News & Comment

October 20... A spate of spurious stories that were in the news last week need to be aired and corrected. They also provide yet another reason to get the Interphone study out as soon as possible.

Le Soir, one of Belgium's leading French-language newspapers, kicked it off on the 15th. "GSM Is Carcinogenic" ran the headline at the top of its front page. The paper based its scoop on what it called the first results of the Interphone study, adapted from the latest project update, which had been posted on IARC's Web site the previous week. In fact, they were really old news. The last update, issued in February, had already included those results that point to a tumor risk. As Elisabeth Cardis, the coordinator of Interphone, later confirmed to *Microwave News,* "There is nothing new in terms of risk in that [October] update." In two follow-on stories in its inside pages, *Le Soir* took a more measured tone, noting that these new "disturbing" results need to be confirmed. Cardis, now at CREAL in Barcelona, told the paper: "We must remain cautious in the interpretation of the Interphone results" —which stands in contrast to the less than cautious warning on page one.

By the following day, the "news" had crossed the North Sea and been amplified by a couple of U.K. papers. "Mobile phones do increase the risk of brain cancer," stated both the *Telegraph* and the *Sun.* The papers ran identical quotes from Cardis: "To underestimate the risk would be a complete disaster." This did not fit with what Cardis has said in the past and was even inconsistent with her interview with *Le Soir.* Not surprisingly, Cardis told us that the quote was wrong. She disavowed it.

We saw Cardis at a workshop hosted by the Swiss national EMF research program in Zurich earlier this month, where she gave a talk on her latest project: the soon-to-be-funded MOBI-Kids, an 11-country study on the possible carcinogenic effects of mobile phones on children and adolescents. As we always do, we asked when the Interphone results would be submitted for publication. We got the now-standard answer. "Soon," she said. Cardis seemed genuinely candid and we believed her.

We hope Cardis is right this time and that we aren't being too credulous. Otherwise the rumor mills will continue to spew out more nonsense about what we do and do not know about the consequences of long-term cell phone use. It's easy to blame the press, but equally responsible are those members of the project who have been arguing about how to present the results for three long years without reaching consensus.

September 30... In many ways, last Thursday's Congressional hearing on cell phone cancer risks, called by Rep. Dennis Kucinich (D-OH), brought few surprises. David Carpenter and Ronald Herberman made the case for precaution, especially for children, while National Cancer Institute's Robert Hoover countered that he is not persuaded that there's anything to worry about.

One piece of compelling news did emerge, however —though it never made it into the mainstream press: Brain cancer appears to be on the rise among young adults. Herberman testified that, on looking at government statistics, he was "struck" by the fact that the incidence of brain cancer has been increasing over the last ten years, particularly among 20-29 year-olds. If the latency for brain tumors is more than ten years and cell phone are in fact responsible for the increase, cancer rates might not peak for at least another five years, according to Herberman.

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September 28... Are you confused about cell-phone tumor risks? Need a roadmap to the epidemiological studies? Want a handle on their strengths and weaknesses? Then read Michael Kundi's new review, "The Controversy About a Possible Relationship Between Mobile Phone Use and Cancer," in *Environmental Health Perspectives.* (*EHP* is an open access journal and all its papers are available for free.) Kundi, an epidemiologist and the head of the Institute of Environmental Health at the University Medical of Vienna, is not totally convinced that there is such a link, but he is persuaded that it's looking that way. So far, Kundi finds, the epidemiological evidence points to an association of "moderate strength," similar to the one for passive smoking and lung cancer, and that there are as yet "no valid counterarguments and no strong evidence" to shake his confidence in a causal relationship.

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September 26... This week's *Economist* features the harshest criticism of the Interphone project to date. Under the headline "Mobile Madness," the article charges that the "massive" study "has ended in chaos" —even before the final paper has been submitted for publication. The magazine goes on to say that, because nine of the 13 participating countries have reported their findings individually, the public has been assaulted with a "farrago of misinformation." Nic Fleming, who wrote the unsigned piece, cites an anonymous source as saying that the relations among the Interphone researchers are "strained" (see June 19 below). Indeed, except for a couple of quotes from Elisabeth Cardis, the head of Interphone, most of the story is presented without attribution. Formerly a reporter for the *Telegraph,* Fleming pins his hopes of finding out whether there is cell phone-tumor risk on future prospective studies, however long they might take.

September 23... The latest issue of the *NCI Cancer Bulletin,* released today, presents the National Cancer Institute's outlook on the cancer risks associated with cell phones. It is based largely on the views of NCI's Peter Inskip.

Here is NCI's bottom line: "The suggestion that using a cell phone may increase a person's risk of developing brain cancer [is] not supported by a growing body of research on the subject." And Inskip adds this: Of all the potential health risks associated with cell phones that have been examined so far, the most convincing evidence concerns the risk of motor vehicle accidents among people distracted by using their cell phone while driving.

Inskip was scheduled to testify at Thursday's Congressional hearing (see **September 17 & 18**, below), but, at the last minute, he was replaced by Robert Hoover, the director of the Epidemiology and Biostatistics Program in NCI's Division of Cancer Epidemiology and Genetics.

As we have reported now many times, the primary concerns about tumor risks are over what happens in the long-term, that is, usually after at least ten years. This is based on both the work of Lennart Hardell and the Interphone teams from five Northern European countries. Like Hardell, the pooled data from these five countries show an increased risk of risk of glioma and acoustic neuroma (two types of tumors) on the same side of the head the phone was used, *but only after ten years.* Instead, Inskip and the NCI focus on what has been reported for exposures of ten years *or less.* As Inskip states and the NCI highlights in large type: "We now have studies covering up to ten years of cell phone usage, and we're still not seeing any convincing evidence of an increased brain cancer risk." With respect to Interphone, the NCI skips over the key findings on long-term risks in the two five-country meta-analyses, noting only: "[S]ome of the 13 participating countries have pooled their data and reported little or no effect on the risk of brain tumors."

To support the contention that there is nothing to worry about, the NCI cites two epidemiological studies: one on Motorola workers by a group at Exponent, a consulting firm, and one on Navy radar technicians during the Korean War. Both are vitiated by lousy exposure assessment. As was pointed out in a commentary accompanying the Exponent study: "A more notable limitation ... is the absence of information on mobile telephone use or RF exposures." This means that no one knows whether the Motorola employees were actually exposed to any electromagnetic radiation (see *MWN,* M/A00, p.7).

In the process, the NCI makes a telling error: Instead of citing the Navy radar study, it links to a 1995 review by John Goldsmith, the noted environmental epidemiologist. In this paper, Goldsmith concluded that there was —even then— enough evidence pointing to microwave-induced health effects, including cancer, to warrant a precautionary policy of limiting exposures. Goldsmith closed with these prescient words:

> "There are strong political and economic reasons for wanting there to be no health effect of RF/MW exposure, just as there are strong public health reasons for more accurately portraying the risks. Those of us who intend to speak for public health must be ready for opposition that is nominally but not truly scientific."

Maybe the NCI cited the right paper after all.

September 22... Peter Inskip, an epidemiologist at the National Cancer Institute, has been added to the witness list for Thursday's Congressional hearing on "Tumors and Cell Phone Use: What the Science Says" (see **September 18**, below). He was invited by the Republican members of Rep. Kucinich's subcommittee. In a paper published in 2001, Inskip reported finding no increased risk of brain tumors or acoustic neuromas among cell phone users. Because the NCI study began in 1993 when phones were relatively new, it could not shed much light on possible long-term risks. Inskip is a member of the advisory panel for the Interphone study.

September 18... "Where is Interphone?" asked Ian Gibson, a member of the U.K. Parliament, at last week's Radiation Research Trust (RRT) conference in London. "Whose desk is it on?" No one offered an answer, not even Anders Ahlbom, a member of the Swedish Interphone group, who earlier that morning had given a talk on EMF epidemiology.

