

Research on Cell Tower Radiation

Claudia Roda, Susan Perry. [Mobile phone infrastructure regulation in Europe: Scientific challenges and human rights protection](#). Environmental Science & Policy, Volume 37, March 2014, Pages 204-214.

- This law article was published in Environmental Science & Policy by human rights experts. It argues that cell tower placement is a human rights issue for children.
- "We argue that (1) because protection of children is a high threshold norm in Human Right law and (2) the binding language of the Convention on the Rights of the Child obliges States Parties to provide a higher standard of protection for children than adults, any widespread or systematic form of environmental pollution that poses a long-term threat to a child's rights to life, development or health may constitute an international human rights violation.
- In particular we have explained how the dearth of legislation to regulate the installation of base stations (cell towers) in close proximity to children's facilities and schools clearly constitutes a human rights concern according to the language of the Convention on the Rights of the Child, a treaty that has been ratified by all European States.

[SAFETY ZONE DETERMINATION FOR WIRELESS CELLULAR TOWER](#) Nyakyi et al, Tanzania (2013)

- This research looked at the radiation that cell towers emit and states a safety zone is needed around the towers to ensure safe sleeping areas. The authors state that "respective authorities should ensure that people reside far from the tower by 120m or more depending on the power transmitted to avoid severe health effect."

[Long-term exposure to microwave radiation provokes cancer growth: evidences from radars and mobile communication systems](#). Yakymenko, 2011

- We conclude that recent data strongly point to the need for re-elaboration of the current safety limits for non-ionizing radiation using recently obtained knowledge. We also emphasize that the everyday exposure of both occupational and general public to MW radiation should be regulated based on a precautionary principles which imply maximum restriction of excessive exposure.

[A cross-sectional case control study on genetic damage in individuals residing in the vicinity of a mobile phone base station](#). Ghandi et al, 2014 (India):

- This cross-sectional case control study on genetic damage in individuals living near cell towers found genetic damage parameters of DNA were significantly elevated. The authors state, "The genetic damage evident in the participants of this study needs to be addressed against future disease-risk, which in addition to neurodegenerative disorders, may lead to cancer."

[Neurobehavioral effects among inhabitants around mobile phone base stations](#).

Neurotoxicology, G. Abdel-Rassoul, et al., (2007)

- "Conclusions and recommendations: Inhabitants living nearby mobile phone base stations are at risk for developing neuropsychiatric problems and some changes in the performance of neurobehavioral functions either by facilitation or inhibition. So, revision of standard guidelines for public exposure to RER from mobile phone base station antennas and using of NBTB for regular assessment and early detection of biological

Mortality by neoplasia and cellular telephone base stations. Dode et al., 2011 (Brazil):

- A clearly elevated relative risk of cancer mortality at residential distances of 500 meters or less from cell phone transmission towers.
- This 10 year study on cell phone antennas was released by the Municipal Health Department in Belo Horizonte and several universities in Brazil. Shortly after this study was published, the city prosecutor sued several cell phone companies and requested that almost half of the cities antennae be removed. Many were.

Carpenter, D. O. **Human disease resulting from exposure to electromagnetic fields,** Reviews on Environmental Health, Volume 28, Issue 4, Pages 159172.

- This review summarizes the evidence stating that excessive exposure to magnetic fields from power lines and other sources of electric current increases the risk of development of some cancers and neurodegenerative diseases, and that excessive exposure to RF radiation increases risk of cancer, male infertility, and neurobehavioral abnormalities.

Shinjyo, T. & Shinjyo, A. (2014), **Signifikanter Rückgang klinischer Symptome nach Senderabbau – eine Interventionsstudie. (English-Significant Decrease of Clinical Symptoms after Mobile Phone Base Station Removal – An Intervention Study)** Tetsuharu Shinjyo and Akemi Shinjyo Umwelt-Medizin-Gesellschaft, 27(4), S. 294-301.

