

IIAS/EHT Expert Forum 2017: Wireless Radiation and Health— The Big Picture

Risks are bigger than you believe
Benefits can be stranger than you imagine
& solutions are easier than you think

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January 23, 2017 Opening Reception

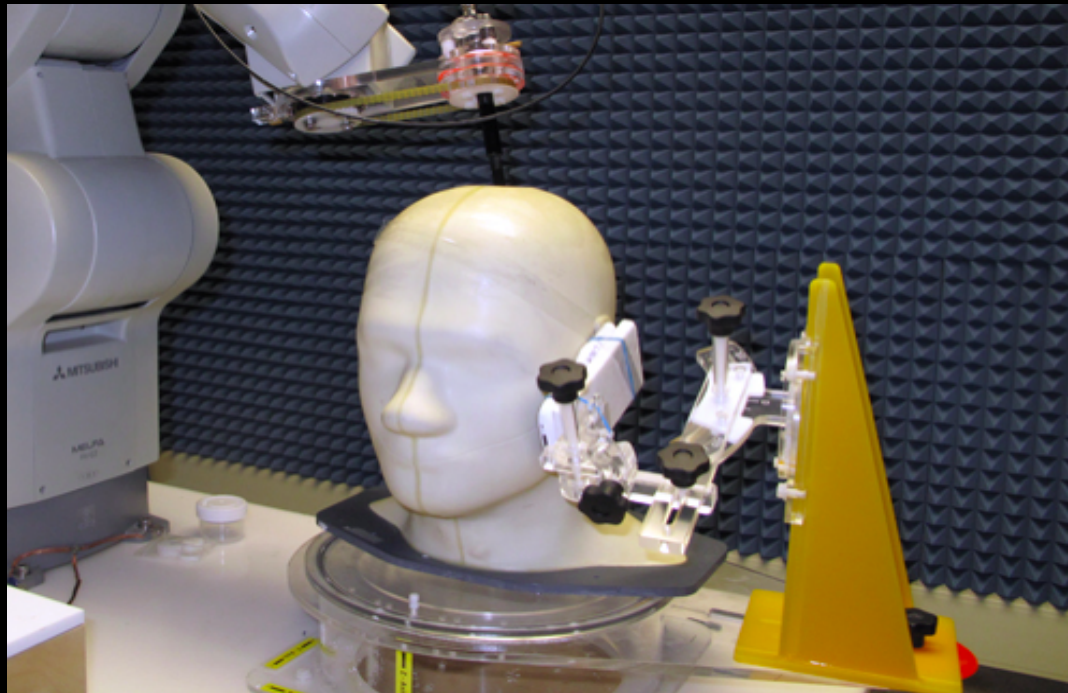


World Health Organization International Agency for Research on Cancer

- 2011: Expert Work Groups determined cell phone and other wireless radiation is a *possible human carcinogen*—same category as lead, engine exhaust and formaldehyde
- Our IIAS/EHT Expert Forum will review all evidence gathered since then including non-cancer endpoints such as neurological, behavioral, immunological and reproductive impacts.