During the lunch break, we ran into Mike Repacholi, who with RRT's Eileen O'Connor, had helped organize the meeting at the Royal Society. We asked what he had heard: Was the Interphone team making progress towards resolving the deadlock now

well into its third year? Early last month, Elisabeth Cardis, the study director, told the French press that the final paper on possible cell phone links to brain tumors would likely be submitted for publication by now (see August 1 below). Repacholi's message was don't hold your breath. "It seems that they've still got a lot to resolve," he said. "The study team is not close to consensus." In fact, he went on, "The positions seemed to have hardened."

When we got back to New York, we checked in with Cardis. "It's true the paper has not yet been submitted," she said, explaining that that it's hard to make progress over the summer with so many people on vacation. When might we expect a consensus draft? "Very soon," Cardis told us.

Ian Gibson, a Labor MP who was a cancer researcher before he got into politics (he did a postdoc at Indiana University), is one of the few elected officials watching out for Interphone. Another is Dennis Kucinich, the Ohio congressman and former presidential candidate. Kucinich may well bring it up next Thursday, September 25th, when his Domestic Policy Oversight Subcommittee hosts the first Congressional hearing on cell phones in 15 years. Among those slated to appear are David Carpenter, a coeditor of the BioInitiative Report, Ronald Herberman of the University of Pittsburgh Cancer Institute (see July 23, 25 & 28 below) and the FCC's Julius Knapp, as well as Ellen Marks of California, whose husband is a brain tumor survivor. A Congressional aide said that the CTIA, the wireless lobby group, was invited but declined to testify.

September 13... A number of mainstream newspapers, including the *Wall Street Journal* and the *Seattle Post Intelligencer*, have picked up the NIEHS–EPRI story on their Web sites (see September 5, below). The *PI*'s Andrew Schneider reports that some at NIEHS are "outraged" by the tie-in with EPRI. "I know we are having budget problems like the rest of the government research labs, but to sell out integrity for a few hundred thousand dollars of industry money means we should hang a large red light over the door and just admit what we are," one staffer told him. ... We grossly underestimated the cost of some EPRI reports in our last post. Today EPRI sent us an announcement for *Overview of Personal Radiofrequency Communication Technologies,* a primer on RFID, WiFi, WLAN, WiMax and cell and cordless phones as well as much else. The price: $25,000.

September 5... In an unprecedented move, the Electric Power Research Institute (EPRI), the research arm of the utility industry, will sponsor a public information booklet on EMFs for a unit of the National Institutes of Health (NIH). The National Institute of Environmental Health Sciences (NIEHS) is working out an arrangement whereby EPRI would pay for the writing and printing of a new edition of the NIEHS booklet, *EMFs: Questions & Answers.*

"This would be absolutely hands off," Christine Flowers, the director of communications at NIEHS in Research Triangle Park, NC, told *Microwave News.* "They cannot influence the document."

News of the deal landed with a thud. "This is an outrageous proposal that should not be allowed to happen," said David Carpenter the director for the Institute for Health and the Environment at the State University of New York in Albany. "The public health issues are too serious to allow them to be perverted by EPRI and the industry. NIEHS has no business taking funds from a group with such a clear conflict of interest." Carpenter led the New York Power Line Project in the 1980s.

"It does sounds strange," said Michael Gallo of the Environmental and Occupational Health Sciences Institute in Piscataway, NJ, who has had a long association with NIEHS. "If totally funded by EPRI, it would then raise the question of objectivity," he added.

Another observer commented that this would be like having Exxon pay for an EPA pamphlet on global warming. No one interviewed, including those at NIEHS, could offer an example of an industry group paying for a government public health document in which it has a direct stake.

"You need a sharp line between government and industry," commented Seth Shulman, the author of *Undermining Science: Suppression and Distortion in the Bush Administration.* "This makes me very uncomfortable, it seems highly inappropriate."

Merrill Goozner, the director of the Integrity in Science project at the Center for Science in the Public Interest in Washington, offered a similar view: "This is a new one on me and it sounds a little dangerous."

Chris Portier, the associate director of NIEHS, is brokering the deal between the institute and EPRI. "If they are truly going to do this with no strings attached, it would be remiss of me not to accept it," he said in an interview. Portier explained that EPRI would contribute to the NIEHS' "Gift Fund" and then "we could spend it any way we want." He estimated that the job would cost $100,00- $130,000 for 30,000 copies and take 12 to 15 months to complete. "We will not do it in-house, a contractor would do it," Portier said.

In a flyer that seeks contributions from member electric utilities, EPRI explains the need for a new Q&A booklet, which was last revised in 2002:

> "It is critically important that the public relies on EMF health-related information that is timely and relevant. Since 2002, the research conducted on EMF health effects... has expanded... An update to the 2002 edition of the report will ensure that the public has access to the best information when deliberating over new transmission line projects."

EPRI is asking participating utilities to contribute $30,000 apiece.

One of the ironies of this project is that, in recent years, EPRI has taken a stand against public information, denying the public access to its research findings. Reports that EPRI used to make available to the press and interested parties are now kept under wraps. The only way to obtain an EPRI report today is to buy it at a cost of $5,000 or more. Rob Kavet, the director of EPRI's EMF program, and his predecessor, Leeka Kheifets, have made it difficult to get even the most basic information about EPRI's activities. Kavet routinely declines to respond to e-mails for clarification on EMF issues, as does the EPRI office of media relations. Since returning from serving as Mike Repacholi's assistant at the WHO EMF project in Geneva, Kheifets has gone back to work as an EPRI consultant.

The first edition of the Q&A booklet was released in 1995 and revised in 2002. NIEHS' Mary Wolfe, who coordinated the last revision, will also work on the new round, Portier said.

September 3... Making sweeping statements about scientific knowledge is always challenging, especially when writing about an unfamiliar field of research. Take, for example, this opening sentence from an article, "Fraud Charges Cast Doubt on Claims of DNA Damage from Cell Phone Fields" by Gretchen Vogel in this week's *Science* magazine:

> "The only two peer-reviewed scientific papers showing that electromagnetic fields (EMFs) from cell phones can cause DNA breakage are at the center of a misconduct controversy at the Medical University of Vienna."

Sweeping ... and wrong.

Not counting the two papers from Hugo Rüdiger's lab in Vienna, here are 11 papers that point to changes in DNA breaks following exposures to cell phone radiation:

- R.J. Aitken et al., "Impact of Radiofrequency Electromagnetic Radiation on DNA Integrity in the Male Germline," *International Journal of Andrology, 28,* pp.171-179, 2005 (Australia);
- W. Baohong et al., "Studying the Synergistic Damage Effects Induced by 1.8 GHz Radiofrequency Field Radiation (RFR) with Four Chemical Mutagens on Human Lymphocyte DNA Using Comet Assay *in Vitro*," *Mutation Research, 578,* pp.149-157, 2005 (China);
- W. Baohong et al., "Evaluating the Combinative Effects on Human Lymphocyte DNA Damage Induced by Ultraviolet Ray C Plus 1.8 GHz Microwaves Using Comet Assay *in Vitro*," *Toxicology, 232,* pp.311-316, 2007 (China);
- G. Gandhi and Anita, "Genetic Damage in Mobile Phone Users: Some Preliminary Findings," *Indian Journal of Human Genetics, 11,* pp.99-104, 2005 (India);
- J. Kim et al., "*In Vitro* Assessment of Clastogenicity of Mobile-Phone Radiation (835 MHz) Using the Alkaline Comet Assay and Chromosomal Aberration Test," *Environmental Toxicology, 23,* pp.319-327, 2008 (Korea).
- S. Lixia et al., "Effects of 1.8GHz Radiofrequency Field on DNA Damage and Expression of Heat Shock Protein 70 in Human Lens Epithelial Cells," *Mutation Research, 602,* pp.135-142, 2006 (China);
- J. Phillips et al., "DNA Damage in Molt-4 T-Lymphoblastoid Cells Exposed to Cellular Telephone Radiofrequency Fields *in Vitro*," *Bioelectrochemistry and Bioenergetics, 45,* pp.103-110, 1998 (U.S.);
- T. Nikolova et al., "Electromagnetic Fields Affect Transcript Levels of Apoptosis-Related Genes in Embryonic Stem Cell-Derived Neural Progenitor Cells," *The FASEB Journal, 156,* pp.495-502, 2001 (Germany);
- K. Yao et al., "Effect of Superposed Electromagnetic Noise on DNA Damage of Lens Epithelial Cells Induced by Microwave Radiation," *Investigative Ophthalmology & Visual Science, 49,* pp.2009-2015, 2008 (China).
- K. Yao et al., "Electromagnetic Noise Inhibits Radiofrequency Radiation-Induced DNA Damage and Reactive Oxygen Species Increase in Human Lens Epithelial Cells," *Molecular Vision, 14,* pp.964-969, 2008 (China).
- D. Zhang et al., "Effects of GSM 1800 MHz Radiofrequency Electromagnetic Fields on DNA Damage in Chinese Hamster Lung Cells," *Chinese Journal of Preventive Medicine, 40,* pp.149-152, 2006 (China, in Chinese).

