The Health Argument against Cell Phones and Cell Towers

The biomedical evidence showing that the radiofrequency radiation emitted by cell phones and cell towers is harmful to health continues to grow. This document summarizes the health argument against cellular technology, whatever the benefits of that technology may be. You may wish to inform yourself about these arguments for any of several reasons:

- You use a cell phone.
- You encourage, or do not discourage, the use of cell phones by family members.
- You live in, or are contemplating moving into, a community close to a cell tower.
- Your school, college, fire station, or police station is considering permitting the installation of a cell tower on its property.
- Your community is considering permitting the installation of cellular repeaters, small-cell towers, or even full cell towers within its jurisdiction.

Below, I introduce myself, provide evidence of the harmfulness of cellular radiation, and show that U.S. Government is not protecting us from harm and is unlikely to do so in the near future. That means that we must protect ourselves and our families at the individual and the community levels while working toward protective action by governments at the local, state, and Federal levels.

Who am I?

I am a retired U.S. Government career scientist (Ph.D., Applied Physics, Harvard University, 1975). During my Government career, I worked for the Executive Office of the President of the United States, the National Science Foundation, and the National Institute of Standards and Technology. For those organizations, respectively, I addressed Federal research and development program evaluation, energy policy research, and measurement development in support of the electronics and electrical-equipment industries and the biomedical research community. I currently interact with other scientists and with physicians around the world on the impact of electromagnetic fields on human health.

Evidence of harm

I present below key evidence, and associated references, that the exposure of humans to radiofrequency radiation, and specifically cellular radiation, is harmful to health.

In 2016, the National Toxicology Program, at the National Institutes of Health, linked cellular radiation to brain and heart tumors.

The National Toxicology Program (NTP), at the National Institutes of Health (NIH), just published the "Partial Findings" of a $25 million multi-year study of the impact of cellular radiation on health. The U.S. Food and Drug Administration "nominated" this NTP study. The NTP indicated that this is the largest and most complex study ever conducted by the NTP.

[1] Ronald M. Powell, Ph.D., USA, email ronpowell@verizon.net, web site https://www.scribd.com/document/291507610/.

The NTP study exposed each of six separate groups of male rats to one of the six possible combinations of three different levels of cellular radiation and two different modulation formats. The modulation format is the method used to impress information on the cellular signal. A separate seventh group of male rats was used as a "control", that is, for comparison, and was protected from exposure to any cellular radiation.

The NTP study found a "likely" causal relationship between exposure to cellular radiation and the occurrence of malignant (cancerous) brain tumors (glioma) and malignant nerve tumors (a form of schwannoma) of the heart in the male rats:

> The rates of occurrence of brain glioma in the male rats ranged from 0 to 3.3 percent for the six groups exposed to radiation. The mean rate of occurrence was 2.0 percent across all six groups.[2]
>
> The rates of occurrence of heart schwannoma in the male rats ranged from 1.1 to 6.6 percent for the six groups exposed to radiation. The mean rate of occurrence was 3.5 percent across all six groups.[3]
>
> The seventh group of male rats, which was used as a control and which was protected from exposure to any cellular radiation, experienced no instances of brain glioma or heart schwannoma.

The NTP considered its findings so important to public health that it issued the "Partial Findings" (May 2016) prior to completing the full study. The NTP then presented those findings at an international conference (BioEM2016, June 2016) attended by 300 scientists from 41 countries. The NTP characterized the motivation for the early release of the "Partial Findings" this way:

> "Given the widespread global usage of mobile communications among users of all ages, even a very small increase in the incidence of disease resulting from exposure to RFR [radiofrequency radiation] could have broad implications for public health. There is a high level of public and media interest regarding the safety of cell phone RFR and the specific results of these NTP studies."

