U.S. AND INTERNATIONAL LAW AND POLICY TO ADDRESS CHILDREN AND CELL PHONE RADIATION HEALTH ISSUES

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CHILDREN ARE MORE VULNERABLE TO WIRELESS RADIATION

Cell phones and wireless devices emit radiofrequency (RF) radiation, a non-ionizing electromagnetic field (EMF).

Children have higher RF exposures:
- Thinner skulls and a higher water content in tissues.
- Smaller heads result in a shorter distance for the RF to travel from the skull to critical brain regions important for learning and memory.[1,2,3]

Children are more sensitive:
- Rapidly developing brains and systems [4]
- More active stem cells, found to be more impacted by RF.[5,6]

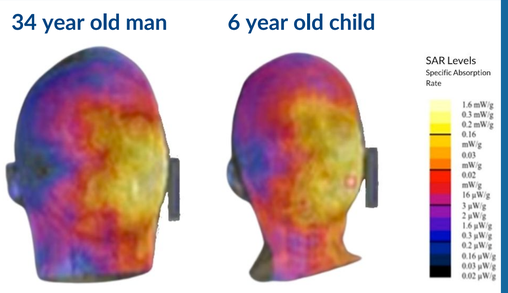
Children will have a longer lifetime of exposure from numerous sources, starting before birth.

Growing scientific evidence links RF to cancer (brain, breast, thyroid), memory damage, hyperactivity, behavior issues, headaches, oxidative stress and genotoxicity as well as impacts to sperm, the endocrine system and brain development.[7,8,9,10,11,12,13,14]



Higher Cell Phone RF Radiation Into a Child's Brain Compared to an Adult[1]

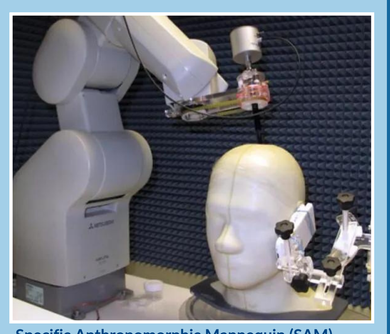
- 10-fold greater RF in the pediatric cerebellum
- 10-fold greater in the bone marrow of the skull
- 30-fold greater in the hippocampus
- 2-almost 5-fold into the eye



Deeper RF penetration into child models (Fernandez et al, 2018)

Cell Phone & Wi-Fi Radiation Compliance Tests Based on Large Adult Man[15,16,17]

- Heat measurement in large adult male phantom, 220 lbs with a 12 lb head.
- Phantom filled with homogenous liquid, inadequate to replicate real brain and body tissue.
- Phones are not RF tested in direct body contact positions. Rules allow 5 to 25 mm separation between phone and body.



Specific Anthropomorphic Mannequin (SAM)

U.S. Regulatory Gaps and Accountability Issues

FCC's heat based limits for human exposure to wireless were set in 1996 and remain unchanged.

The EPA was the lead research agency in development of RF safety limits until it was fully defunded from EMF activitities in 1996. The FCC then issued exposure limits that:
- Protect for heating effects of short term RF exposures only.
- Do not protect for non heating related biological effects nor for effects of chronic, long term exposure.[18,19,20,21]
- Do not consider wildlife, trees and plants.

In 1999, the FDA requested the National Toxicology Program (NTP) perform large-scale animal studies to test for health effects from long term chronic exposure. In 2018, the NTP found cancer and DNA damage.[22,23,24] The FDA then declared it "disagreed" with the NTP findings and released a limited literature review only on phones, omitting all non-cancer impacts.[25,26,27]

Federal agencies such as the EPA, CDC, FDA and NCI have not formally evaluated the totality of up to date scientific evidence. None have evaluated 5G and new technologies. No agency is engaged in activities regarding cell tower and Wi-Fi safety.

