The EMR Policy Institute
A Non-Profit Corporation www.EMRPolicy.org

Advancing Sound Public Health Policy
on the Use of Electromagnetic Radiation (EMR)
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Jerlean E. Daniel, PhD, Executive Director
National Association for the Education of Young Children
1313 L Street, NW, Suite 500
Washington, DC 2005

Via email to: Cathy Kennedy (ckennedy@naeyc.org)
Background References Attachments to follow via e-mail on June 1, 2011

May 31, 2011

Re: Technology in Early Childhood Programs: Serving Children from Birth through Age 8

Dear Ms. Daniel:

The EMR Policy Institute, Inc. respectfully submits comment on the joint position statement referenced above of the National Association for the Education of Young Children (NAEYC) and the Fred Rogers Center for Early Learning and Children's Media (FRCELCM) at Saint Vincent College.

The EMR Policy Institute (EMRPI) is a national organization established in 2003 whose goal is to create better cooperation between public health regulatory agencies and legislators on the state and federal levels for the purpose of mitigating unnecessary hazardous electromagnetic fields (EMF) and radiofrequency radiation (RF) exposures from the use of wireless devices and technology in order to protect the public, especially the health and well-being of fetuses, babies and children. EMRPI educates policy makers, including educators, and the public on the need for sound biologically-based human safety standards that protect public health regarding EMF/RF exposures across the electromagnetic spectrum in light of the Federal Communications Commission's (FCC) inadequate out-of-date exposure limits.

EMRPI understands that the NAEYC is, "dedicated to improving the well-being of all young children, with particular focus on the quality and development services for all children from birth through age 8." EMRPI agrees with the NAEYC/FRCELCM position statement's point, as stated in the section on technology, that, "The health and well-being of all children is a primary goal."

EMRPI has reviewed the NAEYC/FRELCM position statement and is concerned about the implications/meaning of reference to devices and technology that are wireless-type or equipment that may be used with wireless applications. The guidance on the use of technology in early childhood programs and settings as outlined in the statement, while not tacitly/implicitly giving the green light for the use of wireless devices and technology, and its infrastructure, nevertheless gives wireless use credibility and appeal, and enables its use by, with and around children. EMRPI strongly believes the NAEYC should not adopt a position statement that even contemplates the possibility that wireless devices and technologies may be used in programs or settings which would expose any child in America to sources of unnatural man-made electromagnetic fields (EMF) and radiofrequency radiation (RF) emissions.

Why? Because mounting peer-reviewed scientific evidence is sufficiently strong to have established that wireless radiation is a potential health hazard. **The use of wireless devices and technology puts the health and well-being of America's children at risk**. See WHO IARC May 31, 2001 statement on carcinogenicity to humans of RF radiation at: http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208_E.pdf

Wireless exposures to children are entirely involuntary. Babies and children have no say in whether or not they are exposed. Whether it be a parent or a policy maker, it is adults who make the decision whether to allow wireless device to be used by, with or around children. America's children at all stages of development depend on adults to keep them safe, especially those in positions to influence policy and use of wireless technology.

More and more children, students, teachers, and school personnel are finding themselves exposed throughout the day and night to RF radiation from a plethora of devices and infrastructure including cell phones, wireless books and tablets, WiFi, and cell tower antennas that are being sited at or near daycare centers, nurseries, and schools as well as at home and throughout our everyday environment. Questions about health effects from long-term, chronic exposure to this radiation-emitting wireless technology remain unanswered, but substantial clues to its harmful impacts have come to light to warrant precaution to reduce or eliminate RF radiation exposures to children.

Today, May 31, 2011, the World Health Organization's (WHO) International Agency for Research on Cancer (IARC) issued its stunning decision that non-ionizing radiofrequency radiation (utilized by wireless technology) is classified as a 2B (Possible) Human Carcinogen. This mirrors the 2001 WHO IARC decision that extremely low frequency electromagnetic fields (also present in wireless devices) are classified as a 2B (Possible) human carcinogen. As Cindy Sage, co-editor of *The Bioinitiative Report* has stated, "These two findings confirm that non-ionizing radiation should be considered as a possible risk factor for cancers; and that new biologically- based public safety standards are urgently needed."

The warnings and calls to protect children are increasing, significant, and strong. Last week, May 27, 2011, the Parliamentary Assembly of the Council of Europe (PACE), representing 47 member nations, called upon governments to, "take all reasonable measures" to reduce exposure to electromagnetic fields, especially to radio frequencies from mobile phones, and

"particularly the exposure to children and young people who seem to be most at risk from head tumors."

PACE recommends action be taken to protect children:

- 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 school children on school premises;

- Develop …targeted information campaigns aimed at teachers, parents and children to alert them to the specific risks of early, ill-considered and prolonged use of mobile phones and other devices emitting microwaves (wireless electromagnetic radiation);

- …put in place information and awareness-raising campaigns on the risks of potentially harmful long-term biological effects on the environment and on human health, especially "targeting children, teenagers and young people of reproductive age;

- Raise awareness on the potential risks of baby monitors, DECT-type cordless phones, and other home wireless devices which emit continuous pulse microwave radiation, and recommend the use of wires, fixed telephones at home;

- Concerning use of mobile phones, DECT (cordless) phones, WiFi (and WLAN and WIMAX) for computers and other wireless devices such as baby monitors, set preventive thresholds for levels of long-term exposure to microwaves in all indoor areas, in accordance with the precautionary principle, not exceeding 0.6 volts per meter, and in the medium term to reduce it to 0.2 volts per meter.

The President's Panel on Cancer in its 2008-2009 Report advised that, "The use of cell phones and other wireless devices is of great concern, particularly since these devices are being used regularly by ever larger and younger segments of the population…and the most urgent need to address…is whether children or adolescents using cell phones are at increased risk. Studies on ionizing radiation have shown that children are most sensitive among all members of populations in terms of carcinogenic exposure…Do children or adolescents using cell phones face increased cancer risk?"

In 2011 The Seletun Scientific Panel issued the call for halt of wireless rollout especially those that cause exposure for children and pregnant women, and call for new safety standards:

> Scientists who study radiofrequency radiation from wireless technologies warn that exposures may be harming the development of children at levels now commonly found in the environment and that pregnant women are cautioned to avoid using wireless devices themselves and distance themselves from other users. Children of all ages and pregnant women should avoid using cell phones and cordless phones.

The 2007 *Bioinitiative Report: A Rationale for a Biologically-Based Public Exposure Standard for Electromagnetic Fields,* was compiled by the BioInitiative Working Group, an international group of scientists, researchers and public health policy professionals. It raises

concerns about the effects of electromagnetic fields (EMF) on human health and calls for tougher safety standards to regulate radiation from mobile phones, power lines and many other sources of exposure in daily life. It calls for exposure standards for human exposure to electromagnetic fields that are based on the weight of science from a biological perspective. Current US exposure standards are based on an engineering perspective - how strong can the electromagnetic fields be in order to allow machinery and technology to function while only guarding against the heating of living tissue.

Following *The Biointiative Report* in 2008, the European Union Parliament declared the safety standards for EMF "obsolete".

For more than a decade international scientists, physicians, and public health officials have continued to issue urgent warnings and recommendations for governmental policy changes to protect the public health; documents, other than those mentioned above, that include:

- the Russian Resolution RNCNIRP 2011;
- 2009 EU Parliament Electromagnetic Report and Resolution;
- 2008 EU Mid-Term Review of the European Environmental and Health Action Plan, 2007 Venice Resolution;
- 2006 Benevento Resolution;
- Helsinki Resolution;
- Irish Doctors Environmental Association Statement;;
- 2002 Cantonia Resolution;
- 2002 Freiburg Appeal;
- 2000nSalzburg Resolution;
- 2000 UK Stewart Report;
- 1998 Vienna Resolution.

