

Current Research on Wireless Technology and Health

Current FCC regulations controlling human exposure to radio frequency radiation, emitted by every communication antenna, are based on research conducted before 1986. These regulations are long out of date. The national wireless infrastructure has expanded enormously since then.

A recent review of the scientific literature on cell phones points out that 68% of studies have found one or more biological effects from levels of radiation previously deemed "safe."¹ This radiation is now being associated with attention deficit disorder, autism, sleep disorders, multiple sclerosis, Alzheimer's disease and epilepsy, as well as asthma, diabetes, malignant melanoma, breast cancer, and other illnesses which have become increasingly more common.

The Radio Frequency Inter-Agency Working Group, with members representing the FCC, EPA, FDA, OSHA, NIOSH and NTIA, have expressed concern that current regulations are inadequate.² This group should be empowered to revise existing federal regulations to reflect current science.

The dangers of electrosmog are no longer in doubt scientifically, only politically. Many governments and official organizations around the world, including the European Environment Agency,³ the French Parliament,⁴ the UK Department of Education,⁵ the Austrian Medical Association,⁶ and the Toronto Department of Public Health,⁷ have already issued warnings or restrictions on the use of cell phones and/or wireless computers by children.

Universal wireless, broadband over power lines, and "Smart Grid" technology mean that exposure to radiation is involuntary, and that the more vulnerable members of society have nowhere to go to escape it. We are also concerned about documented effects on birds, insects and other wildlife.

Following are web links to the most current scientific databases available; to informative websites; to additional documents for further reading; and quotes from physicians, scientists and health policy experts.

Footnotes

1. A. Huss et al., "Source of Funding and Results of Studies of Health Effects of Mobile Phone Use: Systematic Review of Experimental Studies", *Environmental Health Perspectives*, 115(1): 1-4, 2007. <http://www.ehponline.org/members/2006/9149/9149.pdf>.

2. Radio Frequency Interagency Work Group letter (1999): http://www.emrpolicy.org/litigation/case_law/docs/exhibit_a.pdf

3. European Environment Agency: <http://www.eea.europa.eu/highlights/radiation-risk-from-everyday-devices-assessed>

4. French Parliament: <http://www.independent.co.uk/life-style/gadgets-and-tech/news/french-government-bans-advertising-of-mobiles-to-children-1299673.html>

5. UK Dept. of Education: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4123979

6. Austrian Medical Association: <http://www.aerztekkammer.at/?id=000000000020050830115543&aid=xhtml&id=000000000020050830115543&type=module&noedit=true>

7. Toronto Dept. of Health: <http://www.thestar.com/article/459099>

Scientific Databases

<http://electricwords.emfacts.com/>
<http://www.powerwatch.org.uk/science/studies.asp>

Documents

BioInitiative Report, USA: <http://bioinitiative.org/> A review of 2000 studies of the bioeffects and adverse health effects of non-ionizing radiation. The Report concludes that public exposure guidelines for emissions from cellular antennas, WiFi and other mobile /wireless devices are set too high to protect public health and offers evidence that a large range of illnesses and adverse health effects are linked to mobile phone technology.

The medical journal *Pathophysiology* devoted its entire August 2009 issue to the health effects of electromagnetic fields, with articles by more than 30 scientists
<http://sd.samxxzy.ns02.info/science/journal/09284680> Electromagnetic Fields (EMF) Special Issue Volume 16, Issues 2-3 pp. 67-250 (August 2009)

Bees, Birds and Mankind Destroying Nature by 'Electrosmog': Effects of Wireless Communication Technologies. A Brochure Series authored by Ulrich Warnke, internationally renowned bioscientist at Saarland University <http://www.broschuerenreihe.net/international/bees-birds-and-mankind/index.html>

Section 3.7: (see attached) "Effects of artificially generated fields on bees," documenting behavior characteristic of Colony Collapse Disorder when a portable phone base is placed in a beehive. The U.S. Fish and Wildlife Service links to the Report in a new briefing paper.
(<http://electromagnetichealth.org/pdf/CommTowerResearchNeedsPublicBriefing-2-409.pdf>)

Bibliography of reported biological phenomena associated with radio-frequency and microwave radiation compiled by the US Navy Medical Research Institute in 1971, followed by nine supplements and including 5,083 references, at:
http://www.radiationresearch.org/pdfs/20091016_naval_studies.pdf.

