

EXHIBIT 5

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EMFs AND HEALTH What You Need To Know

What are EMFs (Electromagnetic Fields)?

- Produced by power lines
- Two types of fields – electrical and magnetic
- Electric field depends on voltage and is always present when the line is switched on
- Magnetic field is caused by flow and can vary greatly depending on usage
- Electric fields are stopped by most building materials, but magnetic fields penetrate most materials as if they weren't there
- When cables are buried the electrical field is zero. The magnetic field is higher right over the trench, but dissipates rapidly
- Most experts agree that potential health risks are primarily related to magnetic fields

RESEARCH

First study – 1974, published 1979 – by Dr. Nancy Wertheimer and Ed Leeper. Children who had died from cancer were 2 to 3 times more likely to have lived within 40 m (131 ft) of power lines than other children studied.

1988 – Denver and 1991 – Los Angeles – significant associations between living near power lines and childhood cancer

1989 – Dept of Energy – “It has now become generally accepted that there are, indeed, biological effects due to field exposure.”

1990 – EPA recommended that EMFs be classified as a Class B carcinogen – a “probable human carcinogen” and join the ranks of formaldehyde, DDT, dioxins, and PCB's.

Utility, military and other lobbyists came down hard on the EPA

Final revision did not include that classification, but did add the following explanation – “Several studies showing leukemia, lymphoma, and cancer of the nervous system in children exposed to EMFs, supported by similar findings in adults in several occupational studies also involving electrical power frequency exposures, show a consistent pattern of response that suggest a causal link.”

Even earlier, Brodeur reported employees working in the American Embassy in Russia were exposed to EMF when Russians bombarded the embassy with these fields to see if behavior would change.

Then the employees were exposed to even higher intensity fields from equipment the Americans used to jam the Russian transmitters. The employees were never informed, but nearly all of them ultimately died of cancer.

1992 – Sweden and 1993 – Mexico – increased leukemia incidence for children living near transmission lines.

1993 – Denmark – association for incidence of all childhood cancers.

2000 – Ahlbom and Greenland separately published large meta-analyses, that both found significant doubling in leukemia rates associated with exposure to EMFs of over 0.4 and 0.3 microT (microTesla – a unit of measurement of EMF), respectively.

2001 – a Working Group of the National Institute of Environmental Health and Science with the support of the EMF Research and Public Information Dissemination Program classified EMF as a Group 2B “possible carcinogen”. The full International Agency for Research on Cancer validated that classification that same year. Most governments restrict human access to substances similarly classified.

The World Health Organization in an Oct, 2001 Fact Sheet recommends that power line “siting decisions should also consider ways to reduce peoples’ exposure in addition to considering aesthetics and people’s sensibilities.”

2002 – California Dept of Health Sciences Evaluation – 9 year, \$7 million project – “EMFs can cause (underlining added) some degree of increased risk of childhood leukemia, adult brain cancer, Lou Gehrig’s disease, and miscarriage.” Also “EMFs may cause suicide and adult leukemia. This was an important study because it uses as a standard causation rather than association.

Washington State Dept of Health – Their report suggests EMF is a key cause of the four-fold increase in the incidence of childhood leukemia between 1920 and 1960. “The most remarkable feature of childhood leukemia has been the development of a childhood peak of incidence at ages two through four... Worldwide, the emergence of this peak tracks electrification. Even today, places without electrification do not show this peak.”

United Kingdom’s National Radiological Protection Board may reduce its limits for EMF exposures. New reports suggest that the NRPB will require homes to be at least 150 meters (approx 450 ft) away from power lines.

2002 – Dr. Paul Vailleneuve, Univ of Ottawa – those exposed to 0.6 microT EMF increased by a factor of 12 their odds of developing an aggressive brain tumor known as glioblastoma multiforme.

2005 – Draper – pooled data from 1962-1995 – 29,081 matched case-control pairs (9700 for leukemia) – 70% increase in childhood leukemia for those living within 200m (656 ft) of an overhead transmission line and a 23% increase for those living between 200m and 600m (1969 ft). (Data came from England and Scotland where the highest voltage lines are 400 kV)

St. Jude’s Children’s Hospital – one of the first questions asked of new cancer patients – “Do you live near a power line?”

2003 – reports that the European Union plans to limit power line magnetic field emissions. Switzerland has already limited them to 1.0 microT and Spain has declared such emissions to violate human rights.

Lloyds of London is now refusing insurance coverage to power generating companies against damage to workers’ and consumers’ health.

Dr. David Carpenter, Dean at the School of Public Health, State University of New York believes it is likely that up to 30% of childhood cancers come from exposure to EMFs.

EPA warns – “There is reason for concern.”

