



HB 310, Wireless Radiation and Adverse Health Effects

July 6, 2017 Presentation to
the Honorable Governor Roy Cooper,
Jess Englert & Justin Clayton

Devra Davis, PhD MPH FACE

President of Environmental Health Trust

Visiting Professor of Medicine at The Hebrew University Hadassah Medical School, Israel;
Ondokuz Mayis University Medical School, Turkey; and Sichuan University, Chengdu

Mary Anne Tierney, RN, MPH
SafeTech Kids NC

HB 310 will remove local authority for placement of wireless facilities that will expose people in homes and children in schools to a range of wireless frequencies.



Antennas will be placed in front of bedroom windows.





Nationwide Action: Wireless Infrastructure Bills

From coast to coast communities are opposed to streamlining bills. For example:

Ohio Bill SB 331 80 municipalities sued after Bill passed that would limit cities ability to regulate wireless. The Bill was overturned as “unconstitutional.”

New York Senate Bill S6687: Directs the public service commission to prohibit the attachment of wireless equipment to existing utility poles in certain circumstances.

Nebraska: Conservative Legislature voted NO

Connecticut: Bill passed to require the participation and input of the local municipality and counter preemption efforts by industry.

California: Heavy opposition now underway with hundreds of cities in opposition.

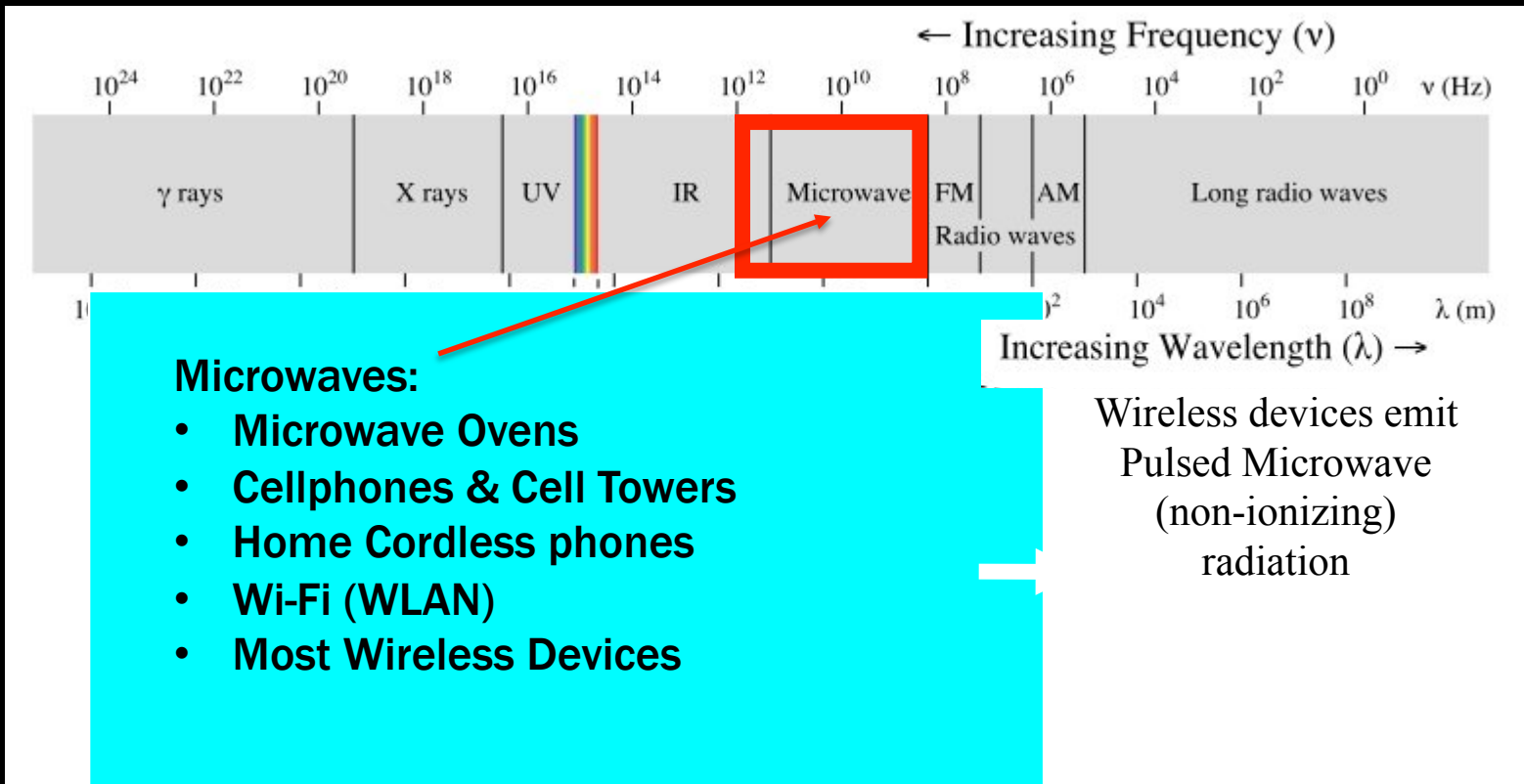
[See The Full List at Environmental Health Trust](#)

Devra Davis, PhD MPH FACE

- Founding Director of the Center for Environmental Oncology, University of Pittsburgh Cancer Institute
- Founding Director of the Board on Environmental Studies and Toxicology of the U.S. National Research Council
- Appointed by President Clinton to the Chemical Safety and Hazard Investigation Board, (1994-99)
- Former Senior Advisor to the Assistant Secretary for Health in the Department of Health and Human Services
- Member of a team of scientists awarded the Nobel Peace Prize in 2007 with the Honorable Al Gore.
- Fellow of the American College of Epidemiology.
- Author of *When Smoke Ran Like Water, The Secret History of the War on Cancer, Disconnect*, and more than 300 published articles

Radiation Electromagnetic Spectrum

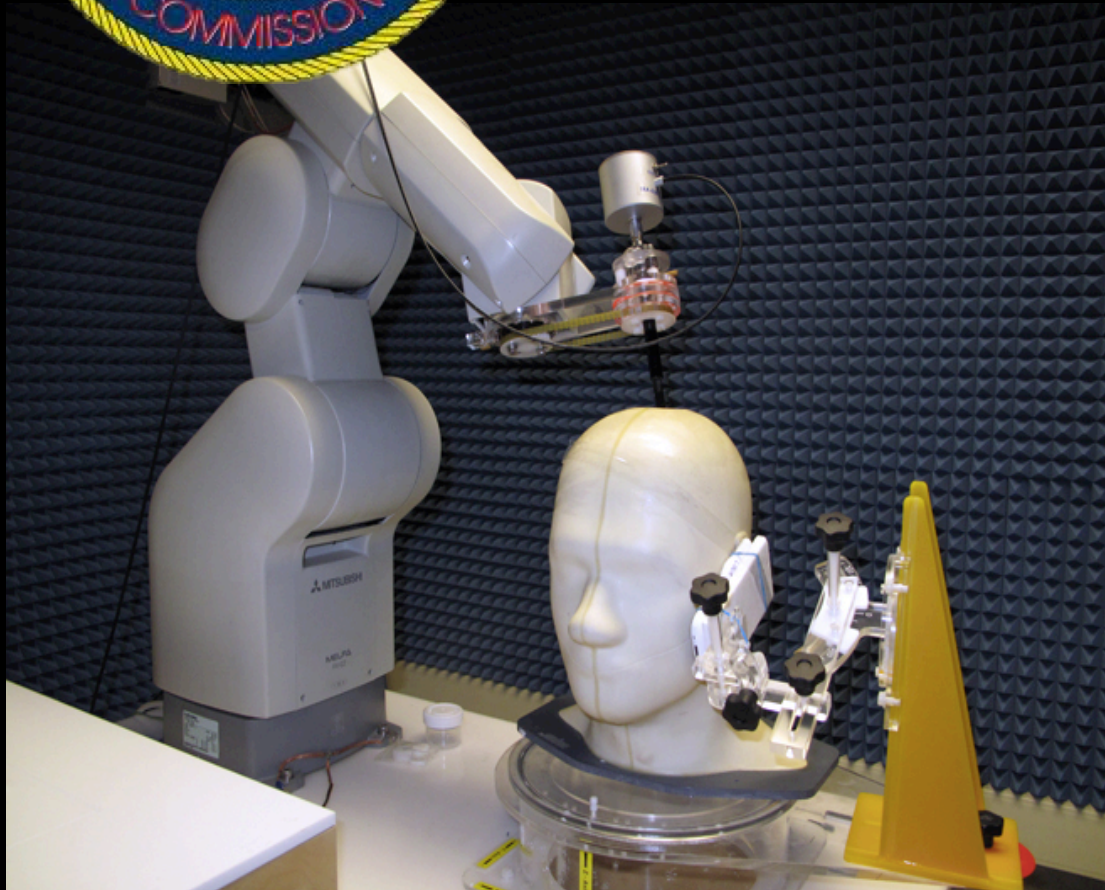
Small Cells and DAS antennas emit a range of microwave frequencies for 2G, 3G and 4G applications.





FCC Human Exposure to Radiofrequency Limits Set in 1996

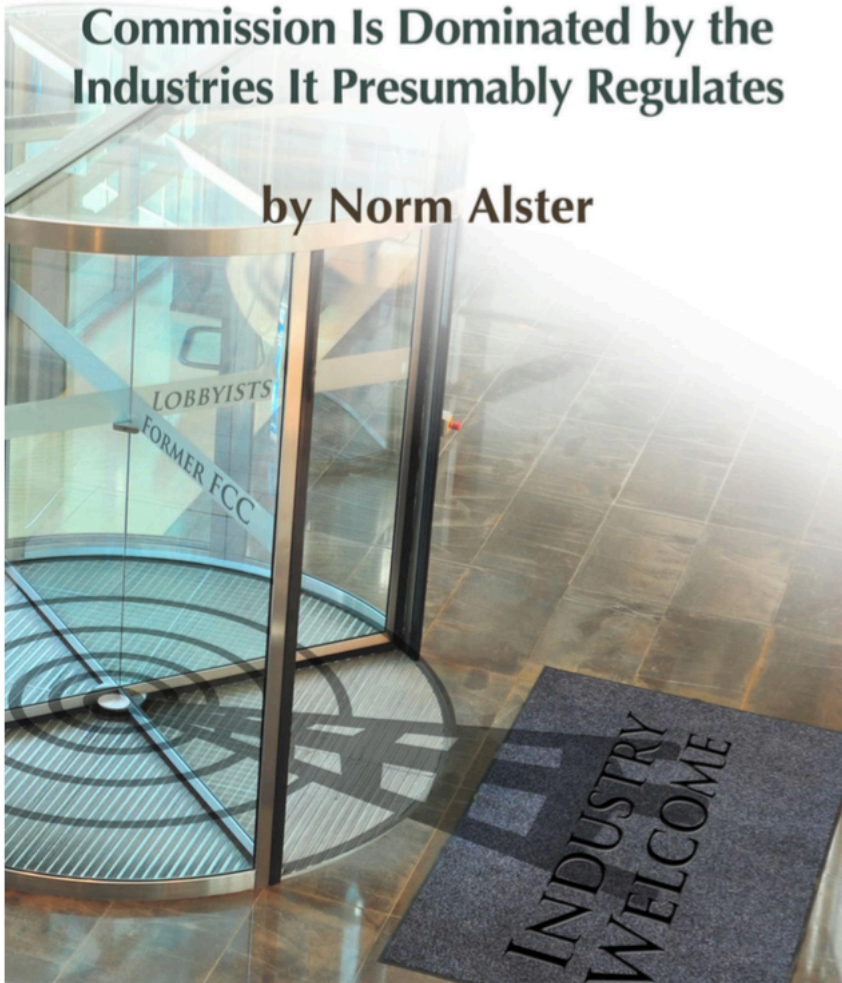
- 20 years outdated limit based on 30 year old science
- Accounts only for heating effects.
- Inadequate for children and pregnant women.



