

# MICRO WAVE NEWS

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## INSIDE...

### EMF NEWS pp.2-3

*NSA Workers Lose Brain Tumor Lawsuit*  
*Italian Animal Studies: Larger and Longer*  
*Aggressive Brain Tumors Among Workers*  
*IARC Publishes Review of Cancer Risks*  
*European Project: Genotoxic Effects "Proven"*

### HIGHLIGHTS pp.4-11

#### Eye on Europe:

*Are the Salzburg Limits PR? • Hyland Responds • German Poll • More on Swiss Tower Rules • U.K. Considers Precaution*

*Support for Leukemia-Vatican Antenna Link*  
*Variations in Ambient Base Station Radiation*  
*New Cancer-Phone Epi Findings: Still Murky*  
*Australia Okays RF/MW Limits Based on ICNIRP*  
*U.K. Tests: Phone Shields Not Much Help*

#### The Talk of Rome

*Jamming 3G • Doubts Over Genotox Data • Complex Phone Exposures • Needless Panic? • New EC Projects • Yankees Stay Home*

*Second-Hand Phone Radiation on a Train*  
*WHO (and EPRI) on Childhood Radiation Risks*  
*Telecom Tower Data on the Web in Europe*  
*In U.S., Tower Information for a Price*

### FROM THE FIELD pp.12-16

*Meeting Notes: COST281 • URSI • Australia Across the Spectrum*  
*Letters: Adair, Albanese & Oughstun • Kheifets*  
*Hot New Papers: GSM and Stress Proteins*  
*Flashback: 5, 10, 20 Years Ago*  
*New Books*

### UPDATES pp.17-18

*CU Has To Be Sure • ICNIRP Explains • People Keeping Current: Follow-Up on the News*

### VIEWS ON THE NEWS p.19

*Ignorance Is the Real Phone Risk to Children*  
*Disney's Mickey Mouse Policy*

## Are Children at Greater Risk from Mobile Phone Radiation?

### No Consensus Yet, Reviews Under Way

Expert panels in France, Germany, Spain and the U.K. have all recommended that children limit their use of cell phones, while a Dutch panel saw no reason to treat children any differently than adults.

In March, Dr. Gro Harlem Brundtland, the head of the World Health Organization (WHO), advised that children should be discouraged from using mobile phones (see *MWN*, M/A02). But Dr. Michael Repacholi, who runs the WHO's EMF project, has stood apart. Two years ago, he declined to join the other members on Sir William Stewart's expert panel who favored a precautionary approach for the use of phones by those under 16 (see *MWN*, M/J00).

Microwave researchers are similarly divided. In a paper published in May, Dr. Om Gandhi of the University of Utah, Salt Lake City, presents new calculations to support his widely cited finding that the smaller heads of children absorb more radiation than those of adults and that the radiation goes deeper into their brains.

On the other hand, Dr. Niels Kuster of the Foundation for Research on Information Technologies in Society (IT<sup>2</sup>IS) in Zurich maintains that the specific absorption rates (SARs) from cell phones are similar for young and old alike. Speaking at a workshop on *Mobile Phones and Children* in Rome on May 5, Kuster said that the evidence for a significant difference in exposure

(continued on p.9)

## China Weighs Breaking Ranks, Adopting 1W/Kg SAR Limit for Mobile Phones

The Chinese government is considering setting a 1 W/Kg specific absorption rate (SAR) standard for mobile phones. If it makes the move, it would have the strictest SAR phone standard of any country in the world.

Both the Chinese Ministry of Health and the Environmental Protection Agency (EPA) are backing 1 W/Kg, but the Ministry of Information Industry favors adopting ICNIRP's 2 W/Kg SAR limit. Dr. Huai Chiang of Zhejiang University in Hangzhou told *Microwave News*.

"They cannot decide what to do," Dr. C.K. Chou of Motorola in Plantation, FL, told *Microwave News*. Chou visits China regularly.

The SAR decision will be made by the Joint Working Group (JWG), composed primarily of representatives of Chinese government agencies. Toward this goal, the JWG will send delegations to the U.S. and to Europe on fact-finding missions. Chou is helping plan the JWG's trip to the U.S.

"We would expect a further proposal to be circulated for comment fol-

(continued on p.6)

## NSA Workers Lose Lawsuit Over EMFs and Brain Tumors

Two former National Security Agency (NSA) workers have lost their lawsuit claiming that the use of a powerful degausser caused them to develop a brain tumor. On April 30, after deliberating for only two hours, six jurors exonerated Electro-Matic Products Co. in Chicago, the manufacturer of the degausser, which is used to erase magnetic data-storage tapes.

A number of well-known members of the EMF community testified at the two-week trial, which was heard in a Maryland state court in Annapolis.

No appeal was filed before the May 31 deadline.

"We can't improve the scientific case we presented," said Ted Flerlage of Peter Angelos's law firm in Baltimore, who represented Tommy Grimes and Thomas Van Meter, both of whom had worked at NSA headquarters in Fort Meade, MD (see *MWN*,

### Italian Animal Studies Will Be Larger and Longer

The huge animal studies being planned at the Ramazzini Foundation in Bologna are "crucial" to understanding the cancer risk posed by EMFs, said Dr. Morando Soffritti at *Carcinogenesis Bioassays and Protecting Public Health*, a conference held in New York City, April 29-30, by the New York Academy of Sciences.

Soffritti, the scientific director of the foundation, explained that the animal studies carried out by the U.S. National Toxicology Program (NTP) had certain "limitations." The NTP may not have used enough animals to evaluate a low-potency cancer agent and may have ended the exposures too early (see *MWN*, J/F98 and M/A98). "More than half the animals were still alive at the end of the NTP experiment. Had we truncated our experiment on vinyl chloride, we would not have seen the tumor effect and there would be no regulation of vinyl chloride today," he said.

The Ramazzini Foundation will be using over 5,000 animals, many times more than the number in NTP's two-year bioassays. Soffritti detailed the different types of exposures, at different intensities of 50Hz alone and in combination with ionizing radiation, microwave radiation, formaldehyde and aflatoxin.

The protocols for a parallel set of experiments with 1.8 GHz radiation are in the process of being finalized, Soffritti said. These will include the exposure of Sprague-Dawley rats in the near and far fields to mimic exposures from mobile phones and towers, respectively (see *MWN*, M/J01).

The meeting commemorated the work of Dr. Cesare Maltoni, who died last year. Maltoni, who led the Ramazzini Foundation, conducted long-term animal experiments on close to 200 different chemicals and is perhaps best known for demonstrating that vinyl chloride and benzene are carcinogens.

M/A00). "The science just isn't strong enough," Flerlage said. He pointed to the lack of supporting evidence from animal experiments as the critical weakness in his case.

Flerlage said that Dr. David McCormick of the IIT Research Institute in Chicago was "very compelling" in his testimony for the defense that animal studies had failed to show a cancer risk following long-term exposure to magnetic fields.