No US federal law or agency policy protects children from wireless devices and technology.

The federal record demonstrates this to be true as outlined in the EMRPI 2010 testimony on An Act to Create the Children's Wireless Protection Act.
http://www.emrpolicy.org/public_policy/schools/25apr2011_emrpi_comment_maine_ld_1014.pdf

Background on Federal Policy on Public Exposure to Wireless Radiation

The Federal Communications Commission (FCC) is a licensing and engineering agency that relies on other agencies and organizations to recommend and set safety standards for exposure to communications technology. It is not a health agency itself.

The Food and Drug Administration (FDA) through its Center for Devices and Radiological Health (CDRH) regulates electronic devices that come in contact with the human body. This includes cell phones.

The FCC has traditionally adopted safety recommendations from the American National Standards Institute (ANSI). ANSI is an industry-base organization comprised of numerous

committees representing diverse business interests, such as the automobile manufacturers, chemical/pharmaceutical companies, electrical industries and many others. To create standards for radiofrequency/microwave radiation (RF/MW) used in telecommunications and other RF/MW related uses, ANSI looks to a subcommittee of the Institute of Electrical and Electronics Engineers (IEEE) called C95.1 that is responsible for making recommendations for RF/MW exposures to the public. The standards are referred to as ANSI-IEEE C95.1-1992; the date refers to the last year in which the revisions were made to the original standard, which was put out in 1966.

The model used for both the IEEE and the National Center for Radiation Protection (NCRP) standards is an adult male of supposed average height (six feet) and weight (220 pounds). Though safety margins are factored in, the standards do not take into account women, pregnant women, fetuses, babies or children into consideration – all of whom absorb radiation differently than this "average" male model. Nor do the standards consider the elderly or infirm who are more susceptible to adverse exposures.

The model and all of the research it is drawn from, is based solely on the thermal effects these frequencies - used in wireless devices and technologies - can create. It has been known for decades that microwaves (RF/MW), at sufficient power output, can create heating. That is what occurs in a microwave oven and when your ear heats up using a cell phone. The current FCC standard presumes that nothing other than heating occurs. Therefore, if heating does not occur, no other adverse biological effect does either. But a range of adverse non-thermal effects have been known for decades as well – at levels magnitudes lower than the current FCC standard. The FCC standard is not based on biology – at the cellular level, but a physics engineering approach, is based on out-of-date science 25 years old using a male model, and is based on only short term exposures of minutes, not chronic long-term exposures experienced by today's public.

The increasing danger to children and the inadequacy of the FCC RF limits for long-term exposure were examined in the September 2008 US Congressional Hearing - Cell phone Use and Tumors: What the Science Says (http://domesticpolicy.oversight.house.gov/story.asp?ID=2199).

During the hearing, when the FCC's Director of its Office of Engineering and Technology, Julius Knapp, was asked during his oral testimony if the FCC's RF safety standards are appropriate to protect children and vulnerable adults, he replied that, "the FCC does not have the expertise to evaluate whether the standard is appropriate." He stated that the FCC exposure standards is a "flat limit" based on RF absorption of an adult male body and concluded his remarks by stating that the FCC "completely supports further analyst on this issue."

However, in 2010 the FCC formulated its National Broadband Plan which calls for, "Funding wireless connectivity to portable learning devices, allowing students and teachers to continue learning beyond the school day."

The NAEYC's position statement references the US Department of Education's 2010 National Education Technology Plan, Transforming American Education: Learning Powered

by Technology that clearly promotes the use of wireless devices and technology in education, as outlined in the sections:

Infrastructure: Access and Enable:

Broadband Everywhere: A crucial element of an infrastructure for learning is a broadband network of adequate performance and reach, including abundant **wireless** coverage in and out of school buildings. 'Adequate' means enough bandwidth to support simultaneous use by all students and educators in the building and the surrounding campus to routinely use the Web, multimedia, and collaboration software.

Access Devices for Every Student and Teacher: Because an infrastructure for learning should support learning in and out of the classroom, students and educators need Internet access devices for around-the-clock use from any location. Internet access devices are continually evolving and today include desktop computers, laptops, net books, public access kiosks, mobile phones, portable digital players, and wireless readers.

Learning: Engage and Empower

Provide multiple and flexible methods of presentation of information and knowledge, examples include digital books, specialized software and websites, text-to-speech applications and screen readers.

The US Secretary of Education's November 2010 letter echoes the DOE Education Technology Plan, in commenting, "The always-on nature of the Internet and mobile access devices provide our educational system with the opportunity to create learning experiences that are available anytime and anywhere." The letter also states, "The plan's development was led by the Department of Education Office of Educational Technology and involved the most rigorous and inclusive process ever." The outcome of that process, the resulting Education Technology Plan, demonstrates the disconnect between its support of wireless technology in US education and the federal record that points out the flaws in the FCC RF safety standards and the significant body of scientific evidence about the possible adverse health impacts of wireless exposure.

So according the DOE's vision of the new world of technology in education to bring "Broadband Everywhere", what would it look like from a child's perspective? How much EMF/RF exposure would surround and penetrate a child? What would the child's cumulative EMF/RF exposure to the brain, head and body? Let's say that she or he is exposed to all the typical wireless devices and infrastructure available today, including WiFi router/antennas at home with multiple cell tower antenna installations in the neighborhood. So the child goes to a setting, program or school where every child, as well as staff members, has a cell phone, wireless laptop and a wireless book reader all enabled by WiFi Internet access. Add to this cocktail of exposure cordless, DECT-type wireless phones, cell antennas on the building's roof or nearby tower, and the installation of Compact Fluorescent Light bulbs (CFLs - which emit both UV and RF radiation). Finally add in one or more wireless Smart Grid meters on the outside of the building and indoors wireless antennas embedded in appliances that "talk" to the Smart Meter. The combined cumulative RF exposure is significant and could even exceed the FCC's current safety limits. But the FCC RF safety limits do not contemplate such

an exposure scenario, identified by the National Academies of Science (NAS) as a flaw in the standards as will be described below.

The NAEYC position statement provides "Recommendations for Classroom Practice" references which include the use of wireless devices, and other devices that may be a wireless-type or transfer data and information wirelessly: "For Infants and Toddlers: Provide children with toy representation of digital objects to encourage toddlers to begin pretending about the ways in which others use technology: **cell phones**, cameras, laptops, CD players, etc;" Preschool and Kindergarten: Freely explore touch screens…, share **e-books**…

This NAEYC guidance is ill advised.

EMRPI agrees with the point made that, "The push to integrate technology into early childhood settings can lead to inappropriate use of technology," but not for the reasons given. According to the joint statement draft, "It is the position of NAEYC and the Fred Rogers Center that technology and interactive media are learning tools that, when used in intentional and developmentally appropriate ways and in conjunction with other traditional tools and materials can support the development and learning of young children. In this position statement, the word "technology" is used broadly, referring to interactive digital and electronic devices, software, multi-touch tablets, technology-based toys, apps, video games and interactive (non-linear) screen-based media."

The missing piece in the "Principles for Appropriate Use of Technology to Support the Optimal Development and Learning of Young Children" is whether the use of wireless devices and technology is prudent given the scientific evidence of health harm. According to the NAEYC statement, **"Early childhood educators must continually monitor and assess research findings related to technology, including** 3-D and eye health, **exposure to electromagnetic fields**, toxins from lead paint or batteries, choking hazards related to small parts, or any other potentially harmful, physiological or developmental effects of side effects related to the use of technology." What does the reference to electromagnetic fields mean in this context? Does it include RF radiation exposures?

