CELL PHONE SAFETY

The Right to Know about Gray Matters

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Drugs, bike helmets, credit card agreements, cigarettes, air bags, and guns all come with notices regarding safe uses and risks. Without laws to enforce them, such warnings are basically a form of product defense that allow manufacturers to say, "I told you so" should any problems develop later. But, where warnings are accompanied by enforceable laws, they can fundamentally change behavior. In fact, fewer kids try smoking nowadays as a consequence of what's been a highly effective shock and awe campaign, including escalating cigarette taxes, massive public educational programs (now slated for cuts), laws that make it illegal to sell tobacco products to those under age eighteen, and warnings slapped directly on packaging.

But what are we to make of the fine-print advisories that come with new cell phones, which are seldom seen and even less frequently heeded? Blackberry's Torch phone cautions teenagers and pregnant women not to hold the phone next to the lower abdomen. Apple's iPhone 5 features a Houdini-like warning—now you see it, now you don't. Printed warnings on thin paper package inserts that advised safe distances for using phones have disappeared.

If you want information about radiation safety and the iPhone, you can read the online product safety notice, which says:

Radio signals: iPhone uses radio signals to connect to wireless networks. For information about the amount of power used to transmit these signals, and about steps you can take to minimize exposure, see Settings > General > About > Legal > RF Exposure.

Then, after going through the above five clicks on your phone, the text below pops up:

iPhone has been tested and meets applicable limits for Radio Frequency (RF) exposure.

Specific Absorption Rate (SAR) refers to the rate at which the body absorbs RF energy. SAR limits are 1.6 Watts per Kilogram (over a volume containing a mass of 1 gram of tissue) in countries that follow the United States FCC limit and 2.0 W/Kg (averaged over 10 grams of tissue) in countries that follow the Council of the European Union limit. During testing, iPhone radios are set to their highest transmission levels and placed in positions that simulate use against the head, with no separation, and near the body, with 10 mm separation.

To reduce exposure to RF energy, use a hands-free option, such as the built-in speakerphone, the supplied headphones, or other similar accessories. Carry iPhone at least 10 mm away from your body to ensure exposure levels remain at or below the as-tested levels. Cases with metal parts may change the RF performance of the device, including its compliance with RF exposure guidelines, in a manner that has not been testified or certified.

SAR values for this device are available at: www.apple.com/legal/rfexposure/iPhone4,1/en/

Thus ends the advice. But wait, there's a trick. If, at this point, you have not given up and you click on the above link purporting to be information on SAR values, you get right back to the text two paragraphs above.

What's missing altogether is this previous statement on the phone that explained that phones carried in the pocket can exceed the FCC exposure guidelines: "Warning: iPhone's SAR measurement may exceed the FCC exposure guidelines for body-worn operation if positioned less than 15 mm (5/8 inch) from the body (e.g., when carrying iPhone in your pocket)." In fact, commercials for cell phones that fill our airwaves, newspapers, and magazines routinely feature young children happily chatting with their phones held smack up against their developing bodies and brains, and iPads plopped directly over young gonads.

> It may well be legal for companies to sell devices that cannot be used safely in the ways they are advertised, but it is certainly not ethical to do so.

When it comes to defining the right to know about this public health risk, San Francisco has been at the leading edge. Outgunned and outspent, the city's legal department has stood its ground on the fundamental right to require phone sellers to tell the truth and inform people about ways to reduce their risks from cell phone radiation. After two years of prolix litigation, the court has agreed with industry: The right to free

speech does not apply to city officials concerned with public health, because this violates industry's free speech by compelling them to disclose the need to use precautions with cell phones before people buy them, rather than allowing this information to be freed from the bowels of the Internet.

In America today, about 20 million children under the age of fourteen have cell phones, and the CDC reported two years ago that one-fifth of all two-year-olds reportedly spend two hours a day in front of a screen. Increasingly, scientists and policy makers in tech-savvy nations like Israel and Finland are concerned that the ways these devices are used imperil the brain. The iPhone plastic baby rattle case protects the phone's glass screen from cracking when dropped or chomped on by babies, but it does not protect the infant's young brain or body from the phone's pulsed digital microwave radiation.

Cell phones have revolutionized the ability to carry out research and promote public health interventions. But there's growing recognition in tech-savvy nations that we need to get smarter about how we use these and other wireless devices. Growing numbers of national authorities, from Israel to France, India, Switzerland, and Russia are making concerted efforts to promote awareness of the need to practice "safe phone."