- This research was undertaken to investigate the validity of concerns about whether chronic exposure to radiofrequency electromagnetic fields (RF-EMFs) emitted from mobile phone base station antennas could cause adverse health effects. The aim of this study was to identify possible adverse health effects among the residents of a condominium on which a mobile phone base station with sets of antennas operating at two different frequencies had been mounted. This research was conducted without outside funds in order to maintain neutrality and avoid pressures from external sources.
- Methods: We investigated possible adverse effects on the health of condominium inhabitants who were exposed from 1998 to 2009 to the radiation from mobile phone base station antennas installed on top of their condominium. To accomplish this, in January and November 2009, 107 of 122 inhabitants were interviewed and underwent medical examinations. The first examination was carried out while the base station was in operation, the second examination three months after the base station antennas were removed once and for all. Based on the health examination results, the residents' health and its changes during the operation of the antennas and after their removal were compared.
- Results: In several cases, significant effects on the inhabitants' health could be proven. The health of these inhabitants was shown to improve after the removal of the antennas, and the researchers

could identify no other factors that could explain this health improvement. These examinations and interviews suggest that there are possible adverse health effects related to RF-EMF exposure among people living under mobile phone base stations.

- **Conclusions and recommendations:** The results of these examinations and interviews indicate a connection between adverse health effects and electromagnetic radiation from mobile phone base stations. Further research and studies are recommended regarding the possible adverse health effects of RF-EMFs. These results lead us to question the construction of mobile phone base stations on top of buildings such as condominiums or houses.

[Epidemiological Evidence for a Health Risk from Mobile Phone Base Stations](#) Khurana, Hardell et al., *Int. J Occup. Envir Health*, Vol 16(3):263267, 2010

- 10 epidemiological studies that assessed for putative health effects of mobile phone base stations. Seven of these studies explored the association between base station proximity and neurobehavioral effects and three investigated cancer. We found that eight of the 10 studies reported increased prevalence of adverse neurobehavioral symptoms or cancer in populations living at distances < 500 meters from base stations.
- None of the studies reported exposure above accepted international guidelines, suggesting that current guidelines may be inadequate in protecting the health of human populations. We believe that comprehensive epidemiological studies of long-term mobile phone base station exposure are urgently required to more definitively understand its health impact.

Levitt & Lai, **[Biological Effects from Exposure to Electromagnetic Radiation Emitted by Cell Tower Base Stations and Other Antenna Arrays](#)**, *Environmental Reviews*, 2010

- Over 100 citations, approximately 80% of which showed biological effects near towers. “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. Built case for ‘setbacks’ and need for new exposure guidelines reflecting multiple and cumulative exposures

Effect of GSTM1 and GSTT1 Polymorphisms on Genetic Damage in Humans Populations Exposed to Radiation From Mobile Towers

Gulati S, Yadav A, Kumar N, Kanupriya, Aggarwal NK, Kumar R, Gupta R. **[Effect of GSTM1 and GSTT1 Polymorphisms on Genetic Damage in Humans Populations Exposed to Radiation From Mobile Towers](#)**. *Arch Environ Contam Toxicol*. 2015 Aug 5. [Epub ahead of print]

- In our study, 116 persons exposed to radiation from mobile towers and 106 control subjects were genotyped for polymorphisms in the GSTM1 and GSTT1 genes by multiplex polymerase chain reaction method. DNA damage in peripheral blood lymphocytes was determined using alkaline comet assay in terms of tail moment (TM) value and micronucleus assay in buccal cells (BMN). Our results indicated that TM value and BMN frequency were higher in an exposed population compared with a control group and the difference is significant. In our study, we found that different health symptoms, such as depression, memory status, insomnia, and hair loss, were significantly associated with exposure to EMR. Damaging effects of nonionizing radiation result from the generation of reactive oxygen species (ROS) and subsequent radical formation and from direct damage to cellular macromolecules including DNA.

Hutter HP et al, (May 2006) [Subjective symptoms, sleeping problems, and cognitive performance in subjects living near mobile phone base stations](#), *Occup Environ Med.* 2006 May;63(5):307-13

- Found a significant relationship between some cognitive symptoms and measured power density; highest for headaches. Perceptual speed increased, while accuracy decreased insignificantly with increasing exposure levels. There was no significant effect on sleep quality.