EMRPI believes that placing the burden on educators to "assess and monitor research findings" to decide what, if any, wireless devices and technologies may be used is inappropriate and unrealistic. EMRPI believes the NAEYC should provide guidance in the position statement that the use of technology, when deemed developmentally and intentionally appropriate, should not include wireless-type devices and technology. The statement says, "When used appropriately, technology can enhance children's cognitive and social abilities." However, scientific research indicates that exposure to sources of RF from wireless technology may adversely impact cognitive ability and concentration.

The position statement says its guidance is grounded in the research on child development, teaching and learning, and in the evolving knowledge base about safe, effective, active, and developmentally appropriate use of technology and new media (Appel & O'Gara 2001;Clements and Sarama 2003,2005: Copple & Bredekamp 2009; Couse & Chen 2010; EDC & SRI 2010; Gee & Levine 2009; Kirkorian, Wartella, & Anderson 2009; Linebarger &Pietrowski 2009; NAEYC 2009; Neuman, Newman, & Dwyer 2011; Plowman & Stephen

2005; Rosen & Jarusand is intended to provide support and guidance for early childhood educators about how technology tools and practices can promote young children's optimal social, linguistic, and cognitive learning."

EMRPI believes that when policy guidance is being provided on the use of technology in early childhood settings the position statement must also be grounded in and reflect the research and information about the potential harmful impacts on children's health and well-being to include cognition, ability to concentrate, sleep disturbance, headaches, and the brain, genes, and future reproductive ability. The potential hazardous consequences of children's exposure to EMF and RF from wireless devices and technology must not be invisible in the making of policy.

The NAEYC national role in providing guidance on early childhood, whether it is to its members, other educators and the public or to members of Congress, is a profound responsibility not to take any position that has the potential to harm America's children. So, too, should the NAEYC change its stance on technology to remove all ambiguity about the appropriateness of using technology that is wireless, including WiFi, in childhood settings and instead proactively guide green, safe alternatives: fiber optic or hard wired Internet connections.

Other guidance that could be provided is:

- Use of laptops on hard surfaces, not on laps to lessen EMF exposures;
- Use of wired landline phones, not cordless DECT-type phones;
- Use LCD (liquid crystal display) screen technology, not plasma screens.

The 2008 National Academies of Science (NAS) Report: Identification of Research Needs Relating to Adverse Health Effects of Wireless Communication (NAS Report at: www.nap.edu/catalog.php?record_id=12036) recognizes the holes – flaws - in the scientific research knowledge upon which the current FCC RF safety policy is based. The NAS Report acknowledged the need to characterize specific aspects of real-life public exposure to wireless devices and technology (see pp. 13-44) that are not addressed in the scientific research record which include:

- Exposure of juveniles, children, pregnant women, and fetuses both for personal devices (e.g., cell phones. wireless personal computers (Wi-Fi) and for cell tower antennas;
- Models for children of various ages;
- Chronic exposures.

Since the publication of *The Bioinitiative Report* stunning evidence about the adverse biological effects of exposure to the electromagnetic radiation emitted by wireless devices and technology has mounted with the steady publication of new research, which include the following most recent findings:

- The firing of brain neurons is altered by exposure to electrical fields of 1 volt per meter (in comparison to FCC safety limit of 82 volts per meter exposure for PCS cell phones)(California Institute of Technology 2011).

- Cell phone radiation – a 50-minute exposure – affects the normal functioning of the human brain, (National Institute of Health – Brookhaven National Lab, 2011).

- Study of 2G and 3G mobile phone use in adolescents, young adults and older adults found effects on cognitive function (Leung S et al. Clin Neurophysiology 2011).

- Studies carried out by scientists in Turkey and Greece revealed at the May 2011 Cell Phones and Health Conference in Turkey that just four hours of exposure to RF-EMF disrupts the ability of the brain to repair damaged genes.

In 2009 the School Board of the Los Angeles Unified School District, the second largest school district in the country, demonstrated its concern about wireless exposures to school children by adopting a resolution prohibiting cell phone base stations and antennas near schools due to safety concerns.

Professor Magda Havas, Ph.D., a professor and researcher at Trent University, Ontario, Canada, stated in her 2009 Open Letter concerning WiFi in Schools, that:

> …it is irresponsible to introduce WiFi radiation into school environments where young children spend hours each day. Children are more sensitive to environmental contaminants and that includes microwave radiation. The Stewart Report (2000). The cell phone exposes your head to microwave radiation. A wireless computer (WiFi) exposes your entire upper body and if you have the computer on your lap it exposes your reproductive organs as well. Certainly this is not desirable, especially for younger children and teenagers. For this reason we need to discourage the use of wireless technology by children, especially in elementary schools. That does not mean that students cannot go on the Internet. It simply means that access to the Internet needs to be through wires rather than through the air (wireless, WiFi and cell tower antennas).

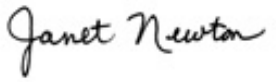
When considering children's health, exposure to what is known as "dirty electricity" must be considered. "Dirty electricity" has been linked with cancers, health and behavioral problems, and both diabetes and multiple sclerosis (Milham and Morgan 2008, Havas and Olstad 2008, and Havas 2006).

EMRPI recognizes the importance of Internet access to the educational process and the need for America's children to be tech savvy. But children's health and well-being must not be compromised or sacrificed in the delivery of early childhood care and education programs. The FCC, FDA and now the US Department of Education have adopted policies and initiatives that allow deployment and use of wireless devices and technologies on the one hand, and on the other, have continuously failed to adopt policies reflecting the peer-reviewed current scientific evidence of adverse biological effects from wireless exposures.

The FCC, FDA, US Department of Education and other federal agencies should adjust their policies and plans to protect the public's health, especially to protect children, but in the mean time organizations such as the NAEYC should proactively act to fill the regulatory void.

The EMR Policy Institute hopes that the information contained in this letter and attachments will cause the NAEYC to re-examine the draft position statement and revise it according to the state of the known scientific evidence of harmful effects of exposure to wireless technology, the international calls for the protection of children from EMF/RF exposures and the precautionary principle approach - that it is better to be safe than sorry – for the sake of the current and future well being of children all through their lives.

Sincerely yours,



Janet Newton, President
The EMR Policy Institute

Please distribute to the following via e-mail Cc:

Stephanie Faujul, President NAEYC Governing Board
Joanne Rogers, Honorary Chair, Advisory Council, Fred Rogers Center for Early Learning and Children's Media
Everette E. Dennis, Ph.D., Chair, Advisory Council, Fred Rogers Center for Early Learning and Children's Media

Attachments to follow via e-mail on June 1, 2011

Advancing Sound Public Health Policy
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To: Maine State Legislature Joint Standing Committee on Energy, Utilities and Technology

From: Janet Newton, President, The EMR Policy Institute

Date: 25 April 2011

RE: Comment on LD 1014 (HP 750) – "An Act To Create the Children's Wireless Protection Act" sponsored by Representative Andrea Boland

Cc: Committee Clerk Kristen Gottlieb
Representative Andrea Boland

Appended here:

1. California Public Utilities Commission's Division of Ratepayer Advocates (DRA) Comment on January 2011 preliminary version of the Smart Meter report issued by the California Council on Science and Technology (CCST)
2. March 2, 2010 Testimony of The EMR Policy Institute on HP 1207 LD 1706 "An Act to Create the Children's Wireless Protection Act," before the Maine Legislature Joint Standing Committee on Health and Human Services

Senator Thibodeau, Representative Fitts, and Honorable Members of the Joint Committee on Energy, Utilities and Technology:

Because of previously scheduled commitments, The EMR Policy Institute is unable to testify in person at the April 27, 2011 hearing before your committee on LD 1014 "An Act to Create the Children's Wireless Protection Act." Thank you for the opportunity to participate in the hearing process for this important public health legislation.