Literature Review: ICNIRP Guideline Critique, Dr Neil Cherry, Lincoln University, New Zealand, October 2, 1999: <http://www.salzburg.gv.at/ICNIRP-Kritik1.pdf>,

Joining the Dots: An Overview of Public Health Trends in 2007, a scientific review commissioned and published by the Australian Democrats:
http://www.democrats.org.au/docs/2007/Joining_the_Dots11.pdf

Freiburger Appeal (signed by over 3,000 doctors):
http://timleitch.net.nz/pdfs/freiburger_appeal.pdf.

Articles

Review article: Nittby H et al. "Radiofrequency and extremely low-frequency electromagnetic field effects on the blood-brain barrier." *Electromagnetic Biology and Medicine* 2008; 27(2): 103-126.
<http://www.informaworld.com/smpp/content~content=a793878246~db=all~order=page>

"Cancer Trends During the 20th Century", Örjan Hallberg and Olle Johansson, *Journal of Australian College of Nutritional & Environmental Medicine* Vol. 21 No. 1; April 2002: pages 3-8:
<http://www.iddd.de/umtsno/cancertrends.pdf>

"The radiation poisoning of America," Amy Worthington, *Idaho Observer*, September 2007
<http://www.proliberty.com/observer/20070910.htm>

Books

Blake Levitt. *Electromagnetic Fields: A Consumers Guide to the Issues and How to Protect Ourselves*, Harcourt Brace 1995.

Blake Levitt. *Cell Towers: Wireless Convenience? or Environmental Hazard?* New Century 2000.

Gunni Nordstrom. *The Invisible Disease: The Dangers of Environmental Illnesses Caused by Electromagnetic Fields and Chemical Emissions*, O Books 2004.

Robert O. Becker M.D. *Cross Currents: The Promise of Electromedicine, the Perils of Electropollution*, J.P. Tarcher 1990.

Websites

USA

Council on Wireless Technology Impacts: <http://energyfields.org>

EMR Policy Institute: <http://emrpolicy.org>

EMR Network: <http://emrnetwork.org>

Electrical Pollution Solutions: <http://electricalpollution.com/>

<http://electromagnetichealth.org>

Coalition to Regulate Antennae Siting: <http://www.safeantenna.org/>

San Francisco Neighborhood Antenna-Free Union:
http://www.antennafreeunion.org/info_research.htm

Microwave News: <http://www.microwavenews.com>

Sage Associates: <http://www.sageassociates.net/radiofrequency.html>

Cellular Phone Task Force: <http://www.cellphonetaskforce.org>

International

International Commission on Electromagnetic Safety: <http://www.icems.eu>

Powerwatch: <http://www.powerwatch.org.uk/>

EMFacts Consultancy: <http://www.emfacts.com/>

FEB: <http://www.feb.se/index.htm>

h.e.s.e. project: <http://www.hese-project.org/hese-uk/en/niemr/index.php>

Expressions of Concern from Physicians, Scientists and Health Policy Experts

Andrew Weil, MD.: "Electromagnetic pollution may be the most significant form of pollution human activity has produced in this [20th] century." <http://www.drweil.com/drw/u/id/QAA26193>.

Robert Becker, Ph.D Nobel Prize nominee noted for decades of research on the effects of electromagnetic radiation says, "I have no doubt in my mind that, at present time, the greatest polluting element in the earth's environment is the proliferation of electromagnetic fields."

The following quotations are available at:

http://www.stralingsrisicos.nl/index.php?option=com_content&view=article&id=23&Itemid=6

William Rea, MD Founder & Director of the Environmental Health Center, Dallas Past President, American Academy of Environmental Medicine

"Sensitivity to electromagnetic radiation is the emerging health problem of the 21st century. It is imperative health practitioners, governments, schools and parents learn more about it. The human health stakes are significant".

