Health Risks of Non-thermal EM Fields & Planned 5G Antenna Densification





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Berkeley CA

Jan 17, 2020

Early History of Health Effects of Radiofrequency and Microwave Radiation

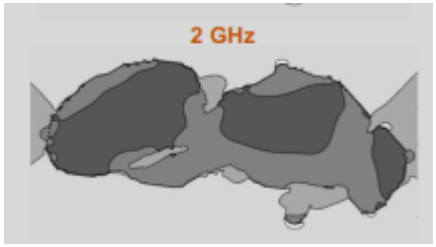
- Microwave Auditory Effect (Frey, 1962)
- Microwave Blood Brain Barrier leak (Frey,1970)
- MW bibliography for US Navy (Z. Glaser, 1971)
- MW form cataracts in eyes (Zaret to Congress, 1973)
- Massive Compilation by Bioinitiative Group (latest 2017)
- RF/ MW as 2B possible carcinogen (IARC, 2011)

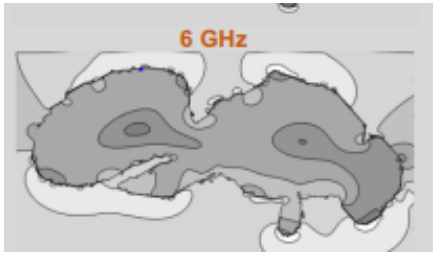
Thousands of Scientific Studies have shown Adverse Health Effects for over 50 years but Economic Factors Predominate and Exposure Guidelines consider only Thermal (Heating) Effects

Check out : www.bioinitiative.org

5G will affect Honey Bees

SCIENTIFIC REPORTS
natureresearch



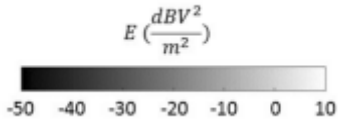


Radio-Frequency Electromagnetic Field Exposure of Western Honey Bees

Arno Thielens[1,2*], Mark K. Greco[3], Leen Verloock[1], Luc Martens[1] & Wout Joseph[1]

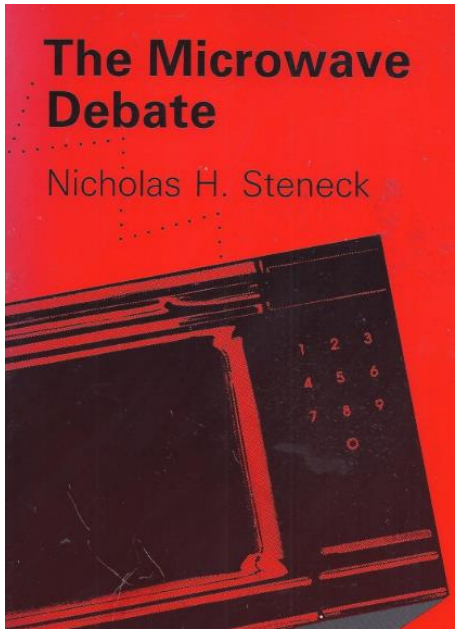
(2020) 10:461 |
https://doi.org/10.1038/s41598-019-56948-0

Lighter Color is worse



- Honey Bees' RF exposure to new 5G frequencies is being studied for absorbtion by their bodies between 0.6 to 120 GHz
- Absorbed power increases by factors 16 to 121 when the frequency is increased from 600 MHz to 6 GHz
- Frequencies higher than 3GHz would lead to an increase of this absorption between 390–570%

Debate on Dangers of Microwaves

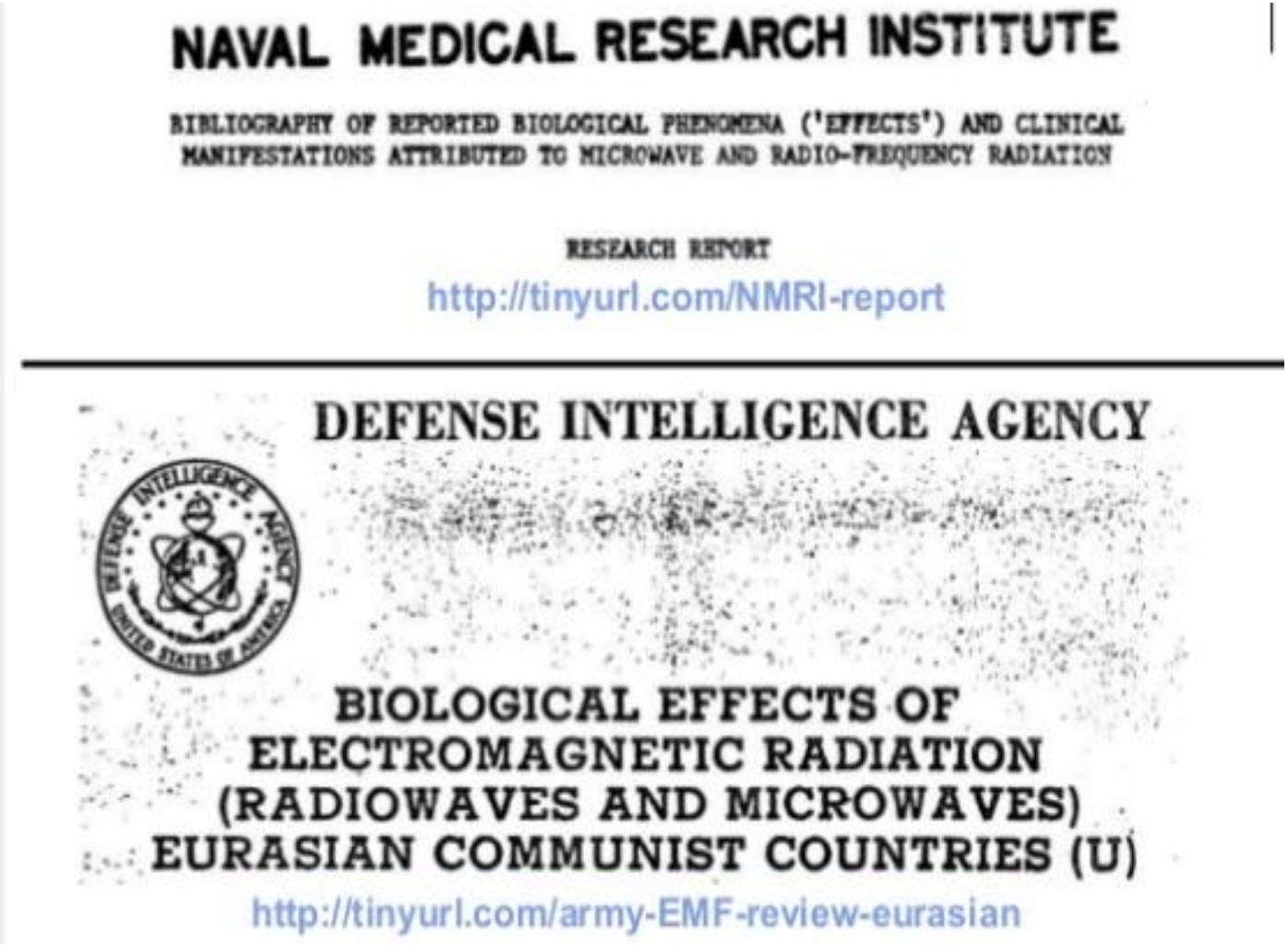




Allan Frey Herman Schwan

- Goes back to the discoveries of Allen Frey's 1961 Microwave Hearing non-thermal effects. Also discovered Blood Brain Barrier Effects of MW
- Herman Schwan helped to define the currently used thermal health approach to microwave radiation. (Ref: HP Schwan , 1957, Electrical properties of cellular tissues and suspensions, Adv. Biol. Med. Phys., 5, 147-209)
- Nicholas Steneck also describes the Soviet microwave attacks on U.S. Embassy in Moscow

US Military reported Harmful Non-Thermal Radiation Effects already in 1970s



NAVAL MEDICAL RESEARCH INSTITUTE

BIBLIOGRAPHY OF REPORTED BIOLOGICAL PHENOMENA ('EFFECTS') AND CLINICAL MANIFESTATIONS ATTRIBUTED TO MICROWAVE AND RADIO-FREQUENCY RADIATION

RESEARCH REPORT

http://tinyurl.com/NMRI-report

- Zorach R Glaser April 1972
- 2300 references

DEFENSE INTELLIGENCE AGENCY

BIOLOGICAL EFFECTS OF ELECTROMAGNETIC RADIATION (RADIOWAVES AND MICROWAVES) EURASIAN COMMUNIST COUNTRIES (U)

http://tinyurl.com/army-EMF-review-eurasian

- Ronald Adams
- Dr R.A.Williams
- March 1976

Also available at www.magdahavas.com

Wireless Evolution

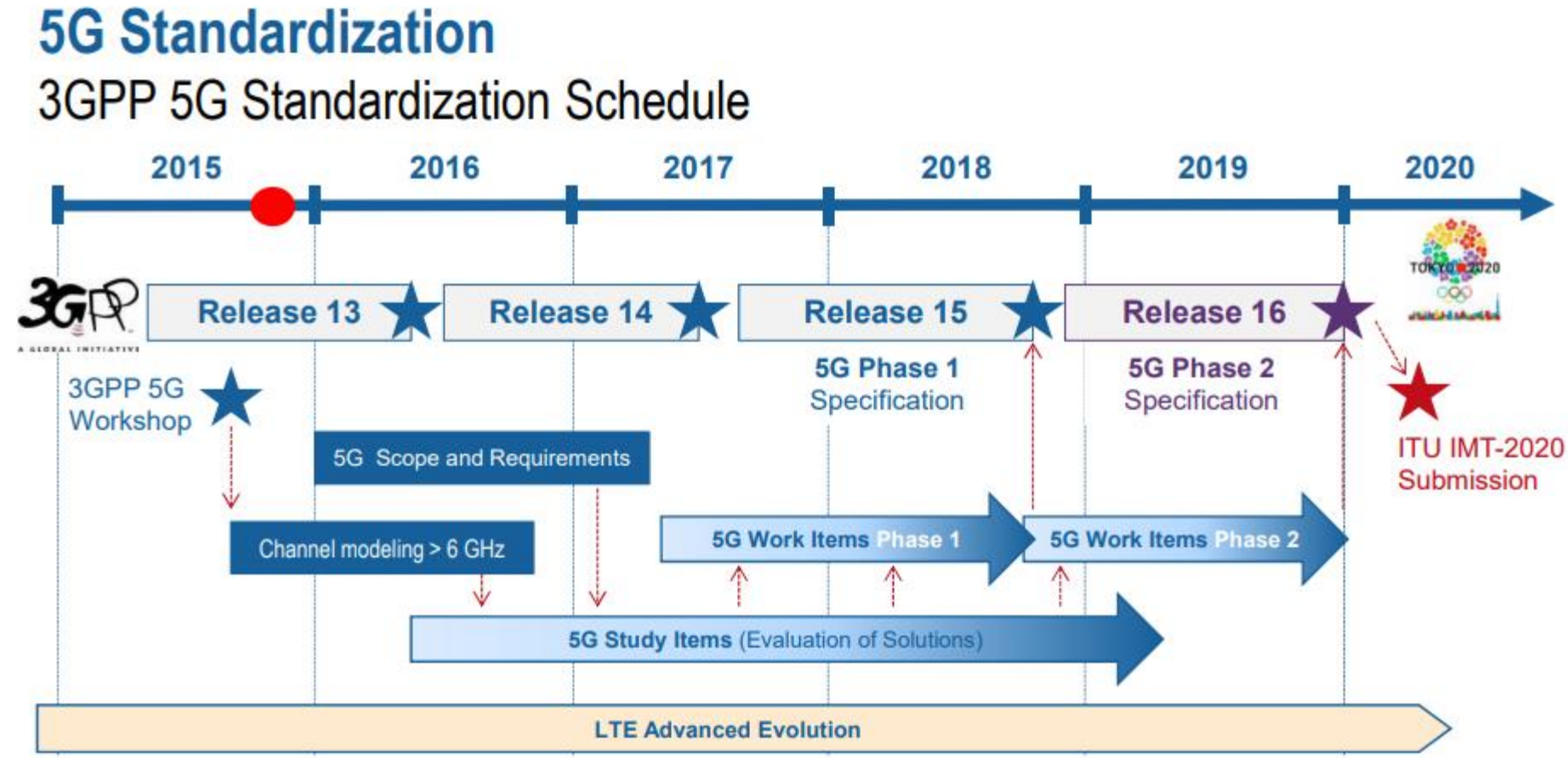
- **1G** – 1980s Principally Analog **Voice**
- **2G** – 1991 Digital, GSM, Data:100kB/s
  - Narrow Band **Voice & Text**
- **3G** – 2001 UMTS, HSPA Data: 2 MB/s
  - Broad Band **Browsing & Internet**
- **4G** – 2010 LTE, LTE Advanced **Video**
  - Mobile Broad Band, 1 HD movie in 6 minutes
- **5G** – LTE on Steroids, > 6 GHz **Machines - IoT**
  - Massive MIMO, Beamforming Technologies – Not Studied



What are the Expected Health Effects ?

Source: http://europa.eu/rapid/press-release_MEMO-14-129_en.htm

How German Rhode & Schwarz sees 5G



ROHDE&SCHWARZ

Conclusion

Is 5G just the next generation? No: It is a paradigm shift!

This Technology has been Years in the Making !

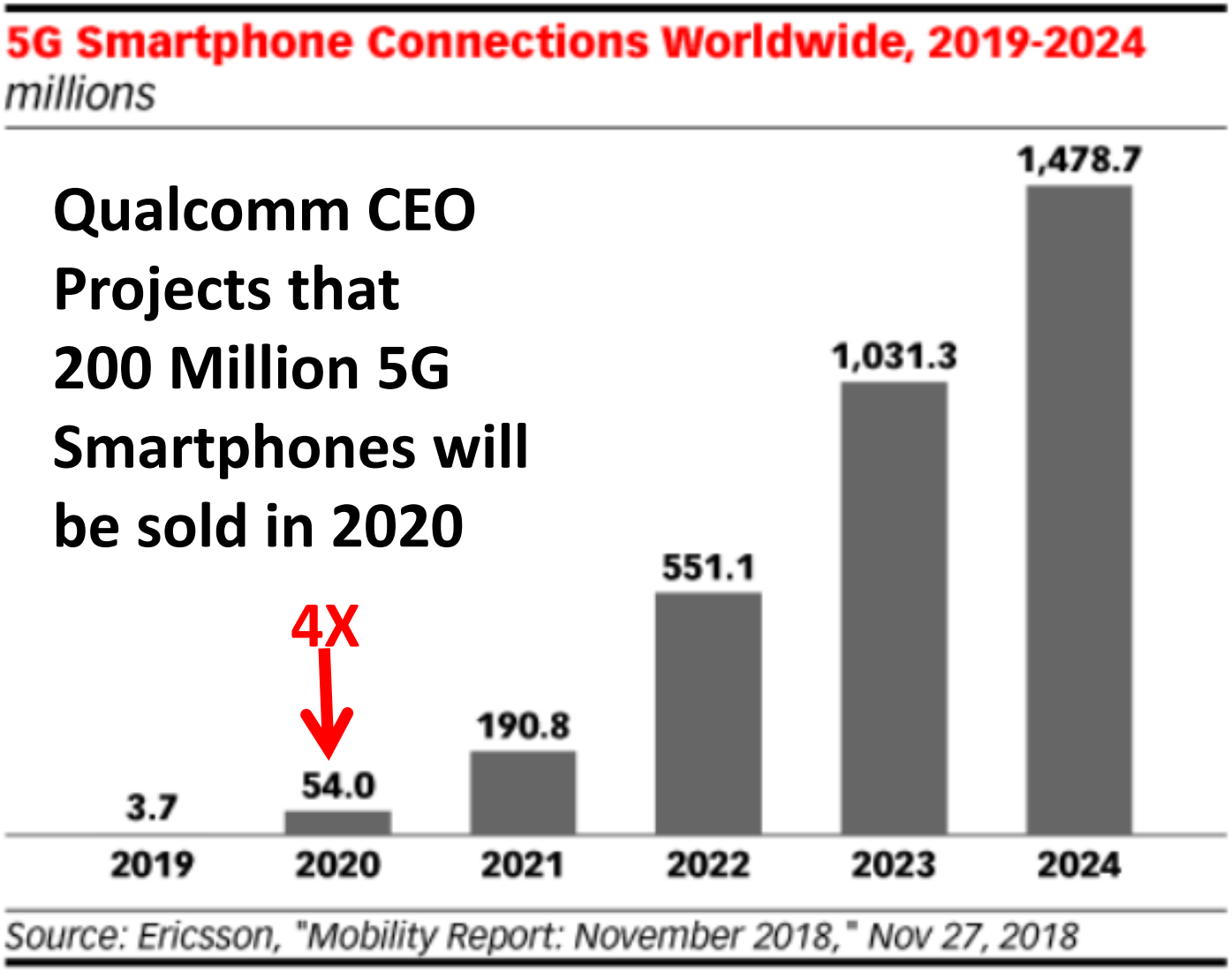
Telecoms predict Massive Windfall



- **Telecon Ericsson Forecasts for 5G in 2024 :**
- 9 Billion Mobile Subscriptions
- 22 Billion IoT connections
- 1.9 Billion 5G subscriptions
- 45% Global Population covered by 5G

https://www.ericsson.com/4a3114/assets/local/newsroom/media-kits/5g/doc/ericsson_this-is-5g_pdf_v4.pdf Data from 2018 version of document.

Ericsson Predicts 400% Increase in 5G Smartphone Connections in 5 Years



Insurance Companies REFUSE to Cover Wireless Industry for RFR Health Effects

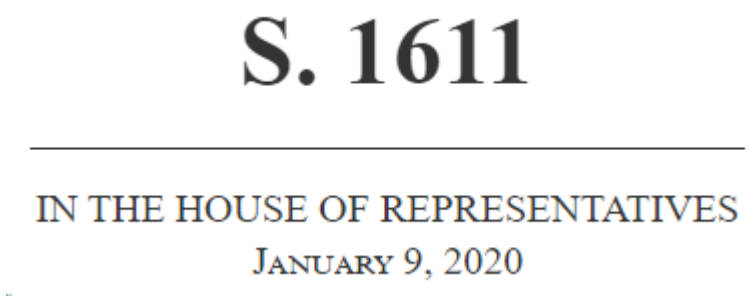
- In a 2013 Emerging Risk Report, Zurich based ***Swiss Re***, the second-largest reinsurer in the world, listed electromagnetic fields (EMFs) in the highest category of casualty risk due to "unforeseen consequences" beyond 10 years.
- Most Wireless Service Providers cannot obtain insurance coverage for damages to health based on EM and MW radiation exposure.

2014 Verizon SEC Filing admits Health Risks



- "Our wireless business also faces personal injury and consumer class action lawsuits relating to health effects of wireless phones or radio frequency transmitters, and class action lawsuits that challenge marketing practices and disclosures relating to alleged adverse health effects of handheld wireless phones."
- Part of Form 10-K and Annual Report Dec 31, 2014

Jan 2020: Digit Act passes Senate



S. 1611

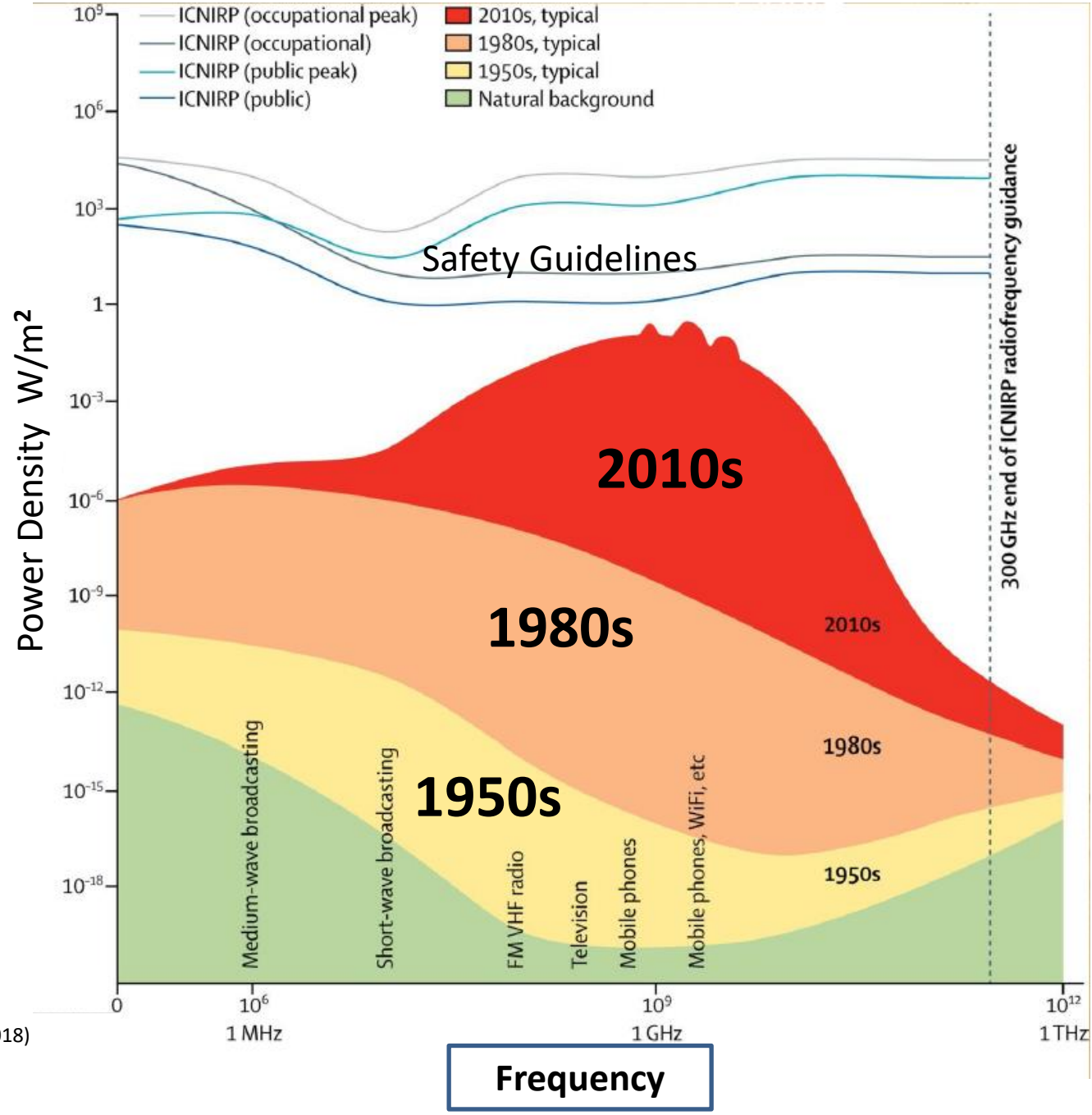
IN THE HOUSE OF REPRESENTATIVES

JANUARY 9, 2020

- Developing Innovation and Growing the Internet of Things D.I.G.I.T.
- Estimates indicate that more than 125 Trillion (125,000,000,000) devices will be connected to the internet by 2030
- Not yet Approved by House of Representatives

Daily Exposure

from man-made and natural power flux densities *compared to Safety Guidelines of International Commission on Non-ionizing Radiation Protection (ICNIRP)*