Some of these experiments investigated the effects of cell phone radiation alone while others looked at synergistic action with other agents. Some found large effects, while others saw small ones. Most found increased DNA breaks, while Jerry Phillips measured both increases and decreases. Nevertheless, they all reported DNA changes with cell phone radiation.

In addition, others have shown chromosomal changes following exposure to cell phone radiation. For instance:

- L. Manti et al., "Effects of Modulated Microwave Radiation at Cellular Telephone Frequency (1.95 GHz) on X-Ray-Induced Chromosome Aberrations in Human Lymphocytes *in Vitro*," *Radiation Research, 169,* pp.575-583, 2008 (Italy);
- M. Mashevich et al., "Exposure of Human Peripheral Blood Lymphocytes to Electromagnetic Fields Associated

with Cellular Phones Leads to Chromosomal Instability," *Bioelectromagnetics, 24,* pp.82-90, 2003 (Israel);

• P. Sykes et al., "Effect of Exposure to 900 MHz Radiofrequency Radiation on Intrachromosomal Recombination in pKZ1 Mice," *Radiation Research, 156,* pp.495-502, 2001 (Australia).

And finally, a number of researchers have documented DNA changes at other, similar microwave frequencies but which are not used in mobile phone networks. For instance:

• H. Lai and N.P. Singh, "Acute Low-Intensity Microwave Exposure Increases DNA Single-Strand Breaks in Rat Brain Cells," *Bioelectromagnetics, 16,* pp.207-210, 1995 (U.S.);

• H. Lai and N.P. Singh, "Single- and Double-Strand DNA Breaks in Rat Brain Cells After Acute Exposure to Radiofrequency Electromagnetic Radiation," *International Journal of Radiation Biology, 69,* pp.513-521, 1996 (U.S.);

• R. Paulraj and J. Behari, "Single-Strand DNA Breaks in Rat Brain Cells Exposed to Microwave Radiation," *Mutation Research, 596,* pp.76-80, 2006 (India);

• S. Sarkar et al., "Effect of Low-Power Microwave on the Mouse Genome: A Direct DNA Analysis," *Mutation Research, 320,* pp.141-147, 1994 (India);

• M. Zhang et al., "Study of Low-Intensity 2450 MHz Microwave Exposure Enhancing the Genotoxic Effects of Mitomycin C Using Micronucleus Test and Comet Assay *in Vitro," Biomedical and Environmental Sciences, 15,* pp.283-290, 2002 (China);

• M. Zhang et al., "Effects of 2450 MHz Microwave on DNA Damage Induced by Three Chemical Mutagens *in Vitro," Chinese Journal of Industrial Hygiene and Occupational Diseases, 21,* pp.266-269, 2003 (China, in Chinese).

Sources tell us that there are more papers now in the publication pipeline.

None of this should be interpreted as indicating that the cell phone–DNA issue is closed. Others have failed to see such genetic effects and the jury is still out. But, clearly, to state that only two papers have shown DNA breaks is grossly misleading —no, simply wrong.

We have been closely following the University of Vienna story for some months and we will be reporting on it in detail sometime soon. The *Science* story reveals but a glimpse of some of the maneuvering going on behind the scenes; in this case, manipulating the media to influence public opinion. At the moment, we are still trying to sort out who is doing what.

September 2 ... While we were away on a summer break, another Interphone paper was released online: An analysis of the incidence of meningiomas (brain tumors) among cell phone users in five Northern European countries. It comes from the same teams that have previously reported increased risks of both glioma (another type of brain tumor) and acoustic neuroma (a tumor of the acoustic nerve) among long-term users. This time around the researchers from Denmark, Finland, Norway, Sweden and the U.K. say that they did not uncover anything of note. Here's the summary statement from their paper in the *International Journal of Epidemiology*:

"We did not find evidence of increased risk of meningioma in relation to mobile phone use, as regular use, years since first use, lifetime years of use or cumulative number of calls, were not associated with an increased risk."

Yet, if you take a close look at the tables in the paper, some anomalies pop out. First and foremost, the calculated tumor risks or odds ratios (ORs) are all low. (An OR of less than one is protective, and an OR greater than one is detrimental.) There are two possible explanations: either cell phones confer close to instant protection against meningiomas, or —much more likely— some systematic bias skewed the study.

We counted 65 ORs in the tables; 62 of these are below one. If cell phones have no effect, good or bad, all the odds ratios should be randomly distributed above and below one. But in the new meningioma paper, only three are above one. The Interphone teams acknowledge this surplus of low ORs. The "likely explanation," they say, is selection bias, which can lead to "the underestimation of the risk."

What they don't mention in the paper is that all three ORs that rise above one are risks for long-term users —that is, those who have used cell phones for ten or more years have the highest risks. Nor do the research teams compare these new results for meningiomas with their previously published findings showing elevated risks for glioma and acoustic neuroma among the same class of long-term users.

Sam Milham, an epidemiologist who has continued to work on EMFs since he officially retired some years ago, has published three different letters to the editors (two to the *American Journal of Epidemiology* and one to the *British Journal of Cancer)* questioning the low ORs in papers published by the Interphone teams from these five European countries. We called him and asked what he thought of this new paper.

"It's déjà vu all over again," replied Milham. "I guess I'm going to have to write another letter." "But there's more," he said, "there's a striking trend in the ORs." Milham explained that in 16 of 17 categories of exposure and latency among cell phone users, the OR in the most exposed groups is greater than the OR in the lowest exposed groups. Yet, that's not the case for

contralateral risks —for tumors on the side of the head not exposed to the phone. In only one of these three categories is the OR greater in the highest exposure group.

"The bottom line," Milham concluded, "is that I think the paper shows that cell phones are in fact associated with meningiomas."

Everyone agrees that there are at least two kinds of bias potentially at work in the Interphone studies: selection bias which tends to lower observed risks, as in this latest paper, and recall bias which would raise the risks. We are told that the final paper has been delayed for close to three years because the participants cannot agree how to interpret the elevated risks from long-term use. It appears that that some members of the Interphone project have no problem publishing papers with consistently low ORs, but have qualms about releasing results with high ones. Call it publication bias.

So, where are we? Even before the final Interphone paper is published, we can be sure that, when it does finally appear, the controversy over long-term tumor risks will continue. Some say that prospective epidemiological studies (for instance, COSMOS) are the way to resolve the uncertainties. They may well help, but we would have to wait for a generation for the results. Epidemiologists no doubt favor 25-30 year projects —think of it as lifetime employment— and the mobile phone industry would also welcome a time-out, but from a public health point of view, this is unacceptable.

Download a pdf of our July/August 2008 "News & Comment"

August 1... The results of the Interphone study may finally surface by the end of the year. In an interview with *Le Monde*, published today, Elisabeth Cardis said the paper with the combined data from the 13 participating countries should be submitted for publication in September. If the peer-review process proceeds smoothly, it should then be available in the late fall. Cardis, the leader of the Interphone project who is now at CREAL in Barcelona, confirmed the schedule to *Microwave News*.

