TUMORS AND CELL PHONE USE: WHAT THE SCIENCE SAYS

HEARING

BEFORE THE

SUBCOMMITTEE ON DOMESTIC POLICY

OF THE

COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM

HOUSE OF REPRESENTATIVES

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TUMORS AND CELL PHONE USE: WHAT THE SCIENCE SAYS

THURSDAY, SEPTEMBER 25, 2008

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON DOMESTIC POLICY,
COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM,
Washington, DC.

The subcommittee met, pursuant to notice, at 11 a.m., in room 2154, Rayburn House Office Building, Hon. Dennis J. Kucinich (chairman of the subcommittee) presiding.

Present: Representatives Kucinich, Issa, Watson, Higgins, and Burton.

Staff present: Jaron R. Bourke, staff director; Jean Gosa, clerk; Charisma Williams, staff assistant; Vic Edgerton, legislative director, Office of Congressman Dennis J. Kucinich; Leneal Scott, information systems manager; Charles Phillips, minority senior counsel; Jason Scism, minority counsel; and William O'Neill, minority senior professional staff member.

Mr. KUCINICH. The committee will come to order.

Before we begin, I just want to thank all of you for being here but share with you that we are at a time in our Nation's history where there are events that have developed of great import with respect to the economy. I felt it was necessary to go forward with this hearing particularly because so many people made efforts to be here and because of the importance of the subject.

There will be Members of Congress who will be coming in and out during the course of this hearing, I am hopeful. The ranking member, Mr. Issa, who is also very involved in some of the economic issues that we are talking about, has communicated to me that he asked me to start the hearing without him. Usually, we start with he and I beginning together, but with Mr. Issa's permission I am going to begin so that we can move quickly to get the testimony on the record of the people who are here today.

So this is the Committee on Oversight and Government Reform, Subcommittee on Domestic Policy. I am Congressman Dennis Kucinich, the chairman of the subcommittee.

Today's hearing will examine what science is saying about the potential links between long-term use of cell phones and tumors or other health effects.

Without objection, the Chair and the ranking minority member will have 5 minutes to make opening statements followed by opening statements not to exceed 3 minutes by any other Member who appears and seeks recognition.

And, without objection, Members and witnesses may have five legislative days to submit a written statement or extraneous materials for the record.

Cell phones have evolved from a clunky novelty to a sleek utility. They have become indispensable and, for many, inseparable from modern life. They are everywhere in America, Europe and some parts of Asia.

While consumer demand for cell phones has grown and as the technology has evolved to give consumers more options and faster connectivity, a vigorous debate has been taking place among scientists about whether long-term use of cell phones causes tumors in the people who use them.

Recently, the debate caught the public's attention with the publication in July of a warning from a preeminent oncologist about the human health effects of cell phone use. We are fortunate to have the author of that memorandum as well as a distinguished group of individuals as witnesses before this committee today.

I regret that the CTIA, the association of the wireless telecommunications industry, declined our invitation to testify. By their refusal, unfortunately, they deny this Congress and the public the benefit of their testimony and the opportunity to pose questions and to hear answers. I hope that the wireless industry will reconsider their decision, should the subcommittee determine it would be beneficial to hold further hearings on this matter.

However, I am grateful to the minority of the subcommittee for identifying another highly qualified expert from the National Cancer Institute. I am confident that he will add immeasurably to the hearing.

I am proud to say that this subcommittee's partnership and spirit of cooperation with the minority is the rule rather than the exception, and I want to thank them, thank Mr. Issa, for engaging in this hearing.

In exploring this topic, it is my belief that the complicated scientific questions should be left to scientists. I challenge our witnesses today to answer the questions posed by members of the subcommittee clearly and to challenge each other as well.

In typical public debates over potential links between an environmental exposure and a health problem, convention is that the message must be black and white. On one side, the charge is made, explicit or implicit, that there is no scientific doubt about a certain health effect from the exposure of concern. On the other side, the relevant industry defends its product with the scientific assertion that there is no evidence that exposure to X causes health effect Y.

Often, the reality and the science lie somewhere in between.

My hope is that we can improve the public's and Congress' understanding about the gray area in this scientific debate. Today, we will let experts present the evidence, discuss the studies and describe the limitations of what is known and what can be implied from the data that we have.

The question before us then is whether the evidence is sufficient to merit action by regulators and legislators to protect public health.

What have other national government health authorities done to protect their people based on the same scientific data?

What should Congress or the administration do, if anything, here in the United States?

At this point, I want to recognize and welcome the distinguished ranking member of our subcommittee, Congressman Darrell Issa of California.

Mr. Issa and I have worked together as partners in this subcommittee. Where we have our differences, we differ in a manner that is collegial. But where we agree, we have opportunities to really make some profound difference.

I want to thank Mr. Issa for his presentation and for his presence here. Thank you.

[The prepared statement of Hon. Dennis J. Kucinich follows:]

Opening Statement
Dennis Kucinich, Chairman
Domestic Policy Subcommittee
Oversight and Government Reform Committee
"Tumors and Cell Phone Use: What the Science Says."
Thursday, September 25, 2008
2154 Rayburn HOB
11:00 A.M.

Cell phones have evolved from a clunky novelty to a sleek utility. They have become indispensable and, for many, inseparable from modern life. They are everywhere in America, Europe and some parts of Asia. While consumer demand for cell phones has grown, and as the technology has evolved to give consumers more options and faster connectivity, a vigorous debate has been taking place among scientists about whether long term use of cell phones causes tumors in the people who use them. Recently, that debate caught the public's attention with the publication in July of a warning from a preeminent oncologist about the human health effects of cell phone use.

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Often, the reality – and the science – lies somewhere in between.

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Mr. ISSA. Thank you, Mr. Chairman. As you said quite rightly, we come from different parties and we have reached different conclusions on where government should go, but when it comes to the conclusion that science has to drive the decision process, we have no differences.

This is an important hearing today. It is important for a number of reasons.

First of all, I understand it has been 15 years since the last time a hearing like this was held.

Second, as somebody who spent his career both in the military and then more extensively for 20 years in business, producing radio frequency products, I am acutely aware that in fact there is a link at some point along the spectrum to cancer.

Now I say that not to say that today we will hear any conclusive evidence as to cell phones. We don't have that, and I think quite frankly we deserve to get it.

But we do know that, for example, x-rays being used to measure shoes extensively decades ago led to a higher incidence of cancer, and in fact today, although valuable, we know to limit x-rays to that which is essential. All our medical personnel here would say the same thing, that we don't unreasonably expose ourselves to x-rays even though we avail ourselves of the benefits.

UV rays, there are many people in the stands today who have suntans. If they are like me, they are natural. If, in fact, they were gleaned from the sun, then you know that you do it at a significant peril that has been well documented.

These rays are no different than any other rays, any other bandwidth. There is a potential for damage at some level. In many cases, as I say, we have studied it. We know a little bit about x-rays. We know about ultraviolet.

It is very clear that we need to know more about the rest of the spectrum, at 40 hertz, 60 hertz, at 400 megahertz, at 800 megahertz and well into the gigahertz bands.

The National Cancer Institute and the World Health Organization and the American Cancer Society claim that no link has been demonstrated to date. There may be no link, but it is also very clear that if there is a link at some level in almost any radiation, that we do need to know what is safe and unsafe.

As I said, I spent more than two decades in the business, producing radio frequency products. Our company meticulously adhered to the FCC standards. Those standards were primarily designed to prevent a product from interfering with other products within the spectrum. That is a good standard and appropriate.

We need to find similar good standards for exposure to any bandwidth of any device.

I say this not to say for a moment that I know that there is a link specifically anywhere close to the amount of radiation that is going out today, but I would say that the wireless industry has played no small role in the advancement and benefit to the American people. In the last 30 years, the wireless industry has changed our lives for the better in so many ways.

Today, with great regret, we will hear from Mrs. Marks about the fact that she deals with an impossible situation of cancer that may or may not have been caused by the extensive use of a product

by—I am sorry—your son, I believe. Your husband, I apologize. And we will hear that.

The fact is I don't know. I do know that you are dealing with a difficult health problem and certainly one that all of us have sympathy for today.

We owe it today to hear what we can hear and learn what we can learn.

Mr. Chairman, I pledge to you that on a bipartisan basis in the next Congress, we will continue the work that we have been doing and take it to the next level of finding out what studies, what additional research we can co-author in order to find out what we cannot necessarily answer here today.

In closing, Mr. Chairman, I once lived under power lines, 20,000 volt power lines. I enjoyed the extra back yard. I felt no particular fear that the high voltage lines were going to hurt me. Today, I still don't.

But many people, when I went to sell that house, enjoyed the extra back yard and were willing to pay for it. Many others looked and said: How could you live underneath these? Don't you know it causes cancer?

The American people deserve their government to answer the questions about radiation at all levels. I believe we have done it well in some areas. I think the testimony here today will show we have done it poorly in others.

So, Mr. Chairman, I appreciate your indulgence, your friendship and certainly the 2-years we have spent working on this committee together and yield back.

[The prepared statement of Hon. Darrell E. Issa follows:]

Statement of Ranking Member Darrell Issa
Domestic Policy Subcommittee
"Tumors and Cell Phone Use: What the Science Says"
September 25, 2008

Thank you, Mr. Chairman, for holding this important hearing to examine the state of scientific research on the possible link between the use of cell phones and the occurrence of brain tumors. I am told the last hearing on this issue was 15 years ago, and I congratulate you for taking this step toward making sure we are doing all we can to advance scientific study of this issue.

One thing is clear with regard to the electromagnetic spectrum; we do not know the effect of electromagnetic energy on the human body across the entire spectrum. We know the effects of x-rays and UV rays. While many types of RF energy have been proven safe, we must continue to study the possible impact of RF energy on the human body.

This hearing will focus on the use of cell phones and tumor growth. This has been an area of significant study since the beginning of the wireless industry. Many past studies have been short-term, and I am grateful that long-term studies are ongoing. What I have noted from the research is that the findings are mixed.

The National Cancer Institute, World Health Organization and the American Cancer Society claim that no link has been demonstrated to date, but more study is needed. Some studies show that there is no relationship. However, some recent studies point to a link between the two, especially with regard to the possible danger of children using cellular devices too frequently.

Several of our witnesses here today will argue there is a causal relationship between brain tumors and cell phone use. I would like to thank Mrs. Ellie Marks especially for appearing before us today. Your family's ordeal has been gut-wrenching, and you are fighting for what I believe everyone in this room wants – to make sure cellular devices are safe to use. Thank you for being here.

The wireless industry has played no small role in the advancement of prosperity around the world. Their products have opened doors and linked people together in ways unimaginable 30 years ago. And while the wireless industry continues to gain approval for its products through the Federal Communications Commission, they also continue to study the possible link between brain tumors and cell phone use. This is an important commitment.

Finally, I am pleased Dr. Hoover from NIH could join us at my request. As we work to learn the facts, and make policy decisions based on facts, the advice of you and your colleagues will be critical.

I look forward to hearing from our witnesses and working with Chairman Kucinich as well as the Energy and Commerce Committee to ensure our study of this issue continues.

Mr. KUCINICH. I thank the gentleman from California.

I want to now introduce our panel. First, to my left, Ellen Marks. Ellen Marks is a realtor and a small business owner. She is the wife of Alan Marks who was diagnosed in May 2008, with a malignant brain tumor in his right frontal lobe.

Mr. Marks could not, himself, be present today to testify about his personal experience with cell phones and cancer. Mrs. Marks will testify on his behalf.

Julius Knapp: Julius Knapp is Chief of the Federal Communications Commission's Office of Engineering and Technology. The Office of Engineering and Technology is the Commission's primary resource for engineering expertise and provides technical support to the chairman, commissioners and Federal Communication Commission bureaus and officers.

Mr. Knapp has responsibility within the Office of Engineering and Technology for spectrum allocations and technical rules for radio frequency devices. Previously, Mr. Knapp served as the Chief of the Policy and Rules Division where he was responsible for FCC frequency allocation proceedings and for proceedings amending the FCC rules for radio frequency devices.

Mr. Knapp was Chief of the Federal Communications Commission Laboratory from 1994 to 1997 where he was responsible for the Federal Communication Commission's equipment authorization program.

He served as Chief of Policy and Rules Division from 1997 to 2001 where he was responsible for developing the Federal Communication Commission's policies and rules for mutual recognition agreements and telecommunications certification bodies.

Next, Dr. David O. Carpenter: Dr. Carpenter is the director of the Institute for Health and Environment at the University of Albany as well as a professor in the Department of Environmental Health Sciences.

A public health physician, Dr. Carpenter previously served as the director of the Wadsworth Center for Laboratories and Research of the New York State Department of Health and later as dean of the School of Public Health at the University of Albany.

He has over 300 peer-reviewed publications in neuroscience, toxicology and environmental health. He has served as the co-editor of the BioInitiative Report, a multi-author report on animal and human effects of exposure to power line frequency and radio frequency, EMFs, and Dr. Carpenter earned his M.S. at Harvard Medical School.

Next, Dr. Ronald Herberman: Dr. Herberman is the founding director of the University of Pittsburgh Cancer Institute, a National Cancer Institute-designed comprehensive cancer center specializing in innovative approaches to cancer diagnosis and treatment.

Along with directing UPCI, he was director of the University of Pittsburgh Medical Center Cancer Centers. He also serves as chief for the Division of Hematology/Oncology at the University of Pittsburgh Medical Center as well as associate vice chancellor for cancer research at the University of Pittsburgh.

Previously, Dr. Herberman was official at the National Cancer Institute including Senior Investigator in the Immunology Branch,

Section Head in the Laboratory of Cell Biology and Chief of the new Laboratory of Immunodiagnosis.

Dr. Herberman received his M.D. from New York University School of Medicine. He has served as president of the American Association of Cancer Institutes and serves on the editorial boards of numerous scientific journals.

And, finally, Dr. Robert Hoover: Dr. Hoover is Director of the Epidemiology and Biostatistics Program of the Division of Cancer, Epidemiology and Genetics at the National Cancer Institute. Dr. Hoover earned his M.D. from Loyola University in Chicago and his M.S. and Sc.D. in epidemiology from Harvard School of Public Health.

Dr. Hoover serves on the editorial boards of three journals and serves on many national and international committees concerned with various aspects of epidemiology and preventive medicine. He has been awarded the Public Health Service Commendation Medal in 1976, the Meritorious Service Medal in 1984 and the Distinguished Service Medal in 1990.

I want to thank our distinguished panelists for appearing before this subcommittee today.

It is the policy of the Oversight and Government Reform Committee to swear in all witnesses before they testify.

[Witnesses sworn.]

Mr. KUCINICH. Let the record reflect that the witnesses have each answered in the affirmative.

I would ask that each of the witnesses now give a brief summary of your testimony and to keep that summary under 5 minutes in duration.

I want each of you to know that while your testimony is in some cases quite extensive, that you don't have to give it all at this moment but that your entire testimony will be included in the record of this hearing, so that Members will have the opportunity to be able to digest it.

So, with that, what I would like to do is to start with Mrs. Marks and again our gratitude for your presence here today. You may proceed.

STATEMENTS OF ELLEN MARKS, LAFAYETTE, CA; JULIUS KNAPP, DIRECTOR, OFFICE OF ENGINEERING AND TECHNOLOGY, FEDERAL COMMUNICATIONS COMMISSION; DR. DAVID O. CARPENTER, DIRECTOR, INSTITUTE FOR HEALTH AND THE ENVIRONMENT, UNIVERSITY OF ALBANY; DR. RONALD B. HERBERMAN, DIRECTOR, UNIVERSITY OF PITTSBURGH CANCER INSTITUTE; AND DR. ROBERT N. HOOVER, DIRECTOR, EPIDEMIOLOGY AND BIOSTATISTICS PROGRAM, NATIONAL CANCER INSTITUTE

STATEMENT OF ELLEN MARKS

Mrs. MARKS. Thank you for inviting me to testify at this critical hearing.

My name is Ellen Marks, and I live in Lafayette, CA. I am here today because my beloved husband and friend of more than four decades cannot be. My husband, Alan, has a malignant brain

tumor and, sadly, we suspect that it is related to his long-term cell phone exposure.

As difficult as this is for my family, I am compelled to share our very personal story to impress upon you the dire need to legislate essential changes concerning cell phone health risks.

Alan and I met when we were 15. He is a self-made man. He sold flowers in front of a cemetery at the age of 13 and then paid his own way through college and medical school.

Alan became involved in the real estate industry, and we moved from our native Chicago to northern California in 1984. We are the proud parents of three adult children, ages 26, 24 and 22. I wish we could say that we lived happily ever after, but that is not the case.

The night of May 5, 2008, we were excitedly packing to leave for our daughter's college graduation the next day. At 2 a.m., I awoke to Alan's bizarre noises and thrashing. I couldn't wake him, and the nightmare remains to this day.

The worst of his seizures lasted about 25 minutes. When his eyes opened, he could not speak or understand anything asked of him by the paramedics.

Witnessing a grand mal seizure is something you can never erase from your mind. Arms flail. Saliva drools. Eyes roll back in the head, and the face contorts.

At 4 a.m., in a cold, stark emergency room, I was told that my lifelong love has a mass in his right frontal lobe, the part of the brain that allows us to differentiate between good and bad, right and wrong, control our impulses and relate to those you love.

Imagine the pain of telling our sons, who had raced to the hospital in the middle of the night, that their dad's increasingly irrational behavior was not a personality problem but a lethal brain tumor.

In the morning, I had no choice but to call our daughter and tell her not to pick us up at the Denver airport. Imagine her despair as she stood alone, learning that her daddy could soon die.

It is heartbreaking to think that he may not have that chance to walk his princess down the aisle or meet his grandchildren.

Six excruciatingly long weeks later, Dr. Berger at UCSF performed a 6-hour craniotomy and resection of Alan's oligodendral glioma, leaving him able to walk and talk. The personality changes remain. Titanium now holds his skull in place, and the tumor will grow back.

It was a slow-growing tumor which caused unexplainable chaos in our family for years. When you love someone and he becomes another person to act strangely, acting out against those you hold dear, you try with all your heart to find ways to help.

Alan also tried with all his heart to continue to be a loving father and husband. He willingly sought professional help and took antidepressants and bipolar medications for years to no avail. He, too, knew something was wrong but just not how terribly wrong.

Now, as a family, we are struggling to understand that the now explainable personality changes are actually an involuntary consequence of his tumor and surgery, not an easy task.

Alan has always been a brilliant man with an incredible sense of humor and sense of responsibility to his family. He clings to that

sense of responsibility now and is deeply depressed by his limitations.

To me, he is still the most handsome man in the world, but the twinkle in his eye is gone. His cell phone and the resulting tumor have robbed us of financial security and the very pursuit of happiness. Alan, a husband, a father and a son, has been handed a death sentence at the age of 56.

Alan had his seizure and diagnosis 10 days before Senator Kennedy. Ironically, my son, Zach, who is sitting behind me, interned for Senator Kennedy just a few years ago. Upon hearing a report that the Senator's glioma may also be linked to cell phone use, our research began.

Alan's cell phone was a vital part of his work—always on, always ringing, always right next to his head. I often threatened to throw it in the garbage and how I wish I had.

He had a cell phone or the original car phone for over 20 years, and he averaged over 30 hours monthly. The tumor is on the same side of his head to which he held the phone.

I learned there are significant flaws in many cell phone risk studies. I learned that in Scandinavia, where cell phones had been used longer than here, a 240 percent increased risk of glioma has been proven in those who use their cell phones more than 22 hours a month. That is less than 1 hour daily.

I learned that cell phone use is exceptionally dangerous for children, and I also learned that we are nearing an epidemic of 20 to 30-year-olds who use only cell phones. If this happens, we could lose more young people to this than any war in Iran or Afghanistan.

I am grateful that Dr. Herberman, a distinguished scientist, has made such a courageous decision. How can we wait if waiting means sick or dead people when we have strong evidence or any evidence at all that there is a risk?

What happened to my husband could happen to you or, worse, to your children or grandchildren.

I am sick and tired of hearing there is not enough conclusive evidence. My husband is conclusive evidence. I am angry as this horror could have been avoided with a simple warning.

I pray that my husband's legacy will be that we helped divulge the truth and that you, the leaders of our great Nation, took action. Governments in other countries have taken steps to protect their citizens from this travesty. I trust you will not fail us.

I beg of you not to let technological advances, invented to enrich our lives, rob us of our lives instead.

Please demand independent studies instead of self-serving studies funded by the cell phone industry. Please demand more rigorous safety standards. Please demand that warnings about cell phone usage and the radiation they emit be stated on every cell phone. By doing so, you will protect our most valued resource of all—human life.

I love my husband with all my heart and hate what has happened to him as a result of this cancer.

Please help save others from facing the deadly diagnosis and lifestyle which our family must endure. If not now, when? And, if not for me, for the millions of potential victims.

I thank you very much.

[The prepared statement of Mrs. Marks follows:]

Ellen Marks
16 Amanda Lane
Lafayette, CA., 94563

Written statement prepared for Congressional hearing on cell phone risk

September 25, 2008

My husband, Alan Randy Marks, was born February 26, 1952 in Chicago, Illinois. He is one of three children. His father died at age 69 from an aortic aneurysm and his mother is alive at age 84. Alan never had any major health issues. He has had high cholesterol levels for many years and has been taking Lipitor for that. Alan attended medical school and has been involved in the real estate industry for many years. We moved from our hometown of Chicago to northern California in 1984. We have 3 children ages 26, 24, and 22. Alan was asked to testify at the hearing on cell phone risks as he was recently diagnosed with a malignant brain tumor which we and many experts feel is associated with his long term excessive cell phone usage. He could not attend the hearing because of his health issues and I was invited to testify on his behalf. I am happy to do so in an effort to help others escape our fate.

On May 6, 2008 Alan suffered a grand mal seizure while asleep. I called 911 and the paramedics transported him to John Muir hospital in Walnut Creek, California. After a CT scan they informed us that Alan had a mass in his right frontal lobe. Alan spent the next few days in the hospital having MRI's and neurological testing. John Muir's brain tumor board met and then told Alan they felt the malignant tumor was inoperable as it could leave him paralyzed, cause further brain damage, and impair his speech. They suggested he go home and enjoy the few years he has left.

For many years prior to the seizure Alan's behavior had changed dramatically. He had been seeing therapists and psychiatrists for years and taking many medications including bipolar medications and anti-depressants. His behavior alienated and damaged our children and destroyed

our marriage. His negative personality changes were due entirely to this slow growing brain tumor and will continue because of permanent brain damage. Alan and I have been married 28 years but have known each other since we were 15 (41 years). He is no longer the man I knew and married. Our children, Alan and I not only have to deal with a death sentence but this tumor and surgery has made living well impossible. It has also taken away his livelihood and our finances are being depleted. He has to remain on anti-seizure medication (Keppra) for the remainder of his life as after an craniotomy there is an increased risk of seizure. He attempts to work but finds it impossible. One of the most common effects of frontal damage can be a dramatic change in social behavior. A person's personality can undergo significant changes after an injury to the frontal lobes. There are some differences in the left versus right frontal lobes in this area. Left frontal damage usually manifests as pseudodepression and right frontal damage as pseudopsychopathic (Blumer and Benson, 1975).

After his seizure and diagnosis at our local hospital we immediately consulted with Dr. Mitchel Berger at UCSF. He saw Alan's MRI's and told us he felt he could remove most of the malignant oligodendroglioma in Alan's frontal lobe. Dr. Berger could not operate for six weeks, but we waited as we heard he is an excellent surgeon with the necessary mapping equipment for this precarious surgery. On June 16, 2008 Alan underwent a six hour craniotomy and resection of the tumor. He survived the surgery but the following days were a living nightmare. His behavior worsened post surgery and he was also on steroids to lessen the swelling of the brain. In his case, the steroids added to his already horrific behavior and made being near him unbearable. The day prior to his discharge we were told that his tumor was a grade 3 meaning he probably had a year to live. They said they would start chemotherapy and radiation two weeks later. The following night the oncologist called with the "good" news that they made a mistake and it is a grade 2 tumor. "Fringe" cells remain which will grow back and he will be monitored with MRI's every eight weeks. When, not if, the tumor begins to grow aggressively he will be treated with chemotherapy and possibly have to endure another surgery. We were told the statistics of his prognosis- 70% of those with this type of glioma live ten years but that is for a 20 year old. At the age of 56 with this type of glioma the estimate was closer to five years. Alan never held that cell phone to his head after this diagnosis. His MRI on August 26 was encouraging as there has been little post surgery growth.

Alan used a cell (or car) phone for over twenty years. He originally had an analog and then a digital. He has had Blackberrys and Nokias. He averaged over 30 hours monthly for many years. He held the phone to the side of the head where the tumor is located. Alan has never been exposed to any other form of radiation nor does he have cancer in any other part of his body.

My son and I researched this possible connection between his cell phone risk and his glioma extensively the past few months. I have corresponded with and spoken with many experts in this field who agree that his glioma was more likely than not caused by his excessive cell phone usage. Dr. Elihu Richter has written a detailed letter confirming this link (which I am attaching as part of my written statement). Dr. Hardell recently used my husband's case as an example concerning this topic at a conference in London. Dr. Carpenter is testifying today that he feels there is an association between my husband's brain tumor and his cell phone use. I have attached my husband's medical records, cell phone records, and a website created by my son with links to many fine articles and studies concerning this risk.

Per Lloyd Morgan, scientist and expert in this field:

'Bottom line: Industry is using their Interphone "study" to suppress the data showing there is a risk, and to cause public confusion (some studies show a risk but most do not show a risk, its all too confusing, more studies are needed).

The Interphone Study is a fraud perpetrated on the public. The full 13-country Interphone Study was completed in 2004. In June 2003, the head of the Interphone Study stated the full pooled results would be published in 2005. The pooled results have yet to be published and many of us believe that, even given the protective skew resulting from the design flaws, that they are afraid to publish the full 13-country results. There have been 10 single country Interphone brain tumor studies published to date. My analysis is based on these published results.

There is other series of studies on the risk of brain tumors from cell phone and cordless phone use by Lennart Hardell and team. This series of study has shown for

many years that there is a dire risk of brain tumors. When each Interphone Study is published there is a media blitz reporting there is no risk of brain tumors from cell hone risk (even when a risk is reported). When each of the Hardell studies are published almost nothing is reported in the media.

Yet the Hardell findings are consistent to what would be expected if cell phones are a risk for brain tumors.

- The higher the cumulative hours of use, the higher the risk;
- The higher the cumulative numbers of calls, the higher the risk
- The higher the radiated power, the higher the risk
- The higher the number of years since first use, the higher the risk
- The higher the exposure (tumor on side of head phone was held, the higher the risk
- The younger the user, the higher the risk.

We are shocked that in light of studies and information suggesting risks that our government has allowed the cell phone industry to conduct business as usual. Cell phones need not be abandoned. The cell phone industry has the capability to make safer devices. In the very least the citizens of our nation should be told the truth concerning this risk so they can protect themselves and their families. I beg of you to take action immediately so that others can be spared the devastation that my family has endured.

Thank you.

MEDICAL RECORDS

TRANSPORT NOT FINAL UNTIL AUTHENTICATED

DISCHARGE SUMMARY

PATIENT NAME: ALAN R MARKS

DATE OF ADMISSION: 05/06/2008
DATE OF DISCHARGE: 05/08/2008

DICTATING PHYSICIAN: TOM T NGUYEN, MD

John Muir hospital
upon signore

DISCHARGE DIAGNOSES:
1. Brain mass. Probably low-grade glioma.
2. Seizure disorder, due to brain mass.
3. History of anxiety/depression.
4. History of hyperlipidemia.
5. Probable left shoulder rotator cuff injury without evidence of dislocation or fracture.

DISCHARGE MEDICATIONS:
1. The patient will resume his current Lipitor at 20 mg at bedtime.
2. Decrease Zoloft to 4.5 mg daily for 5 days, then discontinue.
3. Keppra 500 mg b.i.d., new medication.

CONSULTANTS:
1. Neurosurgery, Richard Perrin, M.D.
2. Neurology, Steven M. Schadendorf, M.D.

NAMES OF PROCEDURES:
1. Head CT without contrast performed on the day of admission showed a poorly defined 1.7 x 3.6-cm low attenuation abnormality.
2. MRI of the brain with and without contrast performed the next day showed a frontal parasagittal abnormality without any significant mass effect. No contrast enhancement.
MRI, functional study to evaluate involvement of motor strip. The results indicate evidence of motor mapping to the mid and posterior medial aspect of the right frontal lobe lesions.

ADMISSION HISTORY AND PHYSICAL: Please refer to Dr. Veronica Simanek dictation on 05/06 for details.

Briefly, the patient was brought to the Emergency Room after an acute onset of convulsions.

HOSPITAL COURSE:
1. Brain mass. CT obtained in the emergency room indicate an abnormality in the right frontal lobe, suspicious for a brain mass. This was followed up with a brain MRI with and without contrast that showed a 3.6-cm nonenhancing abnormality, suggestive of a low-grade glioma. I consulted Dr. Richard Perrin, Neurosurgeon. He evaluated the MRI finding and thought that the patient has low-grade glioma. His recommendations were biopsy and close observation. The case was discussed in a neuro-oncology conference. The consensus recommendation from John Muir was 1 biopsy and close monitoring and observation versus aggressive resection. The patient and family wanted a second opinion from Dr. Mitchell Berger at UCSF. I have arranged for patient to be transfer over UCSF. However, clinically, he does not need to be transferred over to UCSF as an inpatient to inpatient. He is medically stable to be discharged, and his followup will be with Dr. Berger as an outpatient. Records have been sent over for Dr. Berger to review. I discussed with the

patient and family. He will see Dr. Berger within a week or two for a second opinion as to either pursuing a biopsy and observation versus aggressive resection of the tumor. CT scan, the MRI functional study showed involvement of some area in the motor strip.

2. Seizure disorder. The patient convulsant, was associated with seizure, probably caused by the brain tumor. There is a concern about Zoloft decreasing the seizure threshold. The evidence is not strong, however. I discussed with his psychiatrist. My recommendation is to discontinue Zoloft if at all possible. The patient agrees to tapering it down to 12.5 mg from 25 mg over the next 5 days, then discontinue. Further followup will be with his psychiatrist, Dr. Bloch.

3. Transient leukocytosis. On admission, the patient's white count was 18,000. Subsequent followup showed a white count of 10.5. This was probably stress related. There was no evidence of infection. Urinalysis was negative. Chest x-ray was normal.

4. Left shoulder pain. The next day after admission, the patient complained of left shoulder pain and difficulty with full range of motion. X-ray did not show any evidence of dislocation or fracture. I suspect some rotator cuff injury.

The patient will be discharged home today with close followup at UCSF. In addition, he should follow up with his primary care physician, Dr. Mary. Miller, and also with his psychiatrist.

Edit/Authenticate Report in e-MARS

DD:05/08/2008 12:01 DT:05/08/2008 12:44
DOC ID: 435163 Job#: 424101
cc: RICHARD PERRIN
MARY LYNN MILLER
MITCHEL BERGER

CT# 1996157 EXAM 5101 MRI BRAIN,SELLA,FAC'S W/WO 70553

MRI of the brain without and with gadolinium contrast (70553)- 5/6/08

Comparison- CT scan early this morning at 0126 hours.

History- Seizures (NOS) (780.39), ALOC (780.09), Mass or stroke on CT scan.

Technique-
a. Sagittal, T1-weighted images.
b. Sagittal, T1-weighted images with Magnevist contrast (19 ml).
c. Axial, T1-weighted images.
d. Axial, T1-weighted images with Magnevist (magnetization transfer).
e. Coronal, T1-weighted images with Magnevist.
f. Axial, FLAIR images.
g. Axial, T2-weighted images.
h. Axial, diffusion-weighted images.

Findings- A right posterior frontal parasagittal intra-axial abnormality is seen with heterogeneous diminished T1 and moderately increased T2 signal. The abnormality measures 4 x 2.2 x 2.5 cm and involves both cortex and white matter. Subtle mass-effect with effacement of sulci and minimal depression of the roof of the right lateral ventricle. No definite contrast enhancement. On diffusion weighted imaging there is only slightly altered signal consistent with T2 shine through. No other foci of abnormal signal. Ventricles are of normal size and there is no midline shift. No pathologic contrast enhancement. Mild mucosal thickening in the paranasal sinuses.

Impression-

1. Intra-axial right posterior frontal parasagittal abnormality shows mild mass-effect and no contrast enhancement. This is worrisome for a low-grade glioma.

2. MRI is otherwise unremarkable.

Transcriptionist- BETTY LINDSAY
Reading Radiologist- RICHARD SIGEL
Releasing Radiologist- RICHARD SIGEL
Released Date Time- 05/06/08 0923

T-05/06/2008 BL /Read By RICHARD SIGEL/ /Released By DR. SIGEL/

FINAL AN# 0812700010

MARKS, ALAN R DATE 05/06/2008 0434

MR 0779919 ORD BURKE, JOHN K
DD 02/26/1952 M ATT NGUYEN, TOM
LOC 6E-603-04 PCP MILLER, MARY

JOHN MUIR MEDICAL CENTER WALNUT CREEK CAMPUS MEDICAL IMAGING REPORT pg. 1

CT1 09/2008

CT# [illegible] EXAM 5103 MRI BRAIN,SELLA,FACIAL BO /0551
MRI brain without contrast (functional MRI) (70551)- 5/7/08

History- Seizures (780.39).

Comparison- MRI of the brain dated 5/6/08.

Technique- Functional MRI was performed to assess motor function using a GE 1.5 Tesla magnet.

Findings- Numerous areas of motor localization are identified within the supra and infratentorial compartments of the brain. The previously demonstrated lesion along the high parasagittal right frontal lobe does demonstrate some motor mapping along the mid and posteromedial aspects. No other significant findings are identified.

Impression- Evidence of motor mapping to the mid and posteromedial aspect of the high parasagittal right frontal lobe lesion.

Transcriptionist- CHANDRA HART
Reading Radiologist- SAURABH K PATEL
Releasing Radiologist- SAURABH K PATEL
Released Date Time- 05/07/08 1214

T-05/07/2008 CH /Read By SAURABH K PATEL/ /Released By DR. PATEL/

FINAL AN# 0812700010

MARKS, ALAN R DATE 05/07/2008 0739

MR 0770910 ORD PERRIN, RICHARD G
DD 02/26/1952 M ATT NGUYEN, TOM
LOC GE-607-01 PCP MILLER, MARY

CI# 1997170 Exam: 05103 MRI BRAIN,SELLA,IAC'S WO 70551

MRI brain without contrast (functional MRI) (70551): 5/7/08

History: Seizures (780.39).

Comparison: MRI of the brain dated 5/6/08.

Technique: Functional MRI was performed to assess motor function using a GE 1.5 Tesla magnet.

Findings: Numerous areas of motor localization are identified within the supra and infratentorial compartments of the brain. The previously demonstrated lesion along the high parasagittal right frontal lobe does demonstrate some motor mapping along the mid and posteromedial aspects. No other significant findings are identified.

Impression: Evidence of motor mapping to the mid and posteromedial aspect of the high parasagittal right frontal lobe lesion.

Transcriptionist- CHANDRA HART
Reading Radiologist- SAURABH K PATEL
Releasing Radiologist- SAURABH K PATEL
Released Date Time- 05/07/08 1214

FINAL

PATIENT: MARKS,ALAN R

MR: 0779919 DATE: 05/07/08 0739

LOC: *6E-607-01 BD: 02/26/52 56Y M

Phys: PERRIN,RICHARD G

JOHN MUIR MRI
1601 Ygnacio Valley Rd
Walnut Creek, CA 94598
Phone: (925) 295-1545

UCSF MEDICAL CENTER

PT NAME: MARKS, ALAN R
UNIT # 4920088-9
DOB: 02/26/1952 SEX: M
VISIT # 14591485 REPORT STATUS: FINALIZED

PROCEDURES: MR BRAINLAB NAV WITH DTI (6-15-08 11:30)

MRI BRAIN: 06/15/08

CLINICAL HISTORY: A 56-year-old with low grade appearing glioma in the right frontal lobe.

COMPARISON: Outside films dated 05/07/08.

TECHNIQUE: The following MR sequences were obtained through the brain using a 3 Tesla magnet: Triplane localizer, sagittal T1 pre gadolinium, axial FLAIR PROPELLER, axial 3D FSE, axial diffusion, axial perfusion, axial DTI, and spectroscopy.

FINDINGS:
An unchanged 2.3 x 3.4 cm mass-like area of FLAIR hyperintensity is seen in the right superior frontal gyrus. No associated enhancement is identified on the postgadolinium images. Perfusion imaging demonstrates possible slight elevation in cerebral blood volume. MR spectroscopy also demonstrates several voxels with elevated choline and decreased NAA peaks, consistent with tumor.

There is no evidence of midline shift.

No additional areas of FLAIR hyperintensity or abnormal enhancement are identified. There is no evidence of leptomeningeal enhancement.

No evidence of reduced diffusion.

IMPRESSION:

A 2.3 x 3.4 cm focus of mass-like FLAIR hyperintensity is again seen centered in the right superior frontal gyrus. Elevated choline and decreased NAA peaks are seen, consistent with tumor. There is a suggestion of slight elevatibn of cerebral blood volume on perfusion images. Findings likely represent a low-grade glioma.

RADIOLOGIST: Dillon,William
Sun,Yee-Li
ORDERING MD: Berger,Mitchel S

UCSF MEDICAL CENTER

PT NAME: MARKS, ALAN R
UNIT # 4920088-9
DOB: 02/26/1952
SEX: M

DATE: 6-16-08, SURGICAL PATHOLOGY # 308-6298 PARNASSUS
VISIT # 14591498

SOURCE: 1. Tumor (FS)
2. Brain, for tumor resection

DIAGNOSIS:

A. Brain, tumor, biopsy: Oligodendroglioma, WHO grade II; see comment.

B. Brain, tumor, resection: Oligodendroglioma, WHO grade II; see comment.

CLINICAL DATA:

The patient is a 56-year-old man who presented with a seizure and has an enhancing mass in the right hemisphere. He undergoes biopsy.

TISSUE:

GROSS DESCRIPTION:

The specimen is received fresh in two parts, each labeled with the patient's name and medical record number.
Part A is additionally labeled "tumor, FS." It consists of one fragment of white-tan and pink soft tissue, which is irregular and unoriented and measures 0.4 x 0.2 x 0.1 cm. Approximately half the specimen is submitted for cytologic preparation and frozen section diagnosis as FS1, with the frozen section remnant submitted in cassette A1. The remainder of the specimen is submitted in cassette A2.
Part B is additionally labeled "tumor, permanent." It consists of one fragment of unoriented, irregular, red-tan soft tissue, measuring 0.4 x 0.2 x 0.1 cm. The specimen is entirely submitted in tissue paper in cassette B1.
The immunoperoxidase stain(s) reported above were developed and their performance characteristics determined by the UCSF Medical Center Department of Pathology. They have not been cleared or approved by the U. S. Food and Drug Administration. The FDA has determined that such clearance or approval is not necessary. These tests are used for clinical purposes. They should not be regarded as investigational or for research. This laboratory is certified under the Clinical Laboratory Improvement Amendments of 1988 ("CLIA") as qualified to perform high-complexity clinical testing.

INTRAOPERATIVE DIAGNOSIS:

FS1 (A) Brain, biopsy: Oligodendroglioma with high cellularity and mitoses, suspicious for anaplastic oligodendroglioma versus anaplastic oligoastrocytoma, WHO grade III. Tissue section and cytologic

preparation. (Dr. Andrew Bollen, 50741.)

COMMENTS:

This is a highly cellular oligodendroglioma with multiple mitoses present and a moderate degree of pleomorphism. However, both on the intraoperative cytologic material and tissue section and on the permanent tissue sections, no evidence of microvascular proliferation or necrosis is identified, and therefore, I have designated it an oligodendroglioma WHO grade II. Immunohistochemistry will be performed and examined, including GFAP, p53, vimentin, and MIB-1 and an addendum will follow.

ADDENDA:

Immunohistochemistry for p53, vimentin, GFAP on B1 shows the neoplastic cells to be negative for vimentin and GFAP, which also demonstrate staining of the reactive astrocytic population. p53 shows staining in less than 5% of cells. These immunohistochemical findings support the diagnosis of oligodendroglioma, WHO grade II.

PATHOLOGIST: Bollen, Andrew W., MD 50741

ADD PATHOLOGIST: Bollen,Andrew 50741

UCSF MEDICAL CENTER

PT NAME: MARKS, ALAN R
UNIT # 4920088-9
DOB: 02/26/1952 SEX: M
DOCUMENT # 1768774 Signed
VISIT # 14591498

DEPARTMENT OF NEUROLOGICAL SURGERY
400 Parnassus Avenue
Rm A-808, Box 0350
San Francisco, California 94143-0350
Tel: (415) 353-7500 Fax: (415) 353-2889
ADULT BRAIN TUMOR PROGRAM

June 16, 2008
Mary Miller, M.D.
89 Davis Rd., #220
Orinda, CA 94563
RE: Marks, Alan R
U#: 49200889
DATE OF SERVICE: 6/16/2008
Dear Doctor Miller:
I wanted to let you know that everything went well with the surgery on this patient, which we did at UCSF at the Brain Tumor Center yesterday. As you know, he is a gentleman that had a seizure and was discovered to have a right supplementary motor area tumor. This looked like a primary glial neoplasm and I proceeded with a craniotomy and resection, this using both cortical and subcortical motor mapping preceded by diffusion tensor imaging to define the subcortical motor tracks. I was able to achieve a gross total resection of this mass, which went all the way back to the motor system involving his leg and hand.
Postoperatively, he has done very nicely with only a partial supplementary motor area syndrome where he has some difficulty initiating motor function, but is 4+/5 in the upper and lower extremities. This will continue to improve and return to baseline. The pathology thus far is not known, although it looks like a mixed oligoastrocytoma. We will present his case at Tumor Board on Thursday and make decisions regarding the need for any further therapy.
I do appreciate very much being able to participate in his care and if you have any questions please do not hesitate to let me know any time.
Sincerely,
MITCHEL S. BERGER, M.D.
CHAIRMAN
PROFESSOR
EXTRA COPIES:
CARBON COPIES:
DICTATED BY: Mitchel S. Berger, MD 75421
Electronically Signed by
Mitchel S. Berger, MD 06/19/2008 10:29

ATTENDING PHYSICIAN: Mitchel S. Berger, MD 75421
D: 06/17/2008 9:41 A
T: 06/18/2008 7:25 A D34 CS#: 1768774

492 00 88-9

Marks, Alan R

02/26/1952 LOC: 8NI

Accession #: 6215468

Jian, Brian Joobeen

Exam Date: 06/17/2008

Berger, Mitchel S

BRAIN MRI: 06/17/08.

COMPARISON: Brain MRI 06/15/08 and earlier.

CLINICAL HISTORY: Fifty-six year-old man recently undergoing resection of low-grade glioma.