Captured Agency:

How the Federal Communications Commission Is Dominated by the Industries It Presumably Regulates

by Norm Alster



www.ethics.harvard.edu

Harvard Press

- FCC Chair Tom Wheeler prior Head Wireless Industry
- Revolving door between regulators and companies.
- Financial Contributions to Congress
- FCC is a captured agency.

• http://ethics.harvard.edu/files/center-for-ethics/files/capturedagency_alster.pdf

Nonionizing Electromagnetic Fields

Myth: No effects At *low non thermal levels*

Fact: Research has found biological effects at low non-thermal levels in thousands of studies.

- EEG well replicated
- Serious sleep disturbances
- Brain Cancer: All human epi- independent +10yrs
- Oxidative stress markers
- Immune system
- Neurological and reproductive development

2011 classification was based on epidemiological research:
Long term use of cell phones by humans is linked to brain cancer.

International Agency for Research on Cancer



PRESS RELEASE
N° 208

31 May 2011

**IARC CLASSIFIES RADIOFREQUENCY ELECTROMAGNETIC FIELDS AS
POSSIBLY CARCINOGENIC TO HUMANS**

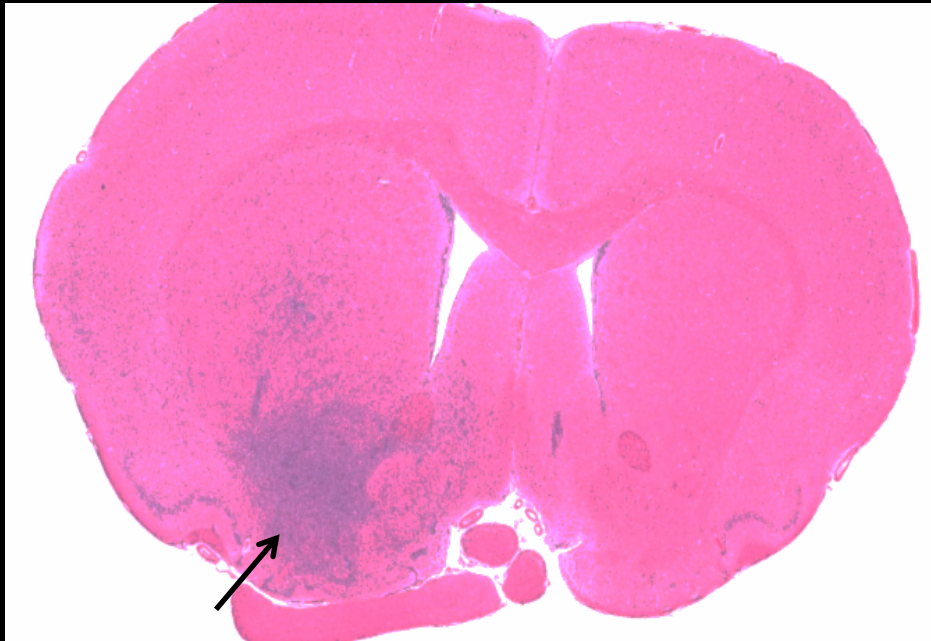
Since the IARC classification, the evidence ***has increased*** which finds radiofrequency exposure associated with increased brain cancer risk.

- Analysis of Canadian data, *American Journal of Epidemiology*, Momoli et al., 2017
- French National Study, *Occupational and Environmental Medicine*, Coureau et al. 2014.
- Analysis of research and Bradford Hill criteria *BioMed Research International*, 2017.
- Hundreds of published studies



Cancers in NTP Rats Parallel Findings from Human Epidemiological Studies

Increased Gliomas in Brain



Increased incidence of brain gliomas reached statistical significance in males with CDMA modulation.

Increased Schwannomas



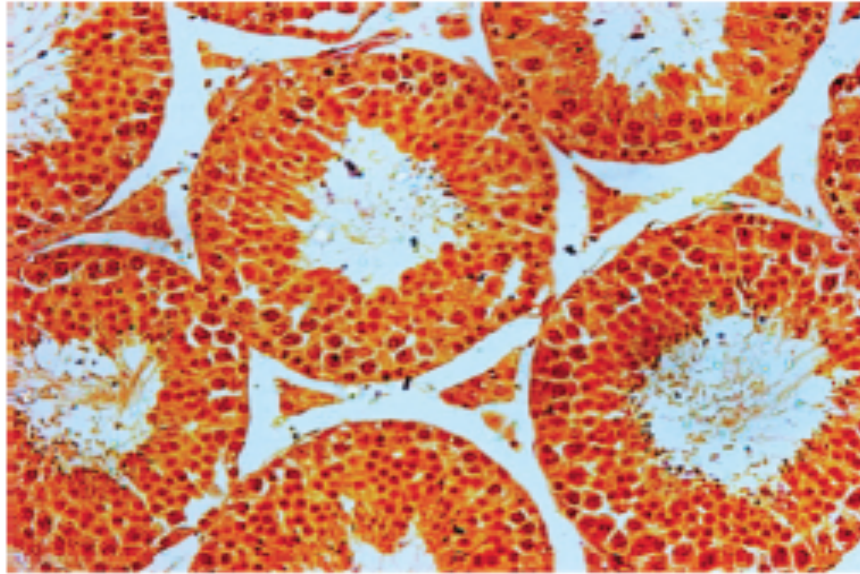
Images from Birnbaum NIEHS
Presentation 2017

GSM or CDMA modulations of RFR in male rats resulted in a statistically significant, positive trend in the incidence of schwannomas in heart.

"These findings appear to support the International Agency for Research on Cancer (IARC) conclusions regarding the possible carcinogenic potential of Radiofrequency Radiation." – National Toxicology Program, June 2016 Presentation

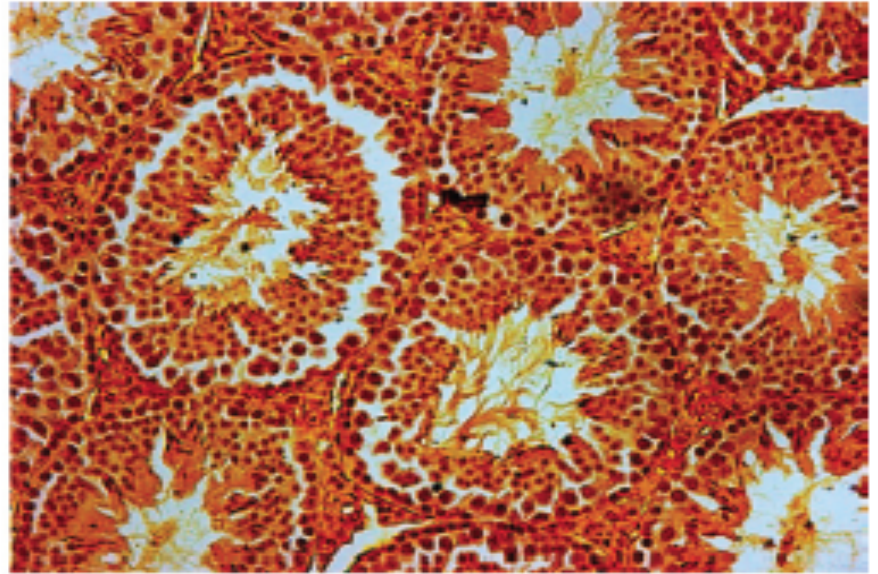
Microwave radiation impairs male reproduction

Multiple research studies and reviews find significant effects.



Shahin et al 2014

Control



Exposed

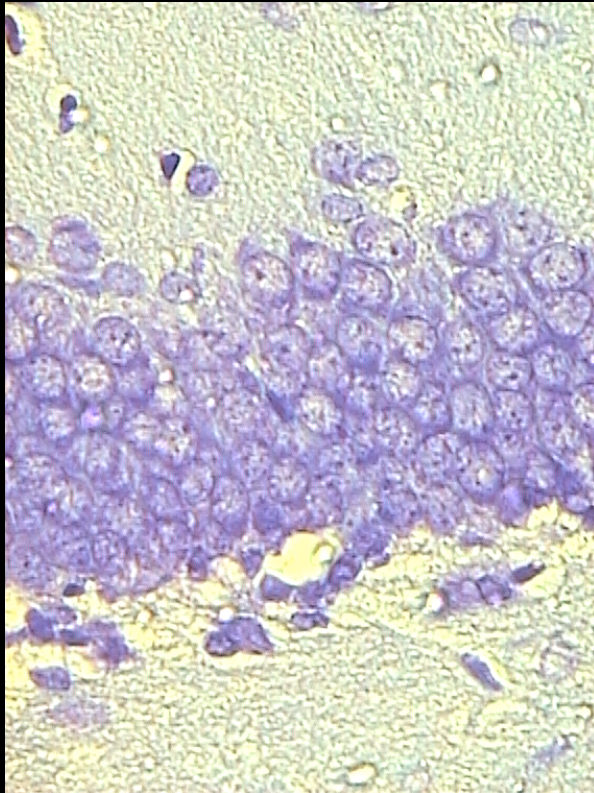
Testis slides show significantly increased i-NOS immunostaining in the spermatogonial cells

Mice exposed to nonthermal Wi-Fi 2.45-GHz 2h/d x 30 d

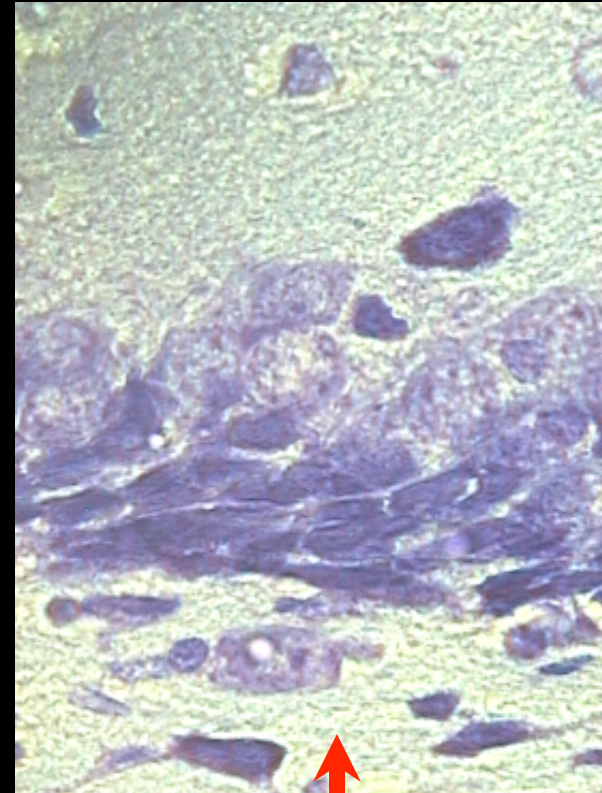
- ↑ ROS in liver, kidney, hypothalamus, and testis
- ↑ RNS, lipid peroxidation
- ↑ Antioxidant capacity, % viable sperm