You can learn more about this study from the following references:

> **Reference:** NTP's brief description of its study. National Toxicology Program: Cell Phones. (http://ntp.niehs.nih.gov/results/areas/cellphones/index.html)
>
> **Reference:** NTP's published "Partial Findings" of the study. Michael Wyde, Mark Cesta, Chad Blystone, Susan Elmore, Paul Foster, Michelle Hooth, Grace Kissling, David Malarkey, Robert Sills, Matthew Stout, Nigel Walker, Kristine Witt, Mary Wolfe, and John Bucher, Report of Partial Findings from the National Toxicology Program Carcinogenesis Studies of Cell Phone Radiofrequency Radiation in Hsd: Sprague Dawley® SD rats (Whole Body Exposure), posted June 23, 2016. (http://biorxiv.org/content/biorxiv/early/2016/06/23/055699.full.pdf)
>
> **Reference:** Informative discussion of the NTP study. Environmental Health Trust, Frequently Asked Questions about the U.S. National Toxicology Program Radiofrequency Rodent Carcinogenicity Research Study. (http://ehtrust.org/science/facts-national-toxicology-program-cellphone-rat-cancer-study)

[2] In the "Partial Findings" reference cited above, the mean (average) rate of occurrence for malignant glioma in male rats was determined from Table 1 on page 13 as follows: (3 + 3 + 2 + 0 + 0 + 3)/(90 + 90 + 90 + 90 + 90 + 90) = 2.0 percent.
[3] In the "Partial Findings" reference cited above, the mean (average) rate of occurrence for malignant heart schwannoma in male rats was determined from Table 3 on page 15 as follows: (2 + 1 + 5 + 2 + 3 + 6)/(90 + 90 + 90 + 90 + 90 + 90) = 3.5 percent.

Reference: Announcement of the BioEM2016 presentation. Results of NIEHS' National Toxicology Program GSM/CDMA phone radiation study to be presented at BioEM2016 Meeting in Ghent, 05 June 2016 — 10 June 2016 Ghent University, Belgium.
(http://www.alphagalileo.org/ViewItem.aspx?ItemId=164837&CultureCode=en)

Reference: Viewgraphs presented by Michael Wyde, Ph.D., NTP study scientist, at BioEM2016 Meeting, Ghent, Belgium, June 8, 2016. NTP Toxicology and Carcinogenicity Studies of Cell Phone Radiofrequency Radiation.
(http://ntp.niehs.nih.gov/ntp/research/areas/cellphone/slides_bioem_wyde.pdf)

In September 2017, the NTP presented further findings from its study of the impact of cellular radiofrequency radiation on the DNA of both mice and rats. The NTP found the following:

"These results suggest that exposure to RFR [radiofrequency radiation] has the potential to induce measurable DNA damage under certain exposure conditions."

Reference: Abstract of data presented at the annual meeting of the Environmental Mutagenesis and Genomics Society, Raleigh, North Carolina, September 9-13, 2017. SL Smith-Roe and others, Evaluation of the Genotoxicity of Cell phone Radiofrequency Radiation in Male and Female Rats and Mice Following Subchronic Exposure.
(https://ehtrust.org/national-toxicology-program-finds-cell-phone-radiation-induces-dna-damage/)

Further findings from the NTP are promised for 2018.

The NTP study reinforces the classification of radiofrequency radiation, including cellular radiation, as a possible human carcinogen, made by the International Agency for Research on Cancer of the World Health Organization in 2011.

In its "Partial Findings" the NTP noted that its study reinforces a decision made by the International Agency for Research on Cancer (IARC) of the World Health Organization (WHO) in 2011. That decision classified radiofrequency radiation, including specifically cellular radiation, as a Group 2B carcinogen (possible carcinogen for humans). This classification was based on the increased risk of brain cancer (glioma) and acoustic neuroma (a form of schwannoma). [4]

Reference: Announcement of the IARC classification. International Agency for Research on Cancer**,** IARC Classifies Radiofrequency Electromagnetic Fields as Possibly Carcinogenic To Humans, Press Release No. 208, 31 May 2011.
(http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208_E.pdf)

Reference: Full report on the IARC classification. IARC Monographs: Non-Ionizing Radiation, Part 2: Radiofrequency Electromagnetic Fields, Volume 102, 2013.
(http://monographs.iarc.fr/ENG/Monographs/vol102/mono102.pdf)

The findings of the NTP study, in combination with the findings of other studies conducted since 2011, have greatly increased the likelihood that the IARC will raise its classification of radiofrequency radiation to

[4] The Mayo Clinic describes acoustic neuroma here: http://www.mayoclinic.org/diseases-conditions/acoustic-neuroma/basics/definition/CON-20023851.

Group 2A (probable carcinogen for humans) or even to Group 1 (known carcinogen for humans) in the near future.