"The jury simply wasn't persuaded that EMFs are hazardous," said Harold Walter of Tydings & Rosenberg in Baltimore, who represented Electro-Matic Products. Walters said that the Angelos team had put on the strongest EMF case to date—by hiring "many of the leading names" to present evidence linking EMFs to brain tumors. In addition, he said, both sides agreed, and the jury acknowledged, that the men were exposed to magnetic fields of at least 1G from the degausser. Flerlage contended that the fields were much higher.

At a pretrial hearing on the scientific evidence held in mid-March, Judge Eugene Lerner refused to restrict the testimony of any of Angelos's expert witnesses. Lerner also denied a pretrial motion to dismiss the case.

The Angelos firm has also sued on behalf of three other workers who developed brain tumors after using a degausser at the NSA. A federal judge suspended two of these lawsuits—motions to reopen them can be filed until December 31, 2003. The third case was dismissed at the plaintiff's request.

At the trial Flerlage called Dr. Abe Liboff, an emeritus professor of physics at Oakland University in Rochester, MI; Dr. Roger McLendon, a neuropathologist at Duke University in Durham, NC; and Dr. Samuel Milham, an epidemiologist formerly at the Washington State Department of Health.

Dr. Henry Lai of the University of Washington, Seattle; Dr. Jerry Phillips of the Biological Sciences Curriculum Study in Colorado Springs, CO; and Dr. Daniel Wartenberg of the Institute of Environmental and Occupational Health Sciences in Piscataway, NJ, were ready but, in the end, were not called. "Expert testimony is expensive," Flerlage explained.

In addition to McCormick, the defense called Dr. Daniel Bracken, a consultant based in Portland, OR; Dr. Philip Cole, an emeritus professor of epidemiology at the University of Alabama, Birmingham; and Dr. John Moulder of the Medical College of Wisconsin in Milwaukee, who testified via a video link.

At the March hearing, Cole said that he was not aware of any study that linked EMF exposure to meningiomas, the type of brain tumor that both Grimes and Van Meter developed.

Bracken's measurements of an Electro-Matic unit similar to the one used by the plaintiffs showed that the men were exposed to fields no greater than 2 G. According to NSA documents, fields near the degausser that Grimes and Van Meter used were as high as 44 G (see *MWN*, J/F01; also N/D01).

Walter did not call Dr. Joseph Roti Roti of Washington University in St. Louis or Dr. Vijayalaxmi of the University of Texas Health Science Center in San Antonio. He explained that their testimony would have countered that of Lai and Phillips.

The Angelos law firm is still waiting to hear whether a federal judge will allow its cell phone-brain tumor case to go to trial (see p.18 and *MWN*, M/A02).

## Canadians Link EMF Work to Risk of Aggressive Brain Tumors

EMF exposure at work can significantly increase the chances of developing an aggressive brain tumor, according to a new study from Canada.

Dr. Paul Villeneuve of the University of Ottawa and coworkers found a 33% increase in brain tumors among workers exposed to an average magnetic field of 6 mG or more. This finding was not statistically significant.

But for grade III and IV astrocytomas—especially aggressive types of brain tumors also known as glioblastoma multiforme—the odds of developing a brain tumor were up to 12 times higher, a significant finding. For less-aggressive tumors, Villeneuve sees no evidence of an increased risk.

These results are “consistent with the hypothesis that magnetic fields act at the promotional stage,” Villeneuve concludes in the February issue of the *International Journal of Epidemiology* (31, pp.210-217, 2002).

Villeneuve analyzed the employment and EMF exposure histories of 543 Canadian men diagnosed with brain cancer between 1994 and 1997, and of an equal number of controls. The 18 of the 198 men with glioblastoma multiforme who had held a job with an average magnetic field exposure of 6 mG or more had an odds ratio (OR) of 5.5, with a confidence interval (CI) of 1.22-24.8. Villeneuve emphasizes that, due to the small number of cases, this and related findings should be interpreted cautiously.

For 10 of these 18 men, whose high magnetic field exposures occurred in their “earliest held job,” the OR for developing a brain tumor is 4.81 (CI=0.94-24.71); for the eight whose high average exposures were in their “last held job,” the OR is 12.59 (CI=1.50-105.6).

Dr. Maria Feychting of the Karolinska Institute in Stockholm previously reported a nonsignificant doubling of the risk of grade III and IV astrocytomas among those with EMF exposures above 2 mG both at work and at home (see *MWN*, J/A97).

In a combined analysis of the data from three large studies of utility workers, Dr. Leeka Kheifets, formerly with EPRI and now at the WHO in Geneva (see p.13), calculated a higher rate of brain cancer among those exposed to EMFs on the job (see *MWN*, S/O99). In an earlier meta-analysis of a larger number of occupational studies, Kheifets also found an increased risk of brain cancer (see *MWN*, J/F96).

## IARC: Rationale for “Possible Carcinogen” Classification

The International Agency for Research on Cancer (IARC) has published its monograph reviewing the cancer risks associated with exposure to ELF and static EMFs.

In June 2001, a panel of experts convened by IARC in Lyon, France, unanimously found that there is “limited evidence” of an association between childhood leukemia and ELF magnetic fields and classified them as “possibly carcinogenic to humans

## Genotoxic Effects Are “Proven”

*The excerpt below is from a progress report for the EC's REFLEX research project, which was distributed by Dr. Franz Adlkofer at the COST281 meeting in Rome on May 2 (see p.8). It covers the project's first two years, through January 31, 2002. Adlkofer, who is with the Verum Foundation [for Behavior and Environment] in Munich, is the project coordinator of the REFLEX project, which is addressing both EMF and RF/MW biological effects (see MWN, M/A00 and N/D01).*

Based on the data related to research on biological effects of ELF EMFs which have been obtained in the REFLEX project so far, it can be stated that a genotoxic effect of EMFs on primary cell cultures of human fibroblasts is to be considered as proven. DNA strand breaks at a significant level are produced by EMFs at a flux density as low as 70  $\mu$ T [700 mG] and there is a strong correlation between the increase in DNA strand breaks and the increase in micronucleus frequencies. With regard to the genotoxic effect of EMFs a considerable interindividual variance exists. Furthermore, there is evidence that EMF influences the expression of genes in embryonic stem cells of mice if the stem cells are deficient of the p53 gene, the so-called guardian of the genome. In these cells the regulatory genes *egr-1*, *p21* and *c-jun* are upregulated after exposure to EMFs. Since the flux density must be as high as 2.3 mT [23 G] before a significant difference in gene expression between exposed and sham-exposed stem cells can be observed, it is not clear yet how to assess the biological relevance of the findings. At present the data suggest that it may be the genetic background [that determines] whether or not stem cells respond to EMFs. No differences in DNA synthesis, cell cycle and apoptosis between exposed and sham-exposed primary human peripheral blood mononuclear cells were observed after EMF exposure. More data dealing with cell proliferation and gene expression in various transformed cell lines need to be confirmed before firm conclusions can be drawn.

(Group 2B).” The 21-member panel concluded that the epidemiological link is “unlikely to be due to chance” but noted that it “may be affected by selection bias” (see *MWN*, J/A01).