Neurological Development Damaged by Radiofrequency Radiation: Multiple Published Studies

Control



EMF exposed

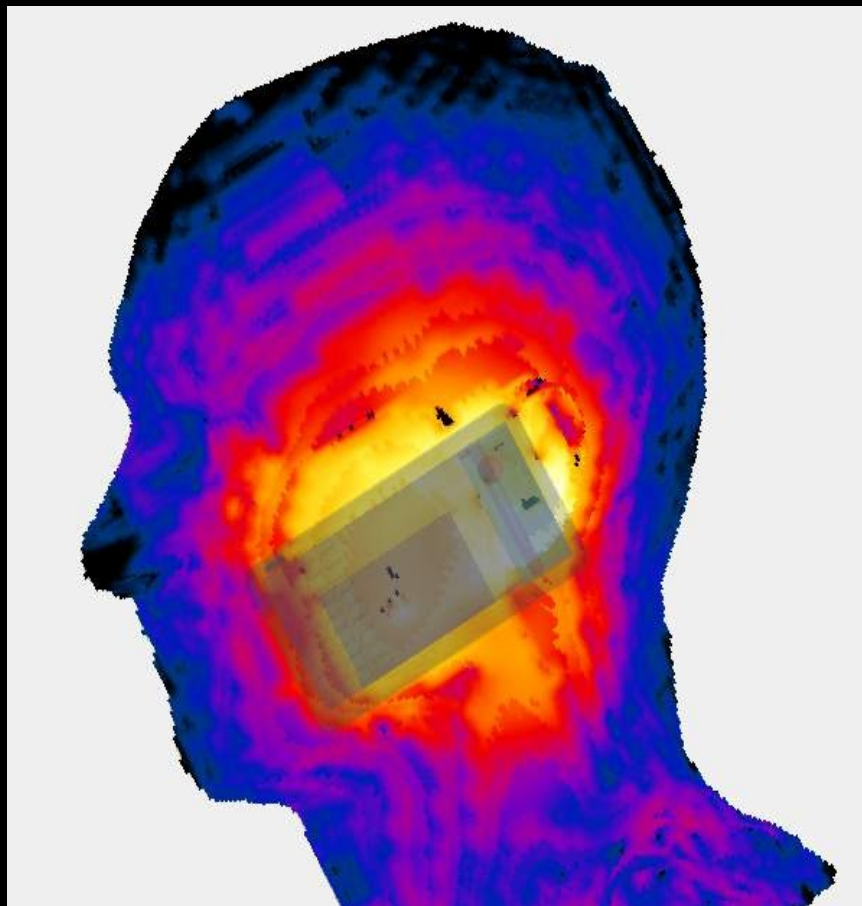


Odaci et al, 2009

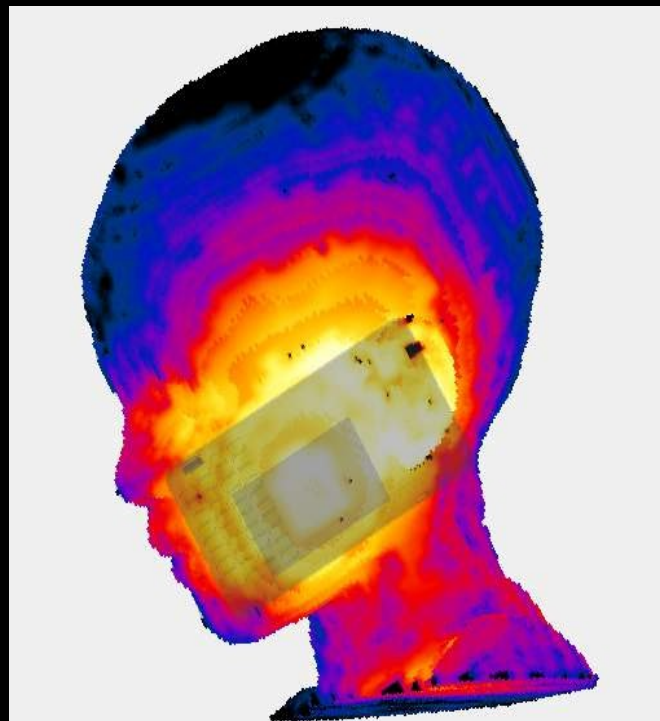
Prenatal 900 MHz EMF exposure decreased hippocampal granular cell number in the dentate gyrus of newborn rats

Children are More Vulnerable

34 Year Old Male



6 Year old



Anatomically based Model of
Porto Alegre Environmental
Health Trust (PAEHT)

Wireless radiation penetrates into children's brains and bodies more deeply than into adults- Up to two times in their brain and ten times into the bone marrow of their skull. Their brain and immune system is still developing.

Wireless radiation from far field penetrates children's skulls, brains and bodies more deeply than into adults.



Image of the simulation of far field radiation penetration into differently aged humans. Seawind Project, EU Commission

5G Millimeter Waves Uniquely Interact With Skin

Sweat glands act as helical antennas when exposed.

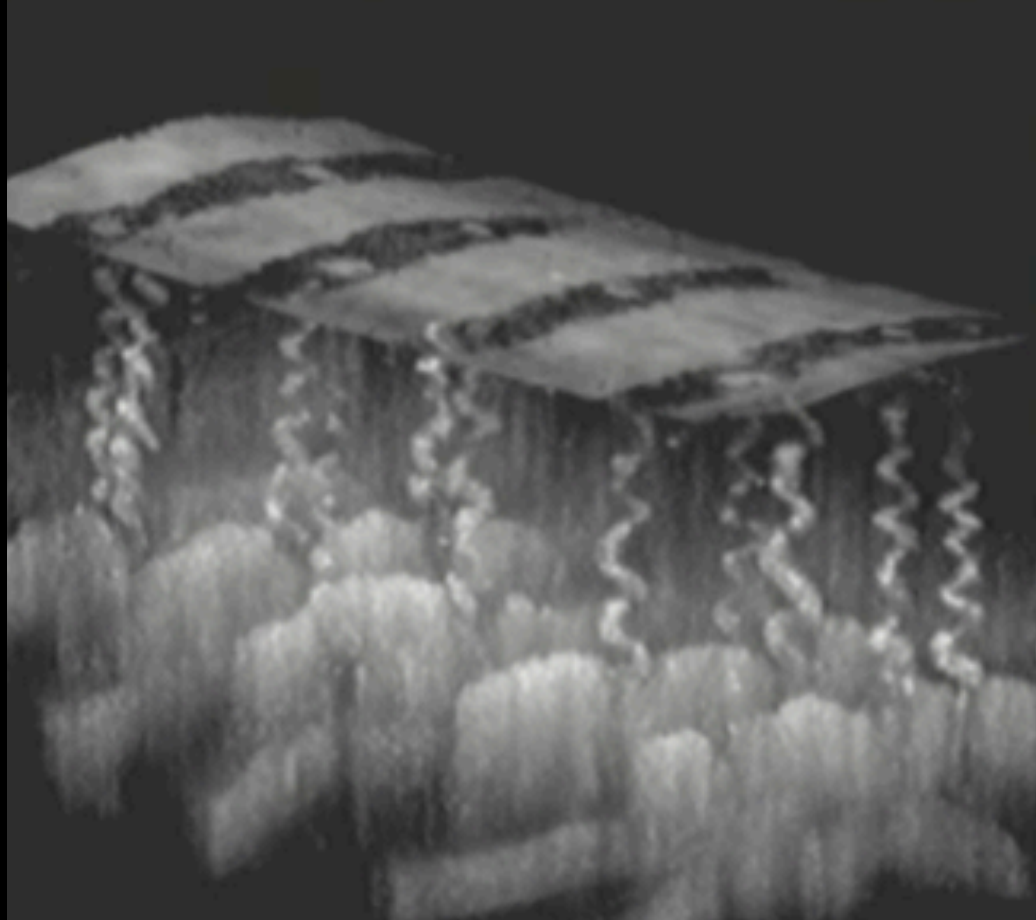


Image From Lecture by Dr. Ben-Ishai and Dr. Yuri Feldman of the Spectroscopy Laboratory of the Department of Applied Physics, Hebrew University of Jerusalem

Active Denial System Crowd Control Weapon

Millimeter waves are used in US Government weapons at higher power to cause pain on contact and disperse crowds.



Images from videos on Active Denial System [and History Channel Report](#) on US Government Active Denial System
[US Department of Defense Non-Lethal Weapons Program FAOS](#)
[A Narrative Summary and Independent Assessment of the Active Denial System The Human Effects Advisory Panel](#)

Santa Clara Medical Association Bulletin Article on 5G Health Effects by Dr. Cindy Russell



**ARRYTHMIAS
HEART RATE VARIABILITY
TERATOGENIC EFFECTS
BACTERIAL AFFECTS AND
ANTIBIOTIC RESISTANCE
CATARACTS
IMMUNE SUPPRESSION
DNA DAMAGE**

*"Do not proceed to roll out
5G technologies pending pre-
market studies on health
effects"*

Dr. Cindy Russell

SCCMA V.P. Community Health

It would greatly extend FCC's current policy of the mandatory irradiation of the public without adequate prior study of the potential health impact and assurance of safety. It would irradiate everyone, including the most vulnerable to harm from radiofrequency radiation: pregnant women, unborn children, young children, teenagers, men of reproductive age, the elderly, the disabled, and the chronically ill." —Ronald Powell, PhD, Letter to FCC on 5G expansion (7)

BRAVE NEW WORLD OF COMMUNICATION

The use of mobile wireless technologies continues to increase worldwide. A new faster 5th generation (5G) telecommunication system has recently been approved by the Federal Communications Commission(FCC) with new antennas already being installed and tested in Palo Alto and Mountain

[Click for article online.](#)

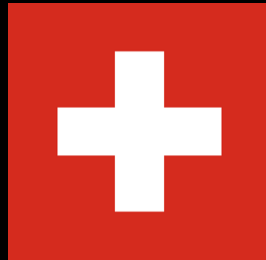
Government Health Agencies Advise Reducing Children's Cell Phone Radiation Exposure



United Kingdom



Russia



Switzerland



Finland



Ireland



Germany



Belgium



Greece



Israel



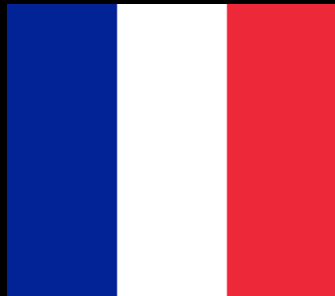
Turkey



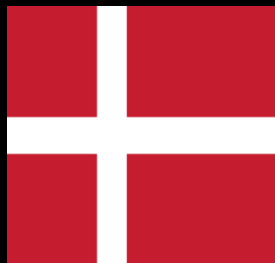
Austria



Singapore



France



Denmark



India



Australia

Symposium on Wireless & Health with USC's President Harris Pastide?