TECHNIQUE: Axial and sagittal T1, axial and coronal T2 FLAIR, axial diffusion, and post gadolinium axial and coronal T1-weighted sequences at 1.5 Tesla.

FINDINGS:

Since 06/15/08, there has been interval right frontal craniotomy, with resection of mass-like T2 signal abnormality previously described within the right superior frontal gyrus posteriorly. Expected post operative changes include blood products within the resection cavity, a very thin extra-axial collection deep to the craniotomy, scattered subarachnoid blood, and pneumocephalus. There has been gross total resection of the abnormal T2 hyperintensity.

No enhancement is noted in the area of resection or elsewhere within the brain, though it should be noted that the tumor did not enhance prior to resection.

Midline structures remain normally aligned. Ventricular size and morphology are normal . A small area of reduced diffusion at the deep margin of the surgical cavity may be expected to enhance on follow-up examinations.

IMPRESSION:

Gross total resection of T2 hyperintense nonenhancing lesion within the posterior right superior frontal gyrus. A thin rim of reduced diffusion at the deep margin of the surgical cavity may enhance on follow-up examinations.

492 00 88-9
Marks, Alan R
02/26/1952 LOC: 8NI
Jian, Brian Joobeen
Berger, Mitchel S

Accession #: 6215468
Exam Date: 06/17/2008

Dictated: 06/17/2008 12:19 PM by Dr.Christopher P Hess
Transcribed: 06/17/2008 12:53 PM by Cyd Sharkey
Last Edited: 06/17/2008 5:27 PM by William P Dillon
Finalized: 06/17/2008 5:27 PM by Dr.William P Dillon
Contributor: Dr.Hess, Christopher P

UCSF MEDICAL CENTER

PT NAME: MARKS, ALAN R
UNIT # 4920088-9
DOB: 02/26/1952 SEX: M
DOCUMENT # 1772962 Prelim

DEPARTMENT OF NEUROLOGICAL SURGERY
400 Parnassus Avenue
Rm A-808, Box 0350
San Francisco, California 94143-0350
Tel: (415) 353-7500 Fax: (415) 353-2869
ADULT BRAIN TUMOR PROGRAM

June 19, 2008
RE: Marks, Alan R
U#: 49200889
SERVICE DATE: 06/19/08
PREOPERATIVE DIAGNOSIS: Right supplementary motor area tumor glioma.
POSTOPERATIVE DIAGNOSIS: Right supplementary motor area tumor glioma.
OPERATION PERFORMED: Right frontal craniotomy, BrainLab navigation, micro-dissection, tumor removal, cortical and subcortical motor mapping.
CLINICAL HISTORY: Clinical history is of a patient who had a seizure with the diagnosis of a right SMA glioma.
The patient was brought to the operating room, placed in the supine position with the head fixed in the Mayfield tongs. The scalp was prepped in the usual sterile fashion after the scalp fiducials had been registered with BrainLab and an incision was made from the midline back behind the coronal suture over towards the zygomatic arch. The scalp was reflected forward along with the periosteum and then a multiple whole bone flap was turned just off the midline. At this point, the dural was opened and reflected mesially and then I began by 1st identifying the tumor and then stimulating. I found stimulation induced movement of the hand and forearm in number IV and V, and then knowing the tumor was in front of this, I began to resect the tumor and identified the falx and went all the way down to uncover the underlying cingulate gyrus and then went out laterally to resect this. This was all done under the microscope to achieve micro-dissection and tumor removal, and then extended the resection posteriorly as I subcortically mapped. We put in the strip electrode to identify the foot motor function and then subcortically did not see any stimulation induced movement. However, by this time, I was around the tumor in a gross total resection fashion and thus lined the cavity with Surgicel for hemostasis, followed by closure of the dura, followed by peripheral and central tack-up sutures and replacement of bone flap with plate and screws. The galeal was closed with 3-0 Vidryl followed by skin and staples. The patient tolerated this well and was taken to the recovery room in good condition.
Sincerely,
MITCHEL S. BERGER, MD
CHAIRMAN
PROFESSOR
DICTATED BY: Mitchel S. Berger, MD 75421
PRELIMINARY REPORT

ATTENDING PHYSICIAN: Mitchel S. Berger, MD 75421
D: 06/19/2008 12:10 P
T: 06/20/2008 8:45 A a45 CS#: 1772962

492 00 88-9
Marks, Alan R
02/26/1952 LOC: PVT
Prados, Michael
Prados, Michael

Accession #: 6234806
Exam Date: 08/26/2008

MRI OF THE BRAIN ENHANCED: August 26, 2008

CLINICAL HISTORY: Follow-up low grade tumor resection.

TECHNIQUE: The following MR sequences were acquired: Axial and coronal FLAIR, axial T2, axial perfusion, axial and coronal T1 post gadolinium.

FINDINGS:

A well defined resection cavity is seen in the parasagittal right frontal lobe with a thin rim of low signal at its margin, in keeping with hemosiderin. Asymmetrically prominent mildly FLAIR hyperintense signal extends inferiorly. Perfusion assessment in this region does not identify increased cerebral blood volume, and no suspicious enhancement is present. Nonetheless, attention to this location is recommended on follow-up examinations.

Thin linear enhancement at the margins of the resection cavity with thin septae coursing obliquely through the cavity are in keeping with postoperative change.

No abnormal diffusion is present.

Ventricles and basal cisterns are patent. No extra-axial mass or abnormal fluid collections identified.

IMPRESSION:

No progression of disease at the superior frontal gyrus resection. There is a slightly prominent focus of FLAIR hyperintensity seen along its inferior margin, and attention on follow-up studies is recommended.

I attest that I have personally reviewed the images for this study and/or supervised this procedure and agree with the report.

Dictated: 08/26/2008 6:29 PM by Dr.Gary Sidhu
Transcribed: 08/27/2008 6:33 AM by Robert Deason
Last Edited: 08/28/2008 12:08 AM by Christine M Glastonbury
Finalized: 08/28/2008 12:08 AM by Dr.Christine M Glastonbury
Contributor: Dr.Sidhu, Gary

James A. Moses, Ph.D., ABPP
Clinical Neuropsychologist
445 Burgess Drive, Suite 150
Menlo Park, CA 94025

September 9, 2008

Client: MARKS, Alan

Identifying Information: The client currently is 56 years of age (DOB 02/26/1952). Demographically he is a white, remarried male. He has worked as a highly successful realtor since 1994. Mr. Marks reports that he was natively left handed, but that he was retrained to use the right hand to write since he was a child.

As a result of his native left-handedness it is less likely that he has strongly lateralized verbal and nonverbal cognitive abilities. Because the likelihood of mixed cerebral dominance for language and visual-spatial skills is present there also is a better prognosis for cognitive skill sparing when there is a lateralized brain lesion. The diagnosis of a relatively low grade glioma also presents a more favorable prognosis for cognitive skill sparing.

Referral Source: Randall Bloch, M.D.

Reason for Referral: Neuropsychological evaluation of cognitive functions – strengths and weaknesses – for Mr. Marks.

History of Present Illness: Mr. Marks reports that he experienced a nocturnal seizure that was the first symptom of a brain tumor. The tumor has been described from MRI brain scan findings by Saurabh K. Patel, M.D., a neuro-radiologist at John Muir Hospital as a "right posterior frontal parasagittal intra-axial abnormality. The abnormality measures 4 x 2.2 x 2.5 cm and involves both cortex and white matter. Subtle mass-effect with effacement of sulci and minimal depression of the roof of the right lateral ventricle [was noted]. No definite contrast enhancement." The lesion is noted to be adjacent to the motor strip, in the supplementary motor area.

A subsequent report from the Department of Neurological Surgery at UCSF Medical Center by Karine Michaud, M.D. dictated on 6/19/2008 notes that the brain tumor was almost completely surgically resected. It was pathologically identified as a grade II oligodendroglioma.

In a postoperative evaluation dictated on 5/20/2008 by Mitchel S. Berger, M.D., Professor and Chairman of the Neurological Surgery Service at UCSF, he noted that Mr. Marks showed normal neurological function on neurological examination following the craniotomy and tumor resection procedure.

Current Prescription Medications
Keppra, 500 mg bid [prescribed since 5/2008] – side *effect of constant fatigue*
Lipitor, 20 mg, once a day [since 2003] – *no side effect noted by client*

Family of Origin: Mr. Marks reports that he was born in Chicago, Illinois and that he spent his childhood years there. His mother is currently 84 years of age. Her health is described as good. His father is deceased. He passed away in 1990 at the age of 69. The cause of his death was a ruptured aortic aneurysm.

Nuclear Family: Mr. Marks is currently married to his second wife. They wed in 1980. He was previously married to and divorced from his first wife in 1976. Mr. Marks is the father of two sons (currently ages 24 and 25 years) and one daughter (currently age 22 years). His three children all are reported to be free of serious illness.

Early Development: Mr. Marks reports that he was born at full term. He noted no delays in achievement of early developmental milestones such as walking, talking, and toilet training. He denies that he suffered from any unusual illness as a child.

Educational History: Mr. Marks has completed 21 years of formal education. He completed a Bachelor of Science degree in biology at the University of Illinois in three years (1970-1973). He went on to earn a Master of Science degree in physiology and he also completed three years of pre-doctoral medical school training. Mr. Marks was an excellent student at undergraduate and graduate collegiate levels. His grade point average is reported to have been 3.9, which makes him a typically "straight A" student.

Mental Health History: Mr. Marks was first treated in 2003 for mood disorder that he identifies as depression with "Bipolar/Manic" features. He notes that there was some symptomatic improvement as a result of that treatment regimen.

Substance Use History. Mr. Marks reports that he drinks wine with meals. He denies hat he has ever been a regular user of alcoholic beverages. He denies any history of non-prescription or recreational drug use.

General Health Issues. Mr. Marks reports that he is five feet 10 inches tall and that his current weight is 190 pounds. He estimates that his ideal weight is approximately 175 pounds. He has gained 20 pounds of body weight during the past three to six months. He reports that he does not know the cause of this weight gain.

Mr. Marks reports that he sleeps well most nights. He denies a history of current physical illness of cardiovascular, gastrointestinal, or orthopedic origin. He reports that he has normal visual acuity and that he does not wear corrective lenses.

He also reports that binaural hearing loss was demonstrated on a formal hearing test. Onset of this hearing loss first occurred during his teenage years.

Personality Change Associated with Right Frontal Brain Lesion: At my request Mrs. Ellie Marks wrote a detailed history of her husband's pre-illness personality and social style and changes that have occurred in their relationship over the years since they were adolescents through the current time. Her account of his personality change since the onset of the brain tumor is instructive.

In particular Mrs. Marks notes that her husband shows signs of disinhibited personality change that includes generalized emotional stress, lowered frustration tolerance, frequent verbal outbursts with verbal hostility toward family members, and intensification of a long-standing, hard-driving work ethic. Personality change of this kind that shows onset during midlife is often accompanies development of an anterior brain lesion, and is fully consistent with the client's neurological history.

Neuropsychological Evaluation

Tests Administered
Benton Temporal Orientation Schedule
Benton Visual Retention Test – copy, recall, recognition
Boston Naming Test
California Verbal Learning Test - II
Conners' Continuous Performance Test – II
Delis-Kaplan Executive Function System (selected subtests)
Judgment of Line Orientation, Form H
Serial Digit Learning Test, Forms SD8 & SD9
Visual Form Discrimination Test
Wechsler Adult Intelligence Scale-III

Test Dates: August 9, 2008 and August 30, 2008

Interpretation of Test Results

Visual Perception. Mr. Marks demonstrated normal visual pattern perception and average two-dimensional visual spatial perceptual ability for an individual of his age and educational level. These basic perceptual skills are essential for performance on the nonverbal constructional, intellectual and memorial measures.

Visual-Motor Copying. Mr. Marks showed intermittent difficulty on the visual-motor copying phase of the Benton Visual Retention Test. His performance was 80% accurate overall, which is within normal limits. His errors involved what appeared to be carelessness and impulsive reproductions in which details of the figures were not well reproduced.

Orientation. Mr. Marks was well oriented to personal information, place, time, and situation during both of the neuropsychological assessment sessions. His performance on

the Benton Temporal Orientation Schedule was precisely accurate with regard to year, month, day of the week, day of the month, and time of day.

Basic Language Skills. Mr. Marks performed at an average level for age on the Boston Naming Test, which is a measure of visual naming ability. His few errors were confined to specialized vocabulary items (e.g. pharaoh for *sphinx*; lattice for *trellis*; harness for *yoke*).

Mr. Marks demonstrated average verbal fluency on measures of letter and category fluency. His performance on a verbal fluency component measure that required switching between categories on various trials was more challenging and produced a somewhat better score than his performance on more basic letter and category fluency trials.

Intellectual Skills: Overall Pattern Analysis. Mr. Marks shows comparable verbal and nonverbal intellectual skills in the average range. His verbal IQ is 10 points higher than his nonverbal IQ. A score difference of this magnitude is greater than one can attribute to chance variation alone. However a score difference of this quantity on these measures also is quite common. It occurs with a frequency of 37.2% among individuals of his age in the WAIS-III normative sample. This score difference is a normal variant.

Comparison of all possible pairs of the four Index Scores (Verbal Comprehension and Working Memory Indices for verbal intellectual skills; Perceptual Organization and Processing Speed Indices for nonverbal intellectual skills) show that all differences among the index scores are normal variants and are clinically unremarkable. Mr. Marks shows no modular areas of cognitive strength or deficit on these summary measures from the WAIS-III.

Verbal Intelligence. Mr. Marks currently scores in the average range of verbal and nonverbal intellectual ability for age on the Wechsler Adult Intelligence Scale-III. His Verbal IQ score ranks at the 70th percentile for age.

WAIS-III Verbal Index Scores provide an alternative way to describe verbal component skill components more specifically than the Verbal IQ score. Mr. Marks demonstrated average performance on the Verbal Comprehension Index (63rd percentile for age) on measures of verbal concept formation and communication skills, verbal abstraction, and formal knowledge of general verbal background information. His skills in this area are comparable to each other and show little variability, but they are lower than we would expect given his advanced level of professional education. .

His performance on the Working Memory Index, another verbal intelligence component, ranks at the 87th percentile for age, which borders on the superior ability range. His performance pattern shows considerably more variability among Working Memory Index subtests than we found among the subtests of the Verbal Comprehension Index.

Mr. Marks shows superior capacity for auditory attention span and auditory working memory for an individual of his age. These skills make it possible for him to attend to complex auditory instructions and to accurately repeat relatively large amounts of auditory-verbal information after he has heard the material once. This immediate repetition ability does not necessarily indicate that he understands the material conceptually. However he can mentally manipulate such information at least for a short period after it has been presented. His abilities to attend for longer periods, to encode spoken information into short-term memory, and to recall such information immediately and after a delay period are addressed in subsequent sections of this evaluation.

We would expect that he should be quite adept at rote memorization of spoken verbal material and that he should be able to attend to cognitive tasks for relatively extended periods. These expectations are based on the test results and are consistent with our clinical observations.

His ability to perform mental arithmetic problems, however, is only average for age. Mental arithmetic ability is typically used as an index of concentration ability. Item analysis showed that his errors occurred on the more difficult items that required him to manipulate information in short-term memory rather than just to repeat information as it was presented to him. A few instances of what appeared to be impulsive guessing were noted. Such errors are typical of the performance of patients with frontal lobe lesions.

Nonverbal Intelligence. Mr. Marks scored in the average range of nonverbal intelligence on the Wechsler Adult Intelligence Scale-III. His current Performance (nonverbal) IQ score ranks at the 45th percentile for age.

Mr. Marks' performance on the Perceptual Organization Index nonverbal intelligence summary measure ranks at the 68th percentile for age. His scores on the component nonverbal subtest skills of this measure show intact ability to analyze and to identify visual details, and to problem solve nonverbal tasks that are both novel.

Mr. Marks commented that several tasks of average difficulty were "hard" for him to execute, even though he solved them. His average score on these measures reflects a tendency to struggle with the solution strategy when the task requires a novel strategy and use of his own feedback to analyze the task and his performance so that he can learn from his successes and his errors. He returned to a trial-and-error strategy when he experienced difficulty, which slowed his performance and lowered his score. He performed more efficiently on nonverbal tasks when he could make use of verbal analysis to supplement his nonverbal problem solving attempts. He experienced more difficulty on tasks that required a strictly nonverbal solution strategy.

Mr. Marks performed in the mid-average range for age on clerical measures of visual-motor processing speed. His fine motor skills are intact and are relatively efficient.

There are no significant strengths or weaknesses among Mr. Marks' verbal skills or his nonverbal skills. His pattern of performance on these intellectual skills is quite even and

shows no suggestion of impairment or decline. This finding is consistent with our expectations based on the frontal location of the client's brain lesion. Measures of verbal and nonverbal intelligence are sensitive to the integrity of left and right parietal lobe function, respectively, and therefore would be expected to be spared in a patient with a frontal brain lesion.

Executive Function: Verbal Concept Formation Ability. Mr. Marks showed average verbal concept formation ability on the Delis-Kaplan Executive Function System (D-KEFS) Proverb Test. His approach to the interpretation of common and uncommon proverbs was consistently abstract and conceptually sophisticated. He was able to interpret difficult and unusual proverbial content even for sayings that were unfamiliar to him. He was able to recognize the most abstract and conceptually correct answer to every item on a multiple choice portion of the proverbial interpretation task.

The D-KEFS Twenty Questions subtest also was administered to Mr. Marks. On this measure he showed a very inconsistent pattern of performance that highlights cognitive difficulties that are related to his frontal lobe lesion.

This test presents the examinee with a set of 30 small clip art pictures on a single page in a matrix array. The respondent is asked to identify which of the items that has been chosen at random by the test developers on each of a series of four trials. The object of the task is to ask abstract questions that will eliminate as many *categories* of items so that one can narrow the search to find the specific target item within a category once that has been identified. Ineffective solution strategies eliminate few categories and lead one to ask trial-and-error questions that may or may not lead one systematically to the task solution.

Mr. Marks showed a perseverative response style by asking the very same initial question on each of the four trials of this task. His strategy was not descriptively "concrete," but it eliminated only four of the 30 possible items. Certainly it was a conceptually lower level attempt to analyze task dimensions and to problem solve. Overall the number of questions that he asked across the four trials was in the average range for age. However item analysis revealed that his performance was efficient on two trials and inefficient on the other two trials. For the two trials on which he initially guessed correctly about relevant categories, his subsequent abstraction level and cognitive concept performance level was quite efficient. His chance guessing of the correct dimension structured the task for him, and he was able to follow that strategy directly to the solution. However these correct solutions were not logical or hypothesis driven. When he initially guessed incorrectly about the relevant categories on the other two trials, the relevant dimensions of the task remained unknown to him. Overall his performance was quite poor on these two conceptually unstructured trials. He also was unable to make use of his errors as a source of feedback to modify or to develop an effective solution strategy. Instead he resorted to guessing and trial-and-error attempts at task solution.

Executive Function: Nonverbal Concept Formation Ability. Mr. Marks demonstrated excellent nonverbal concept formation and problem solving abilities on the D-KEFS Sorting and Tower Tests.

His performance on the nonverbal aspect of the Sorting Test and the Tower Test were very superior. He identified all eight of the possible Sorting Test strategies for each trial of the Sorting Test, which is quite rare, even in individuals of superior intellectual ability. Three of these solutions require use of verbal cue analysis, and the other five solutions require use of nonverbal cue analysis. He performed comparably on the two sets of sorting stimuli for this task that vary widely in their perceptual and conceptual features. His ability to perform optimally on both Sorting Test card task sets shows remarkable cognitive flexibility and nonverbal problem solving ability. Mr. Marks also showed excellent ability to explain his verbal and nonverbal solution strategies.

It appears that when Mr. Marks is presented with a concept formation or problem solving task that is well structured and that provides visual or verbal cues for task solution, he is able to make effective use of such cues to solve difficult nonverbal tasks. His solutions show both originality and cognitive flexibility.

It appears that his verbal skills are primarily responsible for his success on these primarily nonverbal D-KEFS problem solving tasks. He consistently relied on ineffective trial-and-error attempts at solution on several WAIS-III nonverbal subtests that did not provide him with structured perceptual cues to aid task analysis and problem solving. He needed information that he could use to develop and evaluate solution strategies that would provide him with feedback about the accuracy of his solution strategy . Without such feedback he was able to make use of only trial-and-error attempts at solution. Use of such methods may not always be effective for recognition of the correct solution even if one When such strategies fit with an over-learned or an easily recognized perceptual solution, his solution attempts succeeded. Such successes were limited to easier items and those on which he could recognize the pattern on a piecemeal basis. When the task was more complex so that it required novel concept formation and stepwise use of feedback about the accuracy of his solution strategy, his attempts failed.

Effective Problem Solving Strategy -- These results suggest that Mr. Marks can still solve complex nonverbal problems if he makes use of a combined strategy that involves verbal analysis of visual details, explicit analysis of key perceptual and verbally identifiable features, and regular use of verbal feedback to formulate a solution strategy and to check the accuracy of his solution strategy at each step of its execution.

Executive Function: Visual-Motor Sequencing. The ability to perform tasks that require recall of a visual or verbal sequence are critically dependent on frontal lobe systems. When the task requires alternation through two sequences on successive responses, an element of working memory also is introduced. Integration and blending of these complex task elements is an important aspect of efficient executive function.

Two D-KEFS subtests are particularly sensitive to the integrity of these skills. On all of the five component trials of the D-KEFS version of the Trail Making Test, Mr. Marks performed in the average range for age. In particular his performance on the fourth trial of this task that requires simultaneous and integrated letter and number sequencing, stimulus cue alternation, fine motor coordination, visual spatial scanning, and working memory components in unison was performed in the average range.

Mr. Marks also performed in the average to high-average range on the D-KEFS Design Fluency subtest that is particularly sensitive to right frontal quadrant brain function. The task progressed through three trials from a simple visual-motor task (high average performance level) to a selectively cued visual-motor task (target some stimuli while avoiding others - high average performance level) to a visually cued alternation task (alternate between two types of stimuli on successive trials of the task - mid-average performance level). As the task complexity increased his performance speed and efficiency gradually decreased to a minor degree. All of these performances are within normal limits.

Executive Function: Divided Attention. The ability to selectively attend to one set of perceptual cues while simultaneously inhibiting response to other cues is the key skill that is required for "multi-tasking." This complex cognitive ability allows one to maintain primary attention on one task in the attention span foreground while one remains partially aware of another stimulus in the attention span background that is not the focus of immediate attention. This splitting or division of focused attention and the ability to shift the focus of attention between these two simultaneously present cues is called divided attention. It is the executive component of attention.

The D-KEFS Color-Word Interference Test is designed to measure this divided attention ability. Mr. Marks showed average ability to inhibit an over-learned word reading response and to respond to contrasting cues with a less practiced and more difficult color naming response on this task. These inhibition tasks are particularly sensitive to the integrity of frontal lobe function as it influences inhibition and focused direction of attention.

The "interference" trial presents a large series of color name words (e.g. blue, red) that are printed with ink that is of a different color than the written word (e.g. the word *blue* might be printed in *red* ink, or vice versa. Three color names and ink colors are used in the task. The respondent's task on this trial is to name the color of the ink (the less practiced task) and to suppress the more automatic word reading response. On this task Mr. Marks performed at a mid-average level.

On the "interference switching" task another stimulus array is presented. For half of the items the task is the same as in the preceding trial. The respondent names the color of ink in which the word is printed. For other half of the trials the respondent is asked to read the word when it appears with a different perceptual cue. This task introduces an element of cognitive flexibility since the task demand changes every few items in an unpredictable fashion,while rapid response speed, working memory, and over-learned

response inhibition task features remain constant. On this task Mr. Marks performed remarkably well. His score ranks in the high average range for age.

Sustained Attention. Mr. Marks showed a cautious and markedly slowed response style on Conners' Continuous Performance Test-II. This is an automated, precisely timed measure of sustained attention over a period of approximately 14 minutes. His response style shows emphasis on avoidance of commission errors. The task places extra demands on attention since the pace of the task changes unpredictably and often. He demonstrated normal ability to sustain attention and he showed no evidence of impulsive responding on this measure.

A statistical summary score based on a weighted combination of all of the components of the CPT-II profile shows that Mr. Marks' pattern of performance is not clearly defined as a clinical vs. non-clinical syndrome pattern. There is a 59.1% likelihood that his CPT-II profile more clearly resembles the performance of individuals with Attention Deficit/Hyperactivity Disorder rather than a group of normal controls of his age. The ADHD clinical comparison group is used to identify individuals who present with a primary attention span deficit that is not clearly due to a known brain lesion.

Mr. Marks' CPT-II profile shows slightly more resemblance (55.1% likelihood) to the modal profile of a reference group of patients with nonspecific, diagnostically mixed neurological disorder than to a group of normal control cases of his age. It is about as likely as not that his specific pattern of sustained attention is related to his brain lesion. Since his CPT-II profile shows no definite abnormality, this is a reasonable conclusion.

Rote Auditory Recall. Mr. Marks performed at an average level for age and educational level on immediate recall of an eight digit sequence on the Serial Digit Learning Test, Form SD8. That sequence length is one digit longer than a telephone number. He made use of a "chunking" or sequence segmentation strategy to enhance his recall, much as telephone numbers or Social Security numbers are segmented into digital subunits. He mastered errorless recall of the sequence on the third attempt. That performance ranks at the 63rd percentile for age.

The nine digit form of the Serial Digit Learning Test also was administered to Mr. Marks. He mastered errorless recall of the sequence on the fifth trial. Initial difficulty with the task involved the span of recall rather than the sequence of the numbers in the series. His performance ranks at the 80th percentile for age and educational level, and is in the high average range.

Logical Verbal Learning and Memory. Mr. Marks demonstrated average and steady learning ability on the Standard 16-word form of the California Verbal Learning Test. He was able to recall 76% of words consistently from one trial to the next, which is an average level of performance. He made use of a logical categorization strategy in which he recalled related words from the list in subgroups that he recognized and organized from the original presentation order that was not logically grouped. These features show

an active learning style that may be preserved when a frontal lobe lesion is relatively slowly progressive so that compensatory cognitive strategies can be developed over time.

Recall after short delay and 20-minute delay was excellent, and showed minimal confabulation. When a multiple choice trial was presented with non-target words that were conceptually and phonemically related to the target items, however, Mr. Marks showed marked confabulation. He made nearly as many confabulatory errors as correct responses on this trial. This pattern of errors shows the expected disinhibition response pattern that is common with frontal lobe lesion syndromes. There is difficulty with inhibition when distraction stimuli are introduced. Ability to differentiate clearly different target stimuli from incorrect responses was errorless on a subsequent forced choice trial.

Visual Recall and Recognition. Mr. Marks performed with 70% overall accuracy on the immediate recall phase of the Benton Visual Retention Test. This is a normal range performance for a person of his age and educational level. His immediate visual recognition skills on a related multiple choice form of the test also were within the average range for age.

Multi-Axial Diagnostic Impression

Axis I. Cognitive Disorder Not Otherwise Specified
Personality Change Due to Brain Tumor, Other Type (310.1)

Axis II. No Diagnosis on Axis II

Axis III. Status/post resection of an oligodendroglioma, grade II, from right frontal parasagittal area
One generalized motor seizure by history

Axis IV. Problems (stress, discord) with primary support group
Occupational problems, work related stress; compulsive work ethic

Axis V. GAF = 55, moderate difficulty in social and occupational functioning

James A. Moses Jr.., Ph.D., ABPP
Clinical Neuropsychologist

SAMPLES OF CELL PHONE RECORDS

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Call Detail (Continued) 925-899-9000

User Name: ALAN MARKS

Rate Code: UNW9=Unlimited N&W, RM40=Rollover FM 4000, ESM1=Unlimited Expd M2M, DFMR=Call Delivery
Rate Period (PD): NW=Nwknd, DT=Daytime
Feature: VM=VOICE MAIL, M2MC=EXPANDED M2M, CW=Call Waiting, FFMR=Call Delivery Service

Item	Day	Date	Time	Number Called	Call To	Min	Rate Code	Rate Pd	Feature	Airtime Charge	LD/Add'l Charge	Total Charge
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952		05/08	7:32PM	415-601-9790	INCOMI CL	38	UNW9	NW				0.00
953		05/08	8:14PM	415-577-3770	INCOMI CL	[illegible]	UNW9	NW				0.00
954		05/08	8:22PM	[illegible]	WALNUT CA	[illegible]	UNW9	NW				0.00
955		05/08	8:55PM	[illegible]	INCOMI CL	[illegible]	UNW9	NW				0.00
956		05/08	9:23PM	925-254-7040	ORINDA CA	1	UNW9	NW				0.00
		Subtotal Minutes				2779						0.00
Totals						[illegible]						0.00

Interstate Calls Subtotal 0.00
Intrastate Calls Subtotal 0.00

Data Detail 925-899-9000

User Name: ALAN MARKS

Rate Code: TMI1=Text Msg Pay Per Use
Rate Period (PD): AT=Anytime
Feature: SMH=SMS $0.1 MO/MT

Item	Day	Date	Time	To/From	Type	Msg/KB/Min	Rate Code	Rate Pd	Feature	In/Out	Total Charge
[illegible]	FRI	04/28	7:23PM	[illegible]	MTM Other	1 Msg	TMI1	AT	SMH	[illegible]	[illegible]
		Subtotal of Msg's				1 Msg					0.10
Totals											[illegible]

Interstate Calls Subtotal 0.00
Intrastate Calls Subtotal 0.00

Wireless AMBER Alerts

Sign up to receive Wireless AMBER Alerts at www.cingular.com/amberalerts or by sending a text message with up to 5 zip codes to the short code AMBER (i.e. send SUBSCRIBE 12345 to short code 26237). Customers capable of receiving text messages can receive these geographically specified alerts. There is no charge to sign up or to receive AMBER alerts. Normal airtime charges will apply if you place a call in response to an AMBER alert message.

Calling Name Delivery to Landline Customers

Beginning next month, your account name and wireless number will be displayed on Caller ID when you make wireless-to-landline calls. Previously, only your wireless number was displayed. No action is required to have your account name displayed. To block your account name, on all wireless-to-landline calls, you may contact Customer Care at 611 on your mobile or 1 866 Cingular. This change does not affect how your name will display on wireless-to-wireless calls.

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Billing Cycle Date: 06/07/06 - 07/06/06
Account Number: 111937778

Call Detail (Continued) 925-899-9000

User Name: ALAN MARKS

Rate Code: RM40=Rollover FM 4000, UNW9=Unlimited N&W, ESM1=Unlimited Expd M2M
Rate Period (PD): DT=Daytime, NW=Nwknd
Feature: VM=VOICE MAIL, M2MC=EXPANDED M2M, CW=Call Waiting

Item	Day	Date	Time	Number Called	Call To	Min	Rate Code	Rate Pd	Feature	Airtime Charge	LD/Add'l Charge	Total Charge
797		07/06	3:53PM	925-438-2052	ORINDA CA	3	RM40	DT				0.00
798		07/06	4:50PM	925-330-2280	WALNUT CA	2	ESM1	DT	M2MC			0.00
799		07/06	6:02PM	925-285-5437	WALNUT CA	3	ESM1	DT	M2MC			0.00
800		07/06	6:09PM	925-899-8313	INCOMI CL	2	ESM1	DT	M2MC			0.00
801		07/06	6:31PM	925-899-1056	INCOMI CL	1	ESM1	DT	M2MC			0.00
802		07/06	6:52PM	925-899-9000	VMAIL CL	12	RM40	DT	VM			0.00
803		07/06	[illegible]	[illegible]	ORINDA CA	[illegible]	RM40	[illegible]				[illegible]
804		07/06	[illegible]	[illegible]	INCOMI CL	[illegible]	[illegible]	[illegible]				[illegible]
805		07/06	9:32PM	925-285-5437	WALNUT CA	[illegible]	UNW9	NW				0.00
806		07/06	9:41PM	925-285-5437	INCOMI CL	2	UNW9	NW				0.00
		Subtotal Minutes				2173					1.50	1.50
Totals						2173					1.50	1.50

Interstate Calls Subtotal 0.00
Intrastate Calls Subtotal 0.00

Data Detail 925-899-9000

User Name: ALAN MARKS

Rate Code: TMI1=Text Msg Pay Per Use
Rate Period (PD): AT=Anytime
Feature: SMH=SMS $0.1 MO/MT

Item	Day	Date	Time	To/From	Type	Msg/KB/Min	Rate Code	Rate Pd	Feature	In/Out	Total Charge
1	WED	06/07	10:40PM	[illegible]	[illegible]	1 Msg	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	THU	06/08	8:55AM	[illegible]	M2M TEXT MESSAGE	1 Msg	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		Subtotal of Msg's				2 Msg					0.20
Totals											0.20

Interstate Calls Subtotal 0.00
Intrastate Calls Subtotal 0.00

Auto Pay Authorization Agreement

For use only with Auto Pay phone enrollment
If I enroll, I authorize Cingular Wireless to pay my bill monthly by debiting my bank account. I can cancel authorization by notifying Cingular at www.cingular.com, by calling 1-800-331-0500, or by dialing 611 from my wireless phone. If my bank rejects a payment, I may be charged a return fee.

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Page: 99 of 101
Billing Cycle Date: 01/21/07 - 02/20/07
Account Number: 111937778
Bill Reprint

Questions? Call 1-800-331-0500 or 611 from your wireless phone.

Call Detail (Continued) 925-899-9000

User Name: ALAN MARKS

Rate Code: ESM1=Unlimited Expd M2M, RM30=3000 Rollover Mins, UNW9=Unlimited N&W, FN6N=FT9NATP3000RUMMUNW
Rate Period (PD): DT=Daytime, NW=Nwknd
Feature: M2MC=EXPANDED M2M, VM=VOICE MAIL, CW=Call Waiting

Item	Day	Date	Time	Number Called	Call To	Min	Rate Code	Rate Pd	Feature	Airtime Charge	LD/Add'l Charge	Total Charge
637		02/20	12:17PM	925-348-3182	CONCOR CA	7	ESM1	DT	M2MC			0.00
638		02/20	1:40PM	925-254-2187	ORINDA CA	1	FN6N	DT		0.25		0.25
639		02/20	1:43PM	925-285-5437	INCOMI CL	1	ESM1	DT	M2MC			0.00
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647		02/20	3:41PM	925-899-9000	VMAIL CL	3	FN6N	DT	VM	0.75		0.75
648		02/20	3:54PM	925-285-5437	INCOMI CL	5	ESM1	DT	M2MC			0.00
649		02/20	5:26PM	925-899-9000	VMAIL CL	2	FN6N	DT	VM	0.50		0.50
650		02/20	6:30PM	415-260-3310	SNFC C CA	3	ESM1	DT	M2MC			0.00
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[illegible]		02/20	[illegible]	[illegible]	ORINDA CA	[illegible]	FN6N	DT		1.00		1.00
654		02/20	[illegible]	[illegible]	ORINDA CA	[illegible]	FN6N	DT		2.00		2.00
655		02/20	[illegible]	[illegible]	SNFC C CA	[illegible]	FN6N	DT		0.25		0.25
656		02/20	9:46PM	818-224-4299	CANOGA CA	9	FN6N	DT		2.25		2.25
		Subtotal Minutes				1861				15.50		15.50
Totals						1861				15.50		15.50

Interstate Calls Subtotal 0.00
Intrastate Calls Subtotal 15.50

Data Detail 925-899-9000

User Name: ALAN MARKS

Rate Code: RBBW=BBWWAPCUNL
Rate Period (PD): AT=Anytime
Feature: GPRR=GPRS 0 rate APN003

Item	Day	Date	Time	To/From	Type	Msg/KB/Min	Rate Code	Rate Pd	Feature	In/Out	Total Charge
[illegible]	SAT	[illegible]	[illegible]	Data Transfer	Data	[illegible] KB	RBBW	AT	GPRR	Out	0.00
[illegible]		[illegible]	[illegible]	Data Transfer	Data	[illegible] KB	RBBW	AT	GPRR	Out	0.00
[illegible]	SUN	01/21	[illegible]	Data Transfer	Data	[illegible] KB	RBBW	AT	GPRR	Out	0.00
[illegible]		01/21	[illegible]	Data Transfer	Data	[illegible] KB	RBBW	AT	GPRR	Out	0.00
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6		01/21	8:48PM	Data Transfer	Data	8 KB	RBBW	AT	GPRR	Out	0.00
7		01/21	11:48PM	Data Transfer	Data	6 KB	RBBW	AT	GPRR	Out	0.00
8	MON	01/22	7:11AM	Data Transfer	Data	35 KB	RBBW	AT	GPRR	Out	0.00
9		01/22	2:41PM	Data Transfer	Data	2 KB	RBBW	AT	GPRR	Out	0.00
10		01/22	3:00PM	Data Transfer	Data	15 KB	RBBW	AT	GPRR	Out	0.00
11		01/22	[illegible]	Data Transfer	Data	[illegible] KB	RBBW	AT	GPRR	Out	0.00
12	TUE	01/23	[illegible]	Data Transfer	Data	[illegible] KB	RBBW	AT	GPRR	Out	0.00
13	WED	01/24	[illegible]	Data Transfer	Data	[illegible] KB	RBBW	AT	GPRR	Out	0.00
14		01/24	[illegible]	Data Transfer	Data	[illegible] KB	RBBW	AT	GPRR	Out	0.00
15	THU	01/25	7:45PM	Data Transfer	Data	6 KB	RBBW	AT	GPRR	Out	0.00
16		01/25	9:45PM	Data Transfer	Data	2 KB	RBBW	AT	GPRR	Out	0.00
17		01/25	11:46PM	Data Transfer	Data	59 KB	RBBW	AT	GPRR	Out	0.00
18	FRI	01/26	5:56PM	Data Transfer	Data	7 KB	RBBW	AT	GPRR	Out	0.00

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Caution on cell phone use

Group sees possible link to brain cancer

By David Kohn | Sun reporter
July 24, 2008

An international group of 23 prominent doctors and public health researchers and officials is warning that cell phone use may increase the risk of brain cancer.

One of those who signed, Dr. Ronald Herberman, the head of the University of Pittsburgh Cancer Institute, went so far as to advise his own employees to limit cell phone use.

The actions will likely add to a long-running debate on which there is little consensus among medical authorities.

"The most recent studies, which include subjects with a history of cell phone usage during the last 10 years, show a possible association between certain benign tumors and some brain cancers on the side the device is used," the statement reads in part.

The group behind the letter is an ad hoc group of cancer and public health experts concerned about the potential risk from cell phones. None were from Maryland-based institutions. Among those who signed the new letter are Dr. David Carpenter, director of the Institute for Health and the Environment at the University of Albany, and Herberman, director of the University of Pittsburgh Cancer Institute.

"Really at the heart of my concern is that we shouldn't wait for a definitive study to come out, but err on the side of being safe rather than sorry later," Herberman said. In the memo, sent to about 3,000 faculty and staff yesterday, he says children should use cell phones only for emergencies because their brains are still developing.

The key architect of the warning was Devra Lee Davis, head of the department of environmental oncology at the University of Pittsburgh. "The question is do you want to play Russian roulette with your brain," she said. "I don't know that cell phones are dangerous. But I don't know that they are safe." The advisory she and the others signed suggests 10 measures to limit exposure to electromagnetic radiation emitted by the cell phones, such as shortening conversations and keeping the phone away from the head. It also recommends that children not use cell phones except in emergencies.

"It's the first time such a group of public health experts have spoken out for precaution," said Louis Slesin, editor of Microwave News, a Web site that tracks electromagnetic radiation and health.

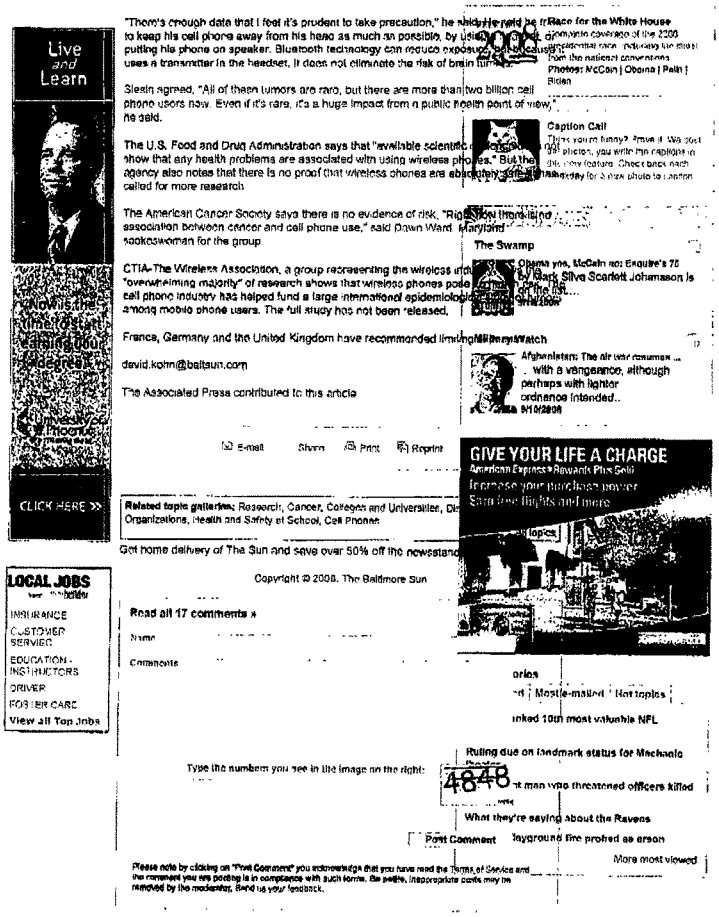
Scientists remain divided on the issue. A study published this spring in the *International Journal of Oncology* examined several previous studies, and found that there was an association between long-term cell phone use and some tumors. Several studies have found that people who have brain cancer and were heavy cell phone users tended to have tumors on the side of the head they used their phone.

But other studies have found no link between cell phone use and cancer. A 2008 University of Utah analysis looked at nine studies with thousands of brain tumor patients and concludes, "We found no overall increased risk of brain tumors among cellular phone users. The potential elevated risk of brain tumors after long-term cellular phone use awaits confirmation by future studies." Studies last year in France and Norway concluded the same thing.

Cell phones emit a small amount of electromagnetic radiation. Some researchers argue that chronic exposure to this radiation may raise cancer risk, perhaps by heating brain tissue or damaging DNA. Many researchers worry about children's exposure, because their skulls are thinner and their brains are still developing.

In January, the National Academy of Sciences issued a report calling for more research.

"There is concern about cell phone use as a risk factor for cancer. But the research is not as sophisticated as I would like," said Dan Wartenberg, chief of the division of environmental epidemiology at the Robert Wood Johnson Medical School in Piscataway, N.J. He was involved in the NAS report and also helped write the new warning



"There's enough data that I feel it's prudent to take precaution," he said. He said he tries to keep his cell phone away from his head as much as possible, by using [illegible] putting his phone on speaker. Bluetooth technology can reduce exposure [illegible] uses a transmitter in the headset, it does not eliminate the risk of brain tumors.