Martin Halper, EPA’s Director of Analysis and Support says, “I have never seen a set of epidemiological studies that remotely approached the weight of evidence that we’re seeing with EMFs. Clearly there is something there.”

BioInitiative Working Group, August 2007 –

Not everything is known yet about this subject (EMFs); but what is clear is that the existing public safety standards limiting these radiation levels in nearly every country of the world look to be thousands of times too lenient. Changes are needed.

There is little doubt that exposure to ELF causes childhood leukemia.

There is no excuse for ignoring the substantial body of evidence we already have that supports an association between breast cancer and ELF exposure; waiting for conclusive evidence is untenable given the enormous costs and societal and personal burdens caused by this disease.

It may be reasonable now to make the assumption that all cancers, and other disease endpoints might be related to, or worsened by exposures to EMFs.

It is no longer acceptable to build new power lines and electrical facilities that place people in ELF environments that have been determined to be risky (ELF of greater than 1 mG).

SUMMARY

Evidence points towards an association between exposure to EMFs and childhood leukemia, adult leukemia, adult brain cancer, neurodegenerative diseases (Lou Gehrig’s), miscarriage, and clinical depression.

At least one large study found a doubling in risk for Alzheimer’s disease.

EMFs may cause DNA breakage and immune system malfunction

EMFs interfere with pacemaker function and the use of defibrillators.

May be related to chronic fatigue, headaches, and reproductive dysfunction.



SECTION I

Preface

Prepared for the BioInitiative Working Group
December 2012

PREFACE

Today, the BioInitiative 2012 Report updates five years of science, public health, public policy and global response to the growing health issue of chronic exposure to electromagnetic fields and radiofrequency radiation in the daily life of billions of people around the world.

The BioInitiative 2012 Report has been prepared by 29 authors from ten countries*, ten holding medical degrees (MDs), 21 PhDs, and three MsC, MA or MPHs. Among the authors are three former presidents of the Bioelectromagnetics Society, and five full members of BEMS. One distinguished author is the Chair of the Russian National Committee on Non-Ionizing Radiation. Another is a Senior Advisor to the European Environmental Agency. As in 2007, each author is responsible for their own chapter.

The great strength of the BioInitiative Report (www.bioinitiative.org) is that it has been done independent of governments, existing bodies and industry professional societies that have clung to old standards. Precisely because of this, the BioInitiative Report presents a solid scientific and public health policy assessment that is evidence-based.

The BioInitiative Report was first posted in August 2007. It still has a significant international viewing audience. Each year, about 100,000 people visit the site. In the five years since its publication, the BioInitiative website has been accessed over 10.5 million times, or four times every minute. Every five minutes on the average, a person somewhere in the world has logged on. More than 5.2 million files and 1 million pages of information has been downloaded. That is equivalent to more than 93,000 full copies of the 650+ page report (288.5 million kbytes).

The global conversation on why public safety limits for electromagnetic and radiofrequency fields remain thousands of times higher than exposure levels that health studies consistently show to be associated with serious health impacts has intensified since 2007. Roughly, 1800 new studies have been published in the last five years reporting effects at exposure levels ten to hundreds or thousands of times lower than allowed under safety limits in most countries of the world. Yet, no government has instituted comprehensive reforms. Some actions have been taken that highlight partial solutions. The Global Actions chapter presents milestone events that characterize the international 'sea change' of opinion that has taken place, and reports on precautionary advice and actions from around the world.

* Sweden (6), USA (10), India (2), Italy (2), Greece (2), Canada (2), Denmark (1), Austria (2), Slovak Republic (1), Russia (1)

The world's populations – from children to the general public to scientists and physicians – are increasingly faced with great pressures from advertising urging the incorporation of the latest wireless device into their everyday lives. This is occurring even while an elementary understanding the possible health consequences is beyond the ability of most people to grasp. The exposures are invisible, the testing meters are expensive and technically difficult to operate, the industry promotes new gadgets and generates massive advertising and lobbying campaigns that silence debate, and the reliable, non-wireless alternatives (like wired telephones and utility meters) are being discontinued against public will. There is little labeling, and little or no informed choice. In fact there is often not even the choice to stay with safer, wired solutions, as in the case of the 'smart grid' and smart wireless utility metering, an extreme example of a failed corporate-governmental partnership strategy, ostensibly for energy conservation.

A collision of the wireless technology rollout and the costs of choosing unwisely is beginning and will grow. The groundwork for this collision is being laid as a result of increased exposure, especially to radiofrequency fields, in education, in housing, in commerce, in communications and entertainment, in medical technologies and imaging, and in public and private transportation by air, bus, train and motor vehicles. Special concerns are the care of the fetus and newborn, the care for children with learning disabilities, and consideration of people under protections of the Americans With Disabilities Act, which includes people who have become sensitized and physiologically intolerant of chronic exposures. The 2012 Report now addresses these issues as well as presenting an update of issues previously discussed.

