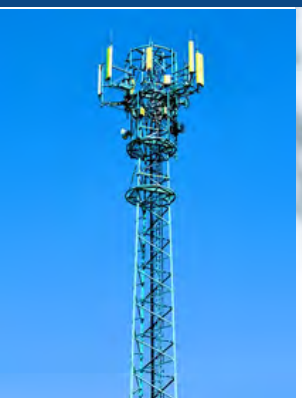
CHILDREN'S VULNERABILITY TO WIRELESS RADIOFREQUENCY (RF) RADIATION





The American Academy of Pediatrics states:

"In recent years, concern has increased about exposure to radio frequency (RF) electromagnetic radiation emitted from cell phones and phone station antennas. An Egyptian study confirmed concerns that living nearby mobile phone base stations increased the risk for developing:

- Headaches
- Memory problems
- Dizziness
- Depression
- Sleep problems

Short-term exposure to these fields in experimental studies have not always shown negative effects, but this does not rule out cumulative damage from these fields, so larger studies over longer periods are needed to help understand who is at risk. In large studies, an association has been observed between symptoms and exposure to these fields in the everyday environment."

–American Academy of Pediatrics
HealthyChildren.org

Cell towers and cell phones emit wireless radiofrequency (RF) radiation.

Children are more vulnerable to RF radiation, just as they are to other environmental exposures. They have proportionately more exposures to RF compared to adults. More importantly, even very low exposures to children can have serious impacts later in life because their nervous and immune systems are still in development.

Children absorb higher levels of RF radiation deeper into their brains and bodies because they have:

- Thinner skulls allow RF radiation to move easier into the brain.
- Higher water content in brain tissue which is more conductive to electricity.
- Smaller heads result in a shorter distance for the RF to travel from the skull to critical brain regions important for learning and memory.

Children are more sensitive to RF impacts because:

- Their brains are still developing.
- Children have more active stem cells- a type of cell scientifically found to be uniquely impacted by RF.
- Children will have a longer lifetime of higher exposures, starting from before they are born.

CELL TOWER RF RADIATION AND CANCER



International Agency for Research on Cancer

World Health Organization

PRESS RELEASE
N° 208

31 May 2011

IARC CLASSIFIES RADIOFREQUENCY ELECTROMAGNETIC FIELDS AS POSSIBLY CARCINOGENIC TO HUMANS

Lyon, France, May 31, 2011 – The WHO/International Agency for Research on Cancer (IARC) has classified radiofrequency electromagnetic fields as possibly carcinogenic to humans (Group 2B), based on an increased risk for glioma, a malignant type of brain cancer[1], associated with wireless phone use.

The World Health Organization International Agency for Research on Cancer Classified Radiofrequency Radiation as a "Possible" Carcinogen in 2011

In 2011, radiofrequency electromagnetic fields (RF-EMF) were classified as a Group 2B possible carcinogen by the World Health Organization's International Agency for Research on Cancer (WHO/IARC).

The WHO/IARC scientists clarified that this determination was for RF-EMF from any source be it cell phones, wireless devices, cell towers or any other type of wireless equipment.

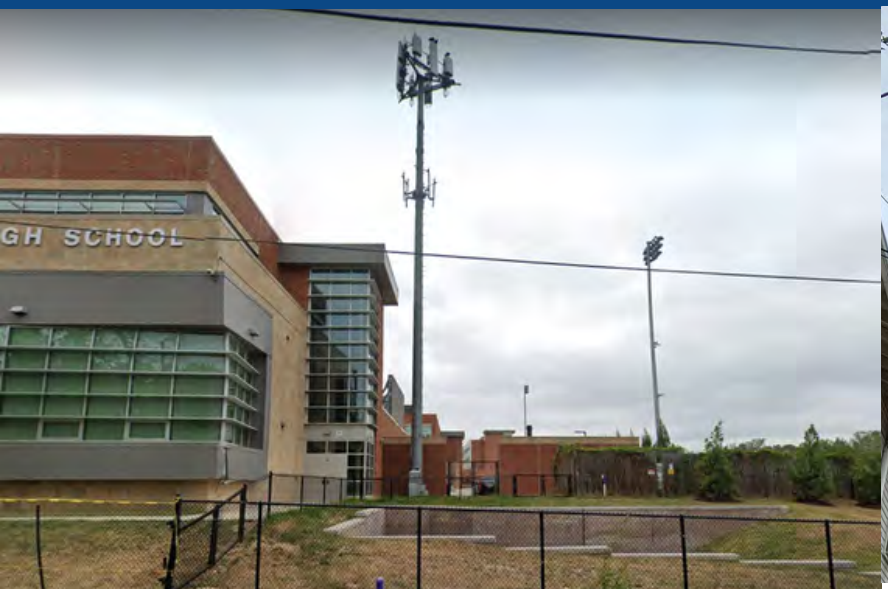
Since 2011, the published peer-reviewed scientific evidence associating RF-EMF (also known as RF-EMR and RFR) to cancer and other adverse effects has significantly increased.

A large-scale animal study published in Environmental Research found rats exposed to RF levels comparable to cell tower emissions had elevated cancers, the very same cancers also found in the US National Toxicology Program animal study of cell phone level RF that found "clear evidence" of cancer in carefully controlled conditions (Falcioni 2018).

In 2019, the WHO/IARC advisory committee recommended that radiofrequency radiation be re-evaluated as a "high" priority in light of the new research. The date of the re-evaluation has not been set.

Currently, several scientists conclude that the weight of currently available, peer-reviewed evidence supports the conclusion that radiofrequency radiation is a proven human carcinogen (Hardell and Carlberg 2017, Peleg et al. 2022, Miller et al. 2018).

PUBLISHED RESEARCH STUDIES





RESEARCHERS RECOMMEND CELL TOWERS BE DISTANCED AWAY FROM HOMES AND SCHOOLS

The review paper entitled "**Limiting liability with positioning to minimize negative health effects of cellular phone towers**" reviewed the "large and growing body of evidence that human exposure to RFR from cellular phone base stations causes negative health effects." The authors recommend restricting antennas near homes, and restricting antennas within 500 meters of schools and hospitals to protect companies from future liability (**Pearce 2020**).

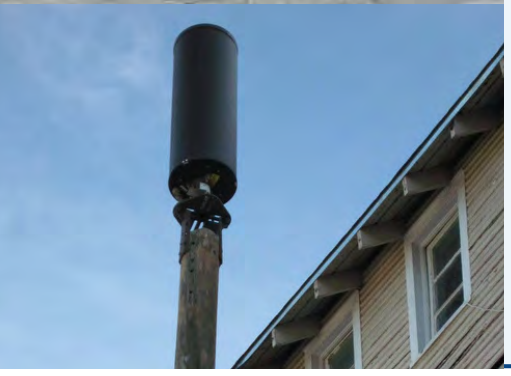
An **analysis** of 100 studies published in *Environmental Reviews* found approximately 80% showed biological effects near towers. "As a general guideline, cell base stations should not be located less than 1500 ft from the population, and at a height of about 150 ft" (**Levitt 2010**).

A **review** published in the *International Journal of Occupational and Environmental Health* found people living less than 500 meters from base station antennas had increased adverse neuro-behavioral symptoms and cancer in eight of the ten epidemiological studies (**Khurana 2010**).

A **paper** by human rights experts published in *Environment Science and Policy* documented the accumulating science indicating safety is not assured, and considered the issue within a human rights framework to protect vulnerable populations from environmental pollution. "We conclude that, because scientific knowledge is incomplete, a precautionary approach is better suited to State obligations under international human rights law" (**Roda and Perry 2014**, **PDF**).

APARTMENTS & CONDO BUILDINGS
INCREASED RF RADIATION FROM CELL ANTENNAS





The study "**Radiofrequency radiation from nearby mobile phone base stations-a case comparison of one low and one high exposure apartment**" published in *Oncology Letters* by **Koppel et al. (2019)** measured 2 apartments and found that the apartment with high RF levels had outdoor areas as close as 6 meters (about 19.6 feet) from transmitting base station cell antennas. In contrast, the apartment with low RF exposure had cell antennas at 40 meters (about 131 feet) away from the balcony.

Furthermore, the researchers also found that both high- and low-RF apartments had good mobile phone reception, and they concluded,"therefore, installation of base stations to risky places cannot be justified using the good reception requirement argument."

A measurement study by **Baltrėnas et al. (2012)** published in *Journal of Environmental Engineering and Landscape Management* investigated RF power density levels from cell phone antennas located 35 meters away from a 10-story apartment building. The transmitting antennas were approximately at the same height as the 6th floor of the building. The researchers found the highest RF levels at floors 5, 6 and 7. The RF at the 6th floor balcony was three times higher than the 3rd floor balcony. The RF power density at the 6th floor was about 15 times the RF measured at the first floor.

A **case report by Hardell et al. (2017)** of RF levels in an apartment in close proximity to rooftop cellular network antennas used an exposimeter to measure levels of different types of RF in the apartment and balconies including TV, FM, TETRA emergency services, 2G GSM, 3G UMTS, 4G LTE, DECT cordless, Wi-Fi 2.4 GHz and 5 GHz and WiMAX. The closest transmitting antennas were 6 meters away from the balcony. The researchers found 97.9% of the mean RF radiation was caused by downlink from the 2G, 3G and 4G base stations. (Downlink means frequencies emitted "down" from the base station cellular antennas.) The researchers found that if the base station RF emissions were excluded, the RF radiation in the children's bedrooms was reduced approximately 99%.

The researchers conclude, "due to the current high RF radiation, the apartment is not suitable for long-term living, particularly for children who may be more sensitive than adults."

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ENVIRONMENTAL HEALTH TRUST

INCREASED EXPOSURE FROM 5G/4G "SMALL" CELL ANTENNAS LOCATED CLOSE TO PEOPLE

A study entitled "**Very high radiofrequency radiation at Skeppsbron in Stockholm, Sweden from mobile phone base station antennas positioned close to pedestrians' heads**" published in *Environmental Research* by Koppel et al. (2022) created an RF heat map of RF measurements, finding that the highest RF measurements were in areas of close proximity to the base station antennas. The researchers concluded with recommendations to reduce close proximity placements such as positioning antennas "as far as possible from the general public" like in high-elevation locations or more remote areas.

A study entitled "**Measurements of radiofrequency electromagnetic fields, including 5G, in the city of Columbia, South Carolina, USA**" published in the *World Academy of Sciences* Journal found the highest RF levels in areas where the cell phone base station antennas were placed on top of utility poles, street lamps, traffic lights or other posts near to the street. The scientists compared their **2022 findings** to an earlier **2019 published review** on the mean outdoor exposure level of European cities and they found the South Carolina measurements to be higher.

The researchers concluded that the highest exposure areas were due to two reasons: cell phone base antennas on top of high-rise buildings provide "good cell coverage reaching far away, but creating elevated exposure to the radiofrequency electromagnetic fields at the immediate vicinity; and cell phone base station antennas installed on top of utility poles have placed the radiation source closer to humans walking on street level."