In 2015, hundreds of international scientists appealed to the United Nations and the World Health Organization to warn the public about the health risks caused by electromagnetic fields (EMF), including radiofrequency radiation and, specifically, cellular radiation.

As of January 29, 2017, 224 scientists from 41 nations have signed an international appeal first submitted to the United Nations and to the World Health Organization in May 2015. These scientists seek improved protection of the public from harm caused by the radiation produced by many wireless sources, including "cellular and cordless phones and their base stations, Wi-Fi, broadcast antennas, smart meters, and baby monitors" among others. Together, these scientists "have published more than 2000 research papers and studies on EMF." They state the following:

> "Numerous recent scientific publications have shown that EMF affects living organisms at levels well below most international and national guidelines. Effects include increased cancer risk, cellular stress, increase in harmful free radicals, genetic damages, structural and functional changes of the reproductive system, learning and memory deficits, neurological disorders, and negative impacts on general well-being in humans. Damage goes well beyond the human race, as there is growing evidence of harmful effects to both plant and animal life."
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> **Reference:** Welcome to EMFscientist.org.
> (https://www.emfscientist.org)
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> **Reference:** International EMF Scientist Appeal: Scientists call for Protection from Non-ionizing Electromagnetic Field Exposure, May 15, 2015 (updated October 10, 2016).
> (https://www.emfscientist.org/index.php/emf-scientist-appeal)
>
> **Reference:** International Scientists Petition U.N. to Protect Humans and Wildlife from Electromagnetic Fields and Wireless Technology.
> (https://www.emfscientist.org/images/docs/International_EMF_Scientist_Appeal_Description.pdf)

In 2012, the BioInitiative Working Group published the most comprehensive of the recent analyses of the international biomedical research, showing a multitude of biological effects from exposure to radiofrequency radiation, including cellular radiation, at levels below the current exposure guidelines set by the Federal Communications Commission (FCC).

The health risks posed by the expanding use of radiofrequency radiation in wireless devices are not limited to cancer, as devastating as that consequence is. The broad range of health effects was extensively reviewed in the BioInitiative Report 2012. This 1479-page review considered about 1800 peer-reviewed biomedical research publications, most issued in the previous five years. The BioInitiative Report 2012 was prepared by an international body of 29 experts, heavy in Ph.D.s and M.D.s, from 10 countries, including the USA which contributed the greatest number of experts (10). The report concluded the following:

> "The continued rollout of wireless technologies and devices puts global public health at risk from unrestricted wireless commerce unless new, and far lower exposure limits and strong precautionary warnings for their use are implemented."

Reference: BioInitiative Working Group, Cindy Sage, M.A. and David O. Carpenter, M.D., Editors, BioInitiative Report: A Rationale for Biologically-based Public Exposure Standards for Electromagnetic Radiation, December 31, 2012.
(http://www.bioinitiative.org)

The BioInitiative Report 2012 documented, in its "RF Color Charts", examples of eight categories of biological effects that occurred at levels below the current exposure guidelines set by the FCC:

- stress proteins, heat shock proteins, and disrupted immune function
- reproduction and fertility effects
- oxidative damage, reactive ion species (ROS), DNA damage, and DNA repair failure
- disrupted calcium metabolism
- brain tumors and blood-brain barrier
- cancer (other than brain) and cell proliferation
- sleep, neuron firing rate, electroencephalogram (EEG), memory, learning, and behavior
- cardiac, heart muscle, blood-pressure, and vascular effects.

These biological effects were attributed to "Radiofrequency Radiation at Low Intensity Exposure" from "cell towers, Wi-Fi, wireless laptops, and smart meters".

Reference: See the "RF Color Charts", accessed from the left column of the web page below.
(http://www.bioinitiative.org)

The U.S. Government is not protecting us.

The radiation exposure guidelines of the FCC do not protect us because they are outdated and based on a false assumption.

The current radiation exposure guidelines of the FCC were adopted in 1996, 20 years ago. Those guidelines are based primarily on an analysis by the National Council on Radiation Protection and Measurements (NCRP) which was published in 1986, 30 years ago. That was many years before the emergence of nearly all of the digital wireless devices in use today.