In 2021, the US Court of Appeals for the DC Circuit ordered the FCC in *EHT et al. v the FCC* to provide a reasoned explanation as to how its 1996 wireless exposure regulations are adequate in light of the ubiquity of wireless devices, current use patterns, children's vulnerability and research documenting long term effects and environmental impacts. The FCC has not complied.[28]

RECOMMENDATIONS FOR POLICIES TO REDUCE EXPOSURE

> ***"Children are not little adults and are disproportionately impacted by all environmental exposures, including cell phone radiation."***
> — American Academy of Pediatrics [29]

> ***"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 tumors…particularly in schools and classrooms, give preference to wired Internet connections, and strictly regulate the* use of mobile phones by schoolchildren…"**
> — The Parliamentary Assembly of Europe Resolution 1815[30]

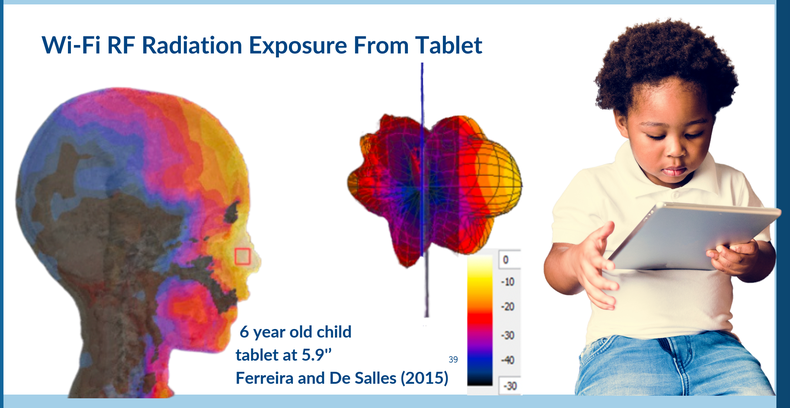
U.S. Medical & Public Health Recommendations to Reduce Children's Exposure

- American Academy of Pediatrics Cell Phone Tips, *2016*[31]
- New Jersey Education Association, *2016*[32]
- California Department of Health Cell Phone Advisory, *2017* [33]
- Maryland State Children's Environmental Health And Protection Advisory Council; Wi-Fi in School, 2016;[34] Reduce EMF, *2016*[35]
- New Hampshire Commission on 5G, Health & Environment, *2021* [36]
- Santa Clara Medical Association Best Practices in Schools, *2023*[37]

Santa Clara Medical Association School Best Practices

- Create a "Safe Tech in Schools Program" to educate students and staff on why and how to reduce wireless
- Educate school nurses on RF and blue light effects and create a health monitoring and reporting program
- Reduce blue light from screens
- Promote cell phone-free policies
- Reduce RF via turning Wi-Fi routers off and increasing distance
- Prefer hard-wired ethernet instead of Wi-Fi when possible
- Professional RF measurements
- Avoid smart meters
- Consider policy to restrict cell towers on or near school property

Wi-Fi RF Radiation Exposure From Tablet



6 year old child
tablet at 5.9"
Ferreira and De Salles (2015) [39]

> ***"Keep radio equipment away from the belly of pregnant women, and away from the lower abdomen of adolescents."***
> — Instructions for cell phone consumers
> 2019 Order by the French Minister of Solidarity and Health and Minister of the Economy and Finance

France Cell Phone Radiation Program

In 2015, their post market tests found the majority of phones tested exceeded RF limits when phones were tested at body contact. Over 43 phone models have been either withdrawn from the French market or had software updates due to excessive radiation emissions.[40,41]

When the French RF test levels are converted to US protocols the RF violations can violate U.S. limits by 3 to 11 times.[17]

The U.S. FCC is opposed to testing phones in body contact positions stating, "Even though some parties claim that the RF exposure evaluation procedures for phones should require testing with a "zero" spacing – against the body – this is unnecessary."[42]