1996 Standards for Cell Phones Based on Outdated Assumptions

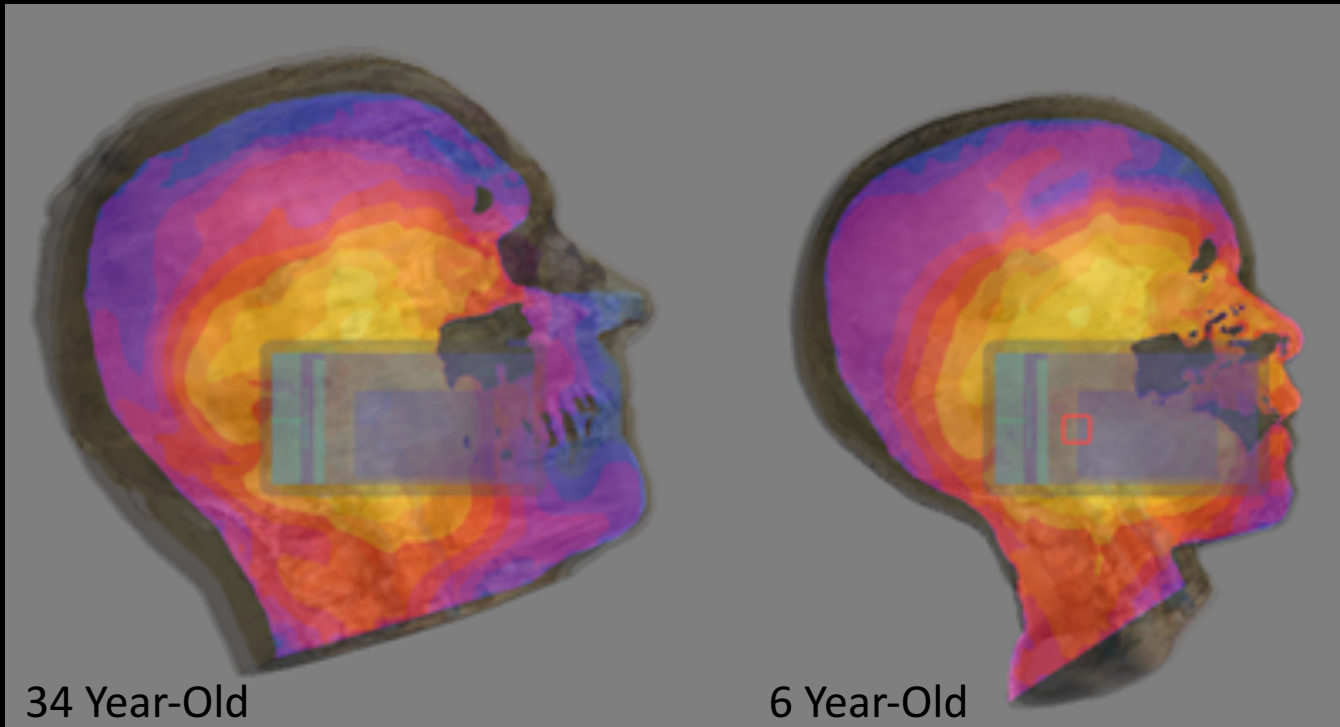


- Typical user was military, medical, or business
- Homogenous Head from a 220 lb male
- Avoid heating after 6 minutes
- Does not consider new studies of cancer, reproductive or other chronic effects

