

## Overview on Wireless Exposure and Children's Health PAS Session 4580

Devra Davis MPH, Ph.D

### CANCER

- 1.F. Barnes and B. Greenenbaum, ["Some Effects of Weak Magnetic Fields on Biological Systems: RF fields can change radical concentrations and cancer cell growth rates."](#), in *IEEE Power Electronics Magazine*, vol. 3, no. 1, pp. 60-68, March 2016.
- 2.Coureau et al., (2014). [Mobile phone use and brain tumours in the CERENAT case-control study.](#) *Occup Environ Med.* 71(7), 514-22.
- 3.Lerchl et al., (2015) [Tumor promotion by exposure to radiofrequency electromagnetic fields below exposure limits for humans.](#) Biochemical and Biophysical Research Communications, Available online 6 March 2015.
- 4.Morgan LL, Miller AB, Sasco A, Davis DL, [Mobile phone radiation causes brain tumors and should be classified as a probable human carcinogen \(2A\) \(review\).](#) *Int J Oncol.* 2015 May;46(5):1865-71. Epub 2015 Feb 25.
- 5.Carlberg M, Hardell L. [Decreased Survival of Glioma Patients with Astrocytoma Grade IV \(Glioblastoma Multiforme\) Associated with Long-Term Use of Mobile and Cordless Phones.](#) International Journal of Environmental Research and Public Health. 2014;
- 6.L. Hardell, M. Carlberg, [Cell and cordless phone risk for glioma - Analysis of pooled case-control studies in Sweden, 1997-2003 and 2007-2009,](#) Pathophysiology (2015), Available online 29 October 2014.
7. Lerchl et al., [Tumor promotion by exposure to radiofrequency electromagnetic fields below exposure limits for humans.](#) Biochemical and Biophysical Research Communications, Available online 6 March 2015.
8. Soffritti et al., [Life-span exposure to sinusoidal-50 Hz magnetic field and acute low-dose γ radiation induce carcinogenic effects in Sprague-Dawley rats.](#) International Journal of Radiation Biology. Vol. 92, Iss. 4, 2016
9. Yakymenko et al.,(2015) [Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation.](#) Electromagnetic Biology and Medicine. July 7,

### REPRODUCTION

- 1.Adams J, Galloway T , Mondal D, Esteves S, Mathews F. (2014). [Effect of mobile telephones on sperm quality: A systematic review and meta-analysis.](#) *Environment International.* 80, 106-112.
- 2.Atasoy HI, Gunal MY, Atasoy P, Elgun S, Bugdayci G. (2013). [Immunohistopathologic demonstration of deleterious effects on growing rat testes of radiofrequency waves emitted from conventional Wi-Fi devices.](#) *Journal of Pediatric Urology.* 9(2), 223-9.
- 3.Avendaño C, Mata A, Sanchez Sarmiento CA, Doncel GF.(2012). [Use of laptop computers connected to internet through Wi-Fi decreases human sperm motility and increases sperm DNA fragmentation.](#) *Fertility Sterility.* 97(1), 39-45.
- 3.Yüksel M, Naziroğlu M, Özkan MO. [Long-term exposure to electromagnetic radiation from mobile phones and Wi-Fi devices decreases plasma prolactin, progesterone, and estrogen levels but increases uterine oxidative stress in pregnant rats and their offspring.](#) *Endocrine.* 2015 Nov 14. [Epub ahead of print]
4. Odaci E, Hancı H, Yuluğ E, Türedi S, Aliyazıcıoğlu Y, Kaya H, Çolakoğlu S.[Effects of prenatal exposure to a 900 MHz electromagnetic field on 60-day-old rat testis and epididymal sperm quality.](#) *Biotech Histochem.* 2015 Oct 15:1-11.
5. Ziberlitz A, Wiener-Magnazi Z, Sheinfeld Y, et al. [Habits of cell phone usage and sperm quality – does it warrant attention?](#) Reproductive BioMedicine. Published online September 2015
- Gul A, Celebi H, Uğras S.(2009). [The effects of microwave emitted by cellular phones on ovarian follicles in rats.](#) *Arch Gynecol Obstet.* 280(5), 729-33.
6. Bakacak M, Bostancı MS, Attar R, Yıldırım ÖK, Yıldırım G, Bakacak Z, Sayar H, Han A. [The effects of electromagnetic fields on the number of ovarian primordial follicles: An experimental study.](#) *Kaohsiung J Med Sci.* 2015 Jun;31(6):287-92. doi: 10.1016/j.kjms.2015.03.004. Epub 2015 Apr 30.