INTERNATIONAL POLICY TO MINIMIZE WIRELESS EXPOSURE TO CHILDREN

LAW OR POLICY	COUNTRY	USA
Straightforward advice that public and/or children "should" minimize cell phone RF exposure	United Kingdom, Russia, Switzerland, Finland, Ireland, Germany, Belgium, Greece, Israel, Turkey, Singapore, France, Denmark, India, Austria, Cyprus, Canada, Italy, French Polynesia,Republic of Korea, Sri Lanka, Croatia	No
Ban on advertising cell phones to children under 14	France, Belgium, French Polynesia, Russia	No
Ban on sale of cell phones designed for young children	Belgium, France, French Polynesia	No
Public awareness program (robust website or multimedia) to educate the public on minimizing exposure	France, French Polynesia, Israel, Cyprus, Belgium, Italy, Republic of Korea, Switzerland	No
Recommendations to prefer wired over Wi-Fi in kindergartens, daycares and schools	France, Israel, Germany, French Polynesia	No
Wi-Fi banned in nursery schools, child care settings and kindergartens	France, Israel, Ghent Belgium, French Polynesia, Cyprus	No
Wi-Fi off or minimized in elementary school	France, Israel, Russia, Cyprus, Various local school districts and regions in Europe	No
Market surveillance program for cell phone and/or Wi-Fi RF radiation emission compliance	France and Canada. A consortium of France, Greece, Latvia, Luxembourg, the Netherlands, and Switzerland began development of program in 2023	No
Cell phone radiation level labeling on device, packaging or by retailer at point of sale	France, Israel, India, Belgium, Russia, Korea *San Francisco and Berkeley, California "Cell Phone Right to Know" ordinances were halted after industry lawsuits*	No
Cell phone model radiation RF levels posted on accessible website	France, Korea, Austria, Senegal, Germany	No
Nationwide cell tower emission environmental monitoring, oversight, compliance and enforcement program	France, Greece, Turkey, Spain, Romania, Serbia, India, Israel, French Polynesia, Croatia, Bulgaria, Tunisia, Malta, Brazil, Bahrain, Monaco, Bhutan, Senegal, United Kingdom, Australia, Spain, Austria, India, Israel, Gibraltar, Belgium, Switzerland, Norway, and Lithuania	No

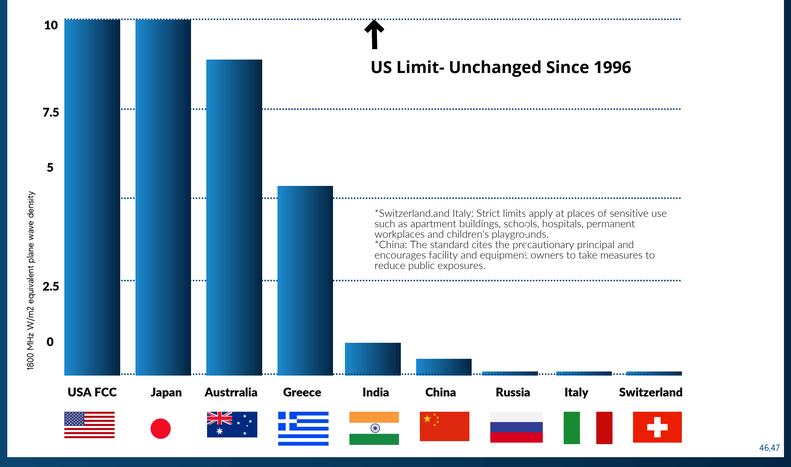
43,44,45,46,47

Environmental RF Limits For Cell Towers, 4G and 5G

Numerous countries have set RF limits for spaces children occupy (i.e. homes, daycares and schools) at levels 10 to 100 times more restrictive than the USA.

Many publicly post RF measurements in online maps. Several have targeted oversight measures for schools to ensure RF compliance and/or further reduce exposure by banning school cell towers. Not the USA.

Country Comparison: RF Exposure Limits Environmental Levels of Cell Towers & Wireless Networks Limit for 1800 MHz W/m2 equivalent plane wave density



46,47

CONCLUSION: RF BIO-EFFECTS ARE ESSENTIALLY UNREGULATED IN THE USA

Robust regulatory oversight, scientific activities and transparency are needed to ensure adequate protection. Federal agencies with health and environmental expertise should implement the following activities:
- Develop RF safety standards to address biological impacts, long term exposure and children's unique vulnerabilities
- Regularly review the latest research to ensure RF limits are evidence based
- Evaluate and implement risk mitigation policies to reduce children's RF exposure
- Label cell phone and wireless devices so that consumers know devices emit RF and how to reduce exposure.
- Launch a nationwide RF monitoring system inside and outside buildings (schools, daycares, parks)
- Implement a compliance, oversight and enforcement program for towers, base stations, cell phones and devices
- Update RF compliance tests to mimic real world use positions of devices in direct contact and include child models
- Re-evaluate the heat based SAR metric for RF compliance and research alternative methods to assess/measure exposures
- Start a post market surveillance and reporting system for health impacts
- Premarket test new technologies and frequencies for biological impacts before deployment

Scientific References

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