Repeated calls for research on infants, toddlers, young children, pregnancy

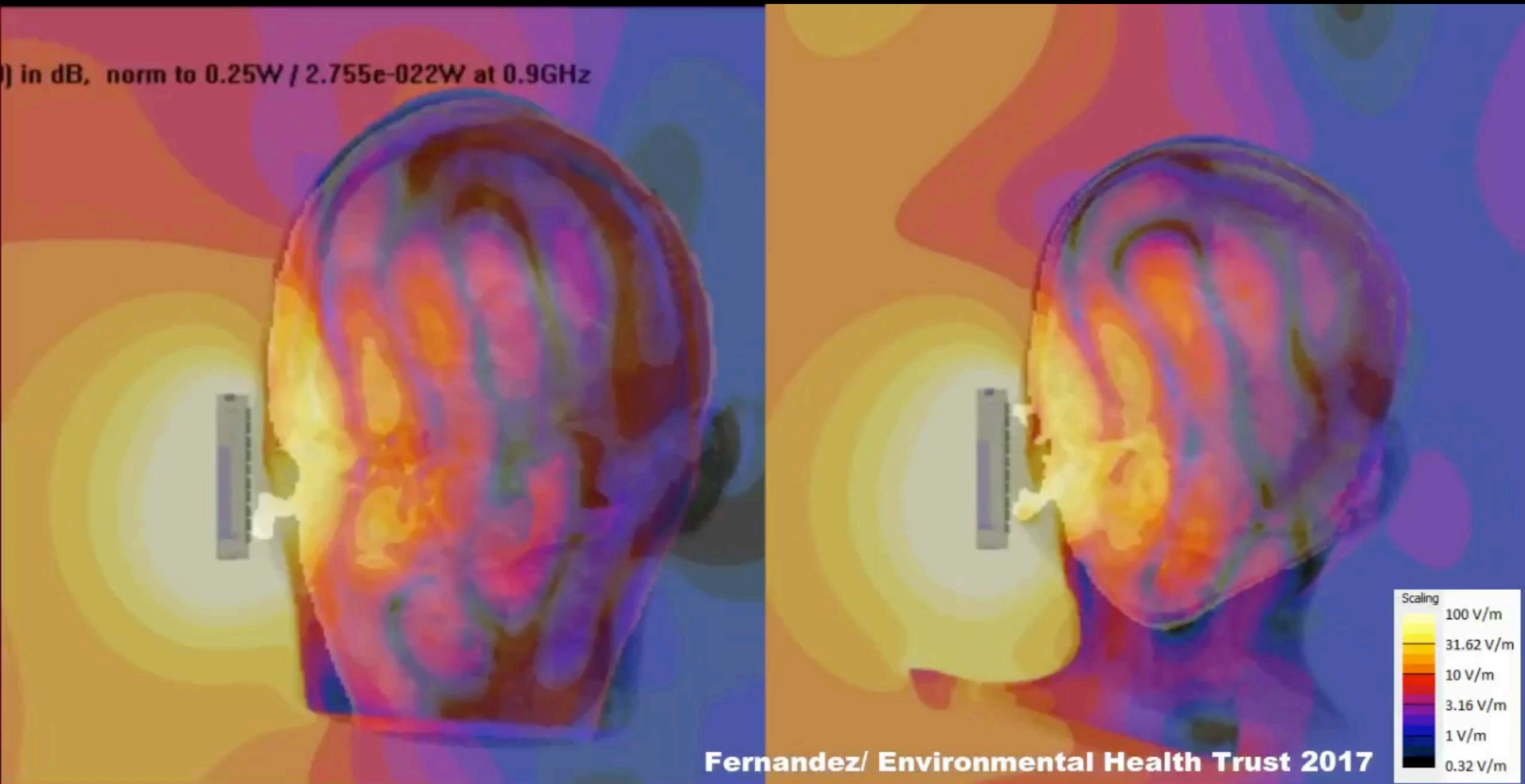


Exposure to RF is proportionally greater and deeper in a child's brain vs. an adult brain



Fernandez, Personal Communication (2017)

SAR (2mW, 50dB) in an oblique slice 5 cm from the cell phone's plane. Exposure is proportionally bigger and deeper in the child and the psSAR is higher in the child's brain.



Cell Phone Radiation into Adult Male and 6 Year Old Child

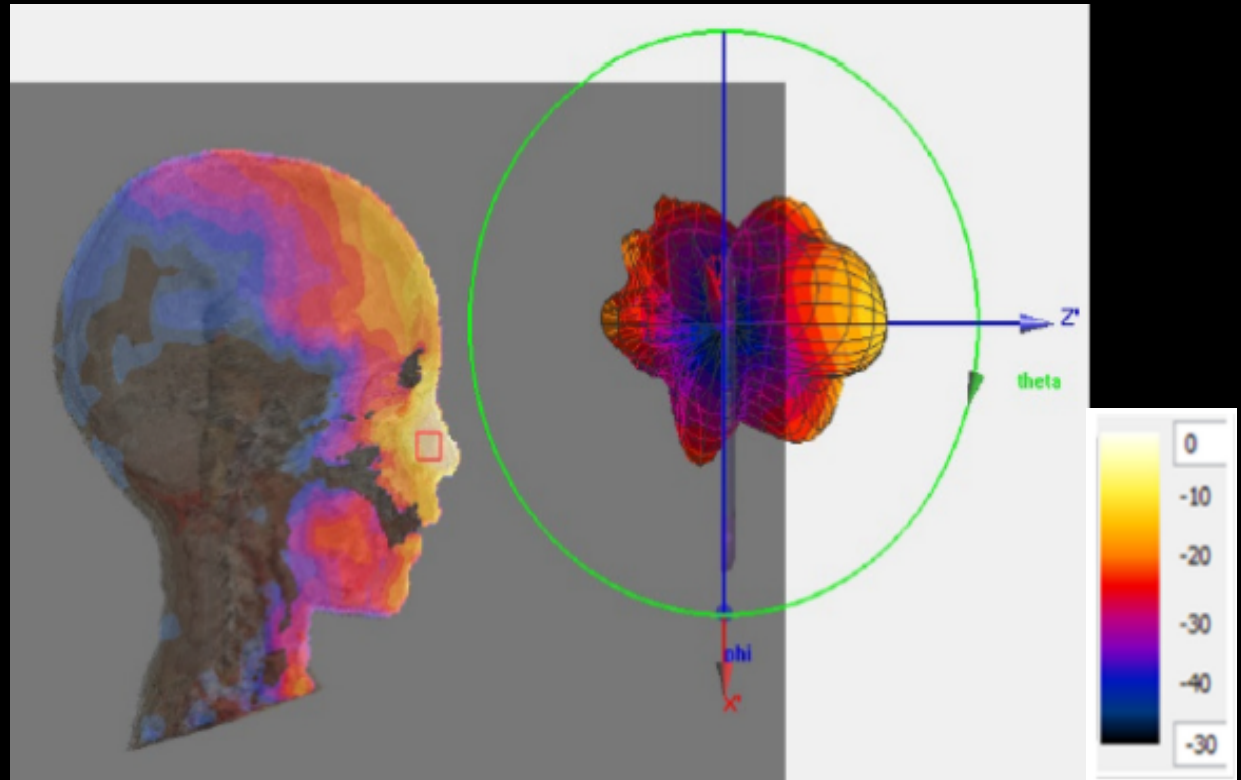
Simulations of Peak Spatial Exposures to Children and Adults from Multiple Devices



