

20-1025 (Lead); 20-1138 (Consolidated)

**UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT**

ENVIRONMENTAL HEALTH TRUST; CONSUMERS FOR SAFE CELL
PHONES; ELIZABETH BARRIS; THEODORA SCARATO

CHILDREN’S HEALTH DEFENSE; MICHELE HERTZ; PETRA BROKKEN;
DR. DAVID O. CARPENTER; DR. PAUL DART; DR. TORIL H. JELTER; DR.
ANN LEE; VIRGINIA FARVER, JENNIFER BARAN; PAUL STANLEY, M.Ed.

Petitioners

v.

FEDERAL COMMUNICATIONS COMMISSION;
UNITED STATES OF AMERICA

Respondents

Petition for Review of Order Issued by the
Federal Communications Commission

**DEFERRED JOINT APPENDIX
SUPPLEMENT – VOLUME 27**

Edward B. Myers
Law Office of Edward B. Myers
14613 Dehaven Court
North Potomac, MD 20878
Phone: 717-752-2032
edwardbmyers@yahoo.com

Counsel for Petitioners 20-1025

Robert F. Kennedy, Jr.
Children’s Health Defense
1227 North Peachtree Pkwy #202
Peachtree City, GA 30269
Phone: 845-377-0211
rfk.fcc@childrenshealthdefense.org

W. Scott McCollough
McCollough Law Firm, P.C.
2290 Gatlin Creek Rd.
Dripping Springs, TX 78620
Phone: 512-888-1112
wsmc@dotlaw.biz

Counsel for Petitioners 20-1138

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137	6623-6692	Sep. 3, 2013	Rachel Cooper	Smart Meters; Assessment of Radiofrequency Microwave Radiation Emissions from Smart Meters; Sage Associates, Environmental Consultants; 2011
138	6693-6699	Jul. 7, 2016	Environmental Health Trust	Smart Meters; FCC Maximum Permissible Exposure Limits for Electromagnetic Radiation, as Applicable to Smart Meters. Dr. Ron Powell PhD.; 2013

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140	6706-6735	Sep. 3, 2013	Kit Weaver	Kit Weaver, Comments
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173	8159- 8167	Sep. 29, 2016	Kevin Mottus	Industry Influence; Illusion and Escape: The Cell Phone Disease Quagmire. Dr. George L. Carlo PhD., JD.; 2008
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176	8178- 8182	Sep. 3, 2013	Monnie Ramsell	Industry Influence; Radiation Protection in Conflict With Science; Dr. Franz Adlkofer PhD.; 2011
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178	8185- 8188	Apr. 30, 2019	Center for Devices and Radiological Health	US Agencies; Letter from Dr. Shuren of the FDA to the FCC's OET Dept.
179	8189- 8279	Sep. 24, 2013	Grassroots Environmental Education, Inc.	US Agencies - Radiation Sickness; US Access Board Acknowledgement of Radiation Sickness (Electromagnetic Sensitivities); 2002

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Testing - Children: Exposure Limits: The underestimation
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Exposure Limits: The underestimation of absorbed cell phone radiation, especially in children

Om P. Gandhi¹, L. Lloyd Morgan², Alvaro Augusto de Salles³,
Yueh-Ying Han⁴, Ronald B. Herberman^{2,5} & Devra Lee Davis²

¹Department of Electrical and Computer Engineering, University of Utah, Salt Lake City, Utah, USA, ²Environmental Health Trust, Teton Village, Wyoming, USA, ³Electrical Engineering Department, Federal University of Rio Grande do Sul (UFRGS), Porto Alegre, Brazil, ⁴Department of Epidemiology and Community Health, School of Health Sciences and Practice, New York Medical College, Valhalla, New York, USA, and ⁵Intrexon Corp., Germantown, Maryland, USA

The existing cell phone certification process uses a plastic model of the head called the Specific Anthropomorphic Mannequin (SAM), representing the top 10% of U.S. military recruits in 1989 and greatly underestimating the Specific Absorption Rate (SAR) for typical mobile phone users, especially children. A superior computer simulation certification process has been approved by the Federal Communications Commission (FCC) but is not employed to certify cell phones. In the United States, the FCC determines maximum allowed exposures. Many countries, especially European Union members, use the "guidelines" of International Commission on Non-Ionizing Radiation Protection (ICNIRP), a non governmental agency. Radiofrequency (RF) exposure to a head smaller than SAM will absorb a relatively higher SAR. Also, SAM uses a fluid having the average electrical properties of the head that cannot indicate differential absorption of specific brain tissue, nor absorption in children or smaller adults. The SAR for a 10-year old is up to 153% higher than the SAR for the SAM model. When electrical properties are considered, a child's head's absorption can be over two times greater, and absorption of the skull's bone marrow can be ten times greater than adults. Therefore, a new certification process is needed that incorporates different modes of use, head sizes, and tissue properties. Anatomically based models should be employed in revising safety standards for these ubiquitous modern devices and standards should be set by accountable, independent groups.

INTRODUCTION

History of Exposure Testing, Guidelines, and Standard-Setting August 1974

In 1974, a study determined that at certain frequency ranges resonance increased the absorbed radiation by up to nine times higher than that previously assumed for humans (Gandhi, 1974).

Address correspondence to L. Lloyd Morgan, Environmental Health Trust, P.O. Box 58, Teton Village, WY 83025 USA; E-mail: Lloyd.L.Morgan@gmail.com

1975

~~In 1975, behavioral studies were performed on food-deprived rats that had learned to bar press for food rewards in order to determine what exposure levels to non-ionizing radiation (NIR) might impair their ability to work for food reward and therefore be deemed as hazardous. The exposure metric used was the specific absorption rate (SAR), the amount of power absorbed per unit mass of tissue (Watt per kilogram). It was determined that trained rats stopped working for food at a whole body average SAR exposure of 4 W/kg (D'Andrea et al., 1975). This level of exposure increased core body temperatures measured with rectal thermometers. It was deduced that the absorbed electromagnetic power was the reason that food-deprived rodents stopped working for food.~~

September 1982

~~The American National Standards Institute (ANSI) published the first exposure NIR exposure standard, which incorporated a 10-fold safety factor for humans exposed to electromagnetic fields between 300 kHz and 100 GHz. No reason per se was given for the size of the safety factor other than there was a consensus (ANSI, 1982, p. 14).~~

In the ANSI standard concerns were expressed that the standard might not be sufficiently protective. "It was recognized that the specific absorption rate (SAR), which provides the basis for limiting power densities, does not contain all of the factors that could be of importance in establishing safe limits of exposure. First, other characteristics of an incident field such as *modulation frequency* and *peak intensity* may pose a risk to health." [emphasis added] Further, the ANSI standard noted that the database they used did not "provide evidence to recommend special provision for modulated fields" (ANSI, 1982, p. 14; see "In-Vivo and In-Vitro Studies" section below).

ANSI adopted a standard for whole body exposure of 0.4 W/kg averaged over 6 min, and a 20-fold greater spatial peak SAR exposure over any 1 gram of tissue of 8 W/kg averaged over 6 min. Effectively, this allowed much higher exposures within the small area of the brain than are permitted over the body. No reason was given for allowing this. The ANSI standard noted the resonant frequency (70 MHz) "results in an approximate sevenfold increase of absorption relative to that in a 2450 MHz field" (ANSI, 1982, p. 12). The intent of this standard was to protect "exposed human beings from harm by any mechanism, including those arising from excessive elevation of temperature." (ANSI, 1982, p. 12, italics in the original)

The ANSI standard called for a review of the standard every 5 years (ANSI, 1982, p. 11).

1987–1988

ANSI, not having medical expertise, handed over the setting of exposure limits to the Institute of Electrical and Electronic Engineers (IEEE), a professional society of electrical and electronics engineers from the electronics industry as well as academia. IEEE is not chiefly a medical, biological, or public health organization.

September 1991

In 1991, IEEE first revised the ANSI standard (IEEE, 1991), which has not changed substantially since then, although minor revisions were provided by Standard C95.1 in 2005–2006, and these changes were not adopted by the FCC. It established a two-tier system: one for the general population within an "uncontrolled environment," and one for workers in a "controlled environment," the latter defined as "locations where there is exposure that may be incurred by persons who are aware of potential for exposure as a concomitant of employment ... where ... exposure levels may be

[up to a whole body SAR of 0.4W/kg for any 1 gram of tissue averaged over 6 minutes and a peak spatial SAR of 8 W/kg for any 1 gram of tissue averaged over 6 minutes].”

For the general population, the IEEE revision of the ANSI standard reduced the average whole-body and spatial peak SAR by a factor of 5. This reduction was recommended because of concerns that the general population includes a wide range of ages, vulnerabilities and health status, and in some circumstances, the potential of 24/7 exposures. In explanation of this reduction of general population exposure guidelines, the IEEE standard noted, “To some, it would appear attractive and logical to apply a larger ... safety factor ... for the general public. Supportive arguments claim subgroups of greater sensitivity (infants, the aged, the ill, and disabled), potentially greater exposures (24 hr/day vs. 8 hr/day) ... , [and] voluntary vs. involuntary exposures. Non-thermal effects, such as efflux of calcium ions from brain tissues, are also mentioned as potential health hazards.” (IEEE, 1991, p. 23) For the general population the standard revised the whole body average SAR exposure to 0.08 W/kg averaged over 30 min and the spatial peak SAR for any 1 gram of tissue to 1.6 W/kg averaged over 30 min (IEEE, 1991, p. 17).

Because the resultant Specific Absorption (SA) is identical for the general population in an uncontrolled environment, as it is for workers in a controlled environment ($0.08 \text{ W/kg} \times 30 \text{ min} = 0.4 \text{ W/kg} \times 6 \text{ min}$), the “larger safety factor” for the general population is non-existent.

The IEEE language concerning the 20-fold larger spatial peak SAR when compared to the whole body SAR went further than the ANSI standard it replaced. The IEEE standard stated, “... spatial peak SARs may exceed the whole-body averaged values by a factor of more than 20 times.” (IEEE, 1991, p. 25)

Twenty years later this standard remains unchanged, despite minor alterations in 2005–2006.

1992

In 1992, ANSI adopted the 1991 IEEE standard. It was referred to as, ANSI/IEEE C95.1-1992, but a copy is no longer publicly available (C.K. Chou, Personal Communications, July 18, 2011).

October 1997

In 1996, the FCC published the first U.S. regulations on maximum allowable cell phone radiation adopting the ANSI/IEEE C95.1-1992 standard, which became effective on October 15, 1997. FCC’s Bulletin 65 described how to evaluate compliance to the FCC regulations for human exposure to electromagnetic fields (Cleveland et al., 1997). The FCC exposure limits were, and remain, identical to the 1991 IEEE standard. The FCC SAR adopted values were:

- (1) For occupational exposures, “0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet, and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) [averaged over 6 minutes].”
- (2) For the general population exposures, “0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) [averaged over 30 minutes].”

Once again, the “larger safety factor” for the general population compared to workers was non-existent. It should be noted that these exceptions did not include the ear (also referred to as the pinna). As we shall see in “The SAM Cell phone Certification Process,” section below, this exclusion of the ear is important.

December 1997

Four months later, the FCC published Supplement C, which provided among other details, additional information for “portable devices” (AKA cell phones) certification. The introduction states, “Currently, industry groups and other organizations are working to develop standardized product test procedures to evaluate RF exposure compliance with . . . SAR limits” (Chan et al., 1997, p. 1). [See June 2001 below.] As this was prior to the adoption of the SAM cell phone certification process, Supplement C notes several concerns about the existing cell phone certification process:

- (1) “The lack of standardized test positions for evaluating handsets can result in difficulties in determining RF compliance with SAR limits;” (Chan et al., 1997, p. 1–2).
- (2) The liquid used to simulate the average electrical properties of an adult head had not been standardized at this time, “The permittivity and conductivity of simulated liquid tissues prepared for SAR evaluation must be measured to ensure that they are appropriate . . . These parameters are usually measured periodically or before each SAR evaluation to determine if it is necessary to add appropriate amounts of water . . .” (Chan et al., 1997, p.12).
- (3) “Most test facilities use separate head models for testing handsets on the left and right side of the head. While some models included ears and others do not, a few have also used a spacer to represent the ear” (Chan et al., 1997, p. 12).

While there was a standardized method to certify the specific SAR for each cell phone, it was not repeatable from one certification facility to the next.

An alternate certification process within Supplement C was computer simulation. “Currently the finite-difference time-domain (FDTD) algorithm is the most widely accepted computation method for SAR modeling. This method adapts very well to the tissue models which are usually derived from MRI or CT scans, such as those available from the visible man projects [see “Virtual Family” discussion below]. FDTD offers great flexibility in modeling the inhomogeneous structures of anatomical tissues and organs. The FDTD method has been used in many far-field electromagnetic applications during the last three decades. With recent advances in computing technology, it has become possible to apply this method to near-field applications for evaluating handsets” (Chan et al., 1997, p. 16).

April 1998

In 1998, a non governmental organization, the International Commission on Non-Ionizing Radiation Protection (ICNIRP, 1998), provided “guidelines.” ICNIRP followed IEEE’s lead by adopting the same two-tier system except that both the general public and occupational exposures were averaged over 6 min. ICNIRP far-field guideline was, “A whole-body average SAR of 0.4 W/kg^{-1} has therefore been chosen as the restriction that provides adequate protection for occupational exposure. An additional safety factor of 5 is introduced for exposure of the public, giving an average whole-body SAR limit of 0.08 W/kg^{-1} .” For general public exposures, the maximum spatial peak SAR = 2.0 W/kg averaged over 10 g, with occupational exposures, SAR = 10 W/kg (ICNIRP, 1998, p. 509).

Many governments set or recommend exposure limits based on ICNIRP's "guidelines". For example, the United Kingdom's Health Protection Agency (HPA) states on their web page, "There is no explicit UK legislation that limits people's exposure to electromagnetic fields, including the radio waves used in mobile telephony," then goes on to state, "The Recommendation incorporates the restrictions on exposure of the general public advised by ICNIRP in its 1998 guidelines" (HPA, 2010).

The ICNIRP guidelines made no recommendation about how to certify a cell phone. It noted, "These guidelines do not directly address product performance standards, which are intended to limit EMF emissions under specified test conditions, nor does the document deal with the techniques used to measure any of the physical quantities that characterize electric, magnetic, and electromagnetic fields. Comprehensive descriptions of instrumentation and measurement techniques for accurately determining such physical quantities may be found elsewhere (NCRP, 1981, 1993; IEEE, 1992; DIN VDE, 1995)" (ICNIRP, 1998, p. 2).

June 2001

In 2001, the FCC's Supplement C was revised (Means and Chan, 2001). For the first time, a standardized and repeatable, although not necessarily accurate, industry-designed (see December 1997 above) cell phone SAR certification process was available (the SAM cell phone certification process). Yet, the FCC continued to offer the alternative computer simulation certification process, repeating the language from the December 1997 edition (with minute language changes), and then added, "The FDTD method offers great flexibility in modeling the inhomogeneous structures of anatomical tissues and organs" (Means and Chan, 2001, p. 13).

CHRONIC EXPOSURE EFFECTS

All exposure limit standards and/or guidelines rested on avoiding acute heating effects originally observed in food-deprived rats (Chou et al., 2006). Chronic effects from levels of NIR that did not induce a measurable change in temperature were not taken into account. However, the intent of the ANSI standard was to protect the "exposed human being from harm by *any* mechanism," not just heating. The IEEE standard increased safety margin was to protect "subgroups of greater sensitivity" from "24 h/day involuntary exposures," and from "non-thermal effects, such as efflux of calcium ions from brain tissues." Then and now, there were many studies showing important effects from chronic non-thermal NIR exposure (See September 1991 above; and BioInitiative Working Group, 2007).

The following studies reported findings of harmful effects, but this is not a comprehensive list. There are studies, often industry funded (Huss et al., 2007), that reported no significant effects. The purpose of this section is to describe the multitude of studies that suggest there is a problem.

In-Vivo and In-Vitro Studies

An extensive number of experimental studies below the exposure limits indicate that pulsed digital radiation from cell phones induces an array of biological impacts ranging from blood-brain barrier leakage to brain, liver, and eye damage in prenatally exposed offspring of rabbits and rats, to genotoxic effects on human cells (e.g., Nittby et al., 2009; Salford et al., 2003; Adlkofer, 2004; Schwarz et al., 2008; Guler et al., 2011; Mulak et al., 2011; Tomruk et al., 2010; Odaci et al., 2008).

When human fibroblast cells were exposed to GSM modulated cell phone radiation, the REFLEX project found that genotoxic effects began at SAR = 0.3 W/kg (Adlkofer, 2004, Fig. 94, p. 135). Another REFLEX study exposed human fibroblast cells to UMTS modulated cell phone radiation found effects beginning at SAR = 0.05 W/kg (Schwarz et al., 2008). In these studies, a UMTS modulated signal has a 6-fold lower genotoxic threshold than a GSM modulated signal. But, other studies were not consistent with this finding. This suggests that the concerns of the 1982 ANSI that "other characteristics of an incident field such as modulation frequency and peak intensity may pose a risk to health" were prescient, as the pulsed nature of signals may be more important than their power.

Brain Cancer Studies

While some studies of brain cancer from chronic cell phone use find no increase in risk, these studies generally have followed people who have used cell phones for a relatively short time. Where long-term, heavy use of cell phones has taken place for over a decade, several epidemiologic case-control studies have found significantly increased risks of brain cancer. The largest brain cancer case-control study was the 13-country, government and industry-funded Interphone study with 2,708 cases and 2,972 controls for glioma, the most serious among many brain cancer types, restricted to ages 30–59 years. (The Interphone Group, 2010). It examined the risk from cell phones, but not the risk from cordless phones. The second largest brain cancer case-control study was done in Sweden without industry funding by Dr. Lennart Hardell's team. This study had 1,251 brain cancer cases and 2,438 controls (Hardell et al., 2011) and examined the risk for all malignant brain tumors, not just glioma, from both cell phones and cordless phones, ages 20–80 years.

In May 2010 the Interphone study published its first pooled results from all 13 countries. It reported no overall increased risk of brain cancer (glioma only) among short-term cell phone users, but found a more than doubled risk of brain cancer when cell phones were used for 10 or more years compared to short-term users (1–1.9 years), OR = 2.18, 95% CI = 1.43–3.31 (The Interphone Group, 2010).

In contrast, the Hardell et al. 2011 study found risk of malignant brain tumor from use of cell and cordless phones (wireless phones) for > 5–10 years, with > 195 cumulative hours, OR = 1.4, 95% CI = 1.1–1.8, and for ≥ 10 years of use, OR = 2.4, 95% CI = 1.7–3.2. Also, it found a strong dose-response risk for all brain cancer types. For every year since first use of a wireless phone, the risk increased by 5.4%, OR = 1.054, 95% CI = 1.036–1.073. ~~Perhaps, most alarming was the risk found by age at first use. When use began as a teenager or younger the risk of astrocytoma from cell phone with > 195 cumulative hours and ≥ 10 years of use, which was more than 3-fold (OR = 3.1, 95% CI = 2.1–4.4, p = 2.5*10⁻⁸).~~

One meta-study found a doubled risk of brain cancer when cell phones are used ipsilaterally (cell phone use on same side as tumor location) for 10 or more years, OR = 2.0, 95% CI = 1.2–3.4 (Hardell et al., 2008). Another meta-study found for > 10 years of ipsilateral use nearly doubled for risk of brain cancer, OR = 1.9, 95% CI = 1.4–2.4 (Khurana et al., 2009).

The overall Principal Investigator (PI) of the Interphone Study, Dr. Elizabeth Cardis, along with the Israeli Interphone PI, Dr. Siegal Sadetzki, published a commentary, *Indications of possible risk in mobile phone studies: should we be concerned?* Based on the evidence of increased brain tumor and acoustic neuroma risk, they concluded, "Simple and low-cost measures, such as the use of text messages, hands-free kits and/or the loud-speaker mode of the phone could substantially reduce exposure to the brain from mobile phones. Therefore, until

definitive scientific answers are available, the adoption of such precautions, particularly among young people, is advisable" (Cardis and Sadetzki 2011).

These findings and more resulted in the International Agency for Research on Cancer (IARC) finding that RF radiation (30 kHz–300 GHz) is a Class 2B carcinogen ("a possible human carcinogen") (Baan et al., 2011). RF sources include: cell phones, cordless phones, Bluetooth, amateur radio, cell phone base stations, wireless routers, Wi-Fi, Wi-Max, baby monitors, and Smart Meters.

Salivary Gland Tumors

An Israeli Interphone study found a significant risk for parotid gland tumors (a salivary gland in the cheek, below the ear) from > 266.3 cumulative hours of ipsilateral cell phone use, OR = 1.49, 95% CI = 1.05–2.13, with the heaviest users (> 4,479 cumulative hours) having more than a two-fold increased risk of non-malignant parotid gland tumors, OR = 2.42, 95% CI = 1.14–5.11 of this tumor (Sadetzki et al., 2008).

A Swedish Interphone study of parotid gland tumors found a borderline significant risk for ≥ 10 years of ipsilateral use, OR = 2.6, 95% CI = 0.9–7.9, $p = 0.078$ (Löön et al., 2006).

Scientists working with the Israeli Dental Association in 2009 reported "a sharp rise in the incidence of salivary gland cancer in Israel that researchers believe may be linked to the use of mobile phones... Among salivary gland cancer cases, researchers found a worrying rise in the number of cases of malignant growth in parotid glands." "Most oral cancer patients were over 70, with only 2.7 percent under the age of 20." (Even, 2009).

From 1970–2001, parotid gland tumors in Israel had averaged 37 cases per year. From 2002–2006, the cases increased by 65% to an average 61 cases per year (Czerninski et al., 2011). Fig. 1 from this study shows the number of cases per year for the 3 types of salivary gland tumors (parotid, submandibular, and sublingual glands) with smoothed trend lines. Only the parotid gland trend line grew over time. However, the figure suggests a break-point analysis would be even more informative as the data suggest a flat trend from 1970 to the early 1990s, and then a sharp upward linear trend afterwards.

Male Fertility

There is a robust and growing literature in both animals and humans that chronic exposures to cell phone radiation, far below existing standards significantly impairs sperm morphology, motility, viability, and count. Often, the mobile phone is placed in the trouser pocket which may lead to significant exposure of the scrotum in men.

One human study found a significant 59% decline in sperm count in men who used cell phones for four or more hours per day as compared with those who did not use cell phones at all (Agarwal et al., 2008). Included in their study were deleterious effects on sperm viability, motility, and morphology (Agarwal et al., 2008).

A study from Hungary found deterioration of human sperm motility associated with self-reported cell phone radiation exposure (Fejes et al., 2005). An Australian study found genotoxic effects on mice sperm (Aitken et al., 2005), while other studies from this group have reported similar effects on human sperm.

A recent study of mice exposed for 6 months to cell phone base station radiation reported, "The exposure of male mice to radiofrequency radiations from mobile phone (GSM) base stations at a workplace complex and residential quarters caused 39.78 and 46.03%, respectively, in sperm head abnormalities compared to 2.13% in control group. Statistical analysis of sperm head abnormality score showed that there was a significant ($p < 0.05$) difference in occurrence of sperm head abnormalities in test animals. The major abnormalities observed were knobbed hook, pin-head and



FIGURE 1 SAM Phantom. Source: Speag Phantom Product Flyer. “CTIA” is Cellular Telecommunications Industry Association.

banana shaped sperm head. The occurrence of the sperm head abnormalities was also found to be dose dependent” (Otitolaju et al., 2010). The researchers reported sperm abnormalities at 489 mV/m (workplace), and 646 mV/m (residential) compared to exposure limits of 41,000 mV/m and 58,000 mV/m, respectively (ICNIRP, 1998).