Slides for Discussion

Secondary Insurers will not Cover Health Damages from Wireless

- 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. “**
- Crown Castle 10k Annual Report 2016
- [Read Annual Reports With Warnings Here.](#)

The effect of millimeter-band radiation of nonthermal intensity on sensitivity of *Staphylococcus* to various antibiotics

- “It has been established that in the presence of subbactericide concentrations of active antibiotics the irradiation could result in both further suppression of bacteria growth and its stimulation.” - Bulgakova et al (1996)

<https://www.ncbi.nlm.nih.gov/pubmed/9044624>

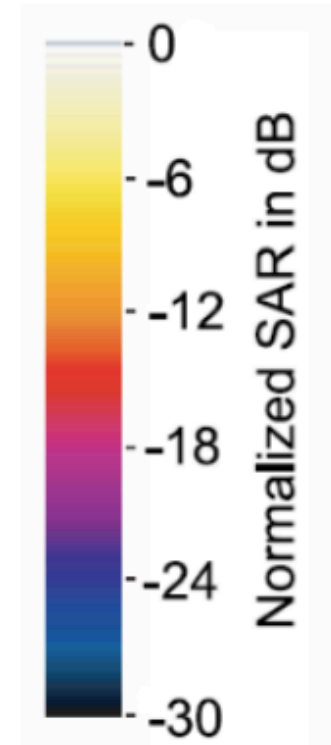
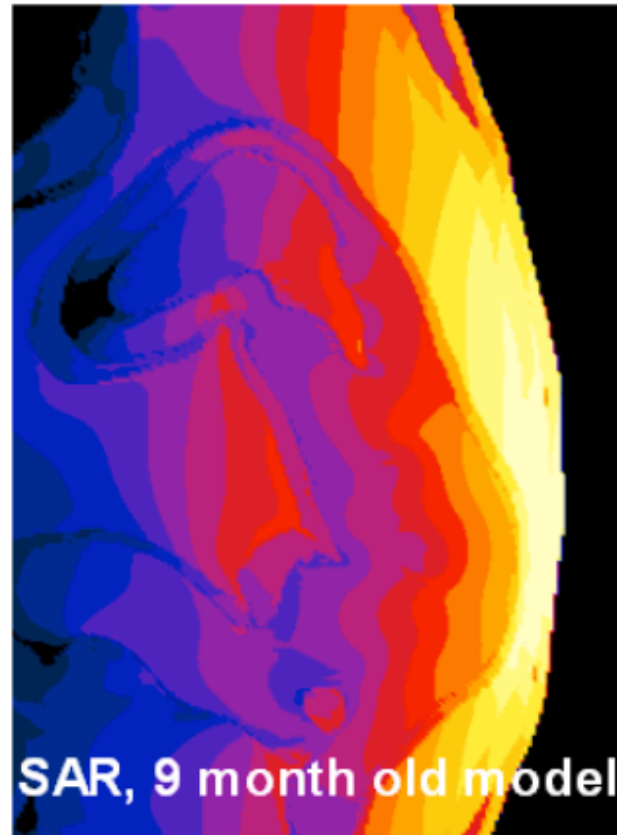
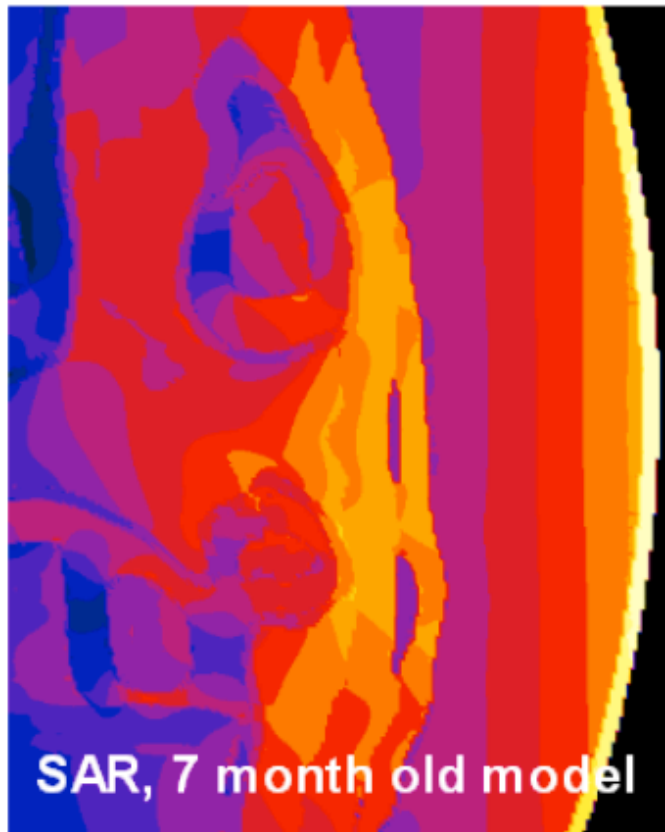
Medical organizations, expert groups and governments recommend reducing radiofrequency exposure to children.

- American Academy of Pediatrics
- Vienna Medical Association
- Athens Medical Association
- American Academy of Environmental Medicine
- EMF Scientists: Over 200 scientific experts
- The Russian National Committee on Non-Ionizing Radiation Protection
- The French National Agency of Health, Food, Environment and Labour
- The Council of Europe
- Maryland State Children's Environmental Health and Protection Advisory Council
- Swiss Physicians Association of Doctors for Environmental Protection
- International Society of Doctors for the Environment
- Irish Doctors Environmental Association
- New Jersey Education Association
- Over a dozen governments

[See links to Medical Recommendations](#)

Greatest exposure occurs to fetal head/spinal cord

Normalized SAR when 7 and 9 month fetus exposed to a dipole antenna in front of abdomen



(courtesy Andreas Christ, IT'IS, 2013)

Doctors Recommend Reducing Wireless Exposure to Pregnant Women To Protect the Baby Brain

10 WAYS TO HELP REDUCE YOUR EXPOSURE.

The BabySafe Project



www.BabySafeProject.org
#KnowYourExposure

- Avoid carrying your cell phone on your body (e.g. in a pocket or bra).
- Avoid holding any wireless device against your body when in use.
- Use your cell phone on speaker setting or with an “air tube” headset.
- Avoid using your wireless device in cars, trains or elevators.
- Avoid cordless phones, especially where you sleep.
- Whenever possible, connect to the internet with wired cables.
- When using Wi-Fi, connect only to download, then disconnect.
- Avoid prolonged or direct exposure to Wi-Fi routers.
- Unplug your home Wi-Fi router when not in use (e.g. at bedtime).
- Sleep as far away from wireless utility meters (i.e. “smart” meters) as possible.

The BabySafe Project is signed by over 140 medical experts

Biological effects reported after exposure in populations living near base stations from exposures at levels far below current exposure guidelines.

“Biological effects from exposure to electromagnetic radiation emitted by cell tower base stations and other antenna arrays” *Environmental Reviews*, Levitt and Lai 2010

- Research has 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

“Long-term exposure to microwave radiation provokes cancer growth: evidences from radars and mobile communication systems.” *Experimental Oncology*) Yakymenko et al. (2011)

“Mortality by neoplasia and cellular telephone base stations.” *Science of The Total Environment* Dode et al., (2011)

10 year Brazilian : A clearly elevated relative risk of cancer mortality at residential distances of 500 meters or less from cell phone transmission towers.

RF Effects Sleep



Dose-response relationship between EMF field intensity and its effects on brain physiology as demonstrated by changes in the sleep EEG and in cognitive performance. - Regel et al (2007)

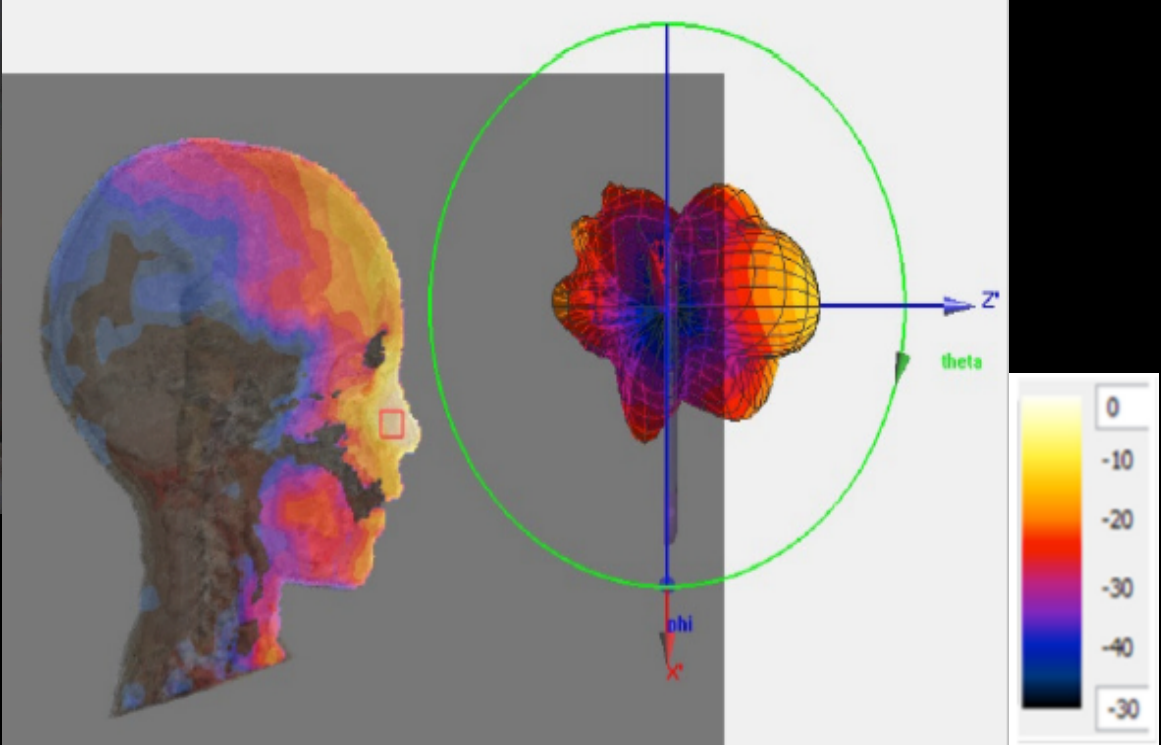
“Consistent with previous findings, our results provide further evidence that pulse-modulated RF EMF alter brain physiology.” - Schmid et al (2012)

Exposure was associated with a prolonged latency to reach the first cycle of deep sleep (stage 3). The amount of stage 4 sleep was also decreased in exposed subjects. Subjects reported more headaches during exposures vs. sham exposure. - Bengt et al (2007)