WORLD ACADEMY OF SCIENCES JOURNAL 4: 23, 2022

Measurements of radiofrequency electromagnetic fields, including 5G, in the city of Columbia, SC, USA

TARMO KOPPEL[1,3] and LENNART HARDELL[2]

Figure 7. Gervais Street: Cell phone base station antenna placed close to street level and causing high exposure to pedestrians and nearby café visitors (exposure scenario illustration). The antenna appears camouflaged and seemingly part of a utility pole. The measurer only discovered the antenna due to the high radiofrequency levels in the vicinity.

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ENVIRONMENTAL HEALTH TRUST

HEALTH SYMPTOMS REPORTED BY PEOPLE LIVING CLOSE TO CELL ANTENNAS



Image: Figure 1: Top floor apartment adjacent to base stations. Nilsson M, Hardell L. (2023) Development of the Microwave Syndrome in Two Men Shortly after Installation of 5G on the Roof above their Office. Ann Clin Case Rep

RESEARCH ON ANTENNAS CLOSE TO HOMES, SCHOOL AND WORK

Surveys of people living near cell tower antennas in **France**, **Spain**, **Iraq**, **India**, **Germany**, **Egypt**, **Poland** have found significantly higher reports of health issues including sleep issues, fatigue and headaches (See **Santini et al. 2003**, **López 2021**, **Alazawi 2011**, **Pachuau and Pachuaua 2016**, **Eger et al. 2004**, **Abdel-Rassoul et al. 2007**, **Bortkiewicz et al., 2004**).

A **study** published in *American Journal of Men's Health* linked higher cell tower RFR exposures to delayed fine and gross motor skills and to deficits in spatial working memory and attention in school adolescents (**Meo 2018**).

A **study** published in *Environmental Research and Public Health* found higher exposures linked to higher risk of type 2 diabetes (**Meo 2015**).

A study following people for 6 years linked increased cell phone and cell phone tower antenna exposure to altered levels of hormones including cortisol, thyroid, prolactin and testosterone (**Eskander et al. 2021**).

A **study** that followed people in a German town after a cell tower was erected found stress hormones adrenaline and noradrenaline significantly increased over the first 6 months after the antenna activation and decreased dopamine and PEA levels after 18 months (**Buchner 2011**).

Two published case report document illness that developed after 5G antennas were installed. In **Hardell and Nilsson 2023,** a couple developed microwave syndrome symptoms (e.g., neurological symptoms, tinnitus, fatigue, insomnia, emotional distress, skin disorders, and blood pressure variability) after a 5G base station was installed on the roof above their apartment.

Similarly, in **"Development of the Microwave Syndrome in Two Men Shortly after Installation of 5G on the Roof above their Office**" two men developed symptoms after 5G antennas were activated on the roof of their workplace. The symptoms disappeared in both men within a couple of weeks (case 1) or immediately (case 2) after leaving the office.

PUBLISHED RESEARCH ON 5G



New York City Jumbo 5G poles with 5 tiers to house transmitting antennas from numerous carriers.



New York City "small cell" antennas in front of living room window.

Scientists state that 5G's higher frequencies cannot be assumed safe.

5G systems are using low band frequencies well associated with harmful effects **(ICBE-EMF 2022, European Parliament 2021, Panagopoulos et al. 2021)**. However 5G networks are *also using higher frequencies* such as 3.5 GHz and into the mmWave range with 24 GHz and higher.

Contrary to claims that the 5G's higher frequencies simply "bounce" off the skin, researchers have documented that the coiled portion of the skin's sweat duct can be regarded as a helical antenna in the sub-THz band and the skin, our largest organ, can intensely absorb the higher 5G frequencies **(Feldman and Ben Ishai 2017).**

Reviews of 5G health effects caution that the expected real-world impact would be far more serious due to the complex waveforms and other combinations with other toxic stimuli in the environment **(Kostoff et al 2020, Russell, 2018, Belyaev 2019, McCredden et al 2023).**

Researchers will often experiment with zebrafish, rodents and fruit flies to gain data on potential health effects to humans. An Oregon State University study on zebrafish exposed to 3.5 GHz **(Dasgupta et al. 2022)** found "significant abnormal responses in RFR-exposed fish" which "suggest potential long-term behavioral effects. Yang et al 2022 found 3.5 GHZ induced oxidative stress in guinea pigs.

A study on 3.5 GHz exposure to both diabetic and healthy rats (**Bektas et al 2022)** found an increase in degenerated neurons in the hippocampus of the brains, changes in oxidative stress parameters and changes in the energy metabolism and appetite of both healthy and diabetic rats. The researchers conclude that, "5G may not be innocent in terms of its biological effects, especially in the presence of diabetes."

PUBLISHED RESEARCH ON 5G



5G's higher frequencies will be combined with the lower frequencies from current networks already present in the environment.

Studies on rats have found exposure to both 1.5 and 4.3 GHz microwaves induced: cognitive impairment and hippocampal tissue damage **(Zhu et al 2921)**; impairments in spatial learning and memory, *with the combined simultaneous exposures* resulting in the most most severe effects **(Wang et al 2022)**; and immune suppressive responses **(Zhao 2022)**.

Long-term exposure to 2.856 and 9.375 GHz microwaves impaired learning and memory abilities as well as EEG disturbance, structural damage to the hippocampus, and differential expression of hippocampal tissue and serum exosomes **Wang et al. 2023)**.

Studies on fruit flies exposed to 3.5 GHz have found the exposure led to increases in oxidative stress, changes in the microbial community **(Wang et al 2022)** and alterations of the expression of several types of genes (Wang et al 2021).

A review by **Russell 2018** found evidence for millimeter wave effects to the skin, eyes, immune system, gene expression, and bacterial antibiotic resistance.

Recent experimental research on high-band 5G impacts to animal fertility found that 27 GHz damages sperm quality in mussels **(Pecoraro et al 2023).**

Yet the US government is not funding any research on biological effects of frequencies at 3.5 GHz or above 6 GHz to humans.

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European Parliament

Health impact of 5G

STUDY

Panel for the Future of Science and Technology

EPRS | European Parliamentary Research Service

Scientific Foresight Unit (STOA)

PE 690.012 – July 2021

Health impact of 5G

Current state of knowledge of 5G-related carcinogenic and reproductive/developmental hazards as they emerge from epidemiological studies and in vivo experimental studies

The upcoming deployment of 5G mobile networks will allow for significantly faster mobile broadband speeds and increasingly extensive mobile data usage. Technical innovations include a different transmission system (MIMO: use of multiple-input and multiple-output antennas), directional signal transmission or reception (beamforming), and the use of other frequency ranges. At the same time, a change is expected in the exposure to electromagnetic fields (EMF) of humans and the environment. In addition to those used to date, the 5G pioneer bands identified at EU level have frequencies of 700 MHz, 3.6 GHz (3.4 to 3.8 GHz) and 26 GHz (24.25 to 27.5 GHz). The first two frequencies (FR1) are similar to those used for 2G to 4G technologies and have been investigated in both epidemiological and experimental studies for different end points (including carcinogenicity and reproductive/developmental effects), while 26 GHz (FR2) and higher frequencies have not been adequately studied for the same end points.

The International Agency for Research on Cancer (IARC) classified radiofrequency (RF) EMF as 'possibly carcinogenic to humans' (Group 2B) and recently recommended RF exposure for re-evaluation 'with high priority' (IARC, 2019). Since 2011 a great number of studies have been performed, both epidemiological and experimental. The present review addresses the current knowledge regarding both carcinogenic and reproductive/developmental hazards of RF as exploited by 5G. There are various *in vivo* experimental and epidemiological studies on RF at a lower frequency range (450 to 6000 MHz), which also includes the frequencies used in previous generations' broadband cellular networks, but very few (and inadequate) on the higher frequency range (24 to 100 GHz, centimetre/MMW).

The review shows: 1) 5G lower frequencies (700 and 3 600 MHz): a) limited evidence of carcinogenicity in epidemiological studies; b) sufficient evidence of carcinogenicity in experimental bioassays; c) sufficient evidence of reproductive/developmental adverse effects in humans; d) sufficient evidence of reproductive/developmental adverse effects in experimental animals; 2) 5G higher frequencies (24.25-27.5 GHz): the systematic review found no adequate studies either in humans or in experimental animals.

Conclusions: 1) cancer: FR1 (450 to 6 000 MHz): EMF are probably carcinogenic for humans, in particular related to gliomas and acoustic neuromas; FR2 (24 to 100 GHz): no adequate studies were performed on the higher frequencies; 2) reproductive developmental effects: FR1 (450 to 6 000 MHz): these frequencies clearly affect male fertility and possibly female fertility too. They may have possible adverse effects on the development of embryos, foetuses and newborns; FR2 (24 to 100 GHz): no adequate studies were performed on non-thermal effects of the higher frequencies.

SCIENTIFIC RESEARCH STUDIES





European Parliament requested a research report "**Health Impact of 5G**" which was released in July 2021 and concluded that commonly used RFR frequencies (450 to 6000 MHz) are probably carcinogenic for humans and clearly affect male fertility with possible adverse effects on the development of embryos, fetuses and newborns.

A review entitled "**Evidence for a health risk by RF on humans living around mobile phone base stations: From radiofrequency sickness to cancer**" reviewed the existing scientific literature and found radiofrequency sickness, cancer and changes in biochemical parameters (**Balmori 2022**).

A **study** published in Electromagnetic Biology and Medicine found changes in blood considered biomarkers predictive of cancer in people living closer to cell antenna arrays (**Zothansiama 2017**).

A **study** published in the International Journal of Environmental Research and Public Health found higher exposure to cell network arrays linked to higher mortality from all cancer and specifically lung and breast cancer (**Rodrigues 2021**).

A 10-year **study** published in Science of the Total Environment on cell phone network antennas by the local Municipal Health Department and several universities in Brazil found a clearly elevated relative risk of cancer mortality at residential distances of 500 meters or less from cell phone towers (**Dode 2011**).

A **study** commissioned by the Government of Styria, Austria found a significant cancer incidence in the area around the RF transmitter as well as significant exposure-effect relationships between radiofrequency radiation exposure and the incidence of breast cancers and brain tumors (**Oberfeld 2008**).

A **review** published in Experimental Oncology found "alarming epidemiological and experimental data on possible carcinogenic effects of long term exposure to low intensity microwave (MW) radiation." A year of operation of a powerful base transmitting station for mobile communication reportedly resulted in a dramatic increase of cancer incidence among the population living nearby (**Yakymenko 2011**).

PUBLISHED RESEARCH STUDIES

OUTDOOR LEVELS OF RF ARE INCREASING DUE TO THE DENSIFICATION OF WIRELESS NETWORKS

An **article** published in *The Lancet Planetary Health* documents how RF exposures are increasing and so is the scientific research linking exposure to adverse biological effects. "It is plausibly the most rapidly increasing anthropogenic environmental exposure since the mid-20th century..."