Signed:



Signed:



David Carpenter, MD
Co-Editor
BioInitiative Report

Cindy Sage, MA
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BioInitiative 2012

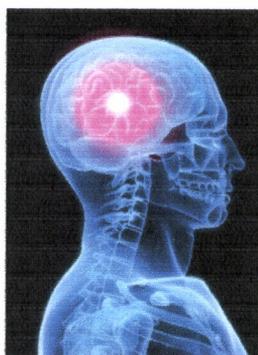
A Rationale for Biologically-based Exposure Standards for Low-Intensity Electromagnetic Radiation

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Why We Care?

The stakes are very high.



Human beings are bioelectrical systems. Our hearts and brains are regulated by internal bioelectrical signals. Environmental exposures to artificial EMFs can interact with fundamental biological processes in the human body. In some cases, this may cause discomfort, or sleep disruption, or loss of wellbeing (impaired mental functioning and impaired metabolism) or sometimes, maybe it is a dread disease like cancer or Alzheimer's disease. It may be interfering with ones' ability to become pregnant, or carry a child to full term, or result in brain development changes that are bad for the child. It may be these exposures play a role in causing long-term impairments to normal growth and development of children, tipping the scales away from becoming productive adults. We have good evidence these exposures can damage our health, or that of children of the future who will be born

to parents now immersed in wireless exposures.

In the United States, the deployment of wireless infrastructure (cell tower sites) to support cell phone use has accelerated greatly in the last decades. The spread of cell towers in communities, often placed on pre-school, church day-care, and school campuses means that young children can have thousands of times higher RF exposures in home and school environments than existed even 20-25 years ago. CTIA estimates that in 1997 there were only 36,650 cell sites in the US; but increased rapidly to 131,350 in June 2002; 210,350 in June 2007 and 265,561 in June 2012 (CTIA, 2012). About 220,500 cell sites existed in 2008. These wireless antennas for cellular phone voice and data transmission produce whole-body RFR exposures over broad areas in communities that are an involuntary and unavoidable source of radiofrequency radiation exposure. Further, the nearly universal switch to cordless and cell phones, and away from corded landline phones means close and repetitive exposures to both EMF and RFR in the home. Other new RFR exposures that didn't exist before come from WI-FI access points (hotspots) that radiate 24/7 in cafes, stores, libraries, classrooms, on buses and trains, and from personal WI-FI enabled devices (iPads, tablets, PDAs, etc). The largest single source of community-wide, pervasive RFR yet rolled out is the 'smart meter' infrastructure. This program places a wireless device (like a mini-mobile phone base station) on the wall, replacing the electromechanical (spinning dial) meter. They are to be installed on every home and classroom (every building with an electric meter). Utilities from California to Maine have installed tens of millions already, despite health concerns of experts and enormous public resistance. The wireless meters produce spikes of pulsed radiofrequency radiation 24/7, and in typical operation, will saturates living space at levels that can be much higher than already reported to cause bioeffects and adverse health effects (utilities can only say they are compliant with outdated federal safety standards, which may or may not always be true - see <http://sagereports.com/smart-meter-rf>). These meters, depending on where they are placed relative to occupied space in the home or classroom, can produce RFR exposure levels similar to that within the first 100 feet to 600 feet of a mobile phone base station (cell tower).

The cumulative RFR burden within any community is largely unknown. Both involuntary sources (like cell towers, smart meters and second-hand radiation from the use of wireless devices by others) plus voluntary exposures from ones' personal use of cell and cordless phones, wireless routers, electronic baby surveillance monitors, wireless security systems, wireless hearing aids, and wireless medical devices like implanted insulin pumps all add up. No one is tallying up the combined exposure levels. Billions of new RFR transmitters from

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the smart meter rollout alone will raise the baseline RFR levels, and will significantly add to the existing RFR background.

Sometimes, science does not keep pace with new environmental exposures that are by-products of useful things we want to buy and use in society. So, the deployment runs ahead of knowledge of health risks. It is an old story. This is the case for EMF and RFR, and this Report underscores the critical need to face difficult questions, make mid-course corrections, and try to repair the damage already done in this generation, and to think about protecting future generations.

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BioInitiative 2012

A Rationale for Biologically-based Exposure Standards for Low-Intensity Electromagnetic Radiation

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Do We Know Enough to Take Action?

There is more evidence than we need.

The last five years worth of new scientific studies tell us the situation is much worse than in 2007 and yet people around the world have so much more daily exposure than even five years ago. Exposures are linked to a variety of adverse health outcomes that may have significant public health consequences. When added across billions of people world-wide, no argument for the status quo can be persuasive now.