With respect to ELF electric fields and static electric and magnetic fields, the IARC panel found that they are “not classifiable as to their carcinogenicity in humans (Group 3).” In addition, it found that there is “inadequate” evidence linking ELF EMFs to any other cancers in humans or to cancer in experimental animals and that the evidence on the carcinogenicity of electric fields is inadequate.

The expert panel noted that, if the link to childhood leukemia “were causal,” the increase in risk above 3-4 mG could be greater than the doubling found in two recent meta-analyses (see *MWN*, S/O00).

The 444-page report, *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans: Volume 80—Non-Ionizing Radiation, Part I: Static and Extremely-Low-Frequency (ELF) Electric and Magnetic Fields*, is available for \$50.00 from: IARC Press, 150 cours Albert Thomas, 69008 Lyon, France, Fax: (33+4) 72 73 83 02, E-mail: <press@iarc.fr>.



## «Eye on Europe»

A survey of RF levels near mobile phone base stations in **Salzburg, Austria**, is fueling the controversy over the  $0.1 \mu\text{W}/\text{cm}^2$  exposure limit favored by local health officials (see *MWN*, J/A 00 and N/D01). Researchers from the Austrian Research Centers Seibersdorf (**ARCS**) and **BAKOM**, the Swiss communications agency, found that 8 of 13 random spot measurements exceeded the Salzburg limit—one by a factor of 40. The standard “cannot be met for those living near antennas in urban areas,” the **Swiss** government, which commissioned the survey, concluded in a recent report. The Mobile Communications Forum, which represents Austria’s wireless industry, declared that the measurements show that the Salzburg limit is “political PR, not reality.” Dr. **Gerd Oberfeld** of the Salzburg State Public Health Department countered that the survey is “worthless.” He said



that the limit is not legally binding and that most of the antennas in the survey belong to carriers who have never agreed to comply with it. **Georg Neubauer**, who led the ARCS survey team, explained that the results are due in part to the measurement protocol stipulated by BAKOM. It assumes that all antennas are operating at maximum power output, an approach consistent with the way Swiss officials apply their own standard for mobile phone antennas. In

contrast, the Salzburg limit applies to normal operation, according to Oberfeld. Two years ago, Neubauer reported that RF levels were below the limit “in most, but not all” of Salzburg. He sees no contradiction between the two sets of results, because of the differences in the protocols. “Direct comparisons have little meaning,” he told *Microwave News*. According to BAKOM, the new survey was prompted by Swiss tower activists who want to adopt the “Salzburg model.” BAKOM’s report, *Non-Ionizing Radiation Emissions in Salzburg*, is available in German at <[www.bakom.ch/de/funk/elektromagnetisch/immission/index.html](http://www.bakom.ch/de/funk/elektromagnetisch/immission/index.html)>. (See also p.5 and p.11.)

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Dr. **Gerard Hyland**’s response to **COST281**’s critique of his report to the **European Parliament** on the potential health hazards of low-level EMFs is now available on the COST281 Web site, <[www.cost281.org](http://www.cost281.org)>. Hyland’s original report and COST’s commentary are also posted there (see *MWN*, N/D01). Hyland calls the COST281 document a “diatribe,” which “deliberately misrepresented and distorted the sense of much of my text.” He concludes: “Given the industrial connections of certain influential members of COST281, however, perhaps this is only to be expected.” Hyland is at the University of Warwick in Coventry, U.K.

### **Vatican Antennas May Have Caused Excess Cancers, New Report Says**

A new report prepared by a four-member panel for a local court suggests that the Vatican transmitters in Cesano outside Rome could indeed present a leukemia risk, according to articles in the Italian news media.

In an open letter, dated May 12, to *Corriere della Sera*, a leading national newspaper, Federico Lombardi, the program director of Vatican Radio, stressed that “the association is far from proven” and that the new report should not be interpreted as “definitive.”

Dr. Pietro Comba, a member of the review panel, told *Microwave News* that, although parts of his report have been leaked to the press, he cannot comment because it has not been officially released. Comba is the director of the Environmental Epidemiology and Biological Monitoring Section at the National Institute of Health in Rome.

The new analysis appears to directly contradict an earlier report by a different four-member committee, which concluded that there is no cancer risk and that epidemiological surveys are unlikely to resolve the controversy (see *MWN*, S/O 01). Interestingly, the chair of this panel, Dr. Donato Greco, is also at the National Institute of Health, where he is the director of the Laboratory of Epidemiology and Biostatistics. Not surprisingly, Greco has criticized the new report.

Comba and his three colleagues—Dr. Paolo Crosignani, the director of the Varese cancer registry at the National Cancer Institute in Milan; Dr. Augusto D’Angiolino, a forensic physician in Rome; and Dr. Gaetano Licitra, the head of the environmental physics unit at ARPAT, the Tuscan regional agency for environmental protection in Pisa (see p.5)—have written a response to Greco and submitted it to the court.

Referring to the new report, Angelo Bonelli, the head of the local Green party, told *il Nuovo* (May 10) that, “This is a break in the code of silence.”

Comba’s panel had access to the epidemiological study by researchers at the regional health authority in Rome, which points to an elevated leukemia risk among the residents of Cesano (see *MWN*, S/O01). That analysis, which was presented at a conference last year, will appear in the June 15 issue of the *American Journal of Epidemiology*.

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More **Germans** worry about mobile phone base stations than about mobile phones—but an even larger number are concerned about power lines. In a poll released on April 29 by the Federal **Radiation Protection Office**, 29.7% expressed “strong” or “very strong” concerns about the health effects of base stations, compared to 27.9% over phones and 14.7% over radio or TV towers. But 31.4% were worried about high-voltage lines. More than 40% of those who use a mobile phone 90 minutes per day or more were concerned about possible health consequences. Asked

whether they would curtail their mobile phone use if a health risk was demonstrated, 67.5% of the respondents said yes. But there were noticeable differences between the young and the old, with 55% of teenagers saying yes, compared to 77.5% of those 50-59 years of age. Six percent believed that radiation from phones or base stations had harmed their health. The most widely cited concerns were tobacco (46.5%), alcohol (39.4%) and air pollution (38%). *Results of a National Survey on Fears and Concerns of the Population in Connection with Mobile Telecommunications* is available in German at <[www.bfs.de/presse/index.htm](http://www.bfs.de/presse/index.htm)>.