Slesin agreed, "All of these tumors are rare, but there are more than two billion cell phone users now. Even if it's rare, it's a huge impact from a public health point of view," he said.

The U.S. Food and Drug Administration says that "available scientific [illegible] show that any health problems are associated with using wireless phones." But the agency also notes that there is no proof that wireless phones are absolutely safe. It has called for more research.

The American Cancer Society says there is no evidence of risk. "Right now there is no association between cancer and cell phone use," said Dawn Ward, Maryland spokeswoman for the group.

CTIA-The Wireless Association, a group representing the wireless [illegible] "overwhelming majority" of research shows that wireless phones pose [illegible] cell phone industry has helped fund a large international epidemiologic [illegible] among mobile phone users. The full study has not been released.

France, Germany and the United Kingdom have recommended limiting [illegible]

david.kohn@baltsun.com

The Associated Press contributed to this article

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LETTER FROM DR. ELIHU RICHTER

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Unit of Occupational and Environmental Medicine
and Center for Injury Prevention

September 14, 2008

Congress of the United States, House of Representatives
Committee on Oversight and Government Reform
Domestic Policy Subcommittee
2157 Rayburn House Office Building
Washington, D.C. 20515-8143

Subject: Submission of Statement to House of Representatives in connection with hearing before Rep Dennis Kucinich on Sept 25 on case of brain tumor of Mr Alan Marks in relation to his use of cell phones.

Dear Members of the Domestic Policy Subcommittee,

I have been asked to present my assessment of the case for a cause-effect relationship between Mr Alan Mark's use of cell phones and the development spelled out below of his right sided frontal brain tumor, an oligodendroma (GLIOMA) some 10 years after first use of hand held phones.

The basis for my opinion is the review of his medical records, including the histologic diagnosis and the imaging of his tumor, the records of his cell phone use, an interview by phone with his wife, and the emerging prior epidemiologic evidence on the case for use of cell phones applied to the side of the head and brain cancer.

My CV and work relevant to cancer and non-lonizing radiation is attached as Appendix 1.

History

Mr. Marks was born in 1952. He suffered a seizure at age 56 (My 6, 2008) and was then found to have a Supplementary Motor Area tumor located in the right hemisphere (posterior right superior frontal gyrus).

He is a right handed male with a history of behavioral problems for several years. Previously his health had been excellent, except for hypercholesterolemia, for which he was on medication. He is married and has 3 children. He has worked in the real estate industry most of his adult life. Prior neurological examination indicated motor weakness in left arm and leg. Imaging showed a non-enhancing frontal lesion in the right SMA. He underwent resection on June 16, 2008 with Dr. Mitchel Berger at UCSF. Most of the tumor was removed but fringe cells remain. It is an oligodnedroglioma WHO rated grade 2. He is being monitored with MRI's and when it grows back aggressively chemotherapy will be administered. He suffers from severe emotional issues, some loss of memory, illogical and irrational behavior, lack of concentration, and some problems with his speech and his gait.

Cell phone use: The family has provided me with information in Appendix 2. The family reports he was a heavy user of cell phones for 10 years. Data are available on cumulative hours of conversation prior to his diagnosis estimated to be 2,020 minutes per month equaling over 400 hours of exposure per year, or more than hour of use per day over 8 years---and does not include data on first two years, which so far are not available. That totals over 3,200 hours of exposure in an 8-year span. The earliest record from ATT is from 2000 but he has used cell phones since they were first invented starting with a car phone. In the past 8 years, the phone was always 100% of the time held to the right ear where the tumor grew in the right frontal lobe.

Discussion

The weight of the evidence suggests it is more likely than not that there is a cause effect relationship between Mark's heavy cell phone use over an 8 year period and his brain tumor. It is more likely than not that these exposures were either the primary or contributory cause. The basis for this statement is as follows;

(1) The fact that the brain tumor appeared after an 10 year latent period and on the right side is consistent with the emerging body of knowledge on exposure and effect and latency and laterality of cell phone use. This body of knowledge is summarized in Hardell et al's latest paper in Occupational and Environmental Medicine and the Bioinitiative Report. (I should add that although evidence suggests that there is an increased risk especially after 10 y of latency, we cannot exclude the possibility risk may be increased even when latency is under 10 y for certain individuals with very high exposures. We have reported individual cases of brain cancer in young radar workers with induction periods < 10 y. (Richter ED, Berman T, Levy O, Brain cancer in young radar workers with induction periods < 10 y, Arch Environ Health. 2002 57(4):270-272))

(2) There is no alternative explanation for the tumor at a relatively early age for onset of brain cancer in this patient.

Comment

Mr Mark's episode, taken together with the emerging epidemiologic knowledge pointing to a cause-effect relationship between cell phone use and brain cancer, is a sentinel event calling for application of preventive measures to reduce population exposures, especially to children, from cell phone use. Are we on the threshold of an epidemic of brain cancer associated with a world wide experiment in which a source of non-ionizing radiation is held right next to the head?

We cannot give an affirmative answer to the above question with certainty. But is it wise to continue on with the mass experiment in exposure to the head from a source held right next to it on hundreds of millions of people in the light of the advancing knowledge? It is this concern which was the basis for the Benevento Resolution in 2006 calling for the application of precautionary strategies to prevent and protect by reducing exposure. This resolution stated that "there is accumulating epidemiologic evidence indicating there is an increased brain tumor risk from long term use of cellular phones". Since then the evidence in support of this statement continues to accumulate. In retrospect, there were indications that such risks were present even in the earliest studies by Hardell et al in early 2000's. Indeed, even studies reported as negative, when closely examined, showed evidence of upward creep in risk associated with laterality and increased latency.

In conclusion, I share with the Committee a set of answers in response to questions from the attorney of a patient with a brain tumor following prolonged cell phone use in Israel.

1. What are the dangers associated with the use of cellular telephones?

The best available knowledge is that use of cell phones is associated with increases in risks for brain tumors, (gliomas, glioblastomas, acoustic neuromas) and most recently, parotid gland tumors. There are also reports of other effects on neurobehavioral function.

2. What are the studies describing the risks?

The Bioinitiative Report summarizes studies showing increased risks for brain tumors associated with increased latency of use and side of use. These results are seen not only in those in which the authors interpret the results as indicative of a positive association, --i.e all those by Hardell) but also in those interpreted as negative (e. g. Shoemaker). Reviews by Hardell and Kundi and others examine these results.

3. Are there negative studies?

It is important to note that there are many negative studies. The question to be as`ked is: Why are the so called positive studies---(i.e. show increase risk) positive and why are the negative ones (absence of increase risk) negative? As Hardell and Kundi have pointed out, the positive studies have larger numbers,

longer follow-up, and provide more detailed information on the side of use --a point that lessens the possibility of dilution of exposure-effect relationships—an important cause of false negative findings in epidemiologic studies. Many of the latter have methodologic shortcomings, most notably very small numbers, short latencies and possible biases associated with comparability of populations, and sometimes overlook trends towards upward creep in risk in subgroups with longer latencies. I first presented a preliminary analysis of some of these problems in excel spreadsheets in the Christopher Newman trial.

4. What is the agent of concern producing the risks?

We do not know for certain what are the biologic mechanisms underlying carcinogenesis from cell phone use. Is it RF/MW or the ELF; produced by modulation of RF/MW waves? Information, not a chemical toxic agent, is the agent of concern. But we have a lot of circumstantial knowledge concerning the plausibility of the association, and that information is sufficient to recommend and implement preventive measures. .The same point held true concerning cigarette smoke and lung cancer: the association, as well as temporality, dose-response and reversal of risk from cessation of exposure were all a basis for preventive measures—i.e. stopping smoking—before we gathered the huge body of knowledge on carcinogens in cigarette smoke.

In general, increases in cumulative risk are considered to be associated with intensity of source of exposure—measured in watts, field strength, measured in uw/cm2, and frequency of use. Intensity of exposure predicts absorption, (the SAR, or specific absorption ratio, measured in W/kg tissue. But strength of the near field is a function of the amount of energy required by the cell phone to connect to the far field. This latter parameter is inversely related to the distance from the phone to the nearest antenna. Therefore, intensity of near field exposure is greatest in rural areas furthest away from the far field. To the degree that transmission from the far field is interfered with by barriers such as walls, especially in closed interiors such as cars, then it is fairly certain that speaking from closed rooms, especially those without windows, will generate higher field strengths in the near field.

Carrying a cell phone which is turned on inside your pocket produces non-ionizing radiation to the tissues closest to the phone. We do not have adequate information on the risks produced by the latter exposures. But absence of evidence should not be considered evidence of absence.

4. Are there cellular changes in the body from EMF?

There is much experimental work showing that exposure to Non Ionizing Radiation results in cellular changes. This information is summarized in the Bioinitiative report. These include effects on cell communication,, DNA changes, membrane permeability and other effects. But there are few studies on cell phones per se.

5. Are there risks for both benign and malignant tumors?

The literature suggests that there can be an increase in risk for both benign and malignant tumors. Gliomas can evolve into glioblastomas, which can spread. A recent paper by Sadetzky et al from Israel, in particular calls attention to parotid

tumors. It is important to emphasize that "benign" tumors in the brain or head, though they do not spread to other tissues, still produce major medical problems requiring surgery, radiation or chemotherapy which themselves have risks and rehabilitation. and enormous long term disability requiring neuropsychologic care and rehabilitation. Chemotherapy itself increases the risk for subsequent cancers.

6. Are there high risk subgroups?

Children: There is concern that children, with softer skulls, more rapidly developing tissues, and a longer shelf life, are considered to be at greater risk than others. This concern is the basis for precautionary recommendations cautioning against the unrestricted use of cell phones by children. Use of cell phones by children should be limited to the barest minimum.

Pregnant women and their fetuses: Information is not readily available on risks from use of cell phones by pregnant women on themselves or their fetuses. However a new study of 13,000 mothers, just published in Epidemiology in July 2008, reports a link between use of handsets and later behavioral problems in children. Scientists found that mothers who did use the handsets were 54 per cent more likely to have children with behavioural problems and that the likelihood increased with the amount of potential exposure to the radiation. The problems included hyperactivity and difficulties with conduct, emotions and relationships by the time they reached school age. The risks were greater if the children themselves used the phones before the age of seven.

Occupation: Szmigielski and others shown dose related increases in risks associated with occupational exposures to non-ionizing radiation from radar frequencies. Our own paper has reported a cluster of high risk in a group of soldiers with estimated heavy exposures to non-ionizing radiation in work with masts used for radar surveillance

Distance and cell phones: Hallberg, in an ecologic study in Sweden, has shown that there were sudden unexplained increases in sickness absences associated with increase in cell phone use in rural areas in Sweden. There was an increase in time trends for many conditions malignant and non-malignant, and an inverse association between distance from antennae and risk for these conditions. The increases were restricted to areas where distance from antennae meant that that there was increased power transmission from the near field. There is a need to duplicate these studies to ascertain whether the same relationships are seen elsewhere.

7. What are the prospects for future risks?

We can say with increasing degrees of certainty that there are increased risks for brain cancer (gliomas and acoustic neuromas) associated with intense and prolonged use of cell phones and cordless phones. We cannot say with absolute certainty what the thresholds of use and intensity are for absence of risk. In general, the findings show that risks for cancer are associated with longer latency and duration of use. Massive increase in cell phone use has created a situation of population wide exposure to cell phones. Several years were required to elapse

before there were was detectable evidence on risks from the first generation of analog phones. With Digital phones, which came into use several years later, it is premature to say they are without risk. At present, there seems a suggestion of a trend towards upward creep in risk in subgroups with longer latencies in studies having longer follow up. (See the Shoemaker study). It is disturbing that the complete findings of the Interphone study and its primary databases have yet to be fully released. The public health concern is that small increases in relative risk applied to hundreds of millions of users will translate into a huge increase in absolute numbers of victims of brain cancer.

8. How should we reduce risk? There is much that can be done at the level of personal protection. Stricter, SAR standards, use of loudspeakers so as to increase distance of the cell phone from the head, less use, and more distance, use of a loudspeaker for all practical purposes should substantially reduce or eliminate nearly all the risk at the individual level. But more fundamentally, there is a need for policies at the community level to protect the public by prevention, i.e. reducing dependence on cell phone use. Everything should be done to ban attempts to get rid of public land line phones in public places. If we reduce use and prevent exposure at the source, there will be no need for protection. Fiberoptic cables for the last mile reduce far field exposure and bring the closest far field to distances far shorter than those from masts and antennae, and thereby offer the potential of replacing mast towers and reducing near field exposure. (http://en.wikipedia.org/wiki/Fiber-optic_communication)

9. Do the cell hone companies do the maximum to reduce risk?

We have to ask: Have cell phone companies chose frequencies for transmission in frequency range of 900 and 1800 MHz, which exploit the head as the antenna for the brain, which is the receiver? Our paper has suggested this possibility.

Cellular Telephones (RF/MW)* and effects on the brain:
The head as an antenna and brain tissue as a receiver**

Absorption: SAR—owing tissue
Cannot be measured
*But, carrier waves (ELF) needed for wave info
Hypothesis: Resonance from wave lengths specifically at 900 and 1800 MHz exploit Head as Antenna
Findings:
Experiments: Increased permeability of blood brain barrier (Salford)
Effects on DNA, Ca++ efflux
Humans:
Headaches, dizziness (Various Reports)
Increased risks for acoustic neuromas and glioblastomas: Side of use with 450 and 900 MHz (Analog), but not 1800 MHz (Digital) (Hardell)
Prevention/Precaution:
Children: Restrict use
Adults: Microphone & distance
Regulation: SAR's of Phones?
**(Z Weinberger and ED Richter, Med Hypotheses 2002)

In so doing they were getting maximum transmission, by exploiting resonance effects which may be implicated in many of the biologic effects of non-ionizing radiation.

From the material I have seen on the web, it is my opinion that the cell phone companies have been less than transparent on reporting risks. Reading their advisory notes/instructions/manuals indicates they do not explicitly report the risks.

It is time for policy makers to require warnings concerning the use of cell phones, the risks from cell phones being held next to the body when turned on but not in use, the risks from cordless phones, and special need for precaution concerning the use of cell phones and cordless phones by children. It is time for policy makers to apply precautionary strategies to prevent risk by reducing exposures and it is time for the public to protect itself by reducing its use of cell phones and to prevent public by reducing exposures

Sincerely

Professor Elihu D Richter MD, MPH

Note: The website, www.madascell.com, prepared by the Marks family, has an excellent compendium of material, including the latest Hardell article, as does the University of Pittsburgh Center for Environmental Oncology, headed by Dr Devra Davis.

Appendix 1

Current Position: Professor Emeritus and Director (Retired)
Unit of Occupational and Environmental Medicine,
Hebrew University-Hadassah School of Public Health and Community Medicine Jerusalem

Education: BA, Columbia 1959; MD, NYU 1963; MPH Harvard 1966; Residency in Community and Environmental Medicine, Mount Sinai Med Center NY.

Specialty Status: Boards in Preventive Medicine, USA and Public Health, Israel

Experience: Governmental work in NYC Dept of Health (Health Officer, East Harlem); Chief Medical Inspector, Ministry of Labor Consultant in Environmental Epidemiology in Ministries of Environment and Health in Israel. Work in various WHO and NIEHS advisory committees in pesticide toxicology. Past and current work in local, regional and international projects in asbestos, silica, lead, cadmium and mercury, heat stress, child labor, pesticides, solvents and cancer clusters, radon, ionizing and non-ionizing radiation (radio-frequency microwave), chemical disasters and emergency response and right-to-know. 80+ publications in peer reviewed journals and 60 publications in textbooks, congresses, conferences on above topics and some 150 medico-legal opinions on behalf of workers and communities with toxic exposures. Gave first courses and set up unit in occupational medicine for Israel Air Force (1978ff)

Work on radiation and non-ionizing radiation: Includes publications on health risks of nuclear industry workers, investigations of radon exposures, preparation of expert opinion on potential hazards from ELF and RF/MW from proposed Voice of America Station in Arava for Supreme Court in Israel, and investigations of cancer clusters in radar technicians, and submission of expert opinion to State Comptroller on Health Risks from Exposures to Non-Ionizing Radiation which served as basis for Comptroller's report, and Work on Principles Guiding classification of Carcinogens, Cancer clusters in Military personnel.

Member of International Commission on Safety in Non-Ionizing Radiation (the Catania Group) and Benevento Group and one of principal co-authors of its final statement on the Precautionary Principle and Non-ionizing radiation. I am also a participant in the California Environmental EMF Web-List Chat group/.

Recent research

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Recent Cases and Consultations

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EMF Mapping of Jerusalem—with Society for Preservation of Nature in Israel
Kibbutz Naan and Ministry of Defense: Arbiter –Recommendations led to closing of antenna farm near this kibbutz, where there was a suspect cancer cluster

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Richter ED, Friedman LS Radon exposures in schoolchildren: The ticking time bomb: How many shall live, how many shall die? Who shall live, who shall die? Collegium Ramazzini Oct 26 2003

Appendix 2

Equipment Used

Blackberry 8300 currently - 1.51 SAR Rating
Blackberry 8700c on 9/18/06 - 1.51 SAR Rating
Nokia 6230 on 7/27/05 - 0.59 SAR Rating

Record of AT&T/Cingular Minutes Used

From To Total Minutes
7/08 - 8/08 - 2,827
6/08 - 7/08 - 1,490
5/08 - 6/08 - 2,500
4/08 - 5/08 - 2,792
3/08 - 4/08 - 2,712
[redacted]
1/08 - 2/08 - 1,734
12/07 - 1/08 - 2,314 = average of 2,460 minutes per month in 2008

11/07 - 12/07 - 2,587
10/07 - 11/07 - 1,368
9/07 - 10/07 - 2,810
8/07 - 9/07 - 2,480
7/07 - 8/07 - 2,120
6/07 - 7/07 - 2,495
5/07 - 6/07 - 2,232
4/07 - 5/07 - 2,833
3/07 - 4/07 - 2,460
2/07 - 3/07 - 1,875
1/07 -2/07 - 1,861
12/06 - 1/07 - 1,808 = average of 2,242 minutes per month in 2007

11/06 - 12/06 - 2,127
10/06 - 11/06 - 2,117
9/06 - 10/06 - 2,512
8/06 - 9/06 - 2,868
7/06 - 8/06 - 2,694
6/06 - 7/06 - 2,173
5/06 - 6/06 - 3,006
4/06 - 5/06 - 2,779
3/06 - 4/06 - 2,341
2/06 - 3/06 - 1,850
1/06 - 2/06 - 1,981
12/05 - 1/06 - 1,723 - average of 2,348 minutes per month in 2006

11/05 - 12/05 - 2,100
10/05 - 11/05 - 700
9/05 - 10/05 - 2,040
8/05 - 9/05 - 2,229

7/2005 - 8/2005 - 679

11/02 - 12/02 - 1,639
10/02 - 11/02 - 2,141
9/02 - 10/02 - 2,600
8/02 - 9/02 - 1,982
7/02 - 8/02 - 2,039
6/02 - 7/02 - 1,842
5/02 - 6/02 - 2,650
4/02 - 5/02 - 932
3/02 - 4/02 - 1,779
2/02 - 3/02 - 2,047
1/02 - 2/02 - 2,336
12/2001 - 1/2002 - 1,582 = average of 1,962 minutes per month in 2002

11/01 - 12/01 - 1,716
10/01 - 11/01 - 1,782
9/01 - 10/01 - skipped
8/01 - 9/01 - 1,149
7/01 - 8/01 - 1,437
6/01 - 7/01 - 1,567
5/01 - 6/01 - 2,698
4/01 - 5/01 - 2,060
3/01 - 4/01 - 2,039
2/01 - 3/01 - 1,690
1/01 - 2/01 - 2,244
12/2000 - 1/2001 - 903

11/00 - 12/00 - 1,097
10/00 - 11/00 - 1,154
9/00 -10/00 - 1,135
8/00 - 9/00 - 1,211
7/00 - 8/00 - 1,808
6/00 - 7/00 - 1,668
May 2000 - June 2000 - 2,273
April 2000 - May 2000 - 1,710 minutes

PLEASE VISIT WWW.MADASCELL.COM
a website created by Zachary Marks, son of Alan Marks, with links
to many excellent articles and studies.

OUR STORY | WHAT SHOULD I DO ? | FIGHT WITH US

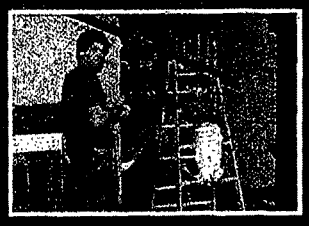
My father Alan was recently diagnosed with a malignant brain tumor.

One week later Senator Ted Kennedy was diagnosed with a brain tumor.

The time has come to expose the truth about cell phones causing brain tumors.

WE HAVE BEEN INVITED TO TESTIFY TO THE U.S. CONGRESS ON SEPTEMBER 25th, 2008

Those who are crazy enough to think that they can change the world...are the ones who do.



Cell Phones Cause Brain Tumors

Wall Street Journal - Cancer Doc Tells Colleague to Lay Off Cell Phones

Cell Radiation Levels

Larry King Live - Dr. Black - Cedar Sinai

Cell Phone Use Raises Tumor Risk

Swedish National Institute

Cell Phone - Brain Tumor Link Seen in Research

Mobile Phones Boost Brain Tumor Risk by up to 270%

CNN - Paging Dr. Gupta - Cancer & Cell Phones

American Brain Tumor Association

Heavy Cell Phone Use Linked To Cancer

French Interphone Cell Phone & Brain Tumor Study

Long Term Cell Use Raises Brain Tumor Risk

London Telegraph - UK Warns Children Not to Use Mobile Phones

Sydney, Australia - Brain Tumors Take More Young Lives Than Any Other Form of Cancer

Brain Surgery Research Paper

FDA Will Research Cell Phone/Cancer Link

Long Term Use Equals Increased Risk Research Paper

Jerusalem Post - Increased Risk with Cell Phones

Demand Action - Contact Your Senator or Representative

MAD AS CELL WHAT SHOULD I DO ? FIGHT WITH US

My father is a top producing Realtor/Broker/Developer in the Bay Area, California.

Alan's cell usage averages 2,020 minutes per month equaling over 400 hours of exposure per year.

That totals over 3,200 hours of exposure in an 8-year span.

Without any warning, imagine getting that call at 3 AM and rushing to the hospital.

Alan had a seizure and underwent brain surgery at UCSF for a malignant glioma in his right frontal lobe.

Cell Phones pose significant health risks resulting in real victims like my Dad.

This is a battle against the status quo that must be fought and won immediately.

Record of AT&T/Cingular Minutes Used

7/08 - 8/08 - 2,827 minutes
6/08 - 7/08 - 1,490 minutes
5/08 - 6/08 - 2,500
4/08 - 5/08 - 2,792
3/08 - 4/08 - 3,712
2/08 - 3/08 - 3,306
1/08 - 2/08 - 1,734
12/07 - 1/08 - 2,314 = average of 2,460 minutes per month in 2008

11/07 - 12/07 - 2,567
10/07 - 11/07 - 1,368
9/07 - 10/07 - 2,810
8/07 - 9/07 - 2,480
7/07 - 8/07 - 2,120
6/07 - 7/07 - 2,495
5/07 - 6/07 - 2,232
4/07 - 5/07 - 2,833
3/07 - 4/07 - 2,460
2/07 - 3/07 - 1,875

MAD AS CELL OUR STORY FIGHT WITH US

Simple Solutions to a Serious Problem

use Speakerphone - DO NOT USE A BLUETOOTH HEADSET

use an Earbud or Headphones

use a Flip Phone instead of a Smart Phone

use a Home Phone - DO NOT ALLOW CHILDREN TO USE CELL PHONES

Unit of Occupational and Environmental Medicine
and Center for Injury Prevention

September 14, 2008

Congress of the United States, House of Representatives
Committee on Oversight and Government Reform
Domestic Policy Subcommittee
2157 Rayburn House Office Building
Washington, D.C. 20515-6143

Subject: Submission of Statement to House of Representatives in connection with hearing before Congressman Dennis Kucinich on September 25, 2008 on case of brain tumor of Mr. Alan Marks in relation to his use of cell phones.

Dear Members of the Domestic Policy Subcommittee,

I have been asked to present my assessment of the case for a cause-effect relationship between Mr. Alan Marks' use of cell phones and the development spelled out below of his right sided frontal brain tumor, an oligodendroma (glioma) at least 10 years after first onset of use.

The basis for my opinion is the review of his medical records, including the histologic diagnosis and the imaging of his tumor, the records of his cell phone use, an interview by phone with his wife, and the emerging prior epidemiologic evidence on the case for use of cell phones applied to the side of the head and brain cancer.

My CV and work relevant to cancer and non-ionizing radiation is attached as Appendix 1.

History

Arch Environ Health, 2002 57(4):270-272

Editorials

Richter ED, Goldsmith J. The IARC classification system: input, internal logic, output, and impact. Amer Journ Indust Med 19:385-397, 1991

Weinberger Z, Richter ED. Cellular Telephones: The Head is the Antenna, the Brain is the Receiver. Medical Hypotheses 2002 59(6) 703-5

Relevant Medico-Legal Work

Richter ED. Expert Opinion submitted to Supreme Court in 1989 on health risks from Voice of America Station

Richter ED, Berman T, Ben-Michael E, Levy O, Westin JB, Peretz T: Cancer Risks in Naval Divers with Multiple Exposures to Carcinogens. Expert Testimony to Government Commission of Inquiry Jan 2001 21 pp and 11 appendices

Abstracts:

Richter ED, Gordon M, Westin JB, Goldsmith JR. Exposures to EMF from Extra-Low Frequency and Radio-Frequency Microwave: an Epidemiologic Update. Proc Intl Soc for Bioenergetics. (Ein Gedi.) 1995.

Richter ED, Cancer in Technicians with RF-MW Exposures. 10 Conf Intl Soc Env Epid 9:4: S126, 1998

Weinberger Z, Richter ED. Cellular Telephones: The Head as the Antenna. Collegium Ramazzini, Carpi Italy Oct 2001

Richter ED, Berman T. EMF and Cancer: Preliminary Dose Response Estimates: Proc Intl Soc Env Epidem Aug 2002. (3.08)

Richter ED, Friedman LS Radon exposures in schoolchildren: The ticking time bomb: How many shall live, how many shall die? Who shall live, who shall die? Collegium Ramazzini Oct 26 2003

It is our mission to persuade the cell phone companies to produce safer equipment.

AMERICA DEMANDS A CONGRESSIONAL HEARING
to study the now undeniable link between cell phone exposure and brain tumors.

Dear Mr. Marks:

The Domestic Policy Subcommittee of the Oversight and Government Reform Committee requests your testimony at a hearing on Thursday, September 25th, 2008 at 10:00 a.m. in 2154 Rayburn House Office Building.

The hearing will focus on the potential health risks associated with cellular phone use and the ways in which those risks should be managed. We would appreciate testimony about your personal experience with health problems you associate with cellular phone use. If you are unable to testify, we would welcome the testimony of your wife Ellen

The Oversight and Government Reform Committee is the principal oversight committee in the House of Representatives, with broad oversight jurisdiction as set forth in House Rule X

CALL SENATOR KENNEDY @ (202) 224-4543

WRITE YOUR REPRESENTATIVE - DEMAND ACTION - SEND AN EMAIL

CALL YOUR SENATOR'S PERSONAL OFFICE ON CAPITOL HILL @ (202) 224-3121

at&t

Page: 86 of 87
Billing Cycle Date: 02/21/07 - 03/18/07
Account Number: 111937778
Bill Reprint

Call Detail (Continued) 925-899-9000

User Name: ALAN MARKS

Rate Code: ESM1=Unlimited Expd M2M, UNW9=Unlimited N&W, RN5N=FTBNATP3000RUMMUNW, RM30=3000 Rollover Mins
Rate Period (PD): DT=Daytime, NW=Nwknd
Feature: M2MC=EXPANDED M2M, VM=VOICE MAIL, CW=Call Waiting

Item	Day	Date	Time	Number Called	Call To	Min	Rate Code	Rate Pd	Fea-ture	Airtime Charge	LD/Add'l Charge	Total Charge
856		03/17	11:07AM	925-817-7719	WALNUT CA	2	UNW9	NW				0.00
857		03/17	12:06PM	925-899-0199	WALNUT CA	1	UNW9	NW				0.00
858		03/17	12:43PM	925-285-5437	WALNUT CA	1	UNW9	NW				0.00
859	SUN	03/18	10:47AM	925-818-8668	WALNUT CA	2	UNW9	NW				0.00
860		03/18	10:50AM	925-285-5407	INCOMI CL	1	UNW9	NW				0.00
					Subtotal Minutes	1875				73.76	3.58	77.33

Interstate Calls Subtotal 0.00
Intrastate Calls Subtotal 73.76

Data Detail 925-899-9000

User Name: ALAN MARKS

Rate Code: RBBW=BBwWAPCUNL
Rate Period (PD): AT=Anytime
Feature: GPRR=GPRS 0 rate APN003

Item	Day	Date	Time	To/From	Type	Msg/KB/Min	Rate Code	Rate Pd	Fea-ture	In/ Out	Total Charge
6	MON	02/19	11:54PM	Data Transfer	Data	51 KB	RBBW	AT	GPRR	Out	0.00
7	TUE	02/20	11:54PM	Data Transfer	Data	47 KB	RBBW	AT	GPRR	Out	0.00
8	WED	02/21	8:55PM	Data Transfer	Data	18 KB	RBBW	AT	GPRR	Out	0.00
9	THU	02/22	7:54AM	Data Transfer	Data	9 KB	RBBW	AT	GPRR	Out	0.00
10		02/22	10:20AM	Data Transfer	Data	52 KB	RBBW	AT	GPRR	Out	0.00
16		02/25	11:02PM	Data Transfer	Data	14 KB	RBBW	AT	GPRR	Out	0.00
17	MON	02/26	10:47AM	Data Transfer	Data	25 KB	RBBW	AT	GPRR	Out	0.00
18		02/26	7:53PM	Data Transfer	Data	20 KB	RBBW	AT	GPRR	Out	0.00
19		02/26	11:50PM	Data Transfer	Data	30 KB	RBBW	AT	GPRR	Out	0.00
20	TUE	02/27	3:01PM	Data Transfer	Data	19 KB	RBBW	AT	GPRR	Out	0.00
28		03/02	11:34PM	Data Transfer	Data	30 KB	RBBW	AT	GPRR	Out	0.00
27	SUN	03/04	8:44AM	Data Transfer	Data	22 KB	RBBW	AT	GPRR	Out	0.00
28		03/04	11:44PM	Data Transfer	Data	233 KB	RBBW	AT	GPRR	Out	0.00
29	MON	03/05	4:44PM	Data Transfer	Data	27 KB	RBBW	AT	GPRR	Out	0.00

cingular
raising the bar.

Page: 101 of 104
Billing Cycle Date: 12/21/06 - 01/20/07
Account Number: 111937778

Questions? Call 1-800-331-0500 or 611 from your wireless phone.

Call Detail (Continued) 925-899-9000

User Name: ALAN MARKS

Rate Code: RM30=3000 Rollover Mins, UNW9=Unlimited N&W, ESM1=Unlimited Expd M2M
Rate Period (PD): DT=Daytime, NW=Nwknd
Feature: VM=VOICE MAIL, M2MC=EXPANDED M2M, CW=Call Waiting

Item	Day	Date	Time	Number Called	Call To	Min	Rate Code	Rate Pd	Feature	Airtime Charge	LD/Add'l Charge	Total Charge
616		01/19	11:09AM	415-541-9685	INCOMI CL	3	RM30	DT				0.00
617		01/19	12:05PM	925-899-0199	INCOMI CL	1	ESM1	DT	M2MC			0.00
618		01/19	12:13PM	925-899-0199	INCOMI CL	1	ESM1	DT	M2MC			0.00
619		01/19	12:29PM	415-972-2221	INCOMI CL	9	RM30	DT				0.00
620		01/19	12:53PM	925-285-5437	INCOMI CL	1	ESM1	DT	M2MC			0.00
621		01/19	1:00PM	925-899-9000	VMAIL CL	[illegible]	RM30	DT	VM			0.00
622		01/19	1:06PM	925-284-8230	INCOMI CL	2	RM30	DT				0.00
623		01/19	1:08PM	925-284-8230	INCOMI CL	[illegible]	RM30	DT				0.00
624		01/19	1:27PM	925-284-[illegible]	LAFAYE CA	[illegible]	RM30	DT				0.00
625		01/19	2:10PM	925-285-5437	WALNUT CA	[illegible]	ESM1	DT	M2MC			0.00
626		01/19	2:30PM	925-890-8998	INCOMI CL	1	ESM1	DT	M2MC			0.00
627		01/19	2:38PM	925-899-0199	WALNUT CA	2	ESM1	DT	M2MC			0.00
628		01/19	2:48PM	925-285-5437	INCOMI CL	2	ESM1	DT	M2MC			0.00
629		01/19	2:55PM	925-798-2535	CONCOR CA	2	RM30	DT				0.00
630		01/19	2:57PM	925-899-9000	VMAIL CL	1	RM30	DT	VM			0.00
631		01/19	2:58PM	925-890-8998	CONCOR CA	14	ESM1	DT	M2MC			0.00
632		01/19	3:02PM	925-348-3182	INCOMI CL	[illegible]	ESM1	DT	M2MC			0.00
633		01/19	3:09PM	925-382-[illegible]	INCOMI CL	2	RM30	DT				0.00
634		01/19	4:20PM	925-899-9000	VMAIL CL	[illegible]	RM30	DT	VM			0.00
635		01/19	5:07PM	925-25[illegible]	INCOMI CL	2	RM30	DT				0.00
636		01/19	5:12PM	925-890-8998	CONCOR CA	1	ESM1	DT	M2MC			0.00
637		01/19	5:13PM	925-899-0199	WALNUT CA	2	ESM1	DT	M2MC			0.00
638		01/19	6:16PM	925-348-3182	CONCOR CA	1	ESM1	DT	M2MC			0.00
639		01/19	6:18PM	925-254-2167	ORINDA CA	2	RM30	DT				0.00
640		01/19	6:18PM	925-765-3759	WALNUT CA	1	RM30	DT				0.00
641		01/19	7:41PM	925-285-5437	WALNUT CA	22	UNW9	NW				0.00
642		01/19	7:50PM	925-285-5437	INCOMI CL	[illegible]	UNW9	NW				0.00
643		01/19	8:05PM	925-285-5437	INCOMI CL	[illegible]	UNW9	NW				0.00
644		01/19	8:08PM	925-285-5437	INCOMI CL	1	UNW9	NW				0.00
645	SAT	01/20	9:06AM	925-285-5437	INCOMI CL	[illegible]	UNW9	NW				0.00
646		01/20	9:48AM	925-285-5437	INCOMI CL	1	UNW9	NW				0.00
647		01/20	11:23AM	925-947-2531	INCOMI CL	3	RM30	NW				0.00
648		01/20	12:57PM	925-899-9000	VMAIL CL	3	UNW9	NW	VM			0.00
649		01/20	1:00PM	925-683-1332	DANVIL CA	1	UNW9	NW				0.00
650		01/20	1:17PM	925-899-9000	VMAIL CL	1	UNW9	NW	VM			0.00
651		01/20	[illegible]	925-284-0724	ORINDA CA	6	RM30	NW				0.00
652		01/20	2:25PM	925-930-2280	WALNUT CA	[illegible]	UNW9	NW				0.00
653		01/20	2:50PM	925-899-9000	VMAIL CL	[illegible]	UNW9	NW	VM			0.00
654		01/20	3:07PM	925-899-0199	WALNUT CA	5	UNW9	NW				0.00
655		01/20	4:02PM	850-908-8181	INCOMI CL	[illegible]	UNW9	NW				0.00
656		01/20	4:08PM	925-285-5437	INCOMI CL	4	UNW9	NW				0.00
657		01/20	4:52PM	850-908-8181	INCOMI CL	1	UNW9	NW				0.00
			Subtotal Minutes			1808						0.00
Totals:						1808						0.00

Interstate Calls Subtotal 0.00
Intrastate Calls Subtotal 0.00

at&t

ALAN P MARKS
19 LAS CASCADAS RD
ORINDA CA 94563-2409

Page 38 of 47
Account Number 925 254-7000 756 9
Billing Date Jan 9, 2007

Cingular Wireless

Detail of Home Charges for 925-899-1358 - Continued

Item No.	Date	Time	Place Called		Number	Rate	Min	Amount
1.	12-18	1051A	VMAIL	CL	707 301-0008	DT	1.0	.00
2.	12-18	514P	VMAIL	CL	707 301-0008	DT	1.0	.00
3.	12-18	713P	EVERETT	WA	425 220-7472	NW	1.0	.00
4.	12-18	1053P	INCOMING	CL	925 899-1358	NW	8.0	.00
5.	12-18	1104P	INCOMING	CL	925 899-1358	NW	1.0	.00
6.	12-19	238P	VMAIL	CL	707 301-0008	DT	1.0	.00
			Subtotal					.00
			Total Home Charges					

M2MC=EXPANDED M2M
SMM=IMM SMS 0.10
VM=VOICE MAIL
AT=Anytime
DT=Daytime
NW=NwkNd

Monthly Service Charges for 925-899-9000

Service from 12/21/08 through 01/20/07

7.	Charge for FTGNATP300GRUMUNW	9.99
	Including: 3000 ANYTIME MINUTES	
	Including: ANYTIME ROLLOVER MINS	
	Including: CALLER ID LINE BLOCK	
	Including: Call Hold	
	Including: Call Waiting	
	Including: Caller ID	
	Including: FAMILY TALK ACCTL	
	Including: NATION GAAT/GSM	
	Including: NNL Night & Wknd Min	
	Including: UNLTD EXP M2M MINS	
8.	Basic Voice Mail	.00
9.	Charge for Cingular Domestic LD	.00
	Including: DOMESTIC LD	
	Including: INTERNATIONAL LD	
10.	Charge for Cingular Roam LD	.00
	Including: DOMESTIC LD	
	Including: INTERNATIONAL LD	
11.	Charge for Cingular Direct Bill	.00
12.	FP-7A NTWKDS SMSD	.00
13.	Unlimited Expd M2M	.00
14.	Charge for GSM Coverage Area	.00
15.	Charge for StandardILD	.00
	Including: DOMESTIC LD	
	Including: Toll International	
16.	IntlDialingAllowed	.00
17.	Charge for IntlRoamAllowed	.00
18.	International Bundle	.00
19.	Charge for Off-Network Roam	.00
20.	Charge for SBMAPCUNL	.00
	Including: Blackberry	
	Including: Data Detailed Billing	
	Including: GPRS	
	Including: INTERNET XPRESS	
21.	Charge for IntlRoamTalk/C	.00
	Including: DOMESTIC LD	
	Including: INTERNATIONAL LD	
22.	BBRYUNL	44.98

Monthly Service Charges for 925-899-9000 - Continued

23.	Charge for Unlimited N&W	.00
24.	Charge for Equip Insurance Prem	4.99
	Total Monthly Service Charges	59.97

Home Usage for 925-899-9000

FTGNATP300GRUMUNW
743 Calls, 11/21/08 through 12/20/08
Free minutes used from Unlimited Expd M2M
Free Combd 234.0 min X 0.00
Free Combd 281.0 min X 0.00
Free NwkNd 612.0 min X 0.00
Total Minutes 2127.0

2127

Total Charges For FTGNATP300GRUMUNW .00

SBMAPCUNL
3,522.0000 KB, 11/21/08 through 12/20/08
Billed Anytime 3,522.0000 KB X 0.00
Total Kilobytes 3,522.0000

Total Charges For SBMAPCUNL .00
Total Home Charges .00

Other Charges and Credits for 925-899-9000

25.	Regulatory Cost Recovery Charge	.93
	Total Other Charges and Credits	.93

Taxes for 925-899-9000

26.	State 911 Tax	.05
27.	Federal Universal Service Charge	.30
28.	State Public Utility Surcharge	.01
29.	Universal Lifeline	.14
30.	Telecomnact Fund	.01
31.	Relay Service Device Fund	.01
32.	CHCF A	.02
33.	CHCF B	.23
	Total Taxes	.77

Detail of Home Charges for 925-899-9000

FTGNATP900GRUMUNW
Calls While in Shared Group 2840828

Item No.	Date	Time	Place Called		Number	Rate	Min	Amount
34.	11-21	956A	INCOMING	CL	925 258-1111	DT	6.0	.00
35.	11-21	1012A	VMAIL	CL	925 899-9000	DT	1.0	.00
36.	11-21	1013A	PALM SPGS	CA	760 250-2783	DT	3.0	.00
37.	11-21	1147A	VMAIL	CL	925 899-9000	DT	3.0	.00
38.	11-21	1152A	ORINDA	CA	925 254-2008	DT	2.0	.00
39.	11-21	1154A	ORINDA	CA	925 438-2052	DT	6.0	.00
40.	11-21	1204P	CANOGAPARKCA		818 224-4288	DT	1.0	.00
41.	11-21	1208P	VAN NUYS	CA	818 406-2706	DT	4.0	.00
42.	11-21	1242P	CONCORD	CA	925 348-3182	DT	7.0	.00
43.	11-21	1251P	INCOMING	CL	925 788-9218	DT	4.0	.00
44.	11-21	115P	WALNUT CRKCA		925 899-0199	DT	1.0	.00
45.	11-21	120P	SNFC CNTRLCA		415 541-9900	DT	2.0	.00
46.	11-21	133P	INCOMING	CL	925 899-0199	DT	4.0	.00
47.	11-21	137P	WALNUT CRKCA		925 818-8888	DT	1.0	.00
48.	11-21	145P	ORINDA	CA	925 438-2052	DT	1.0	.00
49.	11-21	148P	ORINDA	CA	925 254-2008	DT	7.0	.00
50.	11-21	217P	ORINDA	CA	925 438-2052	DT	1.0	.00

at&t

Bill Summary & Call Details

Account Owner: ALAN MARKS, Account Number: 436030751187

Important Information for California Customers

E-mail us your billing questions

CURRENT PAYMENT & CHARGES

Last Payment Received (08-21-08) $312.64

Total Amount Due $0.00

Make a Payment

Wireless Statement Summary

Select Bill Period: 06/19/07 - 07/18/07 View Full Call Details

CALL DETAILS | User: 925-899-9000, ALAN MARKS

Select the type of details to view:

Voice | Data

Phone Book (What's this?)
On | Off | Manage

Voice Details

1 2 3 4 5 6 7 8 9 10 | VIEW ALL

#	DATE	TIME	NUMBER CALLED	MIN	AIRTIME CHARGE	LD/ADD'L CHARGE	TOTAL CHARGE
1	06/19/2007	7:33AM	925-385-0455	1	0.00	0.00	0.00
2	06/19/2007	10:19AM	925-899-9000	1	0.00	0.00	0.00
3	06/19/2007	11:09AM	925-899-9000	1	0.00	0.00	0.00
4	06/19/2007	11:10AM	818-228-4281	4	0.00	0.00	0.00
5	06/19/2007	1:13PM	925-899-9000	2	0.00	0.00	0.00
6	06/19/2007	1:53PM	925-899-9000	1	0.00	0.00	0.00
7	06/19/2007	1:54PM	925-385-0455	1	0.00	0.00	0.00
8	06/19/2007	1:55PM	925-285-5437	1	0.00	0.00	0.00
9	06/19/2007	1:56PM	925-385-0455	2	0.00	0.00	0.00
10	06/19/2007	2:00PM	925-890-3003	1	0.00	0.00	0.00
11	06/19/2007	2:09PM	760-399-6631	5	0.00	0.00	0.00
12	06/19/2007	3:59PM	925-899-9000	4	0.00	0.00	0.00

81	06/21/2007	3:10PM	925-899-1356	4	0.00	0.00	0.00
82	06/21/2007	3:38PM	925-899-1356	2	0.00	0.00	0.00
83	06/21/2007	3:45PM	925-285-5437	3	0.00	0.00	0.00
84	06/21/2007	4:20PM	925-899-0199	4	0.00	0.00	0.00
85	06/21/2007	4:33PM	925-899-1356	3	0.00	0.00	0.00
86	06/21/2007	4:52PM	925-899-0199	3	0.00	0.00	0.00
87	06/21/2007	5:04PM	510-407-8133	10	0.00	0.00	0.00
88	06/21/2007	5:35PM	925-899-9000	3	0.00	0.00	0.00
Totals				**2495**	**0.00**	**0.00**	**0.00**

1 2 3 4 5 6 7 8 9 10 | VIEW ALL

Bill & Payment Support

6/2007

How to View Previous Payments
My Bill Support
Mobile Purchase Charges
More Bill & Payment Support
How to update last pay method

Manage Your Account

Avoiding Overages

Ask Us

Our interactive agent is available 24/7 to answer questions about your wireless bill and payments.