Eskander EF et al, (November 2011) [How does long term exposure to base stations and mobile phones affect human hormone profiles?](#) *Clin Biochem.* 2011 Nov 27.

- Showed significant decrease in volunteers' ACTH, cortisol, thyroid hormones, prolactin for young females, and testosterone levels from RF exposures from both mobiles and cell towers.

[Investigation on the health of people living near mobile telephone relay stations: Incidence according to distance and sex](#) Santini et al, 2002 (France)

- 530 people living near mobile phone masts reported more symptoms of headache, sleep disturbance, discomfort, irritability, depression, memory loss and concentration problems the closer they lived to the mast. This first study on symptoms experienced by people living in vicinity of base stations shows that, in view of radioprotection, minimal distance of people from cellular phone base stations should not be < 300 m.

[The Microwave Syndrome: A preliminary Study](#). Navarro E, 2003 (Spain)

- Statistically significant positive exposure-response associations between field intensity and fatigue, irritability, headaches, nausea, loss of appetite, sleeping disorder, depressive tendency, feeling of discomfort, difficulty in concentration, loss of memory, visual disorder, dizziness and cardiovascular problems. Two different exposure groups also showed an increase of the declared severity in the group with the higher exposure.

[Bortkiewicz et al, 2004 \(Poland\)](#)

- Residents close to mobile phone masts reported: more incidences of circulatory problems, sleep disturbances, irritability, depression, blurred vision and concentration difficulties the nearer they lived to the mast.
- The performed studies showed the relationship between the incidence of individual symptoms, the level of exposure, and the distance between a residential area and a base station.

[Wolf et al, 2004 \(Israel\)](#)

- A four-fold increase in the incidence of cancer among residents living within 300m radius of a mobile phone mast for between three and seven years was detected.

[Eger et al, 2004 \(Germany\)](#)

A three-fold increase in the incidence of malignant tumours was found after five years' exposure in people living within 400m radius of a mobile phone mast.

[Hutter et al, 2006 \(Austria\)](#)

- A significant correlation between measured power density and headaches, fatigue, and difficulty in concentration in 365 subjects.

[Abdel-Rassoul et al, 2007 \(Egypt\)](#)

Residents living beneath and opposite a long established mobile phone mast reported significantly higher occurrences of headaches, memory changes, dizziness, tremors, depressive symptoms and sleep disturbance than a control group.

[Oberfeld et al, 2008 \(Austria\)](#)

All subjects reported various symptoms during exposure including buzzing in the head, heart palpitations, unwellness, lightheadedness, anxiety, breathlessness, respiratory problems, nervousness, agitation, headache, tinnitus, heat sensation, and depression.

Some Research on RF Radiation to Read

[The Bioinitiative 2012 Report:](#)

A Comprehensive Overview of the Science by experts in the field. It is broken down into Chapters on various health effects. Notably, it also has the abstracts of the research (All research since 2007 with a SEARCH feature).

It also has color charts so that you can see the levels of radiation and compare this to the effects shown in research studies.

L. Lloyd Morgan, Santosh Kesari, Devra Lee Davis. [Why children absorb more microwave radiation than adults: The consequences.](#) Journal of Microscopy and Ultrastructure. DOI: 10.1016/j.jmau.2014.06.005. In press. Published online Jul 15, 2014.

- International Cancer registries are showing a rise in brain cancer. Children absorb more microwave radiation, a Class 2 B possible carcinogen than adults. The fetus is in greater danger than children from exposure to MWR. The legal exposure limits have remained unchanged for decades. Cellphone manuals warnings and the 20 cm rule for tablets/laptops violate the “normal operating position” regulation.

Coureau G, Bouvier G, Lebailly P, Fabbro-Peray P, Gruber A, Leffondre K, Guillamo JS, Loiseau H, Mathoulin-Pélissier S, Salamon R, Baldi I. (2014). [Mobile phone use and brain tumours in the CERENAT case-control study.](#) Occup Environ Med. 71(7), 514-22.