A couple of weeks ago, Martine Hours, the head of the French Interphone team, explained the reason for the delay to *L'Express*, a news weekly. While the Interphone data do point to an elevated tumor risk among long-term cell phone users, Hours said that one-third of the Interphone researchers believes the observed excess is an artifact due to bias in the study. Another third thinks that the observed effect is in fact real, while the others are agnostic, arguing that it is impossible to reach a conclusion. Cardis agrees with Hours's breakdown. "There are indeed three groups of roughly similar size," she told us.

"It's high time to publish the results and air our disagreements," Hours said in her interview wth *L'Express*. "The longer we wait, the more the rumor mill will keep on growing."

July 29... On tonight's *Larry King Live*, Otis Brawley, the chief medical officer of the American Cancer Society, called for the release of the Interphone study on the possible cell phone-tumor link. Here's what he said, according to a "rush transcript" from CNN: "I think we're going to have to look at the Interphone Study very carefully. For those listeners who don't know, the Interphone Study is run by the World Health Organization of the United Nations. It's actually been completed for about two and a half years and the people who actually ran the study have yet to publish it. There's a lot of discussions going on amongst those scientists as to exactly what the data show. And it would be really nice if it were published, I must tell you." **July 30...** The transcript is now available. **July 31...**NEXT-UP, the European activist organization, has posted a video of Larry King's 23-minute, cell-phone segment on its Web site. See also CNN's "5 Tips To Limit Your Cell Phone Risk" out today.

July 28... The University of Pittsburgh Cancer Institute's alert continues to attract media interest. CNN's *Larry King Live* has scheduled a new show on "Cell Phone Dangers" for tomorrow (Tuesday) night. (The last one was on May 27.) Sources at CNN told us that the guest list now includes: Keith Black, a neurosurgeon at the Cedars-Sinai Medical Center in Los Angeles, Otis Brawley, the chief medical officer of the American Cancer Society, Devra Davis of the University of Pittsburgh Cancer Institute, Sanjay Gupta, CNN's chief medical correspondent, Paul Song, a radiation oncologist in Los Angeles and Ted Schwartz, a brain surgeon at the Columbia-Presbyterian Medical Center in New York City. The line-up may change before air time. Black, Gupta and Schwartz were also on the May 27 show.

July 25... At this writing, Google News has a list of some 900 articles on the cell phone health alert issued by the University of Pittsburgh a couple of days ago. The *Post-Gazette*, the hometown paper, broke the story on the same day (it got an advance copy), and though some newspapers like the Baltimore *Sun* ran their own write-ups, the vast majority relied on the Associated Press for their coverage.

Unfortunately, the AP reporters made a hash of it. Their story suffers from a number of serious errors as well as misplaced emphases, which made it seem as if the actions of Ronald Herberman, the director of the University's Cancer Institute, were

misguided and inconsistent with the published literature.

Here are some corrections and clarifications:

• The AP reporters cite a 2008 University of Utah meta-analysis of nine published studies as finding no brain tumor risks among cell phone users. In fact, it did point to a 25% increase among long-term users, that is, those who had used a mobile phone for ten or more years. This increase reached (just) statistical significance.

• The AP states that Herberman is relying on the as-yet unpublished Interphone study, a 13-country effort to investigate possible tumor risks from cell phone use. It's true that the overall Interphone results have not yet been public —it's now close to three years behind schedule— but a number of the participating countries, either individually or in groups, have reported elevated incidences of three different types of tumors: glioma (brain tumors), acoustic neuroma, and parotid gland tumors among long-term users. These findings have been published in leading peer-reviewed journals.

• The AP states that the Interphone study suffers from selection bias and casts doubt on the reliability of its risk estimates. This remains an open and highly contested issue among members of the project team and is a major reason for the delay in the release of the final results. While the NRC's recent report cites selection bias as a possible confounder, it also details other reasons as to why the Interphone study may underestimate the risks. It is far too early to toss out the project's final results as unreliable. Shouldn't we at least wait for it to be published before trashing ten years of work?

• While the French Interphone study does not show significant elevated risks, it does point to increases. These were sufficiently strong to prompt the French Ministry of Health to issue an advisory reiterating the recommendation that children be discouraged from using mobile phones.

• It's true that most studies have not indicated a tumor risk, but most of these have only looked at short-term users. For instance, the Muscat study included only 17 cases which had used a phone for four or more years. The NCI study also had very few long-term users: 22 who had used a cell phone for five years or more. Neither discloses how many had used a phone for at least ten years —maybe none.

• It's also true that the Danish study showed no increased risks. But as a cohort study it could not provide any information on the side of the head the phone was used, which, not surprisingly, turns out to be a key variable. The study also excluded corporate accounts, which tended to have the heaviest users.

To be sure, the jury is still out on cell phone health risks. That said, it will be a long time before we know what the true risks may be. It seems that the American Cancer Society is waiting for *conclusive* data showing elevated tumor rates before it is willing to advise caution. And some like physicist Robert Park will never acknowledge there might be a risk regardless of what studies might show.

What we have now are highly suggestive results from a number of different Interphone groups, as well as those from a separate team led by Sweden's Lennart Hardell, that point to long-term health risks. Surely it is time to have an open discussion on what these data mean and how we should protect the most vulnerable in our society. After all, there are now 260 million regular users in the U.S. and more than two billion worldwide, and the wireless phone industry, still looking to grow, is marketing its phones to younger and younger children. This is exactly what Herberman has achieved with his alert.

They say journalism is the first draft of history, but in this case the AP story was a rough draft at best. But we should also understand that writing a story on a complicated subject under a tight deadline is far from easy. Reporters must rely on their sources to point them to the facts. In this case, they were misled by those who want to play down the risks so that our love affair with cell phones can continue unchallenged.

July 23... One of the hallmarks of the cell phone health controversy has been the silence of the U.S. public health communities. No medical, consumer, environmental or labor group has called for precaution, or even for more research. The American Cancer Society, for instance, has adopted a what-me-worry approach. Indeed, CTIA, the industry lobby group, routinely refers press inquiries about possible health impacts to the ACS. As for the Consumers Union, it has decided not to get involved, preferring instead to advise its members on how to pick the best phones and find the best service contracts. Ronald Herberman, the director of the University of Pittsburgh Cancer Institute, has taken a new course. In a memo to the institute's faculty and staff released today —and featured on the front page of the *Pittsburgh Post-Gazette*— Herberman offers "practical advice" to limit exposures from cell phone radiation (see also the accompanying "The Case for Precaution in the Use of Cell Phones"). These recommendations include: "Do not allow children to use a cell phone, except for emergencies." The Pitsburgh initiative follows from the Appeal for Caution launched in France last month by David Servan-Schreiber (see **June 19** post below). Among the Americans who have signed the appeal are David Carpenter, Devra Davis and Dan Wartenberg.

July 22... The brains of young children absorb twice as much as RF energy from a cell phone as those of adults, according to a set of new calculations carried out by Joe Wiart's research group at France Telecom in the suburbs of Paris.

"[Our] analysis confirms that peripheral brain tissues of children seem to be higher exposed than the peripheral brain tissue of adults," Wiart concludes in a paper that appears in the July 7 issue of *Physics in Medicine and Biology*. "Children are not simply small adults." Wiart explained in an interview with *Microwave News.* "Their skin and their skulls are thinner than those of adults, and their ears are smaller too," he said. "Given these differences, the higher SAR for children is not surprising,"

These new findings apply to children who are eight years old or younger. Above the age of eight, the SARs in children are much like those of adults, according to Wiart.

"I agree with Joe," said Niels Kuster, the director of the IT'IS Foundation in Zurich. A team led by Kuster and Andreas Christ recently completed a project for the German Federal Office of Radiation Protection (BfS), which like Wiart, found that regions of the brains of young children can have exposures that are twice those of adults —or even higher.