SAR in 6 Year Old from 2.45 GHz Wi-Fi Tablet



Tablet at 150 mm (5.9 inches)
from eye lens



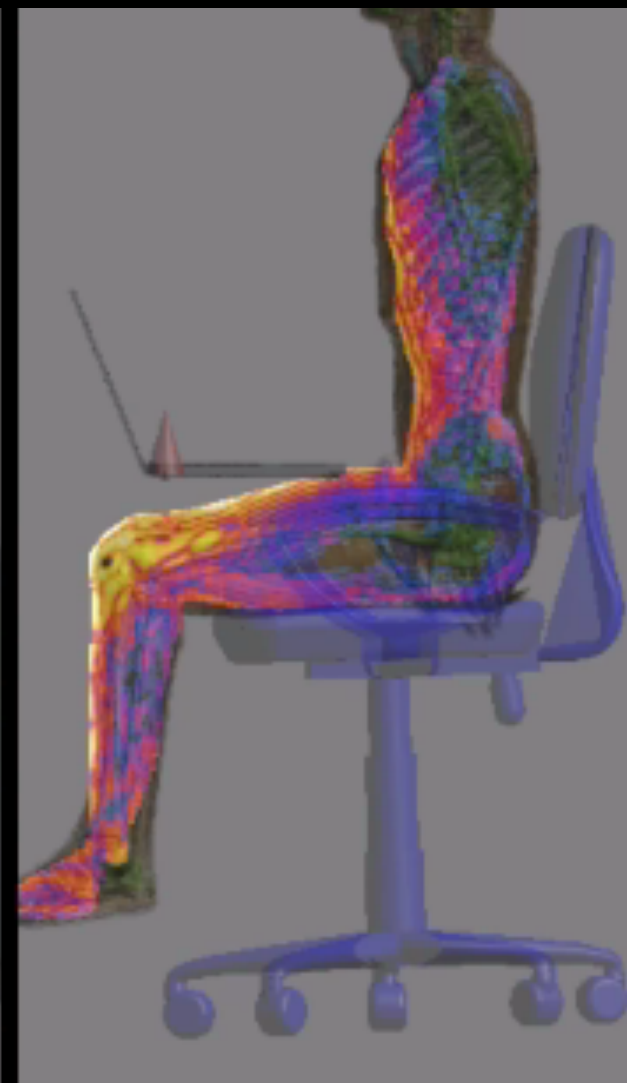
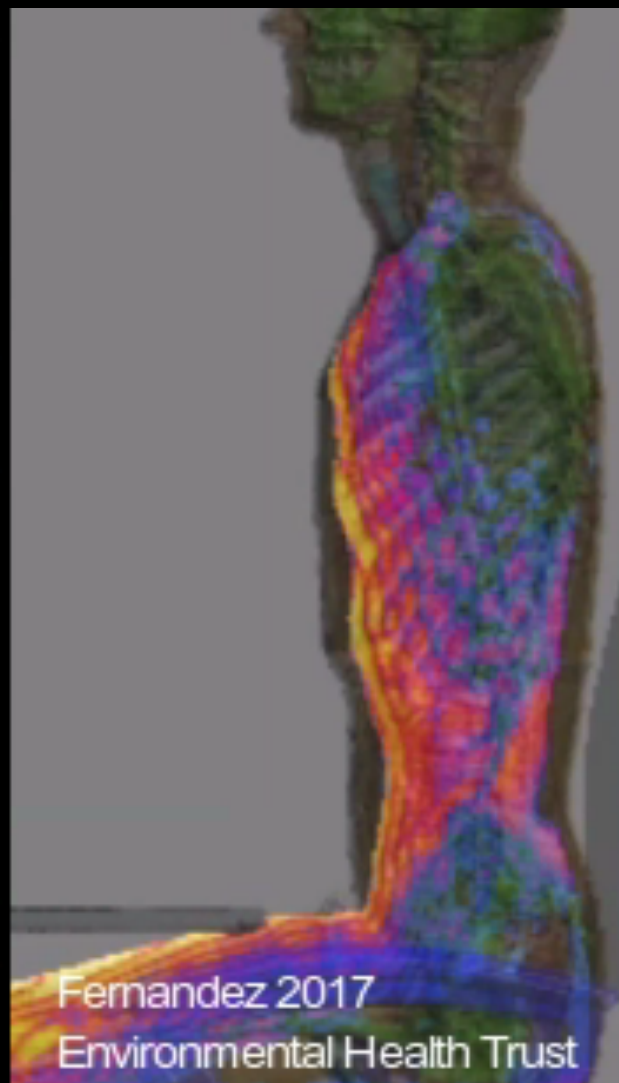
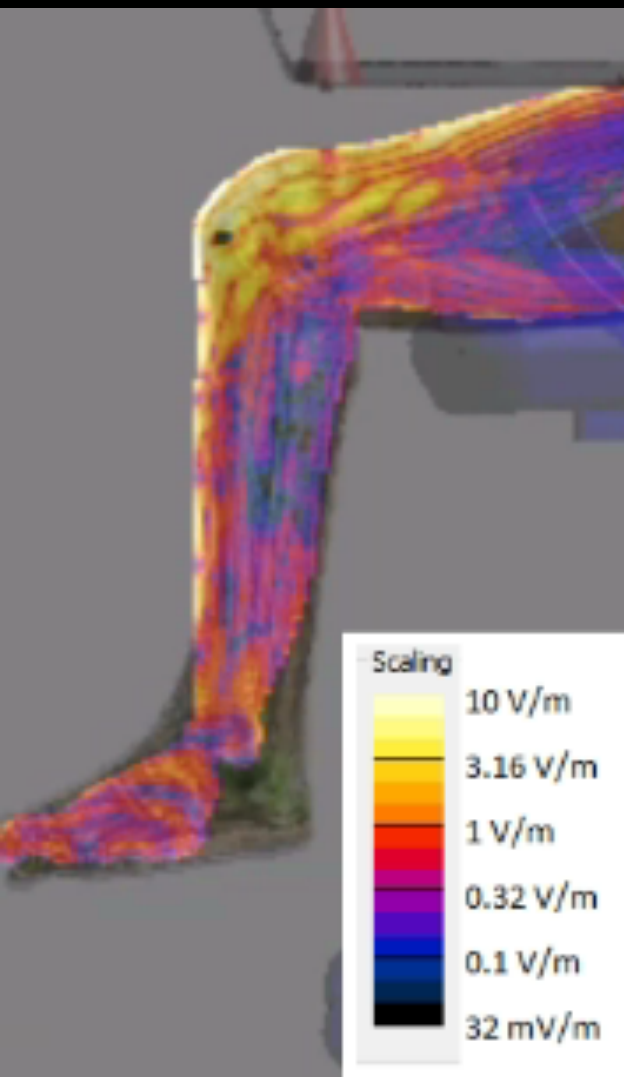
JULIANA BORGES FERREIRA, AND ALVARO AUGUSTO ALMEIDA DE SALLES (2015)

Fig. 7. Radiation pattern normalized to $0.0132 \text{ W/g} = 0 \text{ dB}$, with a 30 dB color scale, and SAR averaged over 1g cube of tissue.

Specific Absorption Rate (SAR) in the head of Tablet user's

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Wi-Fi Radiation Penetrates The Body



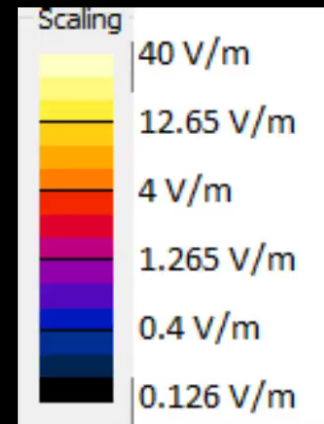
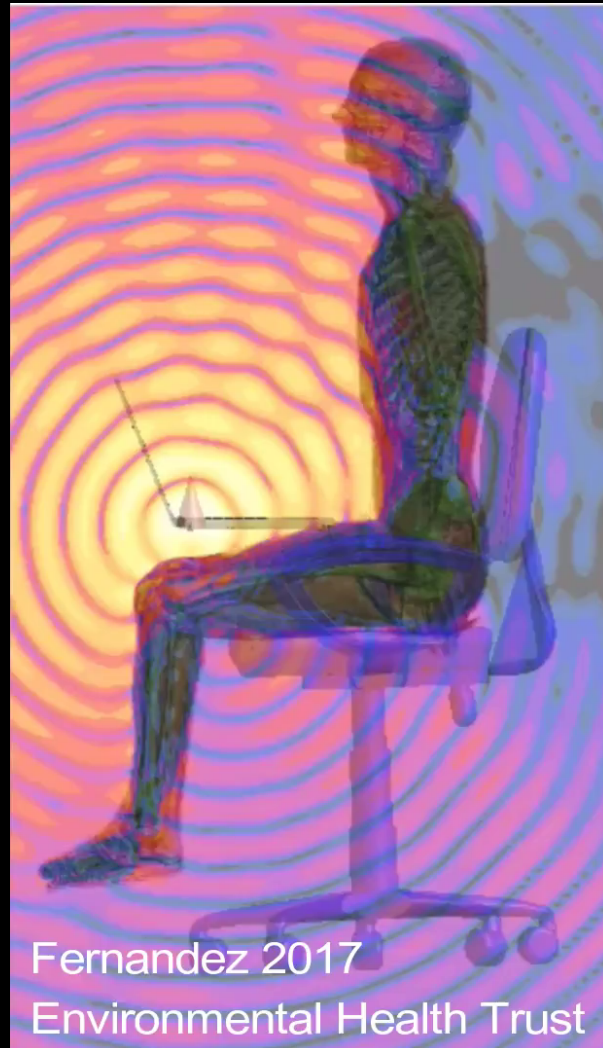
Eye Blink Protects Eye From Damage?

US Government assurance of “low risk” is based on the premise that eyes will close in millimeter wave beam.