"The FCC-adopted limits for Maximum Permissible Exposure (MPE) are generally based on recommended exposure guidelines published by the National Council on Radiation Protection and Measurements (NCRP) in 'Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields,' NCRP Report No. 86, Sections 17.4.1, 17.4.1.1, 17.4.2 and 17.4.3. Copyright NCRP, 1986, Bethesda, Maryland 20814...."

Reference: Federal Communications Commission, Office of Engineering & Technology, Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields, OET Bulletin 65, Edition 97-01 (August 1997). See the last paragraph on page 64.
(http://transition.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet65/oet65.pdf)

Those exposure guidelines have not been substantially changed since that analysis in 1986. They are based on the *thermal assumption* that the only harm that radiofrequency radiation can cause is due to tissue heating. This thermal assumption has been thoroughly disproved since, as biological effects have been found to occur

at levels of radiation below, and even far below, those that cause significant tissue heating. Such lower levels are commonly referred to as *nonthermal* levels. The result is that many authorities now consider the FCC's current exposure guidelines as entirely outdated and much too high (that is, much too permissive) to protect the public.

The evidence disproving the thermal assumption is based on the broadened understanding of the biological effects of radiofrequency radiation made possible by thousands of peer-reviewed papers published by international biomedical scientists since 1986. The BioInitiative Report 2012 is the most recent comprehensive review of that research and provides many examples of bioeffects occurring at nonthermal radiation levels, as described above. Further, the new study by the National Toxicology Program, also described above, added to the evidence disproving the thermal assumption. That study exposed rats to levels of radiation below those that cause significant heating, and both above and below the FCC's current exposure guidelines as well. Yet, even below the FCC's current exposure guidelines, the male rats still developed malignant brain cancer (glioma) and malignant tumors (schwannomas) of the nerves of the heart.
The shortcomings of the FCC's exposure guidelines are described in detail in the following reference:

> **Reference:** Outdated FCC "Safety" Standards: The Five Fallacies of the Electromagnetic Radiation Exposure Limits.
> (http://ehtrust.org/policy/fcc-safety-standards/)

The FCC is not a credible source for exposure guidelines because it lacks health expertise and because it is too heavily influenced by the wireless industries that it is supposed to regulate.

The FCC lacks the health expertise required for developing health-related radiation exposure guidelines. Further, the FCC seems more interested in assuring compatibility among electronic systems than in assuring the compatibility of electronic systems with human, animal, and plant life. Since the exposure guidelines relate to health, it would make more sense for them to be developed by an agency with health expertise, such as the Environmental Protection Agency (EPA).

In addition, the FCC lacks the impartiality required to be a source of credible guidelines. The FCC is too heavily influenced by the wireless industries that the FCC is supposed to regulate. The FCC has acted in partnership with the wireless industries by permitting wireless radiation levels far higher than the biomedical research literature indicates are necessary to protect human health. The success of the wireless industries in capturing the FCC, the committees in the U.S. Congress that oversee the FCC, and the Executive Branch is detailed in a recent monograph from the Center for Ethics at Harvard University.

> **Reference:** Norm Alster, Captured Agency: How the Federal Communications Commission is Dominated by the Industries It Presumably Regulates (2015).
> http://ethics.harvard.edu/news/new-e-books-edmond-j-safra-research-lab

As an example of that capture, President Obama, in 2013, appointed Thomas Wheeler, as the Chairman of the FCC. At that time, Mr. Wheeler was the head of the CTIA – The Wireless Association, which is the major lobbying organization for the wireless industries. This is the infamous "revolving door".

The FCC's decision to fast-track Fifth Generation (5G) cellular technology without prior study of its health impact demonstrates the FCC's disinterest in the public health.

On July 14, 2016, the FCC adopted new rules that would promote fast-tracking the expansion of cellular service to new and higher frequencies as part of the Fifth Generation (5G) of cellular technology. This decision will open selected frequency bands above 24 gigahertz (GHz) and up to 71 GHz. At the same time, the FCC has requested comment on opening even higher frequencies, possibly above 95 GHz.