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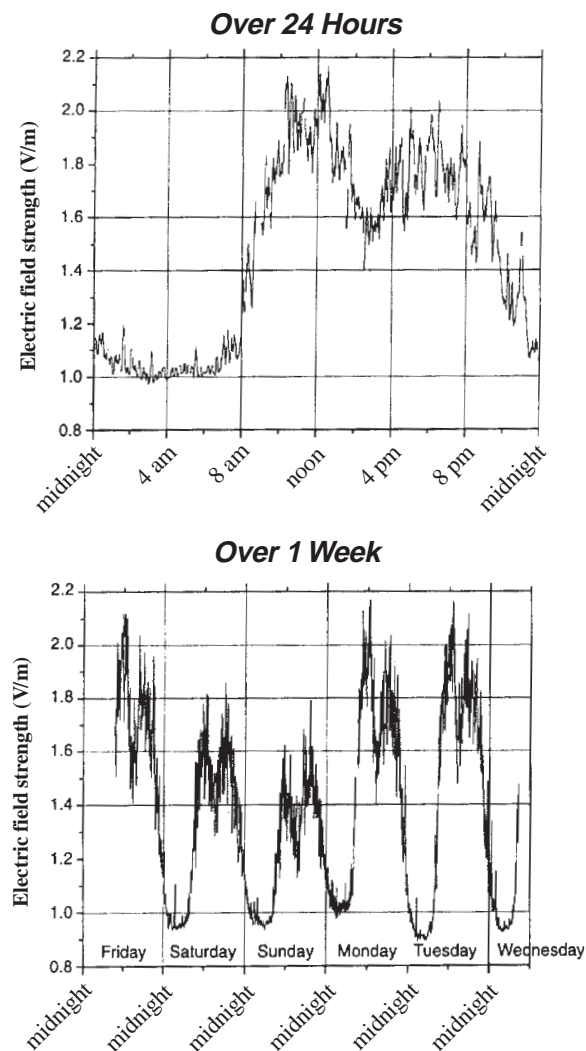
By July 1, the **Swiss** government will decide how to apply the country's precautionary limits for RF/MW radiation when mobile phone antennas are clustered together. **Moritz Leuenberger**, the cabinet minister responsible for environment, transportation, energy and communications, will have to mediate between the competing interests of **BUWAL**, the environment agency, and **BAKOM**, the communications agency. BUWAL has proposed treating all antennas within 100 meters of each other as a single site, in effect turning Switzerland's 4 V/m emission limit for telecom towers into an urban ambient standard (see *MWN*, N/D00 and S/O01). BAKOM has stated that such a standard would be "nearly impossible" to meet without "substantial economic consequences" (see p.4). The wireless industry wants to measure the radiation from each antenna separately as long as the antennas are operated by different service providers. At a March 4 debate in the National Council—roughly equivalent to the U.S. House of Representatives—Georges Theiler, who represents Lucerne, warned that BUWAL's proposal would "lead to safety factors 500 times larger than in other countries." Switzerland "should not become the world champion on this issue by leaving international guidelines behind," he said. Pia Hollenstein, a delegate from St. Gallen, east of Zurich, disagreed. "The right of the affected population to precautionary protection of health" should take precedence over "narrow economic interests," she argued. At the close of the debate, Leuenberger told the legislators that the guidelines will "neither undermine nor tighten" the original ordinance adopted more than two years ago (see *MWN*, J/F00). There will be more consultations before the rules are finalized, he said.

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The **U.K.**'s National Radiological Protection Board (**NRPB**) is carrying out a comprehensive assessment of the scientific basis for its exposure guidelines from DC to 300GHz. The board is also reviewing whether there is "any need to invoke a **precautionary approach**" in cases where "scientific information may be lacking," NRPB's Dr. Michael Clark told *Microwave News*... In May, the board posted its **corporate plan** and **scientific program** for the five-year period, 2002-2007, as well as its business plan for 2002-2003 on its Web site, <[www.nrpb.org](http://www.nrpb.org)>. There may be some changes, however. As these documents were being finalized, the U.K.'s chief medical officer announced that the NRPB would be folded into a newly established health protection agency by next April (see *MWN*, J/F02).

## Changes in Ambient Mobile Phone Radiation in an Italian Home

The measurements below were taken in an apartment in Pisa, Italy, by Dr. Alberto Maria Silvi and coworkers at the Tuscan regional agency for environmental protection (ARPAT) in Livorno (see p.4). The apartment is in the "immediate neighborhood" of wireless base stations and was chosen because prior evaluation indicated "significant levels." The Italian exposure standard for mobile phone radiation is 6 V/m (see *MWN*, J/F00).



Source: A.M. Silvi, A. Zari and G. Licitra, "Assessment of the Temporal Trend of the Exposure of People to Electromagnetic Fields Produced by Base Stations for Mobile Telephones," *Radiation Protection Dosimetry*, 97 (4), pp.387-390, 2001. This is a special issue on *Physical Agents and Measurements in the Environment, Selected Papers from a Workshop held in Ivrea, Turin, Italy, April 3-5, 2001*. Silvi is at: <[am.silvi@arpat.toscana.it](mailto:am.silvi@arpat.toscana.it)>. The figures are reprinted with permission.

### **Mobile Phone Tumor Risks: Conflicting Interpretations**

Use of analog mobile phones was associated with an increased incidence of brain tumors in a Finnish study, but the authors are downplaying their results. At about the same time, a U.S. research team reported no increased risk of acoustic neuromas while the study's sponsor says the data were manipulated.

In the Finnish study, those who used analog phones had twice the risk of developing gliomas, a statistically significant result. The risk rose 20% with each year of use—a significant trend.

But Dr. Maila Hietanen of the Institute of Occupational Health in Helsinki advised caution in interpreting her findings. "This was a feasibility study," she told *Microwave News*. "We were checking on the methodology, that's why we don't rely on the results too much."

Dr. Anssi Auvinen of the Finnish Cancer Registry first reported the findings at the EBFA meeting in Helsinki last year and issued similar caveats (see *MWN*, S/O01; also M/A98).

The phone records of 432 Finns diagnosed with brain or salivary gland tumors in 1996 were analyzed, as were those of close to 2,000 controls. There was no increased risk among users of digital phones. The results appear in the May *Epidemiology*.

The U.S. results are drawn from the study led by Dr. Joshua Muscat of the American Health Foundation in Valhalla, NY, which reported no link between phone use and brain cancer (see *MWN*, J/F01). In a paper appearing in *Neurology*, Muscat now also concludes that the data do "not support the hypothesis that use of hand-held cellular telephones causes acoustic neuroma."

Dr. George Carlo, who headed Wireless Technology Research (WTR), which sponsored the Muscat study, maintains that it initially showed a significant increase in acoustic neuromas for those with the most phone use (see *MWN*, M/A99). Carlo contends that Muscat altered his analysis to weaken this association.

Carlo told *Microwave News* that he will detail these charges this summer in the *Environmental Claims Journal*.

Muscat compared 90 patients with acoustic neuromas with 86 controls. The risk was no higher for those with the most hours of phone use per month or with the most total phone use. While the cancer risk was higher among those who had used a phone the longest—from three to six years—this difference was not statistically significant.

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Anssi Auvinen, Maila Hietanen et al., "Brain Tumors and Salivary Gland Cancers Among Cellular Telephone Users," *Epidemiology*, 13, pp.356-359, May 2002.

J. Muscat et al., "Handheld Cellular Telephones and Risk of Acoustic Neuroma," *Neurology*, 58, pp.1304-1306, April 23, 2002.