A **2021 report** by the French government on 5G analyzed more than 3,000 measurements and found that while RF levels had *not yet* significantly increased, this was due to the lack of 5G traffic. Additional study specific to 5G in the 3500 MHz band with artificially generated traffic concluded that, "initial results suggest an eventual increase of about 20% in overall exposure."

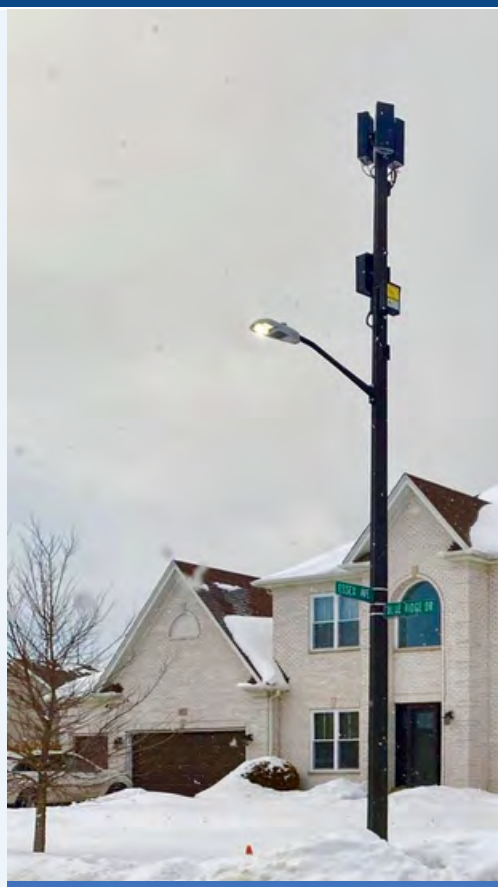
A **2018 multi-country study** published in *Environment International* measured RF in several countries and found cell tower/base station radiation to be the dominant contributor to RF exposure in most outdoor areas. Urban areas had higher RF.

A **study** measuring RF exposure in the European cities of Basel, Ghent and Brussels found the total RF exposure levels in outdoor locations had increased up to 57.1% in one year (April 2011 to March 2012) and most notably due to mobile phone base stations.

A **2018 study** published in *Oncology Letters* documented "unnecessarily high" RF levels in several locations in Sweden and concludes that "using high-power levels causes an excess health risk to many people."

A **2017 Swedish** study of Royal Castle, Supreme Court, three major squares and the Swedish Parliament found that despite the architecturally camouflaged RF-emitting antennas, the passive exposure was higher than RF levels associated with non-thermal biological effects. The researchers noted that the heaviest RF load falls on people working or living near hotspots.

A **2016 study** at Stockholm Central Railway Station in Sweden documented higher RF levels in areas where base station antennas were located closest to people. Importantly, the RF from the downlink of UMTS, LTE, GSM base station antennas contributed to most of the radiation levels.





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CELL TOWERS NEAR SCHOOLS

SCHOOL CELL TOWER SETBACKS

Many communities have policies, ordinances or zoning that ensures cellular antennas are restricted to a specific minimum distance from schools. Hempstead, New York requires a special use permit for cell towers near schools.

Examples of cell tower/4G/5G small cell setbacks/preferred placements for schools:

- Palo Alto, California: 1,500 feet
- Copake, NewYork :1500 feet
- Los Altos , California: 500 feet
- Walnut City, California: 1,500 feet
- Bar Harbor, Maine: 1,500 feet
- Sallisaw, Oklahoma: 1,500 feet
- Shelbourne , Massachusetts: 1,500 feet
- Stockbridge, Massachusetts: 1,500 feet
- San Diego County California 1,000 feet
- Encinitas California:500 feet
- Scarsdale New York: 500 feet
- Ithaca, New York: 250 feet

CELL TOWERS REMOVED FROM SCHOOL GROUNDS

- Milpitas California: School Board asked Crown Castle and T-Mobile to relocate the cell tower to remote location.
- Ripon California: Sprint moved the cell tower at elementary after students and staff developed cancer and parents argued children should not be guinea pigs.
- Alameda California cancelled cell tower contracts.
- Dekalb County Georgia dropped school tower plan.

SCHOOL BOARDS

- Palo Alto Unified School District Cell Tower Resolution supports the City 1,500 setback and opposes cell tower "on or in close proximity to schools to ensure individuals, especially children, are protected from the potential negative effects associated with radiation exposure."
- West Linn-Wilsonville Oregon School Board prohibits cell towers on school property.
- Vancouver School Boards Resolution: 1,000 feet
- Greenbelt Maryland Council opposes school towers.

DID YOU KNOW?

- The International Association of Firefighters passed a Resolution opposing cell towers on its stations in 2004 after a study found neurological damage in firefighters with antennas on their fire stations.

LOS ANGELES UNIFIED CA SCHOOL DISTRICT

- 3 resolutions opposing cell towers on school property.
- The District Office of Health and Safety developed a "cautionary level" for radiofrequency radiation 10,000 times lower than FCC regulations because, *"it is believed that a more conservative level is necessary to protect children, who represent a potentially vulnerable and sensitive population."*

SCHOOL BOARDS THAT REVERSED COURSE

- Montgomery County Maryland Schools policy does not allow cell towers on elementary schools.
- Prince George's County Maryland School Board decided not to renew a cell tower construction master leasing agreement that had allowed over 60 schools to be marketed as cell tower sites.
- Portland Oregon Schools ended new leases for cell towers.

EXPERT RECOMMENDATIONS

- The New Hampshire State Commission 5G Health and Environment Report recommends a setback of 1640 feet for schools.
- The Collaborative For High Performance Schools (Green building rating program) has LOW EMF Criteria which includes no cell towers on school property.

THE EPA SCHOOL SITING GUIDELINES

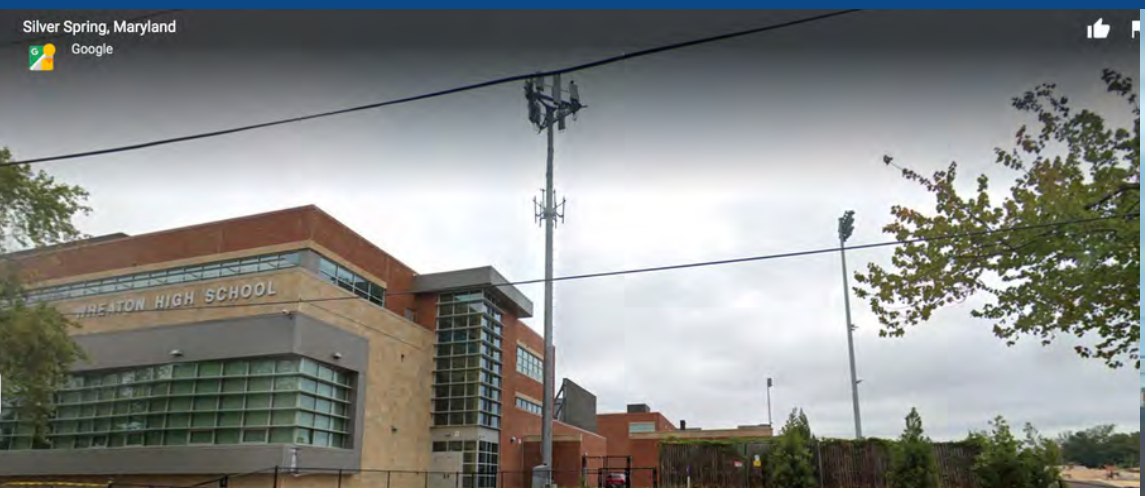
Lists exposure to electromagnetic fields and the fall distance as "potential hazards" from cell towers. The EPA guidelines recommend schools "identify and evaluate cell towers within ~200 feet of prospective school locations."

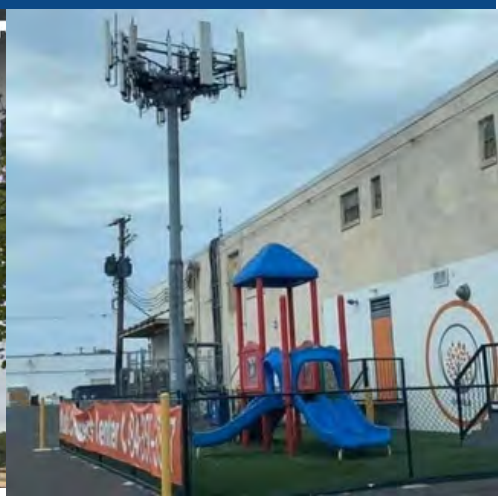
PUBLISHED RESEARCH

- 500 meter buffer recommended for schools to reduce liability and minimize risk (Pearce 2019)
- A moratorium on 5G pending safety research (Frank 2020)
- A precautionary approach is better suited to State obligations under international human rights law (Roda and Perry 2014)
- Increased cancer deaths near cell antennas (Rodrigues 2021)
- Studies find: DNA Damage(Zothansiama 2017), Diabetes (Meo 2015), Cognitive effects (Meo 2018), sleep problems and headaches (Abdel-Rassoul 2007, Levitt & Lai 2010, Shahbazi-Gahrouei 2013)

PARENT TEACHER ASSOCIATIONS

OPPOSE CELL TOWERS





CONEJO PTA WANTS CELL TOWER MOVED
Op-ed in Thousand Oaks Acorn Journal

The California PTA advocates on behalf of children and families. They advocate against electromagnetic field radiation your schools.

The Conejo PTA urges the use of the precautionary principle in making decisions regarding public health this means if something cannot be proven to be safe it is best to avoid exposure. Most people don't realize that the 1996 FCC state standards for safe levels of omission was actually based on a level set by the American national standards institute in 1982. Well this standard has not been changed in 30 years it has usurped all local authority."

"For this reason, Conejo Council PTA made up of 9000 parents and teachers has decided to take action. We're calling on our local leaders to put in place policies that would ensure parents are notified when cell towers are propose near schools and then encourage a buffer zone around schools."

-Kim Huber, legislative chair of the Conejo Council PTA.

NEW YORK STATE PTA
-Adopted TWO Resolutions 2014

"CELLULAR PHONE TOWERS – 2014 (R-'07, R-'00); Resolved that the New York State Congress of Parents and Teachers, Inc. support legislation that would encourage local communities, including parents and school officials, to regulate the placement of cell towers and cell tower antennas particularly in schools and areas where children congregate,

and be it further Resolved that the New York State PTA support continued research into the long-term effects of radio frequency and microwave frequencies on humans especially as they apply to children, and be it further Resolved that the New York State PTA seek to educate parents and school officials as to the current debate over the placement of cell towers and antennas."

NEELSVILLE MIDDLE SCHOOL PTA (MD)

- Voted to oppose proposed cell tower.
- Hosted parent information session with both the cell tower company and Environmental Health Trust.

HILLSMERE ELEMENTARY SCHOOL PTA (MD)

- Sent letters to the school board in opposition to cell towers near the school.

BRIARLAKE ELEMENTARY (GA)

- Voted to oppose cell tower after board approved towers on schools.

PACIFIC GROVE (CA) PTAs

- Forest Grove Elementary Pacific Grove Middle School and Pacific Grove High School PTAs sent a letter to City Council opposing a high school cell tower.