Ask Us

at&t

Bill Summary & Call Details

Account Owner: ALAN MARKS, Account Number: 436030751187

Important Information for California Customers

E-mail us your billing questions

CURRENT PAYMENT & CHARGES

Last Payment Received (08-21-08) $312.64

Total Amount Due $0.00

Make a Payment

Wireless Statement Summary

Select Bill Period: 07/19/07 - 08/18/07 View Full Call Details

CALL DETAILS | User: 925-899-9000, ALAN MARKS

Select the type of details to view:

Voice | Data

Phone Book (What's this?)
On | Off | Manage

Voice Details

1 2 3 4 5 6 7 8 9 10 | VIEW ALL

#	DATE	TIME	NUMBER CALLED	MIN	AIRTIME CHARGE	LD/ADD'L CHARGE	TOTAL CHARGE
1	07/19/2007	8:20AM	925-899-9000	1	0.00	0.00	0.00
2	07/19/2007	9:21AM	925-899-9000	1	0.00	0.00	0.00
3	07/19/2007	9:26AM	925-285-5437	2	0.00	0.00	0.00
4	07/19/2007	10:06AM	925-899-9000	1	0.00	0.00	0.00
5	07/19/2007	11:23AM	925-899-9000	2	0.00	0.00	0.00
6	07/19/2007	11:59AM	925-287-0777	5	0.00	0.00	0.00
7	07/19/2007	12:04PM	925-385-0455	2	0.00	0.00	0.00
8	07/19/2007	12:39PM	925-438-2052	2	0.00	0.00	0.00
9	07/19/2007	12:41PM	925-899-9000	2	0.00	0.00	0.00
10	07/19/2007	12:59PM	510-409-7660	2	0.00	0.00	0.00
11	07/19/2007	1:01PM	760-399-6631	2	0.00	0.00	0.00
12	07/19/2007	3:54PM	510-568-3266	1	0.00	0.00	0.00

13	07/19/2007	3:55PM	925-899-9000	4	0.00	0.00	0.00
14	07/19/2007	4:23PM	510-774-2870	4	0.00	0.00	0.00
15	07/19/2007	4:47PM	925-899-9000	2	0.00	0.00	0.00
16	07/19/2007	4:50PM	925-798-2535	1	0.00	0.00	0.00
17	07/19/2007	5:29PM	925-899-0199	3	0.00	0.00	0.00
18	07/19/2007	5:33PM	925-997-7838	1	0.00	0.00	0.00
19	07/19/2007	5:34PM	925-287-0777	1	0.00	0.00	0.00
20	07/19/2007	5:35PM	925-787-2920	1	0.00	0.00	0.00
21	07/19/2007	5:35PM	925-787-2920	7	0.00	0.00	0.00
22	07/19/2007	5:58PM	925-899-1356	1	0.00	0.00	0.00
23	07/19/2007	6:00PM	925-899-1356	1	0.00	0.00	0.00
24	07/19/2007	11:10PM	925-899-1356	2	0.00	0.00	0.00
25	07/20/2007	7:56AM	925-899-9000	2	0.00	0.00	0.00
26	07/20/2007	8:02AM	925-351-4924	2	0.00	0.00	0.00
27	07/20/2007	8:25AM	925-899-1356	1	0.00	0.00	0.00
28	07/20/2007	8:36AM	925-899-1356	1	0.00	0.00	0.00
29	07/20/2007	9:17AM	925-899-9000	1	0.00	0.00	0.00
30	07/20/2007	9:20AM	925-351-4924	1	0.00	0.00	0.00
31	07/20/2007	9:25AM	925-285-5437	1	0.00	0.00	0.00
32	07/20/2007	10:09AM	925-285-5437	2	0.00	0.00	0.00
33	07/20/2007	10:48AM	925-899-9000	2	0.00	0.00	0.00
34	07/20/2007	11:28AM	925-899-0199	1	0.00	0.00	0.00
35	07/20/2007	11:41AM	760-399-6631	3	0.00	0.00	0.00
36	07/20/2007	11:58AM	925-285-5437	2	0.00	0.00	0.00
37	07/20/2007	12:23PM	925-899-0199	2	0.00	0.00	0.00
38	07/20/2007	12:49PM	510-774-2870	6	0.00	0.00	0.00
39	07/20/2007	1:31PM	925-285-5437	2	0.00	0.00	0.00
40	07/20/2007	1:39PM	925-899-9000	1	0.00	0.00	0.00
41	07/20/2007	1:41PM	925-285-5437	1	0.00	0.00	0.00
42	07/20/2007	1:41PM	925-989-5455	1	0.00	0.00	0.00
43	07/20/2007	1:43PM	925-285-5437	1	0.00	0.00	0.00
44	07/20/2007	1:43PM	925-997-7838	5	0.00	0.00	0.00
45	07/20/2007	1:50PM	925-285-5437	1	0.00	0.00	0.00
46	07/20/2007	1:50PM	707-333-1730	4	0.00	0.00	0.00

47	07/20/2007	3:20PM	925-899-0199	4	0.00	0.00	0.00
48	07/20/2007	4:21PM	925-285-5437	1	0.00	0.00	0.00
49	07/20/2007	4:22PM	925-899-0199	3	0.00	0.00	0.00
50	07/20/2007	4:27PM	925-376-7480	4	0.00	0.00	0.00
51	07/20/2007	4:56PM	925-787-2920	3	0.00	0.00	0.00
52	07/20/2007	5:26PM	925-284-5010	2	0.00	0.00	0.00
53	07/20/2007	5:30PM	925-899-9000	1	0.00	0.00	0.00
54	07/20/2007	6:57PM	510-407-8133	1	0.00	0.00	0.00
55	07/20/2007	6:58PM	800-743-5000	22	0.00	0.00	0.00
56	07/20/2007	8:02PM	925-818-6888	19	0.00	0.00	0.00
57	07/20/2007	8:21PM	925-285-5437	1	0.00	0.00	0.00
58	07/20/2007	9:11PM	925-899-0199	1	0.00	0.00	0.00
59	07/21/2007	11:25AM	925-818-6888	2	0.00	0.00	0.00
60	07/21/2007	11:26AM	925-899-9000	1	0.00	0.00	0.00
61	07/21/2007	12:27PM	925-899-9000	1	0.00	0.00	0.00
62	07/21/2007	12:31PM	925-818-6888	7	0.00	0.00	0.00
63	07/21/2007	12:52PM	925-899-9000	2	0.00	0.00	0.00
64	07/21/2007	12:59PM	925-899-1356	1	0.00	0.00	0.00
65	07/21/2007	1:33PM	925-899-0199	3	0.00	0.00	0.00
66	07/21/2007	1:49PM	818-406-2706	7	0.00	0.00	0.00
67	07/21/2007	1:55PM	925-963-7131	2	0.00	0.00	0.00
68	07/21/2007	3:27PM	925-899-1356	2	0.00	0.00	0.00
69	07/21/2007	4:43PM	925-899-1356	1	0.00	0.00	0.00
70	07/21/2007	4:49PM	925-899-9000	1	0.00	0.00	0.00
71	07/21/2007	4:49PM	925-818-6888	2	0.00	0.00	0.00
72	07/21/2007	4:50PM	925-899-0199	2	0.00	0.00	0.00
73	07/21/2007	5:30PM	415-541-9698	1	0.00	0.00	0.00
74	07/21/2007	5:32PM	415-541-9698	1	0.00	0.00	0.00
Totals				**2120**	**0.00**	**0.00**	**0.00**

1 2 3 4 5 6 7 8 9 10 | VIEW ALL

Bill & Payment Support

How to View Previous Payments
My Bill Support
Mobile Purchase Charges

at&t

Bill Summary & Call Details

Account Owner: ALAN MARKS, Account Number: 436030751187

Important Information for California Customers

E-mail us your billing questions

CURRENT PAYMENT & CHARGES

Last Payment Received (08-21-08) $312.64

Total Amount Due $0.00

Make a Payment

Wireless Statement Summary

Select Bill Period: 05/19/08 - 06/18/08 View Full Call Details

CALL DETAILS

User: 925-899-9000, ALAN MARKS

Select the type of details to view:

Voice | Data

Phone Book (What's this?)
On | Off | Manage

Voice Details

1 2 3 4 5 6 7 8 9 10 | VIEW ALL

#	DATE	TIME	NUMBER CALLED	MIN	AIRTIME CHARGE	LD/ADD'L CHARGE	TOTAL CHARGE
1	05/19/2008	9:59AM	925-899-9000	4	0.00	0.00	0.00
2	05/19/2008	10:31AM	925-254-2167	3	0.00	0.00	0.00
3	05/19/2008	10:32AM	925-899-9000	2	0.00	0.00	0.00
4	05/19/2008	12:40PM	925-899-9000	8	0.00	0.00	0.00
5	05/19/2008	3:39PM	415-353-7500	1	0.00	0.00	0.00
6	05/19/2008	3:43PM	925-297-9988	1	0.00	0.00	0.00
7	05/19/2008	3:43PM	925-297-9988	1	0.00	0.00	0.00
8	05/19/2008	3:45PM	925-297-9988	1	0.00	0.00	0.00
9	05/19/2008	3:45PM	925-297-9988	2	0.00	0.00	0.00
10	05/19/2008	4:10PM	925-899-9000	1	0.00	0.00	0.00
11	05/19/2008	6:18PM	925-899-9000	1	0.00	0.00	0.00
12	05/19/2008	6:21PM	818-224-4289	25	0.00	0.00	0.00

47	05/21/2008	12:24PM	800-729-4073	3	0.00	0.00	0.00
48	05/21/2008	12:27PM	925-989-5455	1	0.00	0.00	0.00
49	05/21/2008	12:43PM	925-285-5437	1	0.00	0.00	0.00
50	05/21/2008	12:43PM	925-254-8888	2	0.00	0.00	0.00
51	05/21/2008	12:46PM	925-285-5437	1	0.00	0.00	0.00
52	05/21/2008	12:51PM	909-466-5297	3	0.00	0.00	0.00
53	05/21/2008	12:58PM	925-899-9000	2	0.00	0.00	0.00
54	05/21/2008	1:03PM	925-899-9000	4	0.00	0.00	0.00
55	05/21/2008	1:08PM	925-297-9988	4	0.00	0.00	0.00
56	05/21/2008	2:07PM	925-297-9988	3	0.00	0.00	0.00
57	05/21/2008	2:12PM	925-899-9000	1	0.00	0.00	0.00
58	05/21/2008	2:12PM	510-339-3863	2	0.00	0.00	0.00
59	05/21/2008	2:13PM	925-250-0990	1	0.00	0.00	0.00
60	05/21/2008	2:14PM	925-798-1314	19	0.00	0.00	0.00
61	05/21/2008	5:35PM	925-385-0455	1	0.00	0.00	0.00
62	05/21/2008	5:56PM	925-385-0455	1	0.00	0.00	0.00
63	05/21/2008	6:26PM	925-989-5455	3	0.00	0.00	0.00
Totals				**2500**	**0.00**	**0.00**	**0.00**

1 2 3 4 5 6 7 8 9 10 | VIEW ALL

Bill & Payment Support

Manage Your Account

Avoiding Overages

Add Early Nights & Weekends
Add a Data Feature
Add a Messaging Bundle
What is Rollover?

Ask Us

Our interactive agent is available 24/7 to answer questions about your wireless bill and payments.

Ask Us

5/2008
before surgery
Alan Marks

at&t

Bill Summary & Call Details

Account Owner: ALAN MARKS, Account Number: 436030751187

Important Information for California Customers

E-mail us your billing questions

CURRENT PAYMENT & CHARGES

Last Payment Received (08-21-08) $312.64

Total Amount Due $0.00

Make a Payment

Wireless Statement Summary

Select Bill Period: 07/19/08 - 08/18/08 View Full Call Details

CALL DETAILS | User: 925-899-9000, ALAN MARKS

Select the type of details to view: Phone Book (What's this?)

Voice | Data On | Off | Manage

Voice Details

1

#	DATE	TIME	NUMBER CALLED	MIN	AIRTIME CHARGE	LD/ADD'L CHARGE	TOTAL CHARGE
1	07/19/2008	10:43AM	925-899-9000	2	0.00	0.00	0.00
2	07/19/2008	11:17AM	925-818-6888	8	0.00	0.00	0.00
3	07/19/2008	11:41AM	925-899-9000	1	0.00	0.00	0.00
4	07/19/2008	11:42AM	925-818-6888	1	0.00	0.00	0.00
5	07/19/2008	11:48AM	415-518-5513	3	0.00	0.00	0.00
6	07/19/2008	11:51AM	510-719-9385	4	0.00	0.00	0.00
7	07/19/2008	12:07PM	925-285-5437	2	0.00	0.00	0.00
8	07/19/2008	12:13PM	925-285-5437	2	0.00	0.00	0.00
9	07/19/2008	1:31PM	818-406-2706	22	0.00	0.00	0.00
10	07/19/2008	3:23PM	925-899-9000	1	0.00	0.00	0.00
11	07/19/2008	6:11PM	925-899-9000	1	0.00	0.00	0.00
12	07/19/2008	9:47PM	925-899-9000	1	0.00	0.00	0.00

727	08/18/2008	5:42PM	925-351-4924	2	0.00	0.00	0.00
728	08/18/2008	5:44PM	760-399-6631	2	0.00	0.00	0.00
729	08/18/2008	5:57PM	925-297-9988	2	0.00	0.00	0.00
730	08/18/2008	6:12PM	925-297-9988	1	0.00	0.00	0.00
Totals				**2827**	**0.00**	**0.00**	**0.00**
							1

Bill & Payment Support

How to View Previous Payments
My Bill Support
Mobile Purchase Charges
More Bill & Payment Support
How to update last pay method

Manage Your Account

Avoiding Overages

Ask Us

Our interactive agent is available 24/7 to answer questions about your wireless bill and payments.

Ask Us

Since surgery
BUT
was scheduled always
& No NEW GROWTH!
Coincidence ?

Alan Marks

RELEVANT ARTICLES

Interphone Brain Tumors Studies To Date
An Examination of Poor Study Design Resulting in an UNDER-ESTIMATION of the Risk of Brain Tumors

The Interphone Study is a 13-country investigation examining if cellphone use causes tumors. It is substantially funded by the cellphone industry: €3.2 million ($5.1M) in Europe, $1 million in Canada and unknown amounts in Japan, Australia and New Zealand.

There have been 13 Interphone brain tumor studies published to date. The overwhelming number of statistically significant findings have shown that use of a cellphone *protects* the user from a brain tumor. Such a result stretches credulity. There are only two possibilities: 1) use of a cellphone does protect the user from risk of a brain tumor, or 2) the study design is highly flawed.

Asking the question, "What would the study findings be like if there was no risk of brain tumors from cellphone use?" allowed an analytic approach. Think about testing a coin to see if there is a "risk" towards heads or tails. Flipping the coin many times, the expectation, if there is no "risk" of heads or tails is that roughly the same number of heads and tails would be found. Say a coin was tossed 20 times and tails came up 19 times, intuitively you can say the coin has a "risk" of coming up tails (or inversely the coin is protected from coming up heads). Mathematically the odds that this would occur by change would be one time in 49,932 for every 20-time coin flipping. This is the method used to analysis the Interphone Study. If there is no risk we would expect and approximately the same number of increased brain tumor risk findings as decreased risk (protection) findings. The analysis concluded that it is *virtually certain* that the Interphone Study shows that use of a cellphone protects the user from a brain tumor, or the Interphone Study is flawed

A close examination of 10 Interphone Study Protocol found 10 design flaws 9 of which independently result in an underestimation of the risk of brain tumors. It would appear that the Interphone Protocol assures that no risk could be found.

Paging Dr. Gupta

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May 28, 2008

Cancer and cell phones

Posted: 12:09 PM ET

By Dr. Sanjay Gupta
Chief Medical Correspondent

Last night, I was part of a fascinating discussion on "Larry King Live" about cell phones and their health risks. (watch) To be clear, most of the established scientific community thinks there is no reason for concern. There were, however, some strong voices on each side of the issue, including neurosurgeon Vini Khurana from Australia. He is convinced, after looking at hundreds of studies, that not only do cell phones cause health problems such as brain tumors, but also they will eventually be considered a bigger health risk than asbestos and even cigarettes.

Wow.

Now, I expected a staunch defense from the American Cancer Society, but instead I heard a more tepid response from Dr. Michael Thun. His bottom-line conclusion is that the studies that currently exist don't show any reason for concern - but - the studies aren't definitive in showing that they are safe either. Not exactly reassuring.

Over the last year, I have reviewed nearly a hundred studies on this topic, including the 19 large epidemiological studies. I urge you to do the same and read carefully to see what you think. Here is an example from a Swedish paper showing no increased risk of a brain tumor, known as acoustic neuroma. (see study) As you read the paper, you will find they defined a "regular" cell phone user as someone who uses a cell phone once per week during six months or more. I don't know about you, but everyone I know uses his or her cell phones much more frequently than that. So, just how reliable are some of these studies?

Furthermore, many of the studies published since 2000 followed patients only three years on average. And, even a Danish study that did have longer-term follow-up excluded anyone under the age of 18. So, what about children who will presumably be using these phones for the rest of their lives?

Mobile devices give off non-ionizing radiation radio frequency. This is different from the ionizing radiation of an X-ray, which everyone agrees can be harmful in large doses. The recommendation by the two neurosurgeons on the panel yesterday – Khurana and Dr. Keith Black, chairman of neurosurgery at Cedars-Sinai Medical Center in Los Angeles - wear a wired ear piece. Even Bluetooth devices give off some radiation, although at lower doses. Don't carry your cell phone in your pocket; instead put it in a holster that meets industry standards.

What do you think? As Larry reminded us last night, it took a long time to develop a cause-and-effect relationship between cigarettes and lung cancer. Nowadays, everyone knows it exists. Is the same thing happening with cell phones? (more from Dr. Gupta on cell phones and cancer)

***Editor's Note**: Medical news is a popular but sensitive subject rooted in science. We receive many comments*

Between the Lines
Larry Dignan, Sam Diaz, Tom Steinert-Threlkeld

April 7th, 2006

FDA to revisit cellphone cancer risk. It's about time.

Posted by David Berlind @ 7:39 am

According to Reuters:

> The U.S. Food and Drug Administration said Thursday that it will review wireless-phone safety following a recently published study that raised concerns about a heightened risk of brain cancer.....**The researchers at the Swedish National Institute for Working Life compared data from 2,200 cancer patients and an equal number of healthy patients. Those who heavily used wireless phones had a 240 percent increased risk of a cancerous tumor** on the side of the head where they used their phone, they reported.

This, in addition to net neutrality, Digital Restrictions Management (aka C.R.A.P.), and open standards is another one of those topics that I'm super passionate about. Especially after evidence surfaced about a year ago that the cellco industry was working hard to supress legitimate research (smacking of Big Tobacco repeating itself). I'm not about to play chicken little by saying the sky is falling. By most all accounts (barring the Swedish one), researchers have routinely said that a connection between cell phone usage and brain cancer can not be ruled-in, nor can it be ruled-out and that more research needs to be done. What is clear however is that big money talks and the FDA's announcement will most surely cause the entire cell phone industry to double its ante in hopes of stopping, slowing, or keeping a lid on whatever bad news might become of this most recent development.

Hopefully, the FDA will be totally transparent in the way it conducts its study and very willing to take input from the public on this issue (particularly researchers who know a thing or two about good testing methodologies). As a member of the the public that the FDA is trying to protect, my confidence would easily be bolstered by total transparency.

Even I've been hauled to the woodshed for a spanking on this issue by some ZDNet readers. Short-sighted fools. Life is the most precious gift of all. Go find some people who are lying on their deathbeds. I'm certain there are a few shortcuts they wish they hadn't taken. And that's what a cell phone is. It's a short cut. And the jury on the short cut is unequivocally out and probably will be for the next ten years. So, what should you do about it? I'm not saying to stop using cell phones. But as long as the jury is out, be smart about it. For example, last April, I published an exhaustive piece called Getting practical about cell phones and cancer. You should read it because of the people I interviewed for it. But here are a couple of key bullet points:

- Check the specific absorbtion rate (SAR) rating of a phone before you purchase it. It also might not hurt to check the SAR rating of the phone you currently own. Check it against CNET's rank ordering of cell phones and their SAR ratings. Don't be stupid like I was. I fell for a deal on Amazon.com where I actually got paid cash to take a cell phone. It turned out to be tied for first place as the most "radiant" cell phone on the market. If you must have a phone, consider picking one from the list of least radiant phones. As a side-note, the Verizon Wireless-provisioned Treo 700w that I'm using has a SAR rating of 1.26 (the maximum allowable SAR rating in the US is 1.6). Some other smartphones like the BlackBerries and T-Mobile's Sidekick are listed here.
- Cell phones have two SAR ratings. One for your head. The other is for your body. What does that tell you? Keep the cell phone away from your head and your body as much as you can. If you're kids *must* have a cell phone, make sure they do the same thing. How much would you hate yourself if your kids developed brain cancer in 20 years? Keep the phones in a backpack or purse. Not in your pocket (for you men out there, some studies have suggested a link between cell phone radiation and sperm cell damage). Use devices and techniques that keep the phone away from your head as much as possible. For example, speakerphone-mode and wired or wireless hands-free devices. If you really need something on your ear, consider the Bluetooth headset route (requires a phone that has a Bluetooth radio in it or that can have one adapted to it). Bluetooth headsets use radios that are way less powerful than the cell phones regular radio which has to transmit to the nearest tower.

Finally, think hard about why it is the SAR rating isn't prominently listed on the packaging of cell phones or why the FDA or some other government institution doesn't require the publication of a phone's SAR rating in big bold text whenever it's being advertised. If phones are so safe, then such a regulation shouldn't negatively impact the interests of those who'd never prominently display that information without being told to do so.

Introducing **Daily Times**
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Monday, October 08, 2007

Cell phone use raises tumor risk

Using a cell phone for more than a decade can double the risk of some brain tumors, according to a new analysis of previous studies. The findings 'give a consistent pattern of increased risk for acoustic neuroma and glioma,' Dr Lennart and colleagues write, with the greatest risk seen on the side of the head where the mobile phone was held.

Acoustic neuromas are benign growths on the nerve linking the ear to the brain, while gliomas are malignant, difficult-to-treat tumors of the brain and nervous system. Concerns have been raised that mobile phones could boost brain tumor risk by exposing the brain to electromagnetic energy, but early studies did not have a long enough follow-up time to fully account for long-term risk.

The team identified 18 studies of brain tumor risk among long-term cell phone users, 11 of which provided data for 10 years or longer. The researchers found people who used cell phones for at least a decade had a 2.4-fold greater risk of acoustic neuromas and were twice as likely to develop gliomas.

One study found no increased tumor risk with cell phone use, but it did show that mobile phone users who developed brain tumors had larger tumors than non-cell phone users. The greatest risk was for tumors located in the area of the brain with the most exposure and the study periods allowed enough time for tumors to develop, the researchers noted. reuters

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CNET'S QUICK GUIDE: Cell phone radiation levels

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Cell phone radiation levels

By CNET staff (updated September 15, 2008)

What it all means

According to the Cellular Telecommunications Industry Association (CTIA), *specific absorption rate*, or SAR, is "a way of measuring the quantity of radiofrequency (RF) energy that is absorbed by the body." For a phone to pass FCC certification, that phone's maximum SAR level must be less than 1.6W/kg (watts per kilogram). In Europe, the level is capped at 2W/kg while Canada allows a maximum of 1.6W/kg. The SAR level listed in our charts represents the highest SAR level with the phone next to the ear as tested by the FCC. Keep in mind that it is possible for the SAR level to vary between different transmission bands and that different testing bodies can obtain different results. Also, it's possible for results to vary between different editions of the same phone (such as a handset that's offered by multiple carriers).

It's important to note that in publishing this list are we in no way implying that cell phone use is or isn't harmful to your health. While research abounds and some tests have shown that cell phone radiofrequency (RF) could accelerate cancer in laboratory animals, the studies have not been replicated. Cell phones can affect internal pacemakers, but there is not conclusive or demonstrated evidence that they cause adverse health effects in humans. Conversely, there is not conclusive or demonstrated evidence that they don't cause adverse health effects in humans. So, in short, the jury is still out, research is ongoing, and we will continue to monitor its results.

If your phone isn't listed here (U.S. customers) and you've purchased it within the last few years (the FCC Web site currently does not provide information on models certified before 1998), you can request the SAR information from the manufacturer or your carrier. You'll need the model number and FCC ID number, which is usually but not always listed in your owner's manual or under your phone's battery (you must pop the battery out). For links to the FCC's Web site, please see the More Resources section below. We'll continue to update the list as new phones are announced. To be the first to know when we've added more phones, subscribe to the On Call Newsletter.

* 10 highest U.S. models

More resources

* New cell phone reviews
* Editors' top cell phones
* Cell phone buying guide
* World of wireless communications, from CTIA
* Cell phone videos
* Cell phone forums
* Cell phone features
* RF safety program, from FCC

THE WALL STREET JOURNAL.

July 24, 2008, 8:52 am

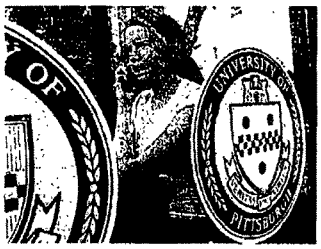
Cancer Doc Tells Colleagues to Lay Off Cellphones

Posted by Scott Hensley

In a startling warning on cellphone safety, the head of a cancer research center in Pittsburgh told faculty and staff to curb their use of mobile phones because of a possible risk of cancer.

The alarm came from Ronald Herberman, director of the University of Pittsburgh Cancer Institute, the Associated Press reports.

His advice, contained in a memo to 3,000 faculty and staff, says kids should only use cellphones for emergencies and adults should keep the phones away from their heads by using speakerphones or a wireless headset.



Sara Loughran, a doctoral student at the University of Pittsburgh, chats with her mother (AP Photo/Keith Srakocic)

It's hard to know exactly what Herberman knows that the rest of us don't. His warning is based on existing studies and also, in part, on "early unpublished data," according to the AP. His stance is in conflict with the preponderance of scientific work that hasn't demonstrated a link between talking on cellphones and cancer. Some studies have suggested cancer risks, however.

Of course, proving a negative–especially in the field of cancer causation–is notoriously difficult. The FDA's standing advice to consumers says, "The available scientific evidence does not show that any health problems are associated with using wireless phones. There is no proof, however, that wireless phones are absolutely safe." For more, check out the FDA's Q&A on cellphones.

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New research findings on brain tumors and mobile phones

On 22 May, the EMR Policy Institute released a statement announcing the results of a study which found a link between gliomas and high mobile phone use. A glioma is a type of primary brain tumour that starts in the brain.

According to Dr Lennart Hardell, MD, oncologist at the University Hospital, Orebro, Sweden, and expert in electromagnetic fields (EMF), heavy use of mobile phones, more than 2000 hours during a lifetime, is associated with EMF. The results of his research project within the BioInitiative framework, also point out that people using their cell phone or cordless phone only on one side of their head for over 10 years have a consistently increased risk of developing a glioma.

Hardell's findings support already existing evidence on the link between EMF and brain tumours. Several countries taking part in the Interphone project have come to the same conclusions.

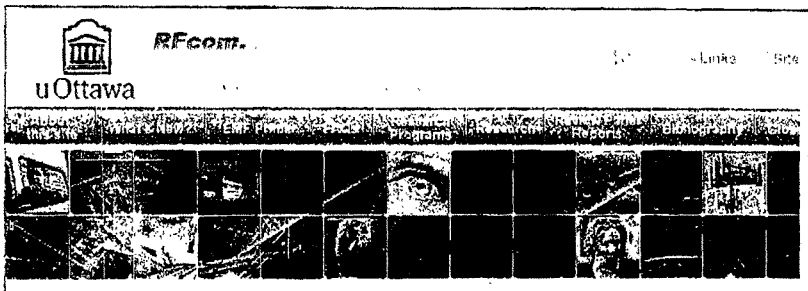
For more information:

- **Access Hardell's work: BioInitiative**
- **Access EMR Policy Institute website**
- **Sign on to the on-line petition to endorse the recommendations of The BioInitiative Report in English, in French and in German**
- **Access the press release**

Written on 26th May 2008.

Useful links:

- The Shadow Side of the Wireless Revolution, video podcast by Commonwealth
- US NIEHS - EMF RAPID



Research Programs - Interphone Study

The Interphone study is the name given to a series of multi-national case-control studies to assess whether RF mobile phones is associated with cancer risk. The International Agency for Cancer Research (IARC) has coord Other potential environmental and endogenous risk factors are also being examined. The types of cancer studi neuroma, glioma, meningioma, and tumours of the parotid gland.

Participating countries are Australia, Canada, Denmark, Finland, France, Germany, Israel, Italy, Japan, New Z Sweden, and the UK. The principal investigators of the INTERPHONE study published a paper that provided c and epidemiological methods, as well as a description of the population included in the study (Cardis et al., 20(included 2,765 glioma, 2,425 meningioma, 1,121 acoustic neuroma, 109 malignant parotid gland tumour cases The paper discussed potential recall and participation biases and their impact on the results. Others papers have (1) the validation of short *term recall of mobile* phone use for the interphone study, (2) the effects of recall errors and of sel recall bias in the assessment of exposure to mobile phones from a retrospective validation study. A publication on the distri emitted by mobile phones in anatomical structures of the brain was also recently published in 2008(4).

Results of national studies have been published since 2004 and are summarized below in Tables (a,b,c). The combined an countries participating in the INTERPHONE study have been finalized and the results are expected to be published in a pe the end of 2006.

The interphone study group is currently working on detailed analyses for future publications such as precise localization of dimensional radiological grid, the health effect of radiofrequency exposure at the exact location of the tumor by using a grac Determinants of mobile phone output power from a software-modified phone (SMP) study is also in preparation. Results fro and retrospective validation studies and also data obtained from the simulation study of recall and selection bias will help m exposure measurement errors on cancer risk related to mobile phone use.

More information can be obtained at www.iarc.fr - follow the links to "IARC Scientific Structure" and "Radiation

The Tables summarise the Interphone studies of brain tumours, including acoustic neuroma and tumours of the complete results of studies of brain tumours, see the main menu of "Epidemiology".)

a) Glioma

Name, site	Cases (participation rate %)	Controls (participation rate %)	Age range	OR regular use (95% CI)	OR = 10 yrs (95% CI)	
Christensen '05 Denmark	252 (71)	485 (64)	20-69	0.71 (0.50-1.01)	1.64 (0.44-6.12) - low grade tumours -6 cases	= 1
Lonn '05 Sweden	371 (74)	674 (71)	20-69	0.8 (0.6-1.0)	0.9 (0.5-1.5) - 25 cases	Par

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Web address:
http://www.sciencedaily.com/releases/2008/02/080214144349.htm

Heavy Cell Phone Use Linked To Cancer, Study Suggests

ScienceDaily (Feb. 15, 2008) — An Israeli scientist, Dr. Siegal Sadetzki, has found a link between cell phone usage and the development of tumors.

An Israeli scientist has found a link between cell phone usage and the development of tumors. (Credit: iStockphoto)

Dr. Sadetzki, a physician, epidemiologist and lecturer at Tel Aviv University, published the results of a study recently in the American Journal of Epidemiology, in which she and her colleagues found that heavy cell phone users were subject to a higher risk of benign and malignant tumors of the salivary gland.

Those who used a cell phone heavily on the side of the head where the tumor developed were found to have an increased risk of about 50% for developing a tumor of the main salivary gland (parotid), compared to those who did not use cell phones.

The fact that the study was done on an Israeli population is significant. Says Sadetzki, "Unlike people in other countries, Israelis were quick to adopt cell phone technology and have continued to be exceptionally heavy users. Therefore, the amount of exposure to radiofrequency radiation found in this study has been higher than in previous cell phone studies.

"This unique population has given us an indication that cell phone use is associated with cancer," adds Sadetzki, whose study investigated nearly 500 people who had been diagnosed with benign and malignant tumors of the salivary gland.

Controlled Study Reveals Link

The study's subjects were asked to detail their cell phone use patterns in terms of how frequently they used one, and the average length of calls. They were compared to a sample of about 1,300 healthy control subjects.

The study also found an increased risk of cancer for heavy users who lived in rural areas. Due to fewer antennas, cell phones in rural areas need to emit more radiation to communicate effectively.

Sadetzki predicts that, over time, the greatest effects will be found in heavy users and children.

While anecdotal evidence has been substantial, the consistency of the results of this study support an association between cell phone use and these tumors. The risks have been hard to prove, mainly due to the long latency period involved in cancer development, explains Sadetzki.

Keep Calling but Call Smarter

Today it is estimated that more than 90% percent of the Western world uses cell phones. As the technology becomes cheaper and more accessible, its usage by a greater number of people, including children, is bound to increase.

"While I think this technology is here to stay," Sadetzki says, "I believe precautions should be taken in order to diminish the exposure and lower the risk for health hazards." She recommends that people use hands-free devices at all times, and when talking, hold the phone away from one's body. Less frequent calls, shorter in duration, should also have some preventative effect.

While she appreciates the ease of communication that cell phones allow between parents and their children, Sadetzki says that parents need to consider at what age their children start using them. Parents should be vigilant about their children's using speakers or hands-free devices, and about limiting the number of calls and amount of time their children spend on the phone.

"Some technology that we use today carries a risk. The question is not if we use it, but how we use it," concludes Sadetzki.

Sadetzki's main research on this new study was carried out at the Gertner Institute for Epidemiology and Health Policy Research at the Sheba Medical Center. Her research is part of the international Interphone Study, which attempts to determine an association between cell phones and several types of brain and parotid gland tumors.

Adapted from materials provided by Tel Aviv University

ONLINE EDITION
JERUSALEM POST

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'Long-term cellular use can cause brain tumor'

Jan. 25, 2007
Judy Siegel-Itzkovich THE JERUSALEM POST

An important study by epidemiologists from five European countries soon to be published in the print edition of the *International Journal of Cancer* has found a nearly 40 percent increase in a type of brain tumor among those who had used a cellphone for a decade or more.

The increase in gliomas, which was found to be statistically significant, was accompanied by a trend showing that the brain tumor risk increased with years of use.

This is the second type of tumor that has been linked to long-term cellphone use. In 2004, the Swedish Interphone group reported a doubling of acoustic neuromas - a benign (non-cancerous) tissue growth that arises on the eighth cranial nerve leading from the brain to the inner ear - among people who had used a mobile phone for 10 years or more.

Most other studies have not shown conclusive evidence linking an increase risk of brain tumors with cellphone use.

The new retrospective study is based on the data collected in Denmark, Finland, Norway, Sweden and the UK and included 1,521 glioma cases and 3,301 controls. There were 143 cases with 10 or more years of mobile phone use.

Prof. Elihu Richter, a senior expert in electromagnetic radiation and recently retired head of the occupational and environmental medicine unit of the Hebrew University-Hadassah School of Public Health and Community Medicine, called the study "an extremely important piece of information" that should become widely known.

Meanwhile, three senior members of the US public health community, all with major experience in researching non-ionizing radiation, have called for precautionary policies to limit leukemia risks to children from cellular phone use after studying the new evidence that long-term use of a cellphone may lead to the development of a brain tumor on the side of the head the phone is used.

At a recent public hearing convened by the Connecticut Siting Council, Drs. David Carpenter, Raymond Neutra and Daniel Wartenberg testified in support of prudent avoidance, especially by children.

A few days ago, *The Times* of London revealed that Lawrie Challis, the head of the UK research effort on mobile phones and health, is in the final stages of negotiations for a study of 200,000 mobile phone users who will be monitored for cancer, Parkinson's and Alzheimer's diseases. "We know from smoking and from the bomb falling in Hiroshima that nothing was seen for 10 years," Challis told the BBC. *The Times* ran a companion article under the headline: "Could these be the cigarettes of the 21st century? ... 'Absolutely'." And in an editorial, *The Times* applauded the decision to carry out the new long-term study: "The precautionary principle still applies here. Manufacturers should welcome the new study."

International cellphone companies have not commented yet, but whenever studies suggesting possible health damage from cellphones are published, the umbrella organization representing the companies in Israel notes that it observes all Israeli regulations and standards.

Mr. KUCINICH. Thank you very much, Mrs. Marks, for your testimony.

Before I go to our next witness, I want to note that we have two more Members of Congress who have joined us, Congresswoman Diane Watson from California and Congressman Higgins from New York. So I want to thank the Members for being here, and we certainly look forward to your participation in the question and answer period.

Ms. WATSON. May I have just 1 minute?

Mr. KUCINICH. You are certainly entitled to do that. I haven't done this before, interrupting the testimony.

Ms. WATSON. I just want to let the witnesses know I have experienced, Mrs. Marks, what you have.

I had a niece that had two brain tumors. She grew up with a telephone on this side and one on this side. And so, I just want all the witnesses to know that I have gone through that experience.

[The prepared statement of Hon. Diane E. Watson follows:]

Opening
Statement
Of
Congresswoman Diane E. Watson
Sub-Committee on Domestic Policy
Oversight and Government Reform Committee
Wednesday, September 25, 2008
2154 Rayburn HOB
11:00 a.m.

"Tumors and Cell Phone Use: What the Science Says"

Thank you Mr. Chairman for holding today's hearing that will examine the possible links between cell phone use and brain tumors. More importantly, I eagerly await testimony from today's panelists regarding the safety issues concerning the use of mobile phones and their potential harmful effects to children's health.

Even though scientific evidence linking cell phone use to health problems is inconclusive, there is not enough evidence to rule it out either. I believe Congress

should not wait by the sidelines and take a wait and see approach to determine if more should be done to address the potential problem. I would like to see the Federal Government lead the effort to research the cause and effect of prolonged use of mobile phones and other frequency emitting devices such as Bluetooth's and cordless phones.

Governments and scientist around the world have cautioned about the use of cell phones, especially in children. There is a belief that children may be very vulnerable to health problems due to cell phone usage because their young bodies, especially the brain are rapidly developing. There is also a common belief that their exposure to radiation will be greater over their

lifetime than older individuals who started to use mobile phones later in life.

Dr. David Carpenter, who is the director of the Institute of Health and Environment at the University at Albany, has found strong evidence that links two types of brain cancers on the same side of the head where cell phones are usually held.

The discovery of these types of cancers should be alarming, especially when considering the exposure rates of children over their lifetime. I believe researching the use of cell phones will give us a more conclusive answer as to whether cell phones, Bluetooth's or even cordless phones cause serious health problems over an extended period of time.

Mr. Chairman, I thank today's witnesses for cooperating with this committee and I look forward to hearing their testimony. I yield back the balance of my time.

Mrs. MARKS. I am sorry.

Mr. KUCINICH. I thank the gentlelady.

At this point, Mr. Knapp, you may proceed.

STATEMENT OF JULIUS KNAPP

Mr. KNAPP. Thank you, Chairman Kucinich and members of the committee.

It is very tough to talk after hearing that story. My heart goes out to you and, of course, all the best for you and your family.

Mrs. MARKS. Thank you.

Mr. KNAPP. My name is Julius Knapp. I am the Chief of the Office of Engineering and Technology at the FCC, and I thank you for the opportunity to participate in this hearing.

As you know, the FCC is responsible for, among others, regulating telecommunications services and devices, everything from multi-kilowatt broadcast antennas to microwatt medical implants.

Pursuant to the National Environmental Policy Act of 1969 [NEPA], the Commission has established guidelines for human exposure to RF radiation. The FCC guidelines, which were first established in 1985, regulate the amount of RF radiation to which humans may be exposed by various transmitters regulated by the FCC.

The guidelines and methods for evaluating the environmental effects of RF have been revised as scientific knowledge in the area has advanced and standards-setting bodies, upon which the Commission relies in setting our exposure guidelines, have revised their maximum acceptable exposure criteria.

The current guidelines were finalized in 1997 based on recommendations and advice of Federal agencies and groups with expertise in health-related areas and in standards setting.

The guidelines were based primarily on criteria developed by the congressionally chartered National Council on Radiation Protection and Measurement and the Institute of Electronics and Electrical Engineers which is within the broad umbrella of the American National Standards Institute.

Their adoption was supported by the Environmental Protection Agency and other health and safety agencies. Four years ago, the Court of Appeals for the District of Columbia upheld the Commission's continued reliance on its existing rules to protect the public from potential health effects from RF exposure.

The standards guidelines specify limits for human exposure to RF emissions from handheld RF devices in terms of specific absorption rate or SAR. For exposure to the general public, exposure of the user of a cell phone or PCS phone, for example, the SAR limit is an absorption threshold of 1.6 watts per kilogram as measured over 1 gram of tissue.

To ensure compliance with the RF exposure guidelines, cell phones must be certificated before they can be marketed to the public. In order to receive certification, each device must be tested to demonstrate compliance with the SAR standard. The test data and the test methodologies are reviewed before the certification is granted, and the test data, including the SAR values, are made available to the public and are on our Web site.