Wi-Fi Tablet Radiation Pattern into a 6 Year Old Child

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

Tablet at 150 mm (5.9 inches)
from eye lens

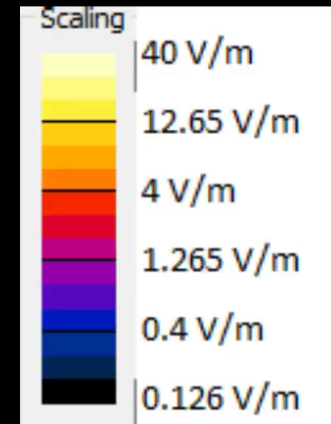
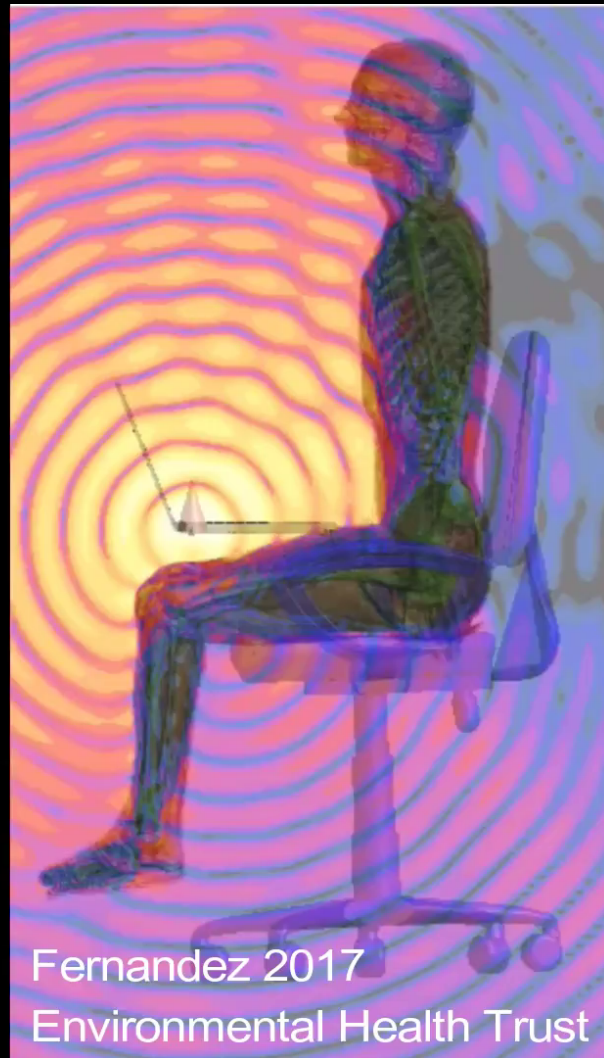


JULIANA BORGES FERREIRA, AND ALVARO AUGUSTO ALMEIDA DE SALLES (2015)