PARENT TEACHER ASSOCIATIONS

OPPOSE CELL TOWERS

Exhibit A

August 6, 2018

Pacific Grove City Council
City Hall
300 Forest Ave.
Pacific Grove, CA 93950

Dear members of Pacific Grove City Council,

I am writing you on behalf of Pacific Grove High School PTA in regard to the Pacific Grove Planning Commission's vote on July 26, 2018, which approved a request by Verizon Wireless to install and maintain a cell tower adjacent to Pacific Grove High School (PGHS). For the reasons described below, the Pacific Grove High School PTA **is strongly opposed** to the location of the Verizon cell tower and is requesting that the City Council consider and support the appeal that is being filed by a group of concerned parents who live in Pacific Grove and send their children to PG schools.

The installment of a cell tower adjacent to PGHS poses significant potential health dangers to both students and staff at PGHS. While some argue that radiation emitted from a cell tower is not a health danger, data from many studies indicate the opposite. Research shows that children and pregnant women are the most vulnerable – two demographics most likely to be on PGHS school grounds on a regular basis. The actual placement of the cell tower– near the back of PGHS and very close to Forest Grove Elementary School- only increases the concerns of the frequency in exposure.

Cell towers also pose a risk to students due to fire hazard. Many cell towers throughout the United States have caught fire and collapsed, posing a significant safety concern, especially in an area with young students walking to and from school every day.

The mission of all PTAs nationwide is to make every child's potential a reality by engaging and empowering families and communities to advocate for all children. Our local PTA is very active in expressing our support for or opposition to issues dealing with the health, safety, education, or general well-being of children and youth in our community.

The members of the Pacific Grove High School PTA strongly urge you to please reconsider the Pacific Grove Planning Commission's previous vote and rescind approval for the Verizon cell tower at Pacific Grove High School.

Sincerely,

Julie Kavanaugh
President, Pacific Grove High School PTA

Example of an EMF Exclusion in an Insurance Plan

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ELECTROMAGNETIC RADIATION EXCLUSION

This endorsement modifies insurance provided under the following:

GENERAL LIABILITY COVERAGE PART
PUBLIC RISK GENERAL LIABILITY RETAINED LIMIT COVERAGE FORM
LAW ENFORCEMENT COVERAGE PART
LAW ENFORCEMENT LIABILITY RETAINED LIMIT COVERAGE FORM
PUBLIC OFFICIALS COVERAGE PART
PUBLIC OFFICIALS LIABILITY RETAINED LIMIT COVERAGE FORM
EMPLOYMENT PRACTICES LIABILITY COVERAGE PART
EMPLOYMENT PRACTICES LIABILITY RETAINED LIMIT COVERAGE FORM

The following **Exclusion** is added:

This policy does not apply to and we will not provide a defense for:

a. "Bodily injury," "property damage", "personal and advertising injury", "employee benefits wrongful acts", "personal injury", "law enforcement wrongful acts", "public officiels wrongful acts", "educator's legel wrongful acts", or "employment practices wrongful acts" arising out of, or which result in, the actual, alleged, threatened, perceived, latent, sudden and accidental or incidental exposure to or contact with electromegnetic radiation in any form, from any source.

b. The costs of abatement or mitigation of:

(1) Electromagnetic radiation; or

(2) Exposure to electromagnetic rediation.

c. Any supervision, instruction, recommendation, waming or advice given or which should have been given in connection with **a.** or **b.** above.

Electromagnetic radiation includes but is not limited to, magnetic energy, waves, fields or forces generated, produced, transmitted or maintained by the charges, currents, frequencies, energy or forces of electricity that is generated, flowing or otherwise transmitted through or via the medium, methods and equipment designed to generate, produce, distribute, trensport or transmit the electrical charges, currents, frequencies, energy or forces.



Verizon Total Mobile Protection Plan

16. Pollution

The discharge, dispersal, seepage, migration or escape of pollutants. Pollutants means any solid, liquid, gaseous, or thermal irritant or contaminant including smoke, vapor, soot, fumes, acid, alkalis, chemicals, artificially produced electric fields, magnetic field, electromagnetic field, sound waves, microwaves, and all artificially produced ionizing or non-ionizing radiation and/or waste. Waste includes materials to be recycled, reconditioned or reclaimed.

THE NEED FOR ACCOUNTABILITY ON WIRELESS SAFETY

EXPERT VOICES





"The National Toxicology Program studies clearly showed that non-ionizing cell phone radiofrequency radiation radiation can cause cancers and other adverse health effects. An important lesson that should be learned is that we cannot assume any current or future wireless technology such as 5G is safe without adequate testing."
— Ronald Melnick PhD 28 year scientist at National Institutes of Health

"I recommend public health organizations raise awareness and educate the public on why and how to reduce our daily exposure to wireless radio frequency radiation. Protective public health policy is needed now. It is time for regulatory bodies to fully evaluate the research and develop science based exposure limits that truly protect the public and the environment."
— Linda S. Birnbaum, PhD, Former Director, National Institute of Environmental Health Sciences and National Toxicology Program of the National Institutes of Health.

"Now we have 5G rolling out in massive quantities, without due diligence to determine are these sources of radiation safe not only for humans but for wildlife. And the answer is, no, they are not."
— Albert M. Manville II, Ph.D. Adjunct Professor, Johns Hopkins University, Wildlife Biologist (17 years), retired from Division of Migratory Bird Management, U.S. Fish & Wildlife Service

"Given the human, animal and experimental evidence, I assert that, to a reasonable degree of scientific certainty, the probability that RF exposure causes gliomas and neuromas is high."
— Christopher Portier PhD former Director of the United States National Center for Environmental Health at the CDC, former Director of the U.S. Agency for Toxic Substances and Disease Registry.

"We should not wait to protect children's brains. The science is now clear and compelling indicating that wireless technology is harmful to health, especially to for children. Wireless radiation is repeating the history of lead, tobacco and DDT."
— Devra Davis PhD, MPH, President of Environmental Health Trust, founding director of the Board on Environmental Studies and Toxicology of the U.S. National Research Council, National Academy of Sciences, and a member of the team of the Intergovernmental Panel on Climate Change scientists who were awarded the Nobel Peace Prize in 2007

CITIES AND TOWNS WITH STRONG ORDINANCES

SETBACKS FOR CELL ANTENNAS





Many communities have setbacks for cell towers and small cells.

Shelburne, MA: 3,000 feet for schools and 1,500 feet for homes; no new wireless antennas in residential zones
Copake, NY: 1,500 feet from homes, schools, churches or other buildings containing dwelling units
Sallisaw, OK: No commercial wireless telecommunications towers within 1,500 of homes.
Calabasas, CA: No "Tier 2" wireless telecommunications facilities within 1,000 feet of homes and schools
Bedford, NH: 750 feet from residentially-zoned property
Scarsdale, NY: No wireless facilities within 500 feet from homes, schools, parks, and houses of worship
Walnut City, California: 1,500 feet
Stockbridge, Massachusetts: 1,000 feet
San Diego County California: 1,000 feet (small cells)
Bar Harbor Maine: 1500 setback for schools

School Boards
Palo Alto, California: School Board supports the City of Palo Alto immediately establishing local municipal zoning setback rules of 1,500 feet or more from an operating wireless transmitter and a school site.
West Linn-Wilsonville Oregon School Board prohibits cell towers on school property.
Los Angeles California School District: Resolutions opposing cell towers on school property and a cautionary level for radiofrequency radiation 10,000 times lower than FCC limits.

Bold blue on this PDF are hyperlinked. For more setbacks go to ehtrust.org

ENVIRONMENTAL HEALTH TRUST

The 2022 study "**Measurements of radiofrequency electromagnetic fields, including 5G, in the city of Columbia, South Carolina, USA**" published in World Academy of Sciences Journal authored by Tarmo Koppel and Lennart Hardell, MD of the Environment and Cancer Research Foundation found the highest RF exposure readings were registered close to cell phone base station antennas mounted on top of utility poles, street lamps or traffic lights.



WORLD ACADEMY OF SCIENCES JOURNAL 4: 23, 2022

Measurements of radiofrequency electromagnetic fields, including 5G, in the city of Columbia, SC, USA

TARMO KOPPEL[1,3] and LENNART HARDELL[2]

Figure 7. Gervais Street: Cell phone base station antenna placed close to street level and causing high exposure to pedestrians and nearby café visitors (exposure scenario illustration). The antenna appears camouflaged and seemingly part of a utility pole. The measurer only discovered the antenna due to the high radiofrequency levels in the vicinity.



WORLD ACADEMY OF SCIENCES JOURNAL 4: 23, 2022

Measurements of radiofrequency electromagnetic fields, including 5G, in the city of Columbia, SC, USA

TARMO KOPPEL[1,3] and LENNART HARDELL[2]

Figure 8. Gervais Street: Another cell phone base station antenna close to street level and causing high exposure to pedestrians (exposure scenario illustration). Note the antenna appears undistinguishable from the utility pole an unnoticeable between the trees.

5G, Small Cells & Cell Towers Can Drop Property Values

Would you buy a home with cell antennas outside the bedroom window?



Legal filings by cities and municipalities to the FCC highlight how small cell deployment could impact aesthetics and property values.

"many deployments of small cells could affect property values, with significant potential effect…"

— Reply Comments of Smart Communities Siting Coalition (local governments and associations representing 1,854 communities) 4/7/2017,Docket No. 16-421, April 7, 2017

"Considering that the Smart Communities' prior filings show that the addition of facilities of this size diminish property values, it is strange for the Commission to assume that approval can be granted in the regulatory blink of an eye…."

"…allowing poles to go up in areas where poles have been taken down has significant impacts on aesthetics (not to mention property values)."

— *Ex Parte* Submission of Smart Communities Letter to Ms. Marlene H. Dortch, Secretary, Federal Communications Commission, September 19, 2018

ENVIRONMENTAL HEALTH TRUST

5G, CELL TOWERS AND WIRELESS

DECREASED PROPERTY VALUE



"An overwhelming 94 percent of home buyers and renters surveyed by the National Institute for Science, Law & Public Policy (NISLAPP) say they are less interested and would pay less for a property located near a cell tower or antenna."

"of the 1,000 survey respondents, 79 % said that under no circumstances would they ever purchase or rent a property within a few blocks of a cell tower or antennas, and almost 90% said they were concerned about the increasing number of cell towers and antennas in their residential neighborhood."

"Cell Towers, Antennas Problematic for Buyers" — Realtor Magazine

"...cell towers are concerning to many people and drop property values."

"While most states do not require disclosure of neighborhood nuisances, such as cell towers or noisy neighbors, a few states do, and more are likely to in the future."
— Real Estate Attorney, South Florida Sun Sentinel, 2021

The California Association of Realtors' Property Sellers Questionnaire specifically lists "cell towers" on the disclosure form for sellers of real estate.
— Click to go to the California Association of Realtors' Property Sellers Questionnaire
(p. 3-4 under K. Neighborhood)

"While the magnitude of the impact varies, the studies uniformly indicate that there is a significant impact on residential property values from installation of cell phone towers..."
— David E. Burgoyne, ASA, SR/WA Certified General Real Estate Appraiser

"In some areas with new towers, property values have decreased by up to 20%."