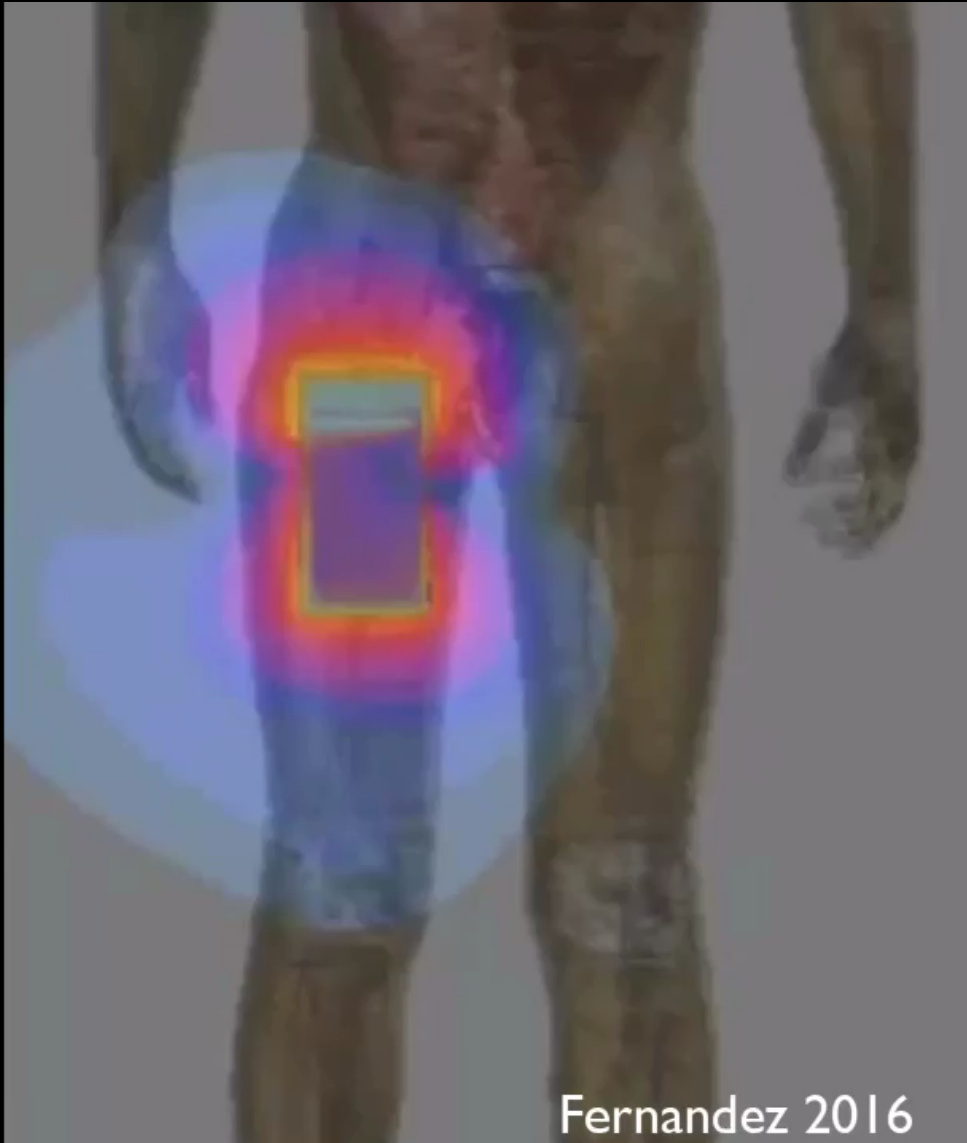
“AFRL researchers concluded and the HEAP panel concurred that the probability of eye damage caused by ADS exposure is very low. The innate blink reflex causes the eyelid to close upon sensing of the millimeter wave energy, protecting the eye from damage.”

[Human Effects Advisory Panel Report on Active Denial System](#)

Wi-Fi Radiation Penetrates the Body



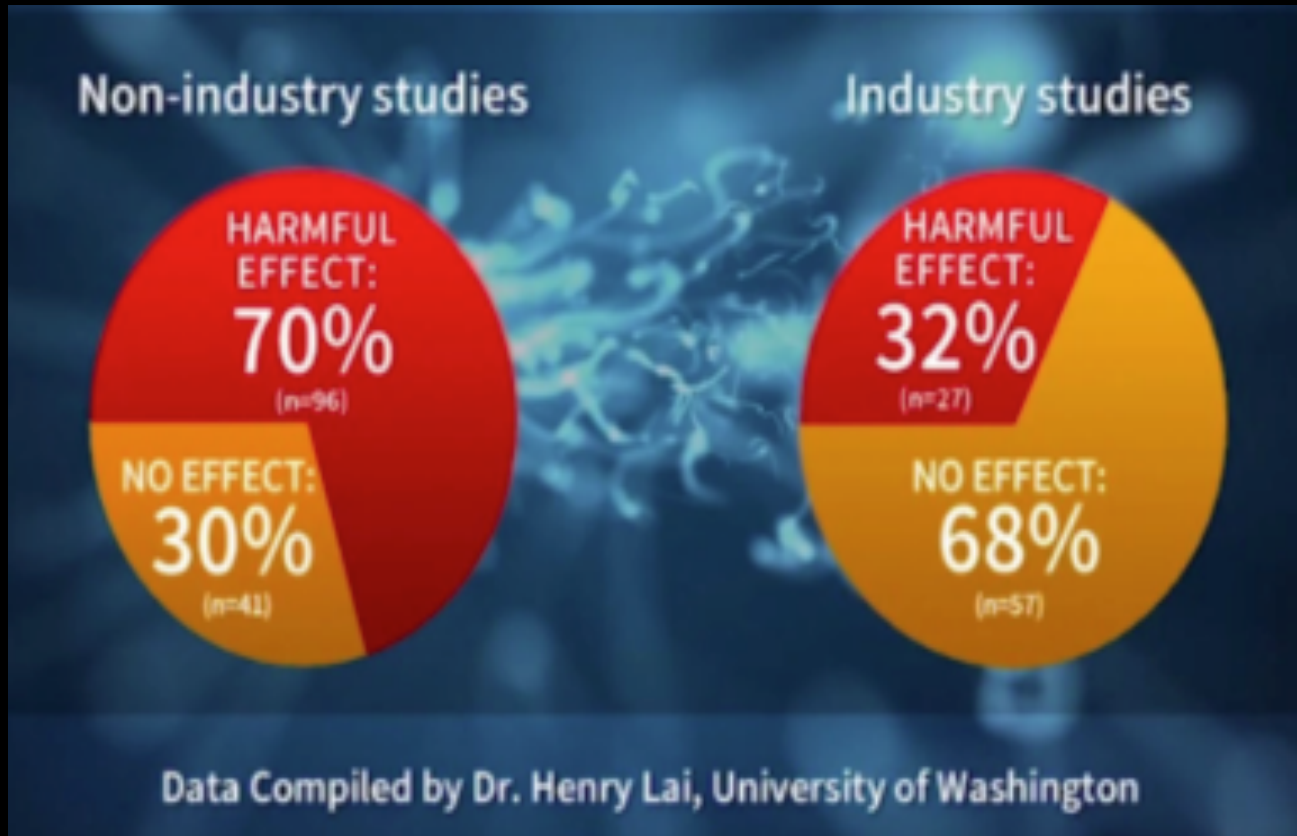
Cell Phones are not radiation tested in body contact positions.



France

- Tested over 500 phones
- 9 out of 10 phones violate safety limits on contact
- Phonegate

Why So Many Inconsistent Results?



Huss 2007: Systematic review- industry funded studies 90% less likely to report effect.

Valentini et al. 2011: “the existence of sponsorship and publication biases should encourage WHO intervention to develop official research standards and guidelines.”

Cell Phone Calls and ADHD

Potential of Lead Toxicity in Korean Children



“combined or cooperative toxic action of RF and lead on the developing brain.”

Byun et al. 2013 PLoS

2,422 children - 27 schools - 10 Korean cities - 2 y follow up
ADHD symptoms associated with voice calls, *only among children with higher blood lead values ($>2.35\mu\text{g}/\text{dL}$; comparable to U.S. BLLs)*

[Byun et al. 2013](#)

American Academy
of Pediatrics



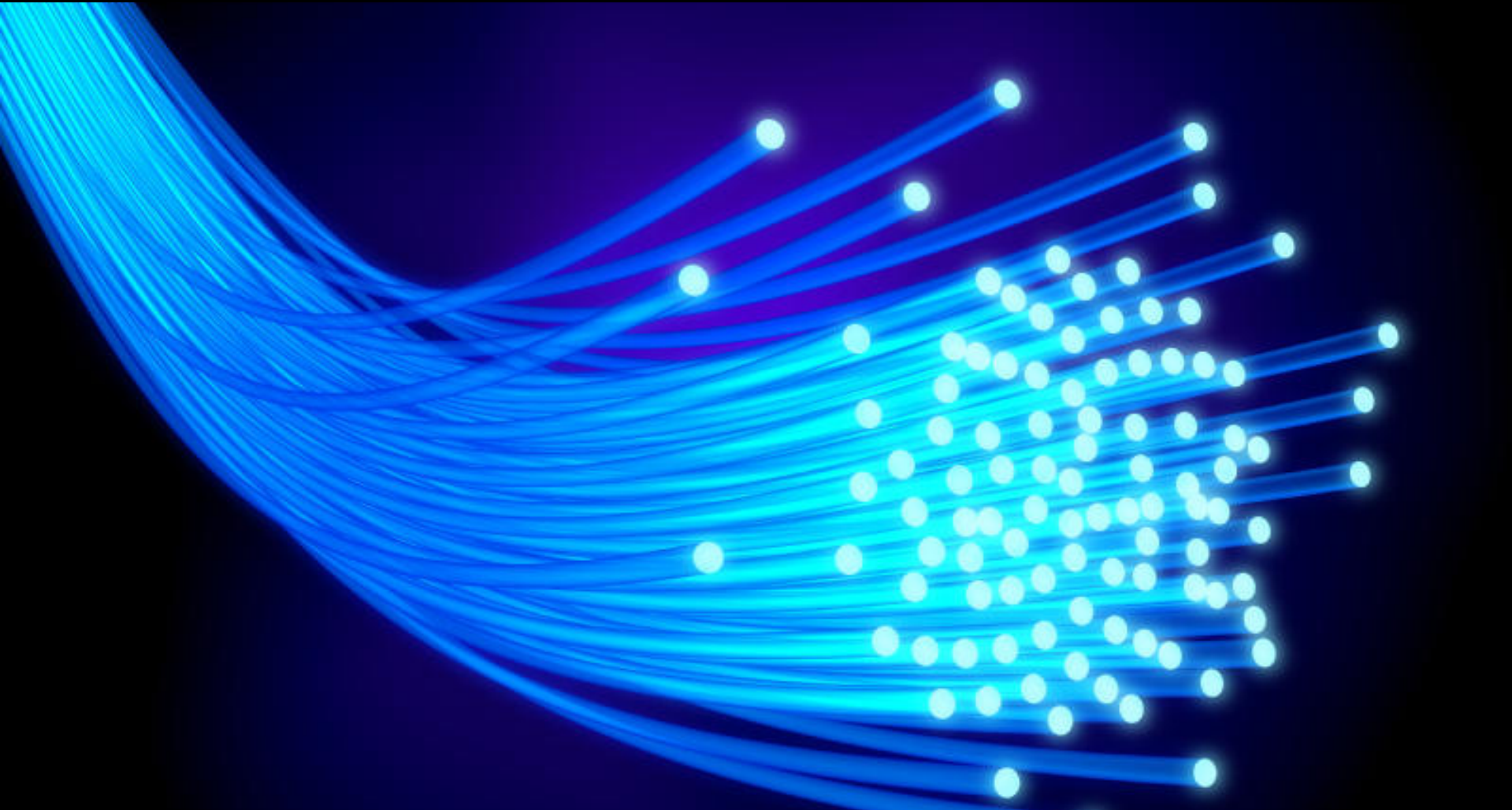
DEDICATED TO THE HEALTH OF ALL CHILDREN™

American Academy Of Pediatrics (AAP) Recommendations

- 2012: Urged support of Federal Legislation HR 6358 to develop safety standards and inform the public.
- 2013: Urged FCC to reevaluate RF guidelines to ensure they protect children and pregnant women and reflect current use patterns in testing and regulatory limits.
- 2016: Reduce radiofrequency radiation: After NTP study results released AAP issued “Ten Tips” to reduce children’s radiofrequency radiation.
- [Read Press Release here](#)

Solutions

Premarket safety testing before infrastructure development, postmarket surveillance, fiberoptoics and wired technology, R and D, proper safety standards to be set.