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### **China Weighs 1W/Kg SAR Limit for Mobile Phones** (continued from p.1)

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lowing JWG's consideration of the reports of the two delegations," Dr. Ken Joyner, Motorola's Australian RF strategist, said in an interview.

"From a health standpoint, some of us want the standard to be stricter," Dr. Zhao-Jin Cao of the Ministry of Public Health, part of the Ministry of Health, told the Bloomberg news service. The Chinese health ministry has long had one of the world's strictest standards for exposures to microwave radiation for both the public and workers (see *MWN*, Jn81 and S/O99).

Cao and Chiang are members of the JWG, as are representatives of China's EPA and Ministry of Information Industry.

"Phone makers will have to bear the brunt of higher costs in research and development to comply with the more stringent standard," Chen Yujian, a director of the China Mobile Communications Association, told Bloomberg (May 24).

Dr. Klaus Ebermann, the EU ambassador to China, is also lobbying China to go with ICNIRP. "Our plea to China is don't go it alone," he told AFXpress, a subsidiary of Agence France-Presse (May 31). "It's not the point to have European standards, but to have common standards."

In its statements to the business press, the mobile phone industry is framing the 1W/Kg SAR proposal as irrational. "We don't understand why the government is considering doing this," Michael Milligan, the secretary general of the Mobile Manufacturers Forum (MMF) in Brussels, told AFXpress (May 24).

And Motorola's Joyner told the *Wall Street Journal* (May 28) that, "It's hard to see why China would impose such a standard on itself and risk its industry development for no consumer gain."

In comments to the JWG which Milligan provided to *Microwave*

*News*, the MMF addresses the health issue directly, arguing that, "There [are] no known adverse health effects to users from exposures below the levels recommended by ICNIRP."

In late 2000, China's Ministry of Health was preparing to adopt the ANSI/IEEE SAR standard of 1.6W/Kg,\* averaged over 1g of tissue (see *MWN*, N/D00). At that time Cao said that this would help China sell phones in international markets.

Then last October, Chiang reported at a WHO conference in Seoul that the JWG had proposed a 1W/Kg limit, averaged over 10g—with the SAR standard becoming even stricter after two hours of mobile phone use.

The MMF states in its comments to the JWG that "the requirement to have SARs reduce over two hours is totally impractical and technically unworkable."

In its own comments to the Chinese government, the World Health Organization's (WHO) EMF project urged the adoption of ICNIRP's limits, according to the MMF, and confirmed by WHO's Dr. Michael Repacholi.

Repacholi told *Microwave News* that, "To date, WHO's reading of the science indicates that [the ICNIRP] standards are pro-

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\* Whether ANSI/IEEE or ICNIRP has the strictest SAR limit for mobile phones depends on how the ear is treated. Under a change recently adopted by the IEEE, the ear is now considered an extremity and governed by a more lenient exposure standard, 4W/Kg (see *MWN*, N/D99 and J/F01). In a new paper (*Phys Med Biol*, see p.10), Dr. Om Gandhi argues that, under this new formulation, the IEEE standard is considerably weaker than ICNIRP's, even though the IEEE mandates averaging over 1g of tissue, while ICNIRP calls for averaging over 10g.



tective.” He declined to release a copy of WHO’s comments.

In her paper presented in Korea last year, Chiang wrote that the ICNIRP limits “are based on short-term, immediate health effects,” but that “there is a body of literature which suggests that biological effects can be shown at levels of radiation which do not produce heating or stimulation.”

The Swedish white-collar union, TCO, has adopted a standard of 0.8 W/Kg for the certification of phones under its initiative, *TCO’01 Mobile Phones* (see *MWN*, J/F01).

China has over 166 million mobile phone users, more than any other country. The U.S., the second-largest market, has over 135 million subscribers.

## **Flat Standard Out, ICNIRP In: Australia Relaxes RF/MW Limits**

As expected, on May 7, Australia adopted a new RF/MW exposure standard that closely follows the recommendations of the International Commission on Non-Ionizing Radiation Protection (ICNIRP). The maximum SAR for mobile phones will be at least double that allowed under the previous standard.

As a precautionary measure, the new standard requires “minimizing, as appropriate, exposure which is unnecessary or incidental” when this “can be readily achieved at reasonable expense.” This language is stronger than that in the draft released for public comment last year (see *MWN*, M/A01).

The approval of the new guidelines by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) is a victory for advocates of harmonizing national standards with those of ICNIRP. The new rules replace the frequency-independent, or “flat,” standard in effect since 1985 (see *MWN*, M/A86).

The new standard follows ICNIRP because, it states, no “significant benefit” would result from deviating from it. New Zealand, which also had a flat standard, abandoned it three years ago in favor of ICNIRP-based rules (see *MWN*, M/J99).

The limit for SARs from mobile phones will be 2.0 W/Kg under the new standard, compared to the old 1.6 W/Kg. SAR averaging volume will also increase from 1g to 10g—a change that effectively permits exposures to rise by a factor of two or more. Public exposure limits will also increase. For example, the limit will change from 200 to 450  $\mu\text{W}/\text{cm}^2$  at 900 MHz.

“The new standards reflect the needs of the telecommunications industry rather than the need to protect human health,” said Senator Lyn Allison on May 10. Allison was the chair of a senate inquiry on mobile phones that ended last year. At that time, she called for a delay in adopting new rules (see *MWN*, M/J01).

The IEEE-based SAR limit was scrapped because it would have been inconsistent with the use of ICNIRP values elsewhere in the new standard, according to Dr. Colin Roy, the director of ARPANSA’s non-ionizing radiation division in Yallambie. In an interview, Roy added that the ICNIRP guidelines are “more health-based and more widely accepted than those of the IEEE.”

A government-appointed panel began work on new guidelines after Standards Australia let the flat standard lapse in 1999 and was unable to agree on a replacement (see *MWN*, M/J99

## **U.K. Report: Shields Little Help**

Many mobile phone shields do not reduce the user’s radiation exposure, and those that do often impair the phone’s performance, according to tests commissioned by the U.K. Department of Trade and Industry (DTI).

Some shields—phone cases and antenna clips—can reduce SARs by “large amounts,” according to a report by Dr. Mike Manning and Matt Densley of SARTest Ltd. in Newdigate, near London. But SARTest’s measurements showed that most shields attenuate the phone’s signal—and that many also reduce its ability to pick up incoming signals.

In urban areas where there are many base stations and a phone is not operating at full power, it compensates by increasing output power. But this, SARTest points out, “negates the benefit of the shield.” If the phone is already at maximum power, the shield will then affect signal quality.

“In buildings, cars and rural areas, shields will reduce the performance of the phone,” Manning told *Microwave News*.

One of the devices lowered exposure without impairing communication, but its brand name was kept secret—as were those of the other products. Critics pointed to the lack of specific information to guide consumers.

“Absorbing buttons” and “earpiece pads” were found to have little effect on SARs. The U.S. Federal Trade Commission recently took action against two sellers of earpiece pads for making false claims (see p.18 and *MWN*, M/A02).