Lastly, a study of human sperm warns, “RF-EMR in both the power density and frequency range of mobile phones enhances mitochondrial reactive oxygen species generation by human spermatozoa, decreasing the motility and vitality of these cells while stimulating DNA base adduct formation and, ultimately DNA fragmentation. These findings have clear implications for the safety of extensive mobile phone use by males of reproductive age, potentially affecting both their fertility and the health and wellbeing of their offspring” (De Iuliis et al., 2009).

Leukemia

Two studies have found that chronic cell phone use increased the risk for leukemia. Adjusting for leukemia risk factors, including benzene, solvents, pesticide exposures at work or home, and working or living near power lines, a study in Thailand, found a 3-fold risk of leukemia from GSM cell phone use (OR = 3.0, 95% CI: 1.4–6.8) and more than a 4-fold risk for any lymphoid leukemia (OR = 4.5, 95% CI: 1.3–15) (Kaufman et al., 2009).

A British study found borderline significant risks of leukemia from > 15 years of cell phone use for acute myeloid leukemia (AML), OR = 2.08, 95% CI = 0.98–4.39, $p = 0.051$, and for all leukemia, OR = 1.87, 95% CI: 0.96–3.62, $p = 0.060$ (Cooke et al., 2010).

TWO CELL PHONE SAR CERTIFICATION PROCESSES

The SAM Cell Phone Certification Process

Specific Anthropomorphic Mannequin (SAM) is a plastic head mannequin (Beard and Kainz, 2004), based on the 90th percentile of 1989 United States military recruits (Gordon et al., 1989). While the exposure limit standard considered body sizes “from small infant to large adult,” (ANSI, 1982, p. 14) only a large adult male that weighed about 220 lb (100 kg) and was 6 foot 2 in (188 cm) in height was used for cell phone compliance testing.

The SAM cell phone certification process uses:

- (1) a plastic head mannequin with an opening at the top of the head (Fig. 1);
- (2) a liquid whose electrical permittivity and conductivity parameters are equivalent to the average electrical parameters of the 40 tissue types in a head;
- (3) a robotic arm (Fig. 2) with a small electric field probe attached (the effective 3-dimensional resolution is limited by the dimensions of the probe).

For cell phone certification a liquid is poured into the head with the average permittivity and conductivity of the head tissues. A cell phone is affixed to either side of the mannequin with a tapered flat spacer used instead of the ear, and the robotic arm measures the electric field within the volume of the mannequin with a resolution of somewhat better than 1 cm³. The SAR values are calculated from the electric field measurements along with the 3-D location of each measurement and the properties of the liquid. The resulted SAR value has a tolerance of $\pm 30\%$ (IEEE 2003, p. 55). Thus a cell phone certified at the exposure limit of 1.6 W/kg could be as large as 2.08 W/kg.

The Computer Simulation Certification Process

For the computer simulation certification process, the revised FCC Supplement C publication states, “Currently, the finite-difference time-domain (FDTD) algorithm is the most widely accepted computational method for SAR modeling. This method adapts very well to the tissue models that are usually derived from MRI or CT scans such as those currently used by many research institutions. The FDTD method offers great flexibility in modeling the inhomogeneous structures of anatomical tissues and organs (Means and Chan, 2001, p. 13).”



FIGURE 2 Robotic arm with electric field probe. Source: Speag DASY 52 Info Sheet.

The Food and Drug Administration (FDA), which has ultimate responsibility for U.S. cell phone safety, has a “Virtual Family” based on MRI scans that indicate different brain tissue properties for use with computer simulation. “Family” members currently include: a 5-year old girl, a 6-year old boy, an 8-year old girl, an 11-year old girl, a 14-year old boy, a 26-year old female, a 35-year old male, an obese male adult, and 3 pregnant women with fetuses at 3rd, 7th, and 9th months of gestation. Additional “family” members are under development (Christ et al., 2010b). “[T]he Virtual Family is already used by more than 200 research groups worldwide.” (<http://www.itis.ethz.ch/research/virtual-population/virtual-population-project/>, accessed 28 Dec. 2010).

Fig. 3 illustrates the members of the “Virtual Family.”

“The development of the [Virtual Family] models was carried out in cooperation with the Center for Devices and Radiological Health of the U. S. Food and Drug Administration (FDA), Silver Spring, MD, USA; the Austrian Research Centers GmbH, Seibersdorf, Austria; the University of Houston, TX, USA; the Hospital of the Friedrich-Alexander-University (FAU), Erlangen, Germany; and Siemens Medical Solutions, Erlangen, Germany” (<http://www.itis.ethz.ch/services/population-and-animal-models/population-models/>, accessed December 10, 2010).

The FCC also regulates medical implants in concert with the FDA. Because metal implants can interact with exogenous electromagnetic fields, computer simulation is also used to calculate resultant interactions.

In order to use the FDTD computer simulation process to certify that cell phones meet the SAR exposure standards the FDTD computer simulation model of the cell phone submitted for certification is required. Because such models are required for product development, they are available.

RESULTS (SAM CELL PHONE CERTIFICATION PROCESS IN COMPARISON TO FDTD COMPUTER SIMULATION PROCESS)

Because any head size smaller than SAM receives a larger SAR, children receive the largest SAR relative to adults modeled with the SAM process. Gandhi et al. (1996) reported that for 5- and 10-year old children, using only head size differences compared to an adult, the children’s SAR was 153% higher than adults. Wiart et al. (2008) employed MRI scans of children between 5 and 8 years of age and found approximately 2 times higher SAR in children compared to adults, and Kuster et al. (2009) reported that the peak SAR of children’s CNS tissues is “significantly larger ($\sim 2x$) because the RF source is closer and skin and bone layers are thinner.” de Salles et al. (2006), using scans of a 10-year old boy’s head with children’s electrical tissue parameters found that differences in head size and other parameters increased the SAR by 60% compared to an adult. Peyman et al. (2001) found the relative permittivity of an adult brain was around 40 while a young child’s brain is from 60–80, resulting in a child’s SAR being 50–100% higher than an adult’s independent of head size. Han et al. (2010) provided additional analyses of the underestimation of spatial peak SAR with the SAM process.

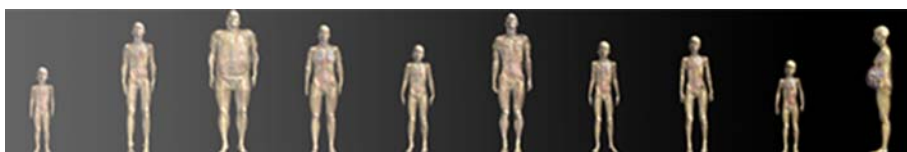


FIGURE 3 The Virtual Family. <http://www.itis.ethz.ch/services/population-and-animal-models/population-models/> (accessed December 10, 2010).

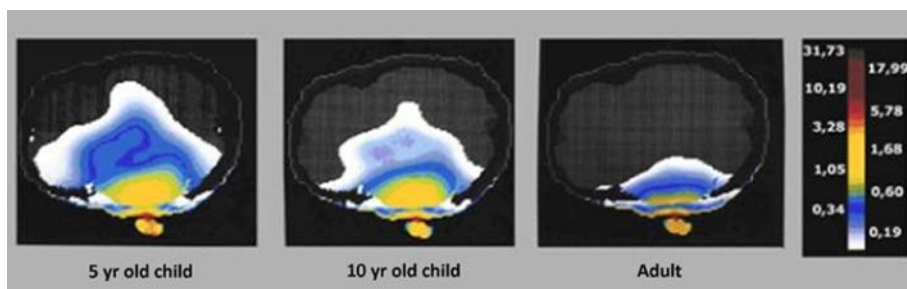


FIGURE 4 Depth of absorption of cell phone radiation in a 5-year old child, a 10-year old child, and in an adult from GSM cell phone radiation at 900 MHz. Color scale on right shows the SAR in Watts per kilogram (Gandhi et al., 1996).

Not only are children exposed to a higher SAR, but also the relative volume of the exposed and still developing child's brain is far greater than in adults. Fig. 4 shows the depth of the cell phone's radiation absorption into the brain is largest for the 5-year old penetrating far beyond the mid-brain. For 10-year old children the penetration of radiation is less, but still beyond the mid-brain, and for the adult, the penetration is much less, and ends well before the mid-brain (Gandhi et al., 1996).

Of course, while no models have been developed for toddlers or infants who may be using or playing with cell phones today, their absorption would be even greater than that of a 5-year old, because their skulls are yet thinner and their brains are yet more conductive and far less developed.

A recent study (Christ et al., 2010a) details the age dependence of electrical properties on the brain, concluding that:

"Exposure of regions inside the brains of young children (e.g. hippocampus, hypothalamus, etc.) can be higher by more than 2 dB–5 dB [1.6–3.2 times] in comparison to adults."

"Exposure of the bone marrow of children can exceed that of adults by about a factor of 10. This is due to the strong decrease in electric conductivity of this tissue with age."

"Exposure of the eyes of children is higher than that of adults."

"Because of differences in their position with respect to the ear, brain regions close to the surface can exhibit large differences in exposure between adults and children. The cerebellum of children can show a peak spatial average SAR more than 4 dB [2.5 times] higher than the local exposure of the cortex of adults."

Increased exposure to the eyes and cerebellum was suggested in a 1998 study of far-field exposures at resonant frequencies to the head and neck (Tinnisword et al., 1998). The authors noted, "[T]he highest absorption is in the neck as the currents generated in the head have to flow into the body through the constricted volume of the neck concentrating them (i.e., increasing the current density) and as a result increasing the SAR." A figure (see figure 5 below) from this article suggests that there is a significantly increased SAR to the thyroid gland.

However, with a dearth of U.S. research funds provided for cell phone research, no studies have examined the exposure of the thyroid gland when using a cell phone.

Another study analyzed relatively greater absorption of children and adults smaller than SAM and concluded, "The results suggest that the recommended ICNIRP reference levels need to be revised" (Bakker et al., 2010), and proposed "fine-tuning" the ICNIRP guidelines.

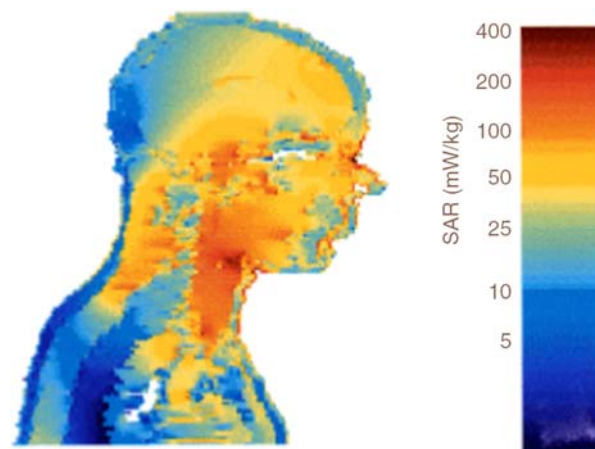


FIGURE 5 The SAR distribution in the head and neck at 207 MHz under isolated conditions. Far-field power density = 1 mW/cm^2 (adapted from Figure 6; Tinniswood et al., 1998).

The spacer used to imitate the ear in the SAM mannequin also results in an underestimation of the SAR. Radiation decreases as the square of the distance from the antenna increases in the far field, and in the near field, radiation decreases as the cube of the distance from the antenna increases. This means that even a small increase in distance has a large effect. Gandhi and Kang (2002) found that incorporating a plastic ear model (or “pinna”) with a 10 mm spacer gave artificially lowered SARs, which are up to two or more times smaller than for realistic anatomic models that hold cell phones directly to the ear. In two studies, the use of plastic spacers results in an underestimation of the SAR by up to 15% for every additional millimeter of thickness of such spacers (Gandhi and Kang, 2002, 2004).

“A mobile phone compliant with the ICNIRP standard of 2.0 W/kg SAR in 10 g of tissue may lead to a 2.5 to 3 times excess above the FCC standard of 1.6 W/kg in 1 g of tissue (i.e., $4\text{--}5 \text{ W/kg}$ in a cube of 1 g of tissue)” (Gandhi and Kang, 2002).

When the back of a cell phone (typically where the transmitting antenna is located) was placed in a shirt pocket while using a cell phone with a headset, a 2002 study found that the SAR increased by up to 7-fold (Kang and Gandhi, 2002). This suggests when a cell phone is in a shirt pocket the surface of the heart muscle closest to the skin could be absorbing substantial cell phone radiation.

Table 1, adapted from Table 2 of Han et al. (2010), summarizes the various findings. ICNIRP, based on its 1998 Guidelines, relies on a larger 10-g volume and a higher 2 W/kg SAR for limiting brain exposures compared to the FCC’s 1-g standard.

DISCUSSION

The FDTD computer simulation process, based on MRI/CT scans, employs anatomically correct head sizes, and allows for inclusion of 80 tissues types with accurate 3-dimension locations, with the electrical properties of each tissue type used to calculate the cell phone’s SAR to a resolution of 1 mm^3 or better.

In contrast, the SAM process, uses a large male head, and assumes the inside of human head is homogenous via a liquid with the average electrical properties of the head. Of course a real head has an ear, not a 10 mm plastic spacer. For this reason the consumer booklets with the information of the functions, etc. of the mobile phone usually contain a page with safety information stating that the phone must not be placed closer than 10 or 15 or even 25 mm to the body. Because the

TABLE 1 Summary of the results confirming that children absorb more radiated electromagnetic energy from cell phones resulting in higher specific absorption rate (SAR) as compared to adults (adapted from Table 3, Han et al 2010).

Author, Year	Highlights of results
Gandhi et al. (1996)	Deeper penetration of absorbed energy for models of 10- and 5-year old children; peak 1-g SAR for children up to 53% higher than adults.
Wiert et al. (2008)	1-g SAR of brain tissues of children is about two times higher than adults.
Kuster (2009)	Spatial peak SAR of the CNS of children is “ significantly larger (~2x) because the RF source is closer and skin and bone layers are thinner”; “ bone marrow exposure strongly varies with age and is significantly larger for children(~ 10x)”
DeSalles et al. (2006)	The 1-g SAR for a 10-year old boy is about 60% higher than for the adults.
Peyman et al. (2001)	Children’s SAR is 50–100% higher than an adult’s SAR.
Christ et al. (2010a)	Hypocampus and hypothalamus receive 1.6–3.1 higher SAR in children compared to adults; children’s bone marrow receive 10 times higher SAR than adults; children receive higher SAR to the eyes than adults; children’s cerebellum receive > 2.5 time higher SAR than adults.
Tinnisword et al. (2008)	Far-field whole body SAR highest in neck particularly where thyroid gland is located.
Bakker et al. (2010)	Recommended ICNIRP reference levels be revised
Kang and Gandhi (2002)	Up to 7 times SAR when back of cell phone in a shirt pocket is closest to skin.
Gandhi and Kang (2002)	10 mm spacer on SAM artificially lowers SAR. Deeper penetration of absorbed energy for smaller heads typical of women and children; peak 1-g SAR for smaller heads up to 56% higher than for larger heads.
Wang and Fujiwara (2003)	Plastic spacer used on SAM for ear (or pinna) decreases SAR by 15% per millimeter.
Martinez-Burdalo et al. (2004)	ICNIRP’s 2 W/kg, 10 g spatial peak SAR results in 2.3–3 times high SAR than FCC’s 1.6 W/kg, 1 g spatial peak SAR
	Compared to peak local SAR in the adult head, we found “a considerable increase in the children’s heads.”
	As head size decreases, the percentage of energy absorbed in the brain increases; so higher SAR in children’s brains can be expected.

10 mm plastic spacer used in testing artificially lowers the calculated SAR for every phone, these booklets make no statement about keeping the device at a distance from the head.

The existing SAR cell phone certification process systematically underestimates exposure for any head smaller than SAM model, and also assumes that the head is homogenous. In fact, tissues and organs in the head vary substantially in density and capacity to absorb radiation and this variation changes inversely with age of children. Only 3% of the U.S. population has a head the size of SAM and no one has a uniformly consistent brain with dielectrically homogenous tissue. Adoption of the FDTD approach would generate standards that reflect the anatomic properties of the brain and correct for this systematic underestimation of the SAM cell phone certification process. Table 2 compares attributes of the SAM cell phone SAR certification process and the FDTD computer simulation cell phone SAR certification process.

For all of the reasons presented in this analysis, the existing cell phone SAR certification process does not adequately protect 97% of the population, i.e., those with heads smaller than SAM. Because children absorb more cell phone radiation than adults, this lack of adequate protection is even of more concern with their growing use of cell phones.

In addition, to these major problems, contemporary cell phones do not comply with the existing certified SAR value when held directly at the head or kept in a pocket. According to manufacturers’ advisories, cell phones can exceed the FCC exposure guidelines as commonly used. Here are some examples of manufacturer’s warnings:

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TABLE 2 Comparison of cell phone certification processes.

Attribute	SAM Process	FDTD Process	Comments
Children's exposures	No	Yes	Male & female, multiple ages
Pregnant women's exposure	No	Yes	1, 3 & 9 months
Female exposure	No	Yes	
Small male exposure	No	Yes	
Large male exposure	Yes	Yes	
Electrical tissue parameters	Average of all tissues	Specific for each tissue	
3-D Resolution	1 cm ³	1 mm ³	
Relative cost	High	Low	
Medical implant modeling	No	Yes	
Testes exposure	No	Possible	
Eye exposure	No	Possible	
Thyroid gland exposure	No	Possible	

- (1) BlackBerry Torch: "To maintain compliance with FCC, IC, MIC, and EU RF exposure guidelines when you carry the BlackBerry device on your body, ... keep the BlackBerry device at least 0.98 in. (25 mm) from your body ..."
"To reduce radio frequency (RF) exposure ... keep the BlackBerry device at least 0.98 in (25 mm) from your body (including the abdomen of pregnant women and the lower abdomen of teenagers ...," i.e., implicitly indicating the importance of keeping it away from teenage boys' testicles (BlackBerry, 2010, p. 23).
- (2) Nokia 1100: "This product meets RF exposure guidelines ... when positioned at least 1.5 cm away from the body ... and should position the product at least 1.5 cm away from your body." (Nokia, 2003, p. 63)
- (3) Motorola V195 GSM: "keep the mobile device and its antenna at least 2.5 cm (1 in) from your body." (Motorola, 2008, p. 70)

The FCC directive states, "For purposes of evaluating compliance with localized SAR guidelines, portable devices should be tested or evaluated based on *normal operating positions* or conditions (Cleveland et al., 1997, p. 42)." [emphasis added] In fact, phones are only tested with a spacer next to the ear or hip and are not tested in the ways that people commonly operate them, i.e., in their trouser or shirt pockets. Moreover, no tests simulate use by the 97% of the population with heads smaller than SAM.

The 5-fold reduction in SAR exposure limits for the general population in the IEEE standard, and adopted by the FCC, was intended to protect the most "sensitive": "infants, aged, the ill and disabled." However, no such reduction exists when SA is considered.

Finally, The FDTD resolution of brain tissues and organs is by three orders of magnitude higher than the resolution of SAM (the dimensions of the electric field probe cannot be made much smaller without losing too much sensitivity). There is a need to protect the most "sensitive" users because, due to curvature of tissue layers but also due to differences in dielectric properties of adjacent tissues and their geometry, "hot spots" (small brain volumes with intense energy absorption), the result of focusing, could occur.

CONCLUSIONS

- (1) Because, the SAM-based cell phone certification process substantially underestimates the SAR for 97% of the population, especially for children, the SAM-based certification process should be discontinued forthwith.

- (2) An alternative FDTD computer simulation cell phone certification process is immediately available and provides three orders of magnitude higher resolution than the SAM-based system for the head.
- (3) The anatomically based "Virtual Family" includes sensitive groups such as small children, pregnant women, and the fetus.
- (4) Advisories found in cell phone manuals violate the FCC compliance guidelines, because they do not take into account customary use of phones in pockets and held directly next to the head.
- (5) The SAM-based cell phone certification process is unable to address exposure to sensitive tissues such as the testes or the eyes, while the FDTD method can addresses exposures to such sensitive tissues.
- (6) Because billions of young children and adults with heads smaller than SAM are now using cell phones extensively, and because they absorb proportionally greater cell phone radiation, it is essential and urgent that governments around the world revise approaches to setting standards for cell phone radiation, to include sufficient protection of children.
- (7) Cell phone for which SAR values were certified prior to June 2001 were not required to be replicatable between different certification facilities (see "December 1997") above.

We have shown that children and small adults absorb significantly more cell phone radiation than SAM estimates. Accordingly, contemporary cell phone standards for all of the world's more than five billion cell phones do not protect the young or the 97% of the population with heads smaller than SAM. Until SAR standards have been revised, Israel (Azoulay and Rinat 2008), Finland (YLE.fi 2010), France (Lean, 2010), India (India eNews, 2008), and the U.K (BBC, 2000) recommend limited use by children, using wired headsets, hands-free kits, texting, and keeping the mobile phone away from the head and from the body to substantially lower exposures with current cell phones.

Governments all over the world should urgently require that industry sell cell phones that work only with headsets (sans speakers and microphones). Then users would have to employ wired or other hands free devices for headphones with the result that the cell phone would be kept away from their heads while talking on cell phones.

The long-term impact of cell phone radiation is a matter that merits major research investment and serious public scrutiny. Anatomically based models should be employed in revising safety standards for these ubiquitous modern devices. Standard setting should not be the province of non-governmental, non-accountable agencies, such as ICNIRP which has been heavily funded by industry, but should be carried out by governmental agencies accountable to the public or by independent experts accountable to governments.

Declaration of Interest

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BioInitiative Reply Comments; Cindy Sage and David O. Carpenter,
Nov. 14, 2013

**FCC 13-39****Before the Federal Communications Commission****Washington, D.C. 20554**

In the Matter of

Reassessment of Federal Communications)	ET Docket No. 13-84
Commission Radiofrequency Exposure Limits and)	
Policies)	
)	
Proposed Changes in the Commission's Rules)	ET Docket No. 03-137
Regarding Human Exposure to Radiofrequency)	
Electromagnetic Fields)	

To: Office of the Secretary
Federal Communications Commission , Washington, DC 20554

As officially presented in the Federal Register/ Vol. 78, No. 107 / Tuesday, June 4, 2013 / Proposed Rules. Federal Communications Commission, 47 CFR Parts 1, 2, 15, 24, 25, 27, 73, 90, 95, 97, and 101 [ET Docket Nos. 03-137 and 13-84; FCC 13-39], Reassessment of Exposure to Radiofrequency Electromagnetic Fields Limits and Policies, Federal Communications Commission

Reply filed by: Cindy Sage, MA and David O. Carpenter, Co-Editors, BioInitiative Reports 2007 and 2012.

1396 Danielson Road
Santa Barbara, CA 93108
E-mail: sage@silcom.com
Tel.: 805-969-0557

5 University Place, Room A-217
University at Albany, Rensselaer, NY 12144
Email: dcarpenter@albany.edu
Tel: 518-525-2660



We have read comments submitted by the parties on 03-137 and 13-84, and submit the following Reply:

There is a broad consensus that new, biologically-based public safety limits for chronic exposure are warranted, given the scientific and public health evidence for health risks from low-intensity radiofrequency radiation exposures from wireless technology applications.

The existing FCC public safety limits are inadequate to protect public health given the proliferation of RF-emitting devices now in common usage.

We do not see a “broad consensus to adopt the Basic Restriction in IEEE C95.1-2005” for SAR and substituting a 10-gm tissue volume for the current 1-gm tissue volume for calculating SAR - except across the associated industry and corporate interests where it would be expected that these parties would promote the status quo regardless of impacts to public health.

Willful disregard by industries and regulators since at least 2007 of this scientific and public health evidence for health harm is no justification to keep existing and inadequate FCC public safety limits.

There is no reasonable basis for time-averaging and spatially averaging measured values as the sole basis for protection against health impacts of chronic exposure. Pulsed radiofrequency health impacts require the development of protective safety limits that control chronic exposure to peak exposures, not time-averaged exposures.

