, on how to reduce, treat, and eliminate children's exposures to environmental hazards to further the public's understanding of the environmental hazards that may potentially affect children; and

(5) Recommend uniform guidelines for State agencies to follow to help reduce and eliminate children's exposure to environmental hazards, especially in areas reasonably accessible to children...

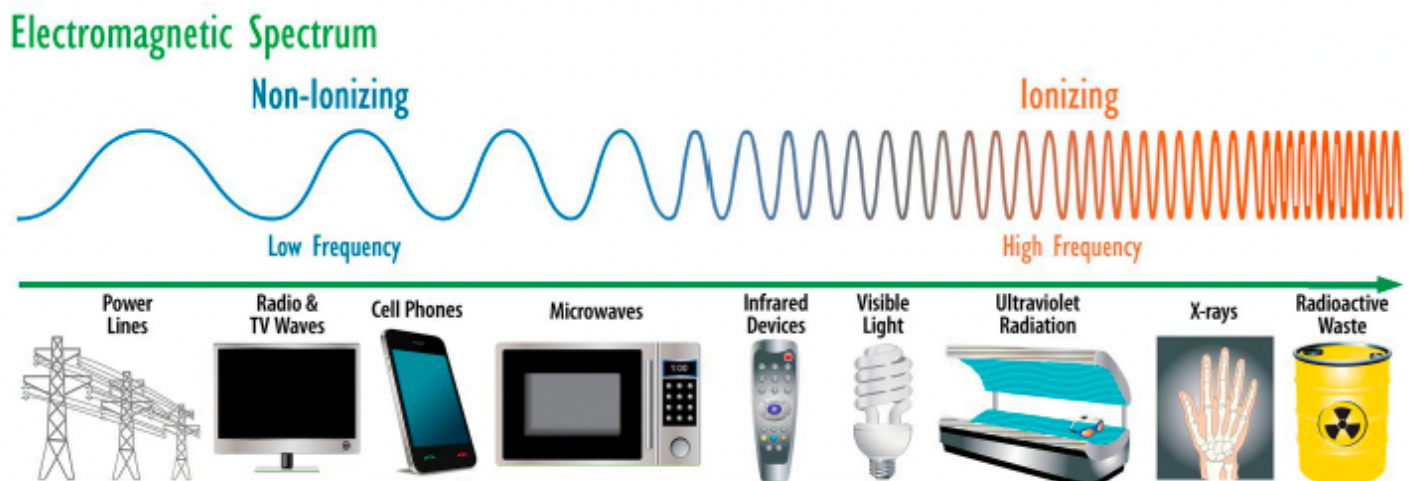


Figure 1. Source: [National Institute of Environmental Health Sciences](#)

In 2016, CEHPAC adopted a report on [WiFi Radiation in Schools in Maryland](#) to examine questions related to potential health outcomes linked to exposures associated with WiFi technology. This report expands on that work by compiling information on how families can reduce their daily exposure to non-ionizing electromagnetic fields. If you are interested in a more detailed analysis and policy recommendations please see the [2016 WiFi Radiation in Schools in Maryland Final Report](#).

What are electromagnetic fields?

“Electromagnetic fields are a combination of invisible electric and magnetic fields of force. They are generated by natural phenomena like the Earth’s magnetic field but also by human activities, mainly through the use of electricity. Mobile phones, power lines and computer screens are examples of equipment that generates electromagnetic fields.” - [European Commission’s Directorate General for Health & Food Safety](#)

How do wireless devices work?

Cell phones and wireless devices use a type of non-ionizing electromagnetic field called radiofrequency radiation to transmit information.