### RADIO FREQUENCY ABSORPTION

- 1.Morris, R.D.; Morgan, L.L.; Davis, D.L., ["Children Absorb Higher Doses of Radio Frequency Electromagnetic Radiation From Mobile Phones Than Adults."](#), in Access, IEEE , vol.3, no. , pp.2379-2387, 2015 doi: 10.1109/ACCESS.2015.2478701
- 2.Fernandez-Rodriguez, C.E.; De Salles, A.A.A.; Davis, D.L., ["Dosimetric Simulations of Brain Absorption of Mobile Phone Radiation-The Relationship Between psSAR and Age."](#), in Access, IEEE , vol.3, no., pp.2425-2430, 2015 doi: 10.1109/ACCESS.2015.2502900
- 3.Gandhi OP, Morgan LL, De Salles AA, Han YY, Herberman RB, Davis DL. (2012). [Exposure limits: the underestimation of absorbed cell phone radiation, especially in children.](#) *Electromagn Biol Med.* 31(1), 3451.
- 4.Juliana Borges Ferreira and Álvaro Augusto Almeida, [Specific Absorption Rate \(SAR\) in the head of Tablet user's](#) Proceedings of the 7th Latin American Workshop On Communications - 2015
- 5.Redmayne M, Johansson O. [Radiofrequency exposure in young and old: different sensitivities in light of age-relevant natural differences.](#) *Rev Environ Health.* 2015 Dec 1;30(4):323-35. doi: 10.1515/reveh-2015-0030.
- 6.Gandhi, Om. [Yes the Children are more exposed to radio-frequency energy from mobile telephones than adults.](#) IEEE Spectrum. PP(99):1. Jun 23, 2015.
7. Panagopoulos, D. J., Johansson, O., & Carlo, G. L. (2015). [Real versus Simulated Mobile Phone Exposures in Experimental Studies.](#) *BioMed Research International*, 2015, 607053. <http://doi.org/10.1155/2015/607053>

### STRUCTURAL

- 1.Zhang (2015), [Exposure to 900 MHz electromagnetic fields activates the mkp-1/ERK pathway and causes blood-brain barrier damage and cognitive impairment in rats.](#) *Brain Res.* 2015 Mar 19;1601:92-101. doi: 10.1016/j.brainres.2015.01.019. Epub 2015 Jan 15.
- 2.Dasdag et al., [Effects Of 2.4 Ghz Radiofrequency Radiation Emitted From Wi-Fi Equipment On microRna Expression In Brain Tissue.](#) *Int J Radiat Biol.* 2015 Mar 16:1-26.
- 3.Bas et al., (2009). [900 MHz electromagnetic field exposure affects qualitative and quantitative features of hippocampal pyramidal cells in adult rat.](#) *Brain Research.* 1265, 178–185.
- 4.Jing J, Yuhua Z, Xiao-qian Y, Rongping J, Dong-mei G, Xi C. (2012). [The influence of microwave radiation from cellular phone on fetal rat brain.](#) *Electromagn Biol Med* 31(1), 57-66.

- 5.Naziroğlu M. and Gumral. (2009). [Modulator effects of L-carnitine and selenium on wireless devices \(2.45 GHz\)-induced oxidative stress and electroencephalography records in brain of rat](#). Int J Radiat Biol. 85(8), 680-689..
- 6.Nittby H, Brun A, Eberhardt J, Malmgren L, Persson BR, Salford LG. (2010). [Effects of microwave radiation upon the mammalian blood-brain barrier](#). European Journal of Oncology. 5, 333-355.
- 7.Sirav B, Seyhan N. (2011). [Effects of radiofrequency radiation exposure on blood-brain barrier permeability in male and female rats](#). Electromagnetic Biology and Medicine. 30(4), 253-60.
- 8.Narayanan SN, Kumar RS, Karun KM, Nayak SB, Bhat PG., (2015) [Possible cause for altered spatial cognition of prepubescent rats exposed to chronic radiofrequency electromagnetic radiation](#). Metab Brain Dis. 2015 Oct;30(5):1193-206.
- 9.Margaritis L.H. et al., 2014. [Drosophila oogenesis as a bio-marker responding to EMF sources](#). Electromagn Biol Med. 33(3): 165-189. <http://www.ncbi.nlm.nih.gov/pubmed/23915130>
10. Papageorgiou C.C. et al,(2011) [Effects of Wi-Fi signals on the p300 component of event-related potentials during an auditory hayling task](#) Journal of Integrative Neuroscience 10(2):189–202
- 11.Leszczynski et al., (2002) [Non-thermal activation of the hsp27/p38MAPK stress pathway by mobile phone radiation in human endothelial cells: molecular mechanism for cancer- and blood-brain barrier-related effects](#). Differentiation.May;70(2-3):120-9

## How to Protect Your Family

### Choose wired over wireless

- Get a corded landline phone and wired cell phones to it.
- Use corded plug-in [non-wireless] connection for printer, mouse, internet, gaming, and router, etc.—without wireless function or WiFi.