The proliferation of wireless gadgets overlooks a critical health issue—nonionizing microwave radiation from cell phones at levels that do not induce measurable changes in temperature can change and damage the brain and sperm of experimental animals. A cell phone is a two-way microwave radio with intermittent and destabilizing pulses, unlike microwave ovens that steadily operate at the same frequencies at much greater power. The weak and erratic microwave radiation from cell phones and tablets cannot directly break the bonds that hold molecules together, but it does disrupt DNA, weaken the brain's protective barrier, and release highly reactive and damaging free radicals. A five-year-old's brain, healthy or otherwise, is encased in a thinner skull and contains more fluid than an adult brain. According to studies carried out by industry modelers in Switzerland and France, the bone marrow of a child's head absorbs ten times more radiation than that of an adult, while that of infants and toddlers will absorb even more.

Few parents realize that infant apps such as *One Fish Two Fish, Peekaboo Farm*, and *Twinkle Twinkle Little Star* may do much more than amuse and distract babies. The American Academy of Pediatrics cautions that children need more real face-time than screen time; more laps than apps, and the group has written to the FCC supporting the need to revamp standards to recognize the growing use of these devices by infants and toddlers.

Most disconcerting are findings from Nesrin Seyhan, the NATO-supported founding chairman of the Biophysics Department at Gazi University in Ankara, Turkey, whose controlled studies show that prenatally exposed rats and rabbits have fewer brain cells—and those that survive sustain more damage to their brains, livers, reproductive systems, and eyes. Recent reports from Yale University's chief of obstetrics and gynecology, Hugh Taylor, found that prenatal exposure significantly increased hyperactive behavior in offspring and altered brain chemistry. Other research carried out by renowned National Institute of Drug Abuse Director Nora Volkow, MD, PhD, finds that just fifty minutes of exposure to cell phone radiation in adult males directly alters the production of glucose—the brain's main fuel.

Experimental work completed by American, Australian, Greek, and Turkish teams working with experts in male reproductive health has reported that cell phone-radiation-exposed human sperm die three times faster, swim significantly more poorly, become more deformed, and develop significantly more damage to sperm DNA.

How is this possible? After all, headlines have repeatedly assured us that there's little to worry about, because we do not face an epidemic of brain cancer. Yet. In fact, the brain cancer story remains complex, because the disease has a long latency—up to four decades—and because past uses and users differ radically from current ones. But evidence on dangers to pregnancy and reproduction from cell phone use are mounting. Of course, not all studies find results, but those that do—especially recent efforts at Yale and the Cleveland Clinic—cannot simply be ignored because others do not find similar results.

What can you do to protect yourself from radiation emitted from high-tech gadgets? In fact, industry denial of the hazards is crumbling. Samsung is the number-one producer of cell phones in the world today. Their new Convoy 2 phone comes with this advice: "Your mobile device is not a toy. Do not allow children to play with it because they could hurt themselves and others, damage the device, or make calls that increase your mobile device bill."

"Keep the mobile device and all its parts and accessories out of the reach of small children."

Samsung and the City of San Francisco have the right idea. People have the right to know how to use these remarkable devices as safely as possible. When the court next reviews the case for the right to know in San Francisco, let's hope that the City will be able to prevail in sharing what it has determined with its citizens, whose health remains of direct relevance to public authorities.

When it comes to using electronic devices, remember: Distance is your friend.

- Don't hold a cell phone directly up to your head. Use a headset or speakerphone to talk on the phone, or a nonmetal case that has been independently tested to reduce radiation up to 90 percent.
- Pregnant women should keep cell phones away from their abdomens, and men who wish to become fathers should never keep activated phones in their pockets.
- Don't allow children to play with or use your cell phone. Older children should use a headset or speakerphone when talking on a cell phone.
- Do not text and drive, and use specially adapted antennas for cars to avoid absorbing maximum power as the phone moves from one cell system to another.
- Turn off your wireless router at night to minimize exposure to radiation.
- Eat green vegetables and get a good night's sleep in a dark room to enhance natural repair of DNA that may have been damaged by radiation.

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The DMV mandates reporting of drivers with dementia, a loss of consciousness, or seizures. Reporting can be done through the Confidentiality and Morbidity Report (CMR) form or through the DMV's DS 699: Request for Driver Reexamination. Physicians can also report drivers with other health issues—such as substance abuse, vision deficits, frailty, and medication side-effects—that may potentially impair their driving. Physicians who report are protected from liability by Health and Safety Code 103900. Especially once families have expressed concern, physicians who choose not to report could face potential liability in the event of an accident. Lawsuits by third parties injured in an accident are often not covered by malpractice policies.