“Radiofrequency (RF) energy is a type of electromagnetic radiation. It is used to transmit signals carrying information in the form of radio waves. Radio waves are broadcast using a transmitter. When the radio waves reach a receiver, the signal is converted back into the information that was originally sent by the transmitter. When you talk on a cell phone, your cell phone acts as a transmitter and your voice is carried on radio waves to the person you are calling. Their phone acts as the receiver and converts the signal back into your voice. In addition to cell phones, other wireless devices such as radios, Wifi routers, satellites, radars and pacemakers can send or receive RF energy waves.” - [US EPA’s RadTown](#)

Are there health concerns about exposure to RF energy from cell phones and wireless technologies?

For a more detailed analysis, please see the [2016 WiFi Radiation in Schools in Maryland Final Report](#), which examined the current evidence linking radiofrequency radiation to health outcomes, including cancer. While the science is still evolving, there are broad concerns about exposure to RF radiation.

According to the [California Department of Public Health](#), “...some laboratory experiments and human health studies have suggested the possibility that long-term, high use of cell phones may be linked to certain types of cancer and other health effects, including:

- brain cancer and tumors of the acoustic nerve (needed for hearing and maintaining balance) and salivary glands,
- lower sperm counts and inactive or less mobile sperm,
- headaches, and
- effects on learning and memory, hearing, behavior, and sleep”

There are no definitive studies establishing a causal link in humans, and scientists disagree about whether cell phones cause these health problems and how great the risks might be.

Children may be at greater risk than adults from exposure to RF energy. Their bodies and brains are still developing and are more vulnerable to exposures that could cause harm. Because their skulls are thinner and their heads are smaller than those of adults, children have a relatively greater risk of exposure to the RF energy of cell phones. Children also will accumulate many more years of cell phone and wireless exposure than adults. Animal research has also shown the potential for health effects of RF radiation to a developing fetus.

In 2011, the International Agency for Research on Cancer (IARC) [classified](#) wireless radiofrequency radiation as a Class 2B possible carcinogen based on research that found long term cell phone use associated with a form of brain cancer.

The [2016 WiFi Radiation in Schools in Maryland Final Report](#) recommended “...limiting exposures as much as feasibly practical, without negatively impacting education.” The Department of Connecticut Department of Health takes this a step further and states, “It is wise to reduce children's exposure.”

Sources of Children’s Exposure to Wireless Radiofrequency Radiation

Common sources of radiofrequency radiation exposure to children include:

- Cell phones
- Cordless phones and their base station
- Tablets, laptops, and computers
- WiFi routers and hotspots
- Wireless video game consoles/handsets
- Wireless Baby monitors
- Signal boosters
- Wireless headphones, printers, speakers, keyboard, mouse
- Wearable wireless tech including “smart” watches and fitness wristbands
- Wireless “smart” appliances
- Wireless utility meters
- WiFi or Bluetooth toys

The Basics of Reducing RF Exposure

Increase Your Distance

The closer you are to a cell phone or wireless device, the higher the exposure to your brain and body. The further away you are, the lower the radiation your body absorbs. Notice how close children are to you when you are using a cell phone or wireless device, and minimize their exposure. For example, do not rest a cell phone on your baby or hold a transmitting device near their bodies.

Minimize Time on Wireless

A child's daily exposure adds up over time. Every time you reduce your child's exposure, even in small ways, you can decrease the overall cumulative exposure to mitigate risk.

Choose Safer Technology Solutions

As consumers, parents and caregivers have safer options when it comes to connecting to the internet or choosing which electronics to purchase. Once you are aware of this issue, you can make low RF radiation choices and choose corded connections whenever possible. Take a look at what you have in your home and swap wireless devices with corded connections if possible. For example, use a corded keyboard or earbuds with a wire.

Recommendations to Reduce Cell Phone and Wireless Device Radiation Exposure

Cell phones, wireless devices, and WiFi routers emit RF radiation all the time, even when you are not using them. Even in standby mode, your phone emits RF radiation because it is constantly searching for service or new messages. If you do not need your cell phone, simply turn it off or put it in airplane mode. This applies to all other wireless devices, including laptops, tablets, video gaming consoles and smart speakers. Additional recommendations are provided below as general guidelines.