The SARTest report is dated June 2001 but, for some reason, was released by the DTI a year later, on May 10, 2002. The report comes in response to a recommendation of the U.K. expert panel on mobile phones chaired by Sir William Stewart (see p.1).

The DTI has still not taken a position on the safety of hands-free kits. The U.K. Consumers’ Association claims that hands-free kits can increase radiation exposures (see *MWN*, M/J00 and N/D00). But Manning, whose earlier measurements for the DTI showed much lower SARs with hands-free kits (see *MWN*, S/O00), is satisfied that the matter is settled. In the new report, he advises those who wish to reduce their exposures to use hands-free kits or shop for low-SAR phones.

*On the Effectiveness of Various Types of Mobile Phone Radiation Shields* is available on the Web at: <[www.dti.gov.uk/cii/regulatory/telecomms/index.shtml](http://www.dti.gov.uk/cii/regulatory/telecomms/index.shtml)>.

and S/O99). The government has continued to enforce the flat standard, but is expected to make the new limits legally binding soon (see *MWN*, N/D01). *Maximum Exposure Levels to Radiofrequency Fields—3 kHz to 300 GHz* is available at <[www.arpansa.gov.au/rf\\_standard.htm](http://www.arpansa.gov.au/rf_standard.htm)>.

Telecom companies will also be subject to a new code on *Deployment of Radiocommunications Infrastructure* adopted by the Australian Communications Industry Forum in April, available at <[www.acif.org.au](http://www.acif.org.au)>. The code also calls for precautionary measures. In addition to minimizing unnecessary exposures, it requires network operators to consider alternatives to siting base stations close to “community sensitive locations” such as schools. The government is expected to adopt the code as law.

### The Talk of Rome

Beyond the food, the wine, the coffee, the springtime air and the hospitality of the Romans, here are some highlights of the meetings\* of the COST281 committee on the potential health impacts of mobile communications and the European Bioelectromagnetics Association (EBEA), held May 2-5.

#### Jamming 3G

Can a disgruntled anti-tower activist shut down a city's third-generation (3G) mobile phone system using a simple, off-the-shelf 100-watt transmitter? asked Dr. Niels Kuster of IT'IS in Zurich, following Dr. Jørgen Bach Andersen's presentation at the workshop on *Emerging Technologies*.

Andersen, of the Center for Personkommunikation at Denmark's Aalborg University, had explained that the new 3G systems, unlike current GSM networks, keep the power received by the tower at a constant level. So, Kuster wondered, could a noisy signal from a rogue transmitter override the 3G power-control system and close it down?

You can interfere with a GSM network but only one cell at a time, Kuster explained later. With 3G, however, you may be able to disrupt the whole system in 30 seconds with one transmitter.

"Before Kuster mentioned it, I had never thought about it," Andersen told *Microwave News*. Andersen was not quick to dismiss the possible threat. On the one hand, it is "fairly easy" to generate an interfering signal, he said, but on the other hand, "it is also fairly easy to locate."

#### Second-Hand Radiation: Cell Phones in a Rail Car

A Japanese researcher predicts that if 30 passengers are using cell phones in a commuter rail car, the ambient levels of microwave radiation could exceed the ICNIRP limits.

Dr. Tsuyoshi Hondou of Tohoku University in Sendai has shown that as window space in a rail car decreases, the radiation has nowhere to go. It is reflected off the metal surfaces until absorbed by passengers or other materials.

Exposures are much higher than would be predicted by models which assume that the radiation decreases with the inverse square of the distance from the source, he writes in the February issue of the *Journal of the Physical Society of Japan* (71, pp.432-435, 2002). An English version of his abstract is at: <jpsj.jps.or.jp>.

As Hondou explained to *Microwave News*, the law of conservation of energy must apply: If there is no absorber in the train carriage and no windows, the energy is not lost. He cited the example of using a wave guide to transfer microwave energy from one location to another.

On May 22, Bitkom, a German mobile phone trade association, issued a press release arguing that Hondou's analysis contains "serious errors." And Michael Milligan of the MMF (see p.6) wrote to Singapore's *Straits Times* (May 28) that Hondou's model is based on "flawed" assumptions.

"You could do it once, you could do it twice," commented Georg Neubauer of the Austrian Research Centers Seibersdorf, "but then you will get caught."

#### Doubts About RF Genotox Experiments

Dr. Franz Adlkofer of the Verum Foundation in Munich, who is coordinating EC's REFLEX research project, has backed off from earlier claims about RF radiation effects on DNA. "I have a lot of doubts about the RF experiments," he said.

In a progress report last fall, Adlkofer reported that he was impressed with Dr. Rudolf Tauber's work at the Free University of Berlin showing RF-induced single- and double-strand DNA breaks (see *MWN*, N/D01). But in Rome, Adlkofer was much more skeptical: "The Berlin results are not reliable at all," he said. "I am not as sure as I was in Brussels." But, he added, "I trust absolutely the ELF EMF data" (see p.3).

With respect to the work on RF effects on gene expression by Finland's Dr. Dariusz Leszczynski, which has just been published (see p.15), he said that he would reserve judgment until the experiment was repeated with a new exposure system supplied by the IT'IS team in Zurich.

#### Cell Phone Exposures Are "Complex"

Assessing radiation exposures for the IARC Interphone epidemiological study is turning out to be "much more complex than we expected," reported Dr. Paolo Vecchia of the National Institute of Health in Rome.

A validation study using specially modified mobile phones carried out in Rome shows that they are operating at maximum power most of the time—especially at the beginning and end of the call. This is a "totally unexpected" result, Vecchia said.

There are clear differences in exposures when the phone is operating at 900 MHz compared to 1800 MHz, as well as when the user is stationary as opposed to in motion, he said. (For more on the Interphone study, see *MWN*, J/F98, S/O98 and M/A00.)

#### The Next (Needless) Safety Panic

"The next big safety panic will be pregnant women wearing a phone on their belts," predicted Dr. Peter Excell of U.K.'s University of Bradford at the end of his flamboyant presentation.

When asked by *Microwave News* if he thought there was a real health risk, Excell quickly tried to put the matter to rest. "There's no hazard at all—not for children, nor for women with a phone on a belt," he said. Any risk would be "negligible" compared to those associated with driving a car, he added.

Excell also maintains that the introduction of 3G phones and the future 4G video phones means that "the days of holding a phone to the head are dead." Bach Andersen made a similar prediction, though in a more low-key manner, some years ago.

#### Three New EC Projects

There were presentations on three new projects that have recently gotten under way—in addition to the EC's ongoing CEM-



FEC, PERFORM-A, REFLEX and Interphone projects (see *MWN*, M/A00 and S/O01).

Dr. Gian Piero Gallerano of ENEA in Frascati, Italy, described the THz-BRIDGE project on terahertz and infrared frequencies (100 GHz-10 THz; BRIDGE stands for biological research investigation on diagnostics and genetic effects). It involves nine research groups in five European countries. A workshop will be held in Capri in the fall (see p.12).