Martin Blank, Ph.D Associate Professor, Department of Physiology and Cellular Biophysics, Columbia University, College of Physicians and Surgeons; Researcher in Bioelectromagnetics; Author of the BioInitiative Report's section on Stress Proteins.

"Cells in the body react to EMFs as potentially harmful, just like to other environmental toxins, including heavy metals and toxic chemicals. The DNA in living cells recognizes electromagnetic fields at very low levels of exposure; and produces a biochemical stress response. The scientific evidence tells us that our safety standards are inadequate, and that we must protect ourselves from exposure to EMF due to power lines, cell phones and the like, or risk the known consequences. The science is very strong and we should sit up and pay attention."

Olle Johansson, Ph.D. Associate Professor, The Experimental Dermatology Unit, Department of Neuroscience, Karolinska Institute, Stockholm, Sweden; Author of the BioInitiative Report's section on the Immune System.

"It is evident that various biological alterations, including immune system modulation, are present in electrohypersensitive persons. There must be an end to the pervasive nonchalance, indifference and lack of heartfelt respect for the plight of these persons. It is clear something serious has happened and is happening. Every aspect of electrohypersensitive peoples' lives, including the ability to work productively in society, have healthy relations and find safe, permanent housing, is at stake. The basics of life are becoming increasingly inaccessible to a growing percentage of the world's population. I strongly advise all governments to take the issue of electromagnetic health hazards seriously and to take action while there is still time. There is too great a risk that the ever

increasing RF-based communications technologies represent a real danger to humans, especially because of their exponential, ongoing and unchecked growth. Governments should act decisively to protect public health by changing the exposure standards to be biologically-based, communicating the results of the independent science on this topic and aggressively researching links with a multitude of associated medical conditions.”

David Carpenter, MD Professor, Environmental Health Sciences, and Director, Institute for Health and the Environment, School of Public Health, University of Albany, SUNY Co-Editor, the BioInitiative Report (www.BioInitiative.org).

Electromagnetic fields are packets of energy that does not have any mass, and visible light is what we know best. X-rays are also electromagnetic fields, but they are more energetic than visible light. Our concern is for those electromagnetic fields that are less energetic than visible light, including those that are associated with electricity and those used for communications and in microwave ovens.

The fields associated with electricity are commonly called “extremely low frequency” fields (ELF), while those used in communication and microwave ovens are called “radiofrequency” (RF) fields. Studies of people have shown that both ELF and RF exposures result in an increased risk of cancer, and that this occurs at intensities that are too low to cause tissue heating.

Unfortunately, all of our exposure standards are based on the false assumption that there are no hazardous effects at intensities that do not cause tissue heating. Based on the existing science, many public health experts believe it is possible we will face an epidemic of cancers in the future resulting from uncontrolled use of cell phones and increased population exposure to WiFi and other wireless devices.

Thus it is important that all of us, and especially children, restrict our use of cell phones, limit exposure to background levels of Wi-Fi, and that government and industry discover ways in which to allow use of wireless devices without such elevated risk of serious disease. We need to educate decision-makers that ‘business as usual’ is unacceptable. The importance of this public health issue can not be underestimated.”

Eric Braverman, MD Brain researcher, Author of *The Edge Effect*, and Director of Path Medical in New York City and The PATH Foundation. Expert in the brain’s global impact on illness and health.

“There is no question EMFs have a major effect on neurological functioning. They slow our brain waves and affect our long-term mental clarity. We should minimize exposures as much as possible to optimize neurotransmitter levels and prevent deterioration of health”.

Abraham R. Liboff, PhD Research Professor Center for Molecular Biology and Biotechnology Florida Atlantic University, Boca Raton, Florida Co-Editor, *Electromagnetic Biology and Medicine*

“The key point about electromagnetic pollution that the public has to realize is that it is not necessary that the intensity be large for a biological interaction to occur. There is now considerable evidence that extremely weak signals can have physiological consequences. These interactive intensities are about 1000 times smaller than the threshold values formerly estimated by otherwise knowledgeable theoreticians, who, in their vainglorious approach to science, rejected all evidence to

the contrary as inconsistent with their magnificent calculations. These faulty estimated thresholds are yet to be corrected by both regulators and the media.