### Bolstered sleep

- Stop use of and power off computers, tablets and phones one hour before going to bed/before bedtime.
- Do not sleep with cell phone, tablet or laptop.

### Maximize distance from self and others

- Reduce distance as you move away from the source.
- Leave devices away from laps, torso and pockets, as their radiation can damage sperm and may be linked to breast cancer.
- Use an older model or one specific phone at maximum distance from head and body.

### Protect children

- Children are particularly vulnerable and should not use cell phones except in emergencies.
- Children are using a phone or other device for longer, power, volume & all of the following numbers to turn off the radiation from cell phones and wireless devices:
- Replace most WiFi and WiFi OFF and WiFi BOTH OFF.
- Do not use a mobile device within a child's arm's length or your own.

### Power off in vehicles

- Mobile devices charge slower, until more intense radiation during travel, and metal surroundings create radiation hot-spots.

[www.EHTrust.org](http://www.EHTrust.org)

## Doctors' Advice to Patients & Families

### Wireless & Health: Simple Precautions Make Sense



This pamphlet presents precautionary advice by Doctors and governments to reduce exposure to Wireless Radiation.



Environmental Health Trust  
Environmental Health Trust is a 501(c)(3) non-profit organization, including Cancer Care, Safe Schools, Safe Workplaces, and Healthy Families. 100% of donations go directly to research, advocacy, and education. [www.EHTrust.org](http://www.EHTrust.org)

## Wireless Radiation Exposures

Everyone—adults, children, seniors, pregnant women, men, and women—all and the entire range of wireless increases radiation or cell phones. Children, pregnant women, and men hoping to father healthy children are more vulnerable to this exposure.

The Child Brain and Skull Absorb up Ten Times More Invisible Wireless Radiation than the Adult Brain! [www.EHTrust.org](http://www.EHTrust.org)



New and fully cited research shows radiation absorption.

### Increased Cancer Risk

Over 20 countries—including the United Nations, the World Health Organization’s International Agency for Research on Cancer in 2011, have declared wireless radiation as a “probable carcinogen” because of increasing evidence, indicating that cell phone and wireless radiation should be classified as a “probable carcinogen” because of increasing human cancer ([www.EHTrust.org](http://www.EHTrust.org), 2011).

These reports say younger ages absorb up to eight times more brain cancer risk.



Source: University of Michigan, [www.EHTrust.org](http://www.EHTrust.org)

## Wireless Exposure Damages Brains



Micrographs of hippocampus of mouse brain tissue (control) and mouse brain tissue exposed to WiFi for 24 hours.

### How Wireless Impacts Children's Health

According to their own assessment, wireless microwave radiation impacts the brain development, the nervous system and reproductive function. That very low doses of wireless radiation affect brain function and development by:

Yale University researchers found that when pregnant mice were exposed to radiation from a mobile phone, the offspring had increased tumors, increased lymphoma and altered brain. New research studies show wireless impacts brain development in various ways.

### The Reproductive System

Numerous studies indicate that wireless exposure decreases sperm counts and quality (including sperm DNA) and damage male and female.

### Testes Damaged by WiFi Equipment Radiation



### Government Protections Worldwide

Over 20 countries—including France, Belgium, Israel and the European Union—have laws policy updates to reduce exposures from WiFi, mobile phones, laptops, cell towers and WiFi in schools in order to protect public health.

[www.EHTrust.org](http://www.EHTrust.org)

## Click here to download the Doctors Advice on Wireless

## How to Protect Your Family

- Do not hold the phone directly against your head or body. Use speakerphone, other hands-free device, or another device that makes WiFi go off.

### 2. Beware of a weak signal.

- Your phone sends higher and continuous radiation into your when the signal is weak or blocked.

- Parents, children, teenagers, and men work in wireless devices. Children absorb twice as much radiation as adults. Some companies are helping.

### 3. Do not sleep with your cell phone.

- Phones do not emit radiation when off or in airplane mode.

### 5. Corded landlines are safer, safer, and more secure.

- Cordless phones also emit microwave radiation.

### 6. Do not run while moving (e.g., driving, hiking, running, walking, skiing).

- Mobile phones can increase the difference between life and death.