In addition to establishing and enforcing the exposure limits, the FCC provides information to consumers and to industry through various publications and on our Web site. The FCC and the Food and Drug Administration have developed a joint Web site to provide health-related information for consumers who are concerned about cell phones, base station towers and other transmitters and wireless products.

Among other things, the joint Web site includes a link to the Commission's data base of approved equipment and instructions on how to find the SAR information for individual cell phones. It also refers to outside sites that compile information on SAR for individual cell phones that may be in a more readily accessible format.

In order to ensure the continued propriety and efficacy of our RF emissions limits, the FCC staff continuously monitors relevant studies and literature and attends and participates in a number of groups and pertinent standards-setting bodies.

In addition, our staff participate with scientists from the Federal health and safety agencies in an informal Radiofrequency Interagency Working Group which was chartered in 1995 to provide a coordinated Federal approach to health issues.

Although the Commission is responsible for setting and enforcing limits for RF exposure from devices that we authorize, it is important to understand that we rely on the guidance from U.S. health, safety and environmental agencies in setting those limits. The FCC staff is not sufficiently qualified to speak with authority to the science of health effects of RF absorption in the body.

If agencies with expertise on health effects of RF exposure were to suggest that our standards should be modified, the Commission would initiate a rulemaking to consider changes in the standards.

In closing, the Commission recognizes the public concerns about cell phone use. The science concerning health effects of RF exposure from cell phones has been the subject of great study and debate. We are continuing to monitor the developments, and the Commission stands ready to take action if it appears appropriate to do so.

Thank you.

[The prepared statement of Mr. Knapp follows:]

Written Statement

Of

Julius P. Knapp

Chief, Office of Engineering and Technology

Federal Communications Commission

Before the

Committee on Oversight and Government Reform

Subcommittee on Domestic Policy

U.S. House of Representatives

"Tumors and Cell Phone Use: What the Science Says."

September 25, 2008

Good morning Chairman Kucinich, Ranking Member Issa and members of the subcommittee. My name is Julius Knapp, and I am Chief of the Office of Engineering and Technology at the Federal Communications Commission. I thank you for the opportunity to participate in this hearing today on this very important topic.

As you know, the Federal Communications Commission is responsible for, among other things, regulating telecommunications services and devices, everything from multi-kilowatt broadcast antennas to microwatt medical implants and anti-shoplifting tags, and all manner of transmitters in between, including cellphone transmit towers, cell phones, and other personal devices that transmit and radiate RF energy.

Pursuant to the National Environmental Policy Act of 1969 (NEPA), the Commission has established guidelines for human exposure to radiofrequency ("RF") radiation The FCC guidelines, which were first established in 1985, regulate the amount of RF radiation to which humans may be exposed by various transmitters regulated by the FCC. The guidelines and methods for evaluating the environmental effects of RF have been revised as scientific knowledge in the area has advanced and standards-setting bodies upon which the Commission relies in setting its exposure guidelines have revised their maximum acceptable exposure criteria.

The current guidelines were finalized in 1997, based on the recommendations and advice of federal agencies and groups with expertise in health –related areas and in standard-setting. The guidelines were based primarily on criteria developed by the Congressionally-chartered National Council on Radiation Protection and Measurement (NCRP) and the American National

Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE). Their adoption was supported by the Environmental Protection Agency and other health and safety agencies. Three years ago, the Court of Appeals for the District of Columbia Circuit upheld the Commission's continued reliance on its existing rules to protect the public from potential health hazard from RF exposure.

The NCRP and ANSI/IEEE guidelines specify limits for human exposure to RF emissions from hand-held RF devices in terms of specific absorption rate, or SAR. For exposure of the general public, e.g., exposure of the user of a cellular or PCS phone, the SAR limit is an absorption threshold of 1.6 watts/kg (W/kg), as measured over any one gram of tissue.

To ensure compliance with the RF exposure limits, cell phones must be certificated before they can be marketed to the public. In order to receive certification, each device must be tested to demonstrate compliance with the SAR limit. The test data and test methodologies are reviewed before certification is granted. Once certification is granted, the application and test data are made available to the public.

In addition to establishing and enforcing exposure limits, the FCC provides information to consumers and to industry through various publications and our RF web site. The FCC and the Food and Drug Administration (FDA) have also developed a joint website to provide health-related information for consumers who are concerned about cell phones, base station towers, and other transmitters and wireless products. Among other things, the joint website includes a link to the Commission's equipment database with instructions on how to find SAR information on

individual cell phones, and refers to outside websites which compile information on SAR for individual cell phones in a more readily accessible format. This website is currently being revised by the FDA to include the most recent information regarding research on RF exposure.

In order to ensure the continued propriety and efficacy of our RF emissions limits, FCC staff continuously monitors relevant studies and literature, and attends and participates in a number of groups and pertinent standards-setting bodies. In addition, our staff participate with scientists from federal health and safety agencies in an informal Radiofrequency Interagency Working Group, which was chartered in 1995 to provide a "coordinated federal approach to health issues associated with existing and proposed technologies, which use and produce exposure to RF radiation." Commission staff also meet regularly with staff from the Food and Drug Administration.

Although the Commission is responsible for setting and enforcing limits for human exposure to radio frequency (RF) energy from the devices we authorize, it is important to understand that we rely on guidance from U.S. health, safety, and environmental agencies in setting those limits. The FCC staff is not sufficiently qualified to speak with authority to the science of health effects of RF absorption in the body.

If agencies with expertise on the health effects of RF exposure were to suggest that our standards should be modified, the Commission would initiate a rulemaking to consider changes to the standards.

In closing, the Commission recognizes the public concerns about cell phone use. The science concerning the health effects of RF exposure from cell phones has been subject to study and intense debate. We are continuing to monitor developments and the Commission stands ready to take action if it appears appropriate to do so.

Mr. KUCINICH. Thank you, Mr. Knapp.
Dr. Carpenter, please proceed.

STATEMENT OF DR. DAVID O. CARPENTER

Mr. CARPENTER. I am very grateful for the opportunity to meet before this committee, and I thank the chairman, Congressman Kucinich, and the other Members for bringing me here.

Mr. KUCINICH. Sir, could you please bring that mic a little bit closer?

Before you begin further, I just want everyone in the audience to know that we appreciate your being here, but out of respect for the witnesses and this proceeding, if you have a cell phone, either turn it off or put it on vibrate, so that phones aren't going off in the middle of someone's testimony.

You may proceed, Doctor.

Mr. CARPENTER. Thank you.

I did testify before a committee of Congress about 15 years ago on the health effects of power line frequency fields. It may have been the hearing that you mentioned, although at that hearing we were not dealing with radiofrequency radiation.

As you mentioned in my introduction, I am a public health physician, not a practicing medical doctor. And, it is important to understand that public health is a profession that tries to prevent disease before it occurs, and it is a population-based discipline.

So this issue of what do we do when we have some information indicating a hazard, but when that information may not be as definitive as we would like, this is a critical public health issue.

Let me just summarize where I am coming from on this issue in that I see the evidence that we have at the present very strongly suggestive of there being a major risk of brain cancer and other cancers as a result of exposure to radiofrequency fields. I certainly find the evidence at present to be less than 100 percent.

But the public health implications, under circumstances where the expansion of wireless technology, where every child is using cell phones all of the time and when exposure are you can't go into a McDonald's or a Starbucks without being in a wireless environment, the public health implications, if we don't take actions and this turns out to be as bad as I suspect it is, these implications are enormous.

As was mentioned, I was one of the co-editors of the BioInitiative Report, a report that appeared about a year ago, written by an international team of 14 scientists who find that the reports from our national bodies, from the FCC, are unduly conservative in our opinion and in doing so fail to protect the public health.

Let me summarize what I see as the most important health effects. Cell phone use really began in Europe. Cell phones were first manufactured in Scandinavia. And, in Scandinavia, cell phone use was very common about 1980, long before most people in the United States even knew what they were.

The studies are coming out of Scandinavia showing that if you use a cell phone intensely for 10 years or more, you are at increased risk of developing a brain tumor, an acoustic neuroma which is a benign growth of the auditory nerve and, in a study

from Israel, cancer of the parotid gland, the salivary gland in the cheek.

This increased risk occurs only on the side of the head where the cell phone was used for that period of time.

There are many studies of cell phone use that have not demonstrated any adverse effect. Almost without exception, these are studies that were not done for long-term users.

And, there is a problem with all of these studies in that the exposure assessment, that being if you were asked how frequently you used a cell phone 10 years ago, you would have difficulty answering that question. So the research isn't perfect.

Now there are studies from Korea showing increased risk of leukemia if children simply live by an AM television or AM radio transmission tower. So that is another form of radiofrequency radiation.

We feel that the studies from Sweden, especially the study published in 2004 and then a more recent presentation of Dr. Leonard Hardell that occurred at a meeting in London that I attended early in September, showing that if a child or a young adult begins to use a cell phone early in life, their risk of going on to develop brain tumors is much higher than if an adult begins to use it.

In the results presented in London 2 weeks ago, Dr. Hardell reported that if a person began to use a cell phone under the age of 20, he had a 5.2fold elevated risk of developing a brain cancer. In contrast, if one looked at all of the people in his study, the risk was 1.4.

So we call on the government to support research with good exposure assessment.

We call on the FCC to review their standards for exposure. Their standards are presently based on the assumption, which we feel to be fallacious, that the only adverse health effect of radiofrequency fields is tissue heating.

And, we call on the health agencies, the NIH, the EPA, the Centers for Disease Control to issue warnings, especially to children who are more vulnerable to any environmental insult, certainly to radiofrequency radiation.

Thank you very much for your attention.

[The prepared statement of Mr. Carpenter follows:]

STATEMENT OF DAVID O. CARPTENTER, M.D.
COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM
Domestic Policy Subcommittee
25 September 2008

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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Mr. KUCINICH. Thank you very much, Dr. Carpenter.
Dr. Herberman, please proceed.

STATEMENT OF DR. RONALD B. HERBERMAN

Dr. HERBERMAN. I want to thank this committee for inviting me to talk with you today about the important concerns that have been raised about cell phones and our health.

As the chairman nicely summarized, I am a physician and cancer researcher and the founding director of the University of Pittsburgh Cancer Institute [UPCI].

I am here with you today to discuss my reasons for being concerned about the potential for health effects from cell phones that led me to develop a simple precautionary message to reduce exposure now while we develop new research to better measure the possible health impacts of cell phone and cordless phone use.

A little bit about the UPCI: It is right by the National Cancer Institute [NCI], among the top 10 cancer research centers, based on cancer research funding.

For two decades before coming to Pittsburgh, I worked for the NCI with teams of innovative researchers. I have published more than 700 peer-reviewed articles. Although I am a physician scientist, I need to point out that I am not, as Dr. Carpenter, an expert on cell phones and cancer risk.

As history tells us, there are examples where delays in reducing exposure to cancer-causing substances have led to large increases in cancer. Tobacco use is one striking example.

Mindful of lessons learned, the UPCI Center for Environmental Oncology began a process more than a year ago of reviewing evidence on the possible association of brain cancer with the long-term use of cell phones. During this process, I became aware of a growing body of scientific evidence indicating that long-term frequent use of cell phones, which receive and emit radiofrequency [RF] signals, may be associated with an increased risk of brain tumors including malignant gliomas, the type of tumor that Senator Kennedy recently developed as well as Mr. Marks.

This particularly concerned me since, in the United States today, more than 9 out of every 10 adults use a cell phone, a remarkable number that has doubled in just the past 5 years. Worldwide, there are 3 billion regular cell phone users including a growing number of children.

Generally speaking, it is important to stress that children are not just little adults. They often are much more vulnerable to the effects of environmental exposures. For cell phones, this matters because the skull of children is much less dense than the skull of adults and modeling research has shown that cell phone RF signals are observed much deeper into the brains of children.

In contrast to the United States, as Dr. Carpenter has pointed out, in the Scandinavian countries, widespread cell phone use has been prevalent for more than two decades. Dr. Leonard Hardell, a distinguished oncologist, finds that people who have used cell phones the most have double the chance of developing malignant brain tumors and also tumors on the hearing nerve called acoustic neuromas.

Dr. Hardell has also, as Dr. Carpenter just summarized, recently reported that teenagers who use cell phones have five times more brain tumors by the age of 29.

I recognize that many studies do not show any association, but most of these negative studies have followed people for a relatively short period of time. It seems likely that brain cancer can take 10 or more years to develop. In addition, few studies have controlled for cordless phone use, and these cordless phones also release RF signals.

In population-based research, clearly methods always matter. My concerns about the use, about the risk for developing brain tumors from long-term cell phone use and my particular concern about risks for children, coupled with the knowledge that experts in several other countries had issued precautionary advisories, led me to issue an advisory in July to our physicians, scientists and staff. The advice was straightforward and has been widely shared by colleagues and news outlets around the world.

Within a week of the distribution of the precautionary memo to our staff, the Israeli Health Ministry endorsed our recommendations. Our warning has also been translated into German, Portuguese and Spanish.

Our advisory recommends that you use cell phones but carefully. Don't keep them turned on and on your body all the time. Use an earpiece, a headset or a speaker phone mode.

Based on the current body of evidence as a physician scientist who has devoted my life to preventing cancer and saving lives, I cannot tell this committee they are definitely dangerous, but I certainly cannot tell you that they are safe.

How are we going to resolve this important matter?

Should we simply wait and watch or should we take simple precautions while we undertake additional, more definitive research that will tell the whole story?

I urge this committee to work collaboratively with the cell phone industry so that independent researchers at our institution, M.D. Anderson Cancer Institute and the National Cancer Institute and National Institute of Environmental Health Sciences will be better able to produce the best, most accurate study of cell phone use and health effects.

The future of our children and grandchildren, I believe, demands that we work together to understand the potential risks from cell phones and, if necessary, to develop effective solutions to reduce future health threats.

And, in closing, I would just say that I find the old adage, to be better safe than sorry, to be very apt for this situation.

Thank you.

[The prepared statement of Dr. Herberman follows:]

Statement
Of
Ronald B. Herberman, MD
Director
University of Pittsburgh Cancer Institute and UPMC Cancer Centers

Domestic Policy Subcommittee
Oversight and Government Reform Committee
Thursday, September 25, 2008
2154 Rayburn HOB
11:00 a.m.

"Tumors and Cell Phone use: What the Science Says"

Thank you for inviting me to speak with you today about the important matter of cell phones and our health. I have served as the Founding Director of the University of Pittsburgh Cancer Institute (UPCI) since 1985, and as the Founding Director of University of Pittsburgh Medical Center (UPMC) Cancer Centers since 2001. The organizations that I lead employ more than 660 oncologists. other cancer experts and research faculty and more than 2,000 other staff members. In addition to the cutting edge cancer research performed at UPCI, our cancer centers, located throughout western Pennsylvania and adjacent states, annually treat more than 27,000 new cancer patients each year

The UPCI is a National Cancer Institute (NCI)-designated comprehensive cancer center, and is one of the top ranked cancer research facilities in the nation. In fact, in 2007, UPCI was ranked 10th nationally in its level of NCI funding for cancer research. During the past two decades, UPCI has recruited some of the world's top scientists.

At UPCI, I am the Hillman Professor of Oncology, Professor of Medicine and Associate Vice Chancellor for Cancer Research at the University of Pittsburgh. I also was the founding Chairman of the Board of Directors, and I currently am the President, of the Pennsylvania Cancer Control Consortium, a state-wide cancer control organization. I am a longstanding member and Chairman of the Research and Clinical Trials Team, of C-Change, a national cancer organization, that has President George H.W. Bush, First Lady Barbara Bush, and Sen. Dianne Feinstein as the honorary co-chairs. For the past few years, C-change has focused mainly on innovative strategies to reduce smoking and other personal risk factors for cancer, and to facilitate medical interventions to protect people at increased risk for cancer

I also served from 1999-2001 as the President of the Association of American Cancer Institutes, an organization that includes almost all of the major academic cancer centers in the US. All of the organizations that I am associated with are focused on eliminating cancer as a public health problem, a commitment that I take very seriously.

As a cancer researcher, I have published more than 700 peer-reviewed articles in major biomedical journals, and for two decades my scientific publications placed me as among the 100 most cited biomedical scientists. In addition, I have served as an associate editor on more than 10 major, peer-reviewed journals, including Cancer Research, the Journal of the National Cancer Institute (JNCI), and the Journal of Immunology, and I have been a peer reviewer for over 1, 000 manuscripts submitted for publication. For nearly two decades before I was recruited to Pittsburgh to found the UPCI, I led research teams at the NCI that focused mainly on characterizing the cellular basis for human anti-tumor immunity and utilizing the insights derived from those studies to develop innovative approaches to use immunotherapy to improve the treatment of cancer. The work of my research team at NCI resulted in the initial identification and then extensive characterization of natural killer (NK) cells. Research by my team at NCI and then at UPCI, along with other leading researchers around the world, have shown that NK cells are a key component of our natural defense against the development and metastatic spread of cancer.

In addition to world class studies in cancer immunology and immunotherapy at UPCI, other programs at our institute are developing prognostic indicators of response to treatment. UPCI also includes experts working on strategies for cancer prevention, early detection, and treatment and approaches for cancer control. Through our innovative Center for Environmental Oncology, we are carrying out studies to better define the role of environmental exposures on cancer risk, coupled with measures to reduce cancer risk by reducing exposure to environmental carcinogens, or using nutritional and other interventions to protect people who have been exposed to environmental hazards.

As part of our overall efforts, we are also working to identify important policy changes that should be developed to reduce the burden of cancer. After years of protracted delays, our nation has finally made progress against smoking by getting individuals to stop smoking. But, smoking control policies proved difficult to implement for many years, because of complex strategies to manipulate information on its dangers. Analogous efforts to identify and then effectively implement actions for other controllable causes of cancer have been fairly limited.

Now, to turn to the issues of direct interest to this committee, I first want to point out that, in contrast to several of the other speakers at this important hearing, who are longstanding experts on some aspects of radiofrequency (RF) radiation associated with cell phones or on the design and implementation of population-based studies, I have only recently become involved in the issue of the possible health risks of cell phones, by issuing a precautionary message to the faculty and staff of the UPCI and the UPMC Cancer Centers. For you to understand why a non-expert in the field took this action, I

believe it is important to explain the process that led up to the issuance of the advisory to reduce direct cell phone exposures to the head and body.

Last year, as she was finalizing her well-researched book, The Secret History of the War on Cancer, my colleague, Dr. Devra Davis, Director of the UPCI's Center for Environmental Oncology and an internationally acclaimed expert in environmentally-induced health risks, shared with me the growing scientific literature on the possible association between extensive cell phone and increased risk of malignant and benign brain tumors. My attention was directed to a large body of evidence, including expert analyses showing absorption of RF into the brain and the comprehensive Bioinitiative Report, review of experimental and public health studies pointing to potential adverse biologic effects of RF signals, including brain tumors, associated with long-term and frequent use of cell phones held to the ear. I also learned of a recent series of similar precautionary advisories from international experts and various governments in Europe and Canada. I reacted to this information in the same fashion as I do with other reports of claims of biologically and/or clinically important findings, namely I first carefully reviewed the reports and consulted with a variety of relevant experts.

My evaluation of the scientific and technical information indicating the potential hazards of cell phones was built on the foundation of my extensive experience in cancer research and critical evaluations of reports being submitted for peer-reviewed publications. I recognized that there was sufficient evidence to justify the precautionary advisories that had been issued in other countries, to alert people about the possibility of harm from long-term, frequent cell phone use, especially by young children. Then, Dr. Davis and I consulted with international experts in the biology of radiofrequency (RF) effects and the epidemiology of brain tumors, and with experts in neurology, oncology and neurosurgery at UPCI. . Without exception, all of the experts contacted confirmed my impression that there was a sound basis to make the case for precaution, especially since there are simple and practical measures that can be taken, to be able to continue to use cell phones while substantially reducing the potential hazards.

Another factor influencing my decision was my growing conviction that substantially more attention should be devoted to promoting a range of strategies to reduce the future burden of cancer. Of course, I appreciate the tremendous progress that the US has made in treating cancer, some of which was achieved by studies at the University of Pittsburgh, on melanoma, breast, brain, and colorectal cancer. I also recognize that approaches that aim to prevent new cases from occurring are the most likely ways to more effectively and efficiently reduce the overall burden of cancer. Accordingly, I decided to act, consistent with my responsibilities as the leader of a major US cancer institute, by informing my colleagues about my concerns that cell phone use may be a substantial risk to public health. I also wanted to stimulate broader awareness and discussion of the evidence that I came to be familiar with, and to encourage changes in the behavior of some of my colleagues and by extension, also their families and friends.

Summary of review of the published scientific evidence for an association between cell phone use and brain tumors

Obviously, scientific research plays a central role in identifying exposures that may affect our health. In public health research, scientists generally rely on two major types of evidence to evaluate potential risks. First, a combination of laboratory-based experimental studies using animals, cell cultures, and computer models can be used to examine mechanisms, identify biological effects and predict the potential impact for humans. Then, population-based human studies can also be used to determine if observed patterns of disease can be correlated with specific exposures, and other more detailed studies of people with a particular disease in comparison with healthy controls, so-called case-control studies, can be carried out to determine if there are different health patterns in those with and without certain exposures..

Although in some cases a clear association between an exposure and health effect can be demonstrated, often methodological differences among studies can introduce subtle differences in the way data are evaluated, and in some cases can lead to very different conclusions. This is especially true for human population-based cancer epidemiology studies where it is sometimes very difficult to select non-exposed controls, where the critical timing of exposure is not precisely known, where the mechanism by which an exposure might cause cancer is not well defined or understood, or where the characteristics of the exposure change over time. A critical review of the literature on the biological effects of cell phones exemplifies this point. Despite the lack of consistency in outcomes in all the cell phone publications, there are several well-designed studies that suggest that long-term (10 years or more) use of wireless phone devices is associated with a significant increase in risk for glioblastoma (glioma), a very aggressive and fatal brain tumor, and acoustic neuroma, a benign tumor of the auditory nerve that is responsible for our hearing.

For more than eight years, the World Health Organization has been conducting a combined effort to study cell phones and brain cancer in thirteen countries, called the Interphone study. No results synthesizing this overall effort have been published yet. But, several reports from countries participating in the Interphone study have appeared. Some analyses have found no increased risk of cell phones, while others, from countries where study participants used cell phones for a decade or longer, have found increased risks for brain tumors. But, even in these negative studies, when the subset of long-term users are examined separately, there is evidence of increased risk of brain tumors.

Clearly, not all of the published cell phone studies have reached the same conclusion. What are some of the characteristics of study design that can explain the differences among cell phone use studies generally and between the Interphone-related studies and the independent, non-Interphone-related studies?

To address this question, in 2008, Dr. Lennart Hardell, a distinguished oncologist and senior author on several cell phone studies in Sweden that have shown increases in brain tumor risk with long-term use, published a combined analysis (also called a meta-

analysis) of published case-control studies that evaluated the effects of cell phone use on brain tumor risk. For gliomas, a malignant tumor of the supporting tissue of the brain, he and his colleagues found 10 studies, 7 were part of the Interphone Study, one was partly based on Interphone participation and partly independent, and 2 were not part of Interphone (one was a Swedish study from Hardell's team. and the second was a Finnish study). In contrast to the Interphone-related studies which found no increased risk for glioma, both of the independent studies found an increased risk of 40-50%. Since 8 of these 10 studies were Interphone-related, and these studies all showed no effect of cell phone use on glioma risk, the combined data result (meta-analysis) also showed no effect. It should be noted, however, that most of these studies included as cell phone users those who only made a single phone call a week and did so over a limited duration.

In contrast, focusing on those who had used cell phones for a decade provided a different story. Of these 10 studies, 6 evaluated long-term exposure effects, resulting from 10 or more years of cell phone use. Of these 6 studies, all showed an increase risk for developing a glioma on the same side of the head where the phone was used, and this increased risk ranged from a low of 20% increased risk for low grade (less aggressive) glioma to more than 400% increase risk of high grade (very aggressive) glioma. The meta-analysis for the combined data indicated that those who regularly used cell phones had twice the risk of malignant brain tumors overall, and four times the risk if they were high users of phones.

For acoustic neuroma, 9 case-control studies have been published that have compared the reported history of cell phone use of persons with and without this benign tumor on the hearing nerve. Eight of these studies are Interphone study-related and one, by Hardell's group, was independent. Whereas six of the 7 Interphone studies showed that no increased risk with regular cell phone use, Hardell found that regular cell phone users had a 70% greater risk. What struck me as especially relevant, and to possibly account for the divergent reports, is one simple fact: all three studies that looked at cell phone users for at least a decade, found a significantly increased risk. In long term users, acoustic neuromas are twice as frequent in regular, long-term users. .

Within the last month, as also noted by Dr. David Carpenter in this hearing, Dr. Hardell reported at a meeting of the Royal Society of London that very frequent and long term users of cell phones by teenagers that started before age 20, resulted in a five times higher rate of brain cancer by the age of 29, when compared with non-cell phone users.

Brain cancer, which is one of the health effects of very serious concern, is believed to develop in adults over a period of at least one decade and in some cases, up to several decades. Among the known causes of brain cancer is ionizing radiation, such as x-rays. RF radiation is not ionizing, but it is absorbed into the brain, according to modeling studies that have been produced by the cell phone industry, in particular by French Telecom. There is no debate that radiation emitted by cell phones is absorbed into the brain -- dramatically more so in children than in adults.

In summary, my review of the literature suggests that most studies claiming that there is no link between cell phones and brain tumors are outdated, had methodological

concerns, and did not include sufficient numbers of long-term cell phone users to find an effect, since most of these negative studies primarily examined people with only a few years of phone use and did not inquire about cordless phone use. In addition, many studies defined regular cell phone use as "once a week."

One major negative study, published by the Danish Cancer Society and supported by the cell phone industry, started with nearly three quarters of a million cell phone users during the period between 1982 and 1995. This study excluded more than 200, 000 business users, who were most likely to be the most frequent users during that time period. Recall bias was a problem with all of these studies as solid data such as cell phone records were not used to document usage and people were simply asked, often the day after surgery, whether or not they had used a cell phone and for how long.

Scientists appreciate that diseases like brain cancer can take decades to develop. This means that even well conducted studies of those who have used phones for only a few years, as most of us have, cannot tell us whether or not there are hazards from long-term use.

In contrast, some recent studies in Nordic countries, where phones have been used longest, find that persons who have used cell phones for at least a decade have 30% to more than 200% more brain tumors than do those without such use, and only on the side of the head where the user holds his or her phone. To put these numbers in context, this is at least as high an increase as the added risk of breast cancer that women face from long-term use of hormone replacement therapy. Based on these findings and the increased absorption into the brains of the young, the French Ministry of Health advised that children should be discouraged from using cell phones, a position also taken by British, German and other authorities.

Precautionary advisory based on review of the published reports and consideration of the precautionary advisories from several countries in Europe and elsewhere

While those issues are being debated and resolved, and as we eagerly await the results, my review of the available published evidence suggesting some increased brain tumor risk following long-term cell phone use, combined with the current near ubiquity of exposure to cell phones and cordless phone RF fields (more than 90% of the population in the Western European countries and about 90% of the population in the USA use cellular phones), led me to work with both international experts and experts at UPCI to develop a set of prudent and simple precautions that I felt could reduce potential risk, while awaiting more definitive evidence. . Certainly, if it turns out that long-term use of cell phones does increase brain tumor risk, the public health implications of not taking action are obvious.

On July 21, 2008, I issued the advisory on the safe use of cell phones to the physicians, researchers and staff at UPCI and UPMC Cancer Centers. Before its issuance, this document was reviewed by UPCI experts in neuro-oncology, epidemiology, environmental oncology, and neurosurgery as well as national and international scientific and engineering experts. A copy can be found at the end of my

testimony (Appendix A). My sole goal in issuing the cell phone advisory was to suggest simple precautions that would reduce exposure to cell phone electromagnetic radiation. The advisory clearly indicated that the human evidence on the potential hazard of cell phones is still evolving, but it pointed out that there are some studies using experimental and population-based approaches that suggest an association between long-term cell phone use and development of brain tumors. It also pointed out that modeling studies suggest the possibility that there may be additional differences in susceptibility between young children and adults. Based on my review of the data, I felt that there was sufficient evidence for possible human health risks, to warrant providing precautionary advice on cell phone use, especially by children.

What are the main points of the advisory? Adults can reduce direct exposure of the head and bone marrow to radiofrequency radiation by using ear pieces or the speaker phone mode whenever possible. Cell phone use by children should be restricted. Here we advised, as do a number of governments, that cell phone use by children be limited to emergencies calls and for older children, text messaging. In circulating this warning, I joined with an international expert panel of pathologists, oncologists and public health specialists, who recently declared that RF radiation emitted by cell phones should be considered a potential human health risk.(Appendix B)[1] In fact, shortly before I sent my precautionary message to faculty and staff at UPCI and UPMC Cancer Centers, a number of countries including France, Germany and India, and the province of Ontario, Canada, issued similar advice, suggesting that exposure to RF radiation from cell phones be limited. Very soon after the UPCI advisory was issued, Israel's Health Ministry endorsed my recommendations, and Toronto's Department of Public Health advised that teenagers and young children limit their use of cell phones, to avoid potential health risks (Appendix C).

I appreciate the interest of this committee in exploring the current state of the scientific evidence on the potential hazards of cell phones. I have provided appendices that include links and references to reviews and advisories that have been issued within the past few years by other authorities. In addition, the web site for UPCI's Center for Environmental Oncology (www.preventingcancernow.org) includes the actual papers as pdf files for all major studies published over the past two years. In addition, the Bioinitatives Report (www.bioinitiativereport.org) provides comprehensive, critical review, that includes references to the more than 4,000 relevant studies that have been published to date on this subject.

Most people throughout the developed world are using cell phones. Cell phones save lives and have revolutionized our world in many positive ways. Without doubt, the most immediate danger from the use of cell phones is that of traffic crashes. But, the longer term spectre of harm cannot easily be dismissed at this point. The absence of definitive positive studies should not be confused with proof that there is no association. Rather, it reflects the difficulties of assembling definitive proof and the absence of well-conducted, large-scale independent studies on the problem.

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[1] *The Case for Precaution in the Use of Cell Phones Advice from University of Pittsburgh Cancer Institute Based on Advice from an International Expert Panel*, available at www.preventingcancernow.org

Throughout my career I have witnessed the tremendously important discoveries that have improved cancer care. I also recognize that cancer professionals and physicians in general have failed to pay adequate attention to the need to identify and then promptly and effectively control avoidable causes of cancer. Nowhere is our failure more evident than in the protracted and prolonged debate that played out over the hazards of tobacco. By all accounts, we have also missed the boat with respect to our national policies on known workplace cancer causes such as exposure to asbestos, and we waited far too long before acting to reduce dangers associated with hormone replacement therapy.

It is worth noting that in the case of tobacco and lung cancer, debates over whether there was a true increase in lung cancer associated with smoking raged far longer than they should have, fomented by an active disinformation campaign of which this Congress is well aware. The dilemma of public policy when it comes to controlling and identifying the causes of cancer is profound. If we insist we must be certain of human harm and wait for definitive evidence of such damage, we are effectively saying that we can only act to prevent future cancers, once past ones have become evident. Recalling the 70 years that it took to remove lead from paint and gasoline and the 50 years that it took to convincingly establish the link between smoking and lung cancer, I argue that we must learn from our past to do a better job of interpreting evidence of potential risk. In failing to act quickly, we subject ourselves, our children and our grandchildren to the possibility of grave harm and to living with the knowledge that with more rapid action that harm could have been averted.

I do not envy policy makers and regulators as they do not always have adequate solid data on which to base standards. In the present case, the link between cell phones and health effects is suggestive but not solidly established. From my careful review of the evidence, I cannot tell you conclusively that phones cause cancer or other diseases. But, I can tell you that there are published peer reviewed studies that have led me to suspect that long term cell phone use may cause cancer. . It should be noted in this regard that worldwide, there are three billion regular cell phone users, including a rapidly growing number of children. If we wait until the human evidence is irrefutable and then act, an extraordinarily large number of people will have been exposed to a technology that has never really been shown to be safe. In my opinion, for public health, when there is some evidence of harm and the exposed group is very large, it makes sense to urge caution. This is why I issued advice to our faculty and staff, especially to take precautions to reduce cell phone RF exposures to children

Now that the issue of a possible association of long-term cell phone with increased brain tumor risk has reached national and international attention, the central question is where we go from here. Should we simply wait and watch? Or, should we take some actions now? I am not sufficiently expert to comment on possible new regulations to affect cell phone usage. Rather, from my perspective as a scientist and cancer center director, I want to do all that I can to see that the matter of cell phones and our health is resolved. I believe that we should undertake additional, more definitive research that will tell the whole story. Many of my colleagues at UPCI, Rutgers

University, University of California, San Francisco and a number of senior faculty at M.D. Anderson Cancer Institute are joining with me in calling for an independent scientific investigation, avoiding as many of the limitations of the prior studies as possible, to determine if long-term, frequent use of cell phones and cordless phones increases brain tumor risk We will urge that these studies engage both university and NIH experts and also the full cooperation of the cell phone industry, which will be asked to provide solid usage data in the form of access to billing records and substantial contribution to the funding of the study but without any direct review or control of the results, in order to clearly settle this issue in the not too distant future.

In the meantime, while we continue to conduct progressively better research on this question, I believe it makes sense to urge caution: it's better to be safe than sorry.

List of Appendices to Testimony of Ronald B. Herberman, MD

September 25, 2008

Subcommittee on Domestic Policy

Government Oversight and Reform Committee

U.S. House of Representatives

Appendix A: Advisory to UPCI Staff on Cell Phones
Appendix B: International Expert Advisories
Appendix C: Overview of Biological Impacts of Radio Frequency
Appendix D: Cell phone- related biological and health risks
Appendix E: Lloyd Morgan critique of INTERPHONE Study

Physical Exhibit: Three Dimensional Model of Brain Showing Radio-absorption

1) Electromagnetic fields from cell phones are estimated to penetrate the brain especially in children. (Figure 1.) [1, 2]

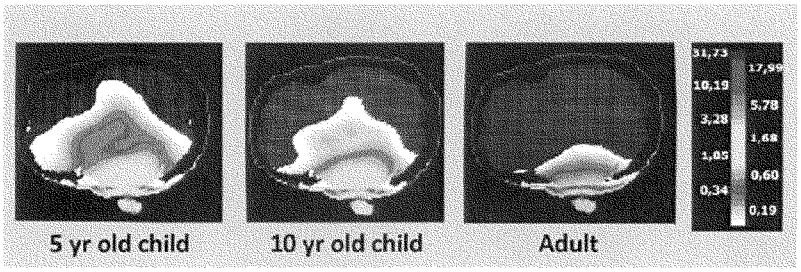

Figure 1. Estimation of the penetration of electromagnetic radiation from a cell phone based on age (Frequency GSM 900 Mhz) (On the right, a scale showing the *Specific Absorption Rate* at different depths, in W/kg) [1]

OR High quality color reproduction of Gandhi imaging studies of brain absorption.

Appendix A: Advisory to UPCI Staff on Cell Phones

MEMORANDUM

TO: UPCI Faculty and Staff

FROM: Ronald B. Herberman, MD

SUBJECT: Important Precautionary Advice Regarding Cell Phone Use

DATE: July 21, 2008

Recently I have become aware of the growing body of literature linking long-term cell phone use to possible adverse health effects including cancer. Although the evidence is still controversial, I am convinced that there are sufficient data to warrant issuing an advisory to share some precautionary advice on cell phone use.

An international expert panel of pathologists, oncologists and public health specialists, recently declared that electromagnetic fields emitted by cell phones should be considered a potential human health risk.[1] To date, a number of countries including France, Germany and India have issued recommendations that exposure to electromagnetic fields should be limited. In addition, Toronto's Department of Public Health is advising teenagers and young children to limit their use of cell phones, to avoid potential health risks.

More definitive data that cover the health effects from prolonged cell phone use have been compiled by the World Health Organization, International Agency for Research on Cancer. However, publication has been delayed for two years. In anticipation of release of the WHO report, the following prudent and simple precautions, intended to promote precautionary efforts to reduce exposures to cell phone electromagnetic radiation, have been reviewed by UPCI experts in neuro-oncology, epidemiology, neurosurgery and the Center for Environmental Oncology

Practical Advice to Limit Exposure to Electromagnetic Radiation Emitted from Cell Phones

1. Do not allow children to use a cell phone, except for emergencies. The developing organs of a fetus or child are the most likely to be sensitive to any possible effects of exposure to electromagnetic fields.

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[1] *The Case for Precaution in the Use of Cell Phones Advice from University of Pittsburgh Cancer Institute Based on Advice from an International Expert Panel*, available at www.preventingcancernow.org

2. While communicating using your cell phone, try to keep the cell phone away from the body as much as possible. The amplitude of the electromagnetic field is one fourth the strength at a distance of two inches and fifty times lower at three feet.

   Whenever possible, use the speaker-phone mode or a wireless Bluetooth headset, which has less than $1/100^{th}$ of the electromagnetic emission of a normal cell phone. Use of a hands-free headset may also reduce exposures.

3. Avoid using your cell phone in places, like a bus, where you can passively expose others to your phone's electromagnetic fields.

4. Avoid carrying your cell phone on your body at all times. Do not keep it near your body at night such as under the pillow or on a bedside table, particularly if pregnant. You can also put it on "flight" or "off-line" mode, which stops electromagnetic emissions.

5. If you must carry your cell phone on you, it is preferable that the keypad is positioned toward your body and the back is positioned toward the outside of your body. Depending on the thickness of the phone this may provide a minimal reduction of exposure.

6. Only use your cell phone to establish contact or for conversations lasting a few minutes, as the biological effects are directly related to the duration of exposure. For longer conversations, use a land line with a corded phone, not a cordless phone, which uses electromagnetic emitting technology similar to that of cell phones.

7. Switch sides regularly while communicating on your cell phone to spread out your exposure. Before putting your cell phone to the ear, wait until your correspondent has picked up. This limits the power of the electromagnetic field emitted near your ear and the duration of your exposure.

8. Avoid using your cell phone when the signal is weak or when moving at high speed, such as in a car or train, as this automatically increases power to a maximum as the phone repeatedly attempts to connect to a new relay antenna.

9. When possible, communicate via text messaging rather than making a call, limiting the duration of exposure and the proximity to the body.

10. Choose a device with the lowest SAR possible (SAR = Specific Absorption Rate, which is a measure of the strength of the magnetic field absorbed by the body). SAR ratings of contemporary phones by different manufacturers are available by searching for "sar ratings cell phones" on the internet.

Appendix B: International Expert Advisories

The Case for Precaution in the Use of Cell Phones
Advice from University of Pittsburgh Cancer Institute Based on Advice from an International Expert Panel

ANALYSIS OF RECENT STUDIES

Electromagnetic fields generated by cell phones should be considered a potential human health risk. Sufficient time has not elapsed in order for us to have conclusive data on the biological effects of cell phones and other cordless phones—a technology that is now universal.

Studies in humans do not indicate that cell phones are safe, nor do they yet clearly show that they are dangerous. But, growing evidence indicates that we should reduce exposures, while research continues on this important question.

Manufacturers report that cell and wireless phones emit electromagnetic radiation. Electromagnetic fields are likely to penetrate the brain more deeply for children than for adults. Modeling in the diagram below estimates that young children are more susceptible to electromagnetic fields due to smaller sized brains and softer brain tissue.

1) Electromagnetic fields from cell phones are estimated to penetrate the brain especially in children. (Figure 1) [1, 2]

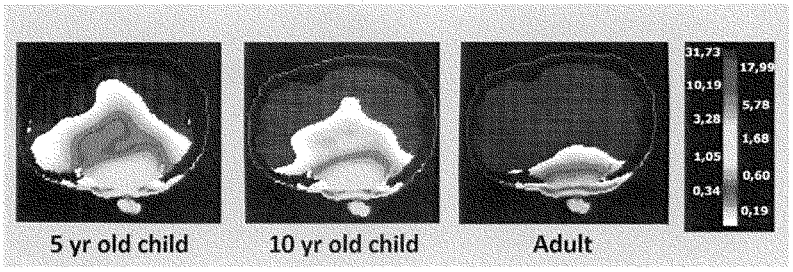

Figure 1 Model estimate of the absorption of electromagnetic radiation from a cell phone based on age (Frequency GSM 900 Mhz) (On the right, color scale showing the *Specific Absorption Rate* in W/kg)[1]

2) Living tissue is vulnerable to electromagnetic fields within the frequency bands used by cell phones (from 800 to 2200 MHz) even below the threshold of power imposed by most safety standards (1.6 W/Kg for 1g of tissue), notably an increase in the permeability of the blood-brain barrier and an increased synthesis of stress proteins. [3, 4, 5, 6]

The most recent studies, which include subjects with a history of cell phone usage for a duration of at least 10 years, show a possible association between certain benign tumors (acoustic neuromas) and some brain cancers on the side the device is used.[6, 7, 8, 9]

However, human epidemiological studies on cell phones conducted to date cannot be conclusive. Due to their recently increased use, we are not yet able to evaluate their long term impact on health. Even where an association between exposure and cancer is well established

and the risk very high -- as with tobacco and lung cancer -- under similar study conditions (in other words with people who smoked for less than 10 years) it would be difficult, if not impossible, to identify an increased risk of cancer, as the risk appears mostly 15 to 35 years later. [7].

THE TEN PRECAUTIONS

Given the absence of definitive proof in humans of the carcinogenic effects of electromagnetic fields of cell phones, we cannot speak about the necessity of *preventative* measures (as for tobacco or asbestos). In anticipation of more definitive data covering prolonged periods of observation, the existing data press us to share important prudent and simple measures of *precaution* for cell phone users, as have been variously suggested by several national and international reports. [6, 9, 10, 11, 12]

These measures are also likely to be important for people who are already suffering from cancer and who must avoid any external influence that may contribute to disease progression.

1. Do not allow children to use a cell phone except for emergencies. The developing organs of a fetus or child are the most likely to be sensitive to any possible effects of exposure to electromagnetic fields.

2. While communicating using your cell phone, try to keep the cell phone away from the body as much as possible. The amplitude of the electromagnetic field is one fourth the strength at a distance of two inches and fifty times lower at three feet.

   Whenever possible, use the speaker-phone mode or a wireless Bluetooth headset, which has less than $1/100^{th}$ of the electromagnetic emission of a normal cell phone. Use of a headset attachment may also reduce exposure.

3. Avoid using your cell phone in places, like a bus, where you can passively expose others to your phone's electromagnetic fields.

4. Avoid carrying your cell phone on your body at all times. Do not keep it near your body at night such as under the pillow or on a bedside table, particularly if pregnant. You can also put it on "flight" or "off-line" mode, which stops electromagnetic emissions.

5. If you must carry your cell phone on you, it is preferable that the keypad is positioned toward your body and the back is positioned toward the outside of your body. Depending on the thickness of the phone this may provide a minimal reduction of exposure.