Even more striking, Kuster and Christ concluded that the "exposure of the bone marrow of children can exceed that of adults by about a factor of ten." They also report that children's eyes are more highly exposed that those of adults.

Whether or not children are at a greater health risk than adults has been debated since at least the year 2000, when a U.K. panel chaired by Sir William Stewart advised that parents limit their children's use of mobile phones. Since then, other government groups, especially those in France and Germany, have issued similar precautionary recommendations.

The mobile phone industry has long disputed the possibility that children are at any greater risk. For instance, earlier this year after the French Ministry of Health reiterated concerns over children's use of cell phones, the MMF, an industry lobby group, issued an advisory stating that cell phones do not present health risks to any users "regardless of age."

The MMF has relied heavily on statements issued by the WHO's EMF Project in Geneva, and the Health Council of the Netherlands. For instance, in a paper published in 2004, the Health Council concluded that: "There is no convincing scientific data to assume a difference in the absorption of electromagnetic energy in heads of children and adults."

July 3... Exposures to ambient magnetic fields may affect the quality of human sperm and may well explain its well-documented decline over the last few decades. De-Kun Li, an epidemiologist at Kaiser Permanente in Oakland, CA, has found that daily exposures of only 1.6mG or higher for at least two-and-a-half hours were associated with significantly poorer semen quality. Men who were exposed to over 1.6mG for over six hours a day were four times more likely to have substandard sperm.

"The longer you are exposed, the higher the risk," Li told *Microwave News.* He presented these new findings last week at the annual meeting of the Society for Epidemiologic Research, held in Chicago. He has submitted them for publication.

"If it holds up, this would be very important because magnetic field exposures are ubiquitous," Li said. "We know that sperm quality has been going down for a long time with the largest declines in urban areas. That would be consistent with EMF exposures which are highest in cities."

The quality of the semen was assessed according to WHO criteria for motility and morphology —that is, the ability of sperm to "swim" (to the egg) and their shape. "Sperm quality could turn out to be a sensitive endpoint to study the biological effects of EMFs," Li said.

Li is one of the few to explore new ways of defining what is a biologically significant dose of EMFs. An important implication of his new study is that while he might classify a man as being in a "high" exposure group, that same man could still have a time-weighted, 24-hour average exposure of less than 1mG, which would put him in the "unexposed" group in most past studies. Such a misclassification would reduce the chances of seeing this effect.

In a study published in 2002, Li showed that women exposed above a certain threshold (16mG) had higher rates of miscarriages (see *MWN,* J/F02, p.1). At the time, many considered that this new concept of EMF dose was worth pursuing. But, in fact, no one did —at least no one has yet published a follow-up study. "In that earlier study we saw higher miscarriage risks among women who had an exposure of more than 16mG at least once a day," Li said, "in our new study, men had poorer sperm quality if they were exposed to a much lower field but it had to be for at least 10% of the day."

The power-frequency fields implicated in this new study are extremely weak. They are approximately 1,000 times lower than the current ICNIRP guidelines and some three times lower than what many see as the threshold for increasing the risk of childhood leukemia (3-4mG). According to a large-scale survey carried out a decade ago, close to 15% of the U.S. population

is exposed to an average of more than 2mG over a 24-hour period (see *MWN,* M/J98, p.4).

Download a pdf of our May/June 2008 "News & Comment"

June 29... The delay in the release of the results of the Interphone project is getting wider and wider attention. The *International Herald Tribune* will feature a story, "Rift Delays Official Release of Study on Safety of Cell Phones," tomorrow, Monday, June 30 —with a blurb for the piece on the front pages of both the European and Asian editions.

Interphone: The Cracks Begin To Show

Cardis Endorses Precaution

Download a pdf of this news and comment

June 19... The divisions within the Interphone project are coming out into the open. As the delay in releasing the final results approaches the three-year mark, the tensions within the study team are no longer much of a secret. It's even becoming clearer who is in which camp —who believes that cell phones present a tumor risk and who thinks the phones are safe.

All this came into focus at last week's Bioelectromagnetics Society (BEMS) annual meeting in San Diego, which featured a panel discussion on cell phones and brain tumors, with special emphasis on the 13-country, $15-plus million Interphone epidemiological study of tumors among users of mobile phones. Near the end of the two-plus-hour session, ex-Motorola staffer Mays Swicord came to the microphone and, with a single word, voiced the question on everyone's mind. "When?" he asked Elisabeth Cardis, the head of Interphone. She replied with what has become her trademark answer: "Soon, I hope." Last March, Cardis left the International Agency for Research in Cancer (IARC) to join the Center for Research in Environmental Epidemiology (CREAL) in Barcelona.

Outside the meeting room, Sweden's Lennart Hardell spoke about the delays at Interphone: "It's not fair to public health to withhold the Interphone results, after all the public paid for most of it." In his BEMS presentation, Hardell concluded that his own studies show a "consistent pattern of increased risk for glioma and acoustic neuroma after ten years." He noted that he believes that a ten-year tumor latency is the "minimum" —that is, the observed risks are likely to grow larger in the years ahead.

Not long after arriving in San Diego, we heard that some progress had been made: A new draft of the final Interphone paper has been completed and was being reviewed by the research teams in all 13 countries. Cardis later confirmed this to *Microwave News,* but she was quick to add that other "final" versions had circulated in the past. When asked whether she was pleased with this latest draft, Cardis declined to offer an opinion. Maria Feychting, who is leading the Swedish Interphone group, also refused to comment. Germany's Joachim Schüz (now in Denmark) was less reticent. "I am very happy where we are now," he told us. "We are extremely close." No one was yet willing to predict when the final Interphone paper would finally be submitted to a journal for publication.

A three-member committee made up of Finland's Anssi Auvinen, Canada's Jack Siemiatycki and New Zealand's Alistair Woodward assembled the most recent draft of the Interphone paper. The project teams in Canada and New Zealand have not yet revealed their own findings, preferring instead to present their results in the joint 13-country paper. The Finnish group reported its data as part of a joint analysis with those from four other Interphone countries (Denmark, Norway, Sweden and the U.K.). Together they reported an elevated risk for brain tumors and acoustic neuroma among long-term cell-phone users.

Even as a new consensus draft has emerged, the split within the project has become move visible. A number of sources close to the project revealed that Feychting, who served as the chair and moderator of the BEMS session, is firmly in the "there is no risk" group, as are Schüz together with Canada's Dan Krewski and U.K.'s Tony Swerdlow. They argue that any observed associations pointing to an elevated tumor risks are more likely due to biases inherent in the study design. For instance, people may say that they used a cell phone on the side of their head with the tumor, even if this were not the case, in order to rationalize how and why they got the tumor.

The opposing group says that higher tumor risks are showing up and precautionary measures are called for. This faction includes Israel's Siegal Sadetzki and Australia's Bruce Armstrong, who have already made their views public (see our **April 28** post).

One insider confided that things have gotten so bad that some members of the Interphone project are no longer talking to each other and this has added to the delay in publishing the final results. "As a result of the animosity between the factions, scientists and the public at large are being denied this important data," that person said. "It's a tragedy to me."

Cardis has been careful not to publicly reveal where she herself stands. That is until this week —immediately after the BEMS meeting— when she endorsed a set of precautionary measures. In an interview published on Monday in *Le Monde,* arguably France's leading newspaper, Cardis said that she is in general agreement with those who argue against the use of cell phones by children under the age of 12 and in favor of the use of hands-free sets. "In the absence of definitive results and in the light of a number of studies which, though limited, suggest a possible effect of radiofrequency radiation, precautions are important," Cardis told *Le Monde.* "I am therefore globally in agreement with the idea of restricting the use of children, though I would not go as far as banning mobile phones," Cardis added. (She provided *Microwave News* with a translation of her comments to *Le Monde.*)

Cardis was responding to an "Appeal" for caution in the use of mobile phones, issued last Sunday, June 15, by 20 cancer and public health specialists in the *Journal du Dimanche,* another well-read newspaper. Among the 20 are Henri Pujol, a past president of the La Ligue Nationale Contre le Cancer, the French counterpart to the American Cancer Society, and Annie Sasco, a former head of epidemiology for cancer prevention at IARC. The Appeal received widespread coverage in the French media —so much so that it prompted the French National Academy of Medicine to issue a "clarification" yesterday in an effort to quell the growing public controversy. The academy stated that the results of the Interphone study that had been published so far are "reassuring" and, in a jab at the group of 20, reminded everyone that medicine is not about advertising or marketing.