> **Reference:** FCC Takes Steps to Facilitate Mobile Broadband and Next Generation Wireless Technologies in Spectrum above 24 GHz: New rules will enable rapid development and deployment of next generation 5G technologies and services.
> (http://transition.fcc.gov/Daily_Releases/Daily_Business/2016/db0714/DOC-340301A1.pdf)

> **Reference:** Fact Sheet: Spectrum Frontiers Rules Identify, Open Up Vast Amounts of New High-Band Spectrum for Next Generation (5G) Wireless Broadband.
> (http://transition.fcc.gov/Daily_Releases/Daily_Business/2016/db0714/DOC-340310A1.pdf)

All five commissioners of the FCC, including Chairman Thomas Wheeler, approved this expedited move to 5G. No commissioner called for evaluating the health impact before proceeding with 5G, despite the recent findings of the National Toxicology Program at NIH that cellular radiation likely causes tumors. Nor did even one commissioner express any interest in, or concern about, the impact of this new technology on public health. Rather, the FCC's emphasis was on the billions of dollars to be made by proceeding to implement 5G as rapidly as possible, with a minimum of regulatory interference, to assure an international competitive position.

In contrast to the FCC's disinterest in the impact of 5G on the public health, extensive written comments from individual members of the public and from many interested organizations raised a host of health concerns that were totally ignored in the FCC's presentations.

> **Reference:** July 2016 Open Commission Meeting addressing "Spectrum Frontiers" and "Advancing Technology Transitions".
> (https://www.fcc.gov/news-events/events/2016/07/july-2016-open-commission-meeting)

> **Reference:** The FCC Approves 5G Millimeter Wave Spectrum Frontiers. Includes excerpts from selected comments provided to the FCC by individuals and organizations that expressed concern about the health impact of the FCC's plan for 5G.
> (http://ehtrust.org/policy/fcc-approves-5g-millimeter-wave-spectrum-frontiers/)

> **Reference:** Comments on FCC Docket 14-177, Spectrum Bands above 24 GHz. All of the comments submitted to the FCC about the key docket leading to the implementation of 5G.
> (https://www.fcc.gov/ecfs/search/filings?proceedings_name=14-177&sort=date_disseminated,DESC)

U.S. Government agencies, and U.S. medical organizations, have disputed the validity of the FCC's exposure guidelines.

U.S. Government agencies, as well as U.S. medical organizations, have disputed the validity of the FCC's thermal exposure guidelines, maintaining that they are outdated and need to be updated to provide adequate protection of human beings, including children and seniors as well as other vulnerable groups.

U.S. Environmental Protection Agency

The Environmental Protection Agency (EPA) would be a better agency than the FCC to entrust with setting radiofrequency radiation exposure guidelines because the EPA has both health expertise and environmental responsibilities. The EPA is often cited by the FCC, and by the wireless industries, as one of the agencies that the FCC has *consulted* about the FCC's exposure guidelines, as if to increase the credibility of those guidelines. However, the fact that the EPA has *explicitly disputed* the validity of those guidelines is consistently omitted from those FCC citations.

Specifically, in 2002, the EPA addressed the limitations of the thermal exposure guidelines of the FCC, and the similar guidelines of private organizations, including the Institute of Electrical and Electronics Engineers and the International Commission on Non-Ionizing Radiation Protection:

> "The FCC's current exposure guidelines, as well as those of the Institute of Electrical and Electronics Engineers (IEEE) and the International Commission on Non-ionizing Radiation Protection, are thermally based, and do not apply to chronic, nonthermal exposure situations…. The FCC's exposure guideline is considered protective of effects arising from a thermal mechanism but not from all possible mechanisms. Therefore, the generalization by many that the guidelines protect human beings from harm by any or all mechanisms is not justified."
>
> "Federal health and safety agencies have not yet developed policies concerning possible risk from long-term, nonthermal exposures. When developing exposure standards for other physical agents such as toxic substances, health risk uncertainties, with emphasis given to sensitive populations, are often considered. Incorporating information on exposure scenarios involving repeated short duration/nonthermal exposures that may continue over very long periods of time (years), with an exposed population that includes children, the elderly, and people with various debilitating physical and medical conditions, could be beneficial in delineating appropriate protective exposure guidelines."
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> **Reference:** Letters from Frank Marcinowski, Director, Radiation Protection Division, EPA, and Norbert Hankin, Center for Science and Risk Assessment, Radiation Protection Division, EPA, to Janet Newton, President, the EMR Network, with copies to the FCC and the IEEE, dated July 16, 2002. (http://www.emrpolicy.org/litigation/case_law/docs/noi_epa_response.pdf)

In summary, the EPA makes the following points: (1) the FCC 's thermal exposure guidelines do *not* protect against all harm, only the harm caused by too much heating; (2) the FCC's thermal exposure guidelines do *not* apply to "chronic, nonthermal exposure", which is the type of exposure generated by cell towers and many other wireless devices; and (3) when new FCC guidelines are developed for chronic nonthermal exposures, they must accommodate "children, the elderly, and people with various debilitating physical and medical conditions" because those groups are not accommodated now.