The overall problem with environmental electromagnetism is much deeper, not only of concern at power line frequencies, but also in the radiofrequency range encompassing mobile phones. Here the public's continuing exposure to electromagnetic radiation is largely connected to money. Indeed the tens of billions of dollars in sales one finds in the cell phone industry makes it mandatory to corporate leaders that they deny, in knee-jerk fashion, any indication of hazard.

There may be hope for the future in knowing that weakly intense electromagnetic interactions can be used for good as well as harm. The fact that such fields are biologically effective also implies the likelihood of medical applications, something that is now taking place. As this happens, I think it will make us more aware about how our bodies react to electromagnetism, and it should become even clearer to everyone concerned that there is reason to be very, very careful about ambient electromagnetic fields.”

Lennart Hardell, MD, PhD Professor at University Hospital, Orebro, Sweden. World-renowned expert on cell phones, cordless phones, brain tumors, and the safety of wireless radiofrequency and microwave radiation. Co-authored the BioInitiative Report's section on Brain Tumors by Dr. Hardell

“The evidence for risks from prolonged cell phone and cordless phone use is quite strong when you look at people who have used these devices for 10 years or longer, and when they are used mainly on one side of the head. Recent studies that do not report increased risk of brain tumors and acoustic neuromas have not looked at heavy users, use over ten years or longer, and do not look at the part of the brain which would reasonably have exposure to produce a tumor.”

Samuel Milham MD, MPH Medical epidemiologist in occupational epidemiology. First scientist to report increased leukemia and other cancers in electrical workers and to demonstrate that the childhood age peak in leukemia emerged in conjunction with the spread of residential electrification.

“Very recently, new research is suggesting that nearly all the human plagues which emerged in the twentieth century, like common acute lymphoblastic leukemia in children, female breast cancer, malignant melanoma and asthma, can be tied to some facet of our use of electricity. There is an urgent need for governments and individuals to take steps to minimize community and personal EMF exposures.”

Libby Kelley, MA Managing Secretariat International Commission For Electromagnetic Safety; Founder, Council on Wireless Technology Impacts; Co-Producer of documentary, “Public Exposure: DNA, Democracy and the Wireless Revolution”; EMF environmental consultant and leading appellant in challenging the FCC Radio Frequency Radiation human exposure guidelines, 1997-2000. (www.icems.eu)

“Radiofrequency radiation human exposure standards for personal wireless communications devices and for environmental exposure to wireless transmitters are set by national governments to guide the use of wireless communications devices and for wireless transmitters. In the U.S., the Food and Drug Administration and the Federal Communications Commission set these standards.

The Council on Wireless Technology Impacts considers these exposure standards to be inadequate as they are based on heating effects and do not accommodate the low level, cumulative exposure conditions in which the public now lives. These standards are also designed for acute, short term exposure conditions and do not acknowledge the medical evidence pointing to increased risks and actual harm that results from chronic, intermittent exposure.

Federal and State public health agencies are not officially addressing what many concerned scientists and medical doctors now see as an emerging public health problem. There are no health surveillance or remedial response systems in place to advise citizens about electromagnetic radiation exposure (EMR).

As wireless technology evolves, ambient background levels increase, creating electrical pollution conditions which are becoming ubiquitous and more invasive. We strongly encourage consumers, manufacturers, utility providers and policymakers to reduce, eliminate and mitigate EMR exposure conditions and to support biologically based standards.”