David Servan-Schreiber, a professor of psychiatry at the University of Pittsburgh and a lecturer at the medical school in Lyon, was the force behind the Appeal. "I gathered a group of experts in order to respond to the questions I was getting every week in my talks and on my Web site," he told *Microwave News.* Servan-Schreiber criticized the Academy of Medicine for its well-known "aversion to any environmental causes of cancer." "[Its] argument that existing cell phone studies warrant continuing use without precautions just doesn't make sense scientifically. This is all quite appalling," he said.

The group of 20 presented a list of ten recommendations on how to practice precaution. In addition to limiting the use of cell phones by children and endorsing the use of a hands-free set, these include picking a low SAR phone, keeping cell phones away from your body, using a landline whenever possible and favoring text messages over making a call. The full text of the Appeal is available here.

June 13... In a follow-up to her column, "Experts Revive Debate Over Cellphones and Cancer," published last week, Tara Parker-Pope, a health reporter at the *New York Times,* invited Louis Slesin, the editor of *Microwave News,* to talk about cell phones, radiation exposures (SARs) and the growing concerns over tumor risks. You can listen to the eight-and-a half-minute conversation on the *Times* Web site. You can also add your comments to the more than 180 that have already been posted on the *Times* blog, "How Much Radiation Does Your Phone Emit?"

June 6... Frank Barnes of the University of Colorado in Boulder is calling for more studies on the effects of cell phones on children. "There are definitely unknowns and there are definitely experiments that have been done —including some in my own lab— where I clearly don't know what the implications are biologically," he told KCNC, the CBS TV station in Denver. "What we don't know is what long-term exposures may or may not do," he said. Barnes chaired the National Academy of Sciences' panel, which issued a report on health research needs for RF radiation earlier this year (see our **January 17** post). One youngster who was also interviewed admitted that she uses her phone "every minute constantly," adding, "I am basically addicted."

June 4... It was a "mistake," says Anders Ahlbom. That's how he explains why his "expert group" left out the Lahkola study from its report on important EMF developments in 2007 for SSI, the Swedish Radiation Protection Authority (see our **March 14** post). The Lahkola study points to a significant increased risk of brain tumors among long-term cell phone users in five countries participating in the Interphone project. This was a curious omission since two of the Lahkola coauthors helped prepare the SSI report. In a comment that has now been appended to the report, here's what Ahlbom, the chairman of the panel, wrote: "the paper was discussed by the group and was part of the basis for the conclusions. However, it was by mistake overlooked when preparing the report. The Expert Group regrets this accidental omission." What's missing is any mention at to why two other Interphone studies (from France and Israel), which showed elevated tumor risks, were also omitted from this same report.

June 3... Chronic exposure to 3G (UMTS) cell phone radiation can promote the growth of tumors, according to a new animal study presented at a workshop in Berlin last week. This finding is "remarkable," according to the lead researcher, Thomas Tillmann of the Fraunhofer Institute of Toxicology and Experimental Medicine (ITEM) in Hannover, Germany. At this point, only the conference abstract is available (p.10). This results stands in contrast to those of the PERFORM A animal studies. (Tillmann was involved in one of the PERFORM A studies too.) Unlike the animals in the PERFORM A experiments which were restrained and under stress (see our report, "Wheel on Trial"), the mice in this new study were allowed to run free. The other

crucial difference, other than the nature of the exposure signal, is that the mice in Tillmann's experiment were exposed for much longer than those in PERFORM A: 20 hours a day, seven days a week. In PERFORM A, the animals were exposed as little as one hour per day, and never more than four hours per day. Last year, in a separate study, Germany's Alex Lerchl reported no effects among lymphoma-prone mice chronically exposed to UMTS.

Today's *New York Times* features a column by Tara Parker-Pope on cell phones and brain tumors, "Experts Revive Debate Over Cellphones and Cancer." As of this afternoon, it is the most popular story (most e-mailed) on the *Times* Web site. **June 4...** Parker-Pope's column is still #1 today —even beating out "New Hints Seen That Red Wine May Slow Aging," which is on this morning's front page.

June 2... Editors and reviewers at *Epidemiology* thought long and hard before publishing the new paper suggesting that a child's behavioral problems can be traced, at least in part, to the mother's use of a cell phone use during pregnancy (see **May 14** below). This comes across in an editorial by David Savitz that appears the same issue (July) as the paper. The study is "a nearly perfect recipe for 'inflammatory epidemiology'," acknowledged Savitz, an editor at the journal who has long been involved with EMF research. But, he went on, "reviewers and editors believe that these findings are worth consideration by the scientific community. The very factors that make this result potentially inflammatory also provide the justification for deciding to publish such research —the exposure is common and growing, the outcome is a public health concern, and the laboratory can provide only limited insights for extrapolation to humans." The paper's take-home message should be, according to Savitz: "No call for alarm, stay tuned."

May 31... Some news notes on the Interphone study:

• Those who say there are no long-term cell phone risks often point to the Interphone study from Japan, published earlier this year, for support. As we have previously reported, the Japanese researchers said there was no association between cell phones and brain tumors, even though they found a close to sixfold increase in glioma among heavily-exposed users after ten or more years (see our **February 15** post). That link was based on a small number of cases and was not statistically significant; the Japanese attributed the increase to recall bias. Bruce Hocking, an occupational and environmental health physician in Melbourne, Australia, suggests otherwise. In a letter published this week in the *British Journal of Cancer,* Hocking points out that the risk of meningioma (another type of brain tumor) is hardly raised at all (OR=1.14). He writes: "If recall bias is the true explanation for the increased risk of glioma, it should similarly have affected the meningioma group, but it has not. Therefore, the increased risk in the glioma group may be a true finding."

• Siegal Sadetzki, Israel's lead Interphone investigator, continues to warn about long-term risks. "I would say our results are in line with previous results that are showing something is going wrong here," she told Tyler Hamilton of the Toronto *Star.* His story, "Listening to Cellphone Warnings," appears in today's editions. "After 10 years or more we do see something there," Sadetzki said. She has reported an increase in parotid gland tumors among long-term users (see "Set Interphone Free" (**January 30**) and our **April 28** post).

• Elisabeth Cardis, the head of the Interphone study now at the Center for Research in Environmental Epidemiology (CREAL) in Barcelona, told the *Star* that the completed study will be submitted for publication "soon." (She has made similar predictions in the past.) On May 27, she presented her latest update on Interphone at a meeting in Copenhagen. Her PowerPoint can be downloaded here.

• And last week, a group of Interphone researchers publshed a study on the possible impact of recall bias on the study results —based on surveys in Australia, Canada and Italy. The paper appears in the *Journal of Exposure Science and Environmental Epidemiology,* which is making the full text available at no cost.

May 29... Next-Up, the European activist group, has posted the entire *Larry King Live* show, "Cell Phones: Are They Dangerous?," on its Web site. Only the ads are missing. Click here to see the 44-minute video. A transcript is also available.

In addition to the guests listed in our **May 27** post, below, a seventh was invited at the last minute, perhaps to balance the majority view that there may well be a health problem with long- term use of cell phones: Ted Schwartz of New York-Presbyterian Hospital — a *fourth* neurosurgeon. He played the role of skeptic, telling Larry King: "I really think the overwhelming amount of evidence that we have from reviewing the literature has shown there really is no good, viable link between cell phone use and brain tumors."