Once the DMV has been notified, whether by an emergency department, the treating physician, or law enforcement, a detailed medical questionnaire (Driving Medical Evaluation, or DME) is sent to the patient. Physicians traditionally dread filling out these forms, but irrelevant sections may simply be lined out rather than completed in detail. The legal consensus is that no liability attaches to filling out the DME, unless deliberately and provably false statements are made.

The most helpful questions for the DMV hearing officer are, "In your opinion, does your patient's medical condition affect safe driving?" and, "Do you currently advise against driving?" Physicians may hesitate to answer these questions, but no liability attaches to answering them. Our medical opinion carries great weight, but the ultimate decision and liability rests with the DMV.

Patients may be reluctant to bring driving concerns to their physician's attention. Driving is a sensitive issue for many older adults who depend on driving for independence. Driving cessation in this population has been associated with a threefold decrease in out-of-home activity and a two-and-a-half-fold increase in depressive symptoms. Thus, ARDDS (age-related driving disorders screening) should be conducted in a supportive environment where options for continued mobility can be given to patients who should no longer be driving.

U.C. San Diego has been training professionals on ARDDS since 2004 through funding from the California Office of Traffic Safety. Our team is a unique partnership of preventive-medicine physicians in the Department of Family and Preventive Medicine, led by Dr. Linda Hill, and trauma surgeons in the Division of Trauma, led by Dr. Raul Coimbra. More than 1,000 patients have been screened for ARDDS in both in- and outpatient settings. We have found both settings to be valuable: Outpatient settings capture the majority of older adults, and primary care physicians are ideally suited to screen and counsel on this issue. Inpatient settings provide access to persons whose health may have suddenly changed and where driving is either temporarily or permanently unsafe. Screening is well accepted, and satisfaction levels are high in both settings.

Addressing driving retirement requires effort on many levels. The availability of alternative transportation methods for older adults is a problem that must be addressed by society through increasing public transportation options. The government has a role through the DMV in helping to identify unsafe drivers during relicensing; however, the health care system must also play a crucial role as physicians screen and identify patients. Society, older adults, and their families depend on physicians to help them through this transition.

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It's time somebody working for the telecommunications industry told the truth. The way most people use cell phones next to their brains and bodies violates the FCC standards. Manufacturers have an obligation to identify and reduce risks and to design phones that can be safely held next to the body. If they do so, our children and grandchildren will not look back on us in shock at the disconnect between what science tells us about microwave radiation from cell phones and how we use them today, but with gratitude that we took simple steps to protect us all. Stop hiding behind fine print legalese buried on websites and tell people what they have the right to know.

For more information, please view YouTube videos from Dutch National Public Television with English subtitles by Google, http://www.youtube.com/watch?v=CC-Cpa3TTz4&feature=youtu.be&a, or my all-hands talk to the National Institute of Environmental Health Sciences at http://www.youtube.com/watch?v=wNNSztN7wJc&list=UUGOSWGSfR2X9TU3wN5aUgzw&index=1&feature=plcp. Information about creating school contests and programs to promote cell phone safety awareness can be found along with advice about the need to Practice Safe Phone, written by medical experts: http://www.environmentalhealthtrust.org/content/downloads.

Devra Davis, BS, MA, PhD, MPH, is the president and founder of Environmental Health Trust, a nonprofit research, education, and policy group. Davis is an award-winning scientist who has authored more than 200 publications, edited eleven monographs, and written three popular books, including Disconnect—The Truth about Cell Phone Radiation, What Industry Has Done to Hide It, and How to Protect Your Family *(Dutton/Plume, 2011). A former presidential appointee and the founding director of the Board on Environmental Studies and Toxicology of the U.S. National Academy of Sciences, Davis currently works with officials in Italy, Switzerland, Finland, and Israel to advance training and research programs on cell phones and health. She recently received the Lifetime Achievement Award from Green America for her "groundbreaking work" on the link between cell phone radiation and health. A major review of cell phone testing methods by the U.S. Government Accountability Office is calling on the Federal Communications Commission to revamp its fifteen-year-old methods. http://magazine.jhsph.edu/2012/technology/online_extras/alumni_dispatches/devra_davis/*