6. Only use your cell phone to establish contact or for conversations lasting a few minutes as the biological effects are directly related to the duration of exposure. For longer conversations, use a land line with a corded phone, not a cordless phone, which uses electromagnetic emitting technology similar to that of cell phones.

7. Switch sides regularly while communicating on your cell phone to spread out your exposure. Before putting your cell phone to the ear, wait until your correspondent has picked up. This limits the power of the electromagnetic field emitted near your ear and the duration of your exposure.

8. Avoid using your cell phone when the signal is weak or when moving at high speed, such as in a car or train, as this automatically increases power to a maximum as the phone repeatedly attempts to connect to a new relay antenna.

9. When possible, communicate via text messaging rather than making a call, limiting the duration of exposure and the proximity to the body.

10. Choose a device with the lowest SAR possible (SAR = Specific Absorption Rate, which is a measure of the strength of the magnetic field absorbed by the body). SAR ratings of contemporary phones by different manufacturers are available by searching for "sar ratings cell phones" on the internet.

CONCLUSION

The cell phone is a remarkable invention and a breakthrough of great social importance. Our society will no longer do without cell phones. None of the members on the expert committee has stopped or intends to stop using cell telephones. This includes Dr. David Servan-Schreiber, a 16 year survivor of brain cancer. However, we, the users, must all take precautionary measures in view of recent scientific data on the biological effects of cell phone use, especially those who already have cancer.

In addition, manufacturers and service providers must also assume responsibility. It is their responsibility to provide appliances and equipment with the lowest possible risk and to constantly evolve their technology in this direction. They should also encourage consumers to use their devices in a way that is most compatible with preserving their health.

In the early 1980's, the owners of asbestos mines were reduced to bankruptcy as a result of lawsuits brought by the families of deceased exposed workers. A few years later, a key executive of Johns Manville, the most prominent company, drew lessons from the years of struggle of his industry against medical data and the scientists who were drawing attention to the risks of asbestos. He concluded with regret that greater warnings for the public, the establishment of more effective precautions, and *more extensive* medical research "could have saved lives, and probably also shareholders, the industry, and the benefits of its product." [14, 15]

We call on the cell phone companies to provide independent access to records of use so that appropriate studies can be carried out.

That is what we wish for today's cell phone industry. We do not need to ban this technology, but to adapt it – to harness it – so that it never becomes a major cause of illness.

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APPEL DE 20 EXPERTS INTERNATIONAUX CONCERNANT L'UTILISATION DES TÉLÉPHONES PORTABLES

- ANALYSE DES ÉTUDES RÉCENTES
- LES 10 PRECAUTIONS A PRENDRE

ANALYSE DES ÉTUDES RÉCENTES

Les champs magnétiques émis par les téléphones portables doivent être pris en compte en matière de santé. Il est important de s'en protéger. Dix mesures simples de précaution peuvent y aider.

A ce jour, les études épidémiologiques existantes sont insuffisantes pour conclure de façon définitive que l'utilisation des téléphones portables est associée à un risque accru de tumeurs et autres problèmes de santé.

Toutefois, il existe un consensus scientifique existe pour conclure que les études disponibles mettent en évidence :

1/ **une pénétration significative des champs électromagnétiques des téléphones portables dans le corps humain**, particulièrement au niveau du cerveau, et plus encore chez les enfants du fait de leur plus petite taille. (Figure 1.)

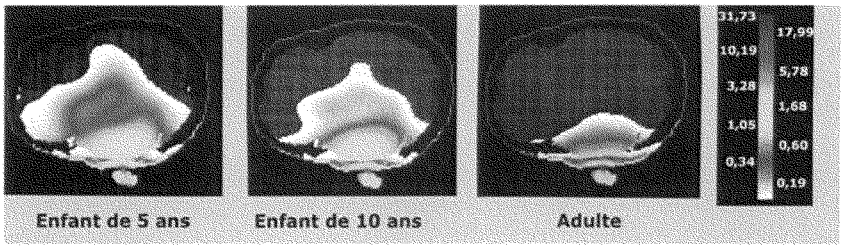

Figure 1. Estimation de la pénétration du rayonnement électromagnétique d'un téléphone portable en fonction de l'âge (Fréquence GSM 900 Mhz) (A droite, échelle du *Débit d'Absorption Spécifique* à différentes profondeurs, en W/kg) *

* Les chercheurs de l'étude INTERPHONE ont obtenu des résultats comparables avec 129 téléphones portables récents (fréquences 800 à 1800 MHz, PDC et GSM) sur les modèles de cerveau adulte mais n'ont pas évalué l'absorption des cerveaux d'enfants.

2/ **divers effets biologiques des champs électromagnétiques dans les bandes de fréquence des téléphones portables (de 800 à 2200 Mhz)** même en dessous des seuils de puissance imposés par les normes de sécurité européennes (2 W/kg pour 10g de tissu) sur les tissus vivants, notamment une augmentation de la perméabilité de la barrière hémato-encéphalique et une synthèse accrue des protéines de stress.

Du fait de la rareté de l'utilisation des portables jusqu'à ces dernières années, nous notons que les études épidémiologiques humaines réalisées jusqu'à ce jour ne peuvent avoir comporté un nombre suffisant de personnes ayant utilisé leur téléphone pendant plus de 10 ans de façon intensive (plusieurs heures par semaine).

Et l'on sait que même dans le cas où l'association d'une exposition avec un cancer est parfaitement prouvée et le risque très fort (comme pour le tabac et le cancer du poumon), des études dans des conditions similaires, à savoir sur des personnes ayant fumé pendant moins de 10 ans auraient du mal à mettre en évidence un risque augmenté de cancer du poumon : le risque apparaît surtout 15 à 35 ans plus tard. .

Les études les plus récentes qui incluent des utilisations de téléphone portable pendant plus de 10 ans montrent une association probable avec certaines tumeurs bénignes (neurinomes du nerf acoustique) et certains cancers du cerveau, plus marquée *du coté d'utilisation de l'appareil.*[*]

LES 10 PRECAUTIONS A PRENDRE

Compte tenu de l'absence de preuve absolue chez l'être humain d'un effet cancérogène des ondes électromagnétiques émises par les téléphones portables nous ne pouvons pas parler de la nécessité de mesures de *prévention* (comme pour le tabac ou l'amiante). Dans l'attente de données définitives portant sur des périodes d'observations prolongées, les résultats existants imposent que l'on fasse part aux utilisateurs des mesures les plus importantes de *précaution* comme l'ont aussi suggéré plusieurs rapports nationaux et internationaux [**]

Ces mesures sont aussi importantes pour les personnes qui sont déjà atteintes d'un cancer afin d'éviter toute influence extérieure qui pourrait contribuer à la progression de leur maladie.

1. N'autorisez pas **les enfants de moins de 12 ans** à utiliser un téléphone portable sauf en cas d'urgence. En effet, les organes en développement (du foetus ou de l'enfant) sont les plus sensibles à l'influence possible de l'exposition aux champs électromagnétiques.
2. Lors de vos communications, essayez autant que possible de **maintenir le téléphone à plus d'1 m du corps** (l'amplitude du champ baisse de quatre fois à 10 cm, et elle est cinquante fois inférieure à 1 m de distance – voir figure 2).

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[*] Le risque pour ces personnes pourrait être près de deux fois celui des non-utilisateurs, voire plus.

[**] Les rayonnements électromagnétiques des antennes relais et des émetteurs WIFI sont beaucoup plus faibles que ceux des téléphones portables. Nous limitons pour cette raison nos recommandations actuelles à l'utilisation des téléphones.

Dès que possible, utilisez **le mode « haut-parleur »,** ou un **kit mains libres équipé d'un tube à air** dans ses derniers 20 cm qui semble moins conduire les ondes électromagnétiques qu'un kit mains libres filaire traditionnel,** ou une **oreillette bluetooth** (moins d'1/100e de l'émission électromagnétique du téléphone en moyenne – mais attention de ne pas la conserver constamment à l'oreille en période de veille).

3. Restez à plus **d'un mètre de distance d'une personne en communication**, et évitez d'utiliser votre téléphone portable dans des lieux publics comme **le métro, le train ou le bus** où vous exposez passivement vos voisins proches au champ électromagnétique de votre appareil.

4. **Evitez le plus possible de porter un téléphone mobile sur vous**, même en veille. Ne pas le laisser à proximité de votre corps la nuit (sous l'oreiller ou sur la table de nuit) et particulièrement dans le cas des **femmes enceintes** – ou alors le mettre en mode « avion » ou « hors ligne/*off line* » qui a l'effet de couper les émissions électromagnétiques.

5. Si vous devez le porter sur vous, assurez-vous que la **face « clavier » soit dirigée vers votre corps** et la face « antenne » (puissance maximale du champ) vers l'extérieur.

6. N'utilisez votre téléphone portable que pour **établir le contact** ou pour **des conversations de quelques minutes seulement** (les effets biologiques sont directement liés à la durée d'exposition). Il est préférable de rappeler ensuite d'un téléphone fixe *filaire* (et non d'un téléphone sans fil --DECT)-- qui utilise une technologie à micro-ondes apparentée à celle des portables).

7. Quand vous utilisez votre téléphone portable, **changez de coté régulièrement,** et avant de mettre le téléphone portable contre l'oreille, **attendez que votre correspondant ait décroché** (baisse de la puissance du champ électromagnétique émis).

8. **Evitez d'utiliser le portable lorsque la force du signal est faible** ou lors de déplacements rapides comme **en voiture ou en train** (augmentation maximale et automatique de la puissance lors des tentatives de raccordement à une nouvelle antenne relais ou à une antenne distante)

9. **Communiquez par SMS** plutôt que par téléphone (limite la durée d'exposition et la proximité du corps).

10. **Choisissez un appareil avec le DAS le plus bas possible** par rapport à vos besoins (le « Débit d'Absorption Spécifique » mesure la puissance absorbée par le corps). Un classement des DAS des téléphones contemporains des différents fabricants est disponible sur www.guerir.fr et d'autres sites internet.

** Certains kits avec tube à air peuvent être commandés sur internet en faisant une recherche sur « *air tube headset* ». Les données sur les kits mains libres filaires sans tube à air sont encore trop imprécises pour en garantir l'efficacité. De plus, une étude récente a observé le même risque accru de tumeurs de la parotide chez les utilisateurs fréquents de téléphones portables, qu'ils utilisent ou non un kit piéton filaire traditionnel.

CONCLUSION

Le téléphone portable est une invention remarquable et une avancée sociétale importante. Nous ne nous en passerons plus. Aucun des membres du comité d'experts ci-dessous n'a renoncé à l'utilisation d'un téléphone portable. Même moi (DSS), porteur d'un cancer au cerveau, je ne m'en passerai plus. En revanche, nous, les **utilisateurs**, devons tous prendre les mesures de *précaution* qui s'imposent aux vues des données scientifiques récentes sur leurs effets biologiques, particulièrement si nous sommes déjà porteur d'un cancer avéré.

Par ailleurs, **les constructeurs et les opérateurs** doivent aussi prendre leurs responsabilités. Il leur revient de fournir aux utilisateurs des appareils et des équipements qui permettent le plus bas niveau de risque possible et de faire constamment évoluer la technologie dans ce sens. Ils doivent aussi encourager les consommateurs à utiliser leurs appareils de la façon la plus compatible avec la préservation de leur santé.

Au début des années 1980, lorsque les propriétaires des mines d'amiante se sont vus réduits à la banqueroute sous l'effet des procès des familles des personnes décédées à cause de leur exposition professionnelle, Johns Manville, le plus important d'entre eux, a tiré les leçons de ses années de lutte contre les données médicales et scientifiques qui mettaient en cause son industrie. Il concluait, avec regrets, que *davantage d'avertissements* appropriés pour le public, la mise en place de *précautions plus efficaces*, et *davantage* de recherche médicale « auraient pu sauver des vies, et probablement les actionnaires, l'industrie, et du coup les bienfaits de son produit. »

C'est ce que nous souhaitons aujourd'hui à l'industrie du téléphone portable. Il ne s'agit pas de bannir cette technologie, mais de l'adapter – de la maîtriser – afin qu'elle ne devienne *jamais* une cause majeure de maladie.

Appendix C: Overview of Biological Impacts of Radio Frequency

Overview of Biological impact of RF - Mechanisms

Effect on Genotoxic effect and DNA Damage

RF may be considered genotoxic, cause DNA damage including single and double strand breaks and cross-link, and micronucleus formation. Of 28 total studies on RF exposure and DNA damage, 14 studies reported significa total studies on RF radiation and micronucleation, 16 studies reported effects (55%). Of 21 total studies on chro damage from RF radiation, 13 studies (62%) reported significant effects.

Selected Significant Study Findings	Refe
Exposed mice to 900-MHz RF radiation at a SAR of 0.09 W/kg for 7 days at 12 h per day. A significant damage to both the mitochondrial genome and the nuclear -globin locus was found.	Aitke
Increases in DNA strand breaks and micronucleation in lymphocytes obtained from cell phone users.	Gand
Human fibroblasts and rat granulosa cells were exposed to mobile phone signal (1800 MHz; SAR 1.2 or 2 W/kg; during 4, 16 and 24 h; intermittent 5 min on/10min off or continuous). Effects occurred after 16 h exposure in both cell types. The intermittent exposure showed a stronger effect than continuous exposure.	Diem
Increases in single and double strand DNA breaks in brain cells of rats exposed for 2 hrs to 2450-MHz field at 0.6-1.2 W/kg.	Lai a 2005
An increased in single strand breaks in brain cells of rats after 35 days of exposure to 2.45 and 16.5 GHz fields at 1 and 2.01 W/kg.	Paulr
Exposed male rats to 2.45 GHz RFR fields for 2 hours daily, 7 days a week, at 5-10 mW/cm2 for up to 30 days. Erythrocyte count, haemoglobin and haematocrit were increased in peripheral blood on irradiation days 8 and 15. Anuclear cells and erythropoietic precursor cells were significantly decreased in the bone marrow on day 15, but micronucleated cells were increased.	Buslj
GSM microwaves at 915 MHz did not induce DNA double stranded breaks or changes in chromatin conformation, but affected expression of genes in rat brain cells.	Belya
Human peripheral blood lymphocytes were exposed to continuous 830-MHz EMFs (1.6-8.8 W/kg for 72 hr) showed a SAR dependent chromosome aneuploidy, a major "somatic mutation leading to genomic instability and thereby to cancer. It is suggesting that epigenetic alterations are involved in the SAR dependent genetic toxicity. The effects were non-thermal.	Mash

Effect on Stress Response (Stress Proteins)

The stress response enables cells to survive environmental stressors with the aid of heat shock proteins (HSP). It thermal power (ELF), and non-thermal RF, as well as thermal RF-EMFs. It has been shown that RF stimulates t and cells start to synthesize stress proteins in many different kinds of cells. Safety standards must be developed damage at nonthermal levels, and the standards must be defined in terms of a non-thermal biological dose.

Selected Significant Study Findings	Refe
EMF may affect electron distribution and movement in DNA, and help it to come apart to initiate protein synthesis. Charge transport through DNA depends on the DNA sequence, and there are reasons to believe that EMFs would cause the DNA to come apart at the EMF consensus sequence, nCTCTn.	Shao Blanl
Genotoxic effects were produced in fibroblasts, granulosa cells and HL60 cells by RF field exposure at SARs between 0.3 and 2W/kg. The expression and phosphorylation of the stress protein hsp27 was one of the many proteins affected.	REFI
The stress response threshold can be stimulated in both ELF and RF frequency ranges appears to suggest that the threshold is independent of EMF energy.	Lai a
The separation of thermal and non-thermal mechanisms had been shown, where chromosomal damage observed under RF in lymphocytes was not seen when the cells were exposed to elevated temperatures.	Mash
The molecular damage stimulated by non-thermal ELF fields occurs in the absence of an increase in temperature. ELF energy thresholds are estimated to be about 10^{-12} W/kg, over a billion times lower than the thermal stimuli that cause damage in the RF range.	Blanl
The importance of non-thermal mechanisms was showing that both denaturation and renaturation of β-lactoglobulin are accelerated by microwave EMF. It has also been shown that microwave radiation causes protein aggregation without bulk heating.	Bohr de Pc
Cellular processes are unusually sensitive to non-thermal ELF frequency fields, in the range of 0.5 to 1.0 μT, not very much higher than the environmental backgrounds of ~0.1μT. The low biological thresholds in the non-thermal ELF range undermine claims that an EMF must increase the temperature in order to cause changes in cells or cause DNA damage.	Blanl 1998 Cara 2005
In addition to very low thresholds, exposure durations do not have to be very long to be effective. It has been shown a full response to an occurred with ELF modulated 915MHz sine waves, when cells were exposed for only 10sec.	Litov

Effect on Immune System

Both human and animal studies reported immunological changes with exposure to environmental levels of EMF physiological changes (mast cells increases) that are bedrock indicators of allergic response and inflammatory c EMF exposures. It is possible that chronic provocation by exposure to EMF can lead to immune dysfunction, ch inflammatory responses and ill health if they occur on a continuing basis over time.

Selected Significant Study Findings	Refe
Assessed immunoglobulin concentrations and T-lymphocyte subsets in workers of TV re-transmission and satellite communication centers, increase in IgG and IgA concentrations, increased count of lymphocytes and T8 lymphocytes, decreased count of NK cells and a lower value of T-helper/T-suppressor ratio were found.	Dmo
Mast cells occur in the brain and their presence may under the influence of EMF and/or RF radiation exposure lead to chronic inflammatory response by the mast cell degranulation.	Zhua
For women exposed to EMF induced by radiotelevision broadcasting stations in residential area at least 2 years, a significant reduction of blood NK CD16+-CD56+, cytotoxic CD3(-)- CD8+, B and NK activated CD3(-)-HLA-DR+ and CD3(-)-CD25+ lymphocytes were found.	Bosc
Exposed mononuclear cells isolated from peripheral blood of healthy donors to 1,300 MHz pulse-modulated microwaves at 330 pps with 5 μs pulse width and the value of SAR = 0.18 W/kg. Pulse-modulated microwaves represent the potential of immunotropic influence, stimulating preferentially the immunogenic and proinflammatory activity of monocytes at relatively low levels of exposure.	Dabr
It was estimated that the proportion of individuals in Switzerland with electrical hypersensitivity (EHS) symptoms is about 5%. Based on a study of EHS in the UK, symptoms reported by mobile phone users included headaches (85%), dizziness (27%), fatigue (24%), nausea (15%), itching (15%), redness (9%), burning 61%), and cognitive problems (42%).	Roos Cox,
It was reported that non-thermal microwave exposure from GSM mobile phones at lower levels than the International Commission for Non-Ionizing Radiation Protection (ICNIRP) safety standards affect chromatin conformation and 53BP1/γ-H2AX foci among EHS adults.	Mark
It was reported that EMF from mobile phones affects the synchronization of cerebral rhythms. The finding suggested that prolonged exposure to mobile phone emissions affect cortical activity and the speed of neural synchronization by interhemispherical functional coupling of EEG rhythms.	Vecc

RF and Reactive Oxidative Species (ROS)

Several factors influence the susceptibility to oxidative stress by affecting the antioxidant status or free oxygen r
Radiofrequency fields of cellular phones may affect biological systems by increasing free radicals, which appea
peroxidation, and by changing the antioxidase activities of human blood thus leading to oxidative stress. Acute e
commercially available cellular phones may modulate the oxidative stress of free radicals by enhancing lipid per
activation of superoxide dismutase (SOD) and total glutathione peroxidase (GSH-Px), which are free radical sca
2001)

RF and gene expression

It was found that some genes were up-regulated during the RF exposure which mainly involved in the following
the basis of reported literatures: cytoskeletal structure, signal transduction pathway, ion channel, complement ac
genes, cell adhesion, etc., whereas oxidation and deoxidization, immediately early genes, transcription factors, p
connexon were down-regulated by clustering analyses. Gene expression of rat neuron could be altered after expo
at a frequency of 1800 MHz modulated by 217 Hz which is commonly used in cell phone. Among 1200 candida
genes and 10 down-regulated genes were identified after 24-h intermittent exposure at an average SAR of 2 W/k

RF and Reproductive System

Animal studies indicate that EMW may have a wide range of damaging effects on the testicular function and ma
1999 and Davoudi et al., 2002). Recently, decreased sperm account has been reported (Agarwal et al.,2008). Me
phones the most had significant poorer sperm quality than those who used them the least. The lowest average sp
men who had the most cell phone use (more than four hours a day).

Overview of Biological Impacts of RF - Epidemiologic Evidence

Study	Population	Period	Study type	No of cases	No of Controls	OR (95% CI)	Cell phone exp
Inskip et al., 2001	USA	1994–1998	Case–control	22	172	1.0 (0.5 – 1.9)[1]	Regular use (at
				5	31	1.9 (0.6 – 5.9)[1]	≥ 5 years of re
				9	51	1.4 (0.6 – 3.5)[1]	> 100 hours of
Muscat et al., 2002	USA	1997–1999	Case–control	11	6	1.7 (0.5 – 5.1)	3–6 years of re cell phone serv
				9	12	0.7 (0.2 – 2.6)	> 60 total hour
Christensen et al., 2004	Denmark	2000–2002	Case–control	45	97	0.9 (0.5 – 1.6)	Regular use (m
				9	25	0.7 (0.3 – 1.9)	> 5 years (> 81
Lönn et al., 2004	Sweden	1999–2002	Case–control	89	356	1.0 (0.6 – 1.5)	Regular use (m
				12	15	3.9 (1.6 – 9.5)	≥ 10 years sinc
Schoemaker et al., 2005	4 Nordic countries, UK	1999–2004	Case–control	360	1934	0.9 (0.7 – 1.1)	Regular use (h months more th
				23	72	1.8 (1.1 – 3.1)	≥ 10 lifetime y
Hardell et al., 2002	Sweden	1997-2000	Case-Control	38	11	3.5 (1.8 – 6.8)	> 1-year latenc
Hardell et al., 2005	Sweden	2000-2003	Case-Control	20	79	2.0 (1.05 – 3.8)	> 1-year latenc
				53	343	4.2 (1.8 – 10)	> 1-year latenc
Hardell et al., 2006	Sweden	1997–2003	Case–control	68	297	2.9 (2.0 – 4.3)	> 1-year latenc
				105	776	1.5 (1.1 – 2.1)	> 1-year latenc
				19	84	3.1 (1.7 – 5.7)	≥ 10-year laten
				36	189	2.2 (1.4 – 3.4)	> 1000 hours c
Takebayashi et al., 2006	Japan	2000–2004	Case–control	51	192	0.7 (0.4 – 1.2)	Regular mobil least 6 months
				4	12	0.8 (0.2 – 2.7)	> 8 years cumu
				7	28	0.7 (0.3 – 1.9)	> 900 hours cu
Schüz et al., 2006	Denmark	1982–2002	Cohort	32	43.7	0.7 (0.4 – 1.03)[2]	Regular use (u
				28	42.5	0.7 (0.4 – 0.95)	≥ 10 years use
Klaeboe et al., 2007	Norway	2001-2002	Case–control	22	227	0.5 (0.2 – 1.0)	Regular use (u for at least 6 m
				8	67	0.5 (0.2 – 1.4)	> 6-year latenc
				7	56	0.6 (0.2 – 1.8)	>425 hours cur
Hardell et al., 2008	Sweden		Meta-analysis	824	4261	0.9 (0.7 – 1.1)	Regular cell ph
				83	355	1.3 (0.6 – 2.8)	Using cell pho

1. Relative Risk 2. Standardized incidence ratio (SIR) was calculated based on observed and expected numbers; 3. Based on
4. Based on 4 case-control study (Lönn et al 2004, Christensen et al. 2004, Schoemaker et al. 2004, and Hardell et al., 2006)

Overview of Biological Impacts of RF – Epidemiologic Study (continued)

Study	Country	Period/study	Type of Tumor	No of cases	No of Controls	OR (95% CI)	Cell phone exp
Inskip et al., 2001	USA	1994–1998	Glioma	172	85	0.8 (0.6 – 1.2)[1]	Regular cell ph
		Case–Control		31	11	0.6 (0.3 – 1.4)[1]	≥ 5 years of reg
			Meningioma	172	32	0.8 (0.4 – 1.3)[1]	Regular cell ph
				31	6	0.9 (0.3 – 2.7)[1]	≥ 5 years of reg
			All brain	172	139	0.8 (0.6 – 1.1)[1]	Regular cell ph
			tumors	31	22	0.9 (0.5 – 1.6)[1]	≥ 5 years of reg
Hardell et al., 2002	Sweden	1997-2000	Meningioma	9	2	4.5 (0.9 – 20.8)	> 1-year latency
		Case-Control		11	14	0.8 (0.4 – 1.7)	> 1-year latency
			All benign	49	13	3.8 (2.0 – 6.9)	> 1-year latency
			tumors	35	34	1.0 (0.6 – 1.7)	> 1-year latency
Hardell et al., 2005	Sweden	2000-2003	Meningioma	74	160	1.7 (1.1 – 2.6)	> 1-year latency
		Case-Control		20	39	2.2 (1.1 – 4.3)	> 1-year latency
			All benign	218	343	1.5 (1.1 – 2.1)	> 1-year latency
			tumors	62	79	2.4 (1.5 – 3.9)	> 1-year latency
				200	305	1.5 (1.1 – 2.0)	> 1-year latency
Hardell et al., 2006	Sweden	1997–2003	Meningioma	113	297	1.3 (0.99 – 1.7)	> 1-year latency
		Case–control		295	776	1.1 (0.9 – 1.31)	> 1-year latency
				34	84	1.6 (1.02 – 2.5)	≥ 10-year latenc
				60	102	1.6 (1.1 – 2.2)	> 1000 hours cu
			All benign	199	297	1.6 (1.3 – 2.0)	> 1-year latency
			tumors	437	776	1.2 (0.96 – 1.4)	> 1-year latency
				57	84	1.8 (1.2 – 2.6)	≥ 10-year latenc
				84	102	1.6 (1.2 – 2.2)	> 1000 hours cu
Schüz et al., 2006	Denmark	1982–2002	Glioma	257	253.9	1.0 (0.9 – 1.1)[2]	Regular cell ph
		Cohort	Meningioma	68	79.0	0.7 (0.5 – 1.0)	Regular cell ph
Klaeboe et al., 2007	Norway	2001-2002	Glioma	161	227	0.6 (0.4 – 0.9)	Regular cell ph
		Case–control		55	61	0.7 (0.4 – 1.2)	> 6-year latency
				49	54	0.7 (0.4 – 1.3)	>425 hours cum
			Meningioma	96	227	0.8 (0.5 – 1.1)	Regular cell ph
				28	50	1.2 (0.6 – 2.2)	> 6-year latency
				18	49	0.9 (0.4 – 1.7)	>425 hours cum

1. Relative Risk 2. Standardized incidence ratio (SIR) was calculated based on observed and expected numbers

Overview of Biological Impacts of RF – Epidemiologic Study (continued)

Study	Country	Period/study	Type of Tumor	No of cases	No of Controls	OR (95% CI)	Cell phone expos
Auvinen et al., 2002	Finland	1996 Case–Control	Gliomas	172	921	2.1 (1.3 – 3.4)	Ever use analogu
				188	938	1.0 (0.5 – 2.0)	Ever use digital c
			Meningioma	121	615	1.5 (0.6 – 3.5)	Ever use analogu
				126	623	0.7 (0.2 – 2.6)	Ever use digital c
			All brain	358	90	1.6 (1.1 – 2.3)	Ever use analogu
			tumors	382	96	0.9 (0.5 – 1.5)	Ever use digital c
Johansen et al., 2001	Denmark	1982-1995 Cohort	Glioma	66	70	0.9 (0.7 – 1.2)	Regular cell phoi
			Meningioma	16	18.6	0.9 (0.5 – 1.4)	Regular cell phoi
			Brain and	84	81	1.0 (0.8 – 1.3)	Analogue cell ph
			nervous	20	15	1.3 (0.8 – 2.1)	Analogue and di
			tumors	50	56.1	0.9 (0.7 – 1.2)	Digital cell phon
Muscat et al., 2000	USA	1994-1998 Case-Control	Brain Cancer	13	20	0.7 (0.3 – 1.4)	Frequent handhe
				14	19	0.7 (0.3 – 1.4)	> 480 hours cum
Schüz et al., 2006	Germany	2000-2003 Case-Control	Glioma	138	283	0.98 (0.7 – 1.3)	Regular cell phoi
				51	91	1.1 (0.8 – 1.7)	≥ 5-year of regul
				34	74	1.0 (0.6 – 1.6)	Lifetime duratio
			Meningioma	104	234	0.8 (0.6 – 1.1)	Regular cell phoi
				23	50	0.9 (0.5 – 1.5)	≥ 5-year of regul
				24	44	1.0 (0.6 – 1.8)	Lifetime duratio
Hepworth et al., 2006	England	2000-2004 Case-Control	Glioma	966	1716	0.9 (0.8 – 1.1)	Regular mobile p
				66	112	0.9 (0.6 – 1.3)	≥ 10-year of regu
				278	486	1.2 (1.0 – 1.5)	Ipsilateral mobil
				199	491	0.8 (0.6 – 0.9)	Contralateral mo
Lahkola et al., 2007	5 North European countries	2000-2004 Case-Control	Glioma	1496	3134	0.8 (0.7 – 0.9)	Regular mobile p
				629	88	0.9 (0.7 – 1.3)	≥ 10-year of regu
			Globlastoma	698	3134	0.8 (0.6 – 0.9)	Regular mobile p
				330	38	0.8 (0.5 – 1.2)	≥ 10-year of regu

1. Standardized incidence ratio (SIR) was calculated based on observed and expected numbers

Summary of weakness and strength of reviewed articles use of cell phone and acoustic r

Study	Strength	Weakness
Inskip et al 2001	Cumulative use was calculated as the product of the duration of regular phone use. The relative risk (RR) were adjusted for several matching variables	Small sample size and inadequat AN. Limited to capture historica heavy exposures. Misclassificati
Muscat et al. 2002	Interviews were performed in person (only one was replied by spouse). The odds ratios were adjusted for several variables including occupational categories.	Definition of regular use can't as phone use, not can response freq term risk measurements.
Christensen et al. 2004[a,b]	The study has power of 75% to detect a doubling risk of AN with a latency 5-year or more. Standardized face-to-face interviews diminished recall bias. Lifetime cumulative use was calculated.	Definition of regular use. High r death. Retrospective case ascerta bias. Lack of information on con
Lönn et al 2004[b]	Control selection was adjusted of their reference dates to ensure that control did not have a longer exposure. Use of analog and digital mobile phones was analyzed separately.	Definition of regular use. Selecti lower response rate among contr control selection.
Schoemaker et al. 2005[b]	Statistical power was high in the larger case-control studies. Lifetime cumulative exposure was calculated. Excluding subjects who reported having radiotherapy.	Definition of regular use. Selecti lower response rate among contr recall bias and changes of cell ph
Hardell et al. 2002, 2005, 2006	Observational bias was reduced by blinding interviewers and data coding. Relatively higher case number and only living cases were included to obtain higher data quality. Long latency of cell phone use was available in the 2006 publication.	Recall bias and misclassification Excluding death cases may unde tumors. Statistical uncertainty du interval.
Takebayashi et al. 2006 [b]	Two indices were considered including cumulative length of use and cumulative call time.	Definition of regular use. Small Participation rate is different am selection bias.
Schüz et al. 2006	The only one cohort study with large population. The mean time since first cell phone subscription was 8-years. Objective measure of exposure and subscription years was derived from the network provider.	Definition of regular use. Exclud who may have higher exposures. calculated. Misclassification of e
Klaeboe et al. 2007[b]	Any substantial change in use that longer than 6 months was reported. Cumulative use was calculated.	Definition of regular use. Small Selection bias due to a 30% non- and controls.

a. First result from the Danish portion of the INTERPHONE project. b. Participants of the INTERPHONE STU

Appendix D: Cell Phone-Related Biological and Health Risks

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Cell phone radiation poses a serious biological and health risk:

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7/5/01

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The Issue:

Thousands of people are using cell phones for hours each day. They are exposing a very sensitive organ, their brain, to higher mean intensities than military personnel are exposed to when repairing radar. The military personnel show significant increases in cancer and a wide range of illnesses. Even at the very low mean levels that people experience living within 10 km of radio and TV towers, significant increases in cancer has been observed.

Analogue cell phones emit an analogue modulated RF/MW signal similar to an FM radio or TV signal. The digital cell phones radiate a pulse RF/MW signal similar to radar. Biological and epidemiological effects from EMR exposure across the spectrum show the same or similar effects.

Many people continue to drive while talking on their cell phones. Attention deficit and neurological effects on the user's brain make accidents much more likely.

Very young children and teenagers are becoming regular to heavy users of cell phones while their brains and bodies are in a much more vulnerable state than elderly people. With cancer and neurodegenerative disease latencies of decades, the possible adverse effects will take some time to become evident. By which time it will be too late for thousands of people.

There is growing concern about cell phone interference with cardiac pacemakers. If cell phone signals can interfere with an electronic pacemaker, then it is likely to also interfere with human hearts that are arrhythmically unstable.

Biophysical Principles:

Radiant energy is absorbed into human bodies according to three main processes. The first is the Aerial Effect where bodies and body parts receive and absorb the RF/MW signal with resonant absorption that is a function of the size of the body parts and the wavelength of the RF/MW signal. For an adult male about 1.8 m tall the optimal absorption frequency is close to 70 MHz, Figure 1. This has a wavelength of 4.3m. The body acts like a half-wave dipole interacting strongly with a half wavelength close to the body size. A monkey interacts with a wavelength of 1m and a half wavelength of 0.5m. This is similar to the absorbency of a human child.

The Aerial effect also relates to body parts such as arms and heads. A typical adult head has a width of 15 cm. This is a half wavelength for a 1 GHz microwave signal, close to that used by most cell phones.

PICTURE MISSING

Figure 1: Average SAR for 3 species exposed to 10 W/m^2 with E vector parallel to the long axis of the body, from Durney et al. (1978).

Cellphone-type radiation is in the 0.9 to 1.8 GHz range, i.e. 0.9×10^9 to 1.8×10^9 Hz. Hence according to Figure 1 neither children nor adults are close to the optimum absorption rate but babies and infants bodies, whose dimensions lie between "monkey" and "mouse", are close to the optimal absorption for cell phone-type radiation.

A person with a height h (m), acting as an aerial in an RF electric field E (V/m) at a carrier frequency f (MHz), has a current induced in them which flows to earth through their feet, given by, Gandhi et al. (1985):

$$I_h = 0.108\ h^2\ E\ f\ \ (mA)$$

This induced current flows mainly through high water content organs. In flowing to ground the current passes through the ankles. These consist mainly of low conductivity bones and tendons and have an effective cross-sectional area of 9.5 cm^2 for an adult, despite the actual physical area is of the order of 40 cm^2. The formula for I_h also allows for the effective absorption area of the person, which is somewhat greater than their actual cross-sectional area, because of the attraction of the surrounding field to an earthed conductor. These aerial considerations are more pertinent to whole-body exposures to cell sites.

Cell phone aerials form digital phones typically occupy the length of the body of the phone and extend a few centimeters out of the top of the phone body. Cellphone radiation for the phone's aerial is quite close to the user's head and can be intense enough to cause a warming sensation.

PICTURE MISSING

Figure 2: The dielectric constant and conductivity of typical biological tissue as a function of frequency, Schwan (1985).

The second mechanism involves the coupling of the signal to the tissue as the signal penetrates the tissue and interacts with the cells and layers of tissue. This process is related to the dielectric constant and conductivity of the tissue types, which vary significantly with the carrier frequency, Figure 2.

The third biophysical absorption process involves resonant absorption by biological systems in the brain and cells. Resonant absorption occurs when a system with a natural frequency is stimulated by an imposed signal of a similar frequency or harmonic frequency. Radio and TV receivers use both the aerial principle and the resonant absorption principle. The aerial resonantly absorbs the carrier frequency and carries it as an induced current to the receiver. Here a tuned circuit oscillating at the same frequency resonantly absorbs the carrier wave and uses decoding circuitry

to extract the encoded message contained in the amplitude, frequency or digital modulation imprinted on the carrier wave.

PICTURE MISSING

Figure 3: Comparison of the frequency spectra of the human EEG from 260 young males showing the 5%, 50% and 95%ile bands, adapted from Gibbs and Gibbs (1951), and Schumann Resonance peaks, from Polk (1982).

Figures 4 and 5 confirm the relationship shown in Figure 3, using independently derived spectra of the daytime human EEG, Figure 4 and the Schumann Resonance spectrum, Figure 5. The figures have been aligned to have a common horizontal frequency scale.

PICTURE MISSING

Figure 4: A typical EEG spectrum, with the Schumann Resonance peaks superimposed.

PICTURE MISSING

Figure 5: Daytime Schumann Resonance Spectrum, Polk (1982).

Figures 3-5 show that the frequency range of the primary peaks of the Schumann Resonances coincide with the frequency range of the human EEG. Upper Schumann peaks also associated with small peaks in the EEG. This shows a resonant interaction and supports the probability of an actual use by the brain or the Schumann Resonance signal. Figure 6 shows that this occurs in a study showing a significant dose-response correlation between the intensity of the 8-10 Hz Schumann Peak and human reaction times.

PICTURE MISSING

Figure 6: Human reaction times as a function of Schumann Resonance 8-10 Hz Relative Intensity, for 49,500 subjects tested during 18 days in September 1953, at the German Traffic exhibition in Munich. Derived from data in Figure 3 of König (1974b). Trend: $t = 10.414$, 2-tailed $p<0.001$.

Cellphone radiation is shown to interact with human EEG patterns and to alter them and to change reaction times. The GSM signal has a pulse frequency of 217 Hz and a modulation at 8.34 Hz. This is in the Schumann Resonance and EEG spectral primary frequency range.

Effects shown for electromagnetic radiation, especially radio and radar signals, but also electrical occupations:

Such signals have been shown to:

Neurological Activity:

- • Alter brain activity, including EEG and reaction times, memory loss, headaches, fatigue and concentration problems, dizziness (the Microwave Syndrome), Gordon (1966), Deroche (1971), Moscovici et al. (1974), Lilienfeld et al. (1978), Shandala et al. (1979), Forman et al. (1982), Frey (1998).

- • Impair sleep and learning, Altpeter et al. (1995), Kolodynski and Kolodynska (1996)
- • Increase permeability of the blood brain barrier (a mechanism for headache), Frey et al. (1975), Alberts (1977, 1978) and Oscar and Hawkins (1977).
- • Alter GABA, Kolomytkin et al. (1994).
- • Increase neurodegenerative disease including Alzheimer's Disease, Sobel et al. (1995, 1996), Savitz et al. (1998a,b)
- • Highly significant Increased permeability of the blood brain barrier for 915 MHz radiation at SAR =0.016-0.1 (p=0.015) and SAR = 0.1-0.4 (p=0.002); Salford et al. (1994).
- • Increase the Suicide Risk, Baris and Armstrong (1990), Perry et al. (1991), Van Wijngaarden et al. (2000).

Cardiological Activity:

- • Alter blood pressure and heart rhythm (heart rate variability) Bortkiewicz et al. (1995, 1996, 1997) and Szmigielski at al (1998).
- • Increases Heart Disease and heart attack mortality, Forman et al. (1986), Hamburger, Logue and Silverman (1983), Savitz et al. (1999)

Immune System Activity:

- • Impairs the immune system Quan et al. (1992), Dmoch and Moszczynski (1998), Bruvere et al. (1998)

Reproductive Activity:

- • Reduces sperm counts in radar exposed military personnel, Weyandt et al. (1996)
- • Increases miscarriage and congenital abnormalities, Kallen et al. (1982), Larsen et al. (1991), Ouellet-Hellstrom and Stewart (1993).
- • Doubles the incidence of twins in the families of radar exposed personnel, Flaherty (1994).
- • Significantly alters the leaf structure of plants exposed to a radar, Magone (1996).
- • Significantly reduces the radial growth of pine trees, Balodis et al. (1996).

- • Reduced fertility of mice exposed to an RF field (27.12 MHz), Brown-Woodman et al. (1989).

- • Increased fetal/embryo lethality in mice exposed to 2.45 GHz microwaves, Nawrot, McRee and Galvin (1985).

- • Radio exposures completely cause complete infertility in mice over 3 to 5 generations at mean exposure levels of 1.05 and 0.17$\mu W/cm^2$, respectively, Magras and Xenos (1997).

Genotoxic Activity:

- • Reduce melatonin and alter calcium ions, Abelin (1999), Burch et al. (1997, 1999) Bawin and Adey (1976), Blackman et al. (1988, 1989, 1990).

- • Enhances heat shock proteins at extremely low exposure levels in a highly reproducible manner showing that they are not stimulated by heat but in reaction to a 'toxic' protein reaction, Daniells et al. (1998), and down to 0.001W/kg (0.34$\mu W/cm^2$) using 750MHz microwaves, de Pomerai (2000).

- • Damages chromosomes. Heller and Teixeira-Pinto (1959), Tonascia and Tonascia (1966), Yao (1982), Garaj-Vrhovac et al. (1990, 1991, 1992, 1993, 1999), Timchenko and Ianchevskaia (1995), Balode (1996), Haider et al. (1994) and Vijayalaxmi et al. (1997) have reported significant chromosome aberrations from RF/MW exposures. In the Mar/Apr 1999 edition of Microwave News it is reported that Drs Tice, Hook and McRee

- • Alters DNA, Ali and Behari (1994).

- • Breaks DNA strands, Lai and Singh (1995, 1996, 1997).

- • Alters gene transcription activity, Phillips et al. (1992, 1993).

- • Neoplastically transform cells, Balcer-Kubiczek and Harrison (1991).

- • Enhances cell death in a dose response manner for signal intensity and exposure time, Garaj-Vrhovac et al. (1991).

- • Enhances cell proliferation in a dose-response manner for exposure time, Mattei et al. (1999).

- • Enhances Ornithine Decarboxylase (ODC) activity, a measure of cell proliferation rate, Byus et al. (1988), Litovitz et al. (1997).

- • Enhances free radicals, Phelan et al. (1992).

- • Increased cancer in rats and mice, Prausnitz and Susskind (1962), Szmigielski et al. (1988) and Chou et al. (1992)

Cancer Epidemiology:

- • Increase the incidence of many types of cancer, including leukaemia, brain tumor, testicular cancer, genitourinary and breast cancer, Robinette et al. (1980), Milham (1985, 1988), Szmigielski (1996), Hocking et al. (1996), Dolk et al. (1997 a, b), Beall et al. (1996), Grayson (1996), Thomas et al. (1987), Lilienfeld et al. (1978), Zaret (1989), Davis and Mostofl (1993), Hayes et al. (1990), Tynes et al. (1996), Cantor et al. (1995), and many others.