It's worth noting that the CTIA, the wireless trade group, declined to send anyone to be on the show. Instead, as Larry King told the viewers, CTIA referred CNN to the American Cancer Society. Like Schwartz, ACS' Michael Thun seemed well in sync with the industry position. "I think now most of the people who actually do research on brain cancer causes are very skeptical that cell phones cause brain cancer," he said. Vini Khurana, the Australian neurosurgeon, immediately responded, "I strongly

disagree."

ROBERT O. BECKER, 1923-2008

May 28... Robert O. Becker, a towering figure in bioelectromagnetics, died on May 14 due to complications from pneumonia. He was 84 and had been ailing for some time. Becker, best known for his research on "currents of injury" and the role they play in regeneration, made significant contributions to many areas of electrobiology. He was later drawn into public controversies over health effects — Becker is credited as the first to use the term "electromagnetic pollution"— and in the end paid dearly for speaking out.

"Bob Becker's passing marks the end of an era in bioelectromagnetics, that time when very few scientists believed that non-thermal electromagnetic exposures were biologically significant," said Abe Liboff, a physicist and the co-editor of *Electromagnetic Biology and Medicine.* "All the work on applying electromagnetic fields to bone repair is attributable to Becker's reinterpretation of Carlo Matteucci's discovery of currents of injury," he said.

Andy Marino, a former graduate student of Becker's who spent 17 years in his lab, recently recalled how his mentor described what prompted him to embark on what would be his life's work:

> "Salamanders have the same bones and muscles and nerves as people. If salamanders can grow new limbs, why not people? I think they can. They lack only the signal to activate cells. I was only in medical school when I thought about this, and I decided to spend my life trying to study bioelectricity and perhaps answer that question."

Marino is now a professor at the LSU Medical Center in Shreveport.

In the 1960s, at the same time that Becker was investigating the electric currents in bone with Andy Bassett, he also made some landmark observations on the effects of magnetic fields on human behavior. These studies, now all but forgotten, were years ahead of their time. For instance, in 1967, writing in *Nature* with Howard Friedman and Charles Bachman, Becker described how modulated magnetic fields could affect reaction times —now a hot topic among those studying cell phone radiation. Some years earlier, they found that admissions in psychiatric hospitals were associated with geomagnetic activity. Later, in a series of papers with Stephen Perry, a medical doctor in northern England, Becker and Marino linked exposures to power frequency fields to depression and suicide.

In perhaps their best-known experiment on power-line EMFs, Becker and Marino showed that mice which were exposed continuously for three generations, yielded offspring that were stunted and were generally frailer. "The results were truly startling," Marino recalled. It took a decade for EPRI, the electric utility industry research group, to repeat the multi-generation study, and the results vindicated Becker and Marino (see *MWN,* M/A86).

Becker's involvement with high-voltage power lines and the U.S. Navy's submarine communications system (Project Sanguine, later Project Seafarer and still later Project ELF) proved to be his undoing. He was forced into retirement at the too-young age of 56. As Becker wrote in the preface to *The Electric Wilderness,* a history of these struggles by Andy Marino and Joel Ray: "We faced a concerted and coordinated effort to suppress the truth which emanated from the military establishment and was simply aided and abetted by the greed of the utilities and the tarnished testimony of scientists for hire."

But even in apparent defeat, Becker made his mark and changed the course of the EMF controversy. His and Marino's fight over the 765 kV power line planned by the NY Power Authority led to the NY Power Line Project which sponsored the research that repeated Nancy Wertheimer and Ed Leeper's childhood leukemia study that forever changed the EMF landscape (see **January 23** post).

After his lab at the VA Hospital in Syracuse was closed, Becker wrote *The Body Electric* with Gary Selden. Published in 1985, the book became a classic and is still in print today. Anyone trying to understand the forces at work in this highly politicized area of science should read his "Postscript: *Political Science.*" Here's how it ends:

> "I want the general public to know that science isn't run the way they read about it in the newspapers and magazines. I want lay people to understand that they cannot automatically accept scientists' pronouncements at face value, for too often they're self-serving and misleading. I want our citizens, nonscientists as well as investigators, to work to change the way research is administered. The way it's currently funded and evaluated, we're learning more and more about less and less, and science is becoming our enemy instead of our friend."

May 27... Larry King will devote tonight's show to a discussion on "Cell Phones: Are They Dangerous?" Among those scheduled to appear are Drs. Keith Black, the head of neurosurgery at Cedars-Sinai Hospital in Los Angeles, Sanjay Gupta, a

neurosurgeon and CNN's chief medical correspondent, Vini Khurana, an Australian neurosurgeon (see **April 10** below), Louis Slesin, the editor of *Microwave News,* and Michael Thun of the American Cancer Society.

Black treated Johnny Cochran, O.J. Simpson's attorney, who died of a brain tumor in 2005. Cochran's widow, Dale, will also be on the show. "There's a significant correlation between the side that one uses [a] cell phone on and the side that you develop the brain tumor on," Black told CNN's Gupta three years ago. Taking an opposing view was Howard Frumkin of Emory University and more recently CDC. "This is a very low probability kind of a thing approaching zero probability," Frumkin said, "There's no evidence to support the idea that Mr. Cochran's brain tumor resulted from cell phone use."

May 14... It's certainly a provocative and surprising finding —almost to the point of being unbelievable. A joint U.S.–Danish team has reported that young children born to mothers who had used cell phones during pregnancy were more likely to have behavioral disorders, such as hyperactivity and emotional problems.

Using a phone as little as two or three times a day during pregnancy was enough to trigger behavioral issues. The incidence was up to 80% higher among those children who had also used cell phones by the age of seven. The survey, carried out in 2005-06, found that 30% of Danish seven-year-olds were already using a cell phone, though less than 1% for more than one hour a week.

These new results will appear in the July issue of *Epidemiology.* An electronic copy of the paper has already been posted on the Internet.

What is far from clear is what type of radiation exposure, if any, the fetuses actually received. As the researchers themselves concede, "The exposure reaching the fetus (either during conversation or when the phone is in standby mode) is likely to be extremely low." An alternative explanation is that the cell phone radiation caused biochemical changes in the mother which then affected the fetus. The team notes that the vast majority of the mothers "carried their cell phones in a bag during their pregnancy" rather than on their bodies. Very few of them used a hands-free set.

Even some members of the EMF activist community are somewhat incredulous. "The findings are remarkable and without obvious explanation," commented Graham Philips of Powerwatch, a U.K. group. "Direct RF exposure to the fetus from a mobile phone handset is basically non-existent." Philips was one of the first to spot the new paper on the PubMed Web site.

The "lack of biological plausibility" is one of the key issues, Jørn Olsen, a coauthor of the new paper, told *Microwave News*. Olsen is the chair of the department of epidemiology at the UCLA School of Public Health and is also associated with the University of Aarhus in Denmark. "We do not have a biological mechanism that could explain the findings," he said, "That is, we do not know the 'how' or the 'why'."

The researchers make it clear that the observed findings need to be replicated before they are taken too seriously. "These results were unexpected and should be interpreted with caution. Observed associations are not necessarily causal," they wrote. Yet they close the paper with the following warning, "If they are real, they would have major public health implications." Among the other coauthors are Leeka Kheifets, a professor-in-residence at UCLA, and Hozefa Divan, a doctoral student.

Powerwatch's Alasdair Philips suggested that, if electromagnetic signals from cell phones were indeed behind the observed behavioral problems, he would favor ELF magnetic fields rather than the microwave transmissions. "The batteries powering mobile phones give off 217 Hz pulses and these can induce relatively strong currents in the human body." But, he added, "there are many other non-EMF stressors that are in fact more likely to have been responsible."

Sam Milham, an epidemiologist based in Olympia, WA, thinks it would be a mistake to dismiss the new findings. "It's a solid study," he said. Milham pointed to a paper published last month by Michael Persinger's group at Canada's Laurentian University, which shows that weak magnetic field pulses —as low as 30nT (0.3mG)— can cause structural changes in the brains of prenatally-exposed rats.