The biologically-relevant time period during which pulsed RF causes disruption of key biological processes should be the basis for determining acceptable safety limits. If biological systems register pulsed RF as a continuous insult (e.g., by expression of stress proteins or HSP, or by disruption of normal electrophysiology or neural synchrony, or by oxidative damage or mitochondrial function disruption as examples) then the biologically relevant time period that cell membranes, cells and tissues respond to pulsed RF as a continuous insult must define the safety limit.



Some parties have commented ‘RF levels in some places already exceed new recommendations by the BioInitiative Working Group and others. There is no justification that today’s levels of RF must be tolerated because the wireless industry created them already; RF levels common today are creating intolerable health problems and should be rolled back. The evidence for health risks comes directly from thousands of published scientific and public health studies that increasing RF levels are producing ‘epidemiologically-visible’ health harm across very large populations of exposed people.

Regulators need to rethink safety limits now, even if it means rolling back ‘RF exposure levels now commonly measured’ to levels below those reported to cause biological effects and adverse health effects. It is precisely why this FCC process has been convened: to re-evaluate the RF health impacts and sufficiency of existing safety limits, and to change them in accord with the damage to health that is now established from the rollout of wireless technologies and the RF exposures they create. And, remember, corporate decisions to roll out wireless technologies over early scientific and public health objections and early evidence of health risk was simply a calculated risk. It was demonstrated at least as early as 2007 that the evolving evidence was sufficient to look for alternatives to wireless in communications and data transmission. Market decisions that ignored such possible health risks do not today deserve to be rewarded at the expense of public health. Further, it is not in the public interest to continue to market technologies that will worsen out-of-control US healthcare costs.

CTIA comments that “*CTIA strongly supports the Commission's decision in the First R&O to classify the pinna as an extremity based on the expert determinations of the FDA and of the IEEE, and the Commission's conclusion that this specification has no practical effect on human exposure to RF energy permitted by the FCC's rules.*” There is no justification for this conclusion since placing a wireless transmitting device (e.g., a cell or cordless phone) against the pinna of the ear also exposes the highly sensitive brain and eyes to excessive pulsed RF. which has already resulted in increased risk for malignant brain tumors, acoustic neuromas, parotid gland tumors and some reports of uveal melanoma. Reclassifying the pinna of the ear as an extremity will greatly increase RF exposures not just within the pinna, but also critical tissues and organs in proximity - the brain, the skin, the eyes, the underlying nerves, blood vessels, salivary glands and tissues. It is already demonstrated that EXISTING RF exposures are linked to increased risk of some cancers. Reclassifying the pinna of the ear as an extremity is an extreme way to



make legal what the industry needs to deploy new and more powerful cell phones and other wireless devices; and to cover themselves from liability where cell phones today don't always comply with existing SAR limits in the manner they are commonly used by consumers.

Utility Telecom Commission (UTC) argues for a categorical exemption for routine RF testing for wireless utility meters.

“Specifically with regard to categorical exclusion, the Commission should clarify that low power fixed transmitters -- such as those that utilities and other CII use for advanced metering infrastructure (AMI), multiple address systems (MAS) and supervisory control and data acquisition (SCADA) – are categorically excluded from routine evaluation. These devices operate at low power and typically only transmit when they are polled by the associated master station or network node. As such, they pose little or no risk of exceeding the RF exposure limits, especially when a time average measurements are conducted. Similarly, bidirectional amplifiers that are used to extend coverage within a building should also be categorically excluded, due to their low power and minimal risk of causing excessive RF exposure.¹⁵ Alternatively, the power limits proposed for categorical exclusion in Section 1.1307(b)(1)(ii) should be revised upward to clearly encompass bi-directional amplifiers. Finally, and consistent with the Commission’s Report and Order, any new rules should not require licensees to conduct routine evaluations for devices that were licensed before the rules go into effect.¹⁶”

We oppose UTCs request for a categorical exclusion of these facilities from routine RF evaluation. UTC ignores the evidence that such meters emit RF pulses far more frequently because they are ‘hand-shaked’ every few seconds by the mesh networks to which they are tied (about 90% more transmissions than estimated for ‘polling’ alone), and not just when ‘polled’ for information (about 10% of transmissions based on testimony by PG&E to the California Public Utilities Commission for the OWS NIC514).

UTC also ignores the evidence that wireless utility meters can violate existing FCC safety limits when the 100% duty cycle requirement for ‘uncontrolled public access’ is properly applied within FCC OET 65 Equations 6 and 10 (Sage, 2011). UTC errs in assuming that “*they pose little or no risk of exceeding the RF exposure limits*”. Further, diluting the RF exposure of millisecond bursts by time-averaging makes a mockery of testing procedures. Pulsed RF has biological effects from millisecond RF bursts that last longer than the interval between these RF emissions; thus the biological insult is continuous (chronic exposure). Time-averaging simply gives the appearance of diluting these biologically-important exposures to extinction.



These devices are frequently placed within mere centimeters of occupied space in family homes, and in businesses that have inside electric meters on walls close to where patrons (including their children) spend time. Considering that perhaps 2-3% of wireless utility meters (electric meters) are completely accessible and closer than 20-40 cm (uncontrolled public access by definition) and there are likely to be 300 to 400 million ‘smart meters’ installed; this would mean about 6 million to 12 million meters would place people in situations where there are significant RF exposures, there is no warning signage, there is complete access to touch or place the face close to the meter (to read the digital output information) and depending on whether it is one meter, or a bank of meters mounted together – this situation demands both routine environmental testing for every meter type, and it demands that the distancing exclusions be eliminated from the FCC’s proposed actions.

We also oppose the proposed new standardized measures for separation distance that could exempt many of these devices,

Distance Exemptions: More realistic provisions must be developed regarding distancing from RFR transmitters (wireless devices, wireless access points and routers, baby monitors, wireless utility meters, etc) for infants and children who cannot reasonably be expected to observe FCC rules for 20 cm or 40 cm separation. The basis for exemptions from routine evaluations (Appendix C – fixed, mobile or portable RF sources) assumes conservative derivations or worst- case predictions leading to “*minimal likelihood for the exposure limits for the general public to be exceeded*” based on faulty logic about what can be expected with regard to the general public knowing or being able to avoid breaching an arbitrary 20 cm or 40 cm distances.

Compliance Testing: Realistic assumptions about operation of wireless utility meter devices (‘smart meters’) should be mandatory in FCC testing and issuance of Grants of Authorization. FCC testing labs ignore the obvious two-antenna or three-antenna design of wireless utility meters, yet issue ‘Conditions’ for compliance that specify “*this compliance test is issued with the condition that the antenna may not operate in conjunction with other antennas*”. The FCC cannot reasonably issue Grants of Authorization based on lab testing that ignores typical construction of the device, and how in common practice it is installed and operated.

Cumulative Effects: Cumulative effects of RFR exposures from multiple wireless devices and environmental exposures are not sufficiently addressed, measured or tested under current or proposed FCC rules. The 2008 NAS Report on Research Needs for Wireless Device summarizes deficiencies for wireless effects on children, adolescents and pregnant women; wireless personal computers and base station antennas; multiple element base station antennas under highest radiated power conditions; hand-held cell



phone compliance testing; and better dosimetric absorbed power calculations using realistic anatomic models for both men, women and children of different height and ages. Realistic assessments of cumulative RFR exposures need to be addressed, taking into account the high variability in environmental situations; and safety buffers below 'effects levels' need to be built into new FCC public safety limits.

100% Duty Cycle: FCC OET 65 should make clear that a 100% duty cycle will continue to be required in calculations of power density 'where the public cannot be excluded'.

CTIA's comments dispute and distort the basis, intent and result of the World Health Organization IARC classification of RF as a Group 2B Possible Human Carcinogen. CTIA recklessly disregards human health with its twisted representation of the IARC classification. If anything CTIA's arrogant attempt to downplay the IARC classification is the real distortion of fact here, not that IARC's work has left the issue "*vulnerable to distortion by alarmists*". IARC could have reviewed the science on RF health impacts and voted it a Group 4 (Not a Carcinogen) if what CTIA maintains is that wireless RF is safe. They did not. IARC could have voted RF as a Group 3 (Insufficient Evidence) but they did not. IARC found there to be sufficient scientific evidence to classify RF as a Group 2B Possible Human Carcinogen, and all the dancing around CTIA does to undermine this in the eyes of the Commission is a cynical dodge favoring the industry members for whom CTIA is chief lobby.

IEEE's justification for reclassifying the pinna of the ear is based on thermal injury alone, and this is an outdated and irrelevant measure of health harm (IEEE C95.1-2005).

The Mobile Manufacturers Forum comment on proposed reclassification of the pinna of the ear as an extremity "*just as for hands, wrists and limbs where there are no major organs subject to RF exposure*" defies belief. Clearly, has MMF no knowledge of basic physiology to say that the human eyes, brain, skin, glands of the throat and neck, and interconnecting nerves are not 'major organs'?

In a spectacular gaff, a staff representative for Hammett and Edison, Inc recently testified in a municipal proceeding on behalf of AT&T (September 2013) that "boiled vegetables" are a Group 2B Possible Human Carcinogen. It would be a laughable mistake except when one considers that the 'expert' in question who misspoke represents one of the most active engineering firms that represents dozens of site applications for major telecom siting companies. But it is another demonstration that engineering firms often



do not have the biological or health credentials and knowledge to make rules on health risks and safety limits, nor do they accurately depict the recent IARC classification. Rather, they issue the oft-heard dismissal that the 300+ listed Group 2B carcinogens also include pickled vegetables, coffee and talcum - rendering any other listings like RF a trivial issue by association. But, usually they trivialize it more accurately.

Hatfield and Dawson Engineers commented that “*(B)oth the IEEE and NCRP guidelines were developed by scientists and engineers with a great deal of experience and knowledge in the area of RF biological effects*”. Nothing could be further from the truth in this matter. Engineers are not experts in biology, and certainly have failed to recommend RF public safety limits and maximum permissible exposures in line with established biological effects and related health harm from low-intensity, chronic RF exposures in all prior IEEE C95.1 proceedings that use ‘thermal injury’ as a basis for defining permissible exposures for the public.

Motorola Solutions Inc. comments support the existing FCC standards. It is another example where industry is telling the FCC they like the existing (and inadequate) safety standards just as they are – although they probably did not intend the irony here.

“(A)s the Commission reviews its RF exposure policies, it should begin from the understanding that the current system is working. The Commission’s policies have enabled the rapid development and widespread adoption of wireless technologies in the United States in a manner that is safe and sustainable.”

The current system is working well for industry. The current system has enabled the rapid development and widespread adoption of wireless technologies for industry benefit - to keep on track with wireless marketing strategies. The current FCC limits suit the industry, and now the industry wants bigger exclusions and higher exposure limits to keep rolling out new wireless technologies.

The current system is NOT WORKING for consumers who suffer health harm from wireless technologies, nor is it working for Americans whose health care costs are already exorbitant and who are suffering from the inavailability of medical insurance. The current system is not sustainable and certainly not safe. This is a positive assertion of safety of wireless devices from Motorola Solutions. It is contradicted by Motorola’s own RF health warnings on cell phones that they issued for years in the fine print of cell phone owners’ manuals.



CTIA has commented that “(B)y continuing a pro-competitive, deregulatory environment for wireless service and directing the FCC to promulgate uniform RF emission standards, the 1996 Telecommunications Act codified the policy goals underlying the Commission’s current RF regime. When adopting the current standards, the Commission noted that it sought to balance public safety with the goal of fostering wireless deployment, thus reflecting the directives of the 1996 Act. The growth of the wireless industry since 1996 attests to the Commission’s success in striking the right balance.”

In fact, the scientific evidence is more than sufficient in 2007, and certainly in 2012 (www.bioinitiative.org) that the Commission has not struck the right balance between uncontrolled wireless rollout and health impacts resulting for Americans, particularly for children. The increased risk for cancers, neurological diseases, memory and learning impairment in children, and other serious medical problems associated with wireless technologies and chronic exposure to low-intensity RF are now clearly available to the Commission.

Respectfully submitted:

Cindy Sage, MA and David O. Carpenter, MD

Kevin Mottus Comments
Sept. 28, 2016

Statement 2

September 28, 2016

Statement By: Kevin Mottus, California Brain Tumor Association

See Attachments 12, 13, 14, 15, 16, 17, 18, 19, 20, 21 and 22

I am strongly opposed to the FCC plan to rollout and auction 5G spectrum technology due to the non-thermal biological health effects created by radiofrequency/microwave radiation or electromagnetic fields (EMF) emitted by wireless transmitters. These documented effects are not recognized and not protected by our current FCC safety standards.

3% to 5% of the population is electrohypersensitive (Attachment 12), which means they develop neurological symptoms due to exposure to wireless microwave radiation or EMF, with symptoms being worse the more continuous the exposure, the closer the source and the higher the intensity of radiation. People become electrohypersensitive as their bodies fail to adapt to the cellular or systemic insult from the billions of electromagnetic waves per second that wireless systems transmit. Once someone becomes electrohypersensitive they are usually electrohypersensitive for a lifetime and with additional continuous exposure with 5G we will have more people become ill and disabled due to electrohypersensitivity. In addition to neurological disease thousands of studies have shown that radiofrequency radiation exposure increases cancer, reproductive harm, DNA damage, immune system dysfunction, difficulty with sleep, etc. 5G would make a big additional contribution to an existing public health crisis. Our government should be warning people and educating them about health effects of wireless microwave radiation and how to minimize their exposure and not making the problem worse with new wireless initiative like 5G.

Dr. Andrew Marino, along with 5 other doctors at LSU, completed an important study showing that Electrohypersensitivity does exist. When time was given for symptoms to appear and dissipate, the electrohypersensitive individuals were able to tell when a wireless source was present or not (See LSU study in Attachment 12). The cities of Boston and Philadelphia through their legal departments have officially stated that the safety standard for wireless microwave/radiofrequency radiation is inadequate and people with electrohypersensitivity (EHS) are not being recognized and protected by current FCC safety standards (see Attachment 13, statement to the FCC from cities of Philadelphia and Boston). According to their statement to the FCC wireless initiatives like 5G violate Americans with Disabilities Act rights for people with EHS. Electrohypersensitive people living in the U.S. will lose access to public streets, parks and facilities violating their civil rights. Recently, a teacher in Los Angeles Unified School District was accommodated for her EHS (see Attachment 14) but with 5G's mesh network there will be no way to accommodate people with EHS. They will be driven from their homes, communities and workplaces and there will be more electrohypersensitive people with more exposure. In Massachusetts parents have sued to

protect their child who is electrohypersensitive from the WiFi in their school (see Attachment 15). Now the country will be opening itself up to thousands of lawsuits. In addition to harming electrohypersensitive individuals the Government will be harming the health of all citizens most of which cannot perceive the damage being done to their health like EHS people can. We should be learning from these EHS people that we are exposing our citizens to a harmful agent rather than ignoring their plight.

The U.S. should recognize the need to protect and accommodate people with sensitivity to wireless microwave radiation as currently done by utility agencies across the nation. Many utility companies across the nation offer an opt-out for people planning to receive a wireless smart meter because hundreds of individuals have testified that the wireless microwave radiation from smart meters have made them sick, mostly with neurological symptoms (see attachments 16 and 17 for testimonies). This is important because as with 5G, these wireless smart meters are located near people's homes, emit a low powered wireless microwave radiation signal and 5G transmitters will actually transmit much more frequently than smart meters are claimed to.

Los Angeles City has acknowledged wireless microwave radiation health effects this past year when they exempted Los Angeles fire stations from having cell towers located on top of their buildings as part of the LA-RICS program. LA County Firefighters commissioned a report from Cindy Sage, an expert in radiofrequency radiation health effects, delineating 49 peer reviewed studies showing a variety of health effects at wireless microwave radiation exposure levels expected under the cell towers including cellular and DNA damage, cancer, neurological effects, cardiovascular problems, fatigue, sleep problems, reproductive harm and cellular damage (see attachment 18 Commission Report). We need our Government to afford the rest of the U.S. Citizens the same protection from wireless microwave radiation health effects as they did to the firefighters and say no to 5G. Firefighters were also given an exemption from having cell towers placed on their stations in California state measure AB57 which states, "due to the unique duties and infrastructure requirements for the swift and effective deployment of firefighters this section does not apply to a colocation or siting application for a wireless telecommunications facility where the project is proposed for placement on fire department facilities." (See attachment 19). Of course, these protections are not afforded to other professions who need to be "swift and effective" or children and families living nearby the same cell towers. The National Firefighters Union has a long history of recognizing wireless microwave radiation health effects and has stood strongly against locating cell towers on top of their fire stations for more than 10 years; see Attachment 20, a 28 page International Association of Fire Fighters Resolution detailing health effects associated with exposure to wireless microwave radiation and reported symptoms of their exposed firefighters.

In addition, Los Angeles Unified School District has also acknowledged wireless microwave radiation health effects and passed a resolution for a policy that no cell tower be located within 200 feet of a school. In another resolution passed by LAUSD they recommended "The board supports responsible deployment of fiber optic broadband technology, which is superior to wireless technology in speed, reliability, security,

durability and protection it affords people and the environment from the potential hazards of exposure to radiofrequency radiation..." See Attachments 21 and 22 for the two LAUSD resolutions.

I am strongly opposed to the FCC plan to rollout and auction 5G spectrum technology due to the non-thermal biological health effects created by radiofrequency/microwave radiation or electromagnetic fields (EMF) emitted by wireless transmitters. These documented effects are not recognized and not protected by our current FCC safety standards. MD and PhD experts, in the field of wireless microwave radiation health effects, warn us of the serious harm that microwave technology especially 5G along with its required deployment of multiple transmitters, will cause. We ask that you abort your plan to auction 5G spectrum and immediately halt the rollout of 5G technology testing. We need to immediately institute safety standards that take into account non-thermal biological health effects. The research attached and cited shows that, at the power levels required for this technology to operate reliably over the project's large areas, the radiofrequency/microwave radiation will have significant biological health effects, especially on electrosensitive individuals and children (Cancer, Neurological effects, immune system disorders, reproductive harm and others). **We are asking that you focus instead on installing only fiber optic wired connection to the Internet along with individualized subsidies to help poor people pay for wired/cabled connection to the Internet. Fiber optic wired connections eliminates wireless microwave radiation transmissions thus eliminating wireless microwave radiation health effects. In addition we insist on instituting RF Exposure standards significantly lower than our current thermal standards as recommended and supported by the Bioinitiative Report ([Bioinitiative.org/conclusions](https://www.bioinitiative.org/conclusions)) of 0.0003 microWatts per centimeter squared.**

Kevin Mottus
California Brain Tumor Association

INTERNATIONAL POLICY BRIEFING: Cautionary Policy on
Radiofrequency Radiation Actions by Governments, Health Authorities and
Schools Worldwide
Environmental Health Trust
Jun. 7, 2017



INTERNATIONAL POLICY BRIEFING

Cautionary Policy on Radiofrequency Radiation

Actions by Governments, Health Authorities and Schools Worldwide

Please go to source documents by clicking on the blue underlined hyperlink.

(Please email info@ehtrust.org for comments/updates as we do our best to ensure accuracy but the policy landscape is always changing. This is a living document.)

France

French Agency for Food, Environmental and Occupational Health & Safety (ANSES) [2016 Report](#)

recommends regulatory changes to ensure "sufficiently large safety margins" to protect the health of young children stating:

"ALL wireless devices, including tablets, cordless phones, remote controlled toys, wireless toys, baby monitors and surveillance bracelets, should be subjected to the same regulatory obligations as cell phones."

- ANSES Article: [“Radio Frequencies, Mobile Telephony and Wireless Technologies”](#)
- [Press Release on Report](#) (translate into English) [Full 2016 Report](#) (French)

2016 National Decree No. 2016-1074 on the protection of workers against the risks arising from electromagnetic fields

- It is forbidden to place workers under age 18 in posts where EMF is apt to exceed limit values
- each employer has to evaluate EMF risks.
- When exposure exceeding limit values is detected or when an undesirable or unexpected health effect from exposure to EMF is reported, the worker will benefit from a medical visit.
- The employer must provide information and training to his employees regarding the characteristics of EMF emissions, the direct and indirect biophysical effects that could result from exposure to EMF, etc.
- The employer must adapt as much as possible the post in order to limit exposure to EMF.
- Specific precautions will be taken regarding pregnant women.
- Next Impact News Article: [“As early as 2017, employers will have to protect their employees against electromagnetic waves”](#)
- Inter France News Article: [“Companies will have to protect employees from electromagnetic waves”](#)
- [Decree No. 2016-1074](#)

[2015 National Legislation - “Law on sobriety, transparency, information and consultation for exposure to electromagnetic waves.”](#) [Original Report](#)

- **WiFi Banned in Nursery Schools:** WIFI and Wireless devices will be banned in “the spaces dedicated to home, to rest and activities of children under 3 years”.

- **WiFi on “OFF” as Default to Minimize Exposures in Schools:** In elementary schools, WIFI routers should be turned off when not in use.
- **Schools Will be Informed:** The school board should be informed when new tech equipment is being installed.
- **Cell Tower Emission Compliance Will Be Verified:** A decree will define the limits of emission of equipments for electronic communications or transmission to which the public is exposed. These values can be verified by accredited organizations and results will be made accessible to the public through a National Radiofrequency Agency.
- **Citizens Will Have Access to Environmental/Cell Tower Radiation Measurements** Near homes: Every resident may get access to the results of measurements for their living space.
- **Cell Antennae Maps For the Country:** A description and map of the places with atypical (higher than the limits) places will be conducted at regular intervals with follow up of the actions being taken to limit the exposure. A map of all antennas will be produced for each town.
- **Continued Evaluation of Health Effects:** The National Radiofrequency Agency will be in charge of surveillance and vigilance, evaluating potential risks and setting up scientific research, including information on health effects.
- **SAR Radiation Labeling Mandated:** The SAR of cell phones must be clearly indicated on the package.
- **Information on Reducing Exposures Mandatory:** Information on ways to reduce exposure will be detailed in the contents of the cell phone package. .
- **WIFI Hotspots will be Labeled:** Places where WIFI is provided should be clearly marked with a pictogram.
- **Advertisements Must Recommend Devices That Reduce Radiation Exposure to the Brain:** Advertising for cell phones should clearly indicate the recommendation of hand free kits for protection of the head of the user and it will be included in the package. Advertising for cell phone not accompanied by such a kit is forbidden. Companies in violation will be fined 75,000 Euros.
- **Children Must Be Provided Protections:** At the request of the buyer, equipment reducing cell phone radiation exposures to the head for children less than 14 years should be provided.
- **The Public Will Be Informed:** Within a year, a policy of information on awareness and information on a responsible and reasonable use of cell phones and other apparatus emitting radiofrequencies will be set up.
- **Electrohyper-sensitivity Report To Be Submitted:** Within a year, a report on electrohyper-sensitivity must be given to the Parliament *according to the law*.
- Le Monde.fr News Article: [“A law to frame exposure to the airwaves”](#)

French Agency for Food, Environmental and Occupational Health & Safety (ANSES) 2013 recommendations for limiting exposure to radio frequencies

- [Original opinion and report on the Update of the “Radiofrequencies and health” expert appraisal](#)
- Recommends hands free phones, SAR labeling, and “limiting the population's exposure to radiofrequencies... especially for children and intensive users, and controlling the overall exposure that results from relay antennas.”
- ANSES news article: [“ANSES issues recommendations for limiting exposure to radiofrequencies”](#)

2010 French Law on National Commitment to the Environment Cell Phone Statute

- For all mobile telephones offered for sale in the national territory, the specific absorption rate shall be clearly indicated in French. Mention should also be made of the recommendation to use the accessory to limit the exposure of the head to radio transmissions during communications

- [Article 183](#): Cell phone advertising aimed at children younger than 14 is banned. In nursery schools, elementary schools and colleges, the use of a mobile telephone during a teaching activity and in the places provided by the rules of procedure, by a pupil is prohibited. Cell phones made for children under 6 are banned “to limit exposure to children”.
- EWG Blog Post: [“French law informs, protects cell phone users”](#)
- [Law No. 2010-788, Article 184](#) [2010 Decree No. 2010-1207 relating to the display of the specific absorption rate of radio terminal equipment](#)

The City of Lyon France’s Cell Phone Campaign [“Poster: No Cell Phone Before 12 Years old”](#)

Removal of Wifi From French Cities and Buildings

- The Dacsupap Blog Press Release: [“BNF Renounces WiFi”](#)
- The French National Library along with other libraries in Paris, and a number of universities have removed all Wi-Fi networks.
- [“Removing Wifi from Schools”](#) - Herouville-Saint-Clair has removed all Wi-Fi equipment installed in municipalities.