These biological and health effects are consistent with the biological understanding that brains, hearts and cells are sensitive to electromagnetic signals because they use electromagnetic signals for their regulation, control and natural processes, including those processes monitored by the EEG and ECG. There is overwhelming evidence that EMR is genotoxic, alters cellular ions, neurotransmitters and neurohormones, and interferes with brain and heart signals, and increases cancer.

Cell Phone Radiation Research:

For years the cell phone companies and government authorities have assured us that cell phone are perfectly safe. For example, they claim that the particular set of radiation parameter associated with cell phones are not the same as any other radio signal and therefore earlier research does not apply. They also mount biased review teams who falsely dismiss any results that indicate adverse biological and health effects and the flawed pre-assumption that the only possible effect is tissue heating. There is a very large body of scientific research that challenges this view. Now we have published research, primarily funded by governments and industry that shows that cell phone radiation causes the following effects:

Neurological Activity:

- • Alters brain activity including EEG, Von Klitzing (1995), Mann and Roschkle (1996), Krause et al. (2000).

- • Disturbs sleep, Mann and Roschkle (1996), Bordely et al. (1999).

- • Alters sleep EEG after awake exposure, Huber et al. (2000).

- • Alters human reaction times, Preece et al. (1999), Induced potentials, Eulitz et al. (1998), slow brain potentials, Freude et al. (1998), Response and speed of switching attention (need for car driving) significantly worse, Hladky et al. (1999). Altered reaction times and working memory function (positive), Koivisto et al. (2000), Krause et al. (2000).

- • Brain cortex interaction as shown by significantly altered human EEG by cellphone radiation, during a 15 minute exposure, Lebedeva et al. (2000).

- • Weakens the blood brain barrier ($p<0.0001$): Persson, B.R.R., Salford, L.G. and Brun, A., 1997.

- • A Fifteen minute exposure, increased auditory brainstem response and hearing deficiency in 2 kHz to 10 kHz range, Kellenyi et al. (1999).

- • While driving, with 50 minutes per month with a cell phone, a highly significant 5.6-fold increase in accident risk, Violanti et al. (1996); a 2-fold increase in fatal accidents with cell phone in car, Violanti et al. (1998); impairs cognitive load and detection thresholds, Lamble et al. (1999). In a large Canadian study Redelmeier and Tibshirani (1997) the risk of collision when using a cellphone was 4 time higher, RR = 4.3, 95%CI 3.0-6.5. Calls close to the time of collision has RR =4.8 for 5 minutes and RR = 5.9, $p<0.001$, for 15 minutes.

- • Significant changes in local temperature, and in physiologic parameters of the CNS and cardiovascular system, Khdnisskii, Moshkarev and Fomenko (1999).

- • Causes memory loss, concentration difficulties, fatigue, and headache, in a dose response manner, (Mild et al. (1998)). Headache, discomfort, nausea, Hocking (1998).

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Figure 7: Prevalence of symptoms for Norwegian mobile phone users, mainly analogue, with various categories of length of calling time per day, Mild et al. (1998).

PICTURE MISSING

Figure 8: Prevalence of symptoms for Swedish mobile phone users, mainly digital, with various categories of length of calling time per day, Mild et al. (1998).

These are the same symptoms that have frequently been reported as "Microwave Sickness Syndrome" or "Radiofrequency Sickness Syndrome", Baranski and Czerski (1976) and Johnson-Liakouris (1998).

Cardiac Activity:

- • Cardiac pacemaker interference: skipped three beats, Barbaro et al. (1996); showed interference, Hofgartner et al. (1996); significant interference, $p<0.05$ Chen et al. (1996); extremely highly significant interference, $p=0.0003$, Naegeli et al. (1996); $p<0.0001$, Altamura et al. (1997); reversible interference, Schlegal et al. (1998); significantly induced electronic noise, Occhetta et al. (1999); various disturbances observed and warnings recommended, Trigano et al. (1999)

- • Significantly increases blood pressure, Braune et al. (1998).

Hormone Activity:

- • Reduces the pituitary production of Thyrotropin (Thyroid Stimulating Hormone, TSH):

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Figure 9: A significant reduction in Thyrotropin (Thyroid Stimulating Hormone) during cell phone use, de Seze et al. (1998).

- • Reduces melatonin significantly, Burch et al. (1997, 1998). A GSM cellphone reduces melatonin, but not significantly in a very small sample (N=18) of subjects, de Seze et al. (1999).

- • A reported but yet to be published Australian Study, EMRAA News, June 2000, used a Clot Retention Test on blood samples to detect hormonal changes. A group of 30 volunteers used a Nokia 6150 cellphone for 10 minutes on each of two consecutive days. The CRT test showed significant changes in the thyroid, pancreas, ovaries, testes and hormonal balance.

Reproductive Activity:

- • Decreases in sperm counts and smaller tube development in rat testes, Dasdag et al. (1999).

- • Increases embryonic mortality of chickens, Youbicier-Simo, Lebecq and Bastide (1998).

Genotoxic Activity:

- • Breaks DNA strands, Verschaeve at al. (1994), Maes et al. (1997), which is still extremely significant $p<0.0001$, at 0.0024W/kg (1.2 $\mu W/cm^2$), Phillips et al. (1998).

- • Produces an up to three-fold increase in chromosome aberrations in a dose response manner from all cell phones tested, Tice, Hook and McRee, reported in Microwave News, March/April 1999. The findings were the same when the experiment was repeated and Dr Tice is quoted as stating: "There's no way you're going to get positive results twice over four different technologies as a chance result."

- • Doubles c-fos gene activity (a proto oncogene) for analogue phones and increases it by 41 % for digital phones, Goswami et al. (1999), altered c-jun gene, Ivaschuk et al. (1997), Increased hsp70 messenger RNA, Fritz et al. (1997).

- • Increases Tumour Necrosis Factor (TNK), Fesenko et al. (1999).

- • Increases ODC activity, Penafiel et al. (1997).

- • DNA synthesis and cell proliferation increased after 4 days of 20 min for 3 times/day exposure. Calcium ions were significantly altered, French, Donnellan and McKenzie (1997). Decreased cell proliferation, Kwee and Raskmark (1997), Velizarov, Raskmark and Kwee (1999)

- • Doubles the cancer in mice, Repacholi et al. (1997).

- • Increases the mortality of mobile phone users compared with portable phone users, RR = 1.38, 95%CI: 1.07-1.79, p=0.013, Rothman et al. (1996).

- • Increases human brain tumor rate by 2.5 times (Hardell et al. (1999)). Associated with an angiosarcoma (case study), Hardell (1999)

- • Hardell et al. (2000), for analogue phones OR = 2.62, 95%CI: 1.02-6.71, with higher tumour rates at points of highest exposure.

- • Significantly increases the incidence of eye cancer (Uveal Melanoma), by between OR = 4.2, 95%CI: 1.2-14.5, and OR = 10.1, 95%CI: 1.1-484.4, Stang et al. (2001).

- • United States, Motorola Study Morgan et al. (2000)

High Exposure	RR = 1.07 (0.32-2.66) n = 3
Moderate Exposure	RR = 1.18 (0.36-2.92) n = 3
High/Mod vs Low	RR = 1.13 (0.49-2.31) n = 6

This project underestimated cancer rates by using a high cancer reference group.

- • Carlo and Schram (2001) report that in the industry funded WTR (Wireless Technology Research) programme Dr Joseph Roti Roti confirmed the Tice, Hook and McRee research showing that cellphone radiation significantly damaged DNA through observed micronuclei formation.

- • Muscat et al. (2000) report elevated brain cancer in cellphone users in the United States, with cerebral tumors occurring more frequently on the side of the head where the mobile phone had been used, (26 vs 15 cases, p=0.06) and for a rare brain cancer, neuroepitheliomatous, OR = 2.1, 95%CI: 0.9-4.7. Mean use of cell phones was 2.5 years for cases and 2.2 years for controls, showing that a small increase in cellphone use (0.3 years) produces a large increase in brain cancer risk.

- • Cell phone users in Denmark Johansen et al. (2001)

Duration of digital subscription		<1 yr	1-2yrs	≥3 yrs
Relative to reference group	SIR	0.7	0.9	1.2
Relative to <1 yr group	RR	1.0	1.29	1.71

Other cancers are set out in "Table 2" below. Over 67 % of phone users had used their phones for 2 years or less. The reference group had a higher than average cancer rate than the age range of cell phone users, underestimating the cancer rates. This is shown by Standard Incidence Ratios (SIR) of some groups being as little as 0.6. For example SIR for users for <1 year is 0.7.

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Table two shows that even with little cellphone use, and even with the use of a high cancer reference group, there are several elevated cancers approaching significance: Testicular cancer SIR = 1.12, 95%CI: 0.97-1.30, Cervical cancer, SIR = 1.34, 95%CI: 0.95-1.85, Female Pharynx cancer, SIR 2.43, 95%CI: 0.65-6.22, Esophagus cancer,

SIR = 1.53, 95%CI: 0.31-4.46 and female breast cancer, SIR = 1.08, 95%CI: 0.91-1.26.

Conclusions:

To date over 50 studies have shown adverse biological or human health effects specifically from cell phone radiation. These research results to date clearly show that cell phones and cell phone radiation are a strong risk factor for all of the adverse health effects identified for EMR because they share the same biological mechanisms. The greatest risk is to cell phone users because of the high exposure to their heads and the great sensitivity of brain tissue and brain processes. DNA damage accelerates cell death in the brain, advancing neurodegenerative diseases and brain cancer. Brain tumour is already an identified risk factor. Cell phones are carried on people's belts and in breast pockets. Hence liver cancer, breast cancer and testicular cancer became probable risk factors.

Altered attention and cognition, as well as the diversion of talking on a phone while driving is a significant risk factor for accidents and fatal accidents.

Some cardiac pacemakers are susceptible to active cell phone signals, recommending keeping cell phones away from hearts and pacemakers.

Because the biological mechanisms are shown and EMR has been observed to significantly increase the following effects, there is extremely strong evidence to conclude that cell phones are a risk factor for breast, liver, testicular and brain cancer. It is also probable that we will observe a very wide range of other effects including cardiac, neurological and reproductive illness and death. Since cell phone radiation cause many cell damages including DNA and chromosome damage, all of these effects will also be caused by cell sites.

Dose-response studies of neurological, cardiac, reproductive and cancer effects in human populations all point to a near zero exposure level of no effect, Cherry (2000). Since cellphone radiation mimics RF/MW radiation effects which mimics ELF biological and health, the adverse effects occur across the spectrum and includes cellphone radiation, with a safe exposure level of zero.

Hence a risk reduction and public health protection based on keeping exposure below a level that doubles the risk, identifies 0.1 $\mu W/cm^2$ as the maximum acceptable exposure. This should allow a mean life-time exposure to be less than $0.01\mu W/cm^2$ which is necessary to reduce the risk of neurological effects. The lower level is necessary because of the exquisite sensitivity of the brain.

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Interphone Brain Tumors Studies To Date

An Examination of Poor Study Design Resulting in an UNDER-ESTIMATION of the Risk of Brain Tumors

L. Lloyd Morgan

RRT Conference, London, 8 & 9 September 2008
(revised 12 October 2008)

Introduction

As will be seen, the dominant results from all Interphone studies published to date is
use of a cellphone ***protects*** the user from a brain tumor.

There are two possible conclusions from these results:
1) Cellphone use does protect the user from brain tumors, or
2) The Interphone Study is fundamentally flawed.

•All ORs in 10 Interphone brain tumors studies were counted.
•Redundant ORs were removed to obtain a count of statistically independent ORs
•The results show there is a persistent protective skew, statistically so strong as to report it is
virtually certain this protective effect is not due to chance.

Methodology

What If There Is No Risk of Brain Tumors?

(Odds Ratios = ORs)

- Expect: Odds Ratios would be randomly distributed
  - # of ORs <1.0 would be ~equal to # of ORs>1.0
  - Think coin tossing
    - OR=1.0 are excluded
  - OR<1.0 implies protection
  - OR>1.0 implies risk
- 13 Interphone brain tumor studies published to date
  - 10 single-country Interphone brain tumor studies analyzed
    - Excluded: 3 multi-country studies overlapping the single-country studies

Calculation Methodology

- Tally the total number of ORs>1.0, ORs<1.0, and ORs=1.0
- Tally the number of statistically independent (non-redundant) ORs
- Calculate the Protection/Risk ratio (OR<1.0/OR>1.0)
- Calculate the cumulative binomial p-values
  - Think: probability of tossing a coin 20 times and getting 18 heads
  - Answer: $p=2.01 \times 10^{-4}$, or 1 time in 4,970 it will be due to chance.

Methodology

Requires Statistical Independence

- Comparison categories
  - Brain Tumors
    - All
    - Acoustic Neuroma
    - Glioma
    - Meningioma
  - Years since first use (Years)
  - Cumulative hours of use (Hours)
  - Cumulative number of calls (Call #)
  - "Regular" cellphone use ("Regular")
  - Years of ipsilateral cellphone use (Years Ipsi)
  - Years of contralateral cellphone use (Yrs Contra)
  - Minutes of cellphone use per day (Min/Day)
- Category comparisons between studies, not within studies

Results

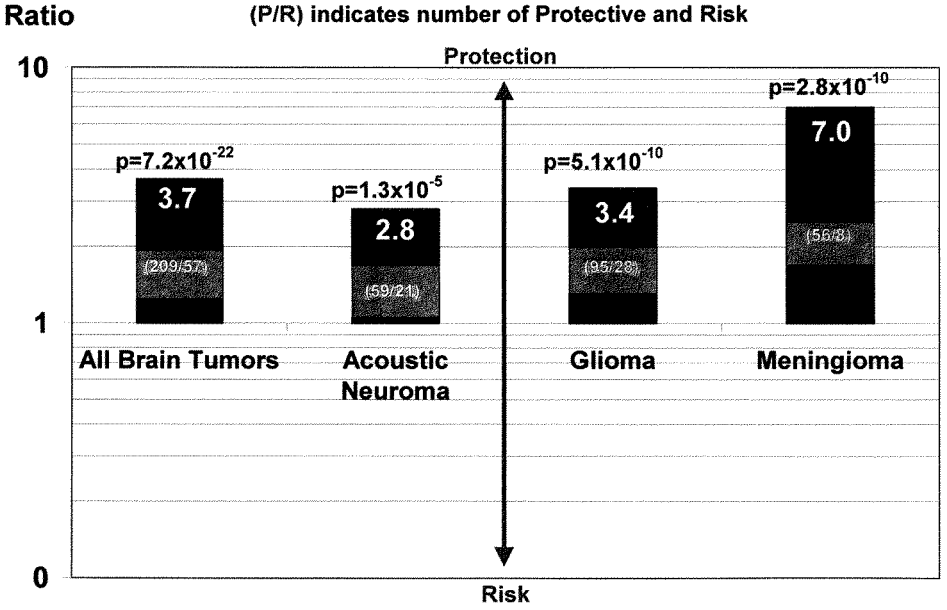
Total ORs and Statistically Independent ORs
(OR=1.0 Excluded)

	Total	Independent	% Ind.
Acoustic Neuroma	160	96	60%
Glioma	234	125	53%
Meningioma	124	64	52%
All Brain Tumors	518	285	55%

OR=1.0 are 1.5% of all Odds Ratios

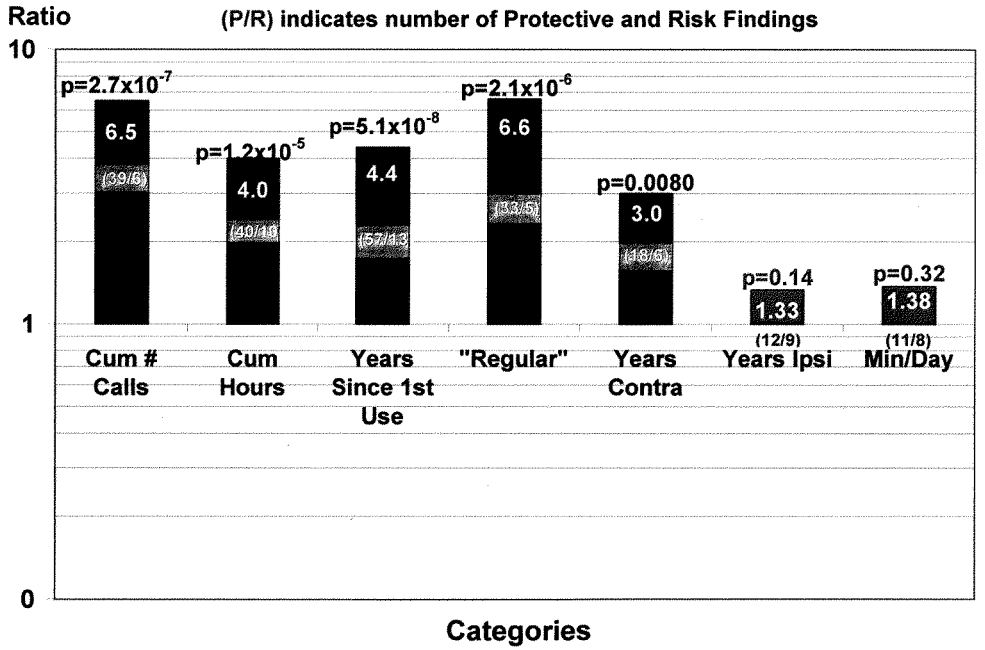
Results

Protection/Risk Ratio by Brain Tumor Type



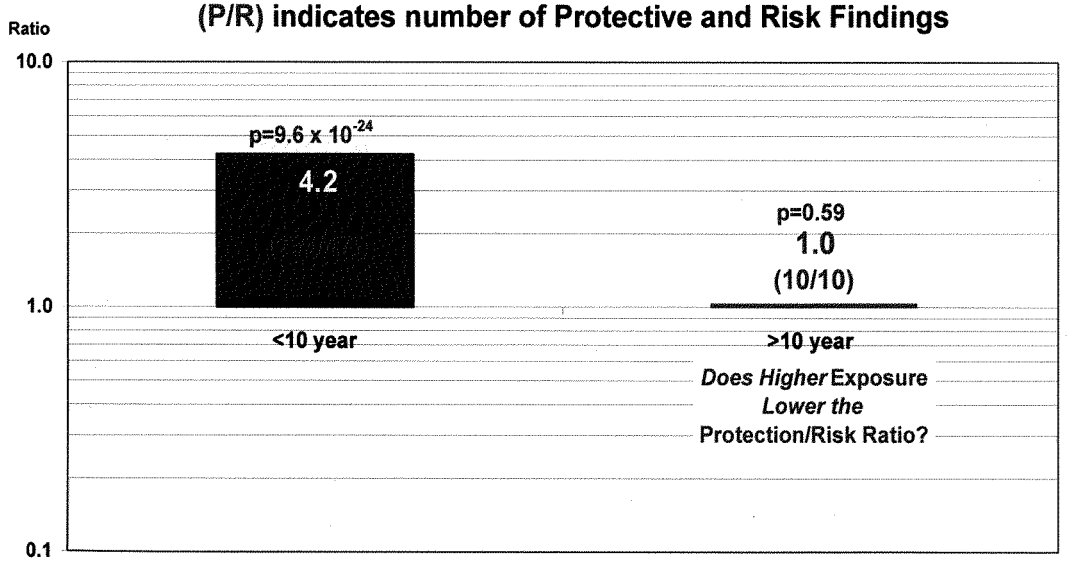
Results

Protection/Risk Ratio by Category



Results

Lower Vs Higher Exposure Time



Interphone Protocol Design Flaws

- Flaw 1: Selection Bias
  - Reasonable to assume that controls who use a cellphone are more likely to participate in a "cellphone study" than controls who do not use a cellphone
    - Selection bias increases as the refusal rate increases
    - Weighted average control refusal rate: 41%
      - Is there selection bias? (Löon 2004)
        - » 34% of controls who refused to participate used a cellphone
        - » 59% of participating controls used a cellphone
  - Underestimates risk

Flaw 1: Selection Bias

A Semi-Hypothetical Example

With Selection Bias			
	Exposed	Unexposed	Totals
Cases	60	40	100
Controls	60	40	100
Totals	120	80	200
Odds Ratio	1.00		

Without Selection Bias			
	Exposed	Unexposed	Totals
Cases	60	40	100
Controls	49	51	100
Totals	109	91	200
Odds Ratio	1.54		

Truly Exposed Controls=(60 "exposed" controls) * (59% participants) + (34 non-participanting controls) * (40% non-participants)=49

Interphone Protocol Design Flaws

- Flaw 2: Exposure Misclassification
  - Tumors outside the radiation plume are treated as "exposed"
    - Overestimates risk of brain tumor
  - **Ipsilateral: exposed Contralateral: unexposed**
  - Percentage of absorbed cellphone radiation by anatomical structure in adults
    - Ipsilateral temporal lobe: 50-60% ~15% of brain's volume
    - "Ipsilateral" cerebellum: 12-25% ~5% of brain's volume
    - **62-85% of absorbed radiation is in ~20% of the adult's brain volume**
    - *Children's brains will absorb a higher values.*

Flaw 2
A Semi-Hypothetical Example

With Flaw 2 Design Error	"Exposed"	Unexposed	Totals
Cases	75	25	100
Controls	60	40	100
Totals	135	65	200
Odds Ratio	2.0		

Without Flaw 2 Design Error	Exposed	Unexposed	Totals
Cases	15	85	100
Controls	12	88	100
Totals	27	173	200
Odds Ratio	1.3		

Truly exposed cases=(75 "exposed cases")*(20% truly exposed)=15. Truly exposed controls=(60 "exposed controls)*(20% truly exposed)=12

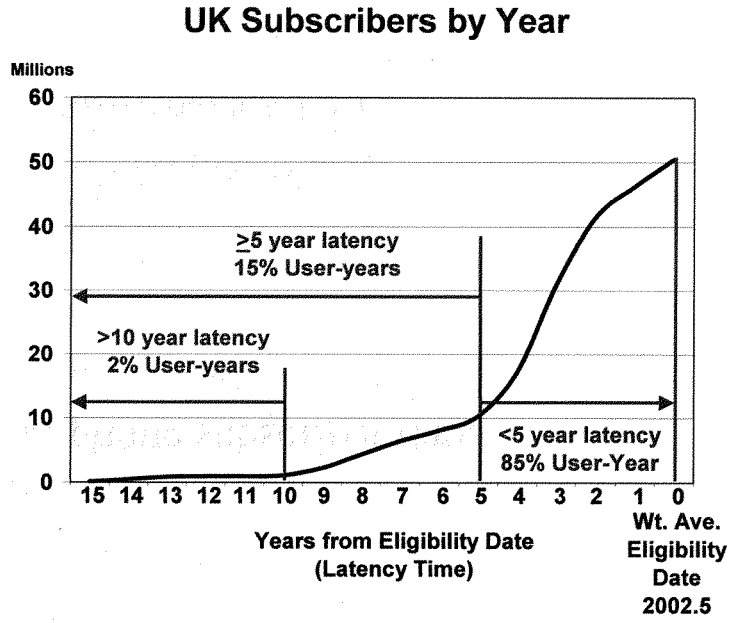
Interphone Protocol Design Flaws

- **Flaw 3**: Short latency times
  - Known latency times
    - Smoking & lung cancer: ~30 years
    - Asbestos & mesothelioma: 20-40 years
    - Ionizing radiation & brain tumor: 20-40 years
  - Only 6.3% of Interphone cases (16 cases/study) used a cellphone for ≥10 years
  - Short latency times underestimates risk
- Flaw 4: Definition of "regular" user
  - At least once a week for 6 months or more
    - Exposures one prior to diagnosis are excluded
  - Definition of "regular" user underestimates risk

Flaws 3 & 4: Latency Time & "Regular" Use

- UK cellphone subscriber data
  - 85% of "regular" use
    - <5 years
  - 98% of "regular" use
    - <10 years
- Reporting "regular" use
  - Suppresses finding a risk
- Expect 20 to 40 years for brain tumor Dx
  - Years of cellphone use (latency) is too short for Dx

Flaws 3 and 4
Latency Time and the Definition of "Regular Users"

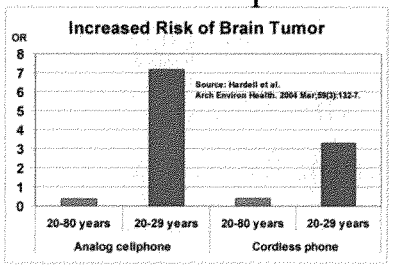


Interphone Protocol Design Flaws

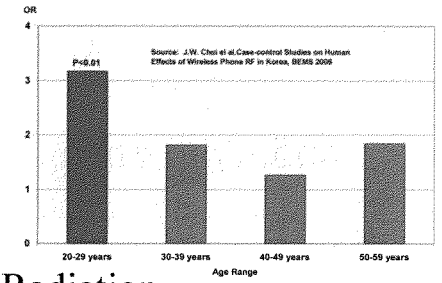
- Flaw 5: Young adults and children are excluded
  - Interphone Protocol's age range: 30-59
    - Young adults and children are the highest risk group
  - Underestimates risk

Flaw 5
Young Adults and Children Excluded

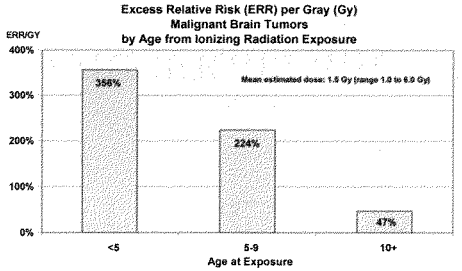
Swedish: Cellphone.



Korean: Cellphone



Israeli: Ionizing Radiation



Source: Sadetzki et al., RADIATION RESEARCH 163, 424–432 (2005)

Interphone Protocol Design Flaws

- Flaw 6: Cellphones radiating higher power levels are not examined (few exceptions)
  - Analog Vs Digital cellphone use
  - Rural Vs Urban digital cellphone use
  - Without inclusion of cellphones radiating the most power there is an underestimation of risk
    - Requires sufficient number of cases for statistical power
- Flaw 7: Cordless phone users are treated as unexposed
  - Underestimation of risk

Flaw 7: Semi-Hypothetical Example

Assumptions:

36% of Swedish cellphone users do not use a cellphone or cordless phone

57% of Swedish do not use a cellphone

There is a 2-fold risk of brain tumors from cellphone use or cordless phone use

	Cordless Phone Exposure Treated As Un-Exposed		
	Exposed	Unexposed	Totals
Cases	43	**57**	100
Controls	27	73	100
Totals	70	130	200
Odds Ratio	**2.0**		

	Cordless Phone Exposure Treated As Exposed		
	Exposed	Unexposed	Totals
Cases	64	**36**	100
Controls	40	60	100
Totals	104	96	200
Odds Ratio	**2.6**		

Interphone Protocol Design Flaws

- Flaw 8: Exclusion of brain tumor types
  - Includes acoustic neuroma, glioma & meningioma
  - Excludes other brain tumor types
  - Underestimates risk
- Flaw 9: Exclusion of brain tumor cases because of death
  - Underestimates risk of the most deadly brain tumors

Interphone Protocol Design Flaws

- Flaw 10: Recall bias
  - Light users tend to underestimate use
  - Heavy users tend to overestimate use
  - Result: Underestimation of risk

Flaw Mitigation

- Increase the diagnosis eligibility time
  - Ten Interphone studies: weighted-average 2.6 years
  - Hardell et al. studies: 6 years
- Lower minimum age from 30 years to 10 years
- Do not tell controls what is the purpose of the study
  - Pay cases and controls for participation in study
- Interview proxies in case of death
- Treat unexposed tumors as unexposed
- And, so on, and so on, and so on …
  - **It could have been done**

Conflicts-of-Interest

- 2008 Global Telecom Industry Revenue: $3.85 Trillion (£6.8T)
  http://www.plunkettresearch.com/Telecommunications/TelecommunicationsStatistics/tabid/96/Default.aspx
  - If risk is admitted: major revenue loss
  - Interphone's funding is inadequate to mitigate flaws
    - Substantial funding from cellphone industry
      - €3.2 million (£4M) in Europe, $1M (£0.6M) in Canada, unknown in Japan, Australia and New Zealand
- Government
  - UK
    - £22.5 billion (~$40B) selling off the 3G licences
    - Annual income of around £15 billion (~$27B) in taxation to the UK exchequer
  - Similar industry funding goes to all governments

Conflicts-of-Interest

- Researchers' conflict-of-interest
  - Perhaps unconscious, but they know industry has funded their studies in spite of a "Firewall"
  - Firewall: Industry send funds to 3rd party group
    - 3rd party selects and funds research teams
  - Honest, but "Don't bite the hand that feeds you"
    - **33 *significant protective* results**
      - **Ignored by authors (no commentary in the text)**

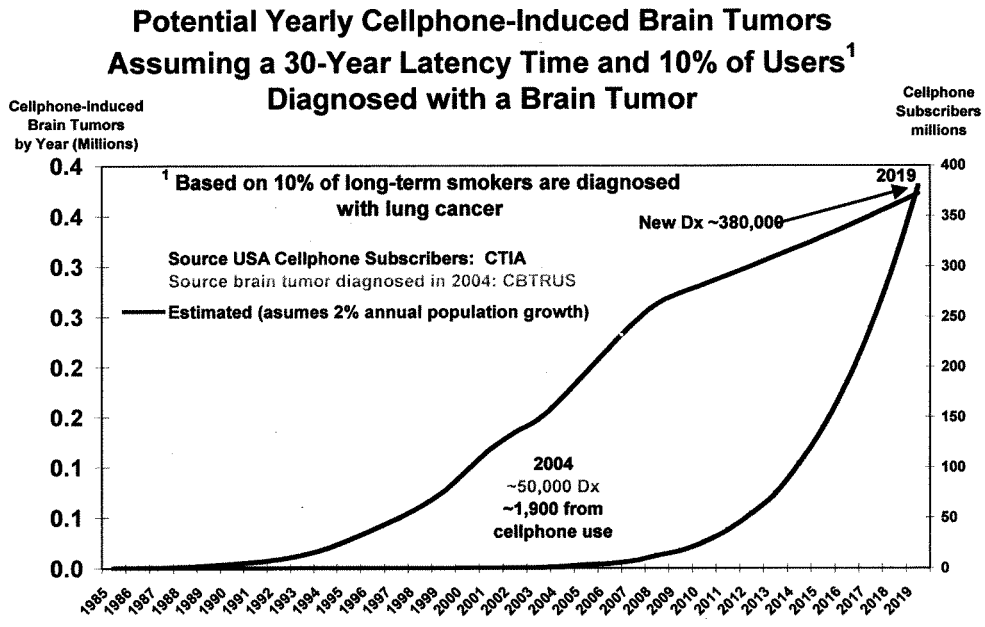
Conclusions

- **There is certainty: either cellphone use is protective, or the Study has major flaws**
- The Interphone Protocol *substantially*, underestimates the risk of brain tumors
  - In spite of the protective skew, significant increased risk is found in the Interphone studies
    - When ≥10 years ***and*** ipsilateral use are combined
      - Increased exposure counteracts design flaws' protective skew?
- Without design flaws, risk would increase substantially
- Cellphone industry's conflict-of-interest is obvious
- **Potential public health impact is enormous**
- Studies independent of industry are required

Cellphone Studies
Independent of Industry Funding

- Swedish team led by Dr. Lennart Hardell
  - Findings consistent with what would be expected, if there is a risk of brain tumors from wireless phone use
    - The higher the cumulative hours of use, the higher the risk
    - The higher the radiated power, the higher the risk
      - Analog Vs Digital cellphones
      - Rural Vs Urban users
    - The higher the number of years since first use, the higher the risk
    - The higher the cumulative number of calls, the higher the risk
    - The higher the exposure, the higher the risk
      - Tumor on the same side of the head where the cellphone was used
    - The younger the user, the higher the risk

Potential Public Health Risk



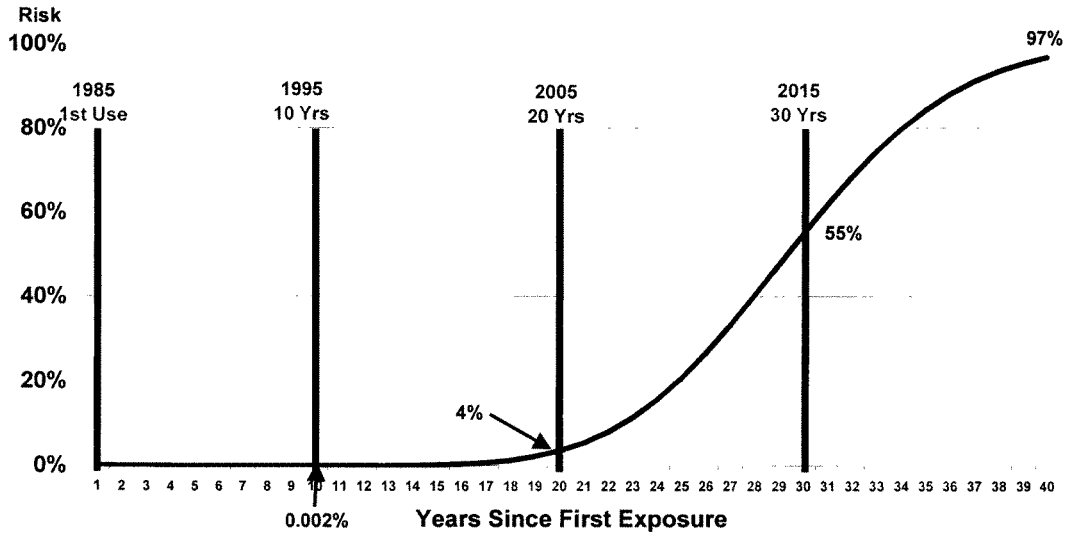
Potential Public Health Risk
Potential Consequences

- 2004
  - ~1,900 cellphone-induced brain tumors out of ~50,000 is not detectable
- 2019
  - ~360,000 cellphone-induced brain tumors
  - Total cost $90B for year 2019
    - $250K per brain tumor patient if neurosurgeons are available
  - Required 7-fold more neurosurgeons
- This will overwhelm the US Health system

I Pray I'm Wrong!

Potential Brain Tumor Risk
30-year Latency

Poisson Distribution Calculation



L. Lloyd Morgan [bilovsky@aol.com]

Mr. KUCINICH. Thank you very much, Dr. Herberman.

I want to note that Congressman Burton from Indiana is with us. In a previous Congress, he was chairman of the full committee. So I appreciate Mr. Burton's presence here.

Dr. Hoover, you may proceed.

Then after Dr. Hoover, we are going to go questions of the witnesses. Thank you very much.

STATEMENT OF DR. ROBERT N. HOOVER

Dr. HOOVER. I am Bob Hoover. I am the Director of the Epidemiology and Biostatistics Program at the National Cancer Institute, and I will be talking briefly about the scientific evidence on the topic of cell phones and the risk of brain cancer. As an epidemiologist, I will be focusing today on studies of risk in human populations.

It is also important to note that on the biologic side, radiofrequency radiation from cell phones is billions of times lower than the energy of x-ray photons. As such, its effect on the body, at least at this time, appears to be insufficient to produce genetic damage typically associated with developing cancer.

Alternative mechanisms have been suggested, but to date these offer no alternative mechanism of how this exposure might result in cancer vetted adequately.

From the epidemiologic side, descriptive data from the large network of population-based tumor registries funded by the National Cancer Institute reveal that there has been no increase in the incidents of brain or other nervous system cancers from 1987 through 2005, the time period when cell phone use increased by about 10-fold.

From the analytic side, the earliest analytic epidemiologic studies including the one conducted by the National Cancer Institute, 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 association between cell phone use and glioma, a malignant tumor of the brain or from a meningioma or acoustic neuroma, two largely benign tumors of the nervous system.

These early studies pointed out that future investigations would be needed to evaluate potential effects of long-term use as well as changing cell phone technology. As a result, a new generation of cell phone studies is emerging.

However, brain cancer is a very difficult disease to study well, epidemiologically. Much of the disease is rapidly fatal, and the tumor in its treatment can impair cognitive function. Cases may cooperate at different rates than controls, and answers to questions may be altered in 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, both in quality and in findings. Because of this, I will focus only on 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 countries, collectively known as INTERPHONE. Analyses of data from individual centers and those pooled from some but not all of the individual countries have been published.

These individual studies have 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.

In addition, no increased risk has been found in relation to several measures of exposure including time since first use, lifelong, lifetime years of use, the number of calls, the hours of use and the use of analog versus digital phones.

A somewhat increased risk has been found in some studies for tumors diagnosed on the same side of the head that the cell phone was used for those with more than 10 years of cell phone use, but these are based on small numbers, generally less than 5 percent of the cases under study, and are consistently seen across all the studies.

Many of us are hopeful that the combined INTERPHONE analysis, including all the centers in the original study, which is now underway, will provide a much larger number of long-term users which will allow an evaluation of different exposure metrics and latency, a formal assessment of the consistency in study-specific results and more comprehensive and statistically stable estimates. This could bring some 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.

We do know that cell phone use is increasing rapidly among children and adolescents. They are a potentially sensitive group because of their small head size and could result in higher radiofrequency 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 provide information on the risk from cell phone use among children.

In summary then, thus far, brain cancer incidence trends in the United States are unrelated to patterns of cell phone use. Most analytic studies indicate no overall increased risk of brain tumors within the first 10 years.

There are inconsistent 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 and different study designs are needed to sort out the roles of chance and bias from those findings that are really worth pursuing.

Potential risks associated with childhood exposure have not been assessed. Insight into these last two points may come relatively soon from ongoing analyses of the overall INTERPHONE Study and from the northern European case-control study of childhood cancer.

I thank you for the opportunity to present and look forward to your questions.

[The prepared statement of Dr. Hoover follows:]

Statement for the Record for the
Subcommittee on Domestic Policy
Committee on Oversight and Government Reform
United States House of Representatives

Statement for the Record for the September 25, 2008, hearing entitled, "Cell Phone Use and Tumors: What the Science Says"

Statement of
Robert N. Hoover, M.D., Sc.D.
Director
Epidemiology and Biostatistics Program
National Cancer Institute
National Institutes of Health
U.S. Department of Health and Human Services

12/12/2008

My name is Dr. Robert N. Hoover, and I am the Director of the Epidemiology and Biostatistics Program of the National Cancer Institute, 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) and electromagnetic field (EMF) as well as ionizing radiation.

I provided the following information as an oral statement at a hearing of the House Committee on Oversight and Government Reform Subcommittee on Domestic Policy about the scientific evidence of cell phone use and the risk of brain tumors. The Committee asked that I provide these remarks as a statement for the record.

My remarks follow:

Good morning. My name is Robert Hoover. I am the director of the Epidemiology and Biostatistics Program in the Division of Cancer Epidemiology and Genetics at the National Cancer Institute [NCI], and I will talk briefly about the scientific evidence on the topic of cell phones and risk of brain cancer.

While as an epidemiologist I will be focusing today 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 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. Many of us are hopeful that the combined INTERPHONE analysis, including all the centers in the original study, which is now underway, will provide a much larger number of long-term users which will allow 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 this morning. I would be happy to take your questions.

Mr. KUCINICH. I thank you, Dr. Hoover.

I want to thank each of the witnesses. We are going to go to questions from Members.

I would like to begin by asking the scientists who are here, I believe every one of you agrees that the science is not conclusive on a connection between cell phones and human health effects. Nevertheless, some scientists look at inconclusive data and see something of concern while others look at that same data and conclude there is no connection.

For the lay person, can you, scientists, please explain how is that possible?

Dr. Carpenter, do you want to start?

Mr. CARPENTER. Well, I wear both hats. I am also a laboratory scientist, and the tradition in laboratory science is that one keeps doing experiments until you get results that show a consistency where there is no greater than a 5 percent chance that your result could be due to statistical variability.

As a public health official, I look at this issue quite differently because I agree that I don't think that the overall evidence for brain cancer from using cell phones reaches quite that 95 percent confidence limit.

But as a public health official, are we at the same place we were with smoking and lung cancer 30 years ago?

In fact, as Dr. Davis in a recent book demonstrated very clearly, the Nazis in the thirties had definitive evidence for a relationship between smoking and lung cancer. We, in the United States, ignored that evidence and did nothing until the Surgeon General's report in, what, the late seventies.

And, I see this from the public health perspective as being very, very important, that we urgently need more research. I totally agree with Dr. Hoover. I think this INTERPHONE Study has some potential, but there are some problems with that as well.

We have almost no U.S.-funded research in this area.

Mr. KUCINICH. Dr. Herberman, would you care to respond?

Dr. HERBERMAN. Yes. Thank you.

I think there are several issues that I would like to bring up. One is although there have been a number of different studies, I point out that the large majority of the negative studies are actually not independent of each other but have used the same methods.

Mr. KUCINICH. What does that mean?

Dr. HERBERMAN. Well, particularly, about six different countries that participated in the INTERPHONE Study used exactly the same design. So if there are flaws in the design, these would be replicated across each of those studies.

One of those which is often cited, the Danish Cancer Society study and Dr. Hoover referred to that, used a very large number of people, but it excluded all business users from the study. That study actually started with about 700,000 cell phone users but excluded the 200,000 who were the business users and, most likely during that era, the most heavy users of cell phones.

They also defined a user as someone who made a simple one call a week. That is not the type of exposure that I am concerned about.

They also didn't evaluate in most of these studies the use of cordless phones which, as I said in my testimony, also involves radiofrequency signals.

Last, let me try to address some of the comments that Dr. Hoover just made. As he nicely summarized, most of the studies that look at the data mainly looked at exposures of less than 10 years. But, as I said in my testimony, I believe it is most likely that the latent period before cancer would develop from such exposure would be probably more than 10 years.

I also note that Dr. Hoover failed to discuss the studies by Dr. Leonard Hardell, and I noticed in the cancer bulletin that the NCI just published within the last few days, that among their references the Hardell studies were omitted.

I think that this is a major lapse of turning a blind eye to the studies that concern me the most.

Mr. KUCINICH. I want to thank Dr. Herberman. We are going to have a chance to get back to you and to Dr. Hoover, excuse me, when I ask the next round of questions to the witnesses. But before my time is up, I want to ask Mrs. Marks if you have any response to what you have just heard, and I would just ask you to keep it brief.

Mrs. MARKS. Well, my response would be that I am not a scientist. I am a human being, a mother, a wife.

I do know from my research and from talking with doctors and scientists worldwide that there are major flaws even in this INTERPHONE Study. I have in front of me something right here that says: The INTERPHONE Studies always find a statistical significant elevated risk when a cell phone has been used for 10 or more years on the same side of the head where the tumor was found.

I am sorry, but I am not understanding the lack of correlation here.

Mr. KUCINICH. OK. You know what, in deference to Dr. Hoover, who may have a different opinion, I will give you a brief response to what was said here.

Dr. HOOVER. You want me to respond to that, rather than the question?

Mr. KUCINICH. You can respond to your colleagues here.

Dr. HOOVER. OK. Yes. Certainly, Dr. Hardell's studies, Dr. Hardell has made important contributions, and he was one of the first in the field.