The Lancet Planetary Health
Volume 2, Issue 12, Pages e512-e514 (December 2018)
DOI: 10.1016/S2542-5196(18)30221-3

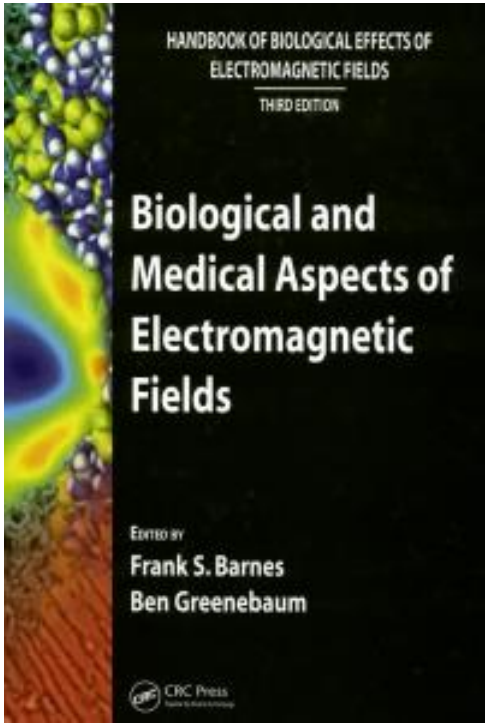


Prof. Arthur Pilla, PhD

Professor of Biomedical Engineering, Columbia Univ

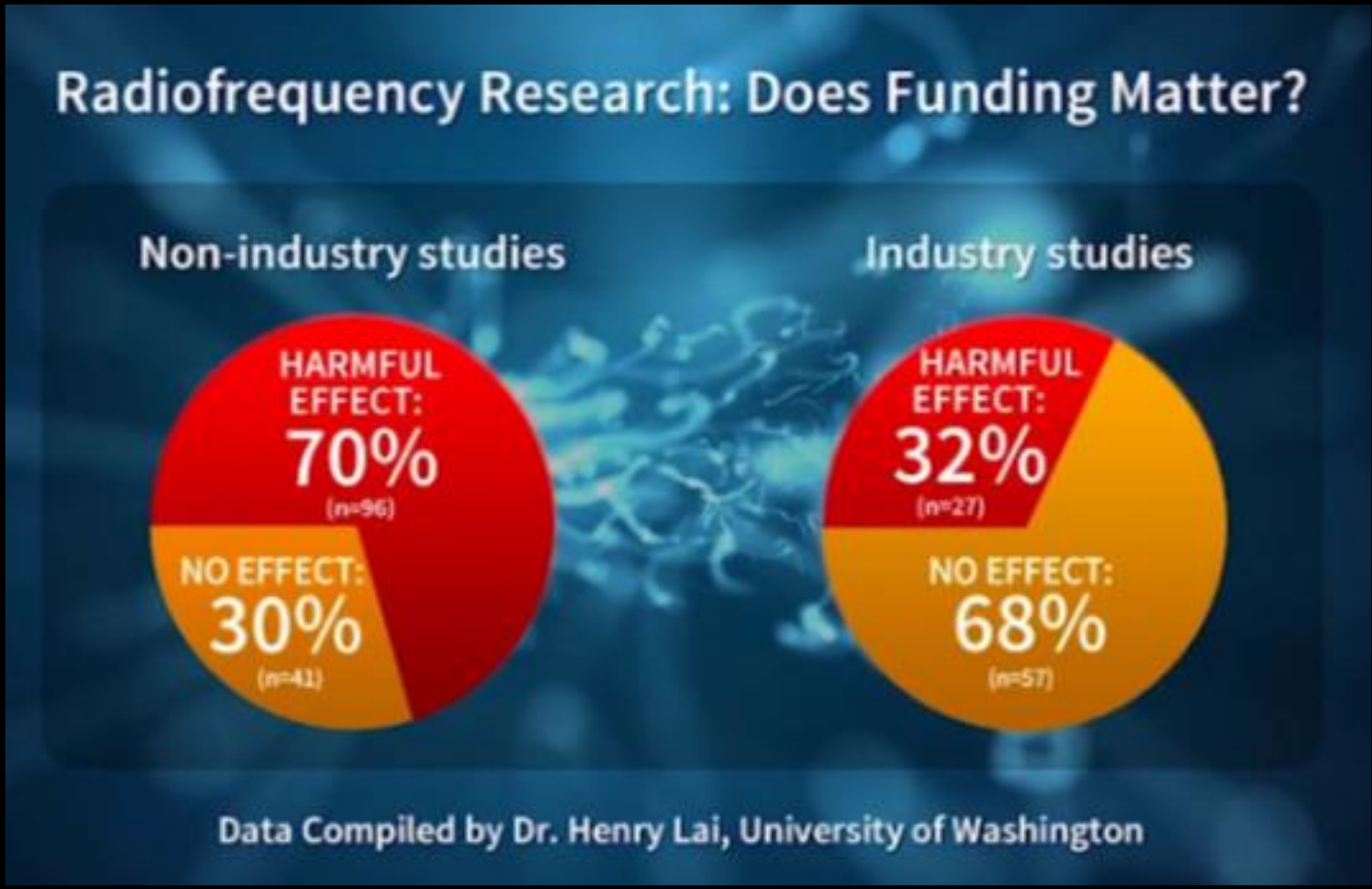
From a Current Biophysics Textbook

"The biophysical lore prevailing until the late 1980s and lingering to this day is that, unless the amplitude and frequencies of an applied electric field were sufficient to produce tissue heating, there could be no effect. However, this position had to be changed as the evidence for weak (non-thermal) EMF bioeffects became overwhelming."



Source: 2007 Textbook: Biological and Medical Aspects of Electromagnetic Fields. F. Barnes and B. Greenebaum eds. P. 377

Industry Studies show Bias



Major Sources of RFR Exposure

- <u>NEAR FIELD DEVICES</u>

Concerns:
Duration of Usage
Proximity to Body

- Cell Phones



- DECT – Cordless Telephones



- <u>FAR FIELD DEVICES</u>

Transmit Continuously
Proximity to Transmitter

- Smart Meters – Home Area Networks



- Wi-Fi in Home & Office





- High Power Radio, TV & <u>Cell Towers</u>





- Satellites – Communication & 5G



Differences between Cell Towers and Handheld Mobile Devices (Phones)

Far Field (Cell Towers/ WiFi)

- Power Density in mW/m^2
- Transmit 24 hours /7 days
- Frequency dependent exposure levels
- WiFi Router also Far Field
- Health Effects related to Distance & Power ($1/d^2$)

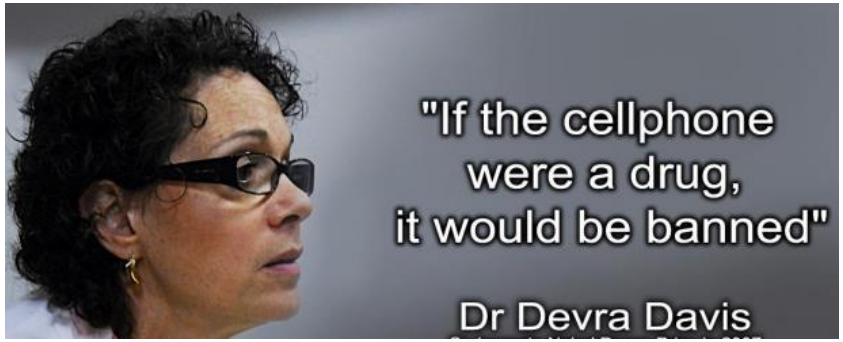
Near Field (Phones)

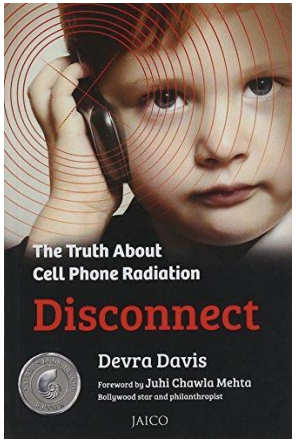
- Specific Absorption Rate W/kg
- Varying Exposure with use
- Frequencies depend on band being used for service
- Cordless Phones, as well
- Health Effects depend on Duration of Usage & Power

"Safety guidelines" are only for short-term thermal exposure: averaging for only 6 minutes (cell phone), 30 min (towers)
There are no LONG-TERM Exposure safety standards !

Cell Phones have been typically largest Individual Source of RFR Exposure

- Devra Davis PhD of Environmental Health Trust very active in alerting public to dangers of cell phones
- ehtrust.org/key-issues/
- Children especially vulnerable
- Pregnant women vulnerable
- Increasing rates brain cancer
- Multiple Antenna in phones
- WiFi 2.4 & 5 GHZ
- GSM (2G)
- UMTS (3G)
- LTE (4G)







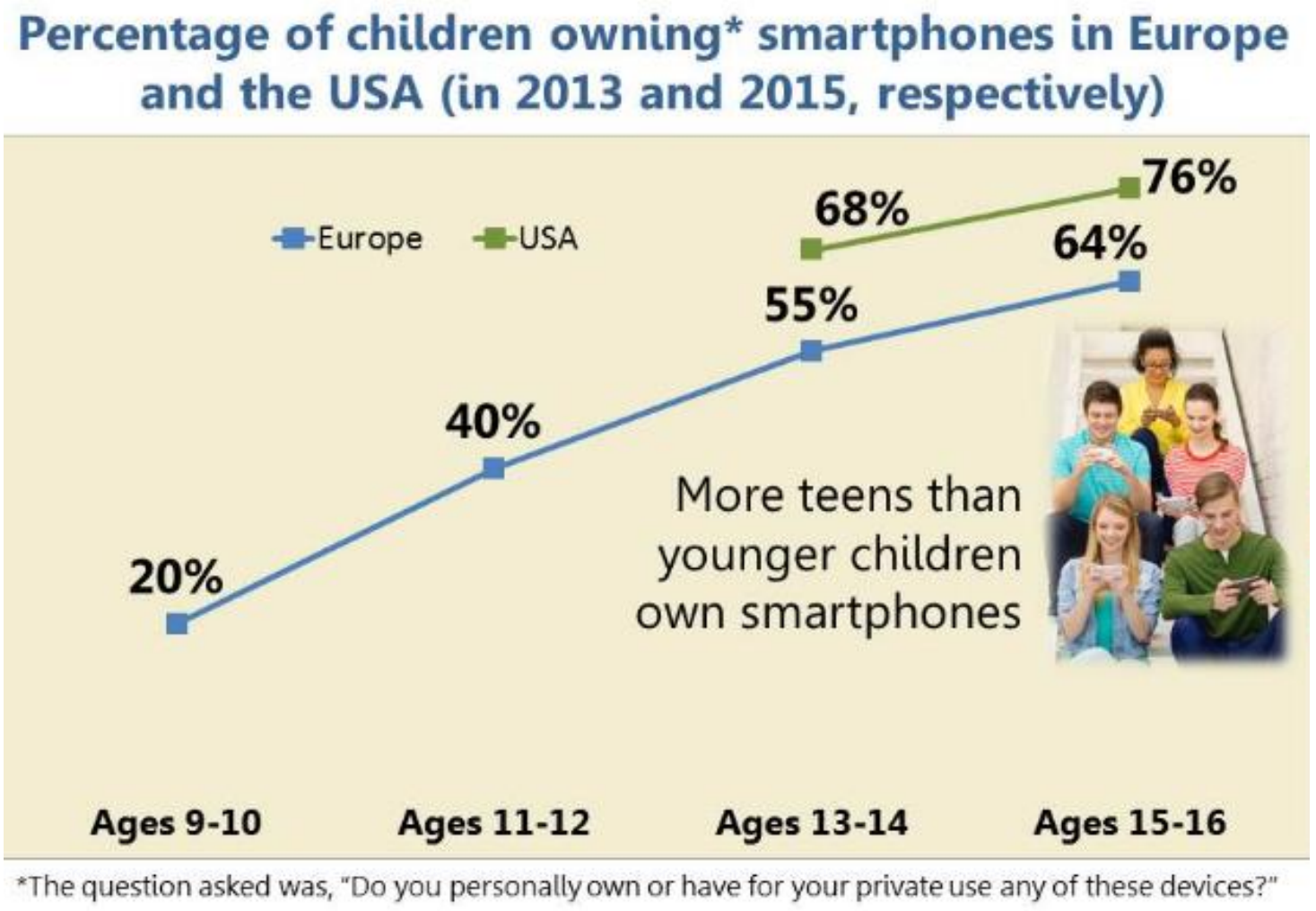


Images: Environmental Health Trust

What are we Doing to Our Children?

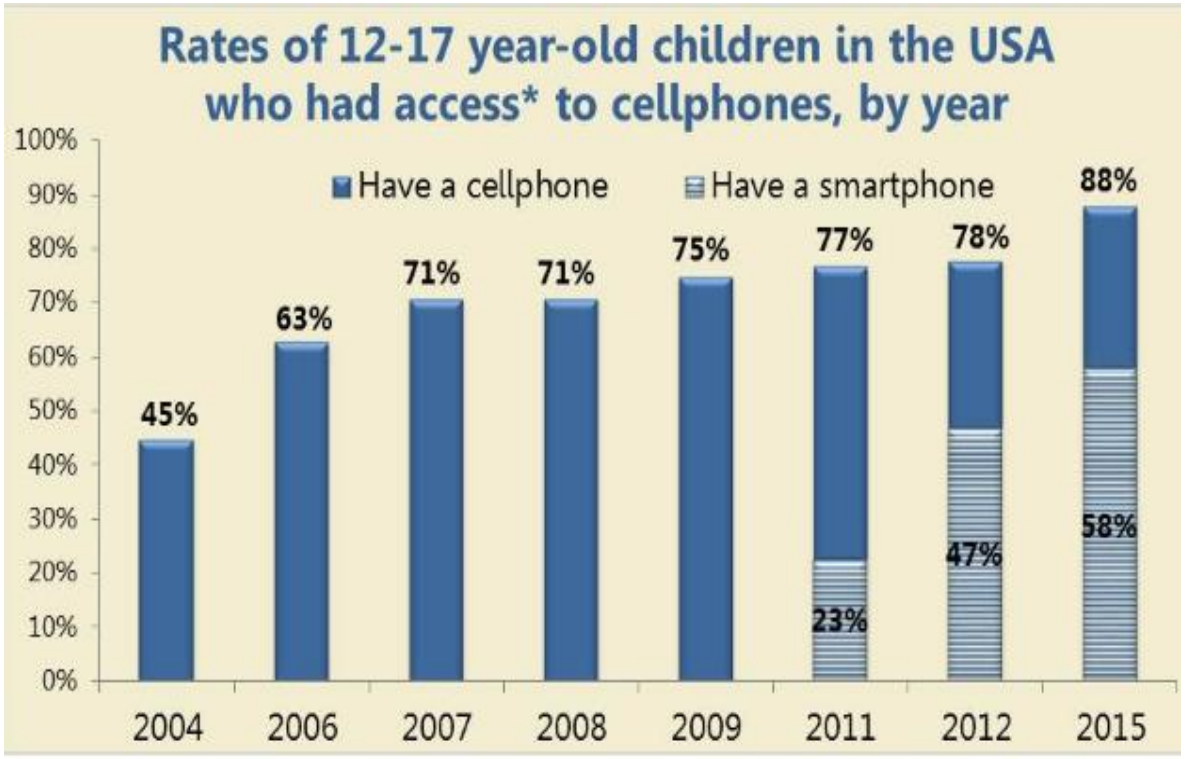


2015 Cell Phone Usage by Children

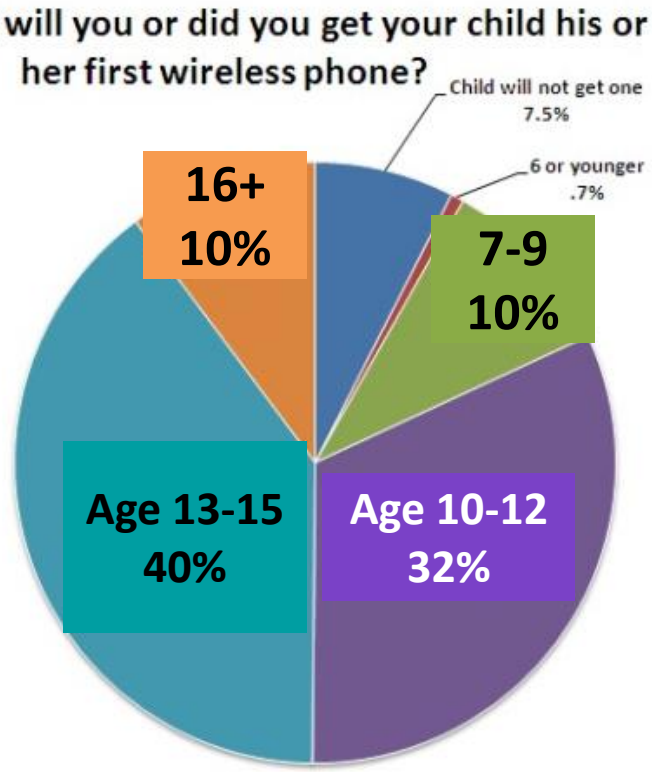


Mascheroni et al: The Mobile Internet, opportunities..divides among European Children
http://eprints.lse.ac.uk/61107/

2015: U.S. Children Cell Phones Increasing



* 2012 –survey question: "Do you have a cellphone?"
2015 –survey question: "Do you have or have access to a mobile phone?"

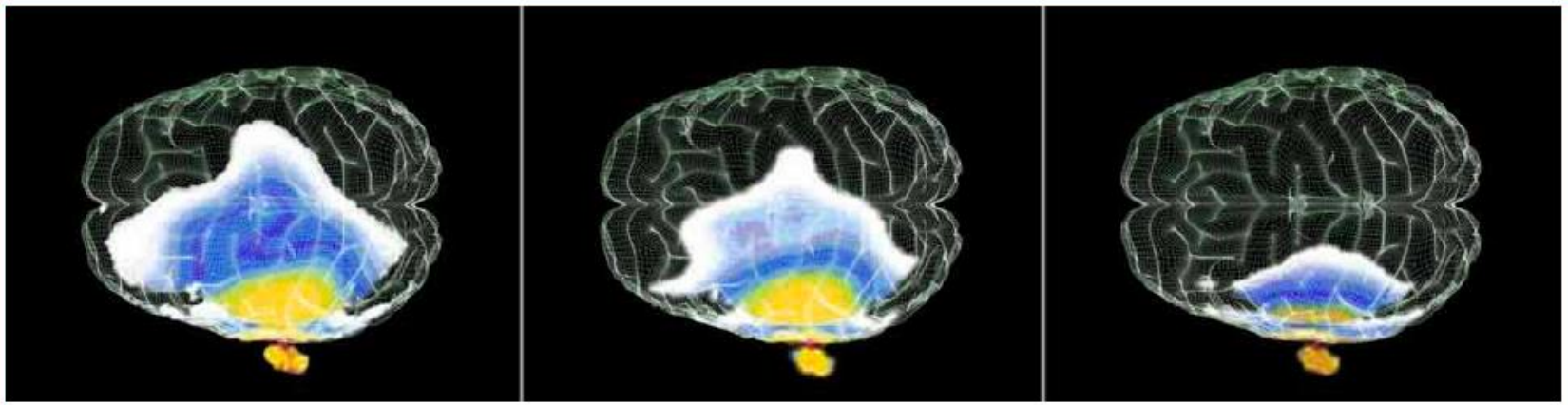


https://www.tnuda.org.il/en/populations-risk/children-adolescents-%E2%80%93-introduction/extent-cellphone-usage-children-and-teens

www.apps.startribune.com/blogs/user_images/edinajo_1316187825_Verizonchart.jpg

Too Many Children with Vulnerable Brains own Cell Phones in the US

- In US, 50% of all 8-year olds have Cell Phones
- By age 12, 75% of kids use Cell Phones
- Other countries have banned sale until Age 16
- 5 year old child absorbs 2.5 X radiation of adult



5 year old child | 10 year old child | adult

Electromagnetic fields from cell phones are estimated to penetrate the brain, especially in children. Model estimate of the absorption of electromagnetic radiation from a cell phone based on age (Frequency GSM 900 Mhz).