"Your new neighbor, a cell tower, may impact the value of your home" National Business Post, 2022.

PDF is hyperlinked. More on property values at ehtrust.org

ENVIRONMENTAL HEALTH TRUST

THE URGENT NEED FOR SAFER TECHNOLOGY

EXPERT VOICES

"I am calling on my industry to bring safer technology to market. The current implementation of technology is not safe. Take a good look at the science. This is about our children's future. Do not be lulled into believing that 25-year-old standards can protect the youngest and most vulnerable. They simply cannot."
— Frank Clegg, Former President of Microsoft Canada, CEO of Canadians for Safe Technology

"A moratorium is urgently needed on the implementation of 5G for wireless communication."
— Lennart Hardell, MD, PhD , advisory to World Health Organization international Agency for Research on Cancer, Department of Oncology, University Hospital, Örebro, Sweden (retired) , leads the Environment and Cancer Research Foundation

"The evidence indicating wireless is carcinogenic has increased and can no longer be ignored. If the World Health Organization International Agency for Research on Cancer were to meet to review all of the evidence, we believe the weight of evidence supports a new determination- that wireless radiofrequency radiation is a human carcinogen."
— Anthony B. Miller MD, Professor Emeritus, Dalla Lana School of Public Health of the University of Toronto. Former Senior Epidemiologist for the International Agency for Research on Cancer and former Director of the Epidemiology Unit of the National Cancer Institute of Canada

"Most parents believe that cellphones were safety-tested before they came on the market. We assume that our federal health and environmental agencies regularly review the latest research and ensure that these incredible devices are safe. They do not. Children are not little adults. As we sadly learned with early childhood lead exposures leaving long-lasting impairments, the developing brain is particularly susceptible."
— Jerome Paulson, MD , Professor Emeritus, George Washington University, Milliken School of Public Health, former Chair of American Academy of Pediatrics Committee on Environmental Health

"The exposure levels of the Federal Communications Commission are totally outdated and do not protect the health of the public, especially of children. I urge you to take strong and active steps to reduce exposure of children and staff to excessive levels of radiofrequency EMFS within your schools."
— David O. Carpenter, M.D. Director, Institute for Health and the Environment University at Albany





FCC EXPOSURE LIMITS DO NOT PROTECT

OUTDATED FCC REGULATIONS FOR RF RADIATION



FCC human exposure limits were adopted in 1996 after the EPA was defunded from creating safety limits. They have not properly reviewed these limits since 1996.

FCC's human exposure limits for the RF microwaves emitted by 5G, 4G, cell towers, cell phones, Wi-Fi, Bluetooth, smart devices and wireless networks are based on outdated science and faulty assumptions.

The limits are irrelevant to modern-day technologies and do not reflect the way people are exposed to RF and actually use technology in the 21st century.

Reasons Why FCC's 1996 Limits Do Not Protect:

Heating-Based Only

FCC limits are heat-based "thermal" limits. This means they primarily protect against the overheating of tissue from RF. FCC's limits are not based on protecting against non-heating biological effects such as cancer, oxidative stress, headaches, behavioral problems, memory damage, disrupting bee behavior, tree damage etc.

Short-Term Impacts Only

FCC limits are based on protecting against acute effects. No federal report or research review exists regarding safety from chronic, long-term RF exposures from cell towers, Wi-Fi and wireless networks in the home, school and workplace. The FDA nominated the National Toxicology Program (NTP) to perform animal studies designed to mimic a lifetime of human cell phone exposure. Cancer and DNA damage was found. Another large-scale animal study used cell tower level exposures and found the same tumors as the NTP. However, the FDA rejected these findings.

Children Are Not Protected

FCC limits are misleadingly presented as being "designed to protect children. When safety thresholds were developed decades ago, the science investigating RF impacts to children's developing brains did not exist. Current research concludes the limits should be hundreds of times more protective for children because they are more vulnerable.

FCC EXPOSURE LIMITS DO NOT PROTECT

OUTDATED FCC REGULATIONS FOR RF RADIATION

No Risk Analysis or Review of Totality of Science
No agency has reviewed all of the latest science. Usually the EPA and FDA use risk assessment to characterize the nature and magnitude of risks to human health for various populations such as children and pregnant women. The EPA also estimates ecological risks, including plants, birds, other wildlife and aquatic life. When groundbreaking studies are published, a quantitative risk analysis of the data is performed. This has never been done for RF.

"The FCC and FDA have failed in their obligation to prescribe safe RFR guidelines produced from wireless communication devices to protect the public health and safety. Devices are becoming more sophisticated, and their usage is as common to daily life as brushing your teeth."
— Pittsburgh Law Review "The FCC Keeps Letting Me Be: Why Radiofrequency Radiation Standards Have Failed to Keep Up With Technology" by Hala Mouzaffar

"The wireless industry reaction features stonewalling public relations and hyper aggressive legal action. It can also involve undermining the credibility and cutting off the funding for researchers who do not endorse cellular safety. It is these hardball tactics that look a lot like 20th century Big Tobacco tactics. It is these hardball tactics—along with consistently supportive FCC policies—that heighten suspicion the wireless industry does indeed have something to hide."

— Norm Alster in the Harvard Press Book "Captured Agency: How the Federal Communications Commission is Dominated by the Industries it Presumably Regulates"





ENVIRONMENTAL HEALTH TRUST

A REGULATORY GAP
No Federal Agency Ensuring Cell Tower Wireless Safety

There is no U.S. government agency with oversight for cell tower radiation health effects: no research reviews, no reports, no environmental monitoring, no risk mitigation and no post market health surveillance for the daily, full body radio-frequency (RF) radiation exposure from cell towers.

"The FDA does not regulate cell towers or cell tower radiation. Therefore, the FDA has no studies or information on cell towers to provide in response to your questions."
— Ellen Flannery, Director, FDA Policy Center for Devices and Radiological Health to a California mother with a cell tower on her street who asked the FDA about safety, July 11, 2022

"As a Federal research agency, the NCI is not involved in the regulation of radio frequency telecommunications infrastructure and devices, nor do we make recommendations for policies related to this technology"
— National Cancer Institute letter to Denise Ricciardi, member of the New Hampshire State Commission on 5G, July 30, 2020

The ACS does "not have any official position or statement on whether or not radiofrequency radiation from cell phones, cell phones towers, or other sources is a cause of cancer."
— American Cancer Society Website

"EPA's last review was in the 1984 document Biological Effects of Radiofrequency Radiation. The EPA does not currently have a funded mandate for radiofrequency matters."
— Lee Ann B. Veal Director, EPA Radiation Protection Division Office of Radiation and Indoor Air, July 8, 2020 Letter to Theodora Scarato

Fact: There are no scientific reports by the CDC on cell tower radiation safety, nor does the agency have staff with expertise monitoring the science and evaluating risk. Public information requests found that **several CDC website pages on radio frequency were found to be drafted with a wireless industry consultant.**

"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." **— U.S. Department of Interior Letter to FCC, 2014**

Fact: The World Health Organization (WHO) EMF Project has not reviewed the science since 1993. The WHO webpages on cell phones and cell towers are not based on a published scientific review. The WHO EMF Project webpages were written by a scientist who **used wireless industry money** to start the WHO EMF Project and who is now a consultant to industry. **In contrast, the WHO International Agency for Research on Cancer (a separate WHO entity vetted for conflicts of interest) determined RF radiation to be a Class 2 B "possible" carcinogen in 2011.** Many scientists now state **the evidence showing cancer has increased.**

Blue text *is hyperlinked to source.*

FACTSHEET: ENVIRONMENTAL HEALTH TRUST ET AL. V. FCC

COURT RULING ON FCC'S LACK OF ADEQUATE REVIEW FOR WIRELESS EXPOSURE LIMITS

LANDMARK FEDERAL COURT RULING AGAINST THE FCC

On August 13, 2021 the U.S. Court of Appeals for the D.C. Circuit ruled the Federal Communications Commission (FCC) ignored scientific evidence and failed to provide a reasoned explanation for its determination that its 1996 regulations adequately protect the public against all the harmful effects of wireless radiation.

FCC'S REFUSAL TO UPDATE 1996 LIMITS

The legal case challenged the FCC's 2019 decision not to update its 1996 regulations regarding allowable radiofrequency radiation (RF) exposures from wireless technologies - including 5G, cell phones, cell towers, Wi-Fi, and wireless networks.

EVIDENCE OF HARMFUL EFFECTS BELOW FCC LIMITS

FCC limits are based on the belief that heating is the only proven harm from RF. Over 11,000 pages of evidence - 447 exhibits in 27 Volumes - was submitted to the Court documenting biological effects and illness from wireless radiation exposure below heating levels. Research has found brain damage, headaches, memory problems, reproduction damage, synergistic effects, nervous system impacts, brain cancer, genetic damage, as well as harm to trees, birds, bees, and wildlife.

THE COURT FINDINGS

The ruling stated that the FCC's "arbitrary and capricious" decision to maintain their 25 year old exposure limits did not address evidence indicating "non-cancer" harm such as:

- impacts to children
- testimony of persons injured by wireless radiation
- impacts to the developing brain
- impacts to the reproductive system
- impacts to wildlife and the environment

THE COURT ORDER

The Court ordered the FCC to provide a reasoned determination as to whether the evidence warrants a change to 1996 RF limits especially in regards to:

- children's vulnerability
- long-term exposure
- environmental impacts
- new technological developments and the ubiquity of wireless
- how FCC's cell phone tests only measure heat and allow a space between the phone and body

TIMELINE

1980s: EPA had robust research program and was tasked to develop RF safety limits by U.S. Science Advisory Board.

1995: EPA presents to FCC on the EPA timeline for its development of human exposure RF limits which would include both thermal effects and non thermal effects.

1996: EPA is fully defunded by Congress amid heavy lobbying for Telecom Act and halts all research on RF.

1996: The FCC adopts RF limits developed by industry-tied groups - based on short term heating - thermal- effects from high power exposures (based on studies of small animals exposed to high RF levels for under an hour).

1999: FDA requests the National Toxicology Program (NTP) study RF because of the lack of safety data on long-term exposure.

2008/2009 Congressional Hearings

2011: Wireless RF classified as a "possible" Class 2B Carcinogen by International Agency for Research on Cancer.

2012: GAO Report recommends rules be reassessed to reflect current use patterns and recent science.

2013-2019: FCC opens record on RF limits - gets over 1000 submissions.

2018: NTP/NIH releases $30M animal study concluding "clear evidence" of cancer. FDA rejects the findings.

2019: FCC closes record, decides not to update its 1996 wireless RF limits.

2020: Cases filed against FCC.

2021: U.S. Court of Appeals, D.C Circuit ruled that the FCC decision not to change human exposure limits and regulations was "arbitrary and capricious." FCC ordered to respond.