James S. Turner, Esq. Chairman of the Board, Citizens for Health Co-author, Voice of the People: The Transpartisan Imperative in American Life Attorney, Swankin-Turner, Washington, DC

“According to the BioInitiative Report: A Rationale for a Biologically-Based Public Exposure Standard for Electromagnetic Fields—from electrical and electronic appliances, power lines and wireless devices such as cell phones, cordless phones, cellular antennas, towers, and broadcast transmission towers—we live in an invisible fog of EMF which thirty years of science, including over 2,000 peer reviewed studies, shows exposes us to serious health risks such as increased Alzheimer’s disease, breast cancer, Lou Gehrig disease, EMF immune system hypersensitivity and disruption of brain function and DNA. The public needs to wake up politicians and public officials to the need for updating the decades old EMF public health standards. This report tells how.”

L. Lloyd Morgan, BS Electronic Engineering Director Central Brain Tumor Registry of the United States, Member Bioelectromagnetics Society, Member Brain Tumor Epidemiological Consortium

*“There is every indication that cell phones cause brain tumors, salivary gland tumors and eye cancer. Yet, because the cell phone industry provides a substantial proportion of research funding, this reality is hidden from the general public. The Interphone Study, a 13-country research project, substantially funded by the cell phone industry has consistently shown that use of a cell phone protects the user from risk of a brain tumor! Does anything more need to be said? It is time that fully independent studies be funded by those governmental agencies whose charter is to protect its citizens so that the truth about the very damaging health hazards of microwave radiation becomes clear and well known.”

*For identification purposes only: All statements are mine and mine alone and do not represent positions or opinions of the Central Brain Tumor Registry of the United States, the Bioelectromagnetics Society or the Brain Tumor Epidemiological Consortia.

Prof. Livio Giuliani, PhD Spokesperson, International Commission for Electromagnetic Safety (www.icems.eu) Deputy Director, Italian National Institute for Worker Protection and Safety, East Venice and South Tyrol; Professor, School of Biochemistry of Camerino University, Italy

The Venice Resolution, initiated by the International Commission for Electromagnetic Safety (ICEMS) on June 6, 2008, and now signed by nearly 50 peer reviewed scientists worldwide, states in part, “We are compelled to confirm the existence of non-thermal effects of electromagnetic fields on living matter, which seem to occur at every level of investigation from molecular to epidemiological.

Recent epidemiological evidence is stronger than before. We recognize the growing public health problem known as electrohypersensitivity. We strongly advise limited use of cell phones, and other similar devices, by young children and teenagers, and we call upon governments to apply the Precautionary Principle as an interim measure while more biologically relevant exposure standards are developed.”

Paul J. Rosch, MD Clinical Professor of Medicine and Psychiatry, New York Medical College; Honorary Vice President International Stress Management Association; Diplomate, National Board of Medical Examiners; Full Member, Russian Academy of Medical Sciences; Fellow, The Royal Society of Medicine; Emeritus Member, The Bioelectromagnetics Society

Claims that cell phones pose no health hazards are supported solely by Specific Absorption Rate (SAR) limits safety standards written by the telecommunications industry decades ago based on studies they funded. These have made the erroneous assumption that the only harm that could come from cell phone radiofrequency emissions would be from a thermal or heating action, since such non thermal fields can have no biological effects. The late Dr. Ross Adey disproved this three decades ago by demonstrating that very similar radiofrequency fields with certain carrier and modulation frequencies that had insufficient energy to produce any heating could cause the release of calcium ions from cells. Since then, numerous research reports have confirmed that non thermal fields from cell phones, tower transmitters, power lines, and other man made sources can significantly affect various tissues and physiologic functions.

We are constantly being bathed in an increasing sea of radiation from exposure to the above, as well as electrical appliances, computers, Bluetooth devices, Wi-Fi installations and over 2,000 communications satellites in outer space that shower us with signals to GPS receivers. New WiMax transmitters on cell phone towers that have a range of up to two square miles compared to Wi-Fi’s 300 feet will soon turn the core of North America into one huge electromagnetic hot spot. Children are more severely affected because their brains are developing and their skulls are thinner. A two-minute call can alter brain function in a child for an hour, which is why other countries ban their sale or discourage their use under the age of 18. In contrast, this is the segment of the population now being targeted here in a \$2 billion U.S. advertising campaign that views “tweens” (children between 8 and 12 years old) as the next big cell phone market. Firefly and Barbie cell phones are also being promoted for 6 to 8-year-olds.