The second new project is known as RAMP, which is short for risk assessment for exposure of nervous-system cells to mobile phone EMFs: from *in vitro* to *in vivo* studies. The three-year effort, which began on April 1, has a budget of €1.1 million (\$1 million). Dr. Bruno Bianco of the University of Genoa is leading RAMP with the participation of France's Dr. René de Seze, Sweden's Dr. Yngve Hamnerius and the U.K.'s Excell.

GUARD, the third project, addresses potential risks of phone radiation to hearing and cognitive function. Dr. Paolo Ravazzani of Italy's National Research Council in Milan heads this three-

year, €1.5 million (\$1.4 million) effort.

### **Few Americans at the Meetings**

Apart from this reporter, only three Americans were at the COST/EBEA meetings. Dr. Mays Swicord represented Motorola and Dr. Lawrence Goldstein came on behalf of WHO's EMF project in Geneva. Goldstein was recently recruited by Dr. Leeka Kheifets—both used to work at EPRI, the electric utility group based in Palo Alto, CA. The third American was sent by Alston & Bird, a law firm helping the wireless industry defend itself against brain tumor compensation claims (see p.18 and *MWN*, M/A02).

\*Workshops on *Emerging Technologies* and on *Mobile Phones and Children* were held on May 4 and 5, respectively, at the University of Rome. They were sponsored by COST281 and the EBEA. In addition, on May 2, COST281 and the EBEA hosted a public forum for researchers to present progress reports on ongoing European Commission (EC) projects (see *MWN*, M/A00, J/A00 and N/D01). COST281 has posted many of the workshop presentations on its Web site, <[www.cost281.org](http://www.cost281.org)>.

### **Children and Mobile Phones** (continued from p.1)

between children and adults is "weak." Kuster noted that he was picking his words carefully in an effort to be "diplomatic."

"Gandhi's studies suffer from severe methodological flaws," Kuster later explained to *Microwave News*. When Gandhi reduced the adult head to a child's size, Kuster argues, he also changed a number of other parameters, each of which could raise or lower the SAR by 50% or more. "Gandhi's resulting differences in SARs are somewhat random," Kuster said.

The disagreement between Gandhi and Kuster is years old. Gandhi first argued that children were at greater risk in 1996, and members of Kuster's lab challenged that claim in 1998. Each side has criticized the other's models and neither has yielded any ground (see *MWN*, N/D01).

At the June meeting of the Bioelectromagnetics Society, Dr. Bill Guy will emerge from semiretirement to join Kuster in questioning Gandhi's calculations. "For all practical purposes, there is very little difference in peak SARs for different-sized heads," he said in an interview from his home in Seattle. Guy's work was funded by Motorola, which also supports Kuster.

Guy says that Gandhi's higher SARs are a natural result of reducing the size of the voxels (three-dimensional pixels) in modeling the child's brain: With a smaller averaging volume, the SAR will be higher, in the same way that an SAR averaged over 1g is always greater than one averaged over 10g.

"It has nothing to do with voxel size," replies Gandhi. "Children have smaller ears, which brings the phone up to 4 mm closer to the head and the brain, and that leads to SARs that are 40-50% higher."

Guy allows that the radiation will penetrate children's heads more deeply because of their smaller size—with the radiation deposited in regions of their brains that are relatively unexposed in adults. But Gandhi contends that this is only part of the story. "Here again, the real issue is the proximity of the phone to the child's brain," he said.

Beyond physical considerations, there is also the question of

### **WHO Report on Risks to Children —Written by Utility Industry Staffer**

A World Health Organization (WHO) report states that children may be at greater risk than adults from non-ionizing radiation (NIR), but stops short of endorsing a policy of prudent avoidance.

Dr. Kristie Ebi, the author of the chapter on NIR, is a manager of EMF programs at EPRI, the electric utility research group in Palo Alto, CA. EPRI has never endorsed precautionary approaches to EMF health risks.

The report, *Children's Health and the Environment: A Review of Evidence*, was prepared by WHO's European Center for Environment and Health in Rome, with the support of the European Environment Agency. Ebi is currently working part-time at the center and part-time for EPRI and will return to EPRI this summer. The WHO report does not identify her EPRI affiliation.

Ebi writes that any EMF risk—evidence for which comes primarily from epidemiological studies of childhood leukemia—is "likely to be small." With respect to RF/MW radiation, she states that studies of possible risks have been "not particularly informative."

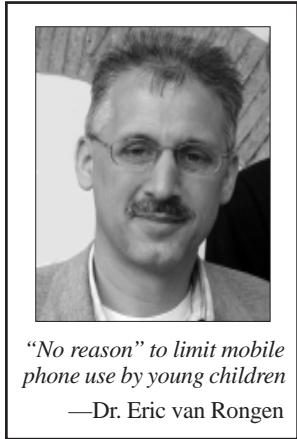
Ebi cautions that children and fetuses "may be more susceptible than adults to any adverse effects" due to their still-developing tissues. She concludes that further research is needed and that prudent avoidance measures to reduce exposures are "one approach to dealing with uncertainty."

Many chapters were originally written for the *3rd Ministerial Conference on Environment and Health*, held in London in 1999. The meeting closed with a resolution to address "areas of emerging concern to children's health on the basis of the precautionary principle."

The report is on the Internet at: <[reports.eea.eu.int/environmental\\_issue\\_report\\_2002\\_29/en](http://reports.eea.eu.int/environmental_issue_report_2002_29/en)>.

whether a child's brain, skull and skin are sufficiently biochemically and biophysically different from those of an adult to result in significantly higher SARs.

At the Rome workshop, Dr. Camelia Gabriel of MCL in London presented her measurements—which were published last year—showing that the dielectric properties of rat tissue change over the first 70 days of life. She has found that as a rat grows older the conductivity and permittivity of its brain tissue decrease,



*"No reason" to limit mobile phone use by young children*  
—Dr. Eric van Rongen

which could lead to lower SARs.

"Children are not little adults," Gabriel said in Rome. As an example, she pointed to changes in the distribution of red and yellow bone marrow with age: The bone marrow of newborns is almost all red, but that goes down to approximately 50% at the age of 20.

"We cannot afford not to do more research," Gabriel told *Microwave News*. Earlier this year, Gabriel received £350,000 (\$500,000) from the U.K. mobile phone research program to make more dielectric measurements

(see *MWN*, J/F02).

According to Gandhi, "The peak 1g and 10 g SARs are up to 80% higher if Gabriel's dielectric data are correct and applicable to children." That is, young children would have higher SARs not only because of their different-sized heads and ears but also due to differences in the electrical properties of their tissues.

There is an "urgent need to generate data on the dielectric properties of tissues for children to validate the finding for younger animals such as rats and mice," Gandhi concludes in his new paper.

Gabriel commented that Gandhi's new paper is "most interesting and should be seriously considered by the relevant standard-setting committees." But, she pointed out, an 80% increase in a peak 1g SAR is based on the assumption that a child's dielectric constants are twice those of an adult. The trend is there, but the actual numbers must still be determined, she said.