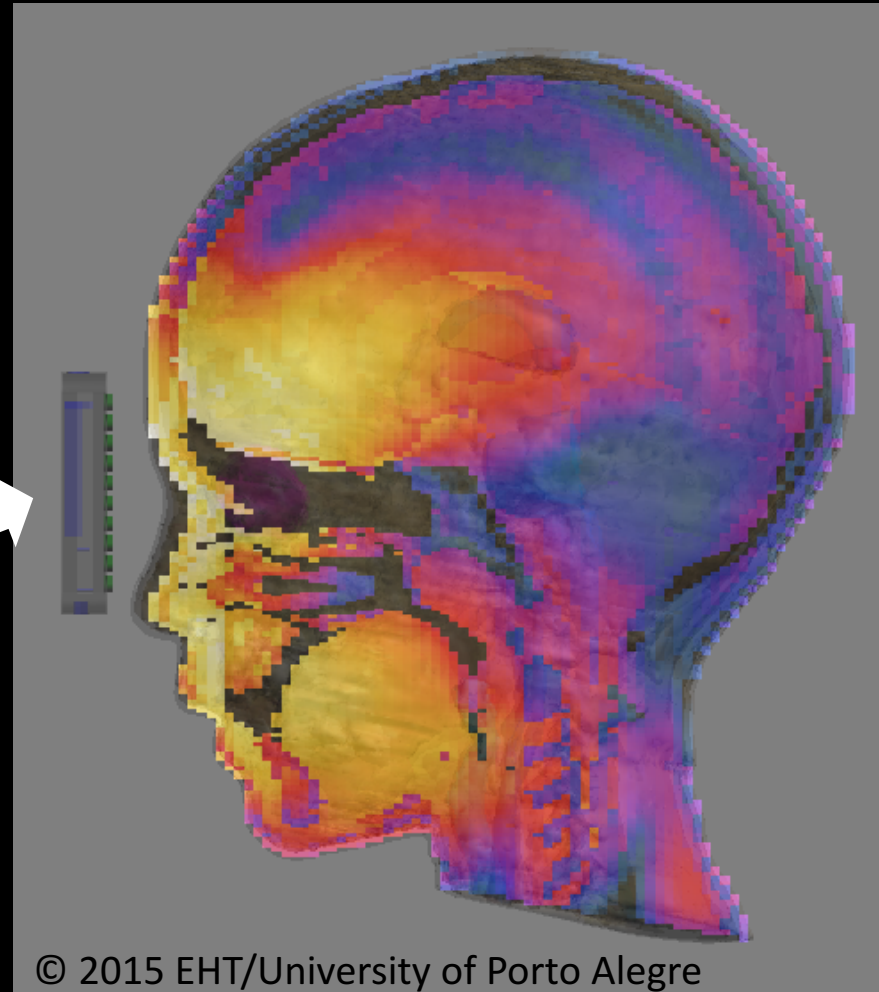
Radiation pattern normalized to $0.0132 \text{ W/kg} = 0 \text{ dB}$, with a 30 dB color scale, and SAR averaged over 1g cube of tissue.