Digital Habits of Millennials
(Born between 1981 – 1996)



- 66 % of millennials live in a totally wireless home.
- 41% have no landline phone (that number would be higher, but many Internet and cable companies provide a landline for free)
- 83% of millennials sleep next to their cell phones.

www.icepop.com/millennials-spending-habits-refusing-purchase/17/

Blue Cross Blue Shield
The Health of America Reports

- Examine the health of commercially insured Americans
- **Unprecedented deterioration in the health of younger Americans**



REPORT | April 24, 2019

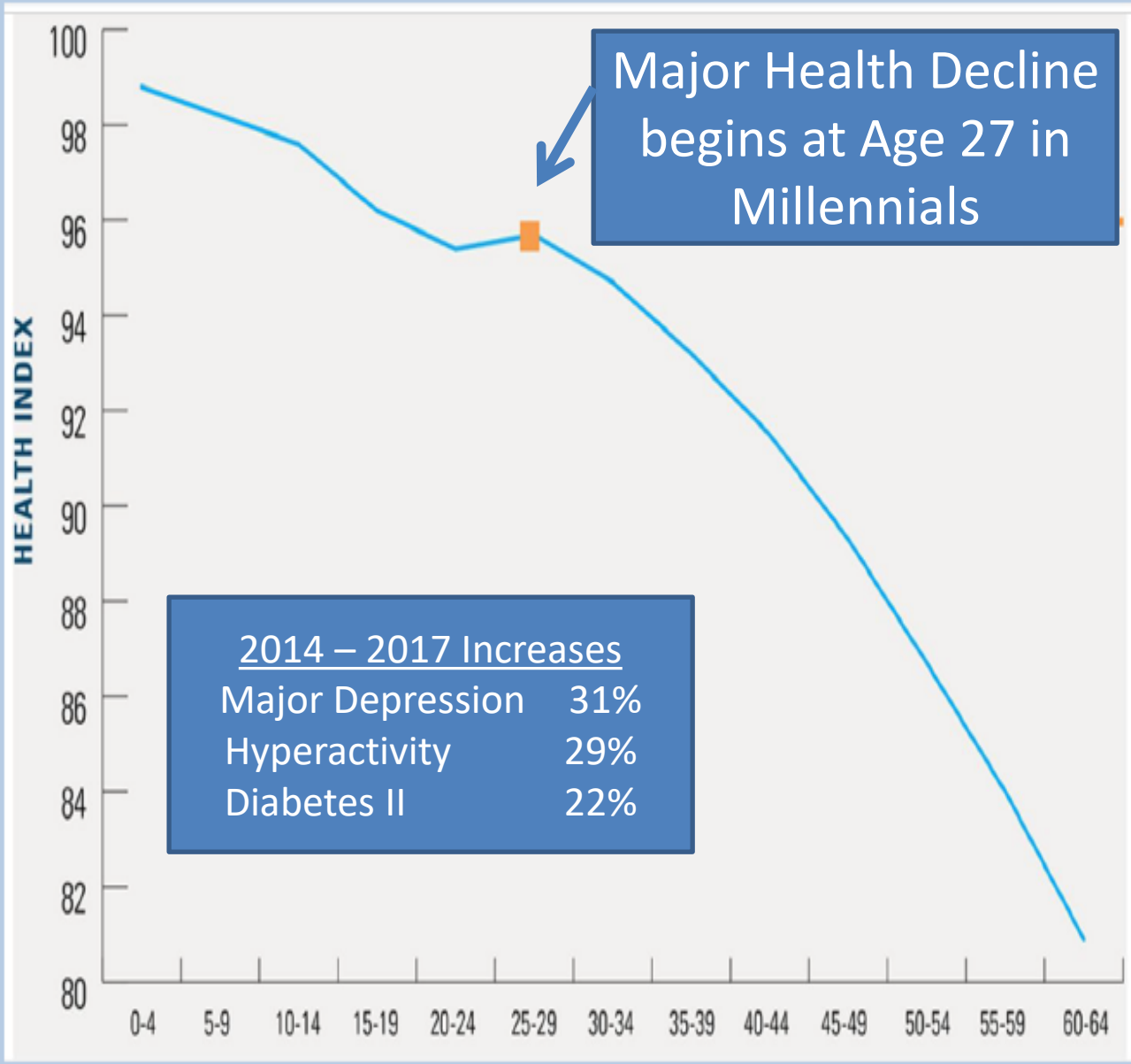
The Health of Millennials

SHARE | READ →

https://www.bcbs.com/the-health-of-america/reports

Blue Cross Blue Shield Millennial Health Study

- Studied 55 Million commercially insured Millennial Americans (born between 1981 and 1996)
- Aged 21-36 in 2017
- **Severe impacts expected on U.S. Economy**



GROUNDBREAKING STUDY EXAMINES EFFECTS OF SCREEN TIME ON KIDS

60 Minutes goes inside a landmark government study of young minds to see if phones, tablets and other screens are impacting adolescent brain development

The New "iGen" Generation

2018
DEC 09

CORRESPONDENT
ANDERSON COOPER

FACEBOOK TWITTER REDDIT FLIPBOARD



Teenagers now spend 4-1/2 hours a day on their phones many checking their social media compulsively every 15 minutes

GROUNDBREAKING STUDY EXAMINES EFFECTS OF SCREEN TIME ON KIDS

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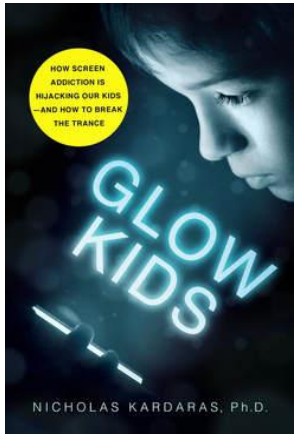
FACEBOOK TWITTER REDDIT FLIPBOARD



- Initial results of $300 Million NIH study shows thinning of brain cortex in kids using screens 7 hours /day

Nicholas Kardaras: Tech Addiction Specialist

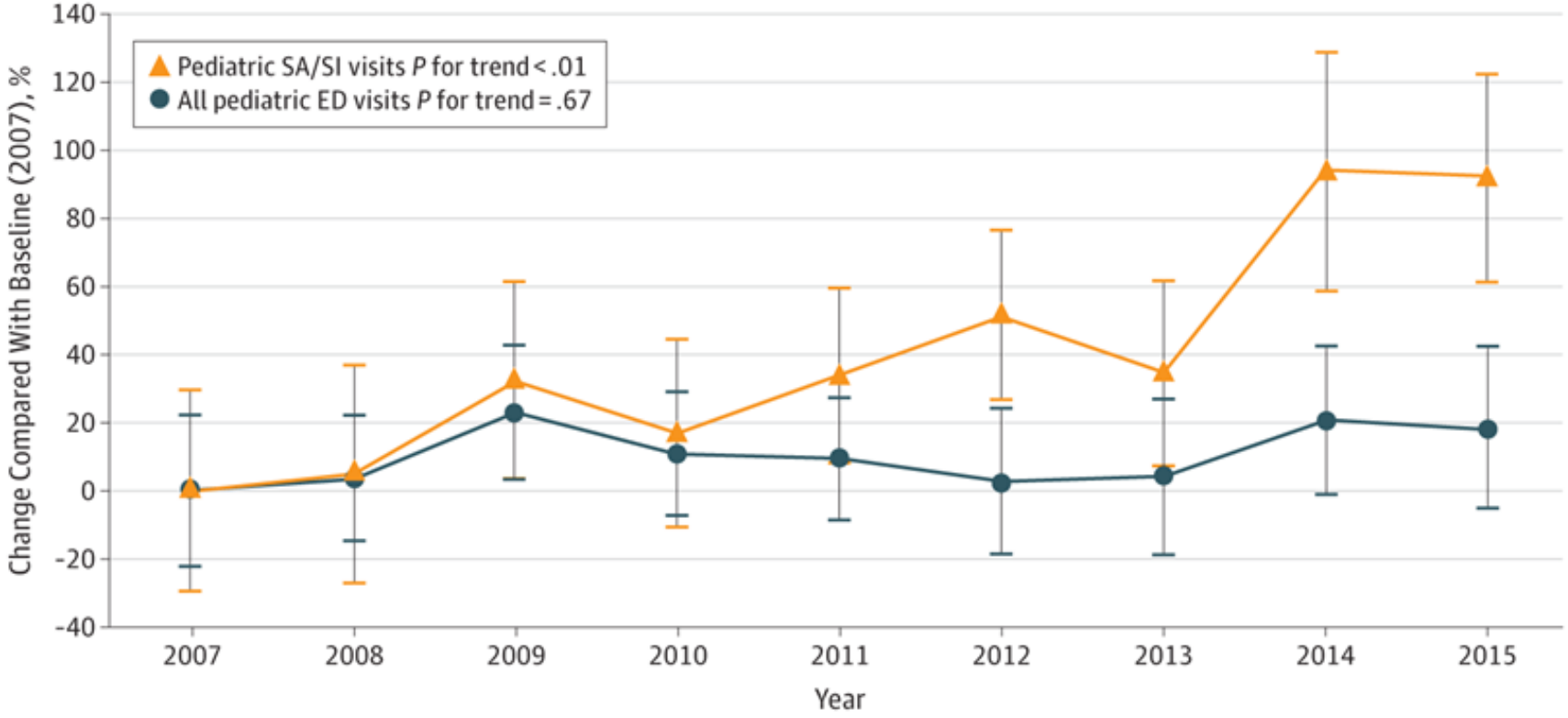




- Tech Addiction in Children is rampant
- Teenagers addicted to Social Media
- Stimulating glowing screens are as dopaminergic – dopamine-activating – to the brain's pleasure center as sex.
- Video games increase dopamine in the brain by 100%, as much as sex does
- Brain imaging studies have shown gray matter shrinkage or loss of tissue volume for internet/gaming addicts

http://www.drkardaras.com/research.html

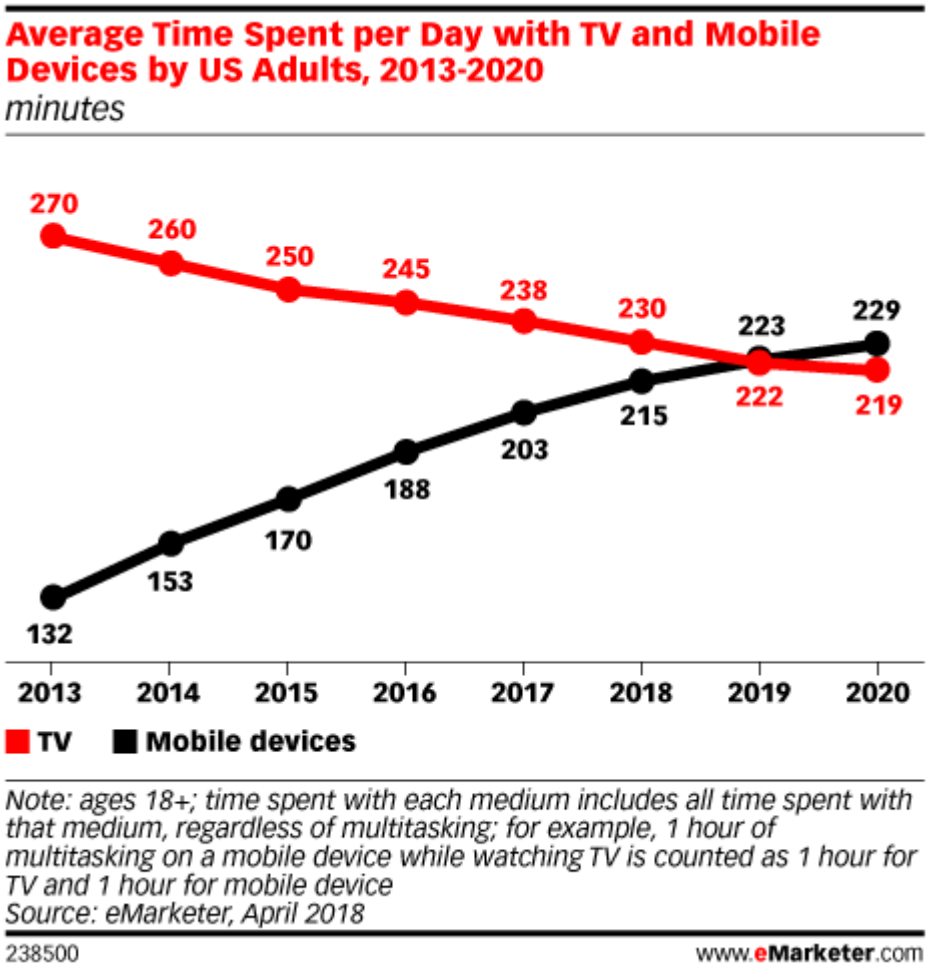
Pediatric Suicide ER Visits have Doubled 2007 - 2015



Associated Changes in Pediatric Emergency Department (ED) Visits for Suicide Attempts (SA) and Suicidal Ideation (SI)

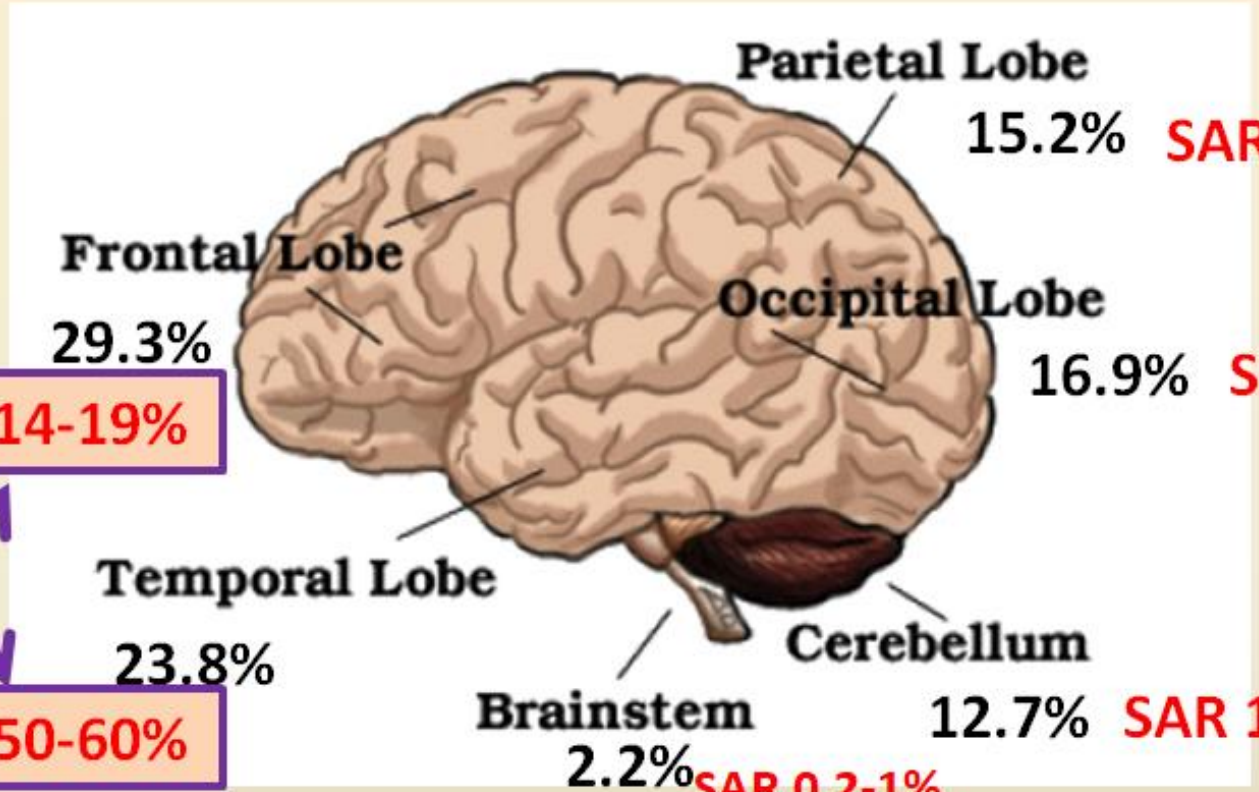
For children age 5 to younger than 18 years and overall pediatric emergency department visits for all children age younger than 18 years over time. Error bars indicate 95% CI.

Americans 18+ spend now spend most time on Mobile Devices per day



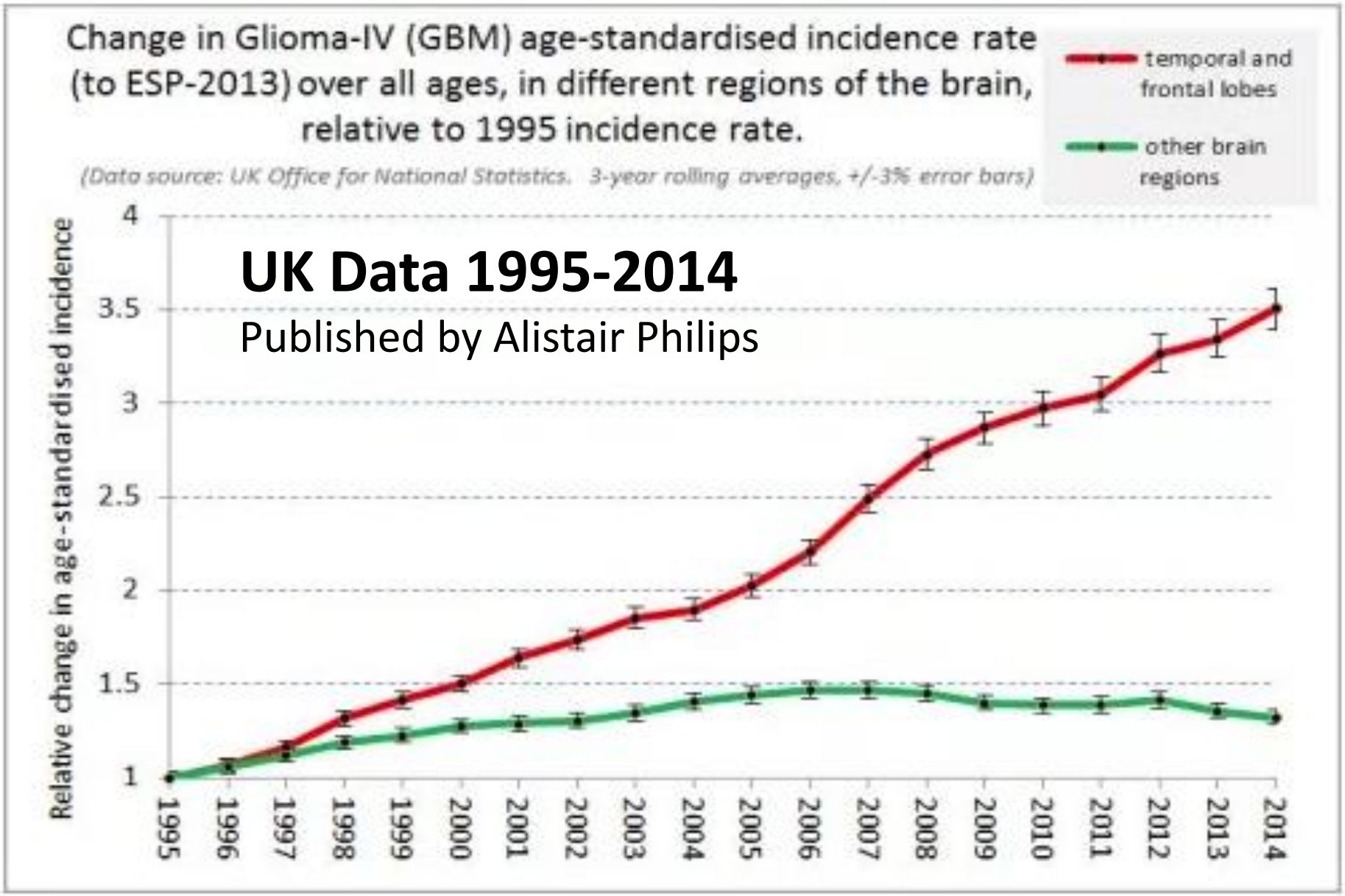
- Source: www.eMarketer.com
- See also https://www.emarketer.com/content/getting-ready-for-5g

Frontal and Temporal Lobes are Largest Parts of the Brain (% in Black)



- **Absorption of RF Radiation varies with frequency. Above Average relative SAR in each region (compared to whole brain absorption) is shown in RED. Data is for European phones tested at both 900 MHz and 1800 MHz. (Table 1 of paper)**
- **Incidence of brain tumors attributed to cell phone use is largest in the frontal and temporal lobes where Specific Absorption Rate (SAR) is highest.**
- Reference: Cardis, E., et al. "Distribution of RF energy emitted by mobile phones in anatomical structures of the brain." *Physics in medicine and biology* 53.11 (2008): 2771.

Brain Tumor Incidence in UK

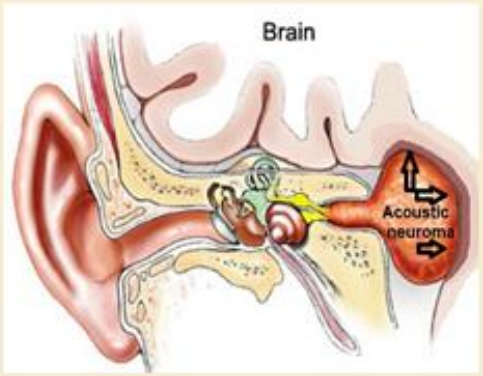


US National Toxicology Program study on mobile phone radiation and health



- “Clear evidence" that radiation from mobile phones causes cancer – specifically, a heart tissue cancer in rats, and "some evidence" of cancer in the brain and adrenal glands.

Other Cancers affected by EMF Radiation



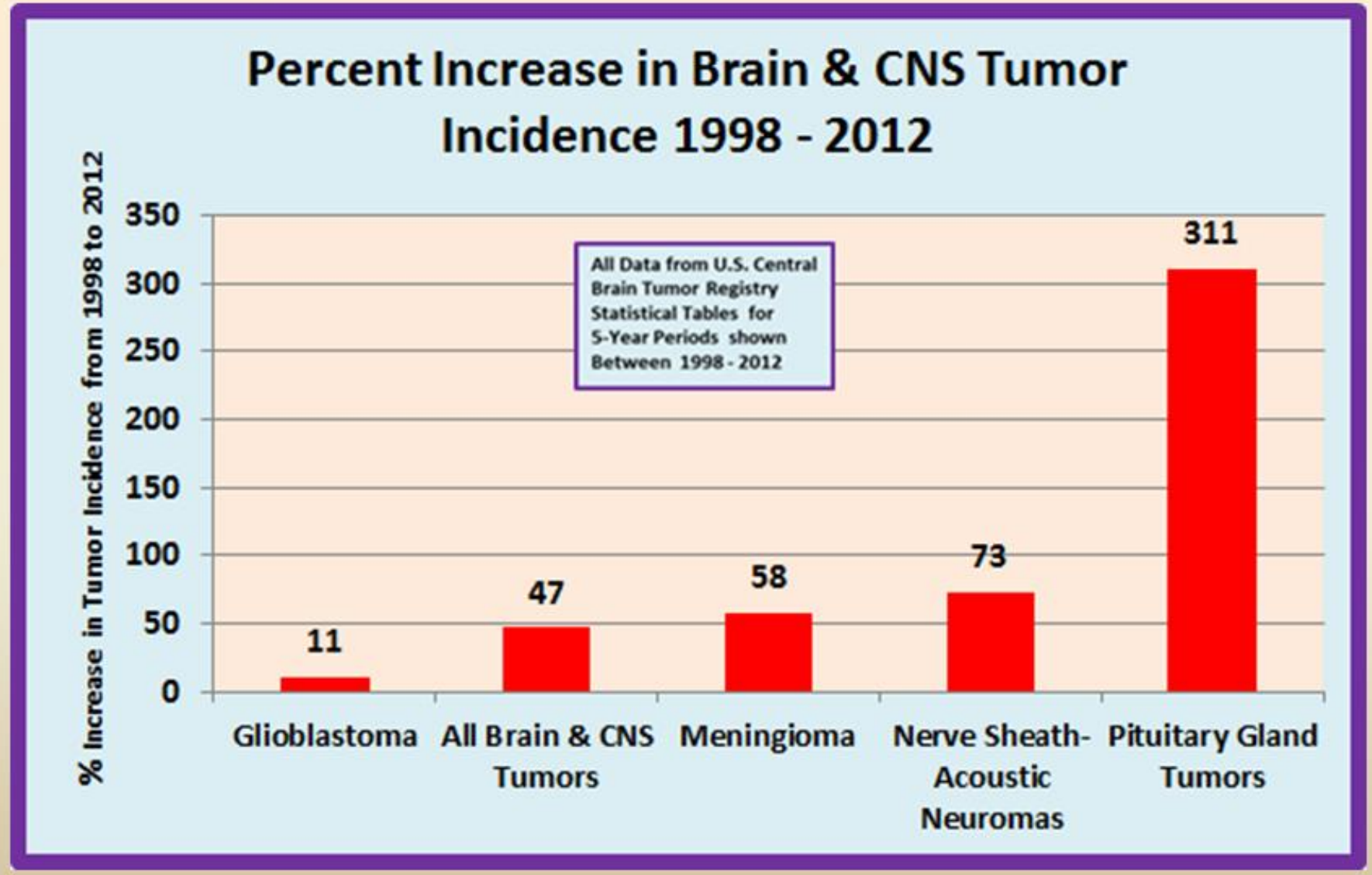






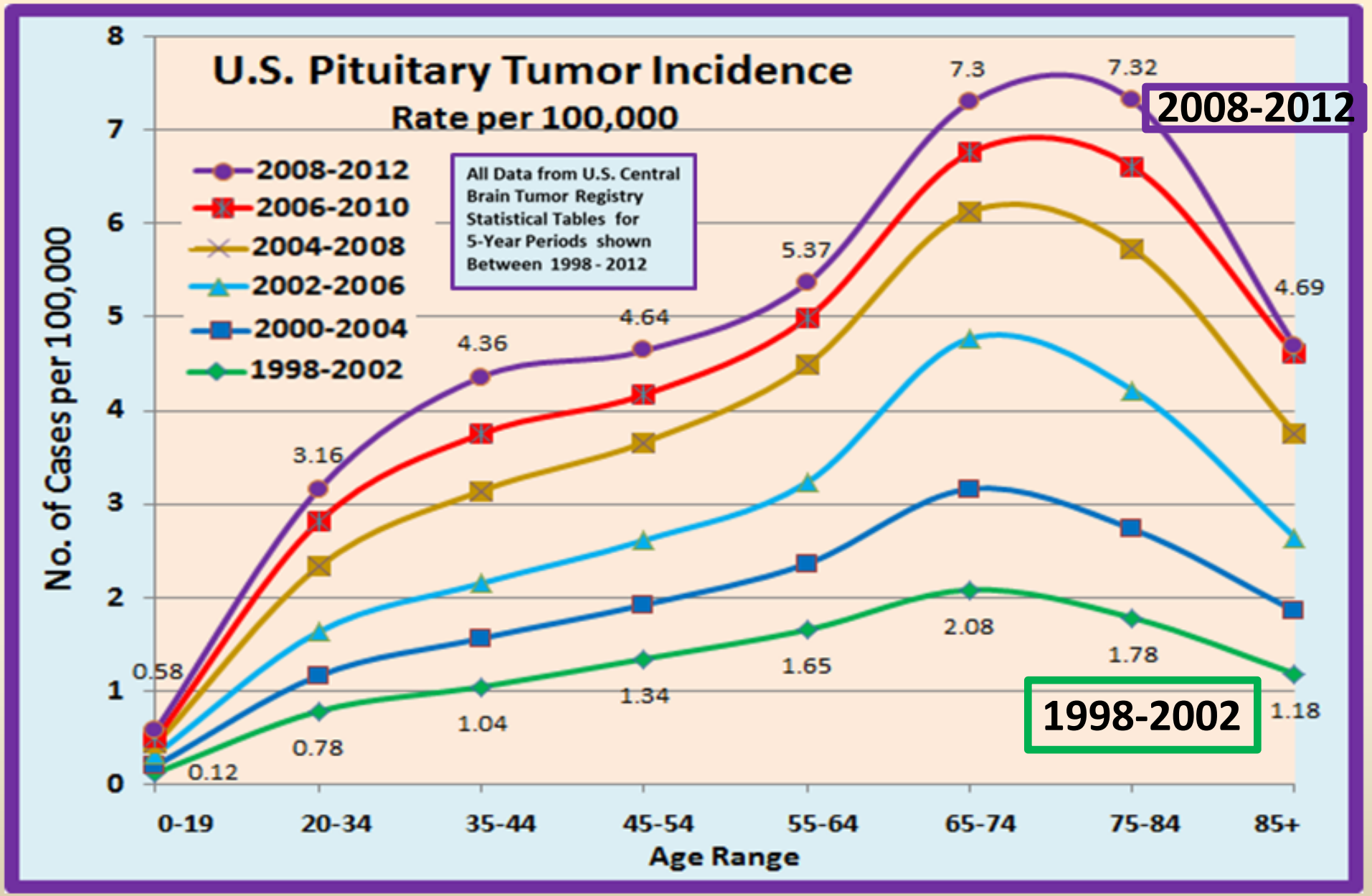
- Acoustic Neuroma: slow growing but in tight spaces in ear region, cell phone radiation is highest when phone held to side of head. May cause facial paralysis.
- Parotid Gland Tumors in Cheek (Israeli study)
- Thyroid Cancer increasing Rapidly in U.S. and Korea
- Breast Cancer in Woman with Phones in Bras

Summary of Calculated Increases in Specific Brain & CNS Tumors



Data Compiled from Central Brain Tumor Registry in U.S.