Belgium

2014: Ghent Belgium bans wi-fi from pre-schools and day care. Read the Flanders Today article: [“Ghent bans wi-fi from pre-schools and day care”](#)

2013 Federal Public Health Regulations Bans Cell Phones and Advertising Cell Phones for Young Children

- Original Legislation: [“New rules for selling mobile phones: Practical guide for sellers and distributors”](#)
- Phones designed for children under 7 years old are prohibited from sale.
- Total Advertising Ban on cell phones aimed at children.
- Mandatory Radiation SAR levels must be available for consumers at point of sale.
- Warning label on phones: “Think about your health – use your mobile phone moderately, make your calls wearing an earpiece and choose a set with a lower SAR value.”
- Recommendations include use of hands-free methods to keep the phone away from the body such as text messaging and not making calls when the signal is weak, such as in elevator/vehicle.
- Flanders Today News article: [“Belgium bans sale of mobile phones designed for children”](#)
- 2014 Presentation on the [“Implementation of the Council Recommendations in Belgium” by the Ministry of Public Health of Belgium.](#)
- Belgium Governments’s [frequently asked questions](#) about the new law.
- Press Release by Dr. Moskowitz: [“Belgium Adopts New Regulations To Promote Cell Phone Radiation Safety”](#)
- Lower RF Limits are Precautionary in accordance with advice of the Belgium Health Council.

2009 Resolution of the Belgian Parliament - “Introduction of new rules for mobile phone sales”

[Belgian Health Food and Safety Brochure on Wireless Devices](#): This document discusses everything from DECT home phones to baby monitors to Bluetooth to SAR.

“Considering that baby monitors can differ so greatly, it is advisable to carefully follow the instruction manual, to place the baby set at a sufficient distance from the crib (at least 1 m) and to use the ‘voice activation’ setting, among other things.”

The Belgian Foundation Against Cancer warns that intensive use of a mobile phone can increase the risk of contracting cancer. They suggest that children younger than 12 should not use a mobile phone, and that using a mobile phone as an alarm clock is not desirable because the phone is in close proximity to the head the entire night. The Cancer Foundation also strongly advises people not to use a mobile phone in the car or a train. Read details in the [Mobile Phones Section 7: UK & International regulations](#) by Alasdair and Jean Philips.

WHO International EMF Project Report on national activities in Belgium for 2010-2016

- Details the research and legislation activities of Belgium

The Government of the Brussels Capital Region Has Maps of Cellular Antennae: A map of all the locations of antennas is [accessible online](#) with the technical data of each installation.

Flanders Belgium Department of the Environment Website Section on “**Radiation: transmitting antennas, WiFi, mobile ...**”

- [Radiation is unhealthy or not?](#)
- [FAQ on transmitting antennas and health](#)

Belgian Federal Public Service: Health, Food Chain Safety and Environment Recommends Reducing Exposure

- [“Wireless Devices”](#) - Document describing regulation for wireless telecommunication equipment, wireless home telephones, baby monitors, wireless on the Internet, bluetooth, and comparison of SAR values
- Specific tips for Wi-Fi installations: “In order to limit the exposure, the following simple measures can be taken: Only switch on your wireless network connection when it is needed. This concerns the wifi adapter in your laptop in particular. Otherwise, your laptop tries to continually connect to the network, and that leads to unnecessary exposure and decreases the life expectancy of the batteries. Place the access point away from places where you spend lots of time.”
- [Tips for prudent use](#) - “So far, it has not been proven that the radiation from mobile phones is harmful to their users. But on the foundation of current scientific knowledge, health risks relating to long-term, frequent mobile phone use cannot be ruled out. Experts – including those on the Superior Health Council – advise everyone to limit their exposure to mobile phone radiation.”
- [Mobile phones and children](#) - “The use of the mobile phone by children is a special point of attention. Children may be more sensitive to radio waves. Children absorb twice as much radiation in the brain than adults do, and 10 times more in the bone marrow of the skull. In addition, due to the popularity of the mobile phone, the cumulative exposure of the current generation of children will be much higher by the time they reach their adulthood than that of the current adults.”
- [Electromagnetic hypersensitivity](#): This webpage contains information about complaints, the state of affairs of the scientific research and advice about what can be done in this situation.
- [Wireless on the Internet](#) “Only switch on your wireless network connection when it is needed. This concerns the wifi adapter in your laptop in particular. Otherwise, your laptop tries to continually connect to the network, and that leads to unnecessary exposure and decreases the life expectancy of the batteries. Place the access point away from places where you spend lots of time. “
- [Brochure electromagnetic fields in Dutch, French and German](#)

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Spain

Spain: Several autonomous parliaments and numerous municipalities have adopted resolutions that urge the application of the precautionary principle in the field of electromagnetic pollution, e.g. by eliminating/limiting wireless networks for children, conducting health education and public awareness campaigns, avoiding the implementation of smart meters, and claiming support measures for people affected by central sensitization syndromes.

Institutional statements of some regional parliaments of the Autonomous Communities (Basque Country and Navarre) adhering to [Council of Europe Parliamentary Assembly Resolution 1815](#) (PACE) of 2011 to apply the precautionary principle in relation to EMF exposure.

More and more Spanish schools requests a cable internet connection, and the case of the School Solokoetxe in Bilbao has been significantly discussed in the [Basque Parliament](#) itself in 2015 with scientific advisors provided by the parents' association.

The [Basque Parliament](#)

In October 2011, the [Basque Parliament](#) in a Non-Law Motion adheres to PACE Resolution 1815 to "act accordingly ... in favor of health protection" in the field of electromagnetic waves, in particular the conducting of information and awareness campaigns "against the immoderate use of mobile phones among children".

In April 2013, a [Resolution of the Ombudsman of the Basque Country](#) recommends that the Basque Department of Education implement measures to reduce the levels of radiofrequency emission in schools.

The Parliament of Navarra

In September 2014 the [Parliament of Navarre](#) voted to adhere to PACE Resolution 1815 [*The potential dangers of electromagnetic fields and their effect on the environment*](#), with a resolution urging the Spanish Government and the Navarre Autonomous Community Government to implement the recommendations to apply the precautionary principle in relation to EMF exposure. News Article: ["The Parliament of Navarre urges to remove the WIFI in schools by precaution"](#)

Since 2012, various institutional declarations have been approved by municipalities and other local entities requesting the implementation of the recommendations of PACE Resolution 1815:

[Barakaldo](#), [Errentería](#), [Espartinas](#), [Hospitalet](#), [Jerez de la Frontera](#), [San Sebastián](#), [Vitoria](#), [Villa de Plentzia](#), [Cornellá de Llobregat](#), [Torrox](#), [Mula](#), [Villa de Buenavista del Norte](#), [Poio](#), [Arganda del Rey](#), [Cenizate](#), [Hospitalet](#), [Juntas generales de Guipúzcoa](#), [Villava](#),

Hospitalet City Council deactivated Wi-Fi: In April 2014, the Hospitalet City Council [deactivated the Wi-Fi network](#) of municipal nursery schools, reducing levels in these centers below the limits required by

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PACE Resolution 1815. In December 2014, the head of the Hospitalet department of education [asked](#) the Department of Education of the Catalonia Autonomous Community to follow the precautionary principle to reduce EMF exposure in Catalan educational establishments.

The Vitoria-Gasteiz City Council at its plenary session in September 2015 unanimously [approved a precautionary approach with wireless](#): Citizens will be informed of the location of wireless transmitters are in civic centers and municipal buildings. It is recommended that children's spaces such as playgrounds and family libraries, will be free of Wi-Fi or have decreased Wi-Fi and Wi-Fi free zones will be established in playgrounds and building entrances.

- El Mundo News Article: [“Victoria ‘cures in health’ against the wifi”](#)

Institutional motions regarding people affected by environmental pathologies

Since 2012, municipal institutional motions have been approved in support of people affected by central sensitization syndromes and / or in favor of prevention and action measures in environmental pathologies: [Vitoria-Gasteiz \(May 2012\)](#), [Pinto \(January 2014\)](#), [Jaén \(December 2014\)](#), [Sant Cugat del Vallès \(September 2014\)](#), [Tarragona \(November 2015\)](#), [Barcelona \(December 2015\)](#), [Vilanova i la Geltrú \(December 2015\)](#), [Terrassa \(January 2016\)](#), [Hospitalet de Llobregat \(March 2016\)](#), [Vilassar de Mar \(March 2016\)](#), [Montcada i Reixac \(March 2016\)](#), [Castellbisbal \(May 2016\)](#), [Badia del Vallés \(April 2016\)](#), [Arenys de Munt \(June 2016\)](#), [Durango \(February 2017\)](#).

The Tarragona City Council (Tarragona is a major city 100 kilometres south of Barcelona) at its plenary session in November 2015 unanimously approved the “Institutional Declaration of support for people with Central Sensitivity Syndromes”:

1. Carry out (with a yearly update) a diagnosis and census of those affected by CSS in the City of Tarragona, showing what is the actual situation and the specific needs of these patients and their families.
2. An intervention protocol for the staff of the Area of Services to Citizens of the Tarragona City Government to look after those with CSS- including a list of economic subsidies for food, first necessity elements, reduced water bill, and home help specific to the needs of these patients.
3. Housing protocol for people with CSS, especially those who have MCS and/or EHS, those threatened by eviction or those who are forced to leave their home. This protocol has to include a series of safe social housing (green/white spaces: free of xenobiotics and electromagnetic waves).
4. Create green/white spaces in all municipal buildings (free of xenobiotics and electromagnetic waves).
5. Eliminate, as much as possible, the use of pesticides in the whole of the municipality. In the case when this is not possible, establish a communication protocol to contact those affected and the press regarding the places and dates of the interventions with preventive advice.
6. Training for social workers and educators about CSS, its social, health and economic reality. Elaboration of information and education to increase the knowledge about these illnesses amongst the general population and of the city workers in particular, with the objective of diminishing the stigma that is now present regarding these illnesses.

7. Protocol for adapting working conditions of the municipal workers who have CSS with specific measures of support when having a flare up. These would be the measures: work schedule flexibility, encourage work from home through internet (teleworking), reserved parking spaces and include in the collective agreement not deduct the salary of the first 20 days of sick leave.
8. [Read the full article in Catalan, Spanish and English detailing the actions here.](#)
9. Blog Post: [“GOOD NEWS: FIRST RESCUE PLAN FOR PEOPLE WITH CSS”](#)

In May 2012, the Galician Association of Biologists [asks the government of the Autonomous Community of Galicia](#) to apply the precautionary principle to exposure to electromagnetic fields, specifically to protect children: Information on health EMF risks, the ban of the use of mobile phones and Wi-Fi devices in the schools and mobile phone antennas near the schools.

In May 2016, the Guipuzcoan Association of Pharmacists of (COFG) and the Guipuzcoan Association of Fibromyalgia and Chronic Fatigue Syndrome Bizi Bide signed [a collaboration agreement](#) of 284 pharmacies in Guipúzcoa to disseminate information and to raise awareness on Central Sensitization Syndromes (Fibromyalgia, Chronic Fatigue Syndrome, Multiple Chemical Sensitivity and Electrohypersensitivity).

Smartmeters

- During 2016 and 2017 motions were approved at municipal or provincial level, in Catalonia and Andalusia, against the installation of “Smart meters” (1 and 2): [Sta. Perpetua de Mogada](#) (June 2016), [Diputació de Barcelona](#) (June 2016), [Barcelona](#) (July 2016), [Masnou](#) (September 2016), [Hostalet de Pierola](#) (September 2016), [Sta. Coloma de Grallanet](#) (September 2016), [Vallirana](#) (September 2016), [Sant Feliu de Guíxols](#) (September 2016), [Celrà](#) (October 2016), [Hostalric](#) (October 2016), [Sant Adrià de Besòs](#) (October 2016), [Cerdanyola del Vallès](#) (October 2016), [Diputació de Girona](#) (November 2016), [Torrelles de Llobregat](#) (November 2016), [San Cugat del Vallés](#) (November 2016), [Hospitalet de Llobregat](#) (November 2016), [Cornellà de Llobregat](#) (November 2016), [La LLagosta](#) (November 2016), [Pallejà](#) (November 2016), [Polinyà](#) (November 2016), [Monistrol](#) (December 2016), [Rupià](#) (December 2016), [Balaguer](#) (December 2016), [Cervellçó](#) (December 2016), [Vendrell](#) (December 2016), [Esplugues de Llobregat](#) (January 2017), [Molins de Rei](#) (January 2017), [Cunit](#) (January 2017), [Sant Cebrià de Vallata](#) (January 2017), [Caldes de Malavella](#) (January 2017), [Prat de Llobregat](#) (February 2017), [Fuente Vaqueros](#) (Granada, February 2017), [Sant Boi de Llobregat](#) (February 2017), [Sant Andreu de la Barca](#) (February 2017), [Sant Quirze del Vallès](#) (February 2017), [Mollet del Vallès](#) (March 2017), [Abrera](#) (March 2017), [Diputación de Granada](#) (March 2017)

Since 2011, several court judgments have been approved recognizing the disability to different people affected by electrosensitivity.

- In May 2011, a judgment of the [Madrid Labour Court nº 19](#) to declare permanent incapacity (100% of his base salary) of a worker Complutense University of Madrid who suffered from chronic fatigue and environmental and electromagnetic hypersensitivity (the EHS is mentioned for the first time in Spain as cause of disability).

- In July 2016, a judgment [Nº 588/2016 of the High Court of Madrid](#) has recognized for the first time a situation of total permanent disability for the exercise of the profession of a telecommunications engineer as result of "electrosensitivity syndrome (EHS)". For the first time in Spain, the EHS condition is considered as the main cause of disability involved. "This is the first we have achieved total disability due exclusively to this syndrome," says attorney Jaume Cortés, the Col·lectiu Ronda. Lavanguardia News Article: ["A 'teleco' with electrosensitivity achieves the inability to work between wifes: The TSJ of Madrid recognizes the right to a benefit denied by the INSS"](#)
- In February 2017, the [Social Court, number 4, of Castellón](#) has issued a ruling that recognizes, for the first time, a permanent disability in the degree of great disability to a patient who suffers as a clinical picture residual multiple chemical sensitivity and electrosensitivity.
- During the last decades, Regional and municipal regulations were approved to reduce the legal exposure in their territories. Unfortunately, now, the last General Telecommunications Law (2014) eliminated the regional and municipal competences in that area.

Canada

Health Canada offers Practical Advice on reducing exposure to wireless radiation

1. Limit the length of cell phone calls
2. Replace cell phone calls with text, use "hands-free" devices
3. Encourage children under the age of 18 to limit their cell phone usage.

2015 Canadian Parliament Standing Committee on Health of the House of Commons Report: "Radio Frequency Electromagnetic Radiation and the Health of Canadians"

- [Original Report](#)
- They made 12 recommendations including an awareness campaign on reducing exposures, improved information collecting and policy measures regarding the marketing of radiation emitting devices to children under the age of 14, "in order to ensure they are aware of the health risks and how they can be avoided."

2015 National Bill C-648 was Introduced into the House Of Commons

- An Act Respecting the Prevention of Potential Health Risks From Radiofrequency Electromagnetic Radiation" would require manufacturers of all wireless devices to place specific health warning labels clearly on packaging, or face daily penalties /fines and/or imprisonment. Although the Bill did *not pass*, it made headlines.Press Conference for
- [Bill C-648 Video](#).
- [Canadians For Safe Technology Press Section Website](#)

Canadian Pediatric Association issued a Position Statement Recommending no Screen-based Activities for Children under Two

- Original Position Statement: [Healthy active living: Physical activity guidelines for children and adolescents](#)
- For healthy growth and development: screen time (eg, TV, computer, electronic games) is not recommended for children under 2 years old. For children 2-4 years, screen time should be limited to <1 h/day; less is better.

European Parliament

2011 The Parliamentary Assembly of the Council of Europe - Resolution 1815:

- [Resolution 1815: “The Potential Dangers of Electromagnetic Fields and Their Effect on the Environment.”](#)
- A call to European governments to “take all reasonable measures” to reduce exposure to electromagnetic fields “particularly the exposure to children and young people who seem to be most at risk from head tumours.” The Resolution calls for member states to:
- Implement “information campaigns about the risk of biological effects on the environment and human health, especially targeting children and young people of reproductive age.”
- “Reconsider the scientific basis for the present standards on exposure to electromagnetic fields set by the International Commission on Non-Ionising Radiation Protection, which have serious limitations, and apply ALARA principles, covering both thermal effects and the athermic or biological effects of electromagnetic emissions or radiation.”
- “For children in general, and particularly in schools and classrooms, give preference to wired Internet connections, and strictly regulate the use of mobile phones by schoolchildren on school premises.”

2009 European Parliament Resolution: Health concerns associated with electromagnetic fields

- [Original Resolution](#)
- Urges the Commission to review the scientific basis and adequacy of the EMF limits as laid down in Recommendation 1999/519/EC and calls for the review to be undertaken by the Scientific Committee on Emerging and Newly Identified Health Risks
- Calls for particular consideration of biological effects when assessing the potential health impact of electromagnetic radiation, especially given that some studies have found the most harmful effects at lowest levels
- Calls for active research to address potential health problems by developing solutions that negate or reduce the pulsating and amplitude modulation of the frequencies used for transmission

Australia

The Australian Radiation Protection and Nuclear Safety Agency 2015 Fact Sheet: [“How to Reduce exposure from mobile phones and other wireless devices.”](#)

- Reduce the risk from WiFi devices by “keeping them at a distance, for example placing the wireless router away from where people spend time”, and “reducing the amount of time you use them”.
- ARPANSA recommends that parents encourage their children to limit their exposure stating that “It is recommended that, due to the lack of sufficient data relating to children and their long term use of mobile phones, parents encourage their children to limit their exposure by reducing call time, by making calls where reception is good, by using hands-free devices or speaker options, or by texting.”

Queensland Department of Education, Training and Employment - 2015 [“Guide to Safe Technology”](#)

- It’s not only physical hazards you need to consider when thinking about health and safety issues at work or home — you should also think about how you use technology. When using a computer, you need to think

about: ergonomics and posture, radiation, vision impacts and harmful lack of exercise (DVT).

- “Wireless devices — smart/mobile phones, tablets, slates, monitors etc — all emit low levels of electromagnetic radiation and should be used correctly. When using electronic devices, the department recommends you follow WiFi/3G/4G best practice:
- Follow the manufacturer’s usage guideline operate from a table or bench — not on your lap
- Use ‘hands-free’ devices to keep smart/mobile phones away from your head and body during phone calls limit the number and length of calls
- Position the device antenna away from your body
- Do not sit within 0.5 m of a wireless router use smart/mobile phone in areas of good reception to reduce exposure.”
- [Safe use of technology by WFi in Schools Australia - Video](#)

New Zealand

2016 - [Rotokawa School Takes Steps to Minimize RF Exposure](#): After concerns were raised about e-learning by a small group of parents from the school, the principal has put some positive procedures in place as follows:

- Children will use ipads in flight mode
- Children using laptops and Chromebooks will work on the desk top
- Parents may request that their child use an Ethernet cord to access the internet
- Children are taught about the health precautions as part of their cyber citizenship
- Digital learning in the one to one Year 5 & 6 environment is kept to less than 2 hours per school day.
- The principal has also stated there are no plans to increase the existing Wi-Fi coverage at this stage.

Italy

2017: The Italian Court of Ivrea ruling recognizes causal link between cellphone use and brain tumor.

- Italian court is the first in the world to recognize this causal link in an April 11, 2017 ruling which awarded a Telecom employee, Roberto Romeo, lifetime damages of 500 euros a month after he developed a brain tumor from fifteen years of cellphone use.
- [Original Ruling](#)
- [Press Release](#)
- The Guardian News Article: [“Italian court rules mobile phone use caused brain tumour”](#)
- NY Daily News Article: [“Italian Court Finds Link Between Cell Phone Use and Tumor”](#)
- Courthouse News Service Article: [“Italian Court Finds Link Between Cell Phone Use and Tumor”](#)

2016: Mayor of Borgofranco d'Ivrea ordered Wi-Fi to be turned off in schools. “Mayor Livio Tola told the town's high school and elementary school to return to using cables to connect to the internet after reading that the electromagnetic waves given off by wireless routers were especially harmful to young children.”

- The Local News Article: [“Italian town shuts down wifi over health fears.”](#)
- Torino News Article: [“Ivrea, The Mayor Removes WiFi as it Could Be Dangerous”](#).

2015: State Parliament of South Tyrol voted to reconfirm the precautionary principle: The State Government

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was mandated:

- To replace existing wireless networks whenever possible with networks that emit less radiation at schools, preschools, hospitals, nursing homes, and other public facilities.
- Establish a working group whose mandate it is to assess these new technologies and their exposure levels. With regard to wireless communication technologies, mobile Internet access, and public health, the working group shall clarify which technologies emit less radiation and provide sustainable technology options and
- To start an education and awareness campaign that informs about possible health risks, especially regarding the unborn, infants, children, and adolescents and that develops guidelines for a safer use of cell phones, smartphones, and Wi-Fi.
- Previous Hearing at the Parliament of South Tyrol, 29 April 2015 - [“hearing on the effects of mobile radio”](#)
- Discussion at the Plenary Session: [“Mobile Communications, Refugees”](#)
- Kompetenzinitiative News Article: [“Parliament of South Tyrol Reconfirms Precautionary Principle”](#)
- [Official Resolution - “WLAN, mobile radio, radiation exposure: does the precautionary principle apply”](#)

2012 Italian Supreme Court Ruling: Man’s brain tumor was caused by his cell phone use.

- The National Institute for Workmen’s Compensation must compensate a worker with head tumor due to cell use.
- Reuters News Article - [“Italy court ruling links mobile phone use to tumor”](#)
- RT News Article - [“Cancer cells: Italian court rules ‘mobile phones can cause brain tumors’”](#)
- Daily Mail News Article - [“Mobile phones CAN cause brain tumours, court rules in landmark case.”](#)

Lecce, Italy, "Istituto Comprensivo Alighieri- Diaz" School banned wifi: Their two resolutions decided:

- To ban wifi in school and install a wired system for the use of internet and reject the request of the local government (Municipality) to install an antenna on the school roof for the wireless signal providing for the "Wireless city" program.
- The resolution also asks the Municipality to install the antenna at a reasonable distance from school.

The Piemonte Region Council adopted a resolution to limit EMF exposure by limiting the use of wifi in schools and be considerate to the problem of EHS people.

- Original Resolution - [“Adoption of the Precautionary Principle exposition Installations in Wireless Environments in School”](#)

The Italian Society for Preventive and Social Pediatrics has officially called to prohibit cell phones for children under 10 years old.