2021: No FCC response to Court, so EHT and others filed request to refresh record.

Timeline is hyperlinked to sources.

FCC'S LACK OF ADEQUATE REVIEW FOR WIRELESS RADIATION EXPOSURE LIMITS

FCC Compliance Does Not Ensure Safety

Most of the public assumes that current FCC safety limits for cell phones, cell towers, Wi-Fi, 5G, and wireless networks are based upon an up to date robust review of all relevant research. This assumption of safety is now clearly documented to be erroneous.

Lack of Oversight by Health and Environmental Agencies

The ruling reveals a lack of accountability with our federal health agencies regarding wireless radiation. The EPA, CDC, NIOSH, and NCI did not submit any reports to the Court, revealing that none of these agencies has reviewed the science on health effects to ensure safety for the public. The U.S. has no pre- market safety testing for health effects, no post-market surveillance, no environmental monitoring, and no meaningful interagency coordination.

FDA's Dismissal of Harm Deemed Insufficient

The Court states the FCC improperly relied on the FDA's conclusions that RF limits did not need an update. The FDA's submissions were described by the Court as "cursory" and "insufficient." Although the FDA later released a literature review, it was only focused on cell phones, not cell towers, Wi-Fi nor 5G technology. It also was only focused on cancer, further confirming the fact that U.S. agencies have failed to evaluate the myriad of effects documented in scientific studies, such as brain, immune, fertility and endocrine impacts. A U.S. government review of *the full body of recent science* has simply never been done.

"the Commission's failure to provide a reasoned or even relevant explanation of its position that RF radiation below the current limits does not cause health problems unrelated to cancer renders its explanation as to the effect of RF radiation on children arbitrary and capricious. "

— 2021 EHT et al. v. FCC

The Court Did Not Agree That "Cell Phones Do Not Cause Cancer"

Contrary to the wireless industry's recent claims, the Court *did not make a scientific determination regarding cancer*. The ruling simply stated that in regards to cancer- the FCC passed the minimum legal requirement for adequate review because it (at least) referenced why the FCC dismissed cancer evidence. The FCC cited the rejections of NIH studies by the FDA and of ICNIRP (a small group with no oversight and whose members have a long history of industry ties).

Children's Vulnerability and Effects of Long Term Exposure Ignored by the FCC

The Court states the FCC "dismissed" the American Academy of Pediatrics recommendations to strengthen regs and ensure children and pregnant women are protected. The Court found the FCC failed to explain why it ignored research indicating children's developing brains are more sensitive. Children will have a lifetime of exposure, yet the FCC was found to ignore the issue of impacts *from long term exposure*.

Wildlife Remains Unprotected

FCC's limits were designed in 1996 to protect only humans, not flora or fauna. The Court found that the FCC had "completely failed" to address the "substantive evidence of potential environmental harms" on the record, which included science showing serious impacts to birds, bees, trees, and plants.

PETITIONERS: Environmental Health Trust, Consumers for Safe Cell Phones, Elizabeth Barris, Theodora Scarato, Children's Health Defense, Michelle Hertz, Petra Brokken, Dr. David Carpenter, Dr. Toril Jelter, Dr. Paul Dart, Dr. Ann Lee, Virginia Farver, Jennifer Baran, Paul Stanley M.Ed.

KEY RESOURCES: Court Ruling 8/13/2021, Evidence (11,000 pages), EHT Press Conference

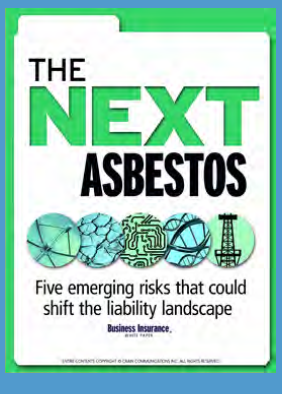
Amicus Briefs

- Amicus of NRDC: Natural Resources Defense Council
- Amicus of Attorney Joe Sandri including declaration of Dr. Linda Birnbaum, former Director of the National Institute of Environmental Health Sciences
- Amicus of Catherine Kleiber
- Amicus of the Building Biology Institute

EHTrust.org for more.

5G, CELL TOWERS AND WIRELESS

LEGAL & LIABILITY ISSUES SHAREHOLDER WARNINGS



"Some research has shown biological effects from lower -level "non thermal" exposure and people exposed at lower levels have reported headaches, dizziness, nausea, mood disorders, mental slowing and memory loss."
Business Insurance White Paper, The Next Asbestos: Five Emerging Risks That Could Shift the Liability Landscape

Insurance Companies Have Electromagnetic Field Exclusions
Electromagnetic field exclusions" are clear and common in most insurance companies. It is applied as a market standard. This exclusion serves to exclude cover for illnesses caused by long-term EMF (non-ionizing radiation) exposure." — Complete Markets

"Exclusions: This insurance does not apply to: Bodily injury, personal injury, advertising injury, or property damage arising directly or indirectly out of, resulting from, caused or contributed to by electromagnetic radiation, provided that such loss, cost or expense results from or is contributed to by the hazardous properties of electromagnetic radiation.
— Portland Oregon Public School Insurance (page 30)

Insurance Plans Not Only Exclude EMF Damages, But Some Even Exclude Defending Decision Makers From Their Actions in Regards to Their Actions on EMFS

"This policy does not apply to and we will not provide a defense for: a. bodily injury... arising out of ... exposure to or contact with electromagnetic radiation... b. costs of abatement .. of EMF" or c. any supervision, instruction, recommendation, warning or advice given or which should have been given in connection with a or b. above."- City of Ann Arbor Michigan Insurance Policy page 14.

Insurance Authorities Rate 5G as "High Risk."
5G mobile networks are classified as a "high," "off-the-leash" risk. "Existing concerns regarding potential negative health effects from electromagnetic fields (EMF) are only likely to increase. An uptick in liability claims could be a potential long-term consequence" and "[a]s the biological effects of EMF in general and 5G in particular are still being debated, potential claims for health impairments may come with a long latency."
— Swiss Re Institute (2019)

Wireless Companies Rank EMF as a Risk with High Impact
"Electro-magnetic signals emitted by mobile devices and base stations may be found to pose health risks, with potential impacts including: changes to national legislation, a reduction in mobile phone usage or litigation."
— Vodaphone 2017 Report ranks EMF as a "Principal Risk with "High" impact.

Wireless Companies Warn Shareholder About Risk But Not People Living Near Their Wireless Infrastructure

Crown Castle says:
"We cannot guarantee that claims relating to radio frequency emissions will not arise in the future or that the results of such studies will not be adverse to us...If a connection between radio frequency emissions and possible negative health effects were established, our operations, costs, or revenues may be materially and adversely affected. We currently do not maintain any significant insurance with respect to these matters."

Wireless Companies Define Pollution in Their Own Policies as Including EMFs, Microwaves and Non-ionizing Radiation.

Verizons Total Mobile Protection Plan says: "Pollution" is defined as "any solid, liquid, gaseous, or thermal irritant or contaminant including smoke, vapor, soot, fumes, acid, alkalis, chemicals, artificially produced electric fields, magnetic field, electromagnetic field, sound waves, microwaves, and all artificially produced ionizing or non-ionizing radiation and/or waste."

ENVIRONMENTAL HEALTH TRUST

T-Mobile on 5G: Possible Changes to FCC Human Exposure Limits for RF Could Impact Cash Flow



T-Mobile advertises to the public about going "live" but omits the warnings they give to shareholders regarding 5G, regulatory changes and risk perception.

T-Mobile

T-Mobile 10-K Report 2/2023

"Negative public perception of, and regulations regarding, the perceived health risks relating to 5G networks could undermine market acceptance of our 5G services" (page 13)

"We, along with equipment manufacturers and other carriers, are subject to current and potential future lawsuits **alleging adverse health effects arising from the use of wireless handsets or from wireless transmission equipment such as cell towers."**

"In addition, **the FCC has from time to time gathered data regarding wireless device emissions, and its assessment of the risks associated with using wireless devices may evolve based on its findings.** Any of these allegations or changes in risk assessments could result in customers purchasing fewer devices and wireless services, could result in significant legal and regulatory liability, and could have a material adverse effect on our business, reputation, financial condition, cash flows and operating results." (T- Mobile 10-K Report page 21)


Mobile Telecommunications and Health

Review of the Current Scientific Research in view of Precautionary Health Protection

A 2000 Ecolog Institute Report commissioned by T-Mobile and DeTeMobil Deutsche Telekom MobilNet recommended an exposure limit 1000x lower than the FCC's current power density limit after reviewing the research on biological effects, including impacts to the immune system, central nervous system, hormones, cancer, neurotransmitters and fertility.

This PDF is hyperlinked. For more on legal liability issues go to ehtrust.org

ENVIRONMENTAL HEALTH TRUST

Cell Tower Companies Warn Shareholders of Risk From Cell Tower Radiation

Why Don't They Warn Families Living Near Cell Towers?

Verizon 10-K Report

"Our wireless business also faces personal injury and wrongful death lawsuits relating to alleged health effects of wireless phones or radio frequency transmitters. We may incur significant expenses in defending these lawsuits. In addition, we may be required to pay significant awards or settlements."

Crown Castle 10-K Report

"We cannot guarantee that claims relating to radio frequency emissions will not arise in the future or that the results of such studies will not be adverse to us...If a connection between radio frequency emissions and possible negative health effects were established, our operations, costs, or revenues may be materially and adversely affected. We currently do not maintain any significant insurance with respect to these matters."

AT&T 10-K Report

"In the wireless area, we also face current and potential litigation relating to alleged adverse health effects on customers or employees who use such technologies including, for example, wireless devices. We may incur significant expenses defending such suits or government charges and may be required to pay amounts or otherwise change our operations in ways that could materially adversely affect our operations or financial results."

T- MOBILE 10-K Report

"Our business could be adversely affected by findings of product liability for health or safety risks from wireless devices and transmission equipment, as well as by changes to regulations or radio frequency emission standards."

This PDF is hyperlinked. For more on legal liability issues go to ehtrust.org

Cell Tower Companies Warn Shareholders of Risk From Cell Tower Radiation

Why Don't They Warn Families Living Near Cell Towers?

American Tower 10-K

"If a scientific study or court decision resulted in a finding that radio frequency emissions pose health risks to consumers, it could negatively impact our tenants and the market for wireless services, which could materially and adversely affect our business, results of operations or financial condition. We do not maintain any significant insurance with respect to these matters."

Nokia 10-K

"Although our products are designed to meet all relevant safety standards and other recommendations and regulatory requirements globally, we cannot guarantee we will not become subject to product liability claims or be held liable for such claims, which could have a material adverse effect on us."

Qualcomm 10-K

"If wireless handsets pose health and safety risks, we may be subject to new regulations, and demand for our products and those of our licensees and customers may decrease."

Ericsson Annual Report

"Any perceived risk or new scientific findings of adverse health effects from mobile communication devices and equipment could adversely affect us through a reduction in sales or through liability claims."