Data Plot: K. Maret MD



- Data Source: CENTRAL BRAIN TUMOR REGISTRY OF THE UNITED STATES, PRIMARY BRAIN TUMORS IN THE U.S. Statistical Reports 1998-2002: Table 12; 2000-2004: Table 16; 2002-2006: Table16; 2004-2008: Table16; 2006-2010: Table13; 2008-2012: Table12.
- **Pituitary Tumor is the 2rd most common brain and CNS tumor in the U.S.**

DECT Cordless Telephone Base Station: A Microwave Transmitter in the Home

NONSTOP PULSED 2.4 GHZ RADIATION INSIDE US HOMES
2nd International Workshop on Biological Effects of Electromagnetic Fields 7-11 Oct 2002

NONSTOP PULSED 2.4 GHZ RADIATION INSIDE US HOMES

THOMAS HAUMANN[1] AND PETER SIERCK[2]

[1]Umweltanalytik und Baubiologie,
Meisenburgstrasse 25, D-45133 Essen, Germany

[2]Environmental Testing & Technology, Inc.,
1106 Second Street, Encinitas CA 92024, USA

Figure 3: Pulsed signal of 2.4 GHz DFHSS technology – ZERO SPAN (GIGASET cordless phone base station)

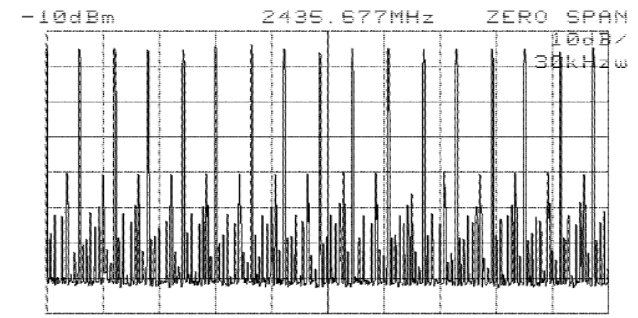
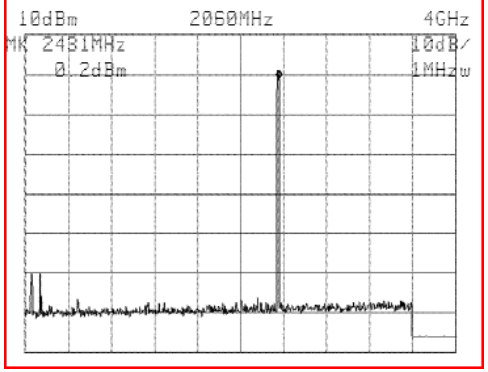


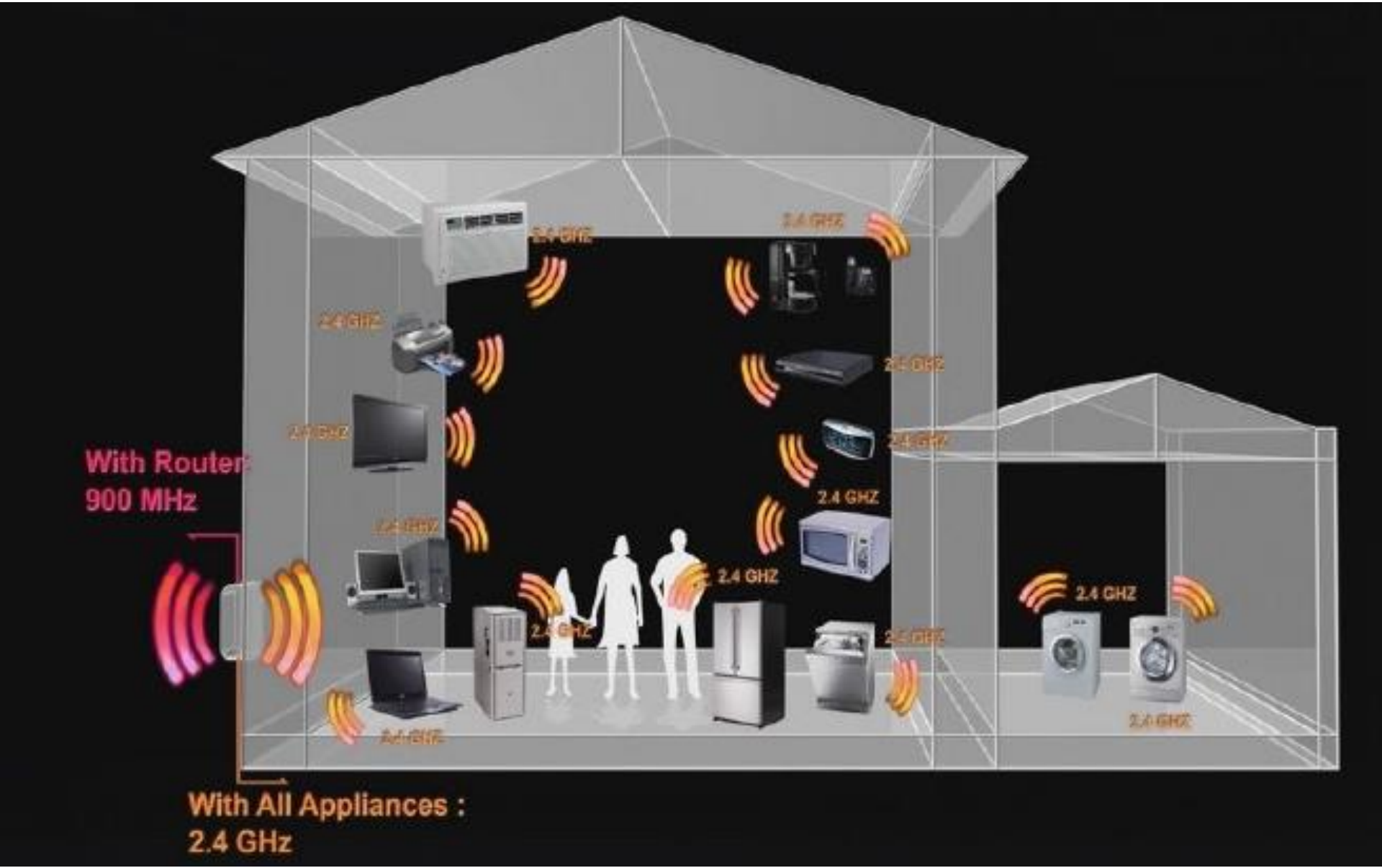
Figure 2: Spectrum analysis (with 2.4 GHz)



DECT oder Gigaset Cordless Phones transmit even when not in use. Have Non-thermal Effects on our Body and Blood

	US GIGASET (2.4 GHz)*
Distance	DFHSS (Digital Frequency Hopping Spread Spectrum) digital pulsed 100 Hz frequency range 2450 MHz
30 centimeter - 12.5“	673,000 µW/m^2
50 centimeter – 19.8”	280,000 µW/m^2
1 meter - 39.4”	72,000 µW/m^2
2 meter - 78.8“	23,000 µW/m^2

‘Smart’ Houses Saturated by Wireless

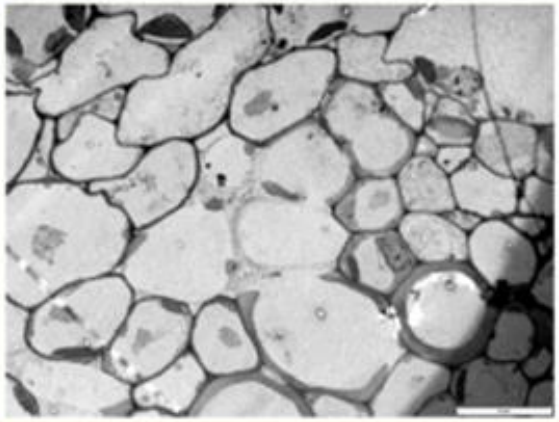


WiFi: 136 Studies showing Health Effects

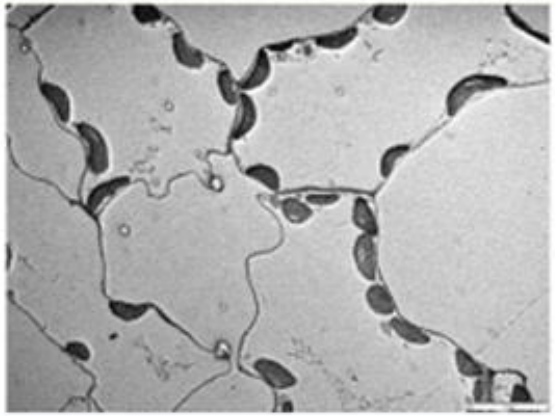
136 Studies Showing Health Effects from WiFi Radio Frequency Radiation

Health Effects	Pages
Effects on Brain and Neurons	Pages 2-18
Effects on Eyes	Pages 18-24
Effects on Fertility and Reproduction	Pages 24-28
Effects on Pregnancy	Pages 29-32
Cancer	Pages 32-35
Effects on Children	Pages 35-36
Effects on Hormones	Pages 36-37
DNA Damage	Pages 37-40
Effects on the Heart	Pages 40-41
Inflammation	Page 41
Effects on Blood	Pages 41-44
Oxidative Stress	Pages 44-46
Effects on Wellbeing	Pages 47-48
Effects on Whole Body	Page 48
Effects on Bone Marrow	Pages 48-51
Effects on Insulin	Page 52
Cell Effects	Pages 52-57
Effects on Behavior	Pages 57-59
Effects on Immune Function	Page 59-60
Effects on Protein	Page 60
Electromagnetic Hyper-Sensitivity	Pages 60-63
Effects on Critical Organs	Pages 63-65
Effects on Sleep	Page 65
Synergistic Health Effects- RF and Other Agents	Pages 66-68
Effects on the Environment	Page 68-69

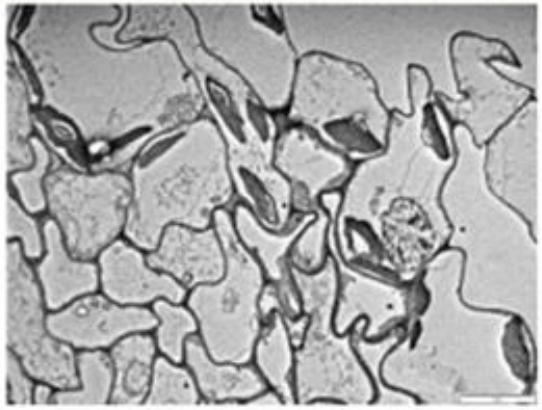
2014 Study: WiFi Effect on Parsley



Control



GSM irradiated



WiFi irradiated

- Note that WiFi (WLAN) irradiated plants created different effect on cell structure compared to 2G (GSM) cell phone.
- In study GSM was at -29dBm measured at 100 mW/m2 at plants
- WLAN (WiFi) was at -19dBm measured as 70 mW/m2 at plants
- All plants were irradiated for 3 weeks. WiFi effects were worse on plant
- Study performed in Romania

- Source: Soran M-L,et al. (2014): Influence of microwave frequency electromagnetic radiation on terpene emission and content in aromatic plants. J Plant Physiol. Jul 8;171(15):1436-1443.

2017 Article on Antibiotic Resistance

Dose-Response:
An International Journal
January-March 2017:1-8
© The Author(s) 2017
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sagepub.com/journalsPermissions.
DOI: 10.1177/1559325816688527
journals.sagepub.com/home/dos
SAGE

Evaluation of the Effect of Radiofrequency Radiation Emitted From Wi-Fi Router and Mobile Phone Simulator on the Antibacterial Susceptibility of Pathogenic Bacteria *Listeria monocytogenes* and *Escherichia coli*

M. Taheri[1], S. M. J. Mortazavi[2,3], M. Moradi[1], S. Mansouri[1], G. R. Hatam[4], and F. Nouri[5]

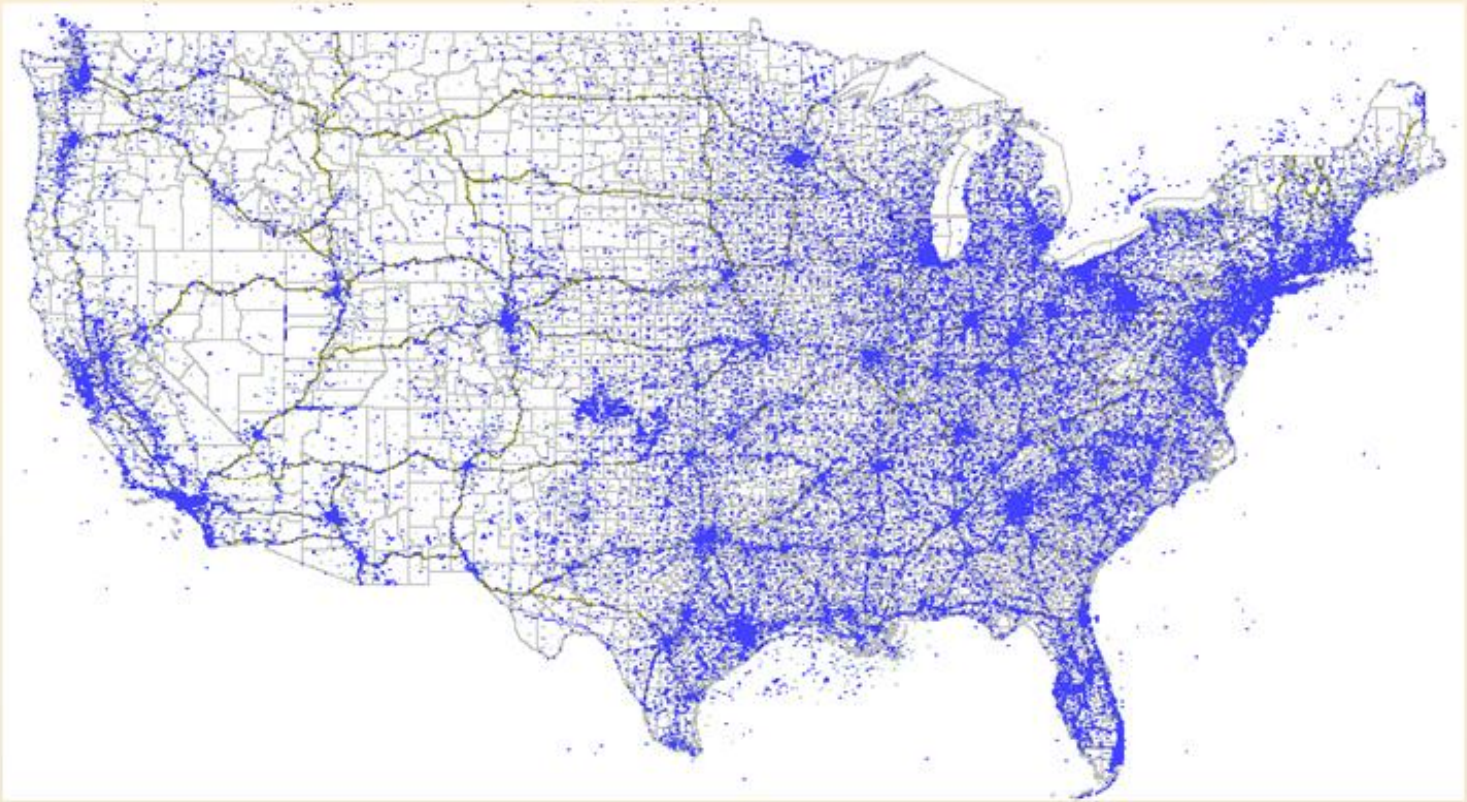
- Listeria monocytogenes and Escherichia coli were exposed to RF-EMFs generated either by a GSM 900 MHz mobile phone simulator and a common 2.4 GHz Wi-Fi router.
- It is also shown that exposure to RF-EMFs within a narrow level of irradiation (an exposure window) makes microorganisms resistant to antibiotics.

CELL TOWERS



- Biological and Health Effects from Cell Towers

Cell Tower Map in U.S.



- **Number of Towers are poorly estimated: Between 117,022 and 242,130**
- **117,022** Towers in 2015 owned by 114 companies; only 900 towers in 1985
- CTIA says cell site totals given at the end of 2009 at 247,081
- Maximum range of a cell tower is 21.7 miles
- Largest Owners of towers: American Tower (39,928 towers); Crown Castle (39,739 towers); SBA Communications (14,873 towers)
- Source: http://wirelessestimator.com/top-100-us-tower-companies-list/

Living in Proximity to Cell Towers

- The closer to the towers people live (less than 300 meters) is accompanied by an increased incidence of reported symptoms including:
  - Headache,
  - Lack of concentration,
  - Memory loss,
  - Irritability,
  - Depression,
  - Insomnia,
  - Fatigue,
  - Loss of libido,
  - Nausea,
  - Lack of appetite.



Symptoms associated with Proximity to Cell Towers

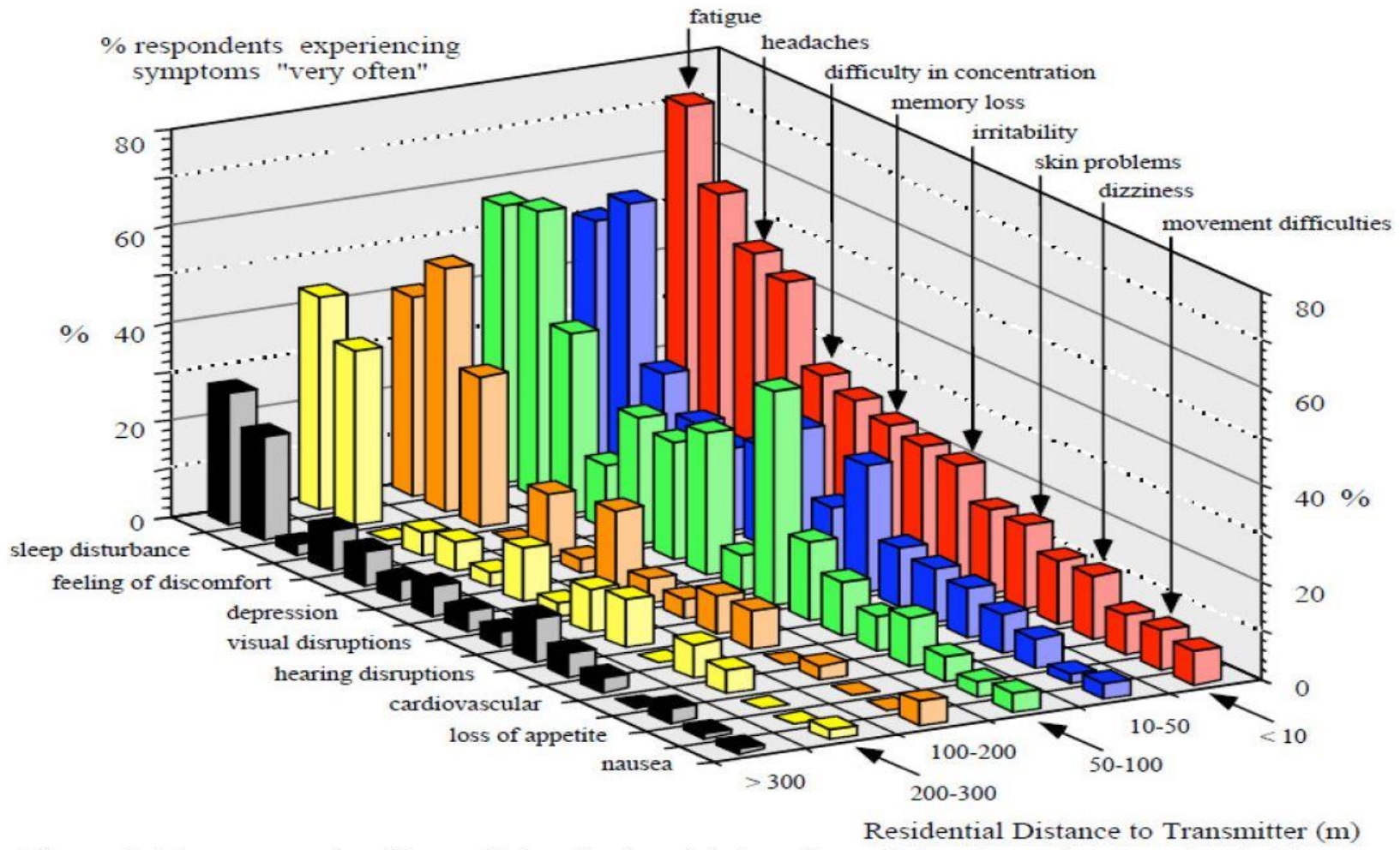
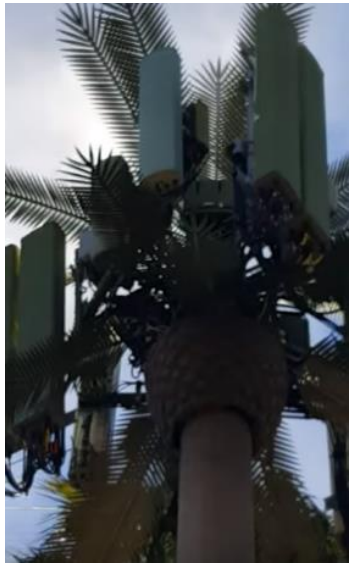


Figure 9. Response of residents living in the vicinity of a cellular phone base station in France.