The EMR Policy Institute (EMRPI) is a national advocacy organization established in 2003 whose goal is to create better cooperation between public health regulatory agencies and legislators in order to mitigate unnecessary hazardous electromagnetic radiation (EMR) exposures. EMRPI educates policy makers and the public on the need for sound, biologically-based human safety policy that protects public health regarding EMR exposures across the electromagnetic spectrum.

EMRPI continues to challenge the inadequacy of the US safety policy on electromagnetic and radiofrequency (RF) radiation exposures by submitting official comment to key federal agencies. EMRPI's record of formal comment as individuals and through its organization dates back to 1997. It includes official comment to key federal agencies such as the NAS, FCC, FDA, GAO, NIOSH, NTIA and DOJ.

The directors of EMRPI have participated in taking three cases to the US Supreme Court challenging the FCC's RF safety policy as **inadequate to protect all members of the public in all exposure scenarios.** In each case the Court denied certiorari on procedural grounds.

This EMRPI Comment is based upon its 14-year record of scrutiny of the inadequacies in the current FCC RF radiation policy that was put in place in 1997. Since 1997 the FCC has resisted all calls to address these inadequacies, i.e., to develop biologically based safety limits for human exposure to RF radiation that protect all members of the public in the various exposure scenarios they encounter in daily life.

EMRPI gave oral and written testimony at the March 2, 2010 hearing on HP 1207 LD 1706 **"**An Act to Create the Children's Wireless Protection Act," before the Maine Legislature Joint Standing Committee on Health and Humans Services. It is included herein as Appendix 2.

The FCC's focus on "safety" continues to protect devices rather than members of the public as found in its 2009 announcement of its International TV White Spaces Fellowship and Training Initiative:

> *. . . by building on a proven concept: the safe deployment of new, intelligent devices in the unused spectrum that exists between television channels* ***without causing undue interference to adjacent users.*** (Emphasis added.)

"Adjacent users" refers to commercial communications devices rather than to humans with Implanted Medical Devices for one example.

The most recent state-level review of current US RF radiation policy is the report, "Health Impacts of Radio Frequency Exposure from Smart Meters," final version released in April 2011 by the California Council on Science and Technology (CCST). It came as a result of California utilities' initiative to deploy wireless smart meters statewide. It came at the request of California Assemblymen Jared Huffman and Bill Monning that CCST study the potential for health impacts from exposure to wireless Smart Meters. The CCST solicited input from scientific experts but did not include their conclusions in the preliminary version of its report issued in January 2011. See:
http://www.ccst.us/publications/2011/2011smart-final.pdf

It should be noted that while the CCST Report specifically addresses wireless Smart Meter exposures, the frequency range at which these devices operate is in the same range of frequencies at which today's cell phones and Smart phones also operate. The scientific literature in question applies to both of these exposure scenarios.

Comment on the preliminary version from the California Public Utilities Commission's Division of Ratepayer Advocates (DRA) (http://www.dra.ca.gov/DRA/hot/110203_smartmeters.htm) found that the CCST Report (http://www.ccst.us/news/2011/20110111smart.php) does not fully explore **the basis for the Report's conclusion that, "there is no clear evidence that additional standards are needed to protect the public from smart meters or other common household electronic devices."** The full text of the DRA comment is included herein as Appendix 1.

At page 3 of its comment DRA recommends, "that CCST explore this issue in greater depth" with these statements:

> **3. CCST should explain more clearly why it concluded that the available evidence does not indicate a need to limit non-thermal impacts of RF emissions.**
>
> The report states that, "there is currently no conclusive scientific evidence pointing to a non-thermal cause and effect between human exposure to RF emissions and negative health impacts." While the report cites three studies that claim adverse impacts, it does not explain why these studies are not relevant to the current debate. The same can be said about the BioInitiative Report, a research survey often cited by parties concerned about RF emissions, which is merely listed in Appendix E as an "unsolicited document."
>
> DRA recommends that the CCST Report be expanded to provide a scientific critique of the BioInitiative Report, and other reports that assert a link between RF emissions and negative health impacts. CCST should explain why, in its opinion, these sources do not constitute evidence that indicates a need to establish limits for non-thermal impacts, if only as a precautionary measure, even if conclusive findings are not yet available.

Despite this critique from a California state regulatory agency the CCST's Key Report Findings as stated in the final version continue to assert at page 4 that:

> 3. To date, scientific studies have not identified or confirmed negative health effects from *potential non-thermal* impacts of RF emissions such as those produced by existing common household electronic devices and smart meters.
> 4. Not enough is currently known about potential non-thermal impacts of radio frequency emission to identify or recommend additional standards for such impacts.

It should be noted that:

- *The BioInitiative Report* reviews more that 2,000 peer-reviewed published scientific papers that demonstrate biological effects and negative health effects resulting from RF radiation exposures at "non-thermal," i.e., low-intensity, levels.
- Contributing authors of *The BioInitiative Report* David O. Carpenter MD MPH and Henry Lai PhD are scheduled to testify before your committee on April 27, 2011. Both of these experts have published numerous peer-reviewed papers and books in this area of science.

The Maine Center for Disease Control's 2010 report on smart meter RF emissions (http://www.maine.gov/dhhs/boh/smart_meters.shtml issued conclusions that are similar to those of the CCST Report. The Maine CDC Report itself states that it is limited in scope.

EMRPI offers herein its Comment in the CCST proceeding as written testimony on LD 1014, "An Act to Create the Children's Wireless Protection Act." The emphasis of this testimony is to delineate the findings of the 2008 National Academy of Sciences Report, ***Identification of Research Needs Relating to Adverse Health Effects of Wireless Communication.*** The stated task of this NAS project was to identify needs and gaps in the research record upon which US RF radiation safety policy is based. The Report did indeed find numerous inadequacies in that research record. Inadequate research results in safety policy that fails to address all exposures encountered by the public. As a result it cannot be asserted that US safety policy protects all members of the public from all mechanisms of harm in all exposure scenarios.

The EMR Policy January 31, 2011 Comment submitted to The California Council on Science and Technology:

1. The January 2011 CCST Report misses out on a key opportunity to address its own "Key Report Findings" and "Other Considerations" by failing to provide the public with a clear analysis of the scientific record upon which the current FCC RF radiation safety policy is based. On p. 8 The CCST Report specifically references the 2008 National Academies of Science Report: *Identification of Research Needs Relating to Adverse Health Effects of Wireless Communication* (NAS Report at: www.nap.edu/catalog.php?record_id=12036) The National Academies of Science provides a service for the US federal government that parallels the role of CCST in the State of California, yet the CCST Report fails to include the specific details of the 2008 NAS Report findings.

2. Safety regulations are based on the published record of scientific studies in a given field. The NAS Report enumerates the holes in the RF research record upon which FCC RF safety policy is based. In failing to include the NAS Report findings, the CCST Report missed the mark for explaining its own Key Finding #3 – *To date, scientific findings have not identified nor confirmed negative health effects from* potential non-thermal *impacts of RF emissions such as those produced by existing common household electronic devices and smart meters. . .* and Other Considerations #3 – *Consumers should be provided with clearly understood information about the radiofrequency emissions of all devices that emit RF including smart meters.*

3. On p. 7 CCST Report states that: *Given current scientific knowledge, the FCC guideline provides a more than adequate margin of safety against the known thermal effects.* CCST fails, however, to specify the holes in the "current scientific knowledge" delineated in the NAS Report