- Giuseppe Di Mauro, president of the Italian Society of social and preventive pediatrics [Società italiana di pediatria preventiva e sociale (www.sipps.it)] “We do not know all the consequences associated with cell phone use, but excessive use could lead to concentration and memory loss, increase in aggressiveness and sleep disturbances.” and he cites electromagnetic fields stating “The damage to health are increasingly evident”
- Il Tirreno Tuscany News Article - [“Pediatricians: Phone Alarm for Kids”](#)

2016 - Turin Mayor Chiara Appendino laid out plans “to cut back on Wi-Fi in state schools and government buildings over concerns that radiation might damage people's health”.

- The Local News Report [“Turin could slash Wi-Fi over 'radiation' concerns”](#)

Finland

2015 - Radiation and Nuclear Safety Authority (STUK) recommend reduced exposure to children

- ["Exposure can be reduced by simple means"](#) webpage recommends:
- Use a hands free device, don't use phones reception is poor, the phone should be kept on a table or similar location instead of in the user's pocket.
- "STUK recommends that unnecessary exposure to radiation from mobile phones be avoided. In particular, children's unnecessary exposure should be avoided as their life-long exposure will be longer than that of those who begin using mobile phone as adults and as only scant research exists on health effects to children."
- ["Mobile phones are a major source of radio frequency radiation"](#) webpage states:
- "The level of exposure to radiation from a mobile phone held next to user's ear can approach the exposure limits. *Never before have humans been exposed to equally strong sources of radiation in their living environments.* Identifying any health impacts is highly important because practically everybody uses a mobile phone today."

2009 - Radiation and Nuclear Safety Authority (STUK) initially issued recommendations to reduce exposure with more explicit cautionary language.

- Information posted on the STUK website in 2009, now removed. - ["Radiation and Nuclear Safety Authority: Children's mobile phone use should be limited"](#)
- 2009 Policy position paper by STUK detailing why "It would be good to restrict children's use of mobile phones." - ["Statement of Finnish Radiation and Nuclear Safety Authority \(STUK\) concerning mobile phones and health on 7th January 2009"](#)
- 2009 Yle Uutiset News article - ["Authority Recommends Restricting Childrens' Use of Mobiles"](#)

Finland Schools

- 2012 [Kivioja primary school](#) in Ylivieska Finland bans phones and minimizes Wireless.
- 2017: Wi-fi OFF Switches Installed in the Fiskars primary school. [Read press release.](#)

Israel

2017: Ministry of Education banned personal use of cell phones for teaching and educational staff during teaching hours. [Read english translated memorandum.](#) [Read original Memo in Hebrew](#)

2016: Ministry of Education banned cell phones during the school day.

- [Original Summary of the Directive](#)
- A computer or tablet are approved for Pedagogical activities and smartphones are not approved until examination of the issue by the Ministry with published Instructions.
- CH10 News Report - ["NEW CEO memorandum - No use of cellphones for learning in class"](#)

2016: The Mayor of Haifa calls for the removal of Wi-fi from all schools. Haifa Mayor Yona Yahav, said that "When there is a doubt, when it comes to our children, there is no doubt".

- "The roots of the decision go back to a 2013 petition by parents in four schools who claim that such networks are harmful. The case eventually made its way to the High Court, which has postponed a final decision on the matter...The movement has spread from Haifa to other cities as well, and petitions have been signed by parents in dozens of cities demanding the removal of the networks. Haifa is the first city to take action on the matter. Haifa Mayor Yona Yahav said that the city would replace the wireless network

with a wired connection that will provide safer options to students.”

- The school system has developed in house ability to ethernet connect computers in schools, however *in practice*, a few schools are choosing to continue to use wireless despite the ability to be fully hardwired but access is limited.
- [Video of Lecture by Reuven Kurman, BSc, MBA](#), Chief Information Officer, Education Department of Haifa, Israel “*What Can be Done*” - *Reducing Exposure to Children in Schools and at City Level* PDF of January 2017 IIAS Presentation
- Haifa & Haifa News Report - ["The - Wi-Fi in kindergartens and schools in Haifa severed."](#)
- Hamodia News Report - ["Haifa to Shut School Wireless Networks."](#)

[2015 Israel National Activity Report](#) details actions being taken to reduce ELF and RF EMF.

- Cellular operators must inform consumers about radiation safety instructions.
- According to a settlement agreement accepted by the Tel Aviv-Yafo District Court in February 2014, cellular operators have to inform buyers of new mobile phone about the radiation safety instructions, including the minimum distances from the head and the body. Hand-free kits must be provided with every new mobile phone and each cellular operator has to provide information on the safe use of mobile phones on its website.

The Ministry of Health - "Environmental Health in Israel 2014" details EMF Policy, Science and Need For More Protections. [Original Publication](#)

- “Precautions should be strictly enforced with regard to children, who are more sensitive to developing cancer.” and that “wireless communication networks in schools be reduced.” The Health Ministry recommends “sensible use of cellular and wireless technology, including: considering alternatives like landline telephones, use of a speaker while talking on a cellphone, and refraining from installing the base of wireless phones in a bedroom, work room, or children’s room.” The Report states that “Findings in Israel clearly indicated a link between cellphone use for more than 10 years and the development of tumors in the salivary glands, particularly among people who held the telephone on the same side where the tumor developed and individuals in the highest category of exposure (heavy use in rural areas).”
- Linda S. Birnbaum, Director, USA National Institute of Environmental Health Sciences and National Toxicology Program wrote in the Israeli Report final chapter that, “*If some of the studies turn out to be harbingers of things to come, we may have major health consequences from the nearly ubiquitous presence of wireless equipment.*”

[2013 Ministry of Environmental Protection Publication on recommendations for ELF-EMF](#): The recommendations of the Ministry of Environment and the Ministry of Health maximum permissible level of exposure to ELF in places of prolonged chronic exposure such as schools and residences is 4 mG. This is signed by Prof. Stelian Galberg and states that this protection should apply to those under 15 years old.

[Israeli Ministry of Health Recommends Reducing Exposure to Cell Phone Radiation](#)

- “These expert committees determined that there are indeed gaps in the knowledge concerning the implications of exposure to this radiation, and therefore they called for further studies on the subjects and recommended to adopt the “**precautionary principle**”. This principle adopts simple and relatively cheap means to reduce exposure to the minimum radiation levels possible with existing technology.”

- “In particular, it is recommended to follow precautionary rules in the children population who are typically more sensitive to cancer development due to exposure to cancerous agents...the Ministry of Health advises parents to reduce children’s exposure to mobile phones as much as possible, consider the age they start using them, reduce the amount of time mobile phones are used, and in any event, make sure they use earphones (not wireless) or a speaker when using the mobile phone.”
- TNUDA - [“Recommendations for prudent use of cellphones in Israel”](#) Include:
 - Using the speakerphone/headset during conversation.
 - Keep the phone away from the body.
 - Reduce the amount and duration of calls made on a cell phone.
 - Areas of low reception equals higher radiation (low cell tower reception, elevator, car, train) Reduce call time in these low reception areas.
 - While driving, it is best to talk as little as possible on the mobile phone, and follow the law which bans handheld phones. Inside vehicles, it is advisable to install an antenna outside the vehicle and not inside it, and to prefer wire connections between the phone and the speaker- rather than bluetooth.

2013 - Israeli Ministry Of Education has issued guidelines limiting WiFi radiation in schools.

- Wireless networks banned in preschool and kindergartens.
- 1st. & 2nd. grade internet is limited to max. 3 hr. per week of internet.
- 3rd grade maximum 8 hours a week.
- A hard wired direct cable connection is required if the teacher has a computer in the class.
- Recommendations for reducing magnetic fields to below 4 mG for children under 15 in schools representing the government's position that international guidelines are NOT protective of children.

Note: Despite the precautionary recommendations of the Health Ministry and the statements in Education Ministry regulations for the preference of wired (not wireless) networks- the reality is that wireless is still being deployed in schools. ICNIRP limits are presented as the limit for comparison at the same time that it is stated that non-thermal effects and effects from long term exposure are possible. The *actual practice* in Israel is different than *the official stance* and this has prompted strong outcry from doctors, parents and citizens for the government to be accountable to children’s health.

- [A 2016 News Report shows the complex picture](#) whereby no agency is assuming responsibility for ensuring protections. Although smartphones are banned as an educational classroom tool, the Education Ministry is still [promoting the use of digital tools](#) that are used for Smartphones, such as [Kahoot](#).

2002 Israel Consumer Protection Regulations (information on non-ionizing radiation from a mobile phone)

- Compulsory cell phone labeling, radiation information provided to consumers. A mobile phone may not be sold unless they comply with the following:
 - A clearly visible sticker on cell phone packaging that says, ““This mobile phone emits non-ionizing radiation; details and information about the radiation levels of this mobile phone model and the maximum permissible level of radiation are included in the attached leaflet.”
 - The packaging must include an information leaflet in Hebrew, Arabic and Russian with SAR information.
 - The information must be clearly displayed to the public at points of sale of mobile phones, service provision centers, websites of manufacturers, suppliers and service providers of mobile phones.
- Israel Environment and Health Fund - [“Non-Ionizing Radiation”](#)
- TNUDA - [Compulsory Marking/Provision of Information on Non-Ionizing Radiation](#)
- Israel Ministry of Environmental Protection - [“Radiation from Cellphones”](#) Webpage

Notable Israeli News Stories/Videos

- 2016: [TV CH 2 Documentary – “HOW WE ARE KILLING OURSELVES – WIRELESS RADIATION”](#)
- [2016 TV Report on Israeli government on WiFi Health Concerns: For english subtitles click CC.](#)
- ["Health Ministry: Limit Kids' Use of Cell Phones"](#) - 2009 News article on cell phone guidelines in Israel

Notable History

- [“Stop Wi-Fi in schools, deputy health minister implores”](#) - In 2012 Israel's deputy Minister of Health Rabi Litzman stated that he supports a ban on Wi-Fi in schools. Currently the Health Minister is relying on scientific recommendations of Dr. Sadetsky.
- ["2012 Israeli National Activity Report"](#) - States that a joint ministerial committee of the Education & Health & Environmental Protection Ministries gave advice to the Education Minister for ethernet connections in schools- not wireless. The Environmental Protection Ministry asked to limit the use of cell phones in buses and to prohibit the use of cell phones in elevators.
- [“The Israeli Supreme Court Ordered the Israeli Government to Investigate the Number of Children Currently Suffering From EHS.”](#) - In 2013 a court case moved through the the Israeli Supreme Court on Wi-Fi radiation in classrooms. The 2015 Israeli Supreme court decision was that that the court sees no reason to intervene with the (Israeli) Education Ministry deployments of wireless network at schools.

Israeli Government Links

[Ministry of Environmental Protection Webpage on Non-ionizing Radiation](#), [Interactive Map of Cell Tower Locations](#)

[Israeli National Information Center for Non-Ionizing Radiation TNUDA](#)

[Ministry of Health Webpage on Cell Phone Radiation](#)

Switzerland**The Switzerland Federal Office for the Environment Webpage Informs Public on EMF**

- [“Mobile as an electrosmog source”](#)
- [“How strong is mobile radiation?”](#) - Webpage that contains a PDF of tips for mobile phone use from the Federal Office of Public Health and which states “caution should be exercised primarily when using devices held close to the body, such as laptops, PDAs and Internet telephones..” and gives recommendations on how to reduce exposure including turning the Wi-Fi off when not in use, installing the access point one metre away from places where you work, sit or rest for long periods of time and keeping laptops off laps.
- [Publications on Electrosmog in the environment](#) - Precautionary protection provided by the installation limit values is limited to locations where people regularly spend lengthy periods of time. Here, long-term exposure shall be kept as low as possible. Places of sensitive use include apart- ments, schools, hospitals, offices and playgrounds, but do not include balconies and roof terraces, stairways, garages, storage and archive rooms, temporary workplaces, churches, concert halls and theatres, camp sites, sports and leisure-time facilities, passenger areas in railways, observation decks.
- [2015 Environmental Report](#) - Chapter 17 on Electrosmog states “Effects can also be detected for weak radiation intensity. For example, weak high-frequency radiation can alter electric brain activity and influence brain metabolism and blood flow. Whether these effects have an impact on health is still unclear” and recommends the precautionary principle to reduce risk “Because major gaps still exist in our knowledge about the health impacts of long-term exposure to weak non-ionising radiation, the adopted protective strategy should be pursued consistently.”

Environmental Health Trust <http://ehtrust.org/>

- [2012 Radiation of radio transmitters and Health](#) - *“In view of the fact that there are gaps in the available data, the absence of proof of health risks does not automatically also mean proof of their absence. From the scientific point of view, a cautious approach in dealing with non-ionising radiation is still called for. There remains a need for extensive research into the potential long-term effects”*

Swiss expert group on electromagnetic fields and non-ionising radiation (BERENIS)

- In Switzerland, the Federal Office for the Environment (FOEN) is the responsible government body for monitoring and assessing research on health effects of non-ionising radiation (NIR) from stationary sources in the environment. The FOEN has nominated *BERENIS - Swiss expert group on electromagnetic fields and non-ionising radiation*- a consultative group of Swiss experts from various disciplines with scientific expertise regarding electromagnetic fields. The BERENIS experts regularly screen the scientific literature, and assess the publications which they consider relevant for the protection of humans from potentially adverse effects. [Regular BERENIS Newsletter and Scientific Updates](#)

2008 - The Governing Council of Thurgau Canton Recommends Hard-Wired Schools

- ["Parliamentary Inquiry on Wireless LAN at Elementary, Junior and Secondary High Schools"](#)
- “The Governing Council recommends for schools to forgo the use of wireless networks when the structural makeup of a given school building allows for a wired network.”
- 2007 [“Decision of the Bavarian Parliament - Protecting Children at School from Radiation Exposures Final Report”](#)

Swiss Physicians Association of Doctors for Environmental Protection

- [2012 Swiss Physicians Letter](#) stating, “the risk of cancer for this type of [wireless] radiation is similar to that of the insecticide DDT, rightfully banned... From the medical point of view, it is urgent to apply the precautionary principle for mobile telephony, WiFi, power lines, etc.”
- [2014: Preliminary draft for a federal law on the protection against dangers:](#) Non-ionizing radiation (NIS) is growing steadily. Especially the everyday stress in the area of low-frequency and high-frequency.
- [2016: Press Release on the NTP Study and Policy Implications:](#) “There are increasingly clear indications that mobile radio is a health hazard. From a medical point of view it is clear: the scientific results so far show it is clear that prudent avoidance of unnecessary exposures is necessary.”
- Report on [Smartphones- \(OEKOSKOP 1/16\)](#)
- [AefU-News about Electrosmog](#)

Germany

The Federal Office for Radiation Protection (FORP) Website provides precautionary advice and tips for reducing radiation exposure to smartphones, tablets and wireless devices stating, *“Since long term effects could not be sufficiently examined up to now the Federal Office for Radiation Protection (BfS) recommends to keep exposures to these fields as low as reasonably achievable.”*

- [“Electromagnetic Fields” FORP Website](#) ”
- *“There are uncertainties in the risk assessment that the German mobile communications research programme has not been able to remove completely. These include in particular: possible health risks of the long-term exposure of adults to high [frequency](#) electromagnetic fields when making mobile telephone calls (intensive mobile use over more than 10 years) & the question of whether the use of mobile phones by*

children could have an effect on health. For these reasons, the BfS continues to consider that precautionary measures are necessary: exposure to electromagnetic fields should be as low as possible."

- ["Smartphones and tablets – tips to reduce radiation exposure"](#) Website - which recommends: *"It is particularly important to minimise children's exposure to radiation. They are still developing and could therefore react more sensitively in terms of health."*
- ["Bundesamt warns schools against WLAN networks"](#) - The FORP recommends landline phone instead of mobile phone base stations and that schools should not connect wirelessly to the internet.
- [FORP Public Education Poster "Less radiation when Telephoning"](#)

The German Federal Ministry for Radiation Protection: Read the [German Parliament 2007 document](#) which states,"supplementary precautionary measures such as wired cable alternatives are to be preferred to the WLAN system."

Bavaria - The State Ministry of Education and Cultural Affairs

- [2007 Decision of the Bavarian Parliament - Protecting Children at School from Radiation Exposures Final Report](#)
- "For precautionary reasons the Federal Office for Radiation Protection recommends for schools that if a wireless network is used to place its components in suitable locations and to prefer the use of wired network solutions whenever possible." In 2007 Parliament recommendation to all schools to *not* install wireless LAN networks.

Frankfurt's Schools Banish Wireless Networks

- The Local Education Authority did not wish to conduct a "large scale human experiment," said Michael Damian, spokesperson of the Head of the School Department Jutta Ebeling. "In Frankfurt's schools there will be no wireless networks in the short or mid term.
- Omega News Article - ["WLAN is to be banished from the school sphere"](#)

2013: Four German Federal Agencies issued a guidebook recommending reducing cell phones and Wi-Fi to young children

- ["Parenting Guide: Environmental and Child Health"](#) by the Federal Office for Radiation Protection (BfS), the Federal Institute for Risk Assessment (BfR), the Robert Koch Institute (RKI) and the Federal Environmental Agency (UBA). It contains practical information including reducing electromagnetic radiation from baby monitors and telephones: Baby monitors should be as far as possible away from the crib. Phones should be banished from the nursery. They are not suitable toys for infants and toddlers. Use of cabled landline phones is preferable. Wi-Fi routers are are not suitable in children's bedrooms, and should be switched off when not in use, especially at night.
- Umwelt Bundesamt News Article - ["Nothing for children's sorts: Thick air in school and home: Federal authorities publish comprehensive advice on children's health"](#)

Austria

Salzberg Public Health Department Advises Against Wi-Fi in Schools

- [Original Letter](#)

Environmental Health Trust <http://ehtrust.org/>

- “The official advice of the Public Health Department of the Salzburg Region is not to use WLAN and DECT in Schools or Kindergartens.” - Gerd Oberfeld, MD.
- The public health department of Salzburg (Landessanitätsdirektion) also recommends to evaluate mobile phone base station exposures based on the [EUROPAEM EMF Guideline 2016](#)
- [Lists Electrosmog studies](#) highlighting the EUROPAEM EMF guideline 2016 as representing the current state of medical science that it is used by the Landessanitätsdirektion Salzburg for the health assessment of EMF.

The Vienna Medical Association issued cell phone safety guidelines

- Guidelines state that cell phones should be used for as short of a time as possible and that children under 16 should not use cell phones at all. They also state that “wireless LAN leads to high microwave exposure”.
- Ten Cell Phone Guidelines:
 1. Make calls as short and little as possible - use a landline or write SMS. Children and teenagers under 16 years old should carry cell phones *only for emergencies!*
 2. Distance is your friend- Keep the phone away from body during connection of Phone. Pay attention to the manufacturer's safer distance recommendation in the manual, keep a distance during the call set-up from the head and body. Take advantage of the built-in speakerphone or a headset!
 3. When using headsets or integrated hands-free, do not position mobile phones directly on the body - special caution applies here for pregnant women. For men, mobile phones are a risk to fertility if Mobile is stowed in Trouser pockets. Persons with electronic implants (pacemakers, insulin pumps et cetera) must pay attention to distance. Unless otherwise possible, use coat pocket, backpack or purse.
 4. Not in vehicles (car, bus, train) calls - without an external antenna, the radiation in the vehicle is higher. In addition, you will be distracted and you bother in public transport the other passengers!
 5. During the car when driving should be an absolute ban on SMS and internetworking - the distraction leads to self-endangerment and endangering other road users!
 6. Make calls at home and at work via the fixed corded (not wireless) network - Internet access via LAN cable (eg via ADSL, VDSL, fiber optic) no Radiation, is fast and secure data transfer. Constant radiation emitters like DECT cordless telephones, WLAN access points, data sticks and LTE Home base stations (Box, Cube etc.) should be avoided!
 7. Go offline more often or use Airplane mode - Remember that for functions such as listening to music, camera, alarm clock, calculator or offline games an internet connection is not always required!
 8. Fewer apps means less radiation - Minimize the number of apps and disable the most unnecessary background services on your smartphone. Disabling "Mobile services" / "data network mode" turns the smartphone again into a cell phone. You can still be reached, but avoid a lot of unnecessary radiation by background traffic!
 9. Avoid Mobile phone calls in places with poor reception (basement, elevator etc) as it increases transmission power. Use in poor reception Area a headset or the speakerphone!
 10. For buyers of mobile phones, Look out for a very low SAR value and an external antenna connection!
- [Press Release - “EMF guideline propagates precautionary principle for electromagnetic fields”](#)
- [Translated Poster with Tips](#)

Austria’s Highest Health Council of the Ministry of Health Advices to Reduce Exposure to Cell Phone

Radiation: Brochure states that since the long term research is still not completed, it is advisable to take simple precautions to reduce exposure.

- [Original Brochure](#)
- [WHO Report on Austria’s EMF activities and research studies](#)

Guideline of the Austrian Medical Association for the diagnosis and treatment of EMF related health problems and illnesses (EMF syndrome)

- [Original Guidelines](#)
- The Austrian Medical Association has developed a guideline for differential diagnosis and treatment of health problems associated with outdoor and indoor electrosmog.

India

2012 - The Ministry of Communications and Information Technology issued new EMF guidelines with new Exposure Limits lowered to 1/10 of the ICNIRP level, and SAR labeling on phones.

- [Official Guidelines](#)
- Precautionary Guidelines for mobile users: 1. Keep distance – Hold the cell phone away from body to the extent possible. 2. Use a headset (wired or Bluetooth) to keep the handset away from your head. 3. Do not press the phone handset against your head. Radio Frequency (RF) energy is inversely proportional to the square of the distance from the source -- being very close increases energy absorption much more. 4. Limit the length of mobile calls. 5. Use text as compared to voice wherever possible. 6. Put the cell phone on speaker mode. 7. If the radio signal is weak, a mobile phone will increase its transmission power. Find a strong signal and avoid movement – Use your phone where reception is good. 8. Metal & water are good conductors of radio waves so avoid using a mobile phone while wearing metal-framed glasses or having wet hair. 9. Let the call connect before putting the handset on your ear or start speaking and listening – A mobile phone first makes the communication at higher power and then reduces power to an adequate level. More power is radiated during call connecting time. 10. If you have a choice, use a landline (wired) phone, not a mobile phone. 11. When your phone is ON, don't carry it in chest/breast or pants pocket. When a mobile phone is ON, it automatically transmits at high power every one or two minutes to check (poll) the network. 12. Reduce mobile phone use by children as a younger person will likely have a longer lifetime exposure to radiation from cell phones. 13. People having active medical implants should preferably keep the cell phone at least 15 cm away from the implant.
- The Ministry of Communications and Information Technology [EMF webpage](#).

2013: Supreme Court of India upheld the High Court of the State of Rajasthan decision to remove all cell towers from the vicinity of schools, hospitals and playgrounds because of radiation “hazardous to life.”

- Two hundred and four mobile towers installed on the school premises of Rajasthan have been removed in compliance.
- [Zilla Parishad orders removal of all cellphone towers](#) near schools citing exposure to “harmful radiation”.
- Economic Times News Article - [“Rajasthan HC orders relocation of mobile towers from schools, hospitals”](#)
- Hindustan Times News Article - [“Brihanmumbai Municipal Corporation \(BMC\) bans mobile towers at parks, playgrounds”](#)

Indian Council of Medical Research Continues research on EMFs:

Environmental Health Trust <http://ehtrust.org/>

[“Short Report on the Indian Studies”](#) - Document prepared by Dr. Sharma, Sr. Deputy Director of the Indian Council of Medical Research on Indian Research Studies.