It is not generally appreciated that there is a cumulative effect and that talking on a cell phone for just an hour a day for ten years can add up to 10,000 watts of radiation. That’s ten times more than from putting your head in a microwave oven. Pregnant women may also be at increased risk based on a study showing that children born to mothers who used a cell phone just two or three times a day during pregnancy showed a dramatic increase in hyperactivity and other behavioral and emotional problems. And for the 30% of children who had also used a cell phone by age 7, the incidence of behavioral problems was 80% higher!

Whether ontogeny (embryonic development) recapitulates phylogeny is debatable, but it is clear that lower forms of life are also much more sensitive. If you put the positive electrode of a 1.5 volt battery in the Pacific Ocean at San Francisco and the negative one off San Diego, sharks in the in between these cities can detect the few billionths of a volt electrical field. EMF fields have also been implicated in the recent massive but mysterious disappearance of honeybee colonies essential for pollinating over 90 commercial crops.

From: *Bienen, Vögel und Menschen: Die Zerstörung der Natur durch 'Elektrosmog' [Bees, Birds and People: The Destruction of Nature by 'Electrosmog']* by Ulrich Warnke, April 2008 (47 pages).

3.7 Effects of artificially generated fields on bees

We investigated the reaction of bees to artificially created electric fields in the laboratory (Warnke 1975, 1976, Warnke et al. 1976) with the following results: In 50 Hz alternating fields with a strength of 110 V/cm the bees became very restless in their enclosure. The temperature in the colony was strongly elevated. Defense of the territory was so heightened that individuals in a colony stung one another. They no longer recognized one other.

After some days in the field, the bees dragged their brood out of the cells. New brood were no longer reared. Honey and pollen were consumed and not replaced. Bees that were newly installed in their hives shortly before the beginning of the experiment left and vanished after the electric field was switched on. Bees that, on the other hand, were long accustomed to their enclosure, cemented all the gaps and holes with propolis, even the entrance hole. This never happened otherwise except in a cold wind in the winter.

Since an acute shortage of oxygen develops when the gaps and entrance hole are plugged, the bees try to get air with intensive fanning. In this process, the wing muscles generate temperatures so high that the wax can melt. The bees try to cool the temperature by even more intensive fanning. The end is a "subsiding" of the hive. This term means the eventual death of all members of the colony – which we could obviously prevent in future.

Among very sensitive colonies field strengths of 1 V/cm and frequencies of 30 Hz to 40 kHz caused a measurable reaction signal: When the field was switched on, the bees suddenly moved their wings and buzzed at 100–150 Hz (Warnke, 1973, 1976, Warnke et al. 1976). With a signal in the frequency range of 10 to 20 kHz they showed a heightened aggressiveness and a greatly reduced ability to find their way home, even though the natural meteorological electromagnetic environment was unchanged in the environment (Warnke, 1973).

Scientists at the University of Koblenz-Landau, in several experiments, looking at various aspects and questions, studied the homing behavior of bees (*Apis mellifera carnica*) as well as the development of weight and area of the honeycomb under the influence of electromagnetic radiation (KUHN et al. 2001, 2002, STEVER et al. 2003, 2005, HARST et al. 2006).

They found a greater agility, an heightened tendency to swarm, and a lack of winter clustering under the influence of electromagnetic radiation from cell phones. In other experiments with fields from the base stations of DECT cordless telephones (1880-1 900 MHz, 250 mW EIRP, pulsed at 100 Hz, 50 m range, continuous exposure), the weight and area of the colonies developed more slowly than that of unexposed control colonies.

The homing ability of the bees was tested beginning five days after the DECT telephones were introduced. There were clear differences in the return times between the irradiated and unirradiated

bees. Among the irradiated bees, no more than six bees ever returned during an experiment – sometimes none returned. With the non-irradiated bees, returning bees were observed continuously throughout the experiment.