Around the Home¹

- Replace cordless phones with corded home phones.
- Unplug cordless phones when not in use (if you have at least one corded telephone in the house, you can always be reached, even if the cordless phone is off at night).
- Remove electronics from the bedroom and especially around your bed and the crib.
- Avoid sleeping with electric blankets and heating pads; if you use an electric blanket to preheat your bed, unplug it before sleeping. If you only turn it off, the electromagnetic field will still be present.
- Do not stand close to a microwave oven when it is on or let your child press their face up to it watching the food cook.

Cell Phones

- Try to keep devices, especially cell phones, away from the head and body. Keeping them an arm's distance away significantly reduces exposure.²
- When you are talking on a cell phone, use the speakerphone to reduce exposure to your head.²
- Avoid carrying your phone against the body like in a pocket, sock, bra, or spandex pants. Cell phone manufacturers cannot guarantee that the amount of radiation you are absorbing will be at a safe level.²
- Make only short or essential calls on cell phones so that you minimize your daily exposure.²
- Use text messaging rather than voice calls when possible.²

Laptops and Computers

- Choose wired Internet (ethernet cable modems) at home instead of wireless systems, if possible.³
- Place WiFi routers as far away from children as possible.³
- Consider using a switch to shut down your wireless router when it is not in use.³

¹ These recommendations are based on a [Fact Sheet by the Collaborative on Health & the Environment](#).

² These recommendations come from the [American Academy of Pediatrics](#) (AAP).

³ Based on the [California Department of Health review](#).

- Instead of laps, place electronic devices, tablets, and laptops on desks and tables which can serve to increase the distance between the device and children's bodies.³

Turn Wireless Antennas Off

- Airplane mode is a setting that turns transmitting antennas off in wireless devices.
- If you plan to watch a movie on your device, download it first, then switch to airplane mode while you watch to avoid unnecessary radiation exposure.²
- Teach children to turn off WiFi when not in use, especially if they are sleeping (also see bedroom suggestions below).³
- Newer phone models turn most of the wireless antennas off with Airplane mode, but Bluetooth or WiFi may stay on, so check that all antennas are set to off such as 4G, 5G, Bluetooth, WiFi hotspot, location.

Learn About When Your Cell Phone Goes to Highest Exposure

Reduce or avoid use of cell phones and wireless technologies when the devices are going to maximum power, which means the device will result in higher radiation exposures.^{2,3}

- *You are in an area of low signal:* Keep an eye on your signal strength (i.e. how many bars you have). The weaker your cell signal, the harder your phone has to work and the more radiation it emits. It is better to wait until you have a stronger signal before using your device.
- *You are traveling in a car or vehicle:* Avoid making calls in cars, elevators, trains, and buses. The cell phone works harder to get a signal through metal, so the power level increases. When vehicles are traveling, the device also increase power to switch connection to each cell tower the vehicle passes.
- *You are streaming video and large files:* The more streaming data, the higher the radiation exposure.

Helpful Tips

- If your tablet or laptop does not have an ethernet port you can get a special adapter that allows you use ethernet with thunderbolt or USB ports.
- Many cell phones can also be plugged into ethernet port with an adapter made for cell phones.
- Use wired peripherals and accessories (e.g. a wired mouse, wired speakers, and wired printers) rather than wireless.
- Wireless virtual assistants emit RF so choose wired tech whenever possible.
- Wireless gaming consoles emit RF even when not in use so keep these out of the bedroom and choose wired handsets.

In the Bedroom

- Cell phones should be powered off at night.²

- If your child or teen needs an alarm clock, get a battery powered alarm clock for the bedroom.²
- If they must use a cell phone for an alarm clock, teach them to turn the phone to airplane mode with wireless antennas off every night (the alarm will still work).²
- Do not charge a cell phone or wireless devices near your child's bed. Charging creates higher electromagnetic fields even if you are not using the device.
- Children should not sleep with their head near a wall that has the electric panel, electric meter, or appliance on the other side.