4. On p. 8 CCST Report states that:: ***At this time there is no clear evidence that additional standards are needed to protect the public from smart meters or other common household electronic devices.*** However, the 2008 NAS Report documents the need to characterize specific aspects of real-life public exposure to RF radiation that are not addressed in the scientific record

upon which the current FCC RF safety policy is based (see pp. 13-44):

a. Exposure of juveniles, children, pregnant women, and fetuses both for personal wireless devices (e.g., cell phones, wireless personal computers [PCs} and for RF fields from base station antennas.
b. Variability of exposures to the actual use of the device, the environment in which it is used, and exposures from other sources.
c. Multilateral exposures.
d. Multiple frequency exposures.
e. Location of use (both geographic location and whether a device is primarily used indoors or outdoors).
f. Models for men and women of various heights and for children of various ages.
g. Exposure to rooftop maintenance workers and to members of the public that live in close proximity to multiple co-located base station antennas.
h. Exposure to subpopulations among maintenance employees.
i. Chronic exposures that are similar to those from existing TV and radio antennas.
j. Multilateral exposure to the typical arrangement of four to six antennas with multiple frequencies, rather than a single antenna radiating at a single frequency from a single direction as used in laboratory studies.
k. Exposure to others sources of RF radiation such as cordless phones, wireless computer communications, and other communications systems.
l. Exposure to the hand or the human lap or parts of the body close to the device.
m. RF exposure in close proximity to metallic adornments and implanted medical devices (IMDs) including metal rim glasses, earrings, and various prostheses (e.g., hearing aids, cochlear implants, cardiac pacemakers).
n. Models for whole-body exposure due to base station antennas.
o. Sufficiently long exposure and follow-up to allow for detection of effects that occur with a latency of several years.
p. Lack of information concerning the health effects associated with living in close proximity to base stations.
q. Research that includes children, the elderly, and people with underlying diseases.
r. Research on possible adverse RF effects identified by changes in EEG (electroencephalogram) activity.
s. Lack of information on possible neurophysiologic effects developing during long-term exposure to RF fields.
t. Studies focusing on possible adverse RF effects identified by changes in cognitive performance functions.
u. Effects of RF exposure to the sensitive biological targets of neural networks.
v. Possible effects of RF exposure on fetal and neonatal development.
w. Possible influences of exposure on the structure and function of the immune system,

including prenatal, neonatal, and juvenile exposures.

x. Possible influences of RF exposures on the structure and function of the central nervous system, including prenatal, neonatal, and juvenile exposures.

5. At p. 8 CCST Report states that: *No clear causal relationship between RF emissions and non-thermal human health impacts has been scientifically established, nor have the mechanisms that might lead to such biological impacts been clearly identified.* In this statement CCST Report leaves the inaccurate impression that science has established the "mechanism" or cause of development of other diseases such as cancer, Alzheimers' Disease or ALS, which is not the case. Lack of a single mechanism for causation of adverse health effects arising from exposure to low-intensity levels of RF emissions is not a valid rationale to negate the scientific evidence demonstrating these "non-thermal" effects.

6. Illustrating inadequate protection under the current FCC RF safety policy is the experience of geophysics professor Gary Olhoeft PhD with the critical EMI (electromagnetic interference) problems he encounters daily with his Medtronics Deep Brain Stimulator (DBS). Prof. Olhoeft's comment was read into the record at the first Public Comment period at the July 26-27, 2010 FCC-FDA combined public meeting on, "Enabling the Convergence of Communications and Medical Systems." Despite Dr. Olhoeft's insightful analysis and account of this one example of EMI between wireless systems and his DBS, neither the FCC moderator nor the FDA moderator of the following day's panel on Electromagnetic Compatibility (EMC) raised one question on this EMI topic so critical to the life, health and well being of millions of Americans. Even the last panel discussion, Electromagnetic Compatibility – How to Promote EMC, made no mention of compatibility with implanted electronic medical devices such as Deep Brain Stimulators that treat Parkinson's patients, or insulin pumps for diabetics, for example.

   Professor Olhoeft submitted his written Comment in the current US Department of Justice Advanced Notice of Proposed Rule Making proceeding. See also the video of his presentation at the 2009 EMRPI scientific conference, "Electromagnetic Radiation Impacts on Human Health," at: www.youtube.com/watch?v=jo-B6LWfVzw&feature=related

7. No federal agency is keeping track of cumulative wireless power density, nor identifying critical levels and locations where individuals who require IMDs may be at risk.

8. The FCC continues to issue compliance statements for new wireless devices and systems without regard for existing RF levels.

9. In stark contrast to the lack of public health concern in key US federal and state agencies are these precautionary provisions called for in The European Parliament April 2009 Resolution approved by a

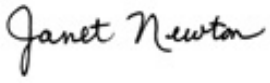
vote of 559-22: www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P6-TA-2009-0216+0+DOC+XML+V0//EN

- **Particular consideration of biological effects,** especially given that **some studies have found the most harmful effects at lowest levels;**
- **Evaluation of potential long-term adverse effects of mobile telephony radio frequencies;**
- Increased investigation of **harmful effects of multiple exposures to different EMF sources, particularly for children;**
- Member States to follow the example of Sweden and to recognize persons that suffer from electrohypersensitivity as being disabled so as to grant them adequate protection as well as equal opportunities;

10. EMRPI strongly urges the State of California to broaden #4 of CCST Other Considerations to require Smart Grid / Smart Meter options that employ fiber optic and hard-wired data transmission rather than wireless transmitting Smart Meters.

Given these numerous and serious "holes" in the research record that is the basis of current US RF radiation safety policy, EMRPI strongly urges the Joint Standing Committee on Energy, Utilities and Technology to support enactment of LD1012 in order to protect the health and well being of the children and citizens of Maine.

Respectfully submitted by
The EMR Policy Institute



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Appendix 1

DRA

Division of Ratepayer Advocates
California Public Utilities Commission

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JOSEPH P. COMO
Acting Director

http://dra.ca.gov

To: California Council on Science and Technology (CCST) Smart Meter Project
From: David Ashuckian, Deputy Director
Date: January 31, 2011

RE: Report on "Health Impacts of Radio Frequencies for Smart Meters"

The Division Ratepayer Advocates (DRA) submits these comments on the CCST's Report on "Health Impacts of Radio Frequencies for Smart Meters" issued on January 11, 2011 ("the Report").

Introduction and Summary

DRA is an independent division of the California Public Utilities Commission (CPUC) whose mission is to obtain the lowest possible rates for service consistent with reliable and safe service levels. (Cal. Public Utilities Code § 309.5(a).) DRA has represented the interests of residential and small business customers in CPUC proceedings involving deployment of advanced metering infrastructure (AMI) systems, also known as smart meters. DRA has not taken a position on whether the meters pose health risks, but it has called on the CPUC to review reliable information on this subject and to address customers' concerns in a public proceeding. DRA welcomes the CCST's contribution to public understanding of the health impacts of RF emissions from smart meters.

In these comments, DRA identifies several questions that warrant additional explanation or analysis. We address three topics, in the following order:

- There are additional factors that can impact RF exposure from SmartMeters that are not addressed in the Report, and should be considered.
- Exposure from multiple co-located meters should be examined more closely.
- CCST should more clearly explain the basis for its conclusion that: "At this time there is no clear evidence that additional standards are needed to protect the public from smart meters or other common household electronic devices." (Report, p. 8.)