- "However, the positive association was statistically significant in the heaviest users when considering life-long cumulative duration for meningiomas and number of calls for gliomas. Risks were higher for gliomas, temporal tumours, occupational and urban mobile phone use. These additional data support previous findings concerning a possible association between heavy mobile phone use and brain tumours."

Davis DL, Kesari S, Soskolne CL, Miller AB, Stein Y. (2013). [Swedish review strengthens grounds for concluding that radiation from cellular and cordless phones is a probable human carcinogen](#). Pathophysiology. 20(2), 123-9.

- "If the increased brain cancer risk found in young users in these recent studies does apply at the global level, the gap between supply and demand for oncology services will continue to widen. Many nations, phone manufacturers, and expert groups, advise prevention in light of these concerns by taking the simple precaution of "distance" to minimize exposures to the brain and body. We note that brain cancer is the proverbial "tip of the iceberg"; the rest of the body is also showing effects other than cancers."

Hardell L, Carlberg M, Söderqvist F, Mild K. (2013). [Case-control study of the association between malignant brain tumours diagnosed between 2007 and 2009 and mobile and cordless phone use](#). International Journal of Oncology 43(6), 1833-45.

- "This study confirmed previous results of an association between mobile and cordless phone use and malignant brain tumours. These findings provide support for the hypothesis that RF-EMFs play a role both in the initiation and promotion stages of carcinogenesis".

Hardell L, Carlberg M, Hansson, Mild K. (2006). [Pooled analysis of two case-control studies on the use of cellular and cordless telephones and the risk of benign brain tumours diagnosed during 1997-2003](#). International Journal of Oncology. 509-18.

- In the multivariate analysis, a significantly increased risk of acoustic neuroma was found with the use of analogue phones.

Aldad et al., [Fetal Radiofrequency Radiation Exposure From 800-1900 Mhz-Rated Cellular Telephones Affects Neurodevelopment and Behavior in Mice.](#) Scientific Reports, 2012; 2
DOI:

- Mice that were exposed to radiation tended to be more hyperactive and had reduced memory capacity. Authors attributed the behavioral changes to an effect during pregnancy on the development of neurons in the prefrontal cortex region of the brain.

Martin L. Pall. [Microwave electromagnetic fields act by activating voltage-gated calcium channels: why the current international safety standards do not predict biological hazard.](#)Recent Res. Devel. Mol. Cell Biol. 7(2014).

- "It can be seen from the above that 10 different well-documented microwave EMF effects can be easily explained as being a consequence of EMF VGCC activation: oxidative stress, elevated single and double strand breaks in DNA, therapeutic responses to such EMFs, breakdown of the blood-brain barrier, cancer, melatonin loss, sleep dysfunction, male infertility and female infertility."

Other Documents of Note

US Department of the Interior

"The electromagnetic radiation standards used by the Federal Communications Commission continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today... Laboratory studies have raised concerns about impacts of low-level, non-thermal electromagnetic radiation...on domestic chicken embryos- with some lethal results"

- Willie Taylor, Director of the Office of Environmental Policy and Compliance of the US Department of the Interior, [Letter to the Department of Commerce in 2014.](#)

THE CELL PHONE REPORT: TECHNOLOGY EXPOSURES, HEALTH EFFECTS, ENVIRONMENT & HUMAN HEALTH, INC.

John Wargo, Ph.D., professor of Environmental Risk and Policy at Yale University and lead author of the report, said, "The scientific evidence is sufficiently robust showing that cellular devices pose significant health risks to children and pregnant women. The weight of the evidence supports stronger precautionary regulation by the federal

government. The cellular industry should take immediate steps to reduce emission of electromagnetic radiation (EMR) from phones and avoid marketing their products to children.”

Recommendations to the Federal Government: Set exposure standards to protect human health.

Recommendations to Individuals: Reduce your exposure to wireless radiation sources.