U.S. Food and Drug Administration

The Food and Drug Administration (FDA) is also often cited by the FCC, and by the wireless industries, as one of the agencies that the FCC has consulted about exposure guidelines. But the FDA is the agency that "nominated" the NTP study of the possible health effects of cellular radiation, in part because of the FDA's uncertainty about the validity of the FCC's exposure guidelines:

> "Currently cellular phones and other wireless communication devices are required to meet the radio frequency radiation (RFR) exposure guidelines of the Federal Communications Commission (FCC),

which were most recently revised in August 1996. The existing exposure guidelines are based on protection from acute injury from thermal effects of RFR exposure, and may not be protective against any non-thermal effects of chronic exposures."

Reference: Nominations from FDA's Center from [for] Device[s] and Radiological Health, Radio Frequency Radiation Emissions of Wireless Communication Devices (CDRH), Executive Summary, as attached to transmittal letter from William T. Allaben, Ph.D., FDA Liaison, to Dr. Errol Zeiger, Coordinator, Chemical Nomination and Selection, National Toxicology Program, May 19, 1999,[5] (http://ntp.niehs.nih.gov/ntp/htdocs/chem_background/exsumpdf/wireless051999_508.pdf)

The FDA's wisdom in nominating the NTP study was well justified by the NTP's publication of the "Partial Findings" described above. Those findings demonstrated both that the FCC's exposure guidelines are not protective and that the thermal assumption on which those guidelines are based is invalid.

U.S. Department of the Interior

In 2014 the Department of the Interior (Fish and Wildlife Service) also addressed the limitations of the FCC's thermal exposure guidelines. The Department of the Interior was motivated by the multiple adverse effects of electromagnetic radiation on the health, and the life, of birds, particularly in connection with cell towers. The Department of the Interior stated the following:

"However, the electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today."

Reference: Letter from Willie R. Taylor, Director, Office of Environmental Policy and Compliance, Office of the Secretary, United States Department of the Interior, to Mr. Eli Veenendaal, National Telecommunications and Information Administration, U.S. Department of Commerce, dated February 7, 2014.
(https://www.ntia.doc.gov/files/ntia/us_doi_comments.pdf)

American Academy of Environmental Medicine

The American Academy of Environmental Medicine (AAEM), which trains physicians in preparation for Board Certification in Environmental Medicine, states the following:

"The AAEM strongly supports the use of wired Internet connections, and encourages avoidance of radiofrequency such as from WiFi, cellular and mobile phones and towers, and 'smart meters'."

"The peer reviewed, scientific literature demonstrates the correlation between RF [radiofrequency] exposure and neurological, cardiac, and pulmonary disease as well as reproductive and developmental disorders, immune dysfunction, cancer and other health conditions. The evidence is irrefutable."

"To install WiFi in schools plus public spaces risks a widespread public health hazard that the medical system is not yet prepared to address."

[5] This date and the referenced URL were changed when this superior reference was posted, at my request, by the NTP/NIEHS/NIH.

Reference: American Academy of Environmental Medicine, Wireless Radiofrequency Radiation in Schools, November 14, 2013.
(http://www.aaemonline.org/pdf/WiredSchools.pdf)

American Academy of Pediatrics

The American Academy of Pediatrics (AAP), whose 60,000 doctors care for our children, supports the development of more restrictive standards for radiofrequency radiation exposure in order to better protect the public, particularly the children. In a letter to the Federal Communications Commission (FCC) and the Food and Drug Administration (FDA), dated August 29, 2013, the AAP states the following:

> "Children are not little adults and are disproportionately impacted by all environmental exposures, including cell phone radiation. Current FCC standards do not account for the unique vulnerability and use patterns specific to pregnant women and children. It is essential that any new standard for cell phones or other wireless devices be based on protecting the youngest and most vulnerable populations to ensure they are safeguarded throughout their lifetimes."