- Work from Santini published in 2002 in France

Bees Dying near Cell Tower Installations



- In Sierra Madre in Southern California hundred of bees documented falling dead to ground between 2 cell towers (5G?) 40 feet apart





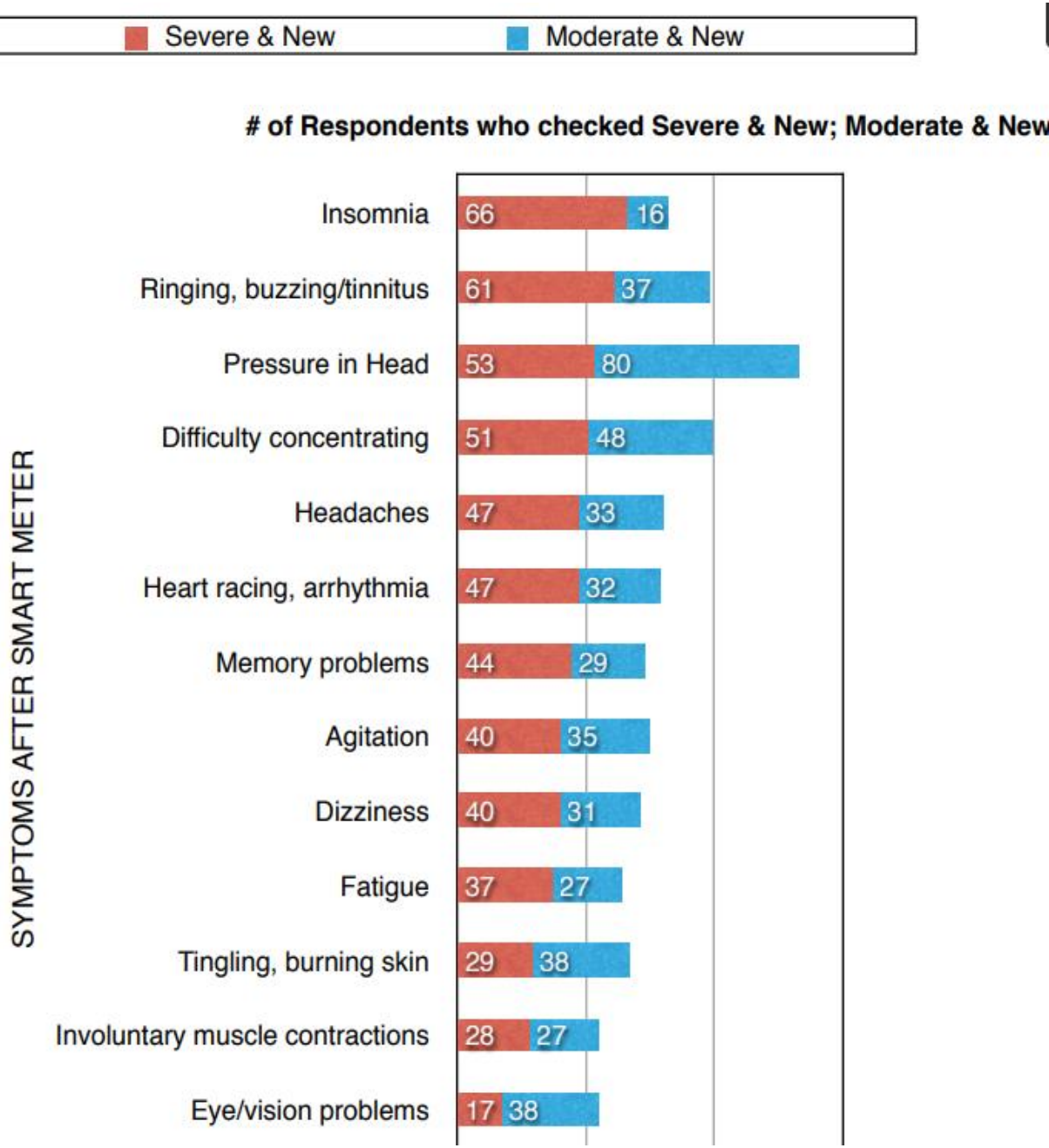
- Video uploaded July 15, 2019
- www.youtube.com/watch?time_continue=1&v=X5IhKHGDKhM

What is Cumulative Effect of Meters ?



This could be especially problematic for apartment and city dwellers with high meter density

Symptoms after Smart Meter (2013)



210 Questionnaire collected
Dec 2012 to Jan 2013
Responses from 50 states (40% CA)
75% USA, 25% Canada/Australia
75% Female, 25% males
67% reported Smart Meter Install.
led to Electrical Hypersensitivity

www.mainecoalitiontostopsmartmeters.org/wp-content/uploads/2013/01/Exhibit-10-Smart-Meter-Health-Effects-Report-Survey2.pdf

Smart Meter (SM) Wireless Effects (2014)

REVIEW ARTICLE

Self-Reporting of Symptom Development From Exposure to Radiofrequency Fields of Wireless Smart Meters in Victoria, Australia: A Case Series

Federica Lamech, MBBS

Alternative Therapies in Health and Medicine; Aliso Viejo Vol. 20, Iss. 6, (Nov/Dec 2014): 28-39.



- In 2013, in State of Victoria in Australia, 142 people reported adverse health effects after SM installation
- Symptoms included: (1) insomnia, (2) headaches, (3) tinnitus, (4) fatigue, (5) cognitive disturbances, (6) dysesthesias (abnormal sensation), and (7) dizziness.

5G and the FCC

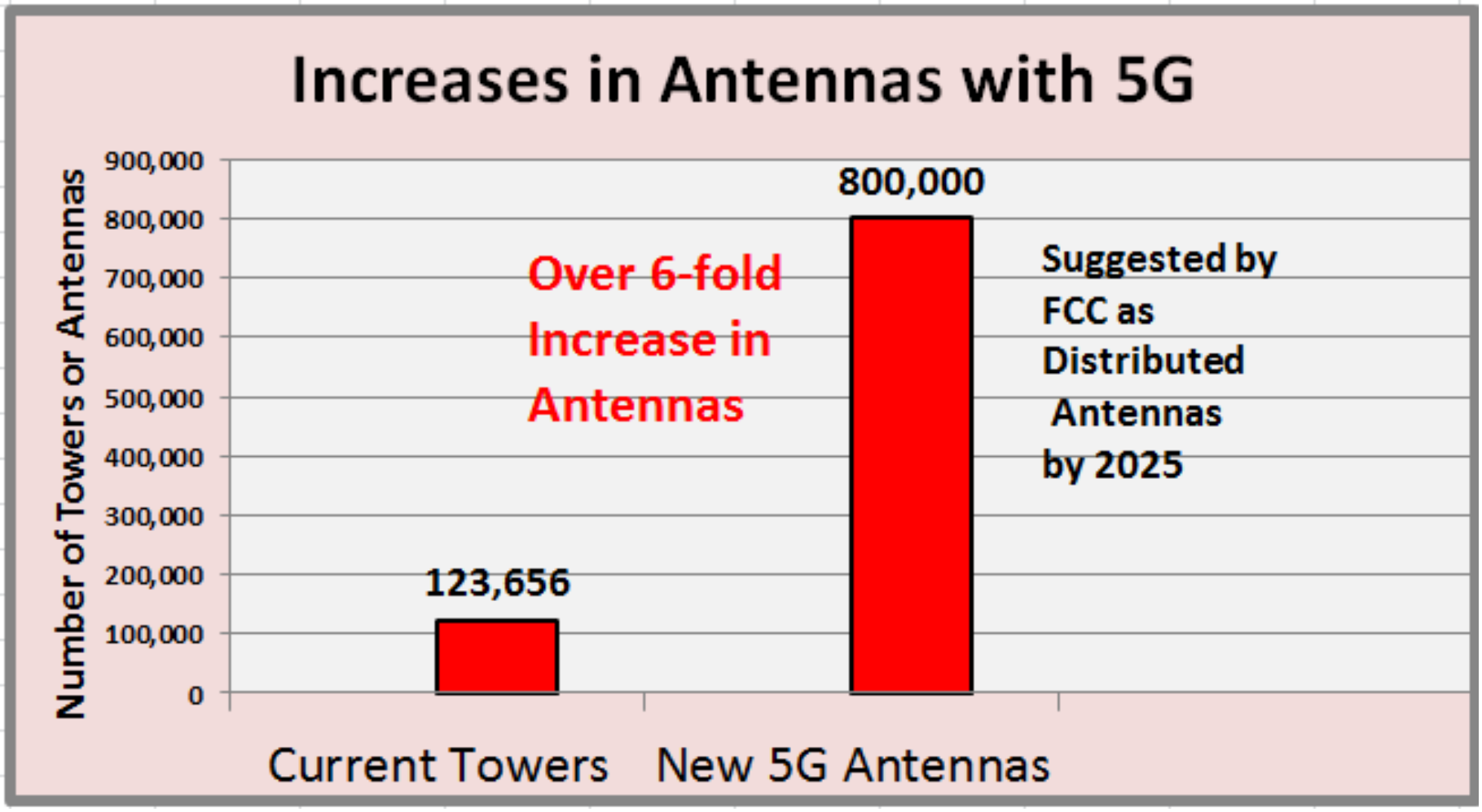


FCC Commissioners Jessica Rosenworcel and Michael O'Rielly, Chairman Ajit Pai and Commissioner Brendan Carr.
FCC



- Plan for 5G roll-out announced by Tom Wheeler, former chairman FCC, on June 20, 2016
- Wheeler tied to Telecom industry for decades; headed lobbying groups prior to appointment to FCC
- Wheeler suggested to put up 800,000 5G antennas by 2025; 6X more antennas than in previous 3 decades

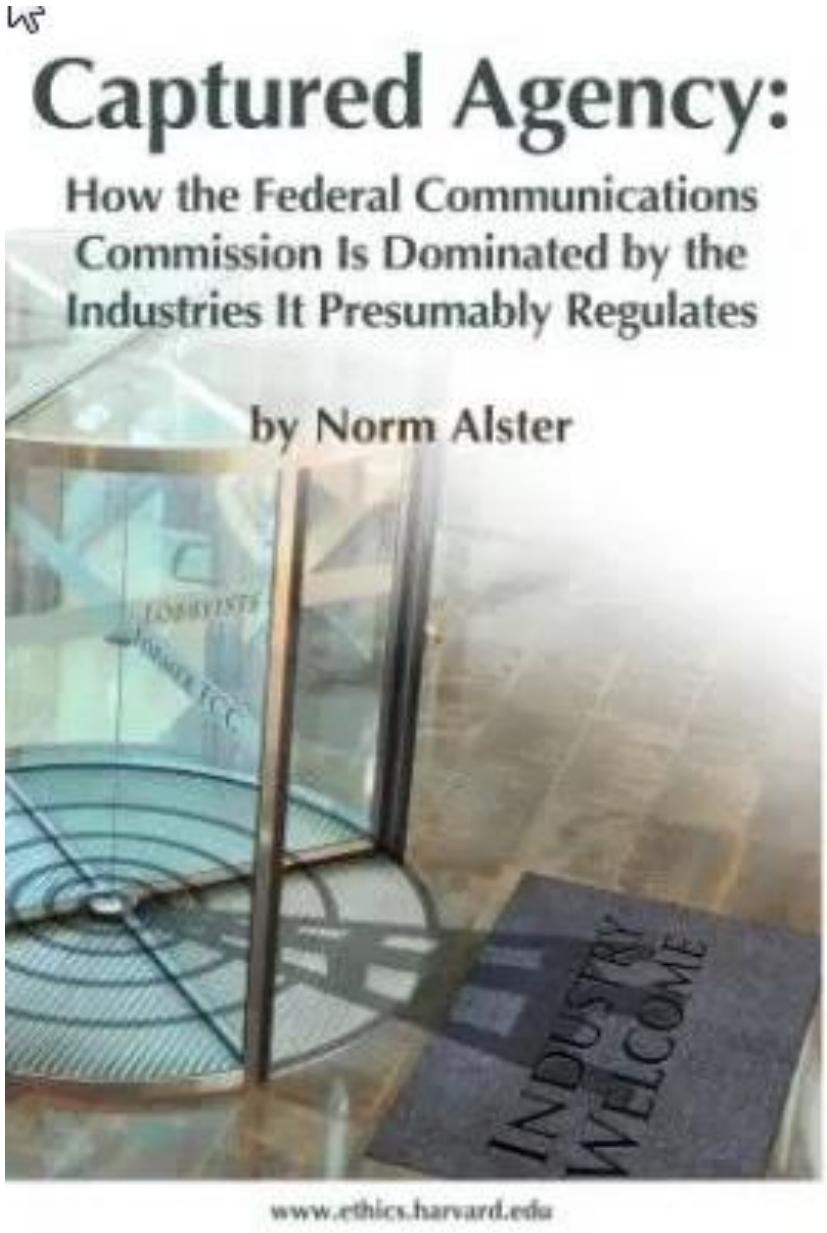
5G Antenna Densification is Planned



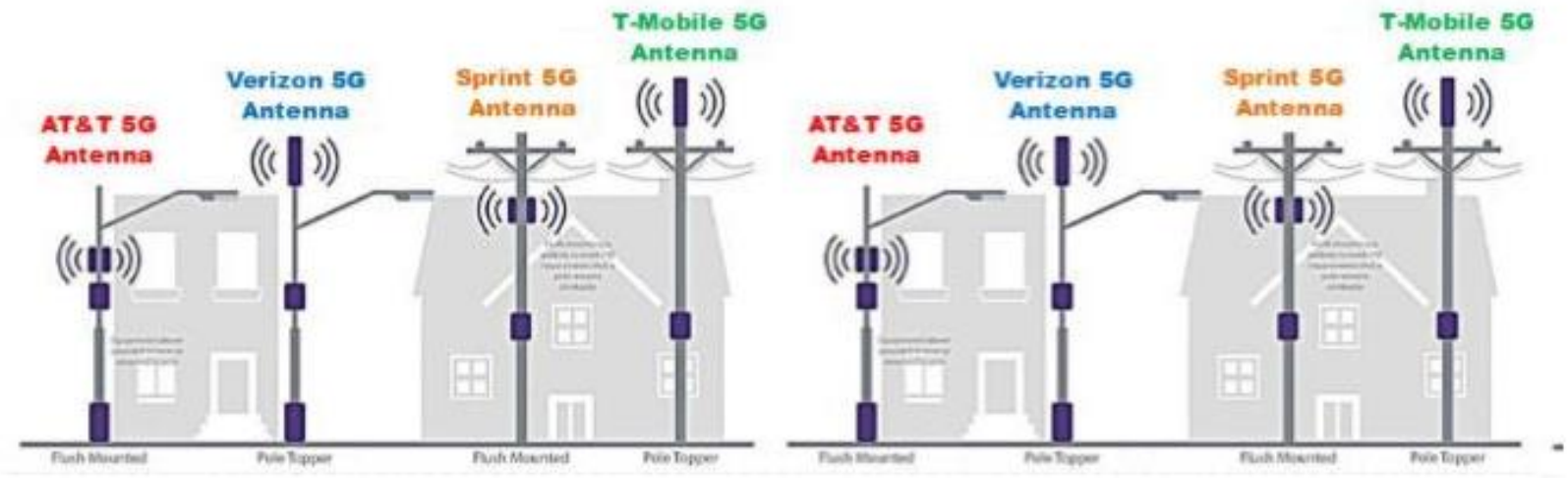
There may be Antennas every 100 meters (or 300 feet) on power poles and lamp posts including residential neighborhoods

FCC is beholden to Industry

- Norm Alster from Harvard University shows that the FCC is heavily influenced by the Wireless Industry that it is supposed to regulate
- Download free e-book: ethics.harvard.edu/files/center-for-ethics/files/capturedagency_alster.pdf



5G and Antenna Densification





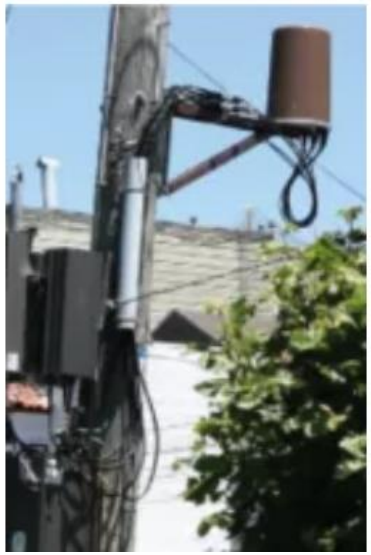
Neighborhood With Multiple Carriers (colors)

- Different carriers may have their own antennas possibly as dense as 10,000 antennas per square mile
- If each carrier needs an antenna every 800 feet, there may be an antenna every 300 feet (100 meters)

5G Installations



Small Cell Mounted on Telephone Pole





Small Cell on Pole with Power Supply Cabinet and Equipment on Ground



Small Cell Near Window



Small Cell on Lamppost

Small Cell Antenna outside Bedroom in San Francisco, CA



5G Antennas may get as close as 300 feet



Utility Pole Mounted Antenna above



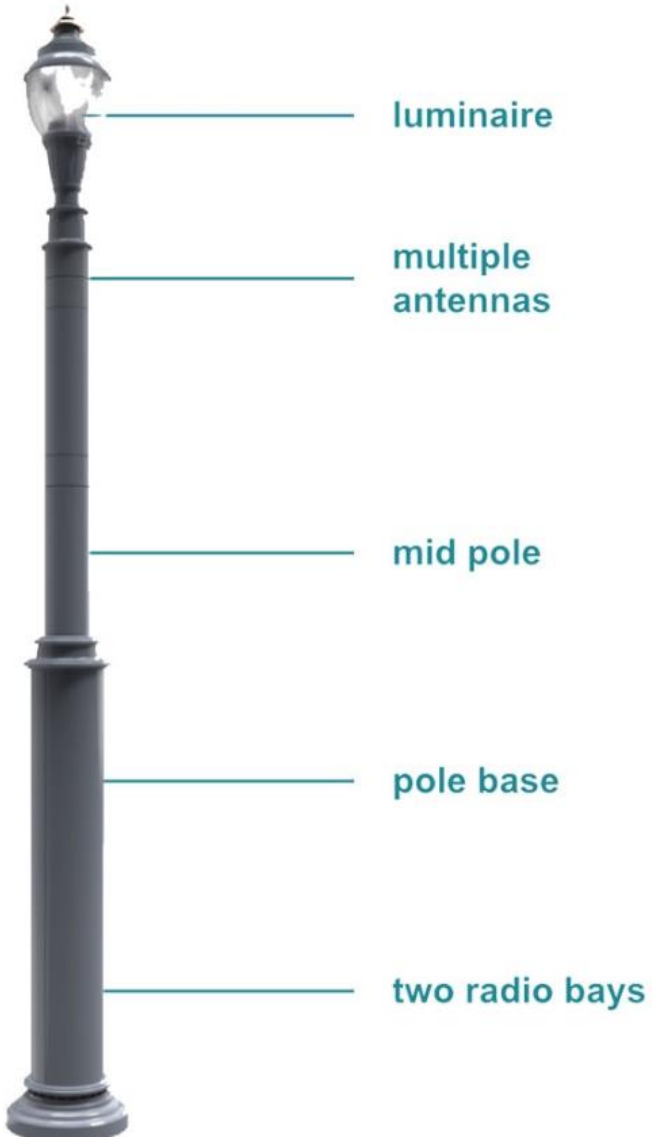
Many Antenna on on block's utility poles



- Curbside lithium battery backup boxes could arc and explode if hit by vehicles. City ought to have veto rights for these installations

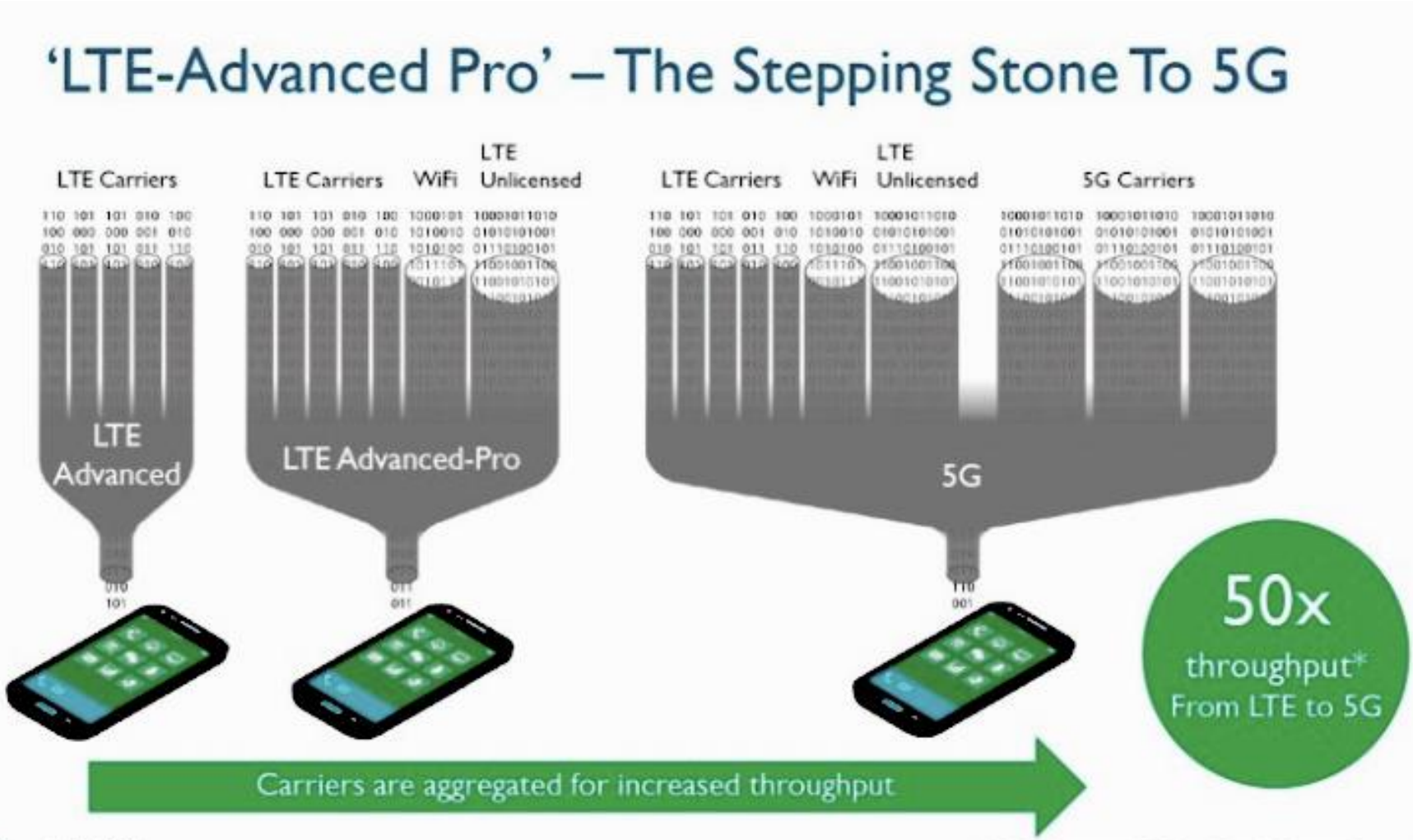
The New Face of Antennas

- Fusion Poles with embedded antennas and radio bays (right)
- Philips and American Tower the rights to as many as 200 existing street-light locations in Huntington Beach CA



www.emfacts.com/2018/07/5g-enlightenment-in-a-brave-new-world/

Current 4G Long Term Evolution (LTE) is Advancing to become 5G



© ARM 2016

* ARM Estimate, LTE Rel 8 to 5G wave 2

ARM

Key Elements of 5G



- Small cell antennas capable of beam-forming;
- Phased arrays capable of directing the beam pattern thereby tracking target device and focusing on person with device linked to the beam
- Massive multiple inputs and outputs, known as massive MIMO; pose unique challenges for measuring exposures.
- Higher frequency Millimeter waves capable of interacting with skin and sweat glands and acupuncture meridians.
- Pulsed Signals can activate Gene expression