This PDF is hyperlinked. For more on legal liability issues go to ehtrust.org

ENVIRONMENTAL HEALTH TRUST

5G, CELL TOWERS AND WIRELESS

LEGAL & LIABILITY ISSUES





When a new cell tower or wireless network is proposed, the first question to ask is: "Do you have insurance for damages from long-term exposure to the radiofrequency radiation (RFR)?" Usually the answer is "No."

An Uninsurable Risk?

- Insurers rank wireless, cell tower, and 5G RFR non-ionizing electromagnetic field (EMF) radiation as a "high" risk, comparing the issue to lead and asbestos.
- Most insurance plans have "electromagnetic field exclusions" and do not insure for long-term RFR damages.
- Additionally, some insurance plans will not provide a defense for any supervision instruction or recommendation given *"or which should have been given"* in connection to EMFs.
- Wireless RFR and non-ionizing electromagnetic radiation are defined as a type of "pollution" by wireless companies themselves.
- U.S. mobile operators have been unable to get insurance to cover liabilities related to damages from long-term RFR exposure.
- Wireless companies warn their shareholders of RFR risk but do not warn users of their products, nor do the companies warn the people exposed to emissions from their infrastructure.

This PDF is hyperlinked. For more on legal liability issues go to ehtrust.org

ENVIRONMENTAL HEALTH TRUST

NEW HAMPSHIRE STATE COMMISSION

2020 REPORT: 5G HEALTH AND ENVIRONMENT

In 2020, the New Hampshire State Commission issued a Final Report with 15 recommendations to "to protect people, wildlife, and the environment from harmful levels of radiation" after a year-long investigation with numerous meetings and expert testimony.


State of New Hampshire

MEMORANDUM

"A likely explanation as to why regulatory agencies have opted to ignore the body of scientific evidence demonstrating the negative impact of cellphone radiation is that those agencies are "captured."

Recommendations To Update RF Exposure Regulations With New Science

- A resolution to U.S. Congress to require the FCC to commission an independent health study and review of safety limits.
- New measurement protocols needed to evaluate high data rate, signal characteristics associated with biological effects and summative effects of multiple radiation sources.

Recommendations To Address Impacts to Wildlife And Environment

- Engage agencies with ecological knowledge to develop RF-radiation safety limits that will protect the trees, plants, birds, insects and pollinators.
- Under the National Environmental Policy Act, FCC should do an environmental impact statement as to the effect on New Hampshire and the country as a whole from 5G and the expansion of RF wireless technologies.

Recommendations To Reduce Public Exposure

- Require setbacks of 1,640 feet for new wireless antennas from residences, businesses and schools.
- Cell phones and wireless devices should be equipped with updated software that stops cell phones from radiating when positioned against the body.
- Establish RF radiation-free zones in commercial and public buildings.
- New Hampshire health agencies should educate the public on minimizing RF exposure with public service announcements on radio, television, print.

Recommendations To Utilize Safer Alternatives

- New Hampshire schools and libraries should replace Wi-Fi with hardwired connections.
- Support statewide deployment of fiber optic cable connectivity with wired connections inside homes.

Recommendations To Increase Transparency

- State should measure RFR and post maps with RF measurements..
- Require 5G structures to be labeled for RFR at eye level and readable from nine feet away.
- RFR signal strength measurements for cell sites should be done by independent contractors.
- NH professional licensure to offer RF measurement education for home inspectors.
- Warning signs posted in commercial and public buildings.

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Electromagnetic Fields: A Hazard to Your Health?

In recent years, concern has increased about exposure to radio frequency electromagnetic radiation emitted from cell phones and phone station antennae. An Egyptian study confirmed concerns that living nearby mobile phone base stations increased the risk for developing:

- Headaches
- Memory problems
- Dizziness
- Depression
- Sleep problems

Short-term exposure to these fields in experimental studies have not always shown negative effects, but this does not rule out cumulative damage from these fields, so larger studies over longer periods are needed to help understand who is at risk. In large studies, an association has been observed between symptoms and exposure to these fields in the everyday environment.

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Thermal and non-thermal health effects of low intensity non-ionizing radiation: An international perspective☆

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ABSTRACT

Exposure to low frequency and radiofrequency electromagnetic fields at low intensities poses a significant health hazard that has not been adequately addressed by national and international organizations such as the World Health Organization. There is strong evidence that excessive exposure to mobile phone-frequencies over long periods of time increases the risk of brain cancer both in humans and animals. The mechanism(s) responsible include induction of reactive oxygen species, gene expression alteration and DNA damage through both epigenetic and genetic processes. *In vivo* and *in vitro* studies demonstrate adverse effects on male and female reproduction, almost certainly due to generation of reactive oxygen species. There is increasing evidence the exposures can result in neurobehavioral decrements and that some individuals develop a syndrome of "electro-hypersensitivity" or "microwave illness", which is one of several syndromes commonly categorized as "idiopathic environmental intolerance". While the symptoms are non-specific, new biochemical indicators and imaging techniques allow diagnosis that excludes the symptoms as being only psychosomatic. Unfortunately standards set by most national and international bodies are not protective of human health. This is a particular concern in children, given the rapid expansion of use of wireless technologies, the greater susceptibility of the developing nervous system, the hyperconductivity of their brain tissue, the greater penetration of radiofrequency radiation relative to head size and their potential for a longer lifetime exposure.

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Biological effects from exposure to electromagnetic radiation emitted by cell tower base stations and other antenna arrays

B. Blake Levitt and Henry Lai

Abstract: The siting of cellular phone base stations and other cellular infrastructure such as roof-mounted antenna arrays, especially in residential neighborhoods, is a contentious subject in land-use regulation. Local resistance from nearby residents and landowners is often based on fears of adverse health effects despite reassurances from telecommunications service providers that international exposure standards will be followed. Both anecdotal reports and some epidemiology studies have found headaches, skin rashes, sleep disturbances, depression, decreased libido, increased rates of suicide, concentration problems, dizziness, memory changes, increased risk of cancer, tremors, and other neurophysiological effects in populations near base stations. The objective of this paper is to review the existing studies of people living or working near cellular infrastructure and other pertinent studies that could apply to long-term, low-level radiofrequency radiation (RFR) exposures. While specific epidemiological research in this area is sparse and contradictory, and such exposures are difficult to quantify given the increasing background levels of RFR from myriad personal consumer products, some research does exist to warrant caution in infrastructure siting. Further epidemiology research that takes total ambient RFR exposures into consideration is warranted. Symptoms reported today may be classic microwave sickness, first described in 1978. Non-ionizing electromagnetic fields are among the fastest growing forms of environmental pollution. Some extrapolations can be made from research other than epidemiology regarding biological effects from exposures at levels far below current exposure guidelines.



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Case Report

How does long term exposure to base stations and mobile phones affect human hormone profiles?

Emad F. Eskander ✉, Selim F. Estefan, Ahmed A. Abd-Rabou

Objectives

This study is concerned with assessing the role of exposure to radio frequency radiation (RFR) emitted either from mobiles or base stations and its relations v human's hormone profiles.

Results

This study showed significant decrease in volunteers' ACTH, cortisol, thyroid hormones, prolactin for young females, and testosterone levels.

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Very high radiofrequency radiation at Skeppsbron in Stockholm, Sweden from mobile phone base station antennas positioned close to pedestrians' heads

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Fig. 3. Street view on the Skeppsbron street with some of the mobile phone base station antennas pointed out with a circle; note the low placement of the antennas, where microwaves irradiate the pedestrian at close range.

A B S T R A C T

In urban environment there is a constant increase of public exposure to radiofrequency electromagnetic fields from mobile phone base stations. With the placement of mobile phone base station antennas radiofrequency hotspots emerge. This study investigates an area at Skeppsbron street in Stockholm, Sweden with an aggregation of base station antennas placed at low level close to pedestrians' heads. Detailed spatial distribution measurements were performed with 1) a radiofrequency broadband analyzer and 2) a portable exposimeter. The results display a greatly uneven distribution of the radiofrequency field with hotspots. The highest spatial average across all quadrat cells was 12.1 V m^{-1} (388 mW m^{-2}), whereas the maximum recorded reading from the entire area was 31.6 V m^{-1} (2648 mW m^{-2}). Exposimeter measurements show that the majority of exposure is due to mobile phone downlink bands. Most dominant are 2600 and 2100 MHz bands used by 4G and 3G mobile phone services, respectively. The average radiofrequency radiation values from the earlier studies show that the level of ambient RF radiation exposure in Stockholm is increasing. This study concluded that mobile phone base station antennas at Skeppsbron, Stockholm are examples of poor radiofrequency infrastructure design which brings upon highly elevated exposure levels to popular seaside promenade and a busy traffic street.

Studies from recent decades have shown elevated health risk under long term exposure to such highly elevated radiofrequency fields.

A review by Khurana et al. (2010) found in 80% of the available studies neurobehavioral symptoms or cancer in populations living at distances <500 m from base stations (Khurana et al., 2010). In another review exposure from base stations and other antenna arrays showed changes in immunological and reproductive systems as well as DNA double strand breaks, influence on calcium movement in the heart and increased proliferation rates in human astrocytoma cancer cells (Levitt and Lai, 2010).

When a GSM 900 MHz base station was installed in the village Rimbach in Germany it had an influence on the neurotransmitters adrenaline, noradrenaline, dopamine and phenyletylamine (Buchner and Eger, 2011). Influence on cortisol and thyroid hormones in people living near base stations was shown in other studies (Augner et al., 2010; Eskander et al., 2012).

Dode et al. (2011 compared base station (BS) clusters and cases of deaths by neoplasia in the Belo Horizonte municipality, Minas Gerais state, Brazil, from 1996 to 2006. In their study largest electric field was 12.4 V m^{-1} and the smallest was 0.4 V m^{-1}. They found cancer-related death rates be higher close to base stations. This finding confirmed earlier findings by Eger (Eger et al., 2004).

In a study from India, genetic damage using the single cell gel electrophoresis (comet) assay was assessed in peripheral blood leukocytes of individuals residing in the vicinity of a mobile phone base station and comparing it to that in healthy controls. Genetic damage parameters of DNA migration length, damage frequency, and damage index were significantly ($p < 0.001$) elevated in the sample group compared to respective values in healthy controls (Gandhi et al., 2014).

The effect of RF radiation among 20 subjects living close to mobile phone base station compared with 20 subjects living with a distance of about 1 km was studied (Singh et al., 2016). The authors concluded that: "*It was unveiled that a majority of the subjects who were residing near the mobile base station complained of sleep disturbances, headache, dizziness, irritability, concentration difficulties, and hypertension. A majority of the study subjects had significantly lesser stimulated salivary secretion ($p < 0.01$) as compared to the control subjects.*"

Zothansiama et al. (2017) in India inspected DNA damage a antioxidant status in cultured human peripheral blood lymphocy (HPBLs) of individuals residing in the vicinity of mobile phone b stations and compared it with healthy controls living further away. analyses of data from the exposed group (n = 40), residing withi perimeter of 80 m of mobile base stations, showed statistically sign cantly ($p < 0.0001$) higher frequency of micronuclei when compare the control group, residing 300 m away from the mobile base statio

The Ramazzini Institute findings (Falcioni et al., 2018) are suppor by the results in the USNTP study on rats and mice exposed to RF diation (National Toxicology Program, 2018a, 2018b). A clear evide of increased incidence of heart Schwannoma and some evidence glioma and tumours in the adreanal medulla in male rats was fo according to the expert panel, for further discussion see Hardell Carlberg (2019).