Department of Telecom, Government of India

- ["Ensuring Safety from Radiations: Mobile Towers and Handsets"](#) - Graphic including precautionary guidelines for mobile phones

2011 Ministry of Environment and Forest Study on the Impact of Communication Towers

- [“Report on Possible Impacts of Communication Towers on Wildlife Including Birds and Bees”](#)
- *“The review of existing literature shows that the Electro Magnetic Radiations (EMRs) are interfering with the biological systems in more ways than one. There had already been some warning bells sounded in the case of bees and birds, which probably heralds the seriousness of this issue and indicates the vulnerability of other species as well.”*

Celebrity Advocates Raising Awareness

- Juhi Chawla - who has won multiple awards for her work: [Global Awards 2016](#), [Indira Gandhi Memorial Awards](#), [Full Speech at Gandhi Awards](#), [2011 Lecture](#), [Do's and don'ts for using cellphone safely by Juhi Chawla](#)

Russia

Russian National Committee on Non-Ionizing Radiation Protection Issued Resolutions to Protect Individuals from Wireless Radiation

- 2011 Original Resolution - [“ELECTROMAGNETIC FIELDS FROM MOBILE PHONES: HEALTH EFFECT ON CHILDREN AND TEENAGERS”](#)
- Official Recommendations: The Russian Federation specifically advises that those under the age of 18 should not use a mobile phone at all, recommends low- emission phones; and requires the following: on-device labelling notifying users that it is a source of RF-EMF, user guide information advising that “it is a source of harmful RF-EMF exposure” and the inclusion of courses in schools regarding mobile phones use and RF-EMF exposure issues. “Thus, for the first time in the human history, children using mobile telecommunications along with the adult population are included into the health risk group due to the RF EMF exposure....In children, the amount of so-called stem cells is larger than in adults and the stem cells were shown to be the most sensitive to RF EMF exposure....It is reasonable to set limits on mobile telecommunications use by children and adolescents, including ban on all types of advertisement of mobile telecommunications for children.”
- 2008 Original Decision - ["Children and Mobile Phones: The Health of the Following Generations is in Danger"](#)
- 2012 - [Video of Russian National Committee](#) Meeting in which they repeatedly warn about electromagnetic radiation impacts on children and recommended WiFi not be used in schools.
- 2010 - [Video](#) of Yuri Grigoriev, President of the Russian National Committee, giving a lecture

European Environment Agency

2013 - EEA Issues [“Late Lessons From Early Warnings: Chapter 12: Mobile phone use and brain tumour risk:](#)

Environmental Health Trust <http://ehtrust.org/>

early warnings, early actions?”

- The chapter concludes that “Precautionary actions now to reduce head exposures, as pointed out by the EEA in 2007, and many others since, would limit the size and seriousness of any brain tumour risk that may exist. Reducing exposures may also help to reduce the other possible harms...”

2011 - Precautions Recommended by David Gee, EEA Senior Advisor on Science, Policy and Emerging Issues

- Original document - [“Health risks from mobile phone radiation – why the experts disagree”](#)
- Gee stated in a press release that “We recommend using the precautionary principle to guide policy decisions in cases like this. This means that although our understanding is incomplete, this should not prevent policymakers from taking preventative action.”

2009 - EEA Issues Recommendations Based on Current Evidence

- [Original Statement](#)
- “The evidence is now strong enough, using the precautionary principle, to justify the following steps: 1. For governments, the mobile phone industry, and the public to take all reasonable measures to reduce exposures to EMF, especially to radio frequencies from mobile phones, and particularly the exposures to children and young adults who seem to be most at risk from head tumours.”

2007 - Professor Jacqueline McGlade, the EEA's executive director issued recommendations

- McGlade stated that “Recent research and reviews on the long-term effects of radiations from mobile telecommunications suggest that it would be prudent for health authorities to recommend actions to reduce exposures, especially to vulnerable groups, such as children.”
- Independent News Article - [“EU watchdog calls for urgent action on Wi-Fi radiation”](#)

Singapore

Singapore’s National Environmental Agency Advises Specific Precautions.

- [Frequently asked Questions About Radiation Protection](#)
- NEA’s advice to the public on cell phone use on their webpage on radiation protection: “While further research is being carried out to study the long-term health effects of RF field, individuals could take precautionary measures to reduce RF exposure to themselves or their children by limiting the length of calls, or using 'hands-free' devices to keep the mobile phones away from the head and body.”

United Kingdom

The UK National Health Service recommends reducing exposure since 2002.

- [2002 Steward Report commissioned by the UK Government - “Phones and Mobile Health - AUK Perspective”](#). The report found that exposure to RF radiation below guidelines has not been “proven” to cause adverse health effects but it is not possible to say “that exposure to RF radiation, even at levels below national guidelines, is totally without potential adverse health effects” as “there is some scientific evidence which suggests that there may be biological effects and gaps in knowledge justify a precautionary approach to the use of mobile phone technologies until much more detailed and scientifically robust information on

any health effects becomes available.”

- [UK Department of Health - 2005 “Mobile Phones and Health” brochure](#) which reads: *“The expert group has therefore recommended that in line with a precautionary approach, the widespread use of mobile phones by children (under the age of 16) should be discouraged for non-essential calls. In the light of this recommendation the UK Chief Medical Officers strongly advise that where children and young people do use mobile phones, they should be encouraged to: • use mobile phones for essential purposes only • keep all calls short - talking for long periods prolongs exposure and should be discouraged The UK CMOs recommend that if parents want to avoid their children being subject to any possible risk that might be identified in the future, the way to do so is to exercise their choice not to let their children use mobile phones.”*
- [NHS 2009 slide presentation - “Radio Waves”](#)
- [2015 Webpage “Risks of mobile phone use”](#) with recommendations that state, *“Children are thought to be at higher risk of health implications from the use of mobile phones. This is because their skulls and cells are still growing and tend to absorb radiation more easily. It is recommended that children use mobile phones only if absolutely necessary.”*
- [National Health Service - 2011 “Mobile Phones and Base Stations”](#) which reads, *“Therefore, as a precaution, the UK Chief Medical Officers advise that children and young people under 16 should be encouraged to use mobile phones for essential purposes only, and to keep calls short. If you are concerned, you can take steps to reduce your exposure such as using hands free kits or texting.”*
- [2011 NHS Brochure - “Mobile phones and base stations: Health advice on using mobile phones”](#), which states: *“The body and nervous system are still developing into the teenage years. Therefore, as a precaution, the UK Chief Medical Officers advise that children and young people under 16 should be encouraged to use mobile phones for essential purposes only, and to keep calls short.”*
- Prior to 2015, the NHS also had additional website sections on health effects, including [“Mobiles and mums-to-be” web page](#), which summarized the research showing cell phones had been linked to behavioral issues in children. NHS also had a [“Mobile effect on sleep” webpage](#) which detailed research which concluded RF “is associated with adverse effects on sleep quality within certain sleep stages”. For the public, the NHS had “recommendations to help lower any potential long-term risks” which included keeping calls short, keeping the phone away from the body on standby mode, only use the phone when the reception is strong and using a phone with an external antenna. These web pages were deleted from the current site.
- In 2011, the National Health Service offered specific recommendations to reduce cell phone radiation exposure to children. Precautions are still recommended, however by 2015 this original advice was no longer present on the site. **The UK National Health service changed the public advice text. Everything noted above was reworded. Now the website states:**
- [2015 Mobile Phone Safety - Risks Webpage](#) - *“If there are any health risks from the use of mobile phones, children might be more vulnerable because their bodies and nervous systems are still developing. Research carried out to date hasn't supported a link between mobile phone use and childhood cancers such as leukaemia. However, if you have any concerns, you can lower your child's exposure to radio waves by only allowing them to use mobile phones for essential purposes and keeping calls short.”*
- The newly edited section called [“Mobile phone safety - FAQs”](#) states: ***“Do scientists know everything about mobile phones and health? No, and research is continuing. Mobile phones have only been widely used for about 20 to 30 years, so it's not possible to be so certain about the safety of long-term use. More research on the effects of mobile phones on children is also needed, as they're known to be more sensitive than adults to many environmental agents, such as lead pollution and sunlight. Government advice is to be on the safe side and limit mobile phone use by children.”***
- [2015 Webpage “Risks of mobile phone use”](#) contains recommendations that state, *“Children are thought to be at higher risk of health implications from the use of mobile phones. This is because their skulls and cells*

are still growing and tend to absorb radiation more easily. It is recommended that children use mobile phones only if absolutely necessary.”

2016 Regulation No. 588 - “Control of Electromagnetic Fields at Work”

- [Original Legislation](#)
- The regulation requires employers to assess the levels of EMFs their employees may be exposed to, ensure compliance, provide information on risks and take action if necessary.
- *“You must ensure you take workers at particular risk, such as expectant mothers and workers with active or passive implanted or body worn medical devices, into account when appropriate, devise and implement an action plan to ensure compliance with the exposure limits.”*
- Safety and Health Practitioner News Article - [“Explained: CEFAW Regulations, which come into force today”](#)

Cyprus

2017 Directive of the Minister of Culture and Education to Ban Wi-Fi from kindergartens, Remove Wi-Fi from Elementary Classrooms and Halt Deployment.

- [Original Translated Directive from the Cyprus Minister of Culture and Education](#)
- Wireless is recommended only to be used if needed in the administrative areas of elementary schools, not by the students. However, if the use of Wi-Fi is required, “necessary measures to protect children should be taken, and wireless access points should remain inactive when not in use for teaching purposes.” Furthermore before installation of any wireless program involving teachers or students “the consent of parents should be ensured in advance” the directive reads stating that the director of the school should send a letter to the parents of children who will participate in programs involving wireless technology informing them for the reason and duration of WiFi usage.
- [Read Press release on Cyprus Wi-Fi removal from elementary classrooms](#)

Cyprus National Committee on Environment and Child Health

- ["Protecting children from radiation emitted by Wi-Fi, mobile phones and wireless" Webpage](#)
- [EMF brochure](#) on reducing the risks to children from exposure to the Non Ionizing Radiation (mobile phones, Wi-Fi, tablets, etc.).
- [The Cyprus National Committee on Environment and Child Health](#) is supported by the Nation of Cyprus and “has as its basic aim the prevention of illnesses, which also are related with the exposure of children in environmental dangers.” The activities of the National Committee are supported by the State of Cyprus.
- The National Committee recommends, “Be Precautionary and reduce exposure to phones, Wi-Fi and other wireless devices,” states the Cyprus National Committee on Environment and Child Health (ECH). Dr. Stella Michaelidou, President of the ECH, states that society should respond by taking precautions because “Documentation of other potential and more serious biological side effects are on the tip of an emerging iceberg.”
- An In-Cyprus news article quoted Michaelidou as saying that “multiple and frequent exposure to this kind of radiation, which falls below the acceptable levels of thermal effects, pose a health risk to a developing embryo.” Children who use their mobile phone more frequently face a higher risk at having a weaker memory, attention deficit disorder, and similar issues.

- In-Cyprus News Article - [“Mobile devices could harm kids”](#)

Public Awareness Video

- **PSA Video on Children’s Health and Wi-Fi:** Original Video in [Greek & English](#)
- **PSA Video on Pregnant Women and Wireless:** Original Video in [Greek & English](#)
- [Youtube channel of the Committee](#)

Scientific Presentations:

- [2015 Powerpoint Slide Presentation by the President of the Commission, Dr. Stella Kanna Michaelides on EMFs \(in Greek\)](#)
- [Dr Michalis Tornaritis on media use \(in Greek\)](#)
- Dr. Michaelidou of the National Committee gives presentation to Ioannina University: [“Neurological and behavioral effects of Non Ionizing Radiation emitted from mobile devices on children: Steps to be taken ASAP for the protection of children and future generation](#)
- **Stella Canna-Michaelidou, PhD**, President of the National Committee on Environment and Children's Health of Cyprus, [Multi-Media Public Health Tools to Promote Public and Health Professional Understanding of Wireless Radiation](#) PDF of January 2017 IIAS Presentation

News Reports from Cyprus

- April 2016 - Dr. Michaelidou, President of the Cyprus National Committee, gives presentation: ["Environment and Health of the Child"](#), presenting on the issue of Electromagnetic radiation and its effects on children's health.
- Sigma TV News Report - [“Children and Wi-fi”](#)
- President of the National Committee "Environment and Child Health" with Professor Loukas Margaritis speaking in a news piece. <https://www.youtube.com/watch?v=WumF2qOUKrU>
- 2015 In-Cyprus News Report: [Mobile devices could harm kids](#)
- 9/2015 News Report Cyprus Mail: [‘Technology harming our children’ MPs say](#)

Argentina

2016 Proposed National Law on Electromagnetic Pollution

- The law proposes a regulatory framework to "radio infrastructure with radiant systems, antennas and all installations capable of generating electromagnetic radiation" in order to "ensure the protection of public health" considering "both thermal effects and biological. " In education and health facilities only wired connections to data networks and Internet access may be used.
- [Electrosensibili News Article](#)

Taiwan

2015 - Government Updated their Protection of Children and Youths Welfare and Rights Act to Ban Cell Phones for Young Children.

- Complete ban on children under the age of two from using electronic devices such as iPads, televisions and smartphones.

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- Parents can be fined NT\$50,000 (about \$1600 US Dollars)
- The new law also states that parents must ensure that under-18s only use electronic products for a 'reasonable' length of time.
- Daily Mail News Article - [“Taiwan makes it ILLEGAL for parents to let children under two use electronic gadgets... and under-18s must limit use to 'reasonable' lengths”](#)
- Teen Safe News Article - [“Fined For NOT Monitoring: Taiwan’s New Parenting Penalty”](#)

Namibia

2011/2012 - Namibia's atomic energy review report states that current so called "safety" standards DO NOT protect citizens from long term health effects.

- [Atomic Energy Annual Review](#)
- “ICNIRP guidelines do not guarantee adequate protection against the long term effects of exposure, such as increased risk of cancer. “ - Republic of Namibia: Atomic Energy Board

Turkey

The Ministry of Health has issued public information brochures that recommend limiting exposure especially for pregnant women and children.

- [Ministry of Health Brochure Mobile Phones and Health Effects:](#)
- The Brochure starts by saying the research on cell phone radiation shows low levels of electromagnetic frequencies “may cause cancer”. 13 Recommendations to Reduce Exposure *which include:* Pregnant women and children (under 16) are more vulnerable and they should use the phone only when necessary, Prefer speaker or headset, Decrease time on phones, Use low SAR phone, Keep phone away from the body, Keep phones out of baby and children’s bedroom, Turn phone off when you sleep or keep it one meter away from bedside, using phones in cars increases your EMF exposure so it is not recommended.

Education on Safer Phone Use Project

- The project is mentioned in the following document: [“Annual Report from Turkey: National Activities on Health Effects of Electromagnetic Fields.”](#)
- Turkey has begun an educational project funded by Ministry of Internal Affairs, accomplished by Temkoder (Prevention, Measurement of Electromagnetic Pollution and Training Organization), which has resulted in secondary school student training in the safer usage of cellular phones.

Development of regulations prohibiting children’s cell phone use. In 2014, the Ministry of Health started working on new regulations to prohibit cellphone usage for children under 14 year-old children.

- [2014 WHO Report - “Annual Report from Turkey: National Activities on Health Effects of Electromagnetic Fields.”](#)
- However by 2016 the regulation was weakened and in 2016 Turkey stated that they are developing regulations that only would pertain to children under 7 years old.
- [2016 WHO EMF Report - “Short Report Related to National Activities on Health Effects of Electromagnetic Fields”](#)

The Ministry of Communications and Maritime Affairs monitors Electromagnetic fields around the schools and homes.

- [Ministry Website](#)

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- The EMF in schools is monitored and the public can get measurements on EMF levels from cell towers and schools at a national site.

Greece

Greek law mandates lower RF exposures near schools, nurseries and hospitals

- The exposure limits in Greece are at 70% of the official European limits. In areas less than 300 m from schools, hospitals and nurseries the exposure limit is lower at 60% of the official European limits. Cell antennae are prohibited from being on top of schools and nurseries.

2012 - The Greek government website materials recommend reducing cell phone radiation to children under 16 and they inform citizens of non-ionizing radiation power levels in their community.

- [The National Observatory of Electromagnetic Fields](#) - Interactive web portal linked to a network of 500 fixed measurement stations throughout Greece that continuously monitor the EMF levels from all kinds of antenna stations in the frequency range 100 kHz – 7 GHz.
- ELF and EMF Site Measurements can be looked up for various locations at [EEAE](#).
- The Greek government funds research as detailed on the [WHO EMF report](#).
- [The Q and A on RF radiation states the following text about children:](#)

“Even though it hasn’t been proven conclusively that children are more sensitive/reactive than adults to exposure to radiation, nevertheless, the direct/pointed recommendation of international organizations is that children be discouraged from [literally translated, learn not to trust] using cell phones. The above statement is supported by the following:

- 1. Up to about the age of 16, the nervous system of the human body is in the process of development. Consequently, it’s totally possible (although not conclusively proven by relevant scientific research) that up until this age, human being are more sensitive to any number of factors/elements/determinants.*
- 2. Younger people have more years ahead of them than older persons during which the long-term effects of mobile phones can be manifested.*
- 3. Environmental factors/elements have a greater general impact on the health of children than on the health of adults.”*

Chile

2012 “Antennae Law” prohibiting cell antennae/towers in “sensitive areas”

- [International Bar Association Legal Practice Division Newsletter: “New communications antennae law in Chile”](#)
- ‘Regulates the installation of antennas used for the emission and transmission of telecommunications services’ This law limits the power of antennas, reduces urban impact of towers through ‘infrastructure sharing’ opens up a process for citizen participation in the approval or denial process, establishes mitigation measures in areas that are saturated with antennas and prohibits towers near “sensitive areas” institutions serving children, the elderly and medically compromised.
- Sensitive areas are those areas that demand special protection due to the presence of educational

- institutions, nurseries, kindergartens, hospitals, clinics, nursing homes or other institutions of similar nature.
- Chile's Minister of Transportation and Telecommunications Pedro Pablo Kuczynski stated, "*...in addition to protecting the urban landscape and the goodwill of the neighborhoods, the new law takes care of the most important: the health of people in a precautionary manner as recommended by the World Health Organization, setting strict limits on the powers of the antennas. Chile is setting standards in this regard.*"
 - [Press release](#)
 - RCRWireless News Article - "[Chilean telecom companies need to comply with new antenna law](#)"

Ireland

Department of the Environment, Community and Local Government Gives Advice to Reduce Exposure

The department has a webpage on Electromagnetic fields which directs people to the advice of the Chief Medical Officer.

- [Advice of the Chief Medical Officer of Ireland.](#)
- "Advice from the Chief Medical Officer on mobile phone use: We may not truly understand the health affects of mobile phones for many years. However, research does show that using mobile phones affects brain activity. There is general consensus that children are more vulnerable to radiation from mobile phones than adults. Therefore the sensible thing to do is to adopt a precautionary approach rather than wait to have the risks confirmed. In the light of these findings, the Chief Medical Officer of the Department of Health and Children strongly advises that children and young people who do use mobile phones, should be encouraged to use mobile phones for "essential purposes only" All calls should be kept short as talking for long periods prolongs exposure to radiofrequency electromagnetic fields. All mobile phone users can reduce their exposure to radiofrequency energy by making fewer calls, reducing the length of calls, sending text messages instead of calling, using cell phones only when landline phones are unavailable, using a wired "hands free" device so that the phone need not be held against the head and refraining from keeping an active phone clipped to the belt or in the pocket".

Irish Doctors Environmental Association Recommends Wired Connections

- [2013 Letter](#)
- The Irish Doctors Environmental Association wrote a statement in 2013 concerning health concerns with Wi-Fi in school: "We urge you to use wired technologies for your own safety and that of your pupils and staff."

Denmark

Denmark Board of Health Provides Recommendations to Reduce Exposure

- [Denmark Board of Health Recommendations on Reducing Cell Phone Radiation](#)
- "As a precautionary measure, the Board of Health recommends a series of simple steps you should follow to reduce exposure from mobile phones:
Use the headset or handsfree with earbud, conversation, or use the speakerphone feature
When possible, use text instead of call
Limit the duration of calls
Did not sleep with the phone close to the head

*Limit conversations during low reception and while in transport.
Do not cover the phone with aluminum foil, special covers, etc.
Compare phones' SAR value. Lower SAR require less exposure*

Denmark Schools that have removed or reduced wireless exposure; Bjedstrup elementary School og Børnehus, (school and kindergarten) Student must hand over cell phones before classes + no wifi in school premises; [Hammer Free Private School](#) - all internet connections are hard wired; Vejlnes private school - no wifi; Kastanjely kindergarten - no wifi

Tanzania

2014 - Director General of Tanzania Atomic Energy Commission (TAEC), Mr Idy Mkilaha publicly endorses precaution.

- "Mr Mkilaha says that when weighing up this convenient tool with the questionable health impact control, caution and measures must be taken to reduce one's exposure from radio frequency (RF) emissions from the cell phone to prevent health hazards."
- "According to TAEC, we should use hands-free devices or wireless headset to increase the distance between the phone and our heads. This is the best approach because it creates distance between us and the radiating phone... We should also keep phone away from us when dialling. Phones use more radiation during connection time, says TAEC."

News Reports

- AllAfrica News Article: "[Tanzania: We Should Manage Our Cell Phones Properly Otherwise...](#)"
- AllAfrica News Article: [Tanzania: Need to Protect Oneself When Using Cell Phone](#)

Tanzania Commission for Science and Technology Newsletter Details how to reduce cell phone exposure

- [Original Newsletter \(pg. 11\)](#)
- After complaints were raised by residents about health effects the Commission co-authored a published paper that reviews national RF level profiles of the radiation emitted from base stations.
- [Review on Measured and Calculated Radio Frequency Radiation Emission From The Base Stations](#)
- The paper states: "*In 2016, [Director General of Tanzania Atomic Energy Commission \(TAEC\), Mr Idy Mkilaha died under investigated circumstances](#) and at this time EHT is unable to find the Reports or official warnings as mentioned in the news reports on the current [Atomic Commission](#) webpage.*"

Romania

Recommendations Of The Consumers Protection Association Of Romania On Cell Phones And Wireless

- [Recommendations to reduce exposure](#)
- The Association for Consumer Protection in Romania launched a national campaign of information and awareness of consumers entitled "SOS electromagnetic pollution."
- "*Do not allow children younger than 12 years how to use a cell phone, except for emergencies. Developing bodies are more susceptible to negative influences from exposure to electromagnetic fields*".

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United States

Legislation has been introduced at the state and national level. Some Communities have issued proclamations, resolutions and started initiatives to inform the public of wireless health issues.

May 12, 2015 Berkeley Adopted the Cell Phone "Right to Know" Ordinance on a Unanimous Vote. Berkeley is the first city in the nation to require cell phone retailers to provide those who purchase a new phone an informational fact sheet which informs buyers to read the user manual to learn the cell phone's minimum separation distance from the body. The text states:

"The City of Berkeley requires that you be provided the following notice: 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."

- ["Right to Know" Ordinance](#) Dr. Moskowitz blog on the Ordinance
- [Berkeley's Right To Know Ordinance](#): Environmental Health Trust's Page on the Ordinance
- [Video of the historic vote](#) featuring Harvard Law professor Lawrence Lessig.
- [Video of testimony to Berkeley](#) from November 8, 2011 on the need for cell phone guidelines.
- [Video of the September 2016 Federal Appeals Court Hearing oral arguments CTIA vs. Berkeley as the CTIA tries to strike down the Ordinance](#). -- This the hearing considering whether to overturn the district court's decision that denied the CTIA's request for an injunction to block Berkeley's cellphone ordinance.
- [March 2017 video of CBC's coverage of the Berkeley Ordinance](#) with an investigation finding cell phones tested against the body violate current safety standards.

2014 - Wireless Router Labeling in all Suffolk, NY Public buildings: Legislation requires all county buildings to post notices that wireless routers are in use such as, "Notice: Wireless technology in use." The resolution, sponsored by Legis. William Spencer (a physician), warns that every wireless device emits radio frequency radiation or microwave radiation. It notes that studies "that have looked at the effects of low-level RFR radiation on human cells and DNA have been inconclusive."