[Read the Full Report](#)

The Parliamentary Assembly of the Council of Europe

Resolution 1815: In 2011 The Parliamentary Assembly of the Council of Europe issued *The Potential Dangers of Electromagnetic Fields and Their Effect on the Environment*. A call to European governments to

- “take all reasonable measures” to reduce exposure to electromagnetic fields “particularly the exposure to children and young people who seem to be most at risk from head tumours.”
- The Resolution calls for member states to: Implement “information campaigns about the risk of biological effects on the environment and human health, especially targeting children and young people of reproductive age.”
- “*Reconsider* the scientific basis for the present standards on exposure to electromagnetic fields set by the International Commission on Non-Ionising Radiation Protection, which have serious limitations, and apply ALARA principles, covering both thermal effects and the a thermic or biological effects of electromagnetic emissions or radiation.”

Norbert Hankin of the EPA, “The FCC’s current exposure guidelines...are thermally based, and do not apply to chronic, non-thermal exposure situations.” http://www.emrpolicy.org/litigation/case_law/docs/noi_epa_response.pdf

International [Scientific Declaration to Health Canada](#) 2014

<http://www.c4st.org/images/documents/hc-resolutions/scientific-declaration-to-health-canada-english.pdf>

The Seletun Scientific Statement Lower EMF Standards for World Health are Urgently Needed, International Scientists Say <http://www.iemfa.org/seletun-statement/>

POTENZA PICENA RESOLUTION

<http://www.scribd.com/doc/137733972/Potenza-Picena-Scientific-Resolution-Radar-radiofrequency-and-health-risk>

AAP submission to the FCC <http://apps.fcc.gov/ecfs/document/view?id=7520941318>

Chen C, [Exposure to 1800 MHz radiofrequency radiation impairs neurite outgrowth of embryonic neural stem cells](#). Sci Rep. May 29, 2014 <http://www.ncbi.nlm.nih.gov/pubmed/24869783?dopt=Abstract>

FCC Submission on RF effects on Developing Brain by Dr. Suleyman Kaplan, Department of Histology and Embryology, <http://apps.fcc.gov/ecfs/comment/view?id=6017465635>

Kesari et al., [Effect of 3G cell phone exposure with computer controlled 2-D stepper motor on non-thermal activation of the hsp27/p38MAPK stress pathway in rat brain](#). Cell Biochem Biophys. 2014 Mar;68(2):347-58. <http://www.ncbi.nlm.nih.gov/pubmed/23949848>

Aldad T, Gan G, Gao X, Taylor H.(2012). [Fetal Radiofrequency Radiation Exposure From 800-1900 Mhz-Rated Cellular Telephones Affects Neurodevelopment and Behavior in Mice](#). Scientific Reports. 2, 3-12. <http://www.nature.com/srep/2012/120315/srep00312/full/srep00312.html>

Razavinasab M1, Moazzami K, Shabani M. [Maternal mobile phone exposure alters intrinsic electrophysiological properties of CA1 pyramidal neurons in rat offspring](#). Toxicol Ind Health. 2014 Mar 6. <http://www.ncbi.nlm.nih.gov/pubmed/24604340>

Gandhi OP, Morgan LL, De Salles AA, Han YY, Herberman RB, Davis DL. (2012). [Exposure limits: the underestimation of absorbed cell phone radiation, especially in children](#). Electromagn Biol Med. 31(1), 3451. <http://www.ncbi.nlm.nih.gov/pubmed/21999884>

A Rationale for Biologically-based Public Exposure Standards for Electromagnetic Fields (ELF and RF) <http://www.bioinitiative.org/>

Dr. Erica Mallery--Blythe [Physicians' Health Initiative for Radiation and Environment -UK](#) "Electromagnetic Radiation and Children" November 2014 Lecture <https://www.youtube.com/watch?v=sNFdZVeXw7M>

Dr. Devra Davis scientific presentation on RF radiation at the National Institute of Environmental Health Sciences (NIEHS) <https://www.youtube.com/watch?v=wNNSztN7wJc>

Blackman,C.,2009.Cell phone radiation: Evidence from ELF and RF studies supporting more inclusive risk identification and assessment. Pathophysiology 16, 205-216. <http://www.pathophysiologyjournal.com/article/S0928-4680%2809%2900004-2/abstract>