Reference: American Academy of Pediatrics, letter dated August 29, 2013 addressed to The Honorable Mignon L. Clyburn, Acting Commissioner, Federal Communications Commission, and The Honorable Dr. Margaret A. Hamburg, Commissioner, U.S. Food and Drug Administration.
(http://apps.fcc.gov/ecfs/document/view?id=7520941318)

After reviewing the "Partial Findings" from the new study by the National Toxicology Program at the National Institutes of Health, described above, the American Academy of Pediatrics cautioned parents about the use of cell phones by their children:

> "In light of the findings, the Academy continues to reinforce its recommendation that parents should limit use of cell phones by children and teens."

Reference: American Academy of Pediatrics, AAP responds to study showing link between cell phone radiation, tumors in rats, May 27, 2016.
(http://www.aappublications.org/news/2016/05/27/Cancer052716)

The Telecommunications Act of 1996, in combination with the FCC's exposure guidelines, empowers the wireless industries to mandate the exposure of the public to levels of radiofrequency radiation already found harmful to health.

The Telecommunications Act of 1996 bars state and local governments from objecting to the placement of cell towers on environmental/health grounds unless the FCC's exposure guidelines would be exceeded. Specifically, the Act states the following:

> "No State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's [FCC's] regulations concerning such emissions."

Reference: Telecommunications Act of 1996, Section 704 Facilities Siting; Radio Frequency Emission Standards, page 117.
(http://transition.fcc.gov/Reports/tcom1996.pdf)

This Act, in combination with the FCC's permissive exposure guidelines, strips state and local governments of the right to protect their own residents from levels of radiofrequency radiation already shown to be harmful to health. In effect, this Act transfers to the wireless industries the right to ***mandate*** the exposure of the public, including those most vulnerable to harm, to radiofrequency radiation without the need for further governmental action. State and local governments can still resist, but to do so they must confront this Act which is designed to frustrate their success. Even so, some governments do heroically resist and some do succeed.

Protecting ourselves and our families

We can act on our own to protect ourselves and our families, but only partially.

Instead of increasing our exposure to cellular radiation, and to the radiation from other digital wireless devices, we can decrease our exposure and improve our chances for good health. Desirable steps in this direction include the following:

- Reduce or stop the use of cell phones. Reserve them for emergencies or other essential uses.
- Replace cordless telephones with corded telephones.
- Establish wired (Ethernet) interconnections between routers and the wireless devices that the routers support. Then turn off the wireless capabilities, such as Wi-Fi and Bluetooth, of them all.
- "Opt out" of the wireless smart meter on your residence, if your state or local electric power company permits. Many states, but not all, have an opt-out provision.
- Alert family members about the health risks posed by wireless devices, particularly for vulnerable groups such as pregnant mothers, unborn children, young and teenage children, adult males of reproductive age, seniors, the disabled, and anyone with a chronic health condition. Everyone is vulnerable, but these groups are more so.

  Reference: For more information on reducing radiation at home, please see Ronald M. Powell, Ph.D., How to Reduce the Electromagnetic Radiation in Your Home, which is document (10) on the following list.
  (https://www.scribd.com/document/291507610/)

We can obtain better protection if we work together.

We can contribute our efforts to the hundreds of new organizations that are emerging nationwide to raise awareness about the health risks posed by the radiation exposure from wireless devices in homes, in the workplace, in schools, and in public places, especially where children are present. Through the Internet, look for organizations that address the intersection of health with cell phones, cordless phones, Wi-Fi, smart meters, and wireless desktop computers, laptops, and tablets. These wireless devices are the principal sources of radiofrequency radiation in the home.

Take care for our children. Today's adults grew up in an environment with much less radiofrequency radiation than exists today. Today's children are not so lucky. To have the same chance at a healthy life, they need a lot of help. Unfortunately, the levels of radiofrequency radiation in our environment are rising exponentially as

governments and wireless industries continue to promote, and even mandate, the exposure of the public to ever higher levels of radiofrequency radiation, with no limit in sight. That means that many of our children will become chronically ill, and many will die, while still young adults. This is a tragedy in the making. To stop it will require greatly increased awareness of the problem and serious political action at multiple levels of government. That is no small task, but we all can help. We can join with others to become a part of the solution for ourselves and our families, but especially for our children and our grandchildren.