- ["Press Release: Suffolk County Passes Legislation to Warn Visitors of Wireless Radiation Exposure"](#)
- Newsday News Article - ["Wireless routers to get warning signs at Suffolk county buildings"](#)

2011 - A Passed Ordinance by the City of San Francisco required cell phone retailers to distribute an educational sheet: Educational sheet created by the San Francisco Department of Environment that explains radiofrequency emissions from cell phones and details how consumers can minimize their exposure. However implementation was blocked after a [three year court battle](#). The CTIA sued the city and settled with the City to block implementation of the Ordinance in exchange for a waiver of attorney's fees.

- Although implementation was halted, the [City Cell Phone Radiation Webpage](#) remains online.
- [Open Letter to San Francisco Mayor and Board of Supervisors](#)
- Press Release: ["San Francisco's Cell Phone Fact Sheet is Factual"](#)
- [Video from testimony to the City of San Francisco](#)
- [Video of San Francisco Supervisor discussing the Ordinance here](#).
- [Press conference with survivors speaking on cellphone health risks](#) at the San Francisco Commonwealth

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- Club. Cellphone cancer victims tell their personal stories and those of their lost loved ones.
- San Francisco developed the following public health information resources:
 - City Webpage - [“Cellphones”](#)
 - Answers on [How to reduce exposures](#) to cell phone radiation.
 - A [Poster](#) on Cell Phones and RF Radiation
 - A [Factsheet](#) for the Public
 - [Display stickers](#) for Cell Phone packaging.

PUBLIC SCHOOLS

2017 - Maryland State Children’s Environmental Health And Protection Advisory Council

Recommendations For Wired Internet In Schools and Minimizing RF Classrooms:

- [The Maryland State Children’s Environmental Health and Protection Advisory Council](#) (CEHPAC) issued a Report advising the Department of Education to recommend local school districts reduce classroom wireless radiation exposures by providing wired—rather than wireless—internet connections.
- The Children's Environmental Health and Protection Advisory Council recommendations:
- “The Maryland State Department of Education should recommend that local school systems consider using wired devices“ “WiFi can be turned off” and instead “a wired local area network (LAN) can provide a reliable and secure form of networking...without any microwave electromagnetic field exposure.”
- “New school construction and renovations to include wired cabled connections: “If a new classroom is to be built, or electrical work is to be carried out in an existing classroom, network cables can be added at the same time, providing wired (not wireless) network access with minimal extra cost and time.”
- “The Maryland State Department of Education should recommend that local school systems use strategies to minimize exposures: “Have children place devices on desks to serve as barrier between the device and children’s bodies; Locate laptops in the classroom in a way that keeps pupil heads as far away from the laptop screens (where the antennas are) as practicable; Consider using screens designed to reduce eyestrain; Consider using a switch to shut down the router when it is not in use.”
- “The Maryland Department of Health and Mental Hygiene should provide suggestions to the public on ways to reduce exposure: Sit away from WiFi routers, especially when people are using it to access the internet. Turn off the wireless on your laptop when you are not using it. Turn off WiFi on smartphones and tablets when not surfing the web. Switch tablets to airplane mode to play games or watch videos stored on the device.”
- “The General Assembly should consider funding education and research on electromagnetic radiation and health as schools add WiFi to classrooms.”
- The Maryland Department of Health and Mental Hygiene should “ask the United States Department of Health and Human Services to formally petition the FCC to revisit the exposure limit to ensure it is protective of children’s health and that it relies on current science.”
- “The Report should be shared with the United States Department of Health and Human Services, Federal Communications Commission, Maryland State Department of Education and Maryland General Assembly.”
- CEHPAC’s health experts include Governor appointed pediatricians, Maryland State House/Senate appointees and representatives of the Department of Education and Department of Health.
- [Wifi Radiation in Schools in Maryland Final Report](#)
- [Letters from Physicians CEHPAC’s Public Comments](#)
- [Testimony to the Maryland State Children’s Environmental Health and Protection Advisory](#)
- [Baltimore Sun article by Devra Davis on the Report Recommendations](#)
- [Baltimore Sun response by Dr. Cindy Russell](#)

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2017 - Montgomery County Maryland Chromebook Policy states that laptops should stay on tables and not on laps.

- [Montgomery County Maryland ChromeBook Guidelines for students.](#)

2016 - Petaluma Public Schools, California USA: Public school district adopts “Digital Device Practices”

- [Digital Device Best Practices PDF](#)
- Parents raised the issue of wireless health risks with the district for years and this new policy was put in place in 2016. However- as this policy still does not protect the students health, parents continue to advocate for a safe school environment and signed a petition which can be found at <http://responsibleipad.com/petition.html>
- The Petaluma 2016 iPad Best Practices state: “Keep it on the Desk: The best place for your iPad to sit during use is on a desk, table or other flat surface.”
- [Videos of Parent Testimony to District](#)
- [Child Testimony](#)
- [Doctors Letters to District](#)

2016 - Onteora School District in New York State Adopts “Best Practices with Wi-Fi

- [April 20, 2016 Meeting Minutes Page 2.](#)
- “Turn off the device when not in use and at the end of each day. If device is to stay on, turn Wi-Fi off when not in use. Always place device on a solid surface. Viewing distance should be a minimum of 12 inches from the screen. Staff was asked by the Principals to post this in areas that contain computers and devices. They are reminding staff to follow it.”

2015 - Ashland Public Schools, Massachusetts Institutes “Best Practices”

- Ashland was the first US school District to institute "Best Practices" to turn the Wi-Fi off when not in use and keep devices away from the body
- [Download powerpoint slides](#) used for teacher/staff training.
- [Video of parent who initiated this](#), [Video of school board member](#) discussing the process.
- [Magazine article on Ashland’s Decision Here](#), [Newspaper Coverage](#)
- [TV Program of parent advocate CeCe Doucette and Keith Marciniak discussing the policy changes.](#)

Los Angeles, California Public Schools Recommends Cautionary Exposure Levels

- [RADIOFREQUENCY \(RF\) EVALUATION REPORT Use of Wireless Devices in Educational Settings](#)
- The LA School District Uses a RF-EMF Exposure Threshold 10,000 Less Than the FCC Limits:
- [2009 adopted resolution](#) - LA School board wrote a resolution banning cell towers from schools and recommending against WiFi.
- [2009 Resolution Condemning Cell towers NEAR Schools as was this T-Mobile Cell Tower across the street from an elementary school.](#)
[Motion by Supervisors Zev Yaroslavsky and Michael Antonovich](#)
- [2000 LA School Board Resolution Opposing Cell Tower Placement on Schools](#) -- Calls for precautions with wireless. 'Whereas, Recent studies suggest there is evidence that radio-frequency radiation may produce “health effects” at “very low field” intensities'

Note: **Digital Device “Best Practices”** that still allow Wi-Fi access points in classrooms *still allow* microwave exposures to the children and such practices are not adequately protective to children. These District actions seem to be *acknowledgment that wireless device expose the body to radiation*. However, such “Best Practices” still allow access points to be powered on and thus are always exposing the students and staff to continuous microwave radiation regardless of the devices being in use or not. In addition, devices are also continuously transmitting during student use of the internet and no procedure is in place to ensure that Best Practices are followed so that the transmissions are turned off when the internet is not needed. Therefore these “Best Practices” *do not* mitigate the risk nor protect students from School District created wireless exposures.

HEALTH ADVICE TO THE PUBLIC

2017 - California Department of Public Health releases Cell Phone and Health Document.

- [California Department of Health Cell Phone and Health Document](#)
- The California document recommends people keep the phone away from the brain and body especially for children stating, “EMFs can pass deeper into a child’s brain than an adult’s. Also, the brain is still developing through the teen years, which may make children and teens more sensitive to EMF exposures.”
- [SUPERIOR COURT OF CALIFORNIA COUNTY OF SACRAMENTO RULING on Petition](#)
- [Dr. Moskowitz webpage detailing the release and court case.](#)
- San Francisco Chronicle News Article - [Long-overdue release of information about cell phone risks](#)
- San Francisco Examiner News Article - [“California Health Officials release report on cell phone radiation”](#)
- NBC Bay Area News Article - [“Cell Phone Cancer Debate Heats up With Document Release”](#)

2016 - American Academy of Pediatrics Issues Recommendations to Reduce Exposure

- [Healthy Children Webpage on Cell Phones](#)
- The webpage reiterated children’s unique vulnerability to cell phone radiation stating, “*Another problem is that the cell phone radiation test used by the FCC is based on the devices' possible effect on large adults—not children. Children's skulls are thinner and can absorb more radiation.*”
- The AAP issued the following cell phone safety tips specifically to reduce exposure to wireless radiation:
- Use text messaging when possible, and use cell phones in speaker mode or with the use of hands-free kits.
- When talking on the cell phone, try holding it an inch or more away from your head.
- Make only short or essential calls on cell phones.
- Avoid carrying your phone against the body like in a pocket, sock, or bra. Cell phone manufacturers can't guarantee that the amount of radiation you're absorbing will be at a safe level.
- Do not talk on the phone or text while driving. This increases the risk of automobile crashes.
- Exercise caution when using a phone or texting while walking or performing other activities. “Distracted walking” injuries are also on the rise.
- If you plan to watch a movie on your device, download it first, then switch to airplane mode while you watch in order to avoid unnecessary radiation exposure.
- Keep an eye on your signal strength (i.e. how many bars you have). The weaker your cell signal, the harder your phone has to work and the more radiation it gives off. It's better to wait until you have a stronger signal before using your device.
- Avoid making calls in cars, elevators, trains, and buses. The cell phone works harder to get a signal through metal, so the power level increases.
- Remember that cell phones are not toys or teething items.
- [Press Release: The AAP responds to study showing link between cell phone radiation, tumors in rats May 27, 2016](#)

2015 - AAP Healthy Child Web Page on Electromagnetic Fields: A Hazard to Your Health?

- This webpage states: “Cell Phones: In recent years, concern has increased about exposure to radio frequency electromagnetic radiation emitted from cell phones and phone station antennae. An Egyptian study confirmed concerns that living nearby mobile phone base stations increased the risk for developing: *Headaches, Memory problems, Dizziness, Depression, Sleep problems.*”
- “Short-term exposure to these fields in experimental studies have not always shown negative effects, but this does not rule out cumulative damage from these fields, so larger studies over longer periods are needed to help understand who is at risk. In large studies, an association has been observed between symptoms and exposure to these fields in the everyday environment.”

2013 AAP Letter to FCC

- [2013 Letter to Commissioner Mignon Clyburn and FDA Commissioner Margaret Hamburg calling for a review of RF guidelines](#)

2012 AAP Letter to US Representative Dennis Kucinich in Support of the Cell Phone Right to Know Act

- [Original Letter](#)
- [Time Magazine News Article - “Pediatricians Say Cell Phone Radiation Standards Need Another Look”](#)

2012 - AAP published Pediatric Environmental Health, Textbook of Children's Environmental Health

- [Chapter 41: Electromagnetic Fields](#)
- [Oxford Medicine Chapter 41](#)

2001 AAP News Article - [More study needed on risk of brain tumors from cell phone use](#)**2014 - The California Medical Association Passed a Wireless Resolution**

- [Full CMA Resolution](#)
- “Whereas scientists are increasingly identifying EMF from wireless devices as a new form of environmental pollution ... Whereas peer reviewed research has demonstrated adverse biological effects of wireless EMF including single and double stranded DNA breaks, creation of reactive oxygen species, immune dysfunction, cognitive processing effects, stress protein synthesis in the brain, altered brain development, sleep and memory disturbances, ADHD, abnormal behavior, sperm dysfunction, and brain tumors; and...Resolved, That CMA support efforts to implement new safety exposure limits for wireless devices to levels that do not cause human or environmental harm based on scientific research.”
- [Santa Clara Medical Bulletin article that explains the CMA resolution and gives recommendations for schools.](#)

2014 - The Connecticut Department of Public Health issued specific recommendations to reduce exposure to cellphone radiation.

- [Connecticut Department of Public Health Cell Phone Q and A about Cell phones](#)
- It is notable that the Department has provided information more in depth than the CDC, EPA and FDA in detailing 7 steps on *how* people can reduce exposure. Furthermore, the Department states “*It is wise to reduce your exposure to radiofrequency energy from cell phones whenever possible.*”

2014 - Greenbelt, Maryland City Council voted unanimously for the following policy actions:

- [Original letter to the FCC](#)
- Alert citizens about the fine print warnings and possible health risks of cell phones and wireless devices By sharing the Environmental Health Trusts 10 Steps to Safe Tech and Doctors Advice on Cell Phones

Environmental Health Trust <http://ehtrust.org/>

Brochure in City health fairs and city centers.

- Send the FCC Chairman a letter urging the adoption of “radiation standards that will protect human health and safety.”
- Oppose cell towers on school grounds and write a letter to the local school board and County Executive.
- Press Release - [“Maryland City Votes Unanimously to Alert Citizens to the Health Risks of Cell Phone/Wireless Radiation and to Oppose Cell Towers on School Grounds”](#)

2011 - San Francisco, California; Cell Phone Radiation (How to Reduce Exposures) Webpages launched

- Webpage - [“Cellphones”](#)
- San Francisco developed the following public health information resources:
- Answers on [How to reduce exposures](#) to cell phone radiation.
- A [Poster](#) on Cell Phones and RF Radiation
- A [Factsheet](#) for the Public
- [Display stickers](#) for Cell Phone packaging.

2012 - Jackson Hole, Wyoming issued a Proclamation of Cell Phone Awareness

- [Original Proclamation](#)
- The proclamation cites concern over long term health effects as well as the increased risk that the radiation poses to children.

2012 - Pembroke Pines, Florida passed Resolution

- [Resolution 3362](#)
- Resolution expresses the City's "Urgent Concerns" about Wireless Radiation and Health and which encourages citizens to read their manuals and presents information on how to reduce exposure by using a headset or speakerphone. Jimmy Gonzalez, an attorney who had developed brain cancer after heavy cell use, initially petitioned the Commission.
- [Video of Jimmy Gonzalez's powerful testimony](#)

2010- California: Burlingame California City Council voted to include cell phone safety [guidelines](#) in their Healthy Living in Burlingame initiative which gives recommendations on how to reduce exposure and states:

“The Federal Communications Commission (FCC) mandates that all cell phone manuals caution users to hold the phone a short distance (.6 inch to 1 inch) from the body. (See your manual's fine print.)

While scientists continue to research and debate this matter, here are some simple things you can do to minimize your exposure to cell phone emissions” Red the [Original Guidelines](#)

2010 - Maine, Portland Mayor Mavodenes, Jr. declared October “Cell Phone Awareness Month”

2009 - Governor of Colorado issued a Proclamation on Electrical Hypersensitivity.

- [Original Proclamation](#)
- *"Electromagnetic Sensitivity is a painful chronic illness of hypersensitive reactions to electromagnetic radiations.*
- *WHEREAS, the symptoms of EMS include, dermal changes, acute numbness and tingling, dermatitis, flashing, headaches, arrhythmia, muscular weakness, tinnitus, malaise, gastric problems, nausea, visual disturbances, severe neurological, respiratory, speech problems, and numerous other physiological symptoms.*

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- *WHEREAS, Electromagnetic Sensitivity is recognized by the Americans with Disabilities Act, the US Access Board and numerous commissions;"*

2009 - Governor of Connecticut issued a Proclamation on Electrical Hypersensitivity.

- [Original Proclamation](#)
- *"WHEREAS, the health of the general population is at risk from electromagnetic exposures that can lead to illness indicted by electromagnetic radiations; and, WHEREAS, this illness may be preventable through the reduction or avoidance of electromagnetic radiations, in both outdoor and indoor environments and by conducting further scientific research..."*

2009 - Broward County, Florida; The Mayor issued a Proclamation on Electrical Hypersensitivity.

- [Original Proclamation](#)
- *"WHEREAS, as a result of global electromagnetic pollution, people of all ages in Broward County and throughout the world have developed an illness known as Electromagnetic Sensitivity..."*

US Proposed Legislation

2012 [The Cell Phone Right to Know Act H.R. 6358](#)

- The Act was introduced receiving strong support from many organizations including the American Academy of Pediatrics. This legislation called for labels on mobile devices at point of sale, a comprehensive national research program to study whether exposure to wireless devices causes adverse biological effects directed by NIEHS and the EPA and exposure level regulation.
- Congressional hearings in 2009 provided expert testimony to Congress.
- [CSPAN VIDEO.](#)
- **Library of Congress Summary:** Written by the Congressional Research Service
- Cell Phone Right to Know Act - Requires the Director of the National Institute of Environmental Health Sciences and the Administrator of the Environmental Protection Agency (EPA) to:
 1. conduct or support a comprehensive research program to determine whether exposure to electromagnetic fields from mobile communication devices causes adverse biological effects in humans, including vulnerable subpopulations such as children, pregnant women, those with compromised immune systems and hypersensitivity reactions, men and women of reproductive age, and the elderly;
 2. disseminate research results to the general public; and
 3. report findings and conclusions to Congress.

Directives:

- Directs the Federal Communications Commission (FCC) to promulgate regulations to allow a subscriber to access personally or to give consent to allow researchers with institutional review board approval to access specific usage data required to investigate the link between electromagnetic radiation exposure and potential adverse biological effects in humans.
- Directs the EPA to promulgate regulations establishing maximum exposure level goals and maximum exposure levels for exposure to electromagnetic fields generated by mobile communication devices.
- Directs the Commissioner of Food and Drugs (FDA) to promulgate regulations to provide for labeling (including exposure ratings and the maximum allowable exposure levels and goals) on mobile communication devices, packaging, instruction manuals, and at points of sale in stores and on websites.
- Requires the Secretary of Health and Human Services (HHS) to increase: (1) the number and size of grants to institutions for training scientists in the field of examining the relationship between electromagnetic

fields and human health; and (2) the number of career development awards for such training for health professionals pursuing careers in pediatric basic and clinical research, including pediatric pharmacological research.

- Amends the Public Health Service Act to establish a graduate educational loan repayment program and authorize national awards for researchers in such fields.
- Amends the Communications Act of 1934 with respect to the prohibition on state or local government zoning regulation of personal wireless service facilities on the basis of the environmental effects of radiofrequency emissions.
- Excludes from such prohibition state or local regulation based on the adverse human health effects of emissions of radiofrequency electromagnetic fields.

Oregon

- 2017 Legislation about to be introduced.
- [2015 Oregon HB 3350](#): This proposed legislation directs the Department of Education to prepare statement that discloses potential health risks of wireless technology and requires public and private schools to distribute statement to employees and parents of students. It declares an emergency effective July 1, 2015.
- [2015 Oregon HB 3351](#): This proposed legislation states that cell phones must have a visible written label that advises consumers of possible risks and steps that consumers can take to reduce the risk of radiofrequency radiation exposure from cellular telephone use. Read it here.

Massachusetts

- 2017: Three Massachusetts Senators and one Representative introduced bills to examine wireless radiation and protect the public. [Click here for details.](#)
 - [S.1268](#) Resolve creating a special commission to examine the health impacts of electromagnetic fields (Senator Karen E. Spilka).
 - [S.1864](#) An Act relative to utilities, smart meters, and ratepayers' rights (gives people the no-fee choice of keeping their non-radiation-emitting water, gas and electrical meters instead of "smart" utility meters; Senator Michael O. Moore).
 - [S.107](#) An Act relative to disclosure of radiofrequency notifications (requires warning labels on radiation-emitting products; Senator Julian Cyr).
 - [S.108](#) An Act relative to the safe use of hand-held devices by children (requires specific language on packaging as modeled by an [ordinance](#) unanimously passed in Berkeley, California; Senator Julian Cyr).
 - [H.2030](#) An Act relative to best management practices for wireless in schools and public institutions of higher education (asks the Massachusetts Department of Elementary and Secondary Education to set wi-fi standards for all schools; Representative Carolyn Dykema).
- 2016 Proposed Bill MA [1222 An Act creating a special commission to study the health impacts of electromagnetic fields](#)
- 2015 [Bill H2007](#): An Act relative to a special commission to study electric and magnetic fields. *Bills Still in Process as of August, 2015.* [Watch a view of the statehouse briefing on RF here.](#)

2015 - Nassau County Proposed a Wireless Router Labeling Act

- The act would place visible warning signs in all county buildings and facilities where a wireless router is located.
- [Media coverage of the initiative](#)

2014 - [The Maine LD 1013 "The Wireless Information Act"](#)

- The act passed the State Senate and House but then failed to pass the second vote. The Bill requires manufacturer's information on radio-frequency exposure be visible on the outside of the cell phone's product packaging.
- [Please a video of State Representative Andrea Boland on how the legislation was thwarted.](#)
- News Article - [Cell Phone Radiation Label Bill Passes Maine Legislature Before Dying](#)
- [Maine's 2015 "Cellular Telephone Labeling Act"](#)

2011 - [San Francisco Cell Phone Right to Know Ordinance](#)

- Ordinance requires cell phone retailers to distribute an educational sheet created by the San Francisco Department of Environment that explains radiofrequency emissions from cell phones and how consumers can minimize their exposure. The CTIA sued the city and settled with the City to block implementation of the Ordinance in exchange for a waiver of attorney's fees.
- The City [Cell Phone Radiation Webpage](#).

2014 - [Hawaii Senate Bill SB 2571](#)

- Senate bill was introduced calling for a warning label encouraging consumers to follow the enclosed product safety guidelines to reduce exposure to radiation that may be hazardous to their health.

[2011 - California Legislation SB 932](#)

- This 2011 legislation would have required retailers to include notices on product packaging that cell phones emit radio frequency (RF) energy. A second notice would be posted at the point of sale when purchasing online or in a physical store.

[2011 - New Mexico Proposed Law HM 32](#)

- This 2011 proposed law request the Department of Health and the Department of Environment to study and review all available literature and reports on the effects of cell phone radiation on human health.

[2011 - Pennsylvania Proposed Law HB 1408](#)

- This 2011 proposed law would require warning labels on cell phones "to inform all citizens about possible health dangers that have been linked to microwave radiation that is emitted by cellular telephones and the steps that can be taken to mitigate those dangers, especially as they relate to children and pregnant women."
- Dr. Ronald B. Herberman, former director of the University of Pittsburgh Cancer Institute (UPCI) and the UPMC Cancer Center offered testimony at a PA House Democratic Policy Committee hearing.
- [CBS Local coverage of hearing](#)
- [Philadelphia Tribune News coverage](#)

[2011- Oregon Proposed Law SB 679 Oregon](#)

- This 2011 proposed law would require warning labels for all new cell phones and cell phone packaging.
- [News video about the law](#)

[1999 - Proposed Law H.R. 2835](#)

- In 1999 Congressman Bernie Sanders sponsored H.R. 2835 (106th): To require an assessment of research on effects of radio frequency emissions on human health.

Schools Worldwide Removing the WiFi and Reducing Exposure

2017: San Diego California USA Waldorf School: Adopted CHPS guidelines wired internet/electronic free zones/and hardwired phones per article published in Renewal Magazine.

2017: Sacramento California USA Waldorf School: WiFi will be turned off when not in use starting in Fall 2017.

2017: Wi-fi OFF Switches Installed in the Fiskars primary school. [Read press release.](#)

2017: Cyprus Bans Wi-Fi from kindergartens, removes Wi-Fi from elementary classrooms and halts deployment. [Original Translated Directive from the Cyprus Minister of Culture and Education](#); [Read Press release on Cyprus Wi-Fi removal from elementary classrooms](#)

2016: Haifa, Israel: Haifa Mayor Yona Yahav (of Israel's 3rd largest city) ordered all schools to have wireless removed and replaced with wired connections. [Watch Haifa School IT Chief describe how they removed/reduced wireless.](#)

- [Read Krayot news article:](#) Haifa Cuts off Wi-Fi in Schools
- [Hamodia article:](#) Haifa to Shut School Wireless Networks
- [Reshet TV Report](#)
- [News Report Israel CH2 Documentary - "How do we kill our self - Radiation" with unofficial English translation](#)
- [News Report "Parents Fight Wireless Radiation in Schools" on Supreme Court Case in Israel](#)

2016 Lowell School, Washington DC

- In the kindergarten wing in 2016, the Wi-Fi hotspots were removed and the teachers are given ethernet and adapters so that computers and class technology can be ethernet connected (corded) to reduce RF-EMF exposure.

