

# **Statement for the Record**

***Subcommittee on Labor, Health and Human Services,***

***Education, and Related Agencies***

***Committee on Appropriations***

***United States Senate***

***September 14, 2009***

***Hearing on “The Health Effects of Cell Phone Use”***

**Statement of**

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My name is Dr. Robert N. Hoover. I am the Director of the Epidemiology and Biostatistics Program of the National Cancer Institute (NCI), part of the National Institutes of Health, an agency of the U.S. Department of Health and Human Services. As Director of this Program, I have established ongoing programs of research in a variety of areas of cancer epidemiology, including the role of environmental, hormonal, and genetic factors in cancer etiology. I am also responsible for the oversight of the Radiation Epidemiology Branch, which conducts and follows research related to radio frequency (RF) radiation and low frequency electromagnetic fields (EMF), as well as ionizing radiation. I have been asked by the Committee to prepare written testimony for the record for this hearing on Cell Phones and Health.

The following is a brief summary of the scientific evidence on the topic of cell phones and risk of brain cancer that I presented in September 2008 at a Congressional Hearing on the subject.

As an epidemiologist my statement will focus on studies of risk in human populations. It is also important to note on the biologic side that the radio frequency [RF] radiation from cell phones is billions of times lower than the energy of an x-ray. As such, its effect in the body appears to be insufficient to produce the genetic damage typically associated

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with developing cancer. To date, no alternative mechanism about how this exposure might result in cancer has been vetted adequately.

In descriptive data from the large networks of population-based registries funded by NCI, there has been no meaningful increase in the incidence of brain or other nervous system cancers from 1987 through 2005, a time period when cell phone use increased 10-fold. In the earliest analytic epidemiologic studies, including one conducted by the NCI, self-reported frequency and patterns of cell phone use were compared between patients diagnosed with brain or nervous system tumors (known as cases) and patients (or controls) with other diseases – an investigation known as a case-control study. These studies found no convincing evidence of an association between cell phone use and glioma, a malignant tumor of the brain, or for meningioma or acoustic neuroma, two generally benign [non-cancerous] tumors of the nervous system. However, these studies pointed out that future investigation would be needed to evaluate the potential effect of long-term use, as well as changing cell phone technology. As a result, a new generation of cell phone studies is emerging.

Brain cancer is a very difficult disease to study well in an epidemiologic study. Much of the disease can be rapidly fatal, and the tumor, and its treatment can impair cognitive function. Cases may participate at a different rate than controls, and answers to questions may be altered for someone who knows they have a specific condition. Given all of this, it is not surprising that there is a fair amount of inconsistency within and between many of these studies. I will therefore focus on only the larger and better designed of these studies.

Perhaps the most notable of these is a large collaborative project that includes individual studies from 13 different countries, collectively known as INTERPHONE. These case-control studies use a common study protocol to obtain more detailed information over a more recent time period about the frequency and patterns of cell phone use, as well as other measures of RF exposure in a wide variety of countries (Australia, Canada, Denmark, Finland, France, Germany, Israel, Italy, Japan, New Zealand, Norway, Sweden and the United Kingdom). Analyses of data from individual centers and those pooled from some, but not all, of the individual countries have been published. These individual studies found no evidence of an overall increase in the risk of any type of brain tumors associated with the first 10 years of cell phone use. No increased risk has been found in relation to several measures of exposure, including time since first use, lifetime years of use, the number of calls, the hours of use, and the use of analog vs. digital phones.

In some studies, a somewhat increased risk has been found for tumors diagnosed on the same side of the head used for speaking on cell phones among those with more than 10 years of cell phone use. However, these findings are based on small numbers (generally less than 5% of cases under study) and are not consistently seen across all studies. We anticipate that when published, the combined INTERPHONE analysis, including all the centers in the original study, will provide a much larger number of long-term users; evaluation of different exposure metrics and latency; a formal assessment of the

consistency in study-specific results; and more comprehensive and statistically stable risk estimates. This could bring considerable clarity to the current state of the science.

In another noteworthy study, Danish investigators followed up cell phone subscribers over time and found no increased risk of brain tumors among the subscribers. This type of study – called a prospective study – has the advantage of not having to rely on people’s ability to remember their past cell phone use, which could be inaccurate or biased.

As for all such investigations, the INTERPHONE study and the Danish prospective study have certain weaknesses as well. However, overall these studies probably provide the highest quality information on the effects of long-term use of cell phones to date.

We know that cell phone use is increasing rapidly among children and adolescents. They are a potentially sensitive group because their small head size could result in higher RF exposure and the young brain may be more sensitive. To date, there are no published studies in the peer-reviewed literature regarding the risk of cancer and cell phone use in children. However, there are ongoing studies in Europe that will soon be able to provide information on the risk from cell phone use among children.

#### Summary

- Thus far, brain cancer incidence trends in the US are unrelated to patterns of cell phone use.
- Most analytic studies indicate no overall increased risk of brain tumors within first 10 years of use.
- There are no consistent findings of increased risk across many different ways of measuring increased dose.
- There are some isolated findings of increased risk in some dose and population subgroups, but larger studies and replication in different study designs are needed to sort out the roles of chance and bias from findings worth pursuing.
- Potential risks associated with childhood exposure have not been assessed.
- Insight into these last 2 points may come relatively soon from ongoing analyses of the overall INTERPHONE study, and from a European case-control study of childhood cancer.

Thank you for the opportunity to present this information to you.