The study concluded that Skeppsbron street mobile phone base station antennas are examples of a poor radiofrequency infrastructure design with mobile phone base station antennas positioned into close range to the general public which brings upon high exposure levels. Given the low placement of the antennas (height from the street floor), the highest exposure was often registered at pedestrian head level. Given that head is one of most vulnerable parts of the body, these placements by mobile telephony service providers put pedestrians into unnecessary risk. Position of these antennas, can pose a health risk to people at close range. This is especially critical for people at particular risk, including persons with medical implants, pregnant women or chronically ill persons.

Based on the latest scientific literature regarding RF exposure and adverse health effects, this study recommends repositioning such base station antennas to areas away from the nearby inhabitants, workers and the general public. Alternatively, very low power antennas may also be considered to reduce the exposure. Occupational exposure of people

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MINI-REVIEW ARTICLE



Low Intensity Electromagnetic Fields Act *via* Voltage-Gated Calcium Channel (VGCC) Activation to Cause Very Early Onset Alzheimer's Disease: 18 Distinct Types of Evidence



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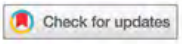


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Abstract: Electronically generated electromagnetic fields (EMFs), including those used in wireless communication such as cell phones, Wi-Fi and smart meters, are coherent, producing very high electric and magnetic forces, which act on the voltage sensor of voltage-gated calcium channels to produce increases in intracellular calcium $[Ca^{2+}]i$. The calcium hypothesis of Alzheimer's disease (AD) has shown that each of the important AD-specific and nonspecific causal elements is produced by excessive $[Ca^{2+}]i$. $[Ca^{2+}]i$ acts in AD *via* excessive calcium signaling and the peroxynitrite/oxidative stress/inflammation pathway, which are each elevated by EMFs.An apparent vicious cycle in AD involves amyloid-beta protein (Aβ) and $[Ca^{2+}]i$. Three types of epidemiology suggest EMF causation of AD, including early onset AD. Extensive animal model studies show that low intensity EMFs cause neurodegeneration, including AD, with AD animals having elevated levels of Aβ, amyloid precursor protein and BACE1. Rats exposed to pulsed EMFs every day are reported to develop universal or near universal very early onset neurodegeneration, including AD; these findings are superficially similar to humans with digital dementia. EMFs producing modest increases in $[Ca^{2+}]i$ can also produce protective, therapeutic effects. The therapeutic pathway and peroxynitrite pathway inhibit each other. A summary of 18 different findings is provided, which collectively provide powerful evidence for EMF causation of AD. The author is concerned that smarter, more highly pulsed "smart" wireless communication may cause widespread very, very early onset AD in human populations.

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The roles of intensity, exposure duration, and modulation on the biological effects of radiofrequency radiation and exposure guidelines

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ABSTRACT

In this paper, we review the literature on three important exposure metrics that are inadequately represented in most major radiofrequency radiation (RFR) exposure guidelines today: intensity, exposure duration, and signal modulation. Exposure intensity produces unpredictable effects as demonstrated by nonlinear effects. This is most likely caused by the biological system's ability to adjust and compensate but could lead to eventual biomic breakdown after prolonged exposure. A review of 112 low-intensity studies reveals that biological effects of RFR could occur at a median specific absorption rate of 0.0165 W/kg. Intensity and exposure duration interact since the dose of energy absorbed is the product of intensity and time. The result is that RFR behaves like a biological "stressor" capable of affecting numerous living systems. In addition to intensity and duration, man-made RFR is generally modulated to allow information to be encrypted. The effects of modulation on biological functions are not well understood. Four types of modulation outcomes are discussed. In addition, it is invalid to make direct comparisons between thermal energy and radiofrequency electromagnetic energy. Research data indicate that electromagnetic energy is more biologically potent in causing effects than thermal changes. The two likely functionthrough different mechanisms. As such, any current RFR exposure guidelines based on acute continuous-wave exposure are inadequate for health protection.

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MINI-REVIEW ARTICLE



Low Intensity Electromagnetic Fields Act *via* Voltage-Gated Calcium Channel (VGCC) Activation to Cause Very Early Onset Alzheimer's Disease: 18 Distinct Types of Evidence



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Abstract: Electronically generated electromagnetic fields (EMFs), including those used in wireless communication such as cell phones, Wi-Fi and smart meters, are coherent, producing very high electric and magnetic forces, which act on the voltage sensor of voltage-gated calcium channels to produce increases in intracellular calcium $[Ca^{2+}]i$. The calcium hypothesis of Alzheimer's disease (AD) has shown that each of the important AD-specific and nonspecific causal elements is produced by excessive $[Ca^{2+}]i$. $[Ca^{2+}]i$ acts in AD *via* excessive calcium signaling and the peroxynitrite/oxidative stress/inflammation pathway, which are each elevated by EMFs.An apparent vicious cycle in AD involves amyloid-beta protein (Aβ) and $[Ca^{2+}]i$. Three types of epidemiology suggest EMF causation of AD, including early onset AD. Extensive animal model studies show that low intensity EMFs cause neurodegeneration, including AD, with AD animals having elevated levels of Aβ, amyloid precursor protein and BACE1. Rats exposed to pulsed EMFs every day are reported to develop universal or near universal very early onset neurodegeneration, including AD; these findings are superficially similar to humans with digital dementia. EMFs producing modest increases in $[Ca^{2+}]i$ can also produce protective, therapeutic effects. The therapeutic pathway and peroxynitrite pathway inhibit each other. A summary of 18 different findings is provided, which collectively provide powerful evidence for EMF causation of AD. The author is concerned that smarter, more highly pulsed "smart" wireless communication may cause widespread very, very early onset AD in human populations.

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REVIEW

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Genetic effects of non-ionizing electromagnetic fields

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ABSTRACT

This is a review of the research on the genetic effects of non-ionizing electromagnetic field (EMF), mainly on radiofrequency radiation (RFR) and static and extremely low frequency EMF (ELF-EMF). The majority of the studies are on genotoxicity (e.g., DNA damage, chromatin conformation changes, etc.) and gene expression. Genetic effects of EMF depend on various factors, including field parameters and characteristics (frequency, intensity, wave-shape), cell type, and exposure duration. The types of gene expression affected (e.g., genes involved in cell cycle arrest, apoptosis and stress responses, heat-shock proteins) are consistent with the findings that EMF causes genetic damages. Many studies reported effects in cells and animals after exposure to EMF at intensities similar to those in the public and occupational environments. The mechanisms by which effects are induced by EMF are basically unknown. Involvement of free radicals is a likely possibility. EMF also interacts synergistically with different entities on genetic functions. Interactions, particularly with chemotherapeutic compounds, raise the possibility of using EMF as an adjuvant for cancer treatment to increase the efficacy and decrease side effects of traditional chemotherapeutic drugs. Other data, such as adaptive effects and mitotic spindle aberrations after EMF exposure, further support the notion that EMF causes genetic effects in living organisms.

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Article

The Effect of Continuous Low-Intensity Exposure to Electromagnetic Fields from Radio Base Stations to Cancer Mortality in Brazil

Nádia Cristina Pinheiro Rodrigues [1,2,*], Adilza Condessa Dode [3], Mônica Kramer de Noronha Andrade [1], Gisele O'Dwyer [1], Denise Leite Maia Monteiro [4], Inês Nascimento Carvalho Reis [1], Roberto Pinheiro Rodrigues [5,6], Vera Cecília Frossard [1] and Valéria Teresa Saraiva Lino [1]

Abstract: Background: this study aims to estimate the rate of death by cancer as a result of Radio Base Station (RBS) radiofrequency exposure, especially for breast, cervix, lung, and esophagus cancers. Methods: we collected information on the number of deaths by cancer, gender, age group, gross domestic product per capita, death year, and the amount of exposure over a lifetime. We investigated all cancer types and some specific types (breast, cervix, lung, and esophagus cancers). Results: in capitals where RBS radiofrequency exposure was higher than 2000/antennas-year, the average mortality rate was 112/100,000 for all cancers. The adjusted analysis showed that, the higher the exposure to RBS radiofrequency, the higher cancer mortality was. The highest adjusted risk was observed for cervix cancer (rate ratio = 2.18). The spatial analysis showed that the highest RBS radiofrequency exposure was observed in a city in southern Brazil that also showed the highest mortality rate for all types of cancer and specifically for lung and breast cancer. Conclusion: the balance of our results indicates that exposure to radiofrequency electromagnetic fields from RBS increases the rate of death for all types of cancer.

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Report of final results regarding brain and heart tumors in Sprague-Dawley rats exposed from prenatal life until natural death to mobile phone radiofrequency field representative of a 1.8 GHz GSM base station environmental emission

A B S T R A C T

Background: In 2011, IARC classified radiofrequency radiation (RFR) as possible human carcinogen (Group 2B). According to IARC, animals studies, as well as epidemiological ones, showed limited evidence of carcinogenicity. In 2016, the NTP published the first results of its long-term bioassays on near field RFR, reporting increased incidence of malignant glial tumors of the brain and heart Schwannoma in rats exposed to GSM – and CDMA – modulated cell phone RFR. The tumors observed in the NTP study are of the type similar to the ones observed in some epidemiological studies of cell phone users.

Objectives: The Ramazzini Institute (RI) performed a life-span carcinogenic study on Sprague-Dawley rats to evaluate the carcinogenic effects of RFR in the situation of far field, reproducing the environmental exposure to RFR generated by 1.8 GHz GSM antenna of the radio base stations of mobile phone. This is the largest long-term study ever performed in rats on the health effects of RFR, including 2448 animals. In this article, we reported the final results regarding brain and heart tumors.

Methods: Male and female Sprague-Dawley rats were exposed from prenatal life until natural death to a 1.8 GHz GSM far field of 0, 5, 25, 50 V/m with a whole-body exposure for 19 h/day.

Results: A statistically significant increase in the incidence of heart Schwannomas was observed in treated male rats at the highest dose (50 V/m). Furthermore, an increase in the incidence of heart Schwann cells hyperplasia was observed in treated male and female rats at the highest dose (50 V/m), although this was not statistically significant. An increase in the incidence of malignant glial tumors was observed in treated female rats at the highest dose (50 V/m), although not statistically significant.

Conclusions: The RI findings on far field exposure to RFR are consistent with and reinforce the results of the NTP study on near field exposure, as both reported an increase in the incidence of tumors of the brain and heart in RFR-exposed Sprague-Dawley rats. These tumors are of the same histotype of those observed in some epidemiological studies on cell phone users. These experimental studies provide sufficient evidence to call for the re-evaluation of IARC conclusions regarding the carcinogenic potential of RFR in humans.