Specific Absorption Rate (SAR) into the 6 year old head from tablet RF

2.45 GHz (Wi-Fi)
34 Year Old Male
Notebook on Lap

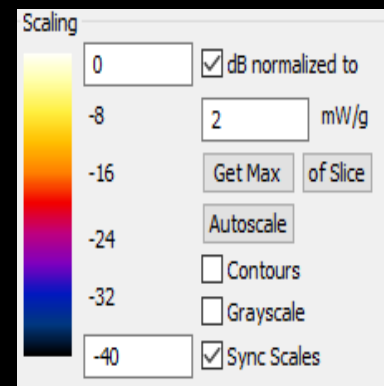


Microwave Radiation into the 6 Year Old Child from Virtual Reality Simulations



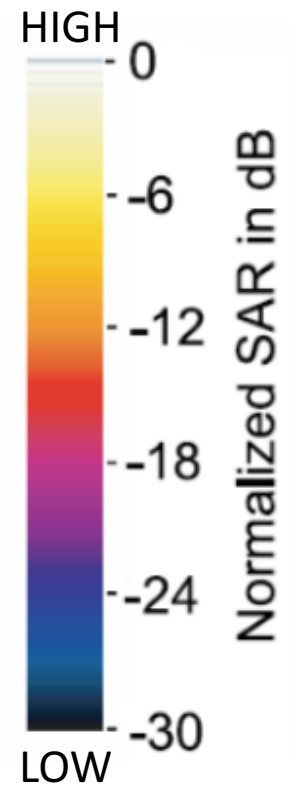
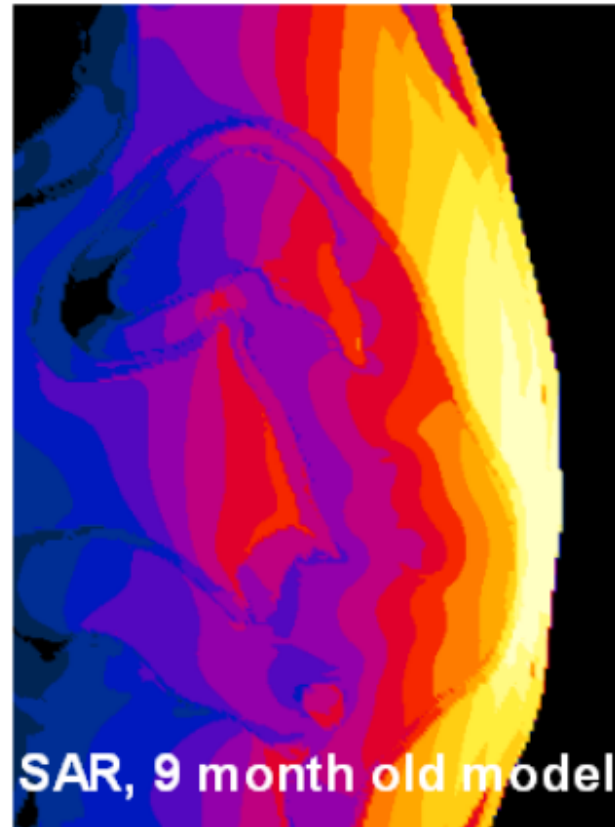
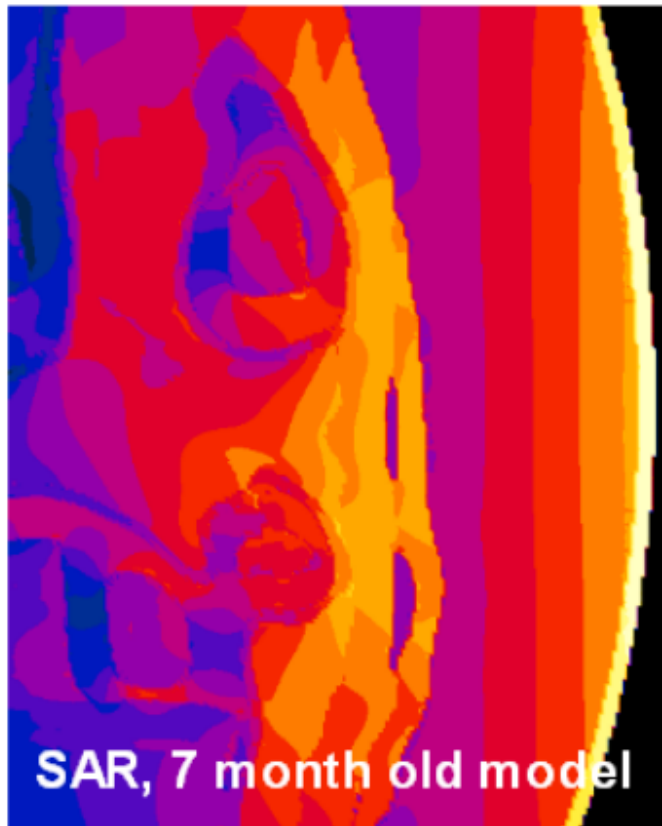