Read the Fine Print

Read the “fine print” from the manufacturer’s instruction manual which may tell users to keep a distance between the phone and your head and body. These fine print warnings range from a few millimeters to almost an inch. The fine print warnings on other wireless devices such as WiFi routers, home cordless phone base stations, and baby monitors generally state devices should be at 20 cm, or about 8 inches. If people are closer than the manufacturer-stated separation distance, then they can be exposed to RF levels that violate the US government FCC limits for this type of radiation.

Beware Radiation Protection Devices

Do not rely on a “radiation shield” or other products claiming to block RF energy, electromagnetic fields, or radiation from cell phones. According to the U.S. Federal Trade Commission, products that interfere with the phone’s signal may force it to work harder and emit more RF energy to stay connected, possibly increasing your exposure. There are no standard protocols for testing and comparing devices to ensure they work. It is best to use wired corded electronics to reduce RF radiation rather than rely on an untested product.³

If You are Pregnant

Findings on prenatal impacts have led doctors to sign onto an [EPA-recognized](#) educational campaign called [The BabySafe Project](#)*urging pregnant women to reduce wireless exposure to minimize risks to their babies’ brain development. They recommend many of the same things listed above, including:

- Keep your cell phone away from your body. Never carry it in a pocket or bra.
- Do not sleep with your phone. Switch your phone to airplane mode whenever you are not using it.
- Keep your wireless laptop or tablet away from your body. Never rest your wireless device on your tummy.
- Use a corded landline if at all possible, rather your cell phone or cordless phone.
- Don't sit anywhere close to your router or smart meter. Turn off routers at night.
- Whenever possible, connect to the internet using wired (ethernet) connections.

*The BabySafe Project is a joint initiative of Environmental Health Trust and Grassroots Environmental Education.

**CHILDREN'S ENVIRONMENTAL HEALTH & PROTECTION ADVISORY COUNCIL MARYLAND DEPARTMENT
OF THE ENVIRONMENT
REPORT ON WI-FI RADIATION IN SCHOOLS
SUMMARY OF RECOMMENDATIONS OF FINAL REPORT DECEMBER 13, 2016**

The Council recommends that the Maryland Department of Health and Mental Hygiene ask the United States Department of Health and Human Services to formally petition the FCC to revisit the exposure limit to ensure it is protective of children's health and that it relies on current science.

The following recommendations are based on principles of industrial hygiene and occupational health. The Council also recommends that:

The Maryland State Department of Education should recommend that local school systems:

- Consider using wired devices.
 - Where classrooms have internet access with a wireless connection, WiFi can be turned off and wired local area network (LAN) can provide a reliable and secure form of networking for as many wireless devices as necessary without any microwave electromagnetic field exposure.
 - If a new classroom is to be built, or electrical work is to be carried out in an existing classroom, network cables can be added at the same time, providing wired network access with minimal extra cost and time.
- Locate laptops in the classroom in a way that keeps pupil heads as far away from the laptop screens (where the antennas are) as practicable.
- Consider using screens designed to reduce eyestrain.
- Consider using a switch to shut down the router when it is not in use.
- Teach children to turn off WiFi when not in use.
- Consider placing routers as far away from students as possible.
- Share this document with teachers and parents.
- The General Assembly should consider funding education and research on electromagnetic radiation and health.
- The Maryland Department of Health and Mental Hygiene should provide suggestions to the public on ways to reduce exposure:
 - Sit away from WiFi routers, especially when people are using it to access the internet.
 - Turn off the wireless on your laptop when you are not using it.
 - Turn off WiFi on smartphones and tablets when not surfing the web.
 - Switch tablets to airplane mode to play games or watch videos stored on the device.

This report should be posted on the Council website and shared with the United States Department of Health and Human Services, the Federal Communications Commission, the Maryland State Department of Education and the Maryland General Assembly.