Comments

1. CCST should consider additional factors that can impact RF exposure from smart meters.

The Report concludes that it is unlikely that California's smart meter population will result in human exposure that exceeds FCC guidelines (which, as explained in the report, address only thermal impacts). While there appears to be consensus that exposure from smart meters in a wide range of installation scenarios will be significantly lower than FCC guideline limits, a new report from Sage Associates (Sage

Report) indicates exposure may exceed FCC guideline levels under certain circumstances.[1] For example, this report calculates that the exposure in a highly reflective environment ("1000% reflection" per the report) adjacent to a bank of 8 meters exceeds FCC guideline levels.[2] DRA questions whether the exposure levels calculated by Sage in this situation would be achieved in real buildings, but believes that Sage raises issues that merit further consideration.[3] A December 2010 EPRI report also discusses physical factors that are not explicitly addressed in the CCST Report.[4]

The Report identifies six "key factors to consider, when evaluating exposure to RF from smart meters," (Report, p. 25). DRA finds this list of factors a useful tool for policymakers. However, the December 2010 EPRI Report and the January 2011 Sage Report indicate that there may be additional factors that should not be overlooked. DRA has prepared a list of such factors, which is attached to these comments. DRA recommends that CCST consider the degree to which the factors listed in this Attachment (particularly environmental conditions such as building materials and exterior conditions) apply to smart meter RF exposure, and augment the table and supporting discussions as appropriate.[5]

2. The exposure from multiple co-located meters should be examined more thoroughly.

The CCST Report addresses the issue of exposure in a multiple- meter setting by citing the EPRI report's field measurements (8% exposure level with 10 meters operating). But other information provided by EPRI indicates that it may be imprudent to draw broad conclusions from these measurements, for at least two reasons.

First, this measurement applies only to Itron meters, which have a nominal power output approximately four times lower than the electric meters used by PG&E. Second, according to a November 2010 summary of the EPRI Report, power density did not diminish as rapidly with distance with multiple meters for a single meter.[6] These factors suggest that actual statewide RF exposure levels may be higher than the EPRI measurement cited in the CCST Report.[7]

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[1] "Assessment of Radio Frequency Microwave Radiation Emissions from Smart Meters", January 1, 2011. Available at http://sagereports.com/smart-meter-rf/.

[2] Sage Report, Table A7. FCC guidelines exceeded at 9" from source with a 1% duty cycle, and at 2.5' with a 10% duty cycle.

[3] Sage bases the existence of a "1000% reflection" scenario on studies by Hondou and others, in which the RF source was operating within a reflective chamber, such as when a cell phone is used in an elevator. In contrast, smart meters will generally be located outside of occupied building spaces, and outside of any reflective surfaces inside the building. Because of this difference, RF emissions by the smart meter would be reflected away from the occupied space, and any RF transmitted into that space would be greatly attenuated. The Hondou studies may be relevant to the propagation of RF signals from Smart appliances.

[4] "An Investigation of Radio frequency Fields Associated with the Itron Smart Meter," EPRI report number 1021126.

[5] The December EPRI report provides discussion and data on many of these additional issues. It should be noted, however, that the specific measurements and resulting data only apply to one type of meter deployed by SDG&E and SCE, and to walls of metal lathe construction.

[6] "Radio-Frequency Exposure Levels from Smart Meters," EPRI report # 1022270, p. 5 and Figure 4.

[7] In addition, EPRI concludes that "beyond three of four meters the aggregate field does not materially increase with additional meters. (EPRI Report, p. 9-7.) However, data in Figure 9-5 and Table 9-2 indicates that this conclusion may not be generally applicable due to the fact that the second meter added, "Meter B", generated the strongest RF field, and may have diminished the impact of the additional meters added.

On the other hand, the EPRI measurements could overestimate actual emission levels, for the following reason. The EPRI report notes that the meters were specially programmed for the tests to emit a constant RF level, although in normal use each meter emits an RF signal intermittently and randomly. Even when two or more meters emit at the same time, their levels will only sum directly if they are perfectly in phase.

The EPRI report highlights a fundamental problem in characterizing RF exposure from smart meters which must be considered by policy makers: the impact of two RF fields only add arithmetically in the limited situation where they are 100% in phase with each other. Outside of this limited condition, additional RF fields will add to a lesser degree, or reduce the combined level due to "destructive interference." This concept applies both to fields from multiple RF radios and reflected fields.

From a policy perspective, at least three methods can be considered for treatment of multiple meters:

1. The combined exposure estimate could be based on a simple addition of multiple fields ***if*** clear disclosure is provided indicating that this method provides a worst-case scenario which would rarely occur, according to information provided by PG&E and EPRI.
2. Actual network operating data could be obtained and used to guide a statistically based estimate of how often meters are operating, and how their fields combine when multiple meters are co-located. This could result in a methodology to estimate "nominal" exposure levels.
3. One could assume the meters never transmit in phase, and account for the multiple meters by increasing the effective duty cycle.

Each of these methods has pro and cons which should be discussed among RF experts in a public venue, as recommended by many parties to the CPUC proceedings. Such a discussion should consider whether the communication network operating algorithms could include constraints to prevent co-located meters from transmitting at the same time.

DRA recommends that the CCST explore this issue in greater depth.

3. CCSF should explain more clearly why it concluded that the available evidence does not indicate a need to limit non-thermal impacts of RF emissions.

The report states that "there is currently no conclusive scientific evidence pointing to a non-thermal cause and effect between human exposure to RF emissions and negative health impacts."[8] While the report cites three studies that claim adverse impacts, it does not explain why these studies are not relevant to the current debate. The same can be said about the Bioinitiative Report, a research survey often cited by parties concerned about RF emissions, which is merely listed in Appendix E as an "unsolicited document."

DRA recommends that the CCST Report be expanded to provide a scientific critique of the Bioinitiative report, and other reports that assert a link between RF emissions and negative health impacts. CCST should explain why, in its opinion, these sources do not constitute evidence that indicates a need to establish limits for non-thermal impacts, if only as a precautionary measure, even if conclusive findings are not yet available.

Conclusion

The CCST's contribution to the public discussion about RF exposure from Smart Meters can be made more valuable by addressing the questions identified in these comments.

[8] CCST Report, p.15.

Attachment: RF Issues That Warrant Additional Consideration

Smart Meter RF Emission Sources

- Does the power and directivity of smart meters vary over time, across all the installed meter "forms," or in "hard to reach" locations?
- How do the horizontal and vertical radiation patterns for each smart meter component impact RF exposure inside and outside of buildings?
- How should the exposure from multiple co-located meters be established, and should it impact the combined power density or duty cycle? (Can published smart meter vendor data help address these questions?)
- Do meter warrantee terms establish maximum permissible duty cycles?
- Can the smart meter network systems be programmed to limit/reduce duty cycle and RF exposure?

Environmental Considerations/Boundary Conditions

- How do reflections from the meter mounting surface, ground, and adjacent structures impact RF exposure for those outside of the building?
- What are the reflection, absorption, and transmission characteristics of common building and ground cover materials?
- What type of real-world smart meter installations result in RF propagation which deviates from free-field predictions?

RF Receivers

- What time and spatial averaging methods are required to accurately characterize thermal impacts from RF exposure? Non-thermal impacts?
- Are FCC guidelines designed to protect all persons exposed by smart meters, including children, the elderly, and those with health issues or medical implants?
- Does reduced mobility of the person receiving the RF exposure increases the level of exposure?

Other

- How will full deployment of home area networks impact RF exposure?
- How will full deployment of the smart grid or other uses of smart meter networks impact duty cycles, and therefore RF exposure?
- Are there administrative measures which could be ordered by the CPUC to limit RF exposure where excessive levels are found to exist?

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Testimony on HP 1207 LD 1706
An Act to Create the Children's Wireless Protection Act
presented by Janet Newton, President
The EMR Policy Institute
www.emrpolicy.org
March 2, 2010

US Regulation of Exposure to Radiofrequency Radiation for Cell Phone Emissions

Senator Branagan, Representative Perry and Honorable Members of the Health and Human Services Committee:

Thank you for the opportunity to speak. I am Janet Newton, President of The EMR Policy Institute. We continue to challenge the inadequacy of the US public health policy on cell phone safety by submitting official comment to key federal agencies as listed on the PowerPoint slide. No US agency policy protects children from cell phone radiation exposure. The federal record demonstrates this fact to be true.

The Federal Communications Commission (FCC) is a licensing and engineering agency that relies on other agencies and organizations to recommend and set safety standards for communications technology. It is not a health agency itself.