**Disclaimer for you:**  
The Global Campaign for Safer Cell Phones provides on-line resources that educate and inform the public about wireless devices, especially cell phones and WiFi. We are not medical doctors, lawyers, or scientists. The information provided is not intended to be medical advice.

Important: 25-30 years of corporate research and 1000+ peer-reviewed studies show cell phones cause cancer and other diseases. [www.EHTrust.org](http://www.EHTrust.org)

Find out how to reduce your risk and get the latest news on [www.EHTrust.org](http://www.EHTrust.org) and [www.safercellphones.org](http://www.safercellphones.org).

## Doctors' Advice to Patients & Their Families

### Cell Phones & Health: Simple Precautions Make Sense



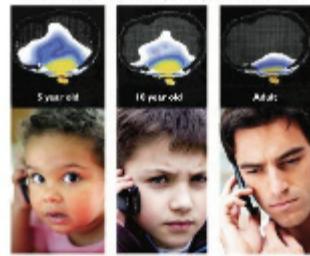
This pamphlet presents precautionary advice by governments to reduce your exposure to cell phone radiation.



## Cell phones are two-time intensive radios that are never properly tested for safety.

Antennas for cell phones are continually sending for signals from towers to send and receive information. This body or brain absorbs about three significant changes in glucose metabolism—the brain, fat, and prostate. These areas excited by cell phone radiation. The fat, brain, and prostate, especially in children, report unusual sensations that can become cancer.

### Children absorb more radiation than adults



Source: Dr. T. Salom and G. Attwells

People who eat and smoke more than the average for their age have a double or triple risk of breast cancer. Those who want to avoid cell phones develop it 3 times more brain cancer in less than a decade. Let us to studies can be found at [www.EHTrust.org](http://www.EHTrust.org).

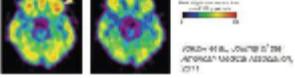
### WORLD HEALTH ORGANIZATION (WHO)

On May 31, 2011, the World Health Organization International Agency for Research on Cancer classified the electromagnetic radiation from cell phones as “possibly carcinogenic to humans” based on an increased risk for glioma, a malignant type of brain cancer, associated with use of mobile phones.

## Can Cell Phones Cause Cancer and Disease?

A number of well-designed studies indicate that cell phone use increases the risk of glioma, a malignant type of brain cancer, after 10 years of use. The risk of glioma increases with the number of hours spent using a cell phone or next to the ear. The brain of a teenager, adult, and even significant changes in glucose metabolism—the brain, fat, and prostate. At present these areas excited by cell phone radiation. The fat, brain, and prostate, especially in children, report unusual sensations that can become cancer.

### Cell phones cause brain damage



Source: American Medical Association, 2011

### Cell Phones Lower Sperm Count

Men who use cell phones 2 to 4 hours per day have 30% lower sperm count and sperm density, and over 4 hours reduce 45% lower sperm count. Studies have shown that microwave radiation can damage sperm.



Source: Agency for Toxic Substances and Disease Registry, 2005

\*Human studies indicate cell phone users that they can test practical measures to reduce WiFi exposure. The Department also encourages parents to reduce their children's WiFi exposure from cell phones and wireless devices and encourage their children to use mobile phones less frequently.

## Click here to download the Doctors Advice for Cell Phones



[Click here to download the SAVE THE GIRLS](#) [Click here to download the SAVE THE BOYS](#)

### A Little Chat Official Music Video: Teens and Safe Technology

Listen to Aspen Jaquet's new song on how to use cellphones more safely.



## **POLICY** [\*\*Download EHT's briefing that details the worldwide precautionary policy on wireless.\*\*](#)

Redmayne M. [International policy and advisory response regarding children's exposure to radio frequency electromagnetic fields \(RF-EMF\)](#). Electromagn Biol Med. 2015 Jun 19:1-9.



### **INTERNATIONAL POLICY BRIEFING** **Radiofrequency Radiation in Communities and Schools** **Actions by Governments, Health Authorities and Schools Worldwide** Please go to source documents by clicking on the blue underlined hyperlink.

#### **France**

National Legislation "[Law on sobriety, transparency, information and consultation for exposure to electromagnetic waves](#)" passed in 2015.

- **WiFi Banned in Nursery Schools:** WIFI and Wireless devices will be banned in “the spaces dedicated to home, to rest and activities of children under 3 years”.
- **WiFi on “OFF” as Default to Minimize Exposures in Schools:** In elementary schools, WIFI routers should be turned off when not in use.
- **Schools Will be Informed:** The school board should be informed when new tech equipment is being installed.