5G Millimeter Spectrum Opened For Sale

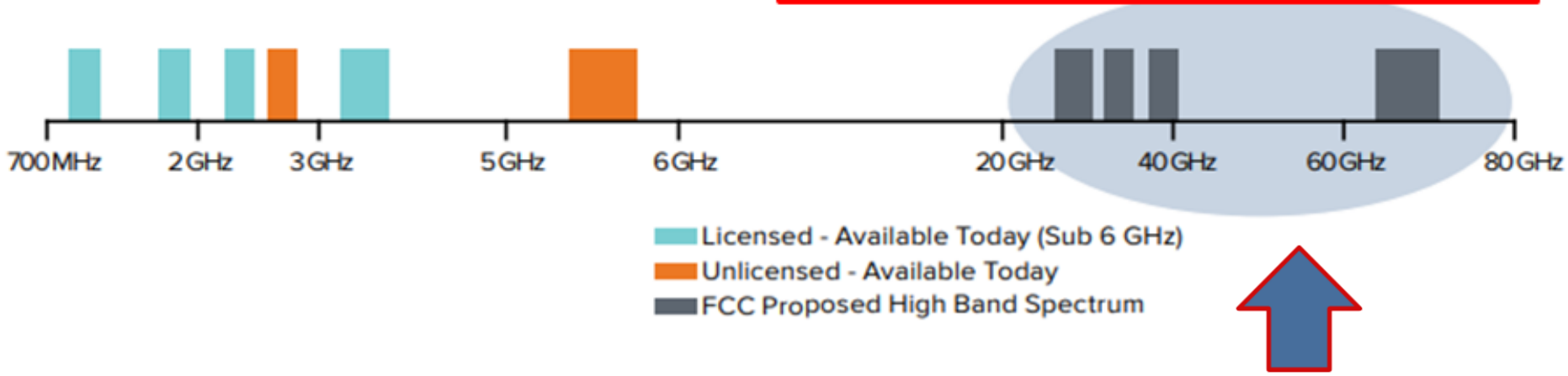
- FCC adds additional spectrum for 5G wireless by an anonymously vote on July 14, 2016
- Total of 10.85 GHz will be made available:
  - 28 GHz: 27.5 to 28.35 GHz
  - 37 GHz: 37.0 to 38.6 GHz
  - 39 GHz: 38.6 to 40 GHz
  - 64 to 71 GHz.

Licensed

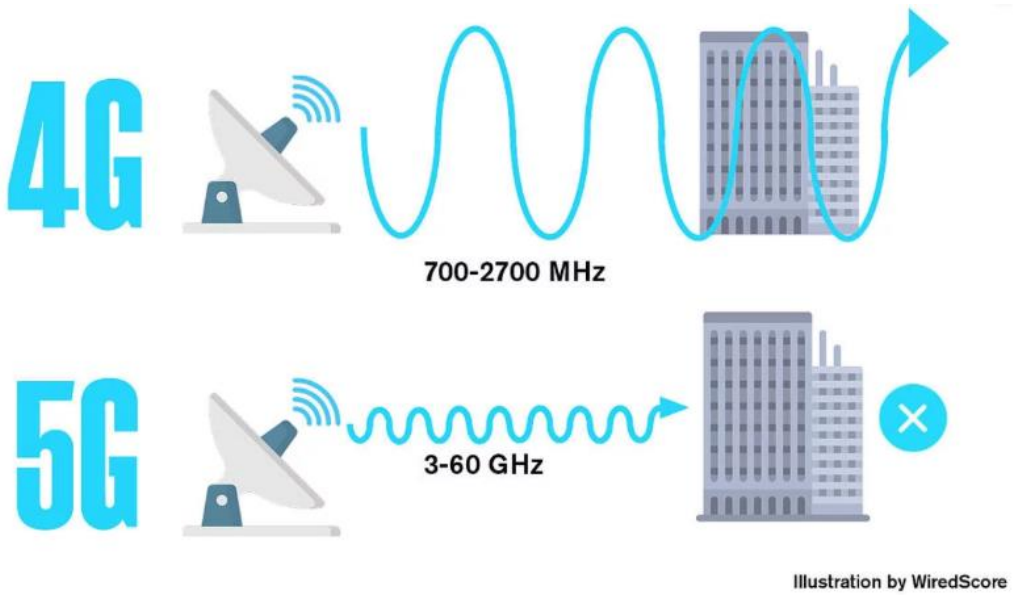
Unlicensed



Millimeter Waves in High Band



5G will also add Millimeter Waves



Current RF & Microwaves (Longer Wavelengths)

Future added Millimeter waves (Shorter Wavelengths)

- 4G antennas use frequencies below 2700 MHz (2.7 GHz) have longer wavelengths, penetrate easily into buildings
- Future 5G antennas using higher frequencies 6+ to 60 GHz (millimeter waves) penetrate poorly, thus more small cell facilities are planned for installation
- Millimeter waves may affect sweat glands & acupuncture points involved with our energetic meridian system

Active Phased Array Antenna in 5G

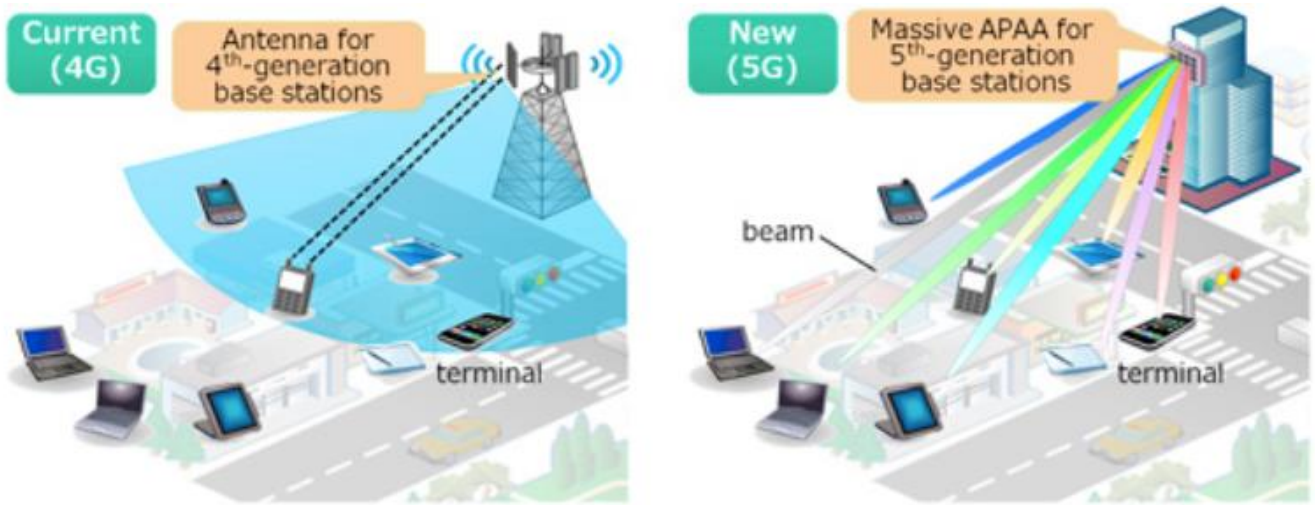


Figure 2. Active Phased Array Antenna (APAA) shown above right in 5G base stations. The combination of analog beam forming via APAA and digital *MIMO* signal processing for the multi-beam multiplexing is believed to be one of the promising approaches for reducing the complexity and power consumption of 5G base stations. However, that has yet to be proven in a commercial 5G deployment.

- What is planned are base stations that send out multiple beams simultaneously to service multiple devices with higher EMF density and steerable beams with side lobes

The Look of 5G Antenna Systems





Conventional Sector Antenna Currently in Use

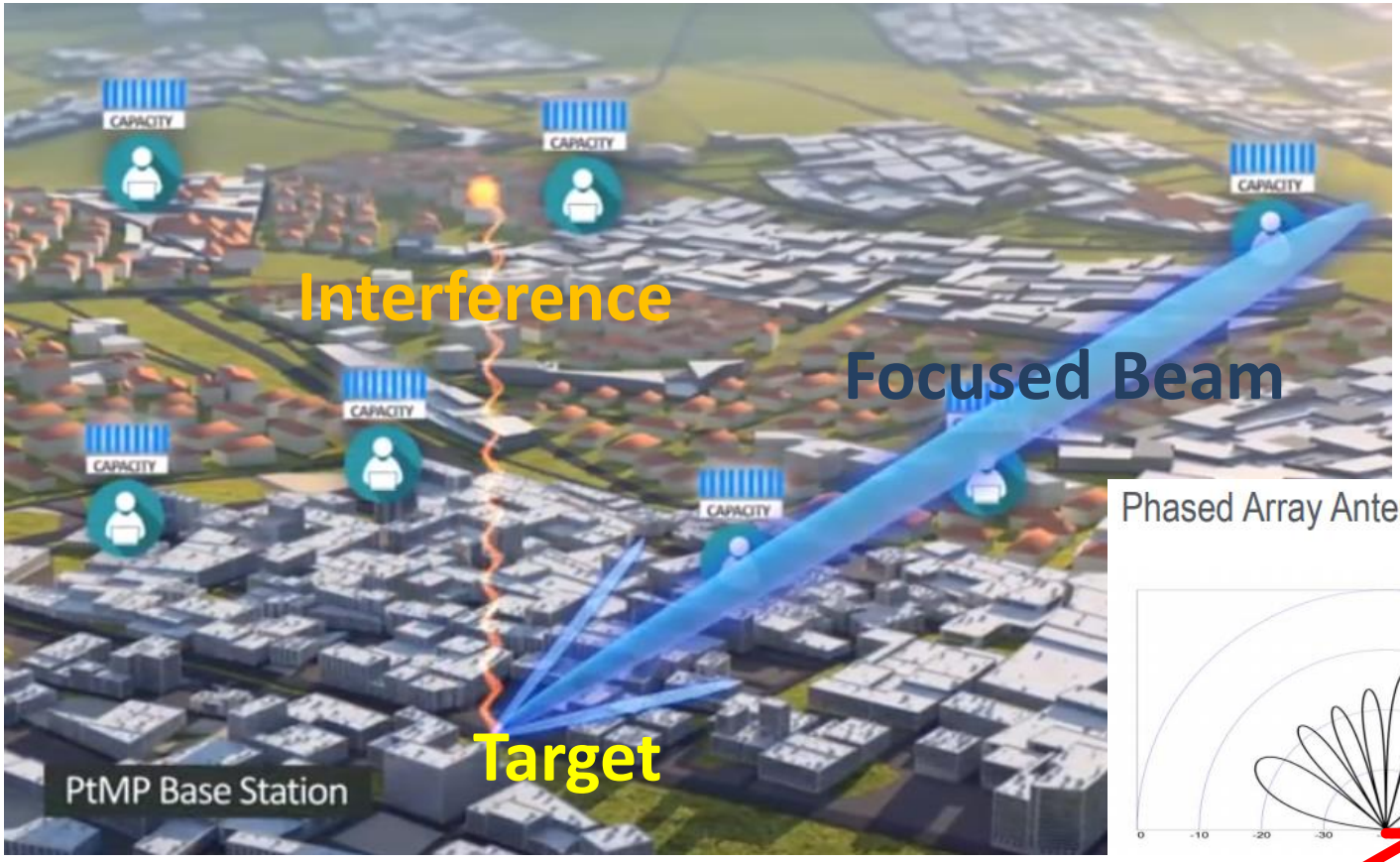
- 5G Antennas located in Oregon (above)

RADWIN 5000 Jet Beamforming Technology

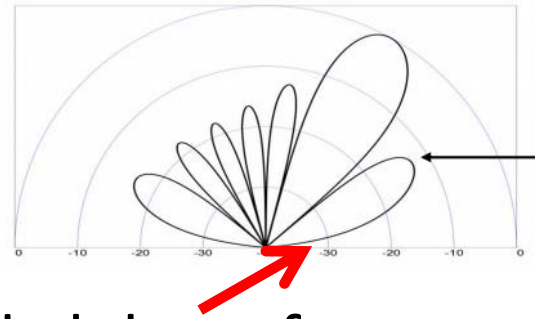


- Multiple Antenna Arrays inside Antenna Box allow steerable narrow beams of focused radiation (somewhat similar to laser beams) that will track devices (phones, IoT etc) on or near people with targeted power
- Designed to make communication immune from interference from other RF sources
- **No health studies have been conducted**

RADWIN 5000 Jet Beamforming Technology



Phased Array Antenna Principle



- Beams sweep across area but also have side lobes of pulsing information that may hit other bystanders

www.youtube.com/watch?v=5iFcS2igi64 See their Promotional Video

SpaceX's Starlink internet satellites could make astronomy on Earth 'impossible' and create a space-junk nightmare, some scientists warn

Morgan McFall-Johnsen Nov 16, 2019, 5:31 AM



SpaceX, the rocket company founded by Elon Musk, plans to surround Earth with Starlink satellites to provide global high-speed, low-latency internet. SpaceX; Kevork Djansezian/Getty; Business Insider

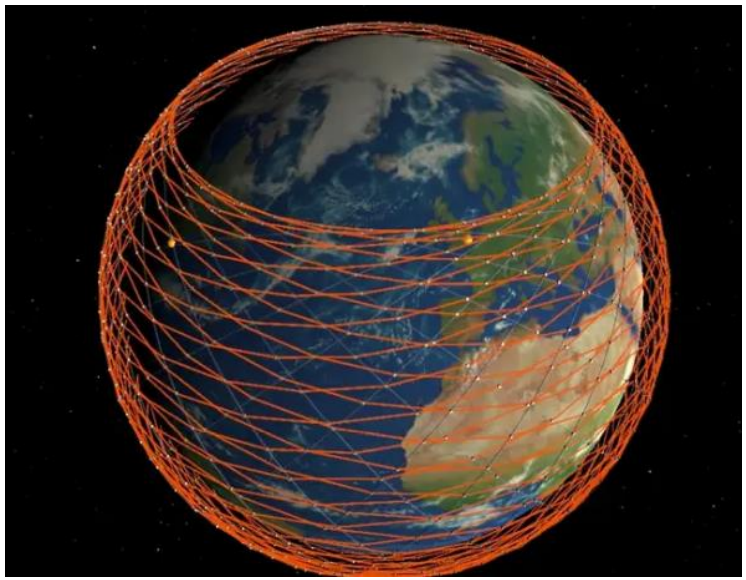
www.businessinsider.com/spacex-starlink-satellites-risks-astronomy-space-junk-2019-11

SpaceX Satellite 5G Network



60 Starlink internet satellites, each weighing about 500 pounds, flat-packed into a stack prior to their launch on May 23, 2019

- Currently 180 satellites in orbit
- Ultimately SpaceX wants to put 42,000 satellites in near Earth orbit
- These will also have beam forming technologies



SpaceX's planned Starlink network



SpaceX's planned Starlink satellite orbits around Earth in pattern

Valerann 5G Embedded Roadway IoT







- British company wants to implant road sensors for autonomous vehicles control and alert
- Vision is for Smart Roads with continuous 5G radiation coming from the roads you drive on

www.valerann.com

2018 Paper: 5G may Damage Tissue

Health Phys. 2018 Sep 21. doi: 10.1097/HP.0000000000000930. [Epub ahead of print]

Systematic Derivation of Safety Limits for Time-Varying 5G Radiofrequency Exposure Based on Analytical Models and Thermal Dose.

Neufeld E[1], Kuster N[1,2].

⊕ **Author information**

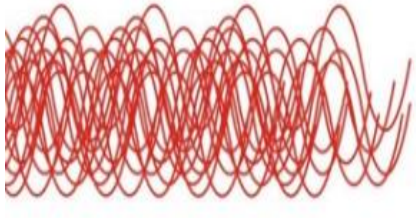
Abstract

Extreme broadband wireless devices operating above 10 GHz may transmit data in bursts of a few milliseconds to seconds. Even though the time- and area-averaged power density values remain within the acceptable safety limits for continuous exposure, these bursts may lead to short temperature spikes in the skin of exposed people. In this paper, a novel analytical approach to pulsed heating is developed and applied

- 5G transmits info in bursts; can lead to tissue heating
- The results also show that the peak-to-average ratio of 1,000 tolerated by the International Council on Non-Ionizing Radiation Protection guidelines may lead to permanent tissue damage after even short exposures, highlighting the importance of revisiting existing exposure guidelines.

New EMF Radiation is Plane Polarized, Beam formed, similar to Laser Coherent Radiation

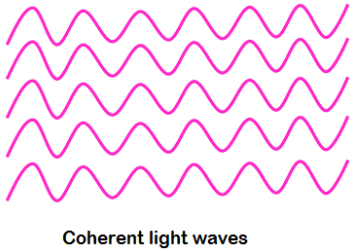




Incoherent Light
Waves not in phase

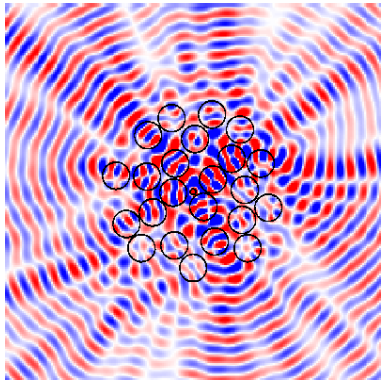






Coherent Light
Waves in phase





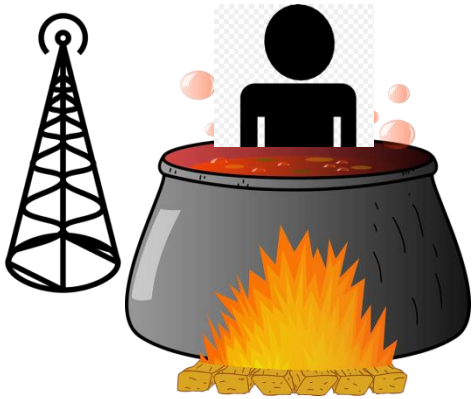
www.eng.yale.edu/stonegroup/cpa/cpa.html

- New EM radiation can use multiple antennas to shape narrow beams using phase controls that may interact differently with human tissue (not yet studied)

RF Exposure Guidelines not Protective

- Outdated, not been revised since 1996 by FCC
- Created by IEEE engineers not EMF Specialists
- Only consider Heating Effects, not Non-thermal
- Other countries (Russia, China) 10x-100x lower
- 5G has Phase Array, Beam-forming directed Radiation

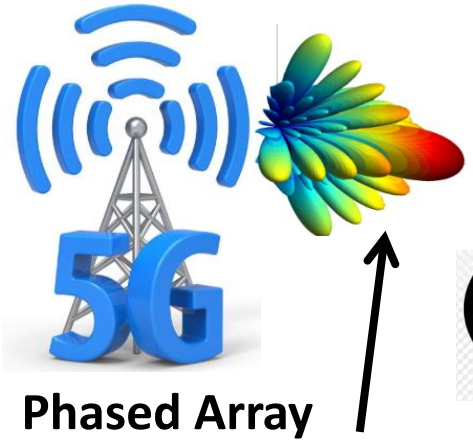
Spherical, Omnidirectional Antenna Radiation



RF Thermal Consideration Only

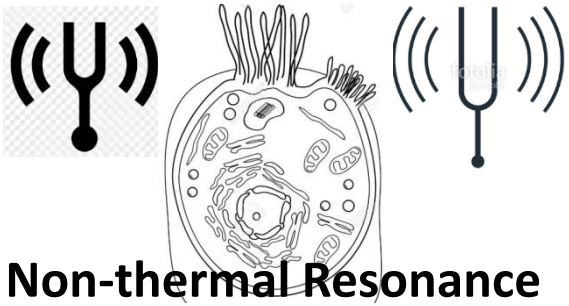


2G, 3G, 4G



Phased Array Antenna Beams: Pulsing, Tracking

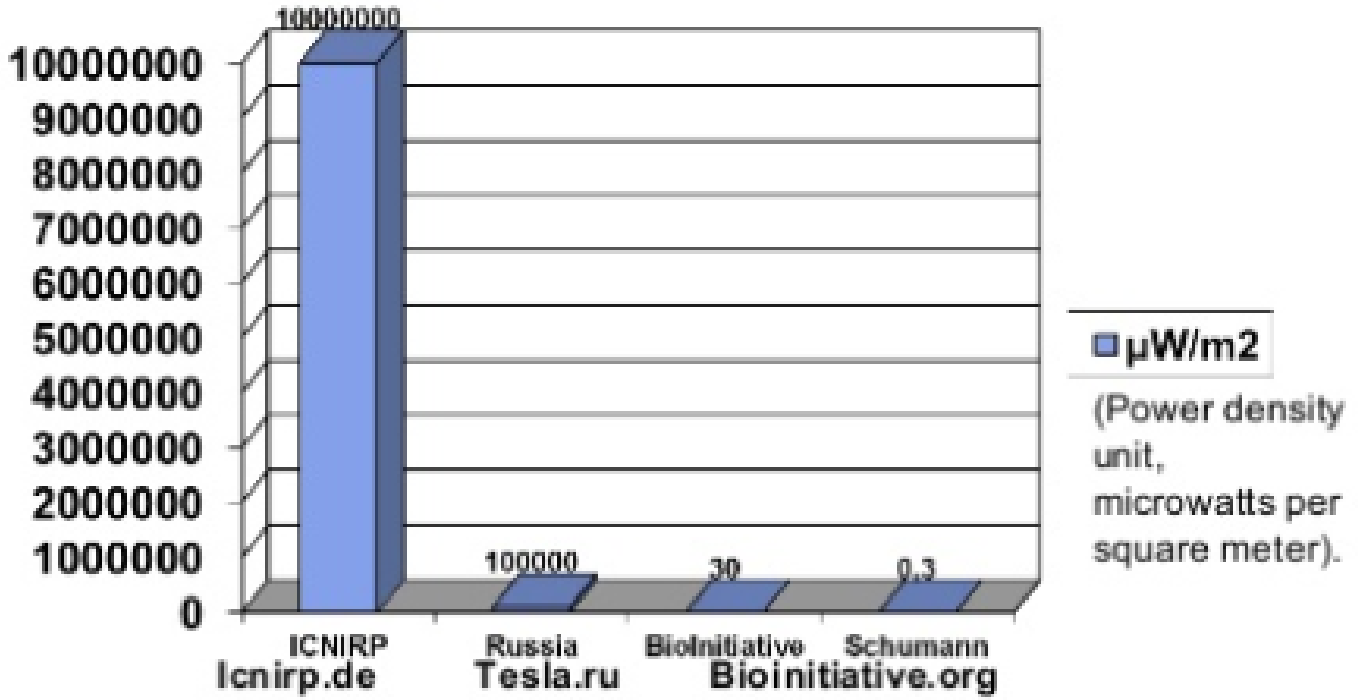




Non-thermal Resonance In Tissues and Cell Water

Thermal Guidelines are Too High

Thermal-only ICNIRP-guidelines (for 3G/UMTS)
vs.
Chronic-exposure non-thermal guidelines (Russia etc.) +
BioInitiative recommendations + RF levels in the nature



A note: ICNIRP/FCC-RF-guideline in many Western countries is million times higher than natural RF-level.