2016 Italy: Turin Mayor Chiara Appendino laid out plans "to cut back on Wi-Fi in state schools and government buildings over concerns that radiation might damage people's health".

- News Report [Turin could slash Wi-Fi over 'radiation' concerns](#)

2016: Onteora School District in New York State USA

- [April 20, 2016 Meeting Minutes Page 2.](#)
- District adopts "Best Practices with Wi-Fi stating:
- "Turn off the device when not in use and at the end of each day. If device is to stay on, turn Wi-Fi off when not in use. Always place device on a solid surface. Viewing distance should be a minimum of 12 inches from the screen. Staff was asked by the Principals to post this in areas that contain computers and devices. They are reminding staff to follow it."

2016 Italy: [Mayor of Borgofranco d'Ivrea \(Italy\) orders Wi-Fi to be turned off in schools.](#)

- "Mayor Livio Tola told the town's high school and elementary school to return to using cables to connect to the internet after reading that the electromagnetic waves given off by wireless routers were especially harmful to young children."
- The Local Newspaper article - ["Italian town shuts down wifi over health fears"](#)
- Torino News Article - ["Ivrea, The Mayor Removes WiFi as it Could Be Dangerous"](#).

2016: [Rotokawa School New Zealand, implemented steps to minimize RF Exposure](#)

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- Children use ipads in flight mode on desk and parents may request that their child use an Ethernet cord. Children are taught about the health precautions as part of their cyber citizenship.

Denmark Schools that have removed or reduced wireless exposure

Bjedstrup elementary School og Børnehus, (school and kindergarten) Student must hand over cell phones before classes + no wifi in school premises

[Hammer Free Private School](#) - all internet connections are hard wired

Vejlernes private school - no wifi

Kastanjely kindergarten - no wifi

2016: [Istituto Comprensivo Alighieri- Diaz in Lecce Italy Banned Wifi](#)

- [Official resolutions number 1](#) and [Resolution 2](#)
- Their two resolutions decided: a) to ban wifi in school and install a wired system for the use of internet and b) Reject the request of the local government (Municipality) to install an antenna on the school roof for the wireless signal providing for the "Wireless city" program. The resolution also asks the Municipality to install the antenna at a reasonable distance from school.

2016: The Piemonte Region has adopted a resolution to limit EMF exposure

- [Original Resolution](#)
- Resolution limits the use of wifi in schools and is considerate to the problem of EHS people.

2015: Ashland Public Schools, Mass (USA)

Ashland is the first school district to vote to enact "Best Practices" in classrooms and publicly post these instructions which include turning off Wi-Fi when not in use and keeping devices in a table, not a lap

News article on these ["Best Practices" to turn the WiFi off when not in use.](#)

- [Download teacher training PPT slides](#). [Video of parent who initiated this](#)
- [Video of school board member](#) discussing the process
- [Magazine article on Ashland's Decision](#)

2016: [Shearwater The Mullumbimby Steiner School](#), Australia, 100% Wi-Fi Free School

2016: [Yallingup Steiner School](#) Australia, WiFi Free Classrooms

2016: Linuwel School, Australia, WiFi in some classrooms, Can accommodate children with EHS.

2016: Cairns Hinterland Steiner School, Australia, WiFi Free Classrooms (may be available in other areas)

2016: Wild Cherry School, Australia, 100% Wi-Fi Free

2015: St. Cajetan School, Belgium: Wired Internet installed and wireless removed.

2015: Washington Waldorf School, Maryland, USA: Removed Wi-Fi Routers from Buildings, Ethernet installed.

2015: Freshwater Creek School, Australia, 100% Wi-Fi Free

2015: Lorien Novalis School, Australia, 100% Wi-Fi Free School Preschool to 12th grade.

2015: Cairns Hinterland School, Australia, WiFi Free Classrooms for EHS

2014: Acorn Hill School, Maryland: Reducing exposure to Wi-Fi. In process.

2014: Friends Community School: Wi-Fi turned off in wing for lower elementary school students. WiFi routers moved OUT of classrooms into hallways for older grades to reduce EMF exposure. Ethernet wires made available in classrooms for families who want children on corded (not wireless) computers.

2014: [DearCroft Montessori](#): Hardwired internet to younger grades, limited Wi-Fi Router exposure to older grades.

2014: [Portland Waldorf School](#), Portland Oregon, USA, WiFi removed.

2014: [Meeting House Montessori](#), Braintree Massachusetts, USA, WiFi replaced with ethernet.

2014: Ghent, Belgium, [Wi-fi banned from pre-schools and day care.](#)

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2014: [UPPER Sturt Primary School](#), Australia. [Read article.](#) [Read “No WIFI” LOW EMF School Policy.](#)

2014: The [St. Augustine School](#) in Italy turned off Wifi and goes back to Wires.

2013 [Winlaw Elementary School](#), B.C. Canada turned off WiFi.

2013 [Te Horo Primary School](#) New Zealand Replaced WIFI with cable-based internet.

2013 [Kootenay Lakes District](#) School Board BC (One school without Wi-Fi)

2013 [Blaise-Cendrars High School](#), Switzerland. Teachers vote to remove WiFi.

2012 [Kivioja primary school](#) in Ylivieska Finland bans phones and minimizes Wireless.

2012: [Halton Waldorf](#), in Burlington Vermont: Remaining free of Wireless Radiation

2011 [City of Lakes Waldorf School](#), WiFi taken out. Minneapolis, Minnesota USA

2011 Aurora School in Ontario removed Wifi and replaced with hardwired.

2011 [North Cariboo Christian School](#) in Quesnel, B.C., removed Wi-fi .

2011 [Pretty River Academy](#) in Ontario no WiFi.

2011 Wayside Academy, Peterborough, Ontario no Wi Fi.

2010 Surrey, [BC Roots and Wings Montessori](#) removed Wi-Fi.

2010 Ontario St. Vincent Euphrasia elementary school: Parents voted to turn off Wi-Fi.

2009 HEROUVILLE-SAINT-CLAIR wi-fi networks removed.

Cell Phone Bans in Schools

This list covers bans of cell phones that occurred after the schools found cell phones in classrooms to be distracting and problematic. It is not necessarily because of the radiofrequency and health issues. This is not a complete list but rather a list as stories make the news starting in 2017. Hyperlinks goto news source

[Victoria Middle School: Canada](#)

Teacher Unions and Parent Teacher Organizations

2016: New Jersey Education Association (NJEA) published the article [“Minimize health risks from electronic devices”](#) in the September 2016 NJEA Review. Adrienne Markowitz and Eileen Senn detail how to reduce physical health risks from devices including risks from radiation exposure:

- *“Keep devices away from the body and bedroom.*
- *Carry phones in briefcases, etc., not on the body.*
- *Put devices on desks, not laps.*
- *Hard wire all devices that connect to the internet.*
- *Hard wire all fixed devices such as printers, projectors and boards.*
- *Use hard-wired phones instead of cell or cordless phones.*
- *Text rather than call.*
- *Keep conversations short or talk in person.*
- *Put devices in airplane mode, which suspends EMF transmission by the device, thereby disabling Bluetooth, GPS, phone calls, and WiFi.*
- *Use speaker phone or ear buds instead of holding the phone next your head.*
- *Take off Bluetooth devices when not using them.”*
- Read the online NJEA article [“Minimize health risks from electronic devices”](#)
- [PDF of NJEA article Recommendations](#)

2016: Phoenicia Elementary School Onteora School District, New York State

The PTA wrote a letter to the Onteora School District calling for the Wi-Fi to be turned off as a precautionary action

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- [Watch a video of the School Board Meetings where letter is read here](#)
- [Watch videos of parents and students calling for Wi-Fi removal here.](#)
- Read News Report: [Some Onteora parents fear Wi-Fi signals in schools are harming their children.](#)

2016: Ontario Secondary School Teachers Federation

The Federation has issued a new call for a moratorium on WIFI and in the Limestone School District and they have taken the issue to the school trustees in that District. “The Teacher Union’s president says there is a growing mountain of evidence that WIFI can pose health risks.” Andrea Loken/OSSTF District President stated in a 3/2016 news interview that, “There are thousands of published peer reviewed papers that are indicating adverse health effects from WIFI and we are seeing an increased awareness around this issue worldwide.”

- Watch [the video of the news piece with Union members here.](#)
- [Read the National Post article here](#)
- [Radio Canada International article here.](#)

2016: Elementary Teachers Federation of Ontario

A 3/2016 News Report states that they are calling for a “WIFI moratorium until further health studies are done, and lawmakers can catch up with new regulations.”

- Watch [the video of the news piece with Union members here](#)
- [Read the National Post article here](#)
- [Radio Canada International article here.](#)

2014 United Federation of Teachers (Teachers, nurses and professionals working in New York City).

In 2014 their [Wireless Radiation Webpage](#) stated “Wireless radiation is emitted by the myriad of wireless devices we encounter every day. It was once thought to be relatively harmless. However, we now know that wireless radiation can cause non-thermal biological effects as well, including damage to cells and DNA, even at low levels.

Curiously in March of 2016, this statement was removed and replaced with [new text mimicking FCC verbiage.](#) However the site *still posts* how to reduce exposure.

- Resources posted on their site still include Dr. Moskowitz’ [Reducing Your Exposure to Wireless Radiation](#) and the BabySafe Project brochure [What You Need to Know About Wireless Radiation and Your Baby.](#) “Taking certain precautions around wireless radiation is appropriate for our most vulnerable populations, including pregnant women.”

2014 New York State Teachers Union NYSUT: A federation of more than 1,200 local unions.

“We have enough evidence to justify taking action and we are not willing to wait until our members, their children and the students suffer health consequences from not doing anything,” -Paul Pecorale, Vice President of the New York State United Teachers Union.

- [Read the Press Release on Best Practices For Schools prepared for NYSUT](#)
- Download the [Guidelines for Safer Use of Wireless Technology in Classrooms](#) Published for NYSUT
- NYSUT hosted a [Webinar: Risks of wireless technologies and protecting children and staff in schools.](#)

2014 National Education Association

- [Section C-19 of the NEA 2013-2014 Resolutions](#)
- “The National Education Association believes that all educational facilities must have healthy indoor air quality, be smoke-free, be safe from environmental and chemical hazards, *and be safe from hazardous electromagnetic fields.*”
- “Students and/or their parents/guardians, education employees, and the public should be notified of actual *and potential hazards.*”

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- “School districts should conduct periodic testing for harmful water *and airborne particles/agents* that are detrimental to the health of students and education employees and shall report the results publicly.”
- “The Association also believes in the development and enforcement of health and safety standards specifically for children.”

2013 [Canadian Teacher Federation’s Brief](#) (200,000 elementary and secondary school teachers)

- “CTF is concerned about the lack of definitive research regarding the adverse health effects of Wi-Fi.
- “We propose a prudent approach to the use of Wi-Fi, especially where children are present.”
- “We recommend an education program regarding the relative safety of Wi-Fi exposure and that appropriate resources be developed to educate the public regarding ways to avoid potential exposure risks of Wi-Fi access points and devices.”
- “Pedagogical needs could be met in schools with an approach that limits exposure to Wi-Fi.”
- Read the Briefing [The Use of Wi-Fi in Schools - Briefing Document](#)
- 2015: Canadian Teacher's Magazine published [CTF Sounds the Alarm on Wi-Fi](#)

2013 [United Teachers of Los Angeles](#), representing 40,000 teachers and staff

- Resolution passed: “I move that UTLA will abide by current National NEA Policy for Environmentally Safe Schools which states that all employees and stakeholders should be informed when there are changes in their exposure to environmental hazards including electromagnetic radiation and that all stakeholders and the public should be notified of any actual and potential hazards. UTLA will advocate for technological solutions that maintain technology upgrades while not increasing employees exposure to electromagnetic radiation.”
- Health and Human Services Committee 3-6-13 #1: Moved by Kevin Mottus, seconded by John Cabrera.
- **UTLA Newsletter [editorial by social worker Kevin Mottus](#).**

2013 [Elementary Teacher's Federation of Ontario](#) Issued a position statement

"There is cause for concern for members' health and safety, especially women," said Sandra Wash, a teacher representing the Peel district when the Federation issued [a 2014 position statement](#) supporting an Expert Panel recommendation that Health Canada provide the public with more information about radiofrequency energy, and the safe use of wireless technology.

[ETFO voted](#) to:

- Turn cell phones off in classrooms
- Label the location Of Wi-Fi access points.
- Research Radio Frequency radiation.
- Develop a hazard control program related to wireless microwave radiation through JHSC.

2012 [The Ontario English Catholic Teachers Association](#) (45,000 Ontario teachers)

- [Read the Position Statement here](#).
- The Teacher Association recommends a wired infrastructure as WIFI “may present a potential Health and Safety risk or hazard in the workplace...The safety of this technology has not thoroughly been researched and therefore the precautionary principle and prudent avoidance of exposure should be practiced.”
- “Controls for WiFi would best be guided by the ALARA principle (As Low As Reasonably Achievable), as well as by applying the concept of prudent avoidance (of non-ionizing radiation).”
- [Read CBC News article](#)

2013 [BC Teachers Federation adopted Wireless Resolutions and Proposed Resolutions](#)

- [Wireless Resolutions and Proposed Resolutions](#)

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- “The BCTF supports members who are suffering from Electromagnetic Hypersensitivity by ensuring their medical needs are accommodated in the workplace.”
- Proposed Resolutions “the World Health Organization's classification of radiofrequency/electromagnetic fields emitted by wireless devices as a 2B possible cancer risk to humans; that the BCTF ensures all teachers have the right to work in a safe environment, including the right to work in a Wi-Fi/ wireless-free environment.”
- Recommendation to the Ministry of Education that school boards “begin immediate installation of on/off switches for Wi-Fi routers in schools, thereby reducing microwave radiation exposure and reducing health risks to members, and/or provide safer Ethernet cables or fibre optics”.
- Daily News Coverage: [Merriitt teachers demand protection from wi-fi radiation 'Evidence is piling up that wi-fi radiation may in fact be harmful'](#)
- [Vancouver Sun News Report](#)

2013 [The BC Confederation of Parent Advisory Councils \(BCCPAC\)](#) of 821 Advisory Councils representing over 500,000 parents in British Columbia passed two resolutions.

- Resolution: [On/Off switches for WiFi Routers and Protocol for the Use of Wireless Devices](#)
- Resolution 17 "calls on each Board of Education to have one public school at each education level that is free of Wi-Fi, cordless phones and cell phones. This school will only be equipped with wired computers and wired telephones for personal, educational and administrative purposes."
- Resolution 18 calls on Boards of Education to "cease to install Wi-Fi and other wireless networks in schools where other networking technology is feasible." passed with a clear majority.

2010 [UK VOICE ;The Union for Education Professionals](#)- 20,000 members

- Read the [Position Statement](#)
- "Voice has advocated that new Wi-Fi systems should not be installed in schools, that existing systems should be turned off when not required and that schools should consider whether they really need to use Wi-Fi, which was developed to facilitate Internet access on the move rather than to be used as a convenient alternative to cables in dedicated IT facilities."
- " In the light of what has happened to one of our members [*who has developed sensitivity to electro-magnetic radiation*], I am concerned that so many wireless networks are being installed in school and colleges without any real understanding of the possible long-term consequences."- Voice General Secretary Philip Parkin
- Voice [Blog post](#).

Los Angeles California Public Schools

- The LA School District Uses a RF-EMF Exposure Threshold 10,000 Less Than the FCC Limits: The OEHS supported a precautionary threshold level that is 10,000 times lower than the current Federal Communications Commission standard. Read the RF Report the LA School District Used to recommend a cautionary exposure level. [RADIOFREQUENCY \(RF\) EVALUATION REPORT Use of Wireless Devices in Educational Settings](#)

2009 LA School Board Resolution Banning Cell Towers from schools and recommending against WiFi.

- "The Board supports responsible deployment of fiberoptic broadband technology which is superior to wireless in speed, reliability, security, durability and protections it affords people and the environment from the potential hazards of exposure to radio frequency radiation."
- [Adopted Resolution](#)
- [Press Release: LOS ANGELES BOARD OF EDUCATION MEMBERS VOTE TO PROHIBIT CELL PHONE TOWERS NEAR SCHOOLS](#)

Environmental Health Trust <http://ehtrust.org/>

- 2009 December Resolution *Condemning Cell towers NEAR Schools* as was this T-Mobile Cell Tower across the street from an elementary school.
- [Original Resolution](#)
“As long as questions exist as to the adequacy of these federal regulations, local governments should have the ability to include consideration of health and environmental effects of these facilities.” (referring to cell towers)
- [Read the motion by Supervisors Zev Yaroslavsky and Michael Antonovich](#)

2000 LA School Board Resolution Opposing Cell Tower Placement on Schools

- [Original Resolution](#)
- Resolution calls for precautions with wireless. 'Whereas, Recent studies suggest there is evidence that radio-frequency radiation may produce “health effects” at “very low field” intensities'

2010 Greater Victoria Teachers' Association

"The GVTA recommends a precautionary approach to the School District with regard to provision of wireless internet in schools. The precautionary approach comes from the environmental movement and has been adopted as common practice in areas regarding potential environmental, ecological or biodiversity damage. It suggests that the lack of significant evidence is not enough of a reason to be unconcerned. The fact that many other countries have instituted regulations to protect children, seniors, pregnant women and other susceptible populations should be the guide for a District policy on WiFi installation and use in the worksites."

The [GVTA Wireless in Schools Webpage](#) states now that:

- Wi-Fi free zones should be available.
- On/Off routers recommended and record any adverse Wi-Fi health effects.
- Minimal or non-use within elementary schools.

2008 Lucerne Elementary Secondary Arrow Lakes District SD 10 New Denver BC, Canada Opts for “No WIFI

2001 Fletcher Hills PTA Resolution submitted to the California State PTA

- “RESOLVED, that the California PTA supports local municipal zoning setback rules of at 1000 feet or more from an operating wireless transmitter and a school or residential area; and be it further
- RESOLVED that the California PTA supports encouraging schools to use cable lines for all communications services on campus and to avoid the endorsement, purchase or use of wireless local area network systems on campus; and be it further
- RESOLVED that the California PTA recommend that teachers and students should limit use of cellular phones or other mobile devices on school property to emergencies and that cellular phones, pagers and other mobile phones be turned off and placed out of sight while the individual is on school property”
- Resolution on Wireless Equipment/Cellular Phones and Antennas [Read it here.](#)

DOCTORS AND SCIENTISTS APPEAL FOR STRICTER WIRELESS TECHNOLOGY REGULATION

Vienna Resolution 1998	Helsinki Appeal 2005 Parish Kirchner Appeal 2005	Potenza Picena Resolution 2011 World Health Organization 2011
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Environmental Health Trust <http://ehtrust.org/>

<u>Salzburg Resolution</u> 2000 <u>Stewart Report, UK</u> 2000 <u>Declaration of Alcalá</u> 2002 <u>Catania Resolution</u> 2002 <u>Freiburger Appeal</u> 2002 <u>Bamberger Appeal</u> 2004 <u>Maintaler Appeal</u> 2004 <u>International Association of Fire Fighters Resolution on Cell Towers</u> 2004 <u>Coburger Appeal</u> 2005 <u>Oberammergau Appeal</u> 2005 <u>Haibacher Appeal</u> 2005 <u>Pfarrkirchener Appeal</u> 2005 <u>Freienbacher Appeal</u> 2005 <u>Lichtenfelser Appeal</u> 2005 <u>Hofer Appeal</u> 2005	<u>Saarlander Appeal</u> 2005 <u>Stockacher Appeal</u> 2005 <u>Vancouver School Resolution</u> 2005 <u>Benevento Resolution</u> 2006 <u>Allgäuer Appeal</u> 2006 <u>WiMax Appeal</u> 2006 <u>Schlüchterner appeal</u> <u>Brussels Appeal</u> 2007 <u>Venice Resolution</u> 2008 <u>French Doctor Appeal</u> 2008 <u>Porto Alegre Resolution</u> 2009 <u>European Parliament EMF Resolution</u> 2009 <u>Dutch Appeal</u> 2009 <u>Int'l Appeal of Würzburg</u> 2010 <u>Copenhagen Resolution</u> 2010 <u>Seletun Consensus Statement</u> 2010 <u>Russian National Committee on Non-Ionizing Radiation Protection</u> 2011	<u>Austrian Medical Association</u> 2012 <u>Resolution on Electromagnetic Health</u> 2012 <u>British Doctor Initiative</u> 2013 <u>BabySafe Project: Joint Statement on Pregnancy and Wireless Radiation</u> 2014 <u>Canadian Doctors Declaration to Health Canada</u> 2014 <u>Scientific Declaration to Health Canada (International Doctors)</u> 2014 <u>International Scientists Appeal to U.N. to Protect Humans and Wildlife from Electromagnetic Fields and Wireless Technology</u> 2015 Over 200 Scientists <u>Reykjavik Iceland Appeal on Wireless in School</u> , 2017
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Firefighter Unions Opposing Cell Towers

INTERNATIONAL ASSOCIATION OF FIRE FIGHTERS

- *"The IAFF opposes the use of fire stations as base stations for towers and/or antennas for the conduction of cell phone transmissions until a study with the highest scientific merit and integrity on health effects of exposure to low-intensity RF/MW radiation is conducted and it is proven that such sitings are not hazardous to the health of our members."*
- The IAFF Official Position *Against* Cell Towers on Fire stations passed in 2004
iaff.org/HSFacts/CellTowerFinal.asp.
- This Position was initiated after increasing complaints among firefighters with cellular antennas on their stations coupled with the California study showing neurological damage in California firefighters conducted by Dr. Gunnar Heuser. [Read the Press Release on the Resolution and Research Study here](#)

L.A. County Firefighters Local 1014

- Local 1014 has a webpage dedicated to stopping towers because of a plan to install them on over 200 of their stations. <http://www.stopcellphonetowers.com/index.html>
- "As firefighters and paramedics, we live in these firehouses. What effect will these towers have on us? What are the risks to our neighbors? It's a no-brainer that LA County should at least have done a proper study before before putting 200-foot high-power microwave antennas on top of our heads."

- **Dave Gillotte, Active Duty Fire Captain**
President, LA County Firefighters Local 1014
[Watch him testify on this issue here.](#)

- *The Firefighter's Website in 2015* <http://www.stopcellphonetowers.com/index.html>

Environmental Health Trust <http://ehtrust.org/>

United Firefighters of Los Angeles City Local 112 IAFF-CIO-CLC Opposes Cell Towers on Their Stations.

- “ It is inexcusable that once again our firefighters in the field were the last to know about a massive 150 million dollar project that could jeopardize their health and safety. ... nobody talked to us and we have not heard from one single expert who has told us that this project will be safe.”
- “UFLAC will strongly oppose the use of Fire Stations as base locations for cell towers and/or antennas “
- **Download the letter from this [LA Firefighters Union Local 112 asking for an immediate halt to cell towers on fire stations.](#)**
- **[Watch videos the these Firefighter Union Presidents testifying to the LA Board of Supervisors on the Issue here.](#)**

See list of Medical Doctor Consensus Statements at this link

<http://ehtrust.org/science/medical-doctors-consensus-statements-recommendations-cell-phoneswireless/>

List of Notable Statements

[Harvard Campus Services: Cell Phone Towers and Radiofrequency \(RF\) Radiation Safety:](#)