All Cell Phones & Wireless Devices Radio Frequency Microwave Radiation Emissions



Cell Phones



Tablets



Laptops



Computers



Wi-Fi Router
Access Points



Video
Game
Consoles



Wi-Fi
Printers

Manufacturers' Fine Print Safety Advice On All Cell Phones and Wi-Fi Devices about Tested Distances



“ To maintain compliance with FCC’s exposure guideline, place the child unit **at least 20 cm (8 inches)** from nearby person’s” - **First Years Baby Monitor Manual**



Body- worn SAR testing has been carried out at a separation distance of 1.0 cm. To meet RF exposure guidelines during body worn operation, the device should be positioned **at least this distance** away from the body.

Samsung Galaxy S5

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Myth:

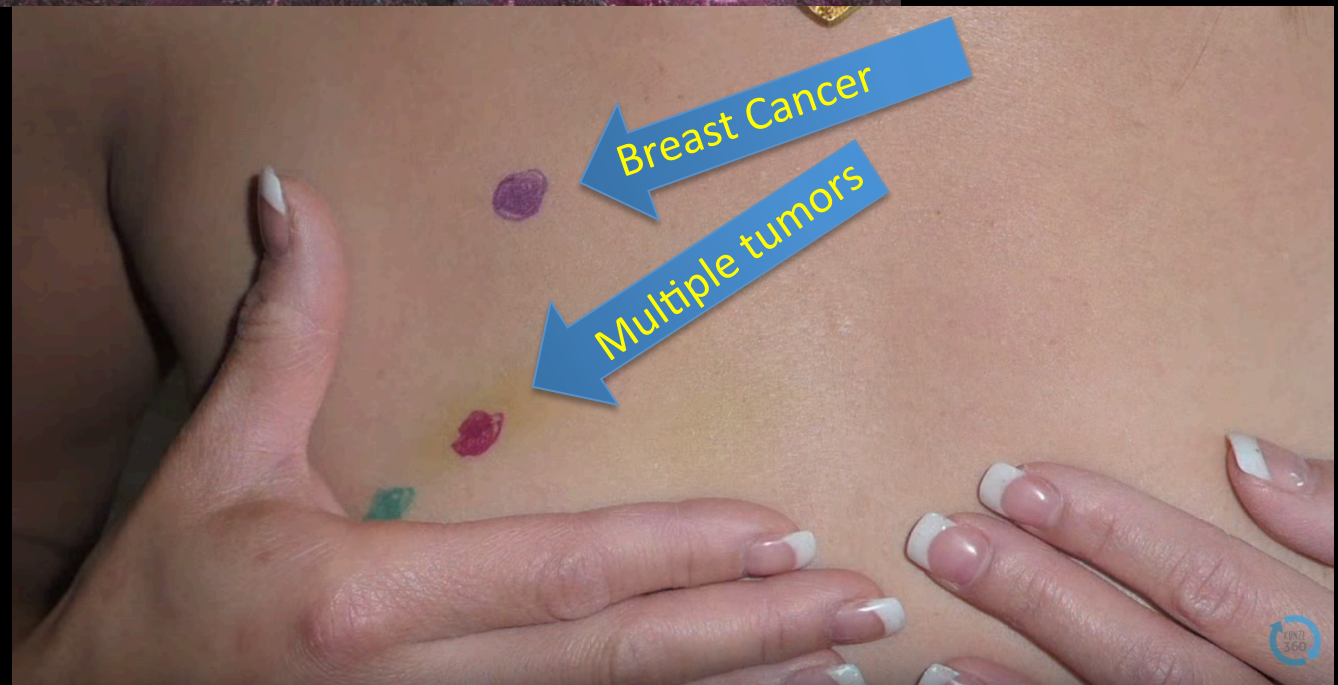
Cell Tower Radiation is like the Sun

Fact:

Cell tower radiation is man made -
polarized- radiation.

Information carrying waves are not
sunlight.

Breast Cancers From Cell Phone in Bra



Published Case Reports
No Genetic Predisp
No Risk Factors
Unusual Tumors
Multifocal
Directly at antennae
location

Since 1997 Secondary Insurers do not cover health damages from wireless

Lloyds of London underwriters deny coverage for health damages from wireless devices

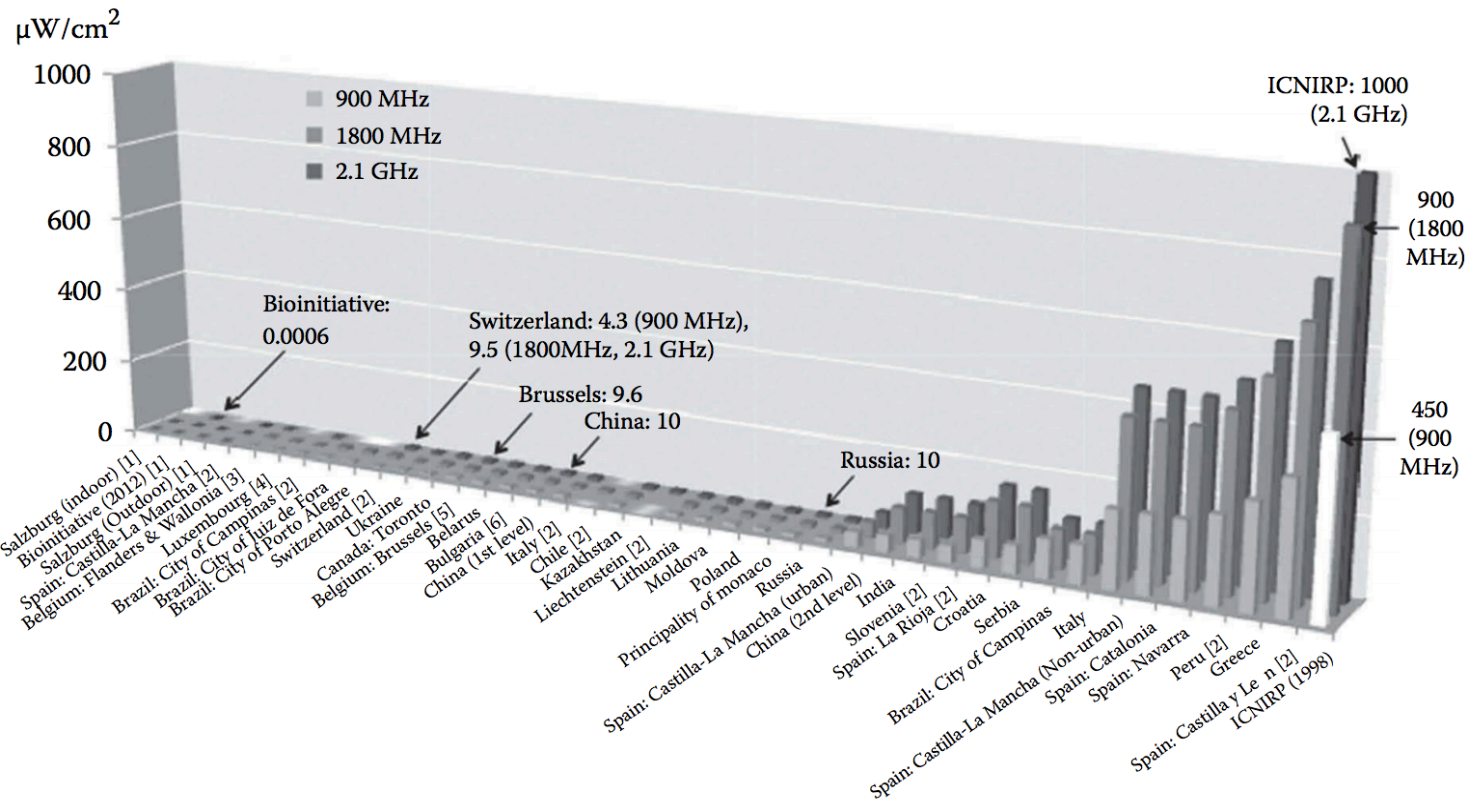
Swiss Re 2014 rates electromagnetic fields as one of the 6 top risks businesses face today, above things like Mad Cow Disease.

“Risk from dangers linked to EMF can be classified as an emergent risk”-- the same category once occupied by asbestos

General Insurance Exclusions: Electromagnetic fields directly or indirectly arising out of, resulting from or contributed to by electromagnetic fields, electromagnetic radiation, electromagnetism, radio waves or noise.



RF EMF Legal Exposure Limits and Nonbinding Recommendations in Different Countries



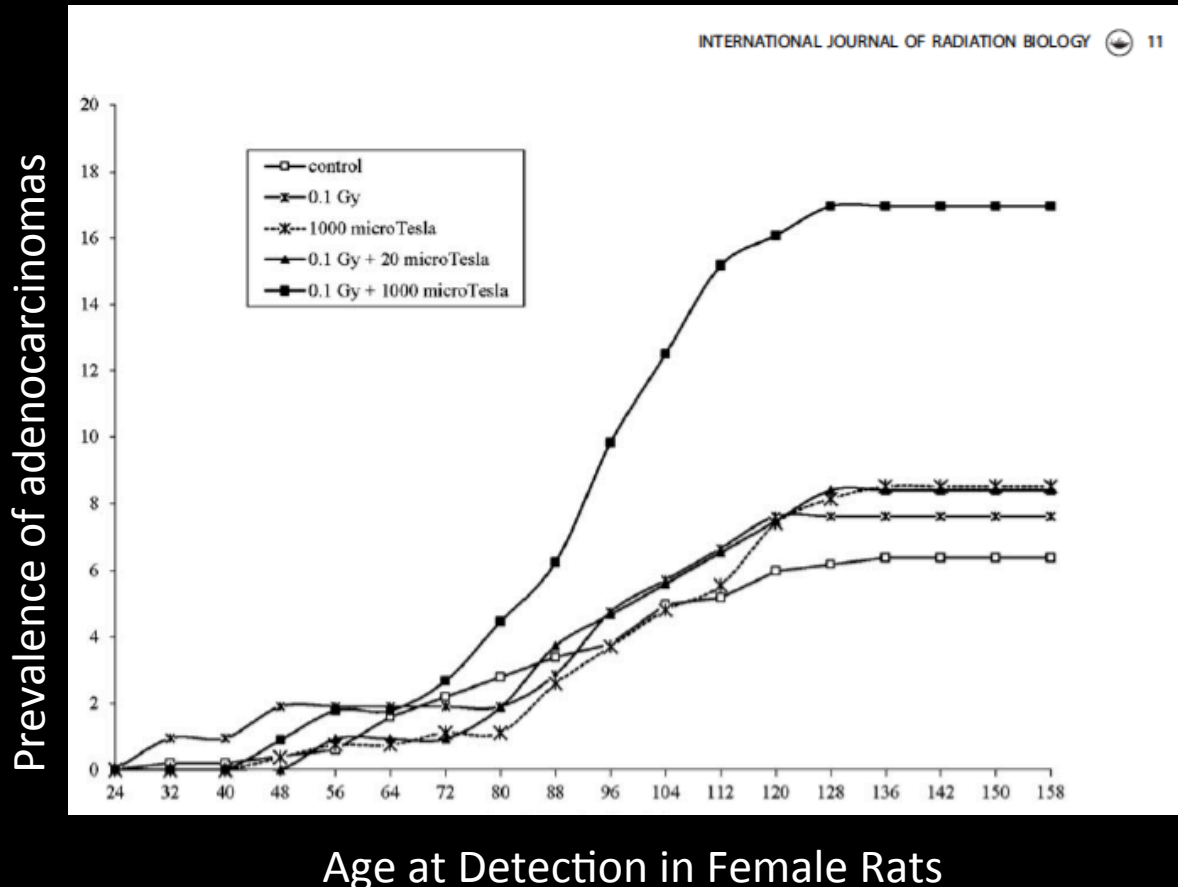
[1] Precautionary recommendation. [2] Sensitive areas.