CT Senator Blumenthal Hearing on 5G



- Hearing held Feb 6, 2019 questioned several Wireless Industry Representatives

<u>Blumenthal asked</u>:

- How much money has the industry committed to support independent research?…has any been completed… on the biological effects of this new (5G) technology?"

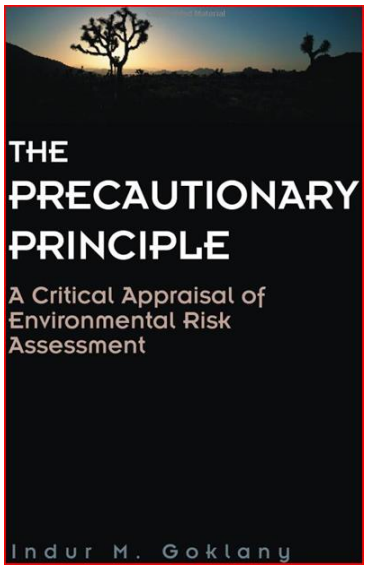
<u>Industry representatives replied</u>:

- ***"There are no industry backed studies to my knowledge right now."***

Senator Blumenthal replied, **" So, we are flying blind here on health and safety"**

Scientists sound Warning on 5G

- International Scientist Appeal about 5G deployment was signed by 261 scientists and doctors (as of Nov 4, 2019) from 41 countries
- 5G "constitutes a massive experiment on the health of all species." states Dr. Joel Moskowitz, UC Berkeley Emeritus on Public Health
- "We believe it should be **unethical to ignore the available evidence of health damages**
- www.5gappeal.eu/about/
- www.emfcall.org/
- www.isde.org/5G_appeal.pdf



Precautionary Principle needs To be invoked

Who is Taking Action? Belgium in 2019



2 April 2019

Originally published on www.akebackyourpower.net

Great news. A Belgian government minister has announced that Brussels is halting its 5G plans due to health effects

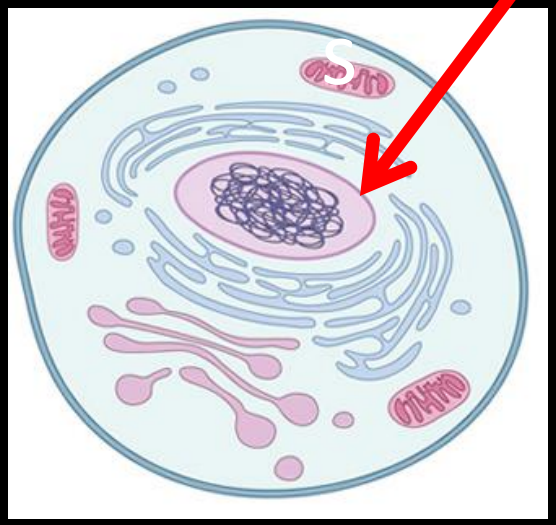
- **5G pilot project is not compatible with Belgian radiation safety standards (9 V/m, or 95 mW/m^2)**
- **U.S. permitted radiation guidelines are higher (64 V/m or 10,000 mW/m^2 , allowing about 105 x more power density)**

5G Vulnerable Body Parts

Oxidative Stress
DNA Damage
Apoptosis: Cell Death
Cancer

Cells

Nucleus



Brain

Eyes

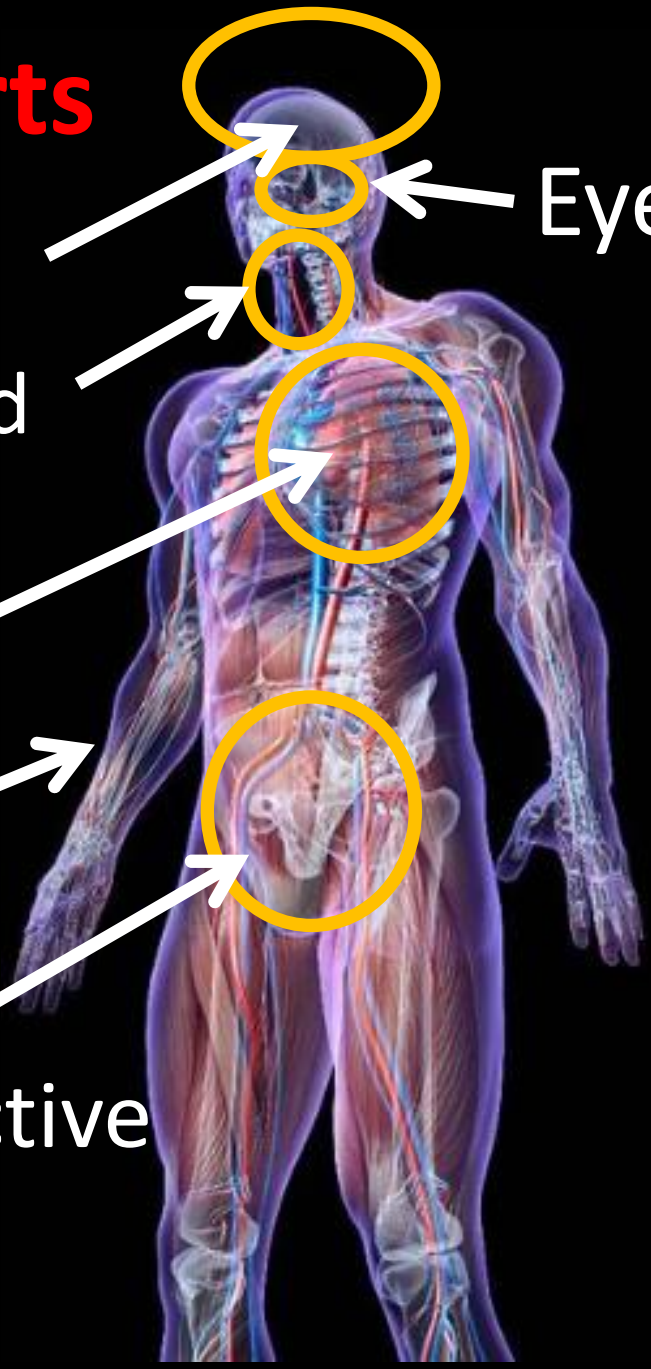
Thyroid

Heart

Skin

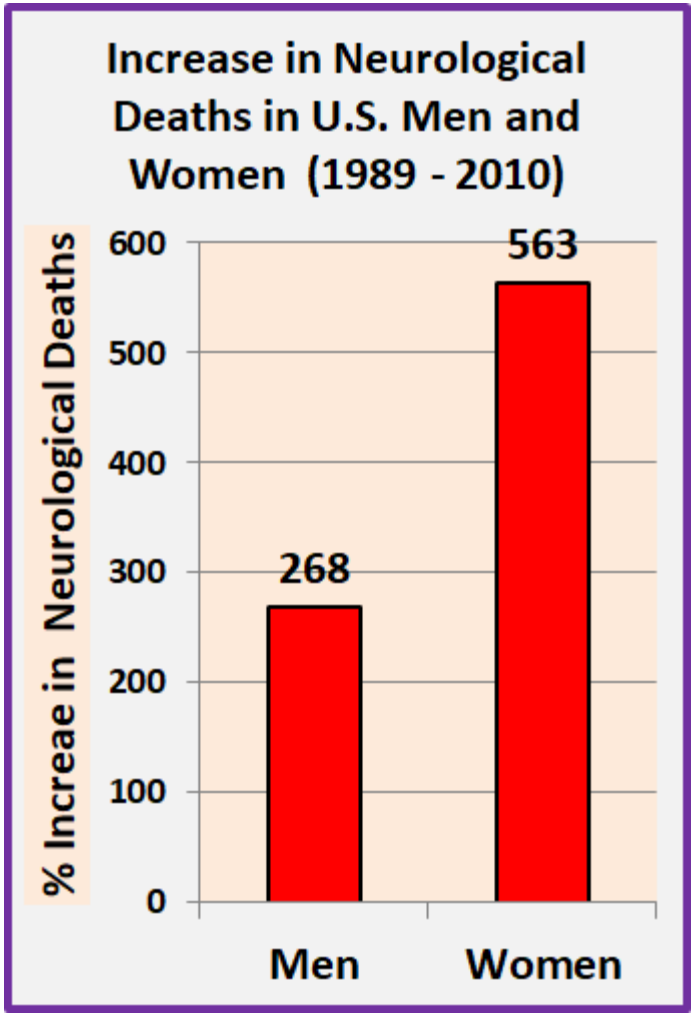
Gonads

Reproductive System



Major Increase in Neurodegenerative Diseases and Deaths (1989 – 2010)

- Colin Pritchard from Bournemouth University reported on study that showed in the United States, where neurological deaths in men aged over 75 have nearly tripled, and in women risen more than fivefold, between 1989 to 2010.
- Pritchard: "We now face unprecedented levels of neurological disease, not just the early dementias."

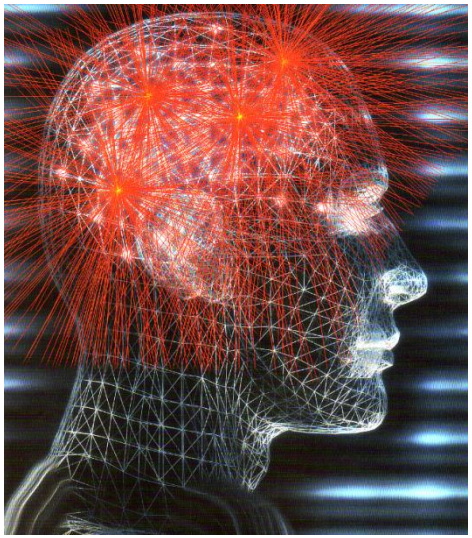


Source: Pritchard (2015): Neurological deaths of American Adults 1989-2010
Surg Neurol Int. 2015 Jul 23;6:123. doi: 10.4103/2152-7806.161420. eCollection 2015

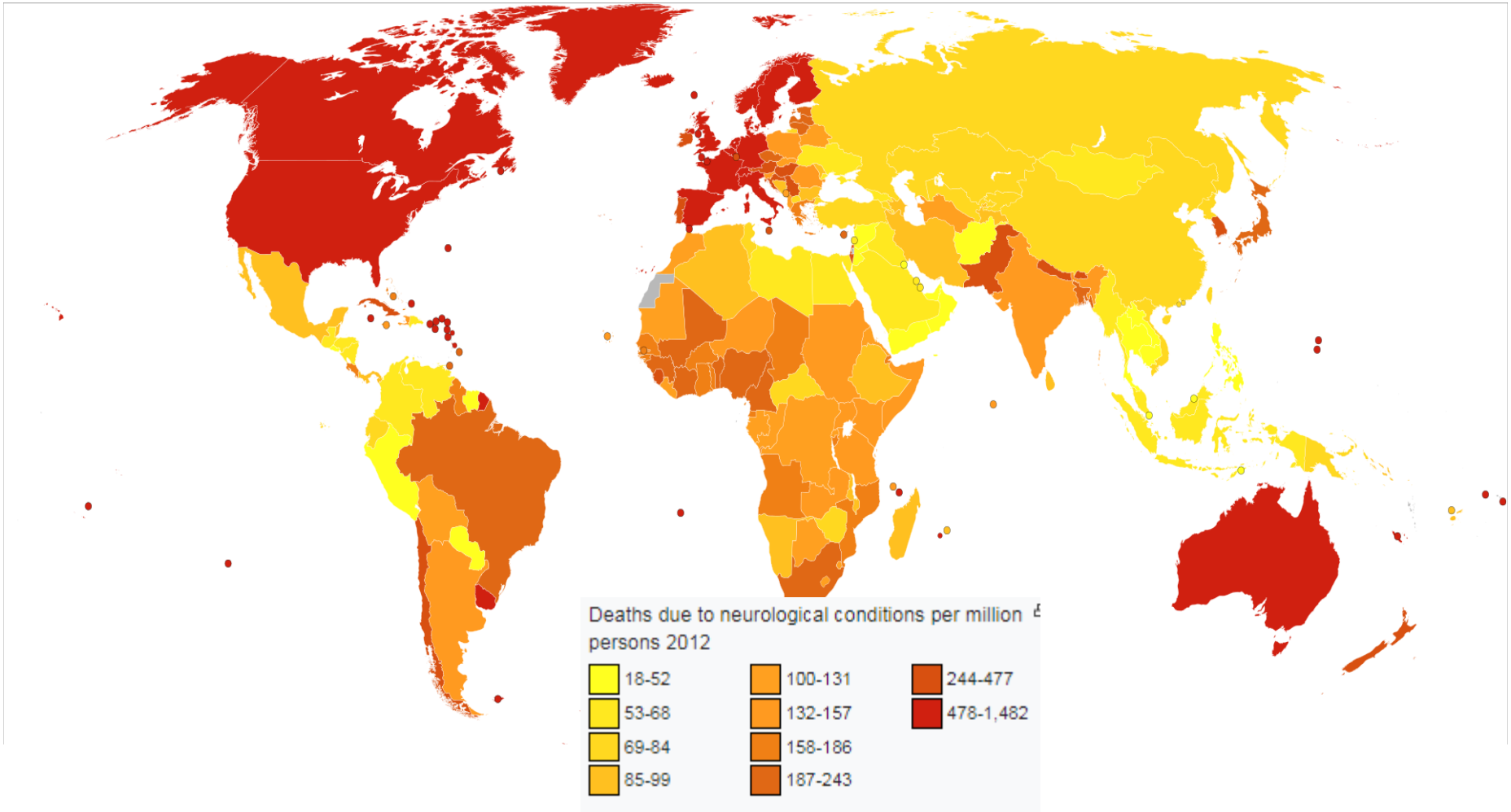
Neurodegenerative Diseases often related to Impaired Mitochondrial Function

These include:

- Bipolar disorder
- Major depressive disorder
- Panic Disorder and social anxiety
- Parkinson's disease
- Alzheimer's Disease
- Chronic fatigue syndrome
- Many are accompanied by Brain Inflammation



Deaths from Neurological Disorders 2012



- Highest Rates occurred in Western Technologically Advanced countries with Highly Developed Wireless Services

https://en.wikipedia.org/wiki/Neurological_disorder

Fire Stations have Opt-Out for Towers

INTERNATIONAL ASSOCIATION OF FIRE FIGHTERS





- Firehouse stations were exempted from mandatory placement of antennas in California Bill SB649 which was vetoed by Gov. Brown on Oct 15, 2017
- A 2004 SPECT brain scan study of firefighters in Central California found brain abnormalities in all the men tested, as well as delayed reaction time, lack of impulse control and cognitive impairment.

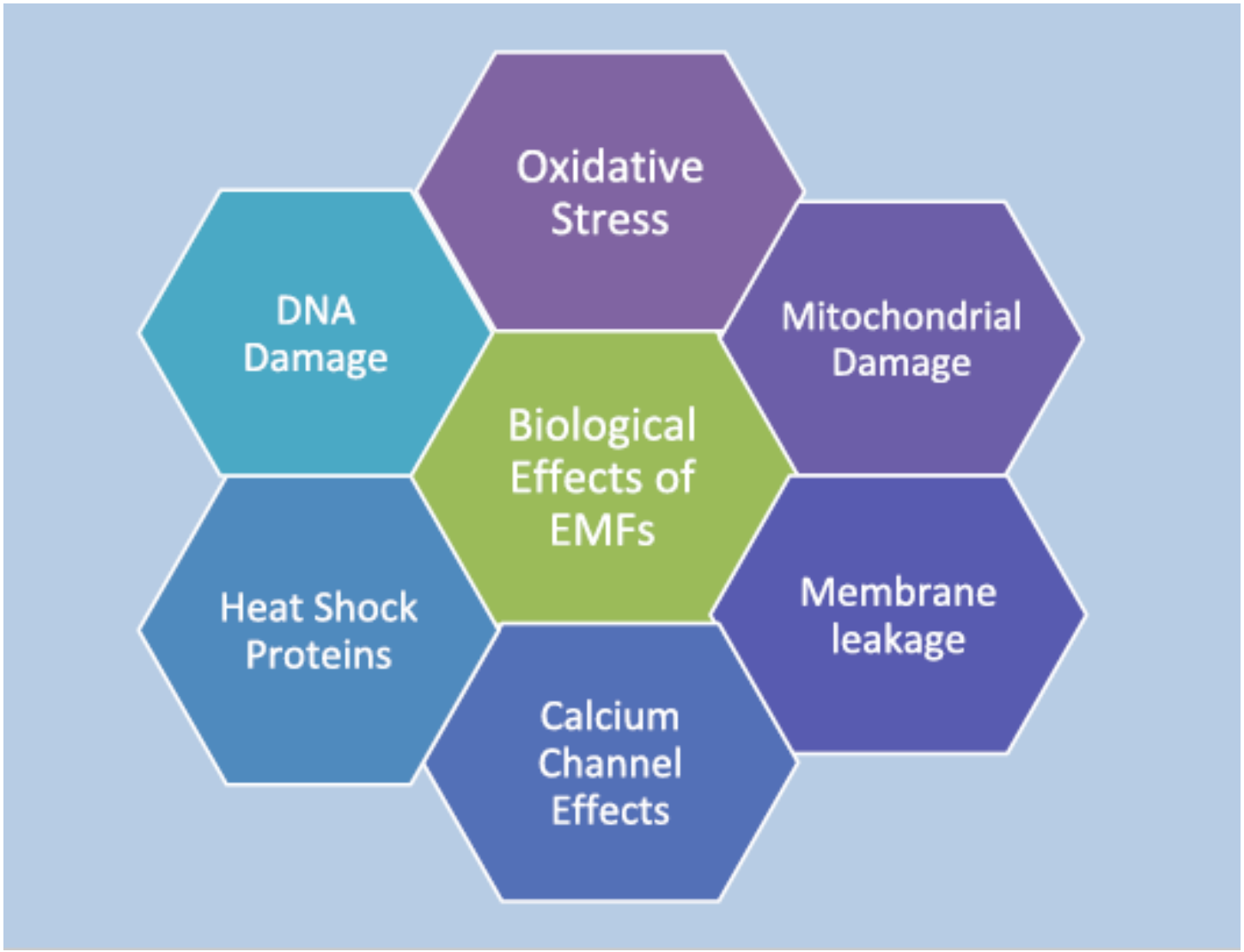
FIREMEN Functional MRI Studies (Heuser, 2017)



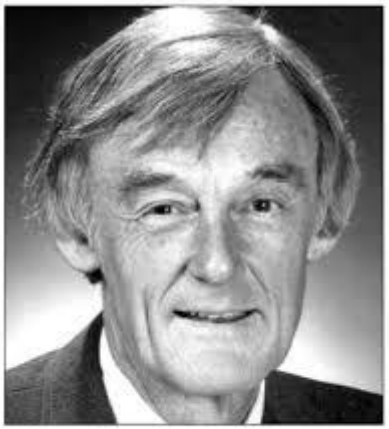
- Abnormal fMRI Brain Studies were found after firemen had been exposed to firehouse antenna radiation and had EHS
- Gunnar Heuser MD at the UCLA Brain Research Institute studied firemen who developed serious cognitive problems on the job
- Diagnosis: Toxic Encephalopathy

Heuser, G., Heuser, SA. Functional brain MRI in patients complaining of electrohypersensitivity after long term exposure to electromagnetic fields. Reviews on Environmental Health. 2017; 32(3): 291–299 (July 5, 2017)

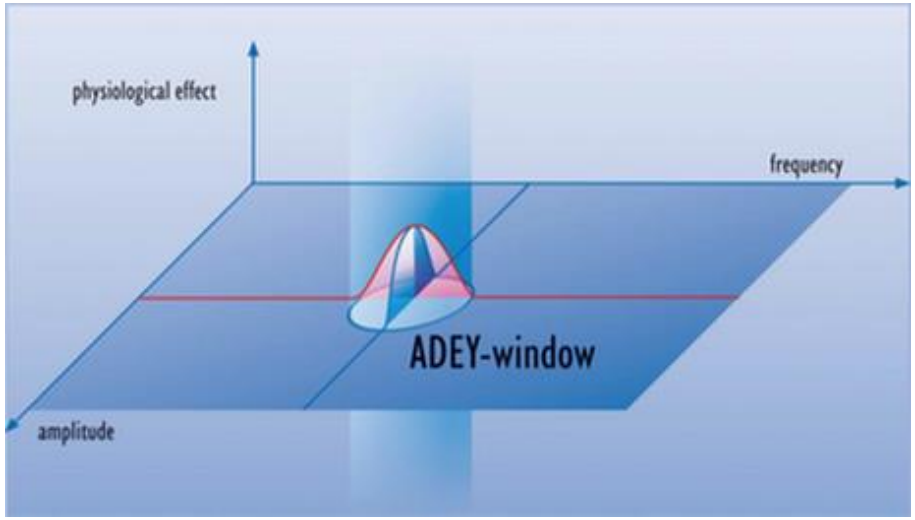
Toxic Biological Effects of Electromagnetic Fields



Adey Biological Windows



William Ross Adey



- Discovered by Ross Adey at Loma Linda University
- At the correct frequency and amplitude of Electromagnetic Fields you get a physiological response such as Calcium ion influx into cells which act as messenger molecules

Tissue interactions with nonionizing electromagnetic fields.

