

STATEMENT OF DAVID O. CARPTENTER, M.D.
COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM
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My name is David Orlo Carpenter, and I am a public health physician whose major research interest is the study of environmental causes of human disease. I have over 300 publications in peer-reviewed scientific journals. After graduation from Harvard Medical School, I spent 15 years working in federal research laboratories, first at the National Institute of Mental Health and then for the Armed Forces Radiobiology Research Institute, where I first became involved in questions concerning the health effects of electromagnetic fields. I left Bethesda in 1980 to become the Director of the Wadsworth Center for Laboratories and Research of the New York State Department of Health, the third largest public health laboratory in the US. In 1985, I became the founding Dean of the School of Public Health of the University at Albany, created as a partnership between the University and the Department of Health. I held this position until 1998, when I became the Director of the Institute for Health and the Environment and Professor of Environmental Health Sciences at the University at Albany, the positions I hold today. Public health is the profession that attempts to prevent disease in the general population, rather than providing direct medical care to individuals.

Two weeks before my arrival in Albany a settlement was reached between two state agencies over the question of possible health effects of high voltage powerlines. Upon arrival I was given the task of serving as the Executive Secretary of the New York State Powerlines Project. Funded by assessments of state utilities, this five million dollar research program confirmed earlier reports indicating that exposure to magnetic fields emitted from electricity increases the risk of childhood leukemia. After the final report was issued in 1987, I became the spokesperson for New York State on issues related to electromagnetic fields. Since that time I have served on several national committees on the subject, edited two books on the *Biological Effects of Electric and Magnetic Fields* (Carpenter and Aryapetyan, 1994 a and b), and served as the Co-Editor of the Bioinitiative Report (Carpenter and Sage, 2007), published last August. I am also the co-author of the chapter in the Bioinitiative Report which deals with the public health implications of electromagnetic fields, and makes recommendations for new exposure guidelines for both powerline frequency and radiofrequency fields. An expanded version of this chapter has been published separately in a scientific journal (Carpenter and Sage, 2008).

The Bioinitiative Report is authored by an international team of scientists, each with specific areas of expertise. The motivation for this report was the consensus among the authors that recent national and international reviews are excessively conservative and that current exposure guidelines do not adequately protect the health of the public. The central conclusions with regard to cell phones and new evidence that has appeared since are as follows:

1. There are literally hundreds of studies that have demonstrated that radiofrequency electromagnetic fields, at intensities that do not cause measureable tissue heating, have harmful effects in animals and isolated human cells (see Carpenter and Sage, 2007). Some of these actions (altered gene induction, production of heat stress proteins, production of reactive oxygen species, altered hormonal levels, altered regulation of cellular calcium and indirect DNA damage) are changes known to be associated with the development of cancer.
2. There have been a number of studies investigating the relation between cell phone use and development of brain cancer. Most of these have not reported an increased risk, but almost

all of the negative studies have been of individuals using a cell phone for a relatively brief period of time. Recent studies, primarily from Scandinavia where cell phones were first manufactured and where there has been longer use as compared to the US, are finding significant increases in risk of brain cancer among individuals who have used a cell phone for ten or more years. In a meta-analysis of ten studies of glioma, Hardell et al. (2008) found a doubling of the risk of developing a brain tumor on the side of the head that the patient held a cell phone, with no elevated risk on the other side of the head. Similar results were found upon analysis of nine studies of acoustic neuroma, a space-occupying tumor of the 8th cranial nerve. They found a 2.4-fold increase in acoustic neuroma but only on the side of the head where the patient utilized the cell phone.

3. Studies from Israel (Sadetzki et al., 2008) have reported about a 50% elevation in the risk of parotid gland cancer among individuals who have used a cell phone for long periods of time, but only on the side of the head on which the patient held his/her cell phone. The parotid gland is one of the salivary glands and is located in the cheek where it is exposed to the radiofrequency emissions from a cell phone.
4. Studies from Korea (Ha et al., 2007) report highly significant increases in rates of leukemia in children living near AM radio transmission towers. Leukemia is the same cancer that is elevated in children as a result of exposure to powerlines. This observation, in light of those cancers found with cell phone usage, suggests that when the full body is exposed to radiofrequency radiation the risk is greatest for leukemia, but that when the exposure is localized, as it is to one side of the head with cell phones, then one sees cancers of the brain, auditory nerve and parotid gland.
5. Very recent studies from Sweden show that young children are at particularly elevated risk from exposure to radiofrequency fields. At a meeting of the Royal Society in London earlier this month, Hardell reported a 40% increase in risk of glioma among individuals of all ages if they had used a cell phone, but a 5.2-fold increase in risk if they were under 20 years of age when they began cell phone usage. This observation is consistent with a large body of scientific studies that demonstrate that children are more vulnerable than adults to carcinogens (Ginsberg, 2003), and poses particular concern because of the widespread use of cell phones by children of all ages today.

The current exposure standards in the US and around the world are based on the assumption that radiofrequency fields are without serious biological effects at intensities that are not adequate to cause tissue heating. The observations listed above demonstrate that this assumption is simply wrong. There are many in the physics and engineering communities that consider it impossible for electromagnetic fields which are not of sufficient energy to directly break chemical bonds to cause harmful effects, and this is the mentality that explains why exposure standards are set as high as they are. This belief ignores the complexities of biology. Setting standards on the basis of this assumption is unjustified, given the evidence in animal and cellular studies and especially in human populations demonstrating a direct relationship between cell phone use and cancer.

Current US standards for uncontrolled public exposure to radiofrequency radiation are about 1,000 times higher than the levels which appear to increase the risk of cancer on prolonged exposure. It is not clear that exposure to radiofrequency electromagnetic fields is safe at any level, but it is very clear that our current standards are incompatible with the evidence of human disease resulting from cell phone exposures. As with other environmental exposures, the scientific evidence indicates that the risk increases with both the intensity and duration of exposure.

On September 4, 2008, the European Parliament passed a resolution stating “the limits on exposure to electromagnetic fields which have been set for the general public are obsolete...and do not address the issue of vulnerable groups, such as pregnant women, newborn babies and children”. We call on the US Congress to give similar attention to this issue. There needs to be consideration of biologically-based standards of exposure by the Federal Communications Commission and international agencies. There needs to be health-based warnings, especially designed to protect children, issued by those federal agencies whose responsibility it is to provide such information to the public, including the Centers for Disease Control, the National Institutes of Health and the Environmental Protection Agency. It is essential that the communications industry work to develop technology that will allow the public to enjoy the benefits of the wireless age without associated serious health risks.

Certainly, more research is needed in order to determine the exact magnitude of the risk of cancer from exposure to radiofrequency radiation. The exposure assessment in the studies done to date is poor, often relying on an individual’s memory of how frequently they used a cell phone over many years, or whether or not an individual owned a cell phone. The limitations in exposure assessment are likely to lead to an underestimation of the actual risk. The evidence available now poses the frightening strong possibility that we are facing an epidemic of brain cancer and other cancers in the future as a result of the uncontrolled use of cell phones. Of particular concern is the fact that many children spend hours on cell phones, with no warning to them, their parents or physicians indicating that this may be dangerous. While the risks are not solely to children, they are the most vulnerable and should have the possibility of a long life free from brain cancer. Precaution is warranted, even in the absence of absolutely final evidence concerning the magnitude of the risk. We must not repeat the situation we had with the relationship between smoking and lung cancer, where we as a nation waited until every “i” was dotted and “t” was crossed before warnings were issued. We have enough evidence to act now to reduce exposure through education, setting appropriate standards and development of technology that will allow us to safely use cell phones and other wireless devices.

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