Levitt & Lai,Biological Effects from Exposure to Electromagnetic Radiation Emitted by Cell Tower Base Stations and Other Antenna Arrays, Environmental Reviews, 2010 <http://www.researchgate.net/publication/233593841>

Long-term exposure to microwave radiation provokes cancer growth: evidences from radars and mobile communication systems. Yakymenko , 2011 <http://www.ncbi.nlm.nih.gov/pubmed/21716201>

Carpenter, D. O. Human disease resulting from exposure to electromagnetic fields, Reviews on Environmental Health, Volume 28, Issue 4, Pages 159172. <http://www.ncbi.nlm.nih.gov/pubmed/24280284>

Epidemiological Evidence for a Health Risk from Mobile Phone Base Stations Khurana, Hardell et al., Int. J Occup. Envir Health, Vol 16(3):263267, 2010 <http://www.researchgate.net/publication/45387389>

Mortality by neoplasia and cellular telephone base stations. Dode et al., 2011 (Brazil):
<http://www.sciencedirect.com/science/article/pii/S0048969711005754>

Ronni Wolf and Danny Wolf, INCREASED INCIDENCE OF CANCER NEAR A CELLPHONE TRANSMITTER STATION. International Journal of Cancer Prevention VOLUME 1, NUMBER 2, APRIL 2004
http://www.emf-health.com/PDFreports/Israelstudy_celltower.pdf

Horst Eger, Klaus Uwe Hagen, Birgitt Lucas, Peter Vogel, Helmut Voit, The Influence of Being Physically Near to a Cell Phone Transmission Mast on the Incidence of Cancer, n Umwelt-Medizin-Gesellschaft 17,4 2004,
http://www.powerwatch.org.uk/news/20041118_naila.pdf

Mortality by neoplasia and cellular telephone base stations. Dode et al., 2011 (Brazil):
<http://www.sciencedirect.com/science/article/pii/S0048969711005754>

Neurobehavioral effects among inhabitants around mobile phone base stations, Neurotoxicology, G. Abdel-Rassoul, et al., (2007) <http://www.ncbi.nlm.nih.gov/pubmed/16962663>

A cross-sectional case control study on genetic damage in individuals residing in the vicinity of a mobile phone base station. Ghandi et al, 2014 (India) <http://www.ncbi.nlm.nih.gov/pubmed/25006864>

SAFETY ZONE DETERMINATION FOR WIRELESS CELLULAR TOWER Nyakya et al, Tanzania (2013)
http://ijret.org/Volumes/V02/I09/IJRET_110209029.pdf

Hutter HP et al, (May 2006) Subjective symptoms, sleeping problems, and cognitive performance in subjects living near mobile phone base stations, Occup Environ Med. 2006 May;63(5):307-13
<http://www.ncbi.nlm.nih.gov/pubmed/1662185>

Eskander EF et al, (November 2011) How does long term exposure to base stations and mobile phones affect human hormone profiles? Clin Biochem. 2011 Nov 27. <http://www.ncbi.nlm.nih.gov/pubmed/22138021>

Investigation on the health of people living near mobile telephone relay stations: Incidence according to distance and sex Santini et al, 2002 (France) <http://www.ncbi.nlm.nih.gov/pubmed/12168254>

The Microwave Syndrome: A preliminary Study. Navarro E, 2003 (Spain) Pathol Biol (Paris). 2002 Jul;50(6):369-73.
<http://www.emf-portal.de/viewer.php?aid=13498&l=e>

Bortkiewicz A1, Zmyślony M, Szyjkowska A, Gadzicka E. Subjective symptoms reported by people living in the vicinity of cellular phone base stations: review, Med Pr. 2004;55(4):345-51.

<http://www.ncbi.nlm.nih.gov/pubmed/15620045>

IAFF Position on Cell Towers <http://www.iaff.org/hs/Facts/CellTowerFinal.asp>

"Erroneous Comments Submitted to the FCC on Proposed Cellphone Radiation Standards and Testing."

<http://ehtrust.org/wp-content/uploads/2013/11/FCC.pdf>