© 2015 EHT/University of Porto Alegre

40dB color Scale.
Smartphone placed
directly in front of
the eyes when
using cardboard
virtual reality
holder.



Greatest exposure occurs to fetal head/spinal cord

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



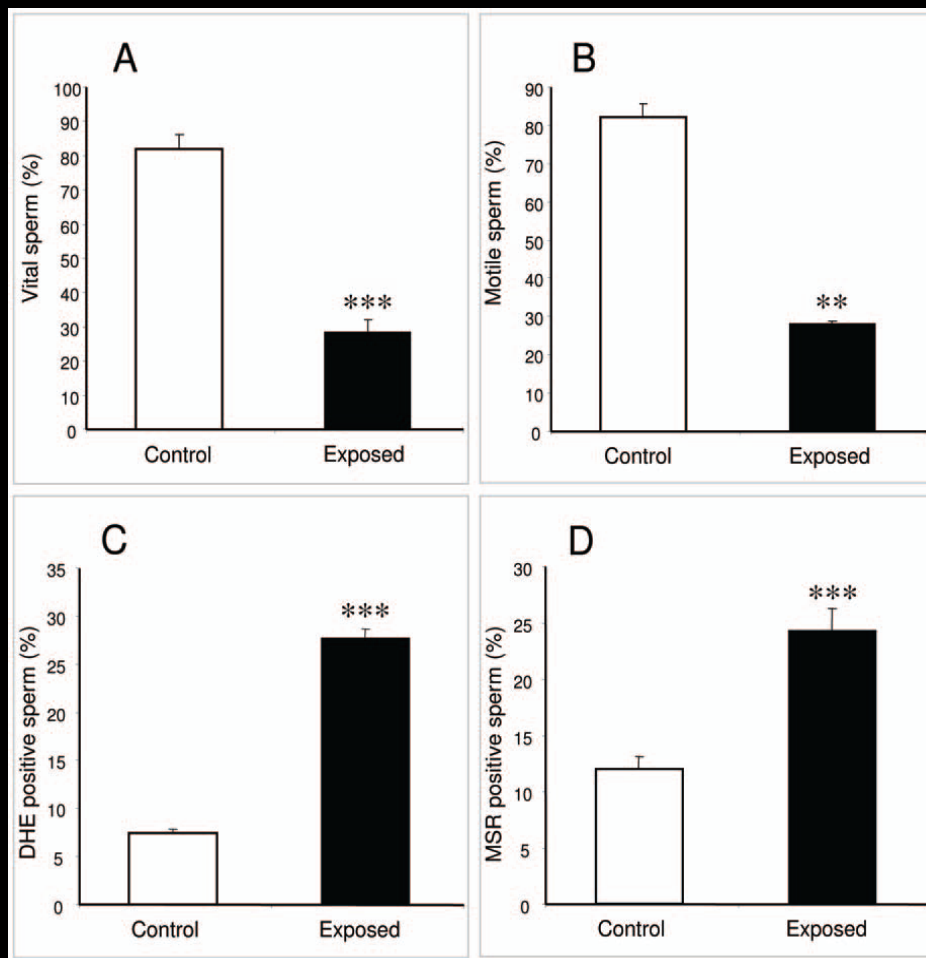
(courtesy Andreas Christ, IT'IS, 2013)