The Food and Drug Administration (FDA) regulates electronic devices that come in contact with the human body through its Center for Devices and Radiological Health (CDRH). This includes cell phones as they are held up to the side of the head in normal use.

The FCC has traditionally adopted safety recommendations from the American National Standards Institute (ANSI). ANSI is an industry-based organization comprised of numerous committees representing diverse business interests, such as automobile manufacturers, chemical/pharmaceutical companies, the electrical industries, and many others. To create standards for radiofrequency/microwave radiation (RF/MW) used in telecommunications and other RF/MW-related activities, ANSI looks to a subcommittee of the Institute of Electrical and Electronics Engineers (IEEE) called C95.1 that is responsible for making recommendations for RF/MW exposures. The standards are referred to as ANSI-IEEE C95.1-1992; the date refers to the last year in which revisions were made to the original standard, which was put out in 1966.

The model used for both the IEEE and the NCRP standards is an adult male of average height and weight. Though safety margins are factored in, the standards do not take women, pregnant women, or children into consideration – all of whom absorb radiation differently than this "average" model. Nor does it consider the elderly or the infirm who are more susceptible to adverse exposures.

The model, and all of the research it is drawn from, is based solely on the thermal effects these frequencies can create. It has been known for decades that microwaves, at sufficient power output, can create heating. That is what occurs in a microwave oven. The current FCC model presumes that nothing adverse other than heating occurs. Therefore, if heating does not occur, no other adverse biological effect does either. But a range of adverse non-thermal effects have been noted or decades as well – at levels significantly lower than the current FCC standard. This has been at the heart of the debate since the 1950's.

Timeline of U.S. Federal Activities Addressing Exposure to Mobile Phone Radiation

1996 - With passage of the Telecommunications Act of 1996 the FCC began to regulate the RF emissions of mobile phones. Prior to 1996 mobile phones were exempt from US federal RF regulation.

1999 – Federal Radiofrequency Interagency Work Group (RFIAWG) issued its June 17, 1999 letter to the radiofrequency (RF) standards setting subcommittee of the Institute of Electrical and Electronics Engineers (IEEE SCC28) that identified issues, "that we believe need to be addressed to provide a strong and credible rationale to support RF exposure guidelines." The letter was issued "in response to preious requests for greater participation on our part in the SCC28 deliberations on RF guidelines." See:
www.emrpolicy.org/litigation/case_law/docs/exhibit_a.pdf

RFIAWG is comprised of experts in exposure to radiofrequency radiation (RF) from the Environmental Protection Agency, Federal Communications Commission, Food and Drug Administration, National Institute of Occupational Safety and Health, Occupational Safety and Health Administration, and the National Telecommunications Information Administration.

What happened – The IEEE committee has not responded.

To date the RFIAWG-identified issues have not been incorporated into any revision of IEEE Radiofrequency Exposure Standards. The current FCC human RF exposure guidelines are based on the IEEE RF exposure standards and the NCRP (National Council on Radiation Protection and Measurement) RF exposure guidelines. Going forward, the NCRP no longer works on RF exposure standards development. It reviews the RF standards development work of other bodies.

RFIAWG RF Guideline Issues Related to Mobile Phone Use

- **Biological basis for local SAR limit -**

… an effort should be made to base local SAR limits on the differential sensitivity of tissues to electric fields and temperature increases. For example, it seems intuitive that the local limits for the brain and bone marrow should be lower than those for muscle, fat and fascia; this is not the case with the current limits which implicitly assume that all tissues are equally sensitive (except for eye and testicle).

- **Selection of an adverse effect level -**

Since the adverse effect level for the 1991 guidelines was based on acute exposures, does the same approach apply for effects caused by chronic exposure to RF radiation, including exposures having a range of carrier frequencies, modulation characteristics, peak intensities, exposure duration, etc., that does not elevate tissue temperature on a macroscopic scale?

- **Acute and chronic exposures -**

. . . a clear rationale needs to be developed to support the exposure guideline for chronic as well as acute exposure.

- **Time averaging –**

If prolonged and chronic exposures are considered to be important, then there should be a reconsideration of the time-averaging practices that are incorporated into existing exposure guidelines.

- **Replication / Validation -**

Published peer-reviewed studies that have been independently replicated/validated should be used to establish the adverse effects level from which exposure guidelines are derived. The definition of "replicated/validated" should not be so restrictive to disallow the use of a set of reports that are scientifically valid but are not an exact replication/validation of specific experimental procedures and results.

Peer-reviewed, published studies that may not be considered to be replicated/validated, but are well done and show potentially important health impacts provide important information regarding uncertainties in the data base used to set the adverse effect level (e.g., incomplete data base).

- **Important Health Effects Literature Areas –**

Documentation should be provided that the literature review process included a comprehensive review of the following three areas:

1) long-term, low-level exposure studies (because of their importance to environmental and chronic occupational RFR exposure);
2) neurological/behavioral effects (because of their importance in defining the adverse effect level in existing RFR guidelines); and
3) micronucleus assay studies (because of their relevance to carcinogenesis).

1999 - FDA nominated RF radiation emissions of wireless communication devices to the National Toxicology Program (NTP) for Toxicological Studies for research because of "widespread consumer and worker exposure" and because "the available data is inadequate to properly assess safety."

From the Executive Summary of the FDA's Nomination:

Over 80 million Americans currently use wireless communications devices (e.g., cellular phones) with about 25 thousand news users daily. This translates into a potentially significant public health problem should the use of these devices even slightly increase the risk of adverse health effects. Currently cellular phones and other wireless communication devices are required to meet the radiofrequency radiation (RFR) exposure guidelines of the Federal Communications Commission (FCC), which were most recently revised in August 1996. The existing exposure guidelines are based on protection from acute injury from thermal effects of RFR exposure, and may not be protective against any non-thermal effects of chronic exposure. Animal exposure research reported in the literature suggests that low level exposures may increase the risk of cancer by mechanisms yet to be elucidated, but the data is conflicting and most of this research was not conducted with actual cellular phone radiation . . . There is currently insufficient scientific basis for concluding either that wireless communication technologies are safe or that they pose a risk to millions of users. A significant research effort, involving large well-planned animal experiments is needed to provide the basis to assess the risk to human health of wireless communications devices.

. . . A large number of biological effects have been reported in cell cultures and in animals, often in response to exposure to relatively low-level fields, which are not well established but which may have health implications and are, hence, the subject of on-going research. It is not

scientifically possible to guarantee those non-thermal levels of microwave radiation, which do not cause deleterious effects for relatively short exposure, will not cause long-term adverse health effects.

2000 - Senator Joe Lieberman and Congressman Ed Markey request GAO (Government Accounting Office) to investigate US research on and regulation of mobile phone health issues.

2001 – GAO issued Report 01-545 Research and Regulatory Efforts on Mobile Phone Health Issues. See: www.gao.gov/new.items/d01545.pdf

One section of the GAO Report addresses "shortcomings" of the FDA and FCC. In particular it underscored a brochure produced by FCC's Consumer Information Bureau that "puts the statement 'Cell Phones Cause Medical Problems' into the category of 'ficton,' noting that 'there is no scientific evidence that proves wireless phone usage can cause cancer, increased blood pressure, memory loss, or other health problems,' though research in continuing." Officials in the FCC's Office of Engineering and Technology were asked to comment on that statement. They concurred with the GAO that "this characterization could be misleading, because it implies that the health issue is settled."

GAO Report Conclusions –

Scientific research to date does not demonstrate that the radiofrequency energy emitted from mobile phones has adverse health effects, but the findings of some studies have raised questions indicating the need for further investigations . . . Given the long-term nature of much of the research being conducted – particularly the epidemiological and animal studies – it will likely be many more years before a definitive conclusion can be reached on whether mobile phone emissions pose any risk to humans health . . .