W R Adey

01 APR 1981 // https://doi.org/10.1152/physrev.1981.61.2.435

PHYSIOLOGICAL REVIEWS
Vol. 61, No. 2, April 1981

Oxidative Stress from RFR

Oxid Antioxid Med Sci 2014; 3(1):1-3 *ISSN: 2146-8389*

EDITORIAL

Low intensity radiofrequency radiation: a new oxidant for living cells

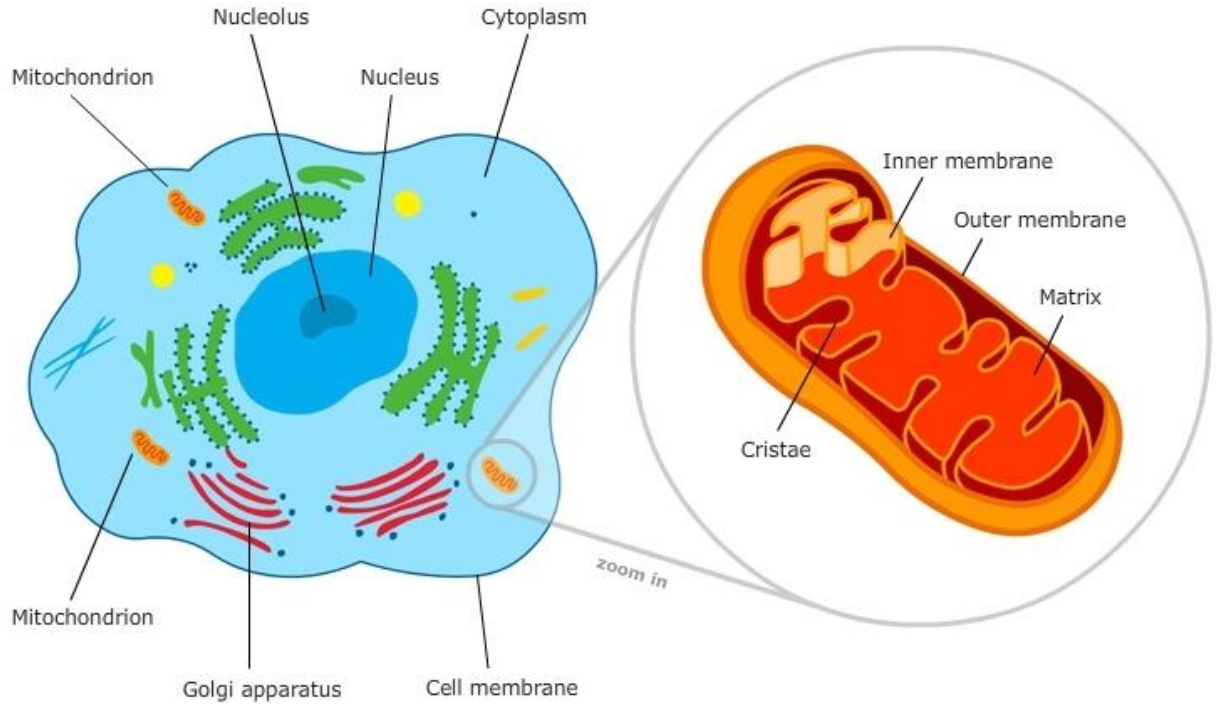
Igor Yakymenko[1], Evgeniy Sidorik[1], Diane Henshel[2], Sergiy Kyrylenko[3]





- Review of 80 papers on oxidative stress caused by RFR, 76 papers (92.5%) showed significant effects
- Published in journal: Oxidants and Antioxidants in Medical Science" March 29, 2014

Mitochondria (Powerhouse of Cells)



Produce ATP as Energy Source for the Cells



- Mammalian somatic cells ranging from 80 to 2000, average 107 per cell; high in brain and heart
- Oocytes have 100,000 to millions of mitochondria
- Most are in Muscle tissue (40% of human body)
- Major source of free radicals in body = oxidative stress

EMFs cause these Effects on Health



- Oxidative Stress = Excessive free radicals formation
- Fatigue, Headaches, Sleep Disturbances, Low Melatonin
- Cognitive & Neurobehavioral Effects, Memory Issues
- Reproductive Effects = Sperm & Oocyte (eggs) changes
- DNA Changes – Single & Double Strand Breaks
- Breaks in Blood Brain Barrier: Brain toxin exposure
- EMF = Type 2B Carcinogen = Long term Cancer Induction

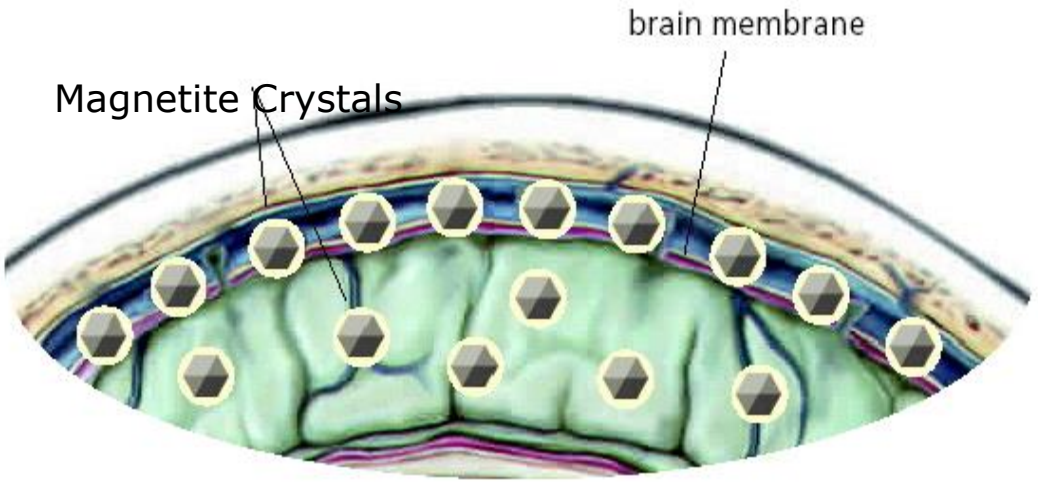
- **These also correlate with Mitochondrial Damage**

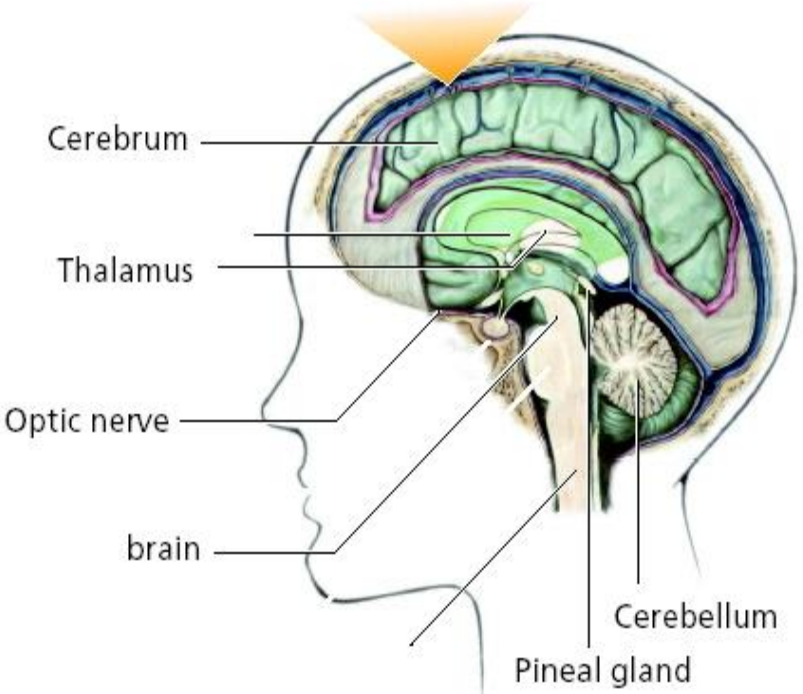
Magnetite Crystals in Human Brain

5 million crystals/gram
In Brain tissue

100 million crystals/gram
in brain membranes

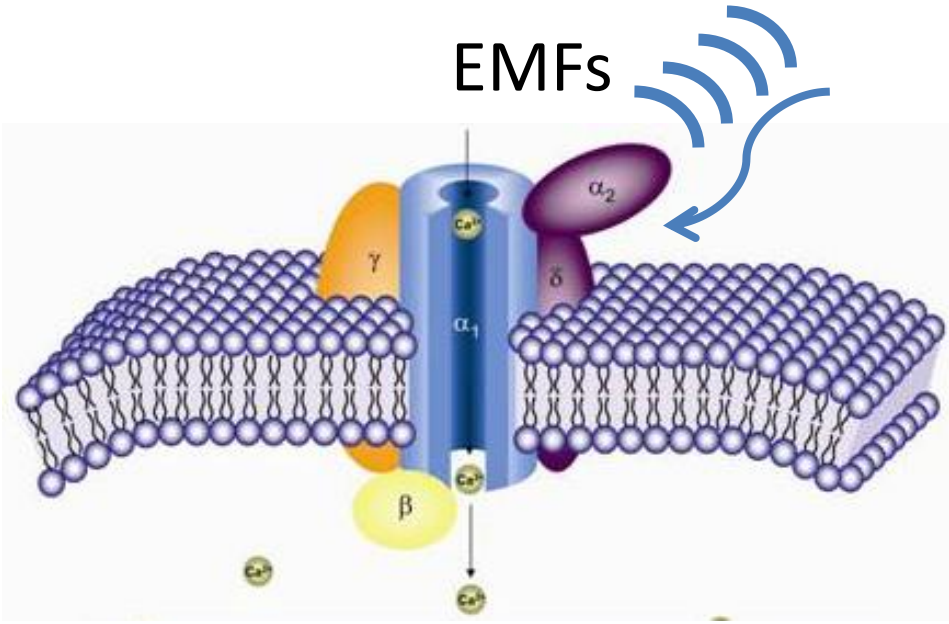
Magnetite crystals allows us to have a magnetic sense and be oriented to the earth's magnetic field. Also affected by artificial fields

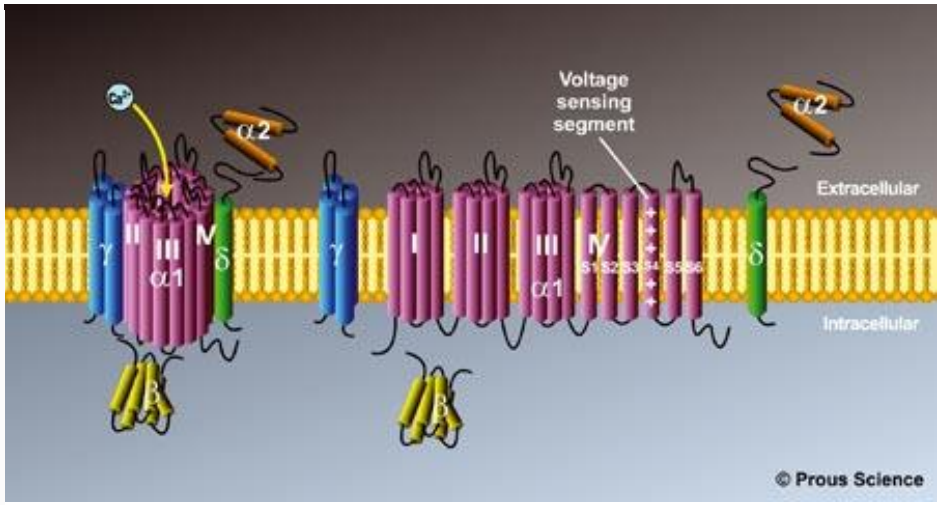




Source: Kirschvink JL: Bioelectromagnetics 17(3):187-194, 1996

Martin Pall Hypothesis:Voltage-Gated Calcium Channels are Culprit





- Various types are present in every Cell Membrane
- Respond to Low Level Electromagnetic Fields pulses
- Effects EMFs blocked by Ca++ Channel Blocker Drugs
- Based on literature review but no experiments

www.peaceinspace.blogs.com/files/5g-emf-hazards--dr-martin-l.-pall--eu-emf2018-6-11us3.pdf

3 - 8% of general population in Europe & California are now Very Electrosensitive

Dr D. Belpomme (Paris) estimates 35% are now Moderately sensitive



Electromagnetic Hypersensitivity Syndrome (EHS)

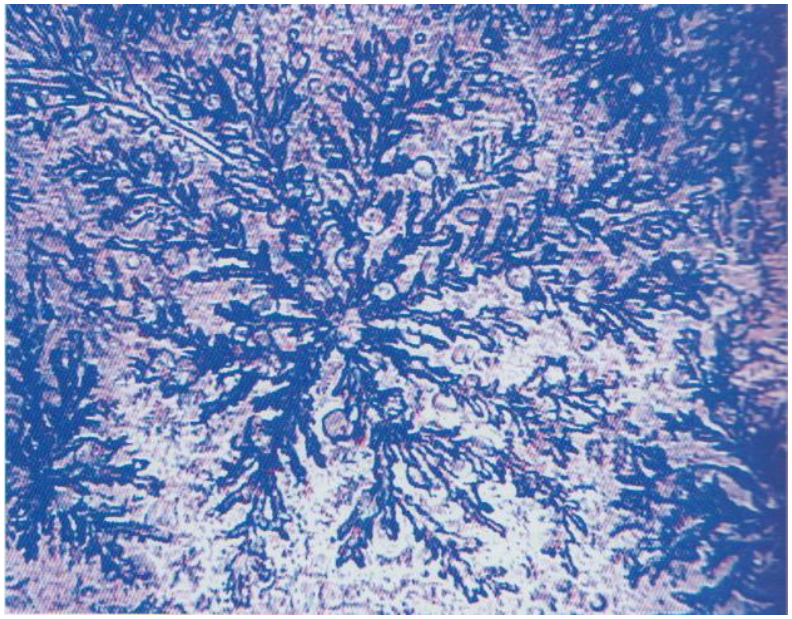
Symptoms of EM Hypersensitivity

- Fatigue
- Headaches
- Depression
- Memory Loss
- Irritability
- Skin Problems
- Nausea
- Dizziness
- Sleep Disturbance
- Feeling of Discomfort
- Difficulty Concentrating
- Visual / Hearing Disruption
- Cardiovascular Problems
- Loss of Appetite
- Movement Difficulties

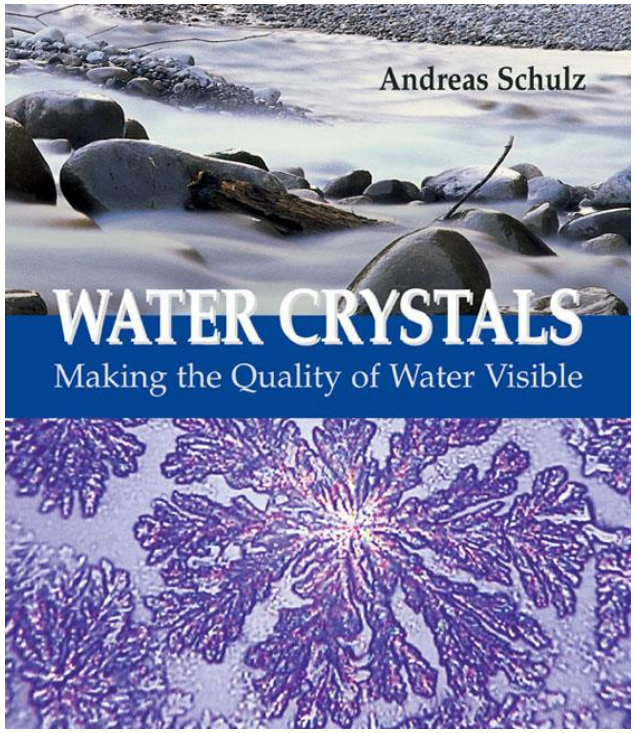
Water and Electromagnetic Fields

- Water absorbs around 70% of all the electromagnetic energy in our atmosphere, making water the most important electromagnetic energy carrier on Earth
- Water absorbs, and/or reacts to electromagnetic waves of 10^{6} Hertz (Megahertz) with wavelengths of about 100 metres to waves of 10^{21} (Sextillion = Billion Trillion) Hertz with wavelength sizes of atomic nuclei.
- 5G radiation will likely seriously affect the “Quantum Coherent Water” in our cells and disturb the coherent water in our body’s acupuncture channels

Water is affected by EM Radiation



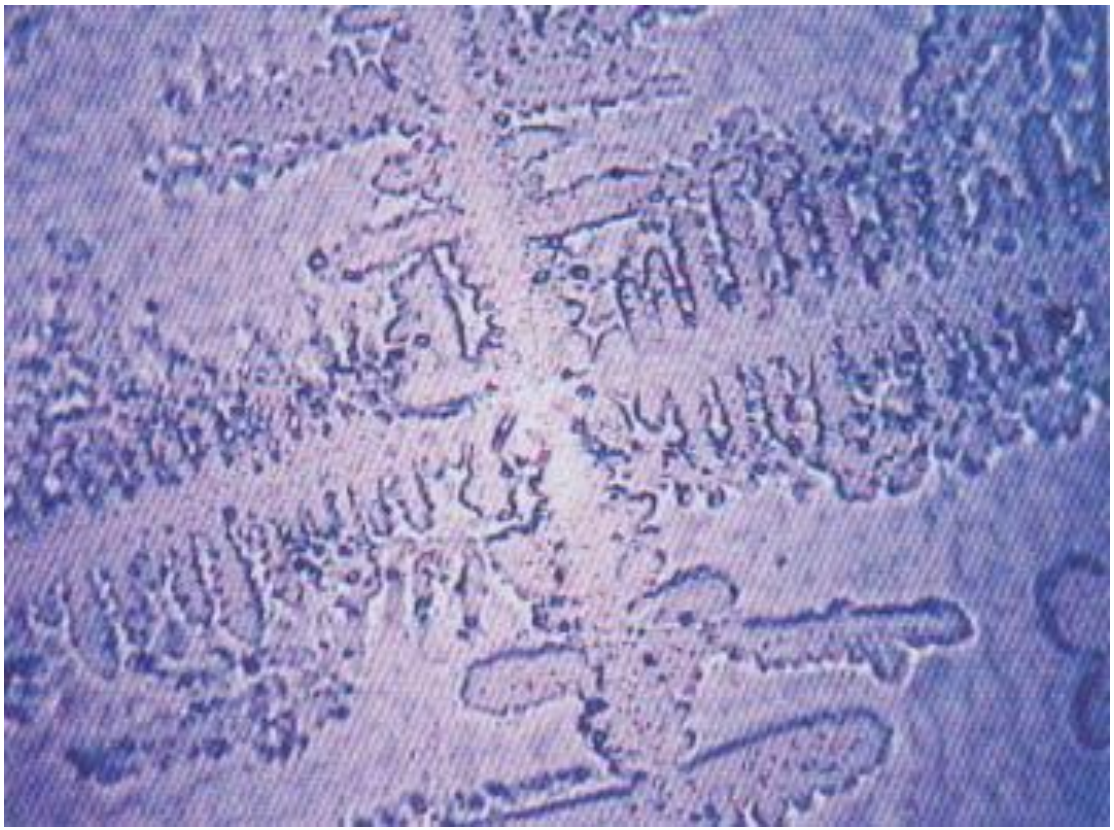
Healthy Water has Branching Organic Hexagonal Structure
Magnification 400X



http://hagalis.com/

- Images from Water Crystallization Experiments
- Work of Andreas Schulz in Germany at Hagalis A.G.

Water from Water Tower with Cell Phone Mast on it



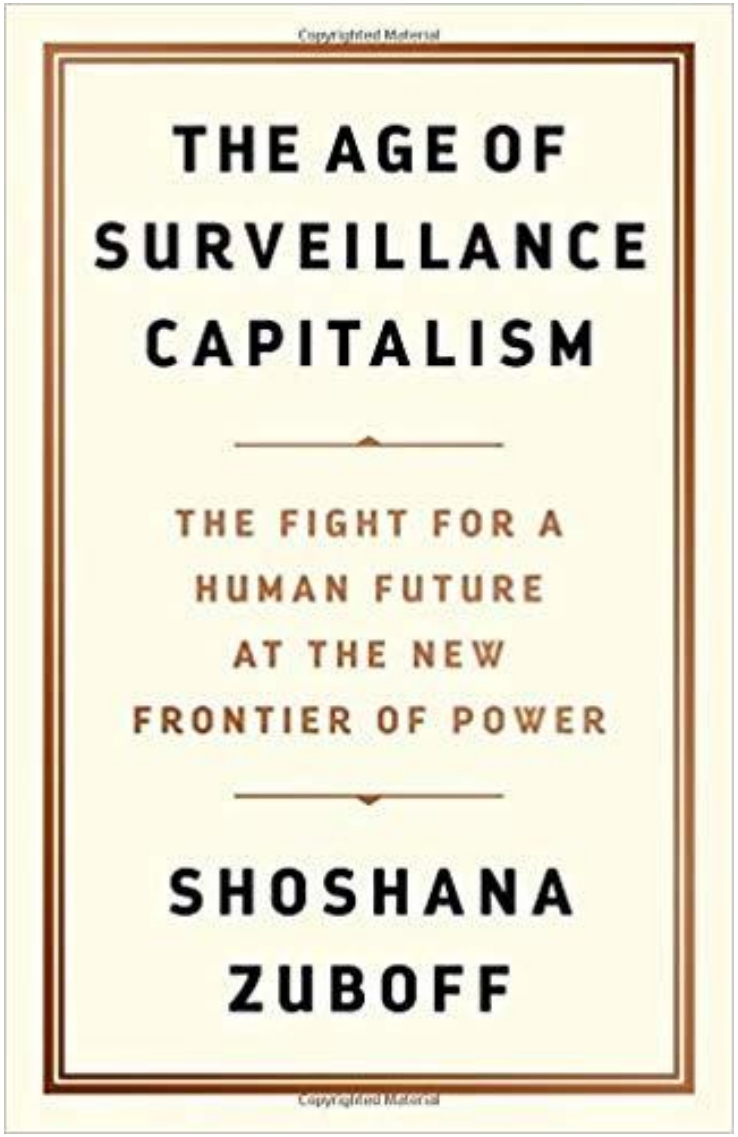
Studied by
Hagalis Method

90 degree type
Crystal pattern

- Square pattern seen in the Water – poor quality
- (100 X Magnification)

Photo from Andreas Schulz

2019: Central Factors driving Tech





Harvard Professor describing what is driving tech today.

Wireless Technologies are especially being used to fulfill the need for Surveilance using Big Data.

Military takes Advantage of 5G



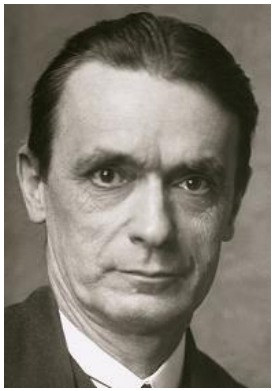
- Report available at: https://media.defense.gov/2019/Apr/03/2002109302/-1/-1/0/DIB_5G_STUDY_04.03.19.PDF

Military takes Advantage of 5G



- 5G system will play an essential role for the use of hypersonic weapons – missiles, including those bearing nuclear warheads, which travel at a speed superior to Mach 5 (five times the speed of sound).

https://www.globalresearch.ca/hidden-military-use-5g-technology/5697848



Rudolf Steiner on Radiation in 1923

- He inspired Anthroposophy, Biodynamic Farming, Waldorf Education and Anthroposophic Medicine
- “This life of men in the midst of electricity, notably radiant electricity, will presently affect them in such a way that they will no longer be able to understand the news which they receive so rapidly. The effect is to damp down their intelligence.”

Some Steps you can Take

- 1. Don’t upgrade to a 5-G smartphone.
- 2. Minimize the use of cellphones. Don’t carry them on your body. Turn them totally off at night.
- 3. Get rid of cordless phones – use corded phones. This includes wireless baby monitors.
- 4. Minimize or turn off Wi-Fi routers when not essential – replace with wired ethernet.
- 5. Replace smart meters with older style analog meters for electricity, gas, and water.

Thank You for Your Attention