Mobile Phone in Pocket Dose to Gonads and Bone Marrow



Fernandez, Personal Communication (2016)

RF Damages Human Sperm



De Iuliis, et al. (2009)

RF-EMR exposure decreases motility and vitality of human sperm while also increasing damaging reactive agents

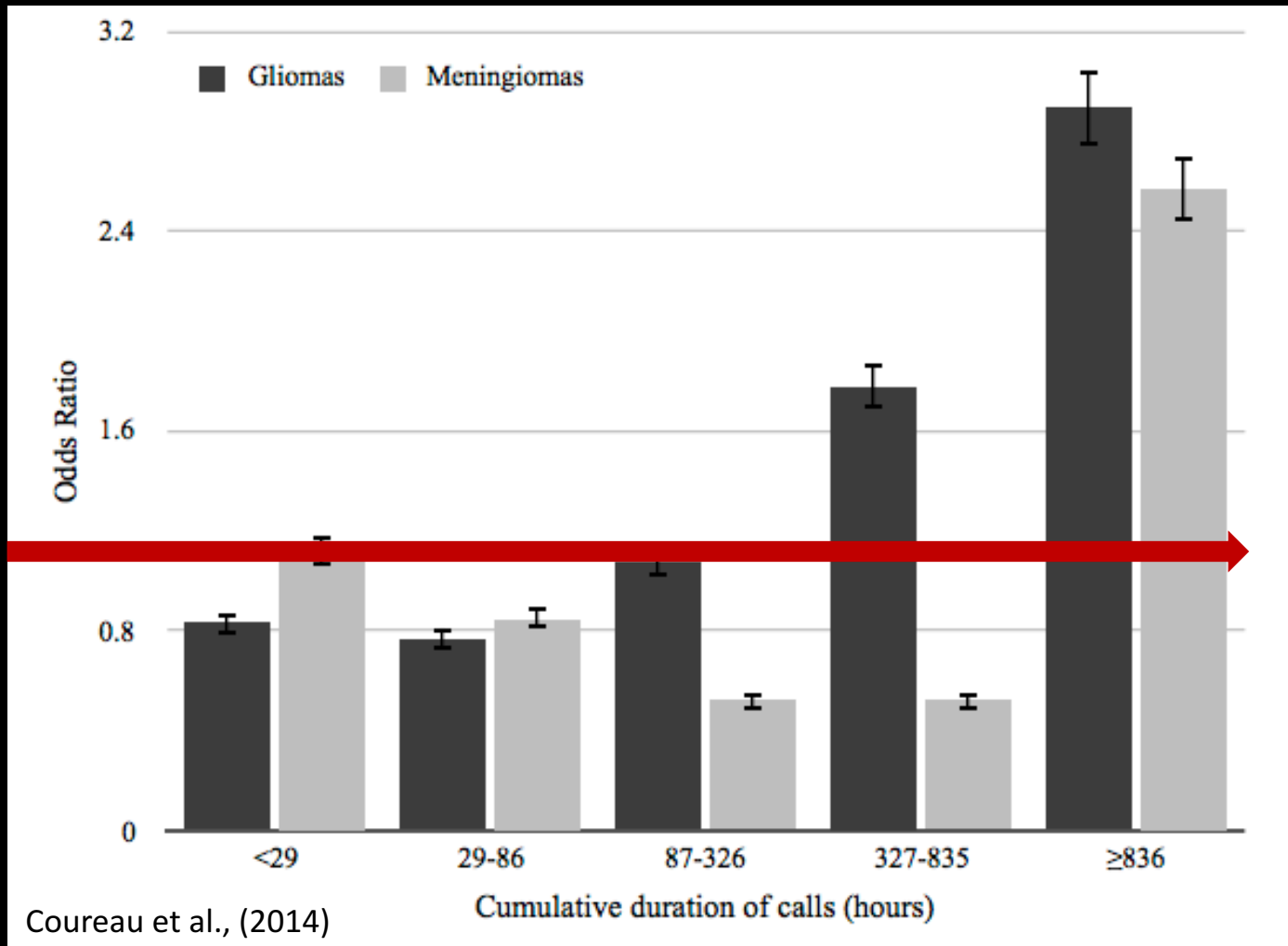


2016 Largest best-designed Final Analyses by U.S. government (\$25 Million) Finds Increased Rare, Malignant Cancers in Rats Exposed to Cell Phone Radiation with None in Control Groups



- 2-Year Exposures to Cell Phone Radiation – CDMA and GSM (prenatal in rats)
- Daily exposure to RFR for ~9 hours (10min on/10min off cycles); Mice at 1900 MHz, Rat at 900 in **shielded chambers**
- Exposures comparable to 36 years of half an hour daily from currently used phones (appx 3000 animals)

Increased risk of gliomas and meningiomas with heaviest cell phone users in gFrench study (2014)



Medical & Other Non-Thermal RF Uses

- Pulsed Radiofrequency Energy to Treat Post-operative Pain and Edema
- Laser Therapy for Bone Stimulation and Repair
- Wound-healing and Collagen Synthesis
- Anti-inflammatory
- Increased Microbial Reactions
- Speeds up Immunological Assays
- Enhances the Uptake of Chemotherapy
- Alternating Electric Fields for Treatment of Glioma Other Solid Tumors



American Academy
of Pediatrics



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Calls for the reevaluation of RF regulations, consumer disclosure and a national research program “to protect children’s health and wellbeing.”

“Current FCC standards do not account for the unique vulnerability and use patterns specific to pregnant women and children.”

Letter to FCC, 2016 based on NTP
findings

Several Commercial Insurance Firms Exclude Damages from EMF



“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.”

<http://www.eperils.com/pol/cfc-a&mcmb-v32.pdf>

Public Service Announcements



Right to Know Legislation Invoked in United States



"To assure safety, the Federal Government requires that cell phones meet radio frequency (RF) exposure guidelines. If you carry or use your phone in a pants or shirt pocket or tucked into a bra when the phone is on and connected to a wireless network, you may exceed the federal guidelines for exposure to RF radiation. Refer to the instructions in your phone or user manual for information about how to use your phone safely." – Berkeley Cell Phone Right to Know Ordinance, 2015

Similar law introduced into Massachusetts State Legislature by Senator Julian Cyr
January 20, 2017

Harvard Professor Larry Lessig, reflecting EHT Right to Know Tool Kit (SD.2053 & SD.1881), 2016

Argentina: “Need for Research and Policy for Environmental Health” —National Legislation Introduced

“The Ministry of the Environment strongly supports the draft Bill that was submitted to the Congress of the Nation by the PRO Party, entitled "Authorization and control regime of radio stations and systems for the provision of telecommunications services ".

“The regulation of non-ionizing electromagnetic radiation or the activities that generate them must be subject to the principles of environmental policy settled in the Law N° 25.675 (General Environmental Law), **especially the precautionary and solidarity principles.**”

The world is not dangerous
because of those who do harm
but because of those who look
at it without doing anything.

- Albert Einstein

Dr. Devra Lee Davis

IIAS/EHT Wireless Radiation and Health

Opening Reception – *Radiation and Health – The Big Picture*

Reference List

Ferreira, Juliana Borges, Alavaro Augusto Almeida de Dalles, and Claudio Enrique Fernández-Rodriguez. [“SAR simulations of EMF exposure due to tablet operation close to the user’s body.”](#) *Microwave and Optoelectrics Conference* (2015). *IEEE* (2016).

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Wyde, Michael, et al. [“Report of Partial findings from the National Toxicology Program Carcinogenesis Studies of Cell Phone Radiofrequency Radiation in Hsd: Sprague Dawley® SD rats \(Whole Body Exposure\).”](#) *bioRxiv*, 055699 (2016).

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