Given the prominence of the mobile phone health issue, FDA and FCC need to provide the public with clear, accurate, and timely information so that they can make informed decisions.

2003 - RFIAWG sent another letter to Chou at IEEE with three more RF concerns:

- **Exclusion of pinna** [ear lobe]. IEEE proposed to reclassify the earlobe as an "extremity" as if it is not part of the head.

If the pinna is to be considered an extremity and subjected to exposure limit of 20 W/Kg over 10 g of tissue, then a clear rationale for treating the pinna as an extremity should be presented. This rationale should include biological properties of the pinna that qualifies it for this exclusion. If thermal effects would be the basis for the ICES standard, then the thermophysiology of the pinna and the skin, bone and other head tissues adjacent to the pinna should be discussed.

- **Rationale for relaxation of current limits**

Federal agencies, as well as the general public and the public health community, are very concerned about a relaxation of exposure guidelines that may result in increased exposure in the future. A rationale should be presented for relaxation of standards. The rationale should include a clear explanation of the impact of the exposures that may result, i.e., the description of the exposures and the effects on critical tissues and organs. An explanation should be given as to why the current standard should be relaxed. The issue of safety factors should be also be addressed as part of the rational for relaxation of current limits.

- **Sensitivity of different tissues**

A clear explanation on how the revision has taken into account sensitivity of different tissues to temperature. Effects of acute and chronic exposure to elevated temperature should be revised standard a description of the risk analysis that was done.

What happened? The IEEE committee has not responded.

Frequently noted in the 2001 GAO Report is the CRADA (Cooperative Research and Development Agreement) between FDA and CTIA (Cellular Telecommunications and Internet Association). Outcomes of that CRADA at NTP and The National Academies of Science are:

2005 – NTP issues a Fact Sheet describing the FDA-nominated RF radiation study entitled: "Studies on Radiofrequency Radiation Emitted by Cellular Phones - Year 2005." It makes the following statements about the research upon which the current FCC Radiofrequency Radiation exposure guidelines are based:

. . . The existing exposure guidelines are based on protection from acute injury from thermal effects of RFR exposure. Current data are insufficient to draw definitive conclusions concerning the adequacy of these guidelines to be protective against any non-thermal effects of chronic exposures.

Studies in laboratory animals are considered crucial for understanding whether exposure to RFR is adverse to human health because meaningful data from epidemiological studies (human population studies) of cellular phone use will not be available for many years. This is due to the long latency period between exposure to a carcinogenic agent and the diagnosis of a tumor. Most scientific organizations that have reviewed the results from laboratory studies conducted to-date, however, have concluded that they are not sufficient to estimate potential human health cancer risks from low-level RFR exposures and long-term, multi-dose, animals studies are needed.

What is the NTP Doing?
The Food and Drug Administration (FDA) nominated RFR emissions of wireless communication devices to the [NTP] for toxicology and carcinogenicity testing. The NTP has carefully evaluated the efforts underway and concluded that while they have an excellent probability of producing high quality results, additional studies may be warranted to more clearly define any potential hazards to the U.S. population.

2007 – As negotiated in the FDA / CTIA CRADA, the National Academies of Science (NAS) convened a Workshop on Identification of Research Needs Relating to Potential Biological or Adverse Health Effects of Wireless Communication Devices. The NAS performs an unparalleled public service by bringing together committees of experts in all areas of scientific and technological endeavor. These experts serve pro bono to address critical national issues and give advice to the federal government and the public. Since its creation in 1863, the nation's leaders have often turned to the NAS for advice on the scientific and technological issues that frequently pervade policy decisions. See: www.nationalacademies.org/about/history.html

2008 - NAS issued its Report entitled: *Identification of Research Needs Relating to Potential Biological or Adverse Health Effects of Wireless Communication Devices,* which states that the FCC's RF Safety Guidelines do not take into account a number of factors needed to protect public health. See: www.nap.edu/catalog.php?record_id=12036

The committee judged that important research needs included, in order of appearance in the text, the following:

- *Characterization of exposure to juveniles, children, pregnant women, and fetuses from personal wireless devices and RF fields from base station antennas.*
- *Characterization of radiated electromagnetic fields for typical multiple-element base station antennas and exposures to affected individuals.*
- *Characterization of the dosimetry of evolving antenna configurations for cell phones and text messaging devices.*
- *Prospective epidemiologic cohort studies of children and pregnant women.*
- *Epidemiologic case-control studies of childhood cancers, including brain cancer.*
- *Prospective epidemiologic cohort studies of adults in a general population and retrospective cohorts with medium to high occupational exposures.*
- *Human laboratory studies that focus on possible adverse effects on electroencephalography activity and that include a sufficient number of subjects.*
- *Investigation of the effect of RF electromagnetic fields on neural networks.*
- *Evaluation of doses occurring on the microscopic level.*
- *Additional experimental research focused on the identification of potential biophysical and biochemical/molecular mechanisms of RF action.*

(p. 2)(Emphasis added.)

* * *

Children

1. *Prospective Cohort Studies of Pregnancy and Childhood. Children are potentially exposed from conception through maternal wireless device use and then postnatally when they themselves become users of mobile phones.*
2. *Case-control Study of Children Mobile Phone Users and Brain Cancer. Owing to widespread use of mobile phones among children and adolescents and the possibility of relatively high exposures to the brain, investigation of the potential effects of RF fields in the development of childhood brain tumors is warranted.*

(p.2)(Emphasis added.)

* * *

The body of the full NAS Report identifies the following issues as not being covered by existing research and therefore are not addressed in current RF safety policy: (Emphasis added.)

- *Are there differences in health effects of short-term vs. long-term exposure?*
- *Are there differences between local vs. whole-body exposures?*
- *Can the knowledge of biological effects from current signal types and exposure patterns be extrapolated to emerging exposure scenarios?*
- *Are there any biological effects that are not caused by an increase in tissue temperature (nonthermal effects)?*
- *Does RF exposure alter (synergize, antagonize, or potentiate) the biological effects of other chemical or physical agents?*
- *Are there differences in risk to children?*
- *Are there differences in risk to other subpopulations such as the elderly and individuals with underlying disease states?*

(pp. 11-12.)(Emphasis added.)

* * *

Laboratory Exposure Systems

Most of the present-day exposure systems used in laboratory studies focus on the exposure of the head. Though exposures to the head are relevant for most cell phone exposures, whole-body exposures due to base stations are a research need. The laboratory exposure systems also need to include ELF and pertinent modulation protocols.
(p. 17.) (Emphasis added.)

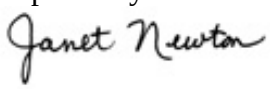
2009 – FDA's Center for Devices and Radiological Health asked for a private briefing on *The BioInitiative Repor*t in April of 2009. It was provided by *The Report's* co-editors David O. Carpenter MD, MPH, and Cindy Sage, MA. See: www.bioinitiative.org

What happened? The FDA has taken no action to protect children since the NAS Report was issued.

It is clear from the statements of the NAS Report as well as from the statements of federal experts in the RFIAWG and from the statements of the FDA and the NTP, all cited herein, that to date the question of adverse health effects from long-term exposure to cell phones to all subgroups of the American public has not been answered in the research record. Our US RF safety guidelines are based on this incomplete research record. Precaution for reducing the exposure of our most vulnerable citizens, i.e., children, pregnant women and the unborn, is warranted.

Children have no voice about their cell phone exposure. Adults in their lives along with policy makers make those decisions for them. I'm very unhappy that my three young grandchildren have no choice about what phone they are given to use. We need warning labels on cell phones so that parents make responsible, informed decisions about their children's future health.

Respectfully submitted by



Janet Newton. President
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