[3] Maximum threshold per antennae. [4] Maximum per operator & per antennae system.

[5] For all antennas taken together. [6] Periodical & short stay areas.

© Dr. Isaac Jamieson

In lifetime cancer study EMF creates synergistic effects with ionizing radiation



650 Exposed /1,001 controls

- Lifespan exposure from in Utero
- 50 Hz EMF (200 mG or 10 G)
- One time dose 0.1Gy at 6 wk

Results = Increased

- mammary adenocarcinomas (both sexes)
- incidence of heart malignant schwannomas (males)
- hematopoietic neoplasias [leukemia and lymphoma] in males treated at 1,000 μ T plus 0.1 Gy.

[\(Soffritti et al., 2016\)](#)

“These results call for a reevaluation of the safety of non-ionizing radiation.”



World Wide Precautionary Action



France: Phones sold with headsets. Wi-Fi Banned for Kindergarten/Wi-Fi off when not in use. New national law



Belgium: Banned cell phones for children.



Israel: Wi-Fi to be removed from all Haifa schools as of April 2016, Health Ministry recommends lowering exposure at home and school.



Italy and Spain: Several local governments voted to declare precautionary principle: protect children and use wires.



UK, Switzerland, Australia, Germany, Canada: Health agencies recommend reduced cell phone exposures.



India: Exposure limits lowered to 1/10 of the ICNIRP level, recommendations to reduce cell phone exposure, SAR labeling on phones, some govs ban towers near schools.



Maryland State Children's Environmental Health and Protection Advisory Council, 19 Members (pediatricians & public health)

Purpose: To identify environmental hazards that may affect children's health and recommend solutions/guidelines to reduce and eliminate hazards.

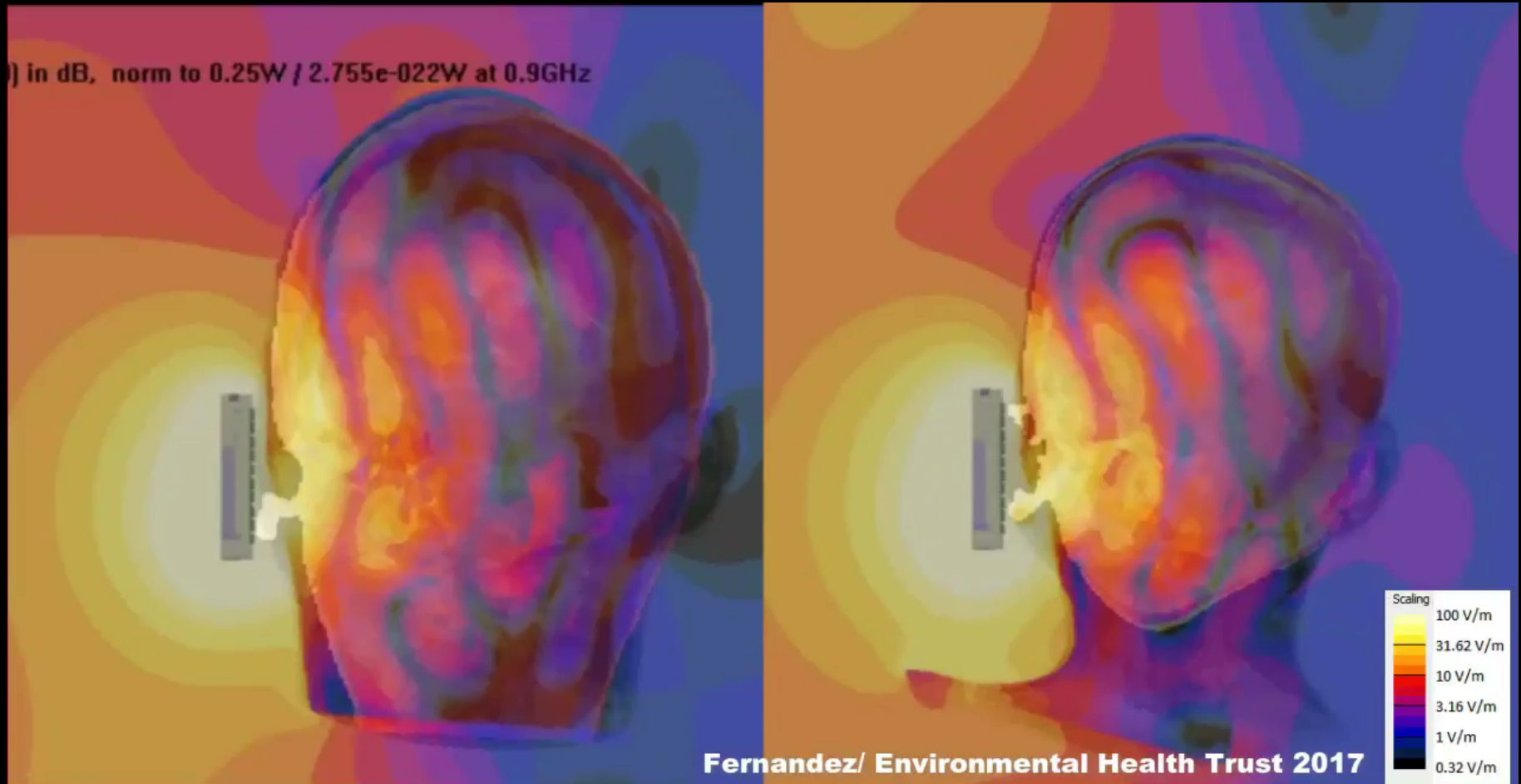
Council is considering the safety risks of cell towers now.

“The Council recommends limiting exposures as much as feasibly practical.”

“The Maryland Department of Health and Mental Hygiene should provide suggestions to the public on ways to reduce exposure.

The United States Department of Health and Human Services to formally petition the FCC to ensure the FCC exposure limit is protective of children’s health and that it relies on current science”.

Relatively Greater Absorption Into Faster Growing Brain Tissues of Children



Cell Phone Radiation into Adult Male and 6 Year Old Child

“two times higher in the brain and 10 times higher in the bone marrow of the skull compared with mobile phone use by adults.” - International Agency for the Research on Cancer

American Academy
of Pediatrics



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American Academy Of Pediatrics (AAP) Recommends *Reducing* Exposure to RF Radiation

AAP website states:

“A study confirmed concerns that living nearby mobile phone base stations increased the risk for developing:

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

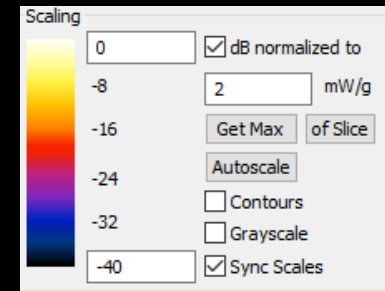
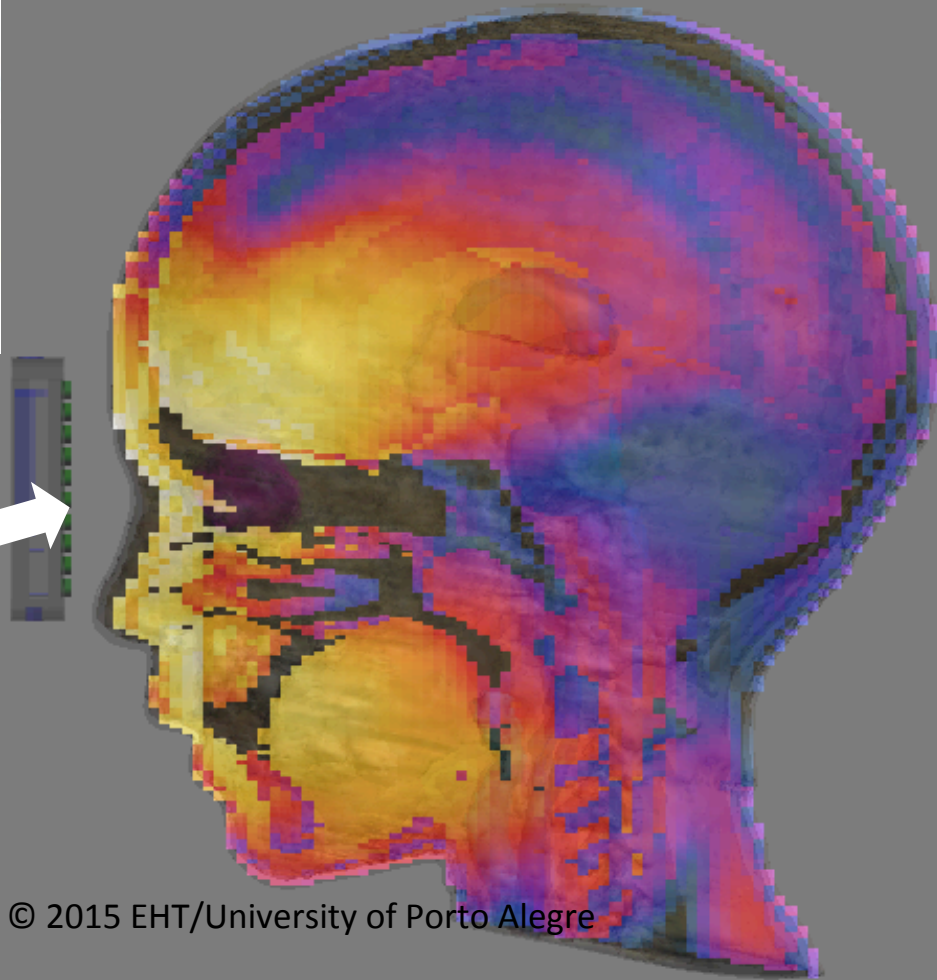
“In large studies, an association has been observed between symptoms and exposure to these fields in the everyday environment.”

The AAP lists 10 ways to reduce exposure to children and has urged US government for review of RF.

[-American Academy of Pediatrics Website on Electromagnetic Fields](#)

Microwave Radiation into the 6 Year Old Child

From Virtual Reality Simulations



40dB color Scale.
Smartphone
placed in front of
the eyes as it
would be placed
using the
cardboard virtual
reality holder.

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