In twenty-one technical chapters of this 2012 update, the contributing authors discuss the content and implications of about 1800 new studies. Overall, there is reinforced scientific evidence of risk where there is chronic exposure to low-intensity electromagnetic fields and to wireless technologies (radiofrequency radiation including microwave radiation).

There is more evidence in 2012 that such exposures damage DNA, interfere with DNA repair, evidence of toxicity to the human genome (genes), more worrisome effects on the nervous system (neurology) and more and better studies on the effects of mobile phone base stations (wireless antenna facilities or cell towers) that report lower RFR levels over time can result in adverse health impacts. There has been a big increase in the number of studies looking at the effects of cell phones (on the belt, or in the pocket of men radiating only on standby mode) and from wireless laptops on impacts to sperm quality and motility; and sperm death (fertility and reproduction).

In other new studies of the fetus, infant and young child, and child-in-school – there are a dozen or more new studies of importance.

The 2007 BioInitiative Report was prepared by world-recognized experts in science and public health policy. Outside reviewers also contributed valuable content and perspective. It was concluded even in 2007 that existing public safety limits were inadequate to protect public health, and agreed that new, biologically-based public safety limits were needed five years ago. The public health cost of doing nothing was judged to be unacceptable in 2007. This did nothing to change the rules, nor roll back the technology tsunami of wireless-everywhere.

The levels of exposure we face in 2012 are higher, and have crept into every day life, even for children. The levels at which undesirable effects on health and well-being are seen is much lower. The levels of concern at have dropped lower in 2012 by 10s to 100s of times. There is much greater involuntary exposure, and it is nearly unavoidable even for people who choose not to 'go wireless' (second-hand radiation effects). Safe forms of communication by land-line telephone are being phased out without general public knowledge or agreement. There is no informed consent for consumers (warning labels on cell phones, for example, have been defeated by telecom industry lobby groups). It is still difficult or impossible for a consumer to get reliable information on levels of exposure from wireless devices. It is simply beyond the reach of people to identify where excessively high levels of exposure occur in their communities, and it is very rare for a county or state health department to accommodate requests for information or provide measurements.

Today the evidence is stronger than ever and it may be placing people at risk, but most people have no idea. There is little indication that cell phone users (whose numbers have risen from roughly 2 billion in 2006 to 6 billion users globally in 2012) are aware of the risks. In that time, whole-body exposures from other RFR sources like WI-FI, WI-MAX, smart grids using wireless utility meters, and vast commercial applications of wireless RFR (in commerce, transportation, in banking, in surveillance and monitoring, in medical imaging and ironically in health care record-keeping and learning environments for education – all these new applications of wireless over wired communications and data transmission add to the RFR saturation in cities.

Wireless laptops and wireless internet in schools, and home offices and for homework mean even more chronic exposures to RFR, a designated IARC 2B Possible Human Carcinogen (May 31, 2011).

The range of possible health effects that are adverse with chronic exposures has broadened. The most serious health endpoints that have been reported to be associated with extremely low frequency (ELF) and/or radiofrequency radiation (RFR) include childhood and adult leukemia, childhood and adult brain tumors, and increased risk of the neurodegenerative diseases, Alzheimer's and amyotrophic lateral sclerosis (ALS). Recent studies largely reinforce the potential risks to health (rather than reducing our concerns, or providing actual indications of safety). In addition, there are reports of increased risk of breast cancer in both men and women, genotoxic effects (DNA damage, chromatin condensation, micronucleation, impaired repair of DNA damage in human stem cells), pathological leakage of the blood-brain barrier, altered immune function including increased allergic and inflammatory responses, miscarriage and some cardiovascular effects. Insomnia (sleep disruption) is reported in studies of people living in very low-intensity RFR environments with WI-FI and cell tower-level exposures. Short-term effects on cognition, memory and learning, behavior, reaction time, attention and concentration, and altered brainwave activity (altered EEG) are also reported in the scientific literature. Biophysical mechanisms that may account for such effects can be found in various articles and reviews.

We could do otherwise. Each wireless need had a wired solution in counterpart that has none of the health effects that wireless RFR does, with the exception of cell phone use for talking directly to someone. It is time to re-think the wireless tsunami and educate people about health, privacy and security risks. It is past time to develop new safety standards. It is necessary now to look to less harmful ways to communicate, move ourselves from place to place, shop, sleep, recreate, save energy, and educate our children in school. It is time to rethink our global commerce, energy, banking, transportation and communications infrastructures so we are all committed to sustaining healthy living spaces and conserve safe sanctuary for all species on earth.

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