As I mentioned in my statement, however, that as more studies have come out and more diverse findings have emerged, there is a capability of segregating studies by quality.

I think to Dr. Hardell's credit, he attempted to do something very fast and get an answer very quickly. He used a method of pursuing prevalent cases in his early studies that effectively ended up eliminating everybody who died quickly or had a significant impairment. And then, I think his first study had about less than 30 percent of the total number of cases.

So there have been, over time, studies to address those kinds of issues and also have more long-term users. So I certainly focused mainly on those.

We could have a discussion all day.

Mr. KUCINICH. We are definitely going to go to more questions.

Dr. HOOVER. Right, so I think that.

The issue of the metric and the dose is that I think tobacco was mentioned a couple of times. With tobacco and with ionizing radiation, for example, there are associations with virtually any dose measure you use, with dose rate, how many cigarettes per day, with total duration that you smoked, with total pack years, with age that you started, with time since you stopped. Those are all.

With those kinds of data, it makes it really easy to think there is really something going on thus far.

Mr. KUCINICH. I want to thank you, gentlemen. Unfortunately, my time to ask questions has expired a couple minutes ago.

We are going to go to Mr. Burton, and then after Ms. Watson we are going to go to another round of questioning. You will have more of an opportunity to expand on that.

The Chair recognizes Mr. Burton.

Mr. BURTON. Thank you, Mr. Chairman.

Three billion users worldwide, you are not going to put this genie back in the bottle. It is a problem that is not going to go away, if it is a problem.

What I would like to know is, first of all, is there any scientific research going on right now that would allow cell phones but not used in the proximity that they are now?

I think one of you said that this little piece that I put on my ear, that it would be much safer. Doesn't it have radio waves connected to it at all?

Mr. KUCINICH. Any of the witnesses can respond.

Mr. BURTON. An ear receptacle like this, does it have radio waves?

Mr. KNAPP. Yes, it does.

Mr. BURTON. So the risk is still there?

Mr. KNAPP. If I could just add, it is about one-twentieth of the power from a normal cell phone.

Mr. BURTON. Well, then I am going to be using that a lot more.

The other thing is you mentioned it could cause brain tumors, ear tumors. I presume the jaw and anything that is in close proximity would be at risk for some kind of cancer.

What about if you carry it in your pocket? You know men and women carry these things around in their pockets. They don't have them sticking out in the air some place. What about other forms of cancer that might be caused?

I know you are speculating. I would just like to know what you think about that.

Mr. CARPENTER. If I could answer that, the cancer that we see with power line frequencies that has been seen with radiofrequency fields in Korea from AM radio transmitters is leukemia.

There is one report of an increase in prostate cancer in men that wear their cell phone in their belt.

My suspicion—I think it needs much more study—is that leukemia is the most vulnerable cancer, that beyond that, if you have a localized exposure as you do with use of the cell phone at the ear, you get cancer of the organs around there. If you wear it in your belt, you are radiating your pelvis.

So, again, we need more research, but I think this is more likely to be a general proximity.

Mr. BURTON. Assuming that your thesis is correct, what can we do about this?

I mean people are going to want to communicate because they are used to it now, and they like carrying it around. They like to be able to get a hold of their husband or their wife or their kids in a moment's notice and know where they are and talk to them about issues that are important to them. So I don't think this is going to change.

So what can be done to make these things safer if that is the problem?

Mr. CARPENTER. Well, I agree. I don't think we are going to go back to the pre-wireless age. I wouldn't even advocate that, and I think it really depends on the combination of industry finding ways to manufacture products that don't have as much radiation plus government finding ways of lowering the exposure limits that are considered acceptable.

Mr. BURTON. To your knowledge, any of your knowledge, are any companies doing research on home phones—everybody has a phone they are carrying around in their home as well—on home phones as far as radiation is concerned and the cell phones?

Are any companies, to your knowledge, working on that or doing research to find out if they can cut down the amount of radio waves that are emanating from these things?

Anybody? Does anybody know? If you don't know, just tell me.

Mr. KNAPP. I believe that some of the industry companies, in particular, Motorola, has done research along the way. Whether it is focused on reducing the power of that, I don't know.

Mr. BURTON. OK. Kids are sitting in front—this is a different subject but I think it is relevant to talk about it. It is related.

Kids sit in front of computers all the time. I mean they are constantly there, either studying or playing games. I mean they are watching that. Many of them, most kids I think today, the younger ones, are using those more than they are watching television even.

This exposure from a computer, does that emit radio waves and is that a threat as well?

Mr. CARPENTER. Well, if I can answer that, if it is a wireless computer, yes. If it is wired, there is a little bit of radiofrequency radiation in any computer screen, any television screen, but there is not significant exposure.

So wired devices, a wired telephone is not going to release any radiofrequency radiation. Most computers are not going to unless they are in the wireless mode.

Mr. BURTON. I am about out of time. The phones that we have at home, everybody has a mobile phone they are carrying around their house. My wife loses it all the time, and I hope she is watching. Do they emit as much radiation as the cell phones?

Mr. KNAPP. Generally not, and the reason for that is your home phone is only trying to go maybe 100 feet or so as opposed to a cell phone that has to get back to a tower that might be a mile and a half away. So it is generally much less.

Mr. BURTON. I think I have run out of time, but you are telling me that this little device, if we use it and if we keep the cell phone

away from vital organs in the body, we reduce our risk, according to you, fairly dramatically. OK.

Mrs. MARKS. Can I make one comment, please?

Mr. BURTON. Sure, sure.

Mrs. MARKS. What we have all purchased since this happened with my husband are ear buds with a little microphone. They are $10 and plug into your cell phone.

Remarkably, my husband stopped using his cell phone to his ear upon the diagnosis, and at his first MRI his tumor had not grown as aggressively as the doctors had suspected.

So one thing we might want to consider—I don't know if it is coincidence or not—is buy some ear buds and plug them into your phone. I think that could help tremendously. I hope the scientists agree with me.

Mr. BURTON. Can I ask one more?

I carry these things in my pocket all the time. I don't want to get prostate cancer or anything else. I don't think anybody else does.

Is there any kind of a device that is around, like a lead device or something that you could put around these things that would keep them from emitting—I mean people are going to ask these questions—that would keep them from emitting in the kinds of ways that might endanger people?

I see Dr. Hoover is squirming all over the place with this thing, but I would just like to know from your perspective.

Mr. CARPENTER. I was given a little woven net at this meeting in London 2 weeks ago that really does prevent the radiation from getting out. Now I don't know how practical that is in terms of if you carry it in your pocket, you want to be able to receive a call if it comes in, but there are some devices.

Mr. BURTON. What is that substance? What is that thing made out of?

Mr. CARPENTER. I am not sure what it is made of, but it is just a little woven pocket that you slip——

Mr. BURTON. And it cuts down the amount of radiation.

Mr. CARPENTER. That is correct.

Mr. BURTON. Thank you, Mr. Chairman.

Mr. KUCINICH. Thank you very much.

The Chair recognizes the Congresswoman from California, Congresswoman Watson.

Ms. WATSON. Thank you so much, Mr. Chairman, for holding this hearing.

As I mentioned up front, I have experienced that not only in my own family, with several of my friends. I think many of you know of the late Johnnie Cochran, and there is a lot of concern about what brought on his tumors and caused his death.

But when I came in, Mrs. Marks, you were speaking. What kind of work did your husband do?

Mrs. MARKS. My husband went to medical school, and then he switched careers. He is a real estate developer and broker.

Ms. WATSON. I see.

Mrs. MARKS. And used to be involved in the financial end of real estate.

Ms. WATSON. So he had that phone at his ear 24–7, I would imagine.

Mrs. MARKS. He did.

Ms. WATSON. Yes.

Mrs. MARKS. Yes. It was a vital part of his work.

Ms. WATSON. You know I have been doing a visual study myself because of my 39-year-old niece. She had a tumor, cancerous tumor on her left ear first. It was removed, and 3 years later it appeared again on the right side.

I was told by the doctor that the cancer stayed under a flap in her cranium. So I just want to say if the cancer is in the body, the cells can remain there, and he said that it just went elsewhere and appeared again.

Mr. Knapp, you mentioned in your testimony that as the FCC is the primary regulator of cell phones, the Agency gets its information about evolving science around cell phones and tumors or other health effects from other agencies, primarily from the FDA. Do you know if there is any staff person who has a background in health or biological sciences, any expertise, at the FCC?

Mr. KNAPP. At the FCC, not in the area of analyzing biological data or medical science.

Our focus is on the implementations. Once the standard is in place, we have the engineers who can make sure that the products comply with the standards.

Ms. WATSON. Well, how often does the FDA discuss information with the FCC on science of health effects and your research and how does this exchange occur? Do they communicate and coordinate?

Mr. KNAPP. It happens at many levels. Staff from FDA and FCC both participate in some of the standards-setting organizations that deal in this field.

There is an interagency working group that includes FDA, EPA, OSHA, all the agencies involved in this that communicates about four times a year.

And then we also have informal staff to staff meetings to discuss broad topics of interest between our agencies—radio devices, including any changes on RF exposure. That meets two to three times a year.

Ms. WATSON. So they do share with you, information.

Mr. KNAPP. Absolutely.

Ms. WATSON. If so, does the FCC issue new rules pertaining to the cell phones and how would the Agency be able to deliberate upon public comments pertaining to health effects?

I mean I am sure they get lots of calls. What happens as a result of obtaining this information?

Mr. KNAPP. Typically, what happens, we will participate in these meetings and ask for advice from those health agencies as to is there something we should be doing, should we have a standard that is adopted, should it be changed. And thus far, we haven't gotten guidance to change that from the other agencies.

As far as were we to be in the position of trying to evaluate that, we really don't have the expertise to tell which level causes which effects and which studies are valid on the medical side.

Ms. WATSON. I think I heard somewhere on the panel that some countries are issuing warnings. Does anyone on the panel know what countries and what kind of warnings they are issuing?

Dr. HERBERMAN. Yes, I would be happy to speak to that.

Before I issued my advisory back in late July, several countries in Europe had put out such precautionary advisories. They were specifically Germany, France and Sweden and also the Province of Ontario.

And after my advisory was issued, the Government of Israel also came out with parallel recommendations.

I would also, if I could just take another minute, I would like to address one point about what you are raising about the FCC regulations. Mr. Knapp has referred specifically to the SARs which are helpful indications of the amount of absorption that occurs from the radiofrequency into the brain.

I point out that these are based on adults and, as I said in my testimony, there is quite striking evidence that if you do the same type of absorption studies in children, the amount of absorption into the brain is considerably greater.

I actually brought a visual model to demonstrate what Professor Ghandi, who did studies along these lines, has actually shown, and his studies have been confirmed by French Telecom.

Ms. WATSON. Mr. Chairman, can we have a little more time to see these models?

Mr. KUCINICH. We are going to go to another.

Dr. HERBERMAN. This would take one, just a couple of seconds.

Mr. KUCINICH. Sure, of course. Yes, we are going to go to another level of questioning, but please proceed.

Dr. HERBERMAN. If I could just show, this is the model of the brain that shows the amount of absorption into the brain of an adult. It only goes about 2 inches into the brain.

This is a model of the same part of the brain near the ear of a 5-year-old child. This goes pretty far into the brain, and I think that is something that the FCC should consider to talk about the amount of absorption in the brains of children as opposed to adults.

Mr. KUCINICH. Could staff bring that model up here for a minute?

Mr. BURTON. Can we get pictures of that. Is there any way?

Ms. WATSON. I saw some pictures.

Mr. KUCINICH. Would staff bring the model up here? I just want to take a look at it.

The gentlelady's time has expired on this round. We are going to come back. We are going to take another round here.

Mr. BURTON. Can I make an inquiry? Let me just make an inquiry. I don't know whether it is possible, but is there any way with our copying devices to make copies of that so we can take those with us?

Mr. KUCINICH. Dr. Herberman.

Dr. HERBERMAN. Actually, within my written testimony, we have a photograph showing the same thing.

Mr. KUCINICH. OK. Just for the record here, this model, Dr. Herberman, is an adult brain model. Is that what you are saying?

Dr. HERBERMAN. Correct.

Mr. KUCINICH. On this model, where is the cell phone?

Dr. HERBERMAN. The thing sticking out on the side is supposed, the cardboard thing.

Mr. KUCINICH. The cell phone is right here.

Dr. HERBERMAN. Right there.

Mr. KUCINICH. OK. The cell phone is here. We are trying to keep this close to the model.

The cell phone is here, and you are saying that the directed energy from that cell phone goes in like this and then expands out into the tissue of the brain.

Dr. HERBERMAN. Right. Yes, and this shows.

Mr. KUCINICH. So I am just turning it in another view. That is what an adult brain. What is your basis for that?

Are there studies that prove this? Is that what you are saying?

Dr. HERBERMAN. This was done with models in which radiofrequency signals that are in the same range as the commonly used cell phone were used for this.

Mr. KUCINICH. Now this would be a model of a child's brain at what age?

Dr. HERBERMAN. Five years old.

Mr. KUCINICH. A 5-year-old child.

Do you have research that shows, public health research, Dr. Carpenter, that 5-year-old children will use a cell phone? Is that possible?

Mr. CARPENTER. I have had inquiries from parents of 2-year-old children who have given their child the on cell phone to play with. I don't think most 5-year-olds are making phone calls, but when kids get in elementary school, they begin.

Mr. KUCINICH. So, OK. Now here, we have seen the effect. Here is the adult brain effect of use of the cell phone, and then we look at the child. Again, so the cell phone is here, is that right?

Dr. HERBERMAN. Correct.

Mr. KUCINICH. The cell phone is here, and it is a very deep penetration, you are saying. Now is this kind of penetration of the energy of a cell phone, the radiofrequency, the radiation, we are saying. Would you say that, from looking at this visually, is it your testimony that most of the brain of a child would receive some of this energy?

Dr. HERBERMAN. That is correct. Most of the brain, at least on that side of the head, would be absorbing that energy, and it is a simple explanation for it. One is that the skull is considerably thinner in a child, and it doesn't reach maturity until the twenties.

In addition to that, the nerves in the brain in an adult are protected by a myelin sheath. In children, the myelin has not fully developed. So there are several reasons for the increased absorption in a child.

Mr. KUCINICH. I want to talk a little bit more about children here. You are saying that children are more vulnerable, just no question about it. I mean you presented models here which demonstrate that. You say there is research that backed that up.

This is a model of a 5-year-old. Now are children 10 years old vulnerable?

Dr. HERBERMAN. This was actually done as part of the same modeling experiment and, as you might guess, the model of the

brain of a 10-year-old is somewhere in between that of a 5-year-old and an adult.

Mr. KUCINICH. Children, 15 years old, we are talking teenagers, young teenagers, do they have a vulnerability? Is it your testimony they have a vulnerability?

Dr. HERBERMAN. I believe they still are more vulnerable than adults because of the myelin.

Mr. KUCINICH. You believe or you know, Doctor? Doctor, you believe or you know?

Dr. HERBERMAN. This has not been directly studied, but I think from other biologic information I know that there is not as much myelin protection to a teenager as there is for an adult.

Mr. KUCINICH. One of the things that occurs to me, and my colleagues I think would probably support this, is it is customary in our society to look at various products or substances and say that children should not be permitted to have access to them or to use them.

For example, States have passed laws that restrict children from being able to purchase cigarettes. States have laws that restrict children from being able to purchase alcohol. We even have national standards that restrict children's access to being able to watch certain types of movies.

Should there be, and I would like to have a response from the doctors who are here, is it your judgment that as a precautionary measure, there should be national standards of either warning or precaution relating to the use of cell phones for children of any age?

Dr. Carpenter.

Mr. CARPENTER. I would certainly support warnings in precautionary levels. I wouldn't say that the evidence is so overwhelming that absolutely prohibiting them.

I do have Dr. Hardell's slide that he presented 2 weeks ago, showing that the risk for people under the age of 20 when they start to use their cell phone is increased by 5.2 fold whereas for the overall population, including that group, there is only a 1.4 percent increase in risk.

I think the evidence is certainly strong enough for warnings that children should not use cell phones.

Mr. KUCINICH. So you recommend that we would take strong preventive action now based on evidence in hand?

Mr. CARPENTER. Absolutely, because the failure to do that is going to lead us to an epidemic of brain cancer in the future.

Mr. KUCINICH. Dr. Herberman, would you respond?

Dr. HERBERMAN. Yes, at a couple of levels. One is I think the statements from the wireless phone industry, when they sell cell phones, should include the data about the specific absorption rates for children as well as adults so that people will be better informed about this issue.

And, second, that is why, as one of the precautions that I have advised and several other countries have advised, is to warn that children, particularly young children, should limit their cell phone use.

Mr. KUCINICH. Dr. Hoover, do you have a response?

Dr. HOOVER. I think it does depend on whether there is a risk or not.

Mr. KUCINICH. What depends on if there is a risk?

Dr. HOOVER. Pardon me?

Mr. KUCINICH. What depends if there is a risk?

Dr. HOOVER. Whether you would make a recommendation or not. I have not had the opportunity to see Dr. Hardell's study, but presumably it will be in the peer review literature soon, and I can take a look at it.

And there is, I think, a very good study that is being concluded. Its field phase is December, and probably we will have data in early 2009 or mid-2009 which should go a long way toward telling us if there is a risk among children.

Mr. KUCINICH. Thank you, Dr. Hoover.

The Chair recognizes, once again, Mr. Burton of Indiana.

Mr. BURTON. You know when I look at these models, these brains, how did they come up with this? How did you decide how far the radiation was going?

I mean you obviously didn't cut somebody's brain open. How can you tell that the danger is this severe with a child and how severe it is with an adult?

Dr. HERBERMAN. Well, this was not actually done with brains. This, as described in the publication by Professor Ghandi and the reference for that is in the appendix to my written testimony, was making a model of what is known about the thickness of the skull and other characteristics of the brain of a child compared to an adult and then using radiofrequency signals that mimic the type of radiation that one gets to the ear by holding a cell phone to the ear. So it is modeling data rather than actual human or brain data.

But it has not only been done by Professor Ghandi. As I said, French Telecom came out with a study recently that confirmed Professor Ghandi's results. So I believe it is quite credible.

Mr. BURTON. I am not disputing that at all but when you start talking about putting warning labels on products. I think you are probably correct, but I am playing devil's advocate here.

Shouldn't you do some tests on possibly animals by putting some kind of a device similar to a cellular phone near their ear and watch the result of that?

I mean I still don't understand how you can be really accurate from just a model without actually seeing the effect on a living organism.

Dr. HERBERMAN. I can't specifically respond to this, but maybe Dr. Carpenter can.

Mr. CARPENTER. Well, in this, I have this publication here. What they did was construct model brains of the composition that you would have of these different ages and then put probes in to measure the penetration of the radiofrequency fields.

Now, unfortunately, those probes, they are not small. So actually putting them into, say, a monkey brain would be technically complicated, but I basically do agree with you that it would be much better to have real measurements in a living brain.

Mr. BURTON. Is there anything in the human skull or brain that is substantially different than the test model? The reason I am ask-

ing that is because the test model may show these things, and is it conclusive that the human brain will have the same reaction?

Mr. CARPENTER. There certainly is always the possibility that your model is inaccurate. I acknowledge that.

This was done to the best of the understanding of the electrical characteristics of the skull and the brain tissue by Dr. Ghandi. He is a member of the IEEE. So he is an expert in the physical properties of these fields.

Mr. BURTON. So there is no doubt that the radio waves are penetrating. Whether or not this is entirely accurate may be questionable, but there is no question that the radio waves are going into the brain and could cause tumors.

Mr. CARPENTER. That is precisely how I see that result.

Mr. BURTON. One more thing, I was asking about us carrying these phones around, and I carry two phones and a computer. It scares the dickens out of me.

But when you carry those in your pocket, what evidence is there that the radio waves will penetrate far enough to get to your vital organs? They are not on the surface.

Dr. HERBERMAN. If I could address that, there is not a lot of data about this, but I have been struck by two reports that I think are relevant. One was a study from the Cleveland Clinic that reported that men who carried cell phones around in their pocket had lower sperm counts, and another report indicated that by taking bone marrow from the hip on the side where the cell phone is kept in the pocket had lower bone marrow counts for generating blood-forming cells.

So I think this is suggestive evidence, but more needs to be done to be certain about that.

Mr. BURTON. Thank you, Mr. Chairman.

Mrs. MARKS. Can I make a comment as a parent about the children issue?

Mr. KUCINICH. Please proceed.

Mrs. MARKS. There was a report in our local newspaper recently on opening day of school that between 80 to 90 percent of the children in elementary school came back to school with cell phones.

I have also heard from Lloyd Morgan, who is a scientist and was recently in London at the conference that Dr. Carpenter and Dr. Hardell were at, that children are sleeping, and teenagers, with their cell phones underneath their pillows. I can't imagine that would not be a risk, considering what I have heard today.

I also called AT&T for my husband's cell phone records. And, while I was on hold AT&T, has a recorded message playing, and one of the things that they say is please limit the amount of time that your child uses a cell phone. I would like to know why they are saying that.

Mr. KUCINICH. I thank the gentlelady for her additional comments, and the Chair recognizes Ms. Watson.

Ms. WATSON. You know you have given us such food for thought. Just through my observation, I am seeing that we suffer under a great deal of risk, given the kinds of radiation-contributing devices we have in our homes and around our children and that flesh that seems to be absorbent, so absorbent when you are young is exposed to it, 24–7, in every room in their homes.

This is a question and whoever might address it, I would appreciate it. Can the use of high frequency wireless network routers in the home be a potential health hazard as well?

Mr. KNAPP. The FCC also authorizes those kinds of devices. The power levels, again, are generally much lower. We do look at them to make sure that they are either going to comply with a SAR standard or an RF exposure risk.

Generally, there are two things that reduce any risk from those kinds of products: the lower power level and the separation. So we don't have those products up against our bodies.

Ms. WATSON. I note that in a lot of businesses now they have a screen they are putting, separating the human from the screen on the computer. Do you know those screens they are putting in front of the television screen, any of you?

Mr. KNAPP. I am not sure exactly which screens you mean but the old picture tubes.

Ms. WATSON. The picture tubes and then there is a screen they are using.

Mr. KNAPP. Yes, but the screens that are used today, the LCD screens and the plasmas, generally don't pose a risk that I am aware of. They don't use the kind of radiation that the old big picture tubes did.

Ms. WATSON. The old ones.

Mr. KNAPP. Yes.

Ms. WATSON. New technology is reducing the risk.

Mr. KNAPP. Yes.

Ms. WATSON. Thank you very much. I yield back.

Mr. KUCINICH. I thank the gentlelady.

What are the trends in brain cancer rates for young adults and children, Dr. Hoover? Dr. Hoover, do you have information about that?

Dr. HOOVER. Yes. The rates in children went up a little bit in going from the 1970's to the 1980's.

Mr. KUCINICH. From when?

Dr. HOOVER. From the 1970's to the 1980's.

And then, as for the total rate, have been pretty level from the late eighties until currently or until 2005 which is our recent data.

Mr. KUCINICH. Dr. Herberman.

Dr. HERBERMAN. Yes. We have been looking at this issue and are, in fact, preparing a publication related to this.

Mr. KUCINICH. Could you bring that mic a little bit closer.

Dr. HERBERMAN. Yes. We are actually carefully looking at the studies from the SEER Registry that the NCI and the CDC maintain. And what I have been struck by is an increased rate over the last 10 years or so, particularly for individuals in the age range between 20 and 29, and this would fit perhaps with the Hardell data that Dr. Carpenter was alluding to and again is of concern.

Mr. KUCINICH. Is the latency for brain cancer longer than? Is there a latency period of the cancer involved here?

Dr. HERBERMAN. Well, we can't really be certain, but based on general experience with tumors of this type and others I am estimating that a latent period of 10 years or more is a very likely thing. But we need more evidence about that.

Mr. KUCINICH. If brain cancer was associated or is associated with cell phones, when would this exposure become evident in the human population?

Dr. HERBERMAN. If it takes indeed more than 10 years as I am surmising, then it would probably be another 5 years or more in the United States, at least, before we would see the effects of the almost ubiquitous use now of cell phones.

Mr. KUCINICH. Dr. Carpenter, would you like to respond?

Dr. HOOVER. I was just saying that I could certainly provide.

Mr. KUCINICH. Excuse me, Dr. Hoover.

Dr. HOOVER. Yes.

Mr. KUCINICH. I directed a question to Dr. Carpenter. I will come back to you. You will have every opportunity to respond, and I would like you to just follow procedure, and everything is going to be fine.

Dr. Carpenter.

Mr. CARPENTER. I am afraid I don't have any specific information on rates in children.

Mr. KUCINICH. Thank you.

Dr. Hoover.

Dr. HOOVER. I was just going to say that I can certainly send the rates from the SEER Program to the committee for the record when I go back, the age specific rates over time.

Mr. KUCINICH. Thank you very much. Also, when you send that, Dr. Hoover, the subcommittee unfortunately did not receive a copy of your written testimony and, of course, it is customary to provide the committees with written testimony before a witness appears. That didn't happen, and I am asking on behalf of the subcommittee if you will provide this subcommittee with your written testimony within the next 5 business days, so we may include it in the record of this hearing.

Dr. HOOVER. We did send you the NCI fact sheet which was generated by myself and others which would basically the substance of such a written record.

Mr. KUCINICH. Maybe it wasn't explained to you but a narrative explaining that is also helpful. So if you could submit to the subcommittee, written testimony, we would be very grateful.

Dr. HOOVER. OK, good. We did clear it with the committee, the subcommittee because of the kind. I know we were a substitute for somebody else.

Mr. KUCINICH. I am grateful that you are here. Thank you, Dr. Hoover.

I would like to ask a question that may seem technical, but it has very serious implications. The FCC sets an absorption level called the specific absorption level of 1.6 watts per kilogram. That is the exposure limit. Is that correct, Mr. Knapp? Just yes or no.

Mr. KNAPP. Yes.

Mr. KUCINICH. OK. That number was calculated, assuming that the only way radiofrequency emissions could inflict harm would be to heat the tissue similar to the way that a microwave heats food.

And this question is directed to any of the witnesses. What evidence is there that cell phones can cause biological responses in ways that do not involve heating of the tissue? What health effects or biological responses are potentially implicated?

Which of the witnesses would like to answer that question?

Dr. Carpenter.

Mr. CARPENTER. There are literally hundreds of experimental studies and animal model systems and in isolated cells that show biological effects of radiofrequency radiation at levels that do not cause tissue heating. Not all of those effects are necessarily harmful.

I think the strongest evidence that there is reason to be concerned in humans is the evidence on the association between brain tumors and cell phone use because while the energy of the cell phones has gone down over time, the evidence is really quite strong.

And, I should say that this is not just Dr. Hardell. There are studies from other investigators in Finland, in Sweden, in Germany, in France that show this elevation in brain cancer risk after more than 10 years of exposure, but I think that evidence is what concerns me most because those are exposures that fall within the current FCC guidelines.

Mr. KUCINICH. Dr. Herberman, do you wish to respond?

Dr. HERBERMAN. Well, I have very much enjoyed the opportunity to review the publications in the BioInitiative Report that Dr. Carpenter played a lead role in, and I have been impressed that there are quite a number of studies, both at the cellular level but also at animals levels, indicating that there is effects and damage.

And the thing that has struck me the most, and I think this is important to have in the record, is there are several reports from very experienced, credible scientists of damage to the DNA which we know is a central mechanism for developing tumors and malignant cancer. This is surprising at one level because one wouldn't have expected that from non-ionizing radiation which the radio frequencies are.

Mr. KUCINICH. How would that happen? We are laymen here, if you could just very briefly describe how it is possible that the radio frequencies from a cell phone could conceivably have an effect on changing or damaging DNA.

Dr. HERBERMAN. My favorite hypothesis about this, but it needs to be experimentally tested, is that this could be generating what we refer to as reactive oxygen species to separate the oxygen from the hydrogen in water which then has the ability to damage the DNA. And this needs to be demonstrated, but I think this is a very plausible explanation.

Mr. KUCINICH. Dr. Hoover, your response?

Dr. HOOVER. Yes, there are certainly biological effects of radio emissions, and I think I agree with the others that the question is are they things that might be related to cancer risk. And that is what hasn't been vetted well yet in the laboratory and which would be really useful to understand underlying biologic mechanisms.

I know that very recently there has been these reports of ability to actually do genetic damage, and some of them I guess are currently under scrutiny as to whether they might be withdrawn or not. So I think the area is actually still evolving.

Mr. KUCINICH. Thank you, Dr. Hoover.

Mrs. MARKS. Can I answer that as a lay person because one scientist did explain it to me?

Mr. KUCINICH. Sure.

Mrs. MARKS. I was explained that cellular radiation is—and please correct me if I am wrong—the only technology now that we have that combines two different radiation waves. They travel in two different paths or two different waves. Am I correct in saying that, and it combines the two?

Mr. KUCINICH. Would anyone like to respond?

Mrs. MARKS. And our brains are not equipped to handle that?

Mr. KUCINICH. Would anyone respond to that?

Mr. KNAPP. It just gets a little complicated, very technical. There is a electrical and a magnetic component to a wave. So, technically, that is true.

Mr. KUCINICH. So radio frequencies and electromagnetic?

Mr. KNAPP. Except that it is the radio portion of the wave that propagates through space.

Mr. KUCINICH. Is what she said essentially true?

Mr. KNAPP. That there are two components to it, yes, a magnetic. I am sorry that it is getting so technical.

Mr. KUCINICH. Well, no. I mean actually technical relates to science relates to health effects. So here we are.

Mr. KNAPP. There is a magnetic component that usually propagates a very short distance.

Mr. KUCINICH. Mr. Knapp, one of the concerns about the current specific absorption rate is that they assume the person who is exposed is a 6-foot tall man. Does that make the allowable exposure limit higher or lower?

Mr. KNAPP. The limit is a flat limit. So it doesn't vary. It is for the device.

Mr. KUCINICH. Mr. Knapp, we just heard testimony that there are varying effects based on the thickness of, let's say, the adult's skull versus a child's skull. Isn't that the testimony we have heard here? So you have heard that testimony.

There is established by the FCC a specific absorption rate. What do you have to say, now that you have heard this testimony?

Do you think that the allowable exposure limit should be higher or lower or, based on what you have heard, is there evidence that children are more vulnerable than adults and that might cause the FCC to have to take that into account when construction your specific absorption rate which is the exposure limit that you enforce?

Mr. Knapp.

Mr. KNAPP. The standard that is in place is based on an industry recommended and recommended by other Federal Agencies accepted standard. It has a margin built into that standard.

Mr. KUCINICH. When was that standard developed? When was the baseline for that standard?

Mr. KNAPP. In 1997. There has also been ongoing work. The IEEE has developed a subsequent standard, but it is actually more lenient than our current standard.

Mr. KUCINICH. When you say that the industry recommended it, did you just testify to that?

Mr. KNAPP. When I said industry, perhaps that was an imprecise word because these were an IEEE committee that is open to all.

Mr. KUCINICH. Would you explain to people what the IEEE is?

Mr. KNAPP. Yes. It is a professional society that develops standards, the Institute of Electrical and Electronic Engineers. It follows the American National Standards guidelines, so that it has to be open to all who want to participate. It includes members of government, users and manufacturers and health specialists. So it is developed by a broad range of experts.

Mr. KUCINICH. This was established, as you said, 1997.

Mr. KNAPP. Correct.

Mr. KUCINICH. You have heard testimony here in September 2008, 11 years later, that indicates that with respect to children there is an increased likelihood of adverse health effects. Having heard that testimony, how would you choose to proceed with respect to the exposure limits that the FCC sets on a specific absorption rate?

Mr. KNAPP. The FCC doesn't have the expertise to evaluate whether the standard is an appropriate protection level for the cases that were discussed here.

Mr. KUCINICH. So where do you get the expertise?

Mr. KNAPP. From, I think, the other Federal Agencies that are conducting ongoing research.

Mr. KUCINICH. OK. Thank you, Mr. Knapp.

Congresswoman Watson.

Ms. WATSON. Thank you, Mr. Chairman.

It is a nexus right into the question that is on my mind. Any of you, can you tell us about the research and the studies that are currently taking place and when can we expect results and are there any being initiated through one of our Federal Agencies?

Who would like to respond?

Mr. CARPENTER. I think I can probably answer that well. There are a number of studies. As already been mentioned, this INTERPHONE Study, it is a partnership between the World Health Organization and the cell phone industry. It is going on in a number of countries in Europe, also in Israel and Australia.

The report was expected about 2 years ago, and there have been preliminary reports released from some of the studies. And the latest gossip, at least, is that the members of the committee that are supposed to write the final report cannot agree, and nobody knows when this final report will be out.

One of the surprising findings is that for short-term use, many of these studies are showing a protective effect, in other words, fewer cases of brain cancer. That doesn't have any biologic sense. So it probably indicates a fault in the design of all of those studies.

Ms. WATSON. When you say short-term use, what do you mean?

Mr. CARPENTER. Less than 10 years.

Ms. WATSON. Using a cell phone for less than 10 years.

Mr. CARPENTER. That is correct.

Now some of those studies are getting information on more than 10 years, but apparently what they are finding is that it looks like in the short term it protects you from brain cancer. And then as time goes on, as you use it longer and longer, it gets near. It gets higher, but it never gets to statistical significance in all of the studies.

So that may reflect a real increase in risk with prolonged time, but it is still uncertain, and we are waiting for the full results to come out which may come out sometime in the next year.

Ms. WATSON. Would there be a difference in a person, say, that uses a cell phone?

When you said short-term use, I am thinking of the use of the cell phone by an individual, not the years that cell phone has been used by an individual but the use of time on your cell phone.

Mr. CARPENTER. Well, our understanding is that like any other environmental exposure, it is both how much time for how many years and also there is a factor of we are not all the same genetically.

Ms. WATSON. The length of calls.

Mr. CARPENTER. So there is a matter of variations and susceptibility, and these are all issues that have to be factored in, and that is why you need a large number of cases to really factor out the things that influence the risk of cancer.

Ms. WATSON. You mentioned the World Health Organization and other countries. Are there any studies being initiated here, FCC, FDA, at universities?

Mr. CARPENTER. I am not aware of any studies in the United States. The National Institute of Environmental Health Sciences did support a program on EMFs, but that ended in the late 1980's, 1990's, and there has been almost no attention to this issue in the United States. And this, in my judgment, is urgently needed with the best possible exposure assessment.

Dr. HERBERMAN. If I could just add a little bit to what Dr. Carpenter said.

Ms. WATSON. Please.

Dr. HERBERMAN. I agree completely with what his last remarks were. We urgently need such a study, and that is what I was alluding to at the end of my testimony.

One of the things that my colleagues at the University of Pittsburgh Cancer Institute are planning, particularly together with epidemiologists at M.D. Anderson Cancer Institute, but it would require the cooperation of the wireless industry, would be to obtain the billing records of use.

We know from other types of medical outcome studies that billing records are the most accurate, objective indication of use of various procedures and, rather than rely on likely faulty recollections, the billers get it right all the time.

They have the records of how much, how long, and that type of information that could be linked with other information that you have to get a history on—like is there also use of cordless phones and how much is that used—would, I think, take us a substantial distance toward a better, more definitive study than the ones that have been done so far.

Ms. WATSON. Would you yield me just another second to kind of summarize what I am thinking?

Mr. KUCINICH. The gentlelady may proceed.

Ms. WATSON. I think back to the years that it took us in California to study the effects of tobacco, 14 years, and California was the first State to come out with the no smoking policy. I remember under Governor Jerry Brown, it was no smoking on planes in Cali-

fornia air space. It has spread now globally—lead, asbestos and so on.

I am thinking is the industry so powerful that they have not wanted to engage in looking at the risk that comes about from high technology?

What I think we ought to do and certainly our chairman is very, very experienced in coming out with innovative approaches, but I think we ought to, as a committee, recommend to the FCC or the FDA or the National Institutes of Health that we start looking into these studies.

I think we need to drive this, Mr. Chairman. Thank you so much.

Mr. KUCINICH. Just to respond to my colleague, Congresswoman Watson, we will.

I also want to let you know that staff has informed us that most, if not all, cell phones currently come with some kind of a warning from the FDA. That may be because of more research that might be more recent than the FCC relies on for its specific absorption rate.

So one of the things we will need to do is to get these agencies to communicate with each other. That is No. 1.

But something that has come from this committee, I am going to comment on when I conclude these questions.

I want to just ask you to put yourself in a mother's or father's shoes. You are told to protect your children from certain TV programs, chemicals in the water and food, chemicals in the air. Parents have to protect a child from more things than we could even mention here today.

Now what we are doing in this hearing is empowering people with scientific information to further protect themselves. But is that realistic?

Should the onus be on the cell phone user or should the onus be on the companies that profit from this technology? Should they bear some burden? What should they do?

I would like to hear a response to that question, starting with Dr. Hoover and going down the line to Mrs. Marks, and if you could each keep your response brief.

Dr. HOOVER. Well, I think certainly knowledge, particularly knowledge disseminated to the public, is good and people can actually make personal decisions because obviously personal decisions about risk are widely variable. Even in this area, there are still people who talk on cell phones when they are in cars, and there is overwhelming evidence that is a very bad thing to do.

So I think that there is value to pushing out good information of what we know and what we don't know, so people can make those kind of risk decisions themselves.

I think in the area of making public health recommendations it is a lot trickier because the standard is usually quite a bit higher mainly because people believe that if it comes out as a public health recommendation, there is a whole lot of science behind it. We undercut ourselves if we don't demand that sort of science to make our public health recommendations.

I know I have been embroiled in Saccharin and bladder cancer and coffee drinking and pancreatic cancer, which had a fairly large constituency and evidence that someone should do something, but

the science was not there yet. And as the science got there, it became less true.

So I believe that there are two paths to go down. One is to get the information out so that people can make, can see what the level of evidence is and isn't and make personal decisions and to improve on what is really currently lack of adequate scientific evidence to move to a solid public health recommendation.

Mr. KUCINICH. Thank you.

Dr. Herberman.

Dr. HERBERMAN. I would urge that this committee use its powers of persuasion with the cell phone industry to fully cooperate in the design of independent studies done by academia as I described a minute ago to really get the answer. If the answer is that there is no connection between cancer and cell phone use, I would be absolutely delighted.

But I think we have to get the answer, and getting the billing records and cooperation of the industry I think is very important.

Mr. KUCINICH. Thank you.

Dr. Carpenter.

Mr. CARPENTER. I think there are three levels that are important. Certainly education of the public is important.

I think that it is really incumbent on the industry to take steps to find ways in which we can still use our cell phones but without greater risk.

And then, finally and perhaps in my judgment most importantly, I think there is a major responsibility of government, and I would point to my colleagues at the FCC. Their assumption that there is no adverse effect except tissue heating is simply wrong, and it comes from—as Mr. Knapp said—the IEEE.

This is a bunch of engineers. They are not people that have health background. They may have some health advisors, but it isn't the engineering community that should be setting the health standards.

And I am firmly convinced that the ultimate protector of the public has to be government. There are a number of other government agencies involved, but I think all three things are important.

Mr. KUCINICH. Mr. Knapp.

Mr. KNAPP. The standards that we are applying are based on what has been recommended not only by the IEEE and supported by other Federal Agencies, but that is what we have been advised is the appropriate level, and that is where we are applying to ensure that the products do comply with those levels as they go out the door.

We absolutely support continuing research into this. In fact, the FDA had tasked the National Academies to make recommendations for further study, and one of the first areas that they identified was continuing research relevant to this. And we completely support the further analysis of this issue.

Mr. KUCINICH. Mrs. Marks.

Mrs. MARKS. Well, as a parent, I feel that the responsibility lies with our government and the cell phone industry.

I am unaware of the thing that you mentioned about the FDA. I didn't feel that this fell entirely under their jurisdiction. I am not

aware that they are supplying warnings. So perhaps I am wrong, but I wasn't aware.

Mr. KUCINICH. I have been told by staff that there is some language in some of the instruction manuals for the cell phones, but language in an instruction manual which you may not really see is a little bit different than a warning.

Mrs. MARKS. Right. Also, I worry terribly about children, but I feel that their parents should be the ones regulating their use per government and cell phone industry warnings.

I also worry terribly about children who are going to be losing parents to this, such as my children. As much as I love children and I want to protect them, I think that we have to consider that also.

And I thank you, and I hope that we can make some changes.

Mr. KUCINICH. Thank you.

Does my colleague, Congresswoman Watson, have any closing remarks here?

Ms. WATSON. Let me just say how much I appreciate the testimony here today. I think it opens up our eyes as to what our responsibility should be. Government plays a tremendous role.

I am thinking about China and the babies that have died and gotten sick because there wasn't the oversight or the monitoring and what they put in the formula, and I think about Similac in the 1970's that was given to babies in Africa.

I am just saying where is the public's responsibility and government's responsibility to protect the public's health?

I am just appalled that studies have not been initiated, and I think I know why—because industry now and people have made millions off of these high technological devices without really taking time to look at their long-range effect.

I think that it is incumbent on us, Mr. Chairman, and I know that you share those thoughts as well. You demonstrated them in the past. So thank you very much, and I would like to thank our witnesses for the time they spent with us today.

Mr. KUCINICH. I thank the gentlelady.

I want to note for the record, apropos of what Dr. Herberman and Dr. Carpenter have mentioned, that in preparing her testimony, that Mrs. Marks did submit to this subcommittee extensive medical records of her husband, extensive cell phone records of her husband.

The committee will, of course, review those because it may be that a kind of evidentiary track will be quite significant in being able to continue our work to be able to see if there is a case made for stronger action.

I want to say in conclusion, I certainly thank all the witnesses. Each of you has brought something to this hearing that has been quite important.

Mrs. Marks, your family has suffered greatly, and I just want you to know on a personal basis that I am very impressed with your courage in coming here and telling this story. It can't be easy to do that.

Mrs. MARKS. It is not, and I thank you.

Mr. KUCINICH. I just want to note that, that it is much appreciated that you would care enough to bring your story to this committee and to back it up with facts.

Each of the witnesses has presented information that is going to be very valuable to us. I want you to know that this subcommittee will continue to retain jurisdiction over this matter.

We will continue to seek the cooperation of the industry. They will be given another opportunity to testify, and they will be asked to provide records with respect to these health issues. So we are not going to let this matter rest.

I want to take a note particularly about what information has been presented with respect to the possible adverse health effects concerning children. That is an area that has, I think, some urgent import, and I will be discussing this matter with other congressional leaders with respect to that.

I want to thank each and every one of you for your presence.

I am Dennis Kucinich, Chairman of the Domestic Policy Subcommittee of the Oversight and Government Reform Committee.

This has been a hearing of the subcommittee on the topic of "Tumors and Cell Phone Use: What the Science Says."

Again, thanks to all of you in attendance.

This committee stands adjourned.

[Whereupon, at 1:05 p.m., the subcommittee was adjourned.]