When asked whether he thought it is a good idea for a seven-year-old to use a cell phone, UCLA's Olsen replied, "It would be reasonable to be cautious."

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April 28... Another Interphone researcher is expressing concern over the tumor risks associated with the long-term use of mobile phones. "I think the evidence that is accumulating is pointing towards an effect of mobile phones on tumors," Professor Bruce Armstrong of the University of Sydney School of Public Health told "TodayTonight," an Australian current affairs show on Channel 7, a national network.

"I would not want to be a heavy user of a mobile phone," Armstrong said. "People might be shocked to hear that the evidence does seem to be coming more strongly in support of harmful effects."

The ten-year Interphone data has clearly changed Armstrong's outlook. A few years ago, he told the *Sydney Morning Herald* that "there is no consistent evidence that there is an increased risk of cancer," but even then he allowed that "it could be 15 years before we see an effect."

Armstrong, who is leading the Australian component of the Interphone project, is the second principal investigator of the 13 country teams to urge precaution. Last December, Siegal Sadetzki of the Chaim Sheba Medical Center in Israel told *Haaretz,* a national newspaper, that, "The time is past when it could be said that this technology does not cause damage; apparently it damages health."

Neither the Australian nor the Israeli results on brain tumor or acoustic neuroma risks have yet been made public. Sadetzki has reported a significant increase of parotid gland tumors after ten years of cell phone use. Her paper appeared in the February 15th issue of the *American Journal of Epidemiology*.

Meanwhile, the final Interphone paper is still not finished. Just a few days ago, Elisabeth Cardis, who leads the overall Interphone study, told *Microwave News* that she hopes that the combined results from all 13 countries will be submitted for publication "in the not too distant future." Cardis recently left IARC to join the Center for Research in Environmental Epidemiology (CREAL) in Barcelona.

The nine-minute piece also features an interview with Chris Zombolas, the technical director of EMC Technologies. In measurements commissioned by the TV show, Zombolas found that a number of cell phones do not meet the 2W/Kg SAR standard when placed in a pocket and used with a hands-free set or a BlueTooth transmitter. The worst of the four phones tested was a Nokia E65. Zombolas measured an SAR of 3.35W/Kg at 1800MHz and an SAR of 5.84W/Kg at 2100 MHz. The Australian SAR standard is 2W/Kg.

[As of May 4, the *TodayTonight* segment, "Health Fears over Mobile Phones," can no longer be viewed on the program's Web page, only a brief synopsis is now available. Next-Up, the European activist group, has posted the complete video on its Web site, and it may also be viewed on a Yahoo video site.]

April 10... Vini Khurana hit the big time last week. The Australian neurosurgeon parlayed a 69-page literature review on cell phones and brain tumors into a spot on the U.S. NBC Nightly News. Call it the power of the sound bite.

The centerpiece of Khurana's report is his prediction that cell phone radiation would turn out to be a worse public-health disaster than either smoking or asbestos. On March 27th, the *Canberra Times,* his hometown newspaper, wrote it up under the headline, "Mobiles May Be a Death Sentence." This prompted some chatter among EMF bloggers, but the big break came the following Sunday when the U.K. *Independent* ran its own story: "Mobile Phones 'More Dangerous than Smoking'."

Equating cell phones and tobacco is indeed provocative since we all know that smoking is a killer while the jury is still out on the health risks associated with using a hand-held phone. In fact, this was not the first time a major British newspaper had drawn a parallel between the two. Last year the *Times* asked, "Could [Mobile Phones] Be the Cigarettes of the 21st Century?" The question may have been rhetorical, but the *Times* left nothing to the imagination. "Absolutely," it added.

The *Times* story was definitely noticed, but it was the *Independent* that touched a nerve. Minutes after the Web editors at the *Independent* posted the story, it became one of the lead stories on the "Drudge Report," a favorite among those in search of the latest hot news and gossip. It didn't take long for Khurana's warning to become the #1 most popular story (most read and most e-mailed) on the *Independent*'s Web site. It was still on the list, albeit at #10, a week later. In the meantime, hundreds, if not thousands, of other publications and Web sites repeated the claim that using a cell phone might be worse than smoking.

Few American newspapers went along, but on April 3, Bob Bazell, NBC's chief science correspondent, aired an interview with Michael Thun of the American Cancer Society on the Nightly News. The ACS has long maintained that the link between cell phones and cancer is nothing more than a "myth" (see *MWN,* M/J03 and August 3, 2007), yet this time Thun allowed that there is some "legitimate uncertainty" over what might happen following long-term, cell-phone use. (At this writing, the segment is still on the NBC News Web site, look under "Health.")

Bazell was skeptical at best. Citing unnamed U.S. "experts," he dismissed Khurana's conclusions as "absurd" and concluded that there is "no evidence of danger." Nevertheless he closed his piece with a precautionary hedge against the unknown. "It's never a bad idea to use your earpiece to get the antenna away from your head," he advised.

Why did Khurana's report get so much more media play than, for example, the BioInitiative Report, which offers a much more detailed analysis of EMF health risks by some of the leading researchers in the field? Part of the reason is that Khurana

is a brain surgeon and it is only natural for people to think that he would know about brain tumor risks. (Hey, it *is* brain surgery!) That his report offers little that is new may have been missed by those who never ventured beyond the "Key Messages" in its first few pages.

Another way to think about it is that the episode offers another lesson on the vagaries of what becomes news. Few can predict what stories will catch the public's imagination, though a provocative sound bite always helps. Yet, a receptive audience is an important part of the equation. One sure lesson of the Khurana episode is that the public, even though enamored by cell phones, has a latent concern about the long-term risks.

March 14... The Interphone saga gets weirder and weirder. The latest chapter comes with the release, earlier this week, of a status report on EMFs and health by the Swedish Radiation Protection Authority (SSI).

Recent Research on EMF Health Risks, the fifth annual report by an independent expert group, covers what was learned about various types of EMFs, from ELF to RF, in 2007. Here we address only what it says about the latest Interphone results —or more precisely, what it does *not* say.

For reasons that we cannot begin to understand, the group headed by Anders Ahlbom of the Karolinska Institute in Stockholm never mentions what is arguably the most important cell phone study published last year: the Lahkola study, an analysis of the Interphone data from five northern European countries. It points to a long-term risk of a brain tumor on the side of the head the phone was used. (See our post of **January 22, 2007**).

It is impossible that the SSI panel did not know of this meta-analysis. The second author of Lahkola, Anssi Auvinen of Finland's University of Tampere, is a member of the panel, and the Karolinska's Maria Feychting, another Lahkola coauthor, is its scientific secretary. Indeed, Ahlbom is himself associated with the Interphone project and could hardly be unaware of Lahkola.

The Lahkola study was posted online on January 17, 2007 —at the very beginning of the year. For a moment, we thought it might have been included in last year's SSI report. Not so.

Nor was the Lahkola paper the only Interphone study to be ignored by the SSI committee. The French and Israeli papers were also somehow left out. Both indicate a possible long-term tumor risk. (We do allow that the Israeli study was published in December when this report was being finished, though we suspect that Auvinen and Feychting as members of the Interphone project would likely have been aware of those results and the fact that they would soon be published.)

The panel did cite two new Interphone studies —a German one on acoustic neuroma and Norwegian one on brain tumors. Neither showed an elevated risk.

Why were the three Interphone papers suggesting cell-phone tumor risks shunted aside while those showing no risks included? Is this about the power of money to keep the lid on the cell phone health debate? Is this about political interference?

Whoever or whatever is responsible, it goes much deeper than Sweden's SSI. Of the seven members of the panel, five have strong ties to ICNIRP: Three are members of the commission (Ahlbom, U.K.'s Richard Saunders and France's Bernard Veyret), and two others are members of its standing committees (Finland's Jukka Juutilianen and U.S.' Leeka Kheifets). The report is a reflection of the leadership of the EMF community and it indicates a need for change.

But first, we need an answer to the question: How could these studies have possibly been ignored?

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