Many of those who argue that children are no different from adults point to the recent analysis by the Health Council of the Netherlands. In Rome, Dr. Eric van Rongen, the council's scientific secretary, reiterated the council's conclusion that there is no reason to limit children's access to mobile phones (see *MWN*, J/F02).

Van Rongen noted that the statements in the U.K.'s Stewart report pointing to a greater health risk for children are based on assumptions and are "not backed by scientific data." In fact, he said, it is "unlikely from the developmental point of view" that



*"It is important to study this question further"*  
—Dr. Camelia Gabriel

there is any change in electromagnetic sensitivity after two years of life.

In an interview following his talk, van Rongen took a somewhat softer stance, agreeing with Gabriel that more research is "very important." "We had to deal with the information we had available," he said, referring to the council's report. "Our conclusions are not definitive."

COST281 is establishing a panel to review the literature and make recommendations on how to address the use of mobile phones by children.

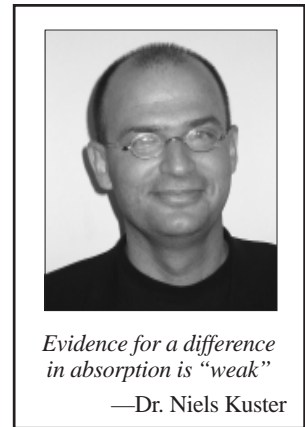
Dr. Luc Martens of Ghent University in Belgium is chairing this "short-term mission."\* He plans to have a draft report ready by the next COST meeting, to be held in London in November (see p.12).

The WHOEMF project in Geneva is planning to issue its own recommendations on the use of cell phones by children. Repacholi will assemble a special review committee, probably in the late fall, to investigate children's sensitivity to EMFs.

"It is very important that this issue be investigated thoroughly by WHO before firm recommendations can be made," Repacholi emphasized to *Microwave News*.

Repacholi pointed out, however, that the ICNIRP standard includes a safety factor for the public "because the very young and older people may be more sensitive to EMFs."

"The WHO has tentatively taken the position that children are currently protected by this additional safety factor in the exposure limits and that no specific additional measures appear necessary to protect health," Repacholi said. Those who wish to take precautionary measures, he added, should limit their calls or use hands-free kits.



*Evidence for a difference in absorption is "weak"*  
—Dr. Niels Kuster

\*A description of the COST281 mission on *Mobile Communication and Children* is available on its Web site, <[www.cost281.org](http://www.cost281.org)>.

For more on the various expert panels, see *MWN*, J/F01 for France; J/F01 and J/A 01 for Germany; J/F02 for Spain; and M/J00 and M/J01 for the U.K.

O. Gandhi, G. Lazzi and C. Furse, "Electromagnetic Absorption in the Human Head and Neck for Mobile Telephones at 835 and 1900MHz," *IEEE Transactions on Microwave Theory and Techniques*, 44, pp.1884-1897, October 1996.

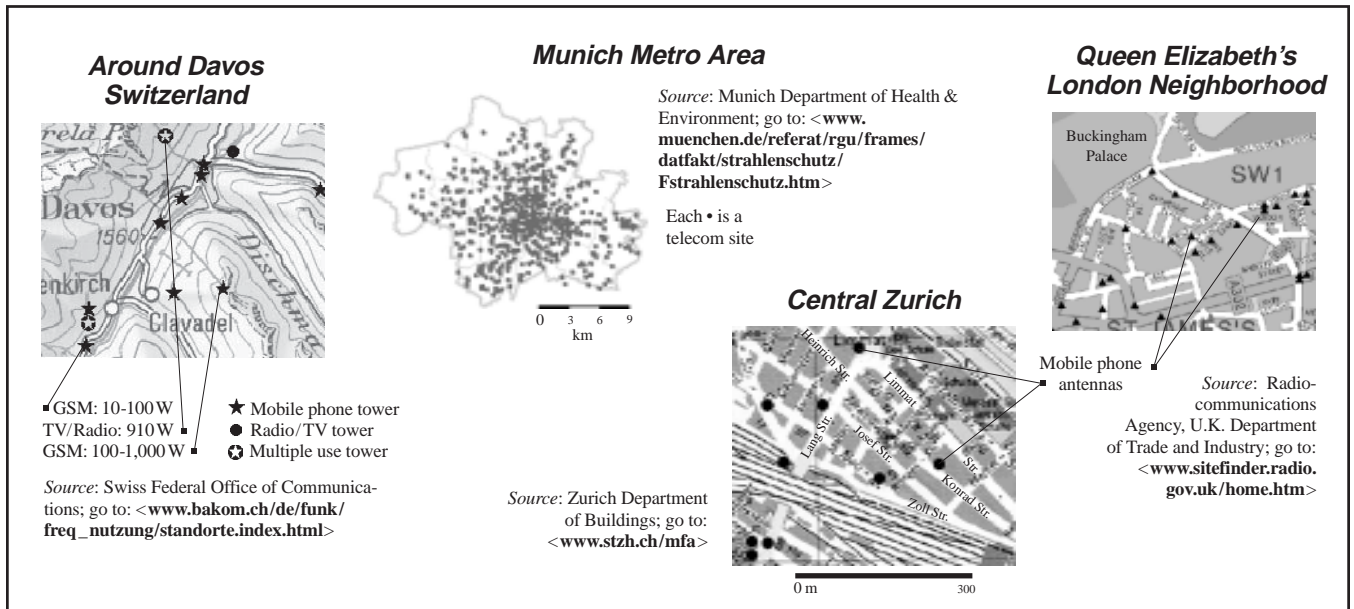
O. Gandhi and G. Kang, "Some Present Problems and a Proposed Experimental Phantom for SAR Compliance Testing of Cellular Telephones at 835 and 1900MHz," *Physics in Medicine and Biology*, 47, pp.1501-1518, May 7, 2002.

A.W. Guy, C.K. Chou and G. Bit-Babik, "FDTD Derived SAR Distributions in Various Size Human Head Models Exposed to Simulated Cellular Telephone Handset Transmitting 600mW at 835MHz," Paper No.7-3, to be presented at the 24th Annual Meeting of the Bioelectromagnetics Society, Quebec City, Canada, June 23-27, 2002.

A. Peyman, A. Rezazadeh and C. Gabriel, "Changes in the Dielectric Properties of Rat Tissue as a Function of Age at Microwave Frequencies," *Physics in Medicine and Biology*, 46, pp.1617-1629, June 2001.

F. Schönborn, M. Burkhardt and N. Kuster, "Differences in Energy Absorption Between Heads of Adults and Children in the Near Field of Sources," *Health Physics*, 74, pp.160-168, February 1998.

## HIGHLIGHTS



## Telecom Towers in Europe: Public Has Detailed Information

The Swiss and U.K. governments have set up Internet sites to provide the public with the locations of telecom antennas. City officials in Munich and Zurich have established their own Web pages for information on tower sites.

Each set of maps is different, both in the types of RF/MW sources covered and the specific information offered for each antenna. For instance, only mobile phone base stations are shown in the U.K. and Zurich maps, while the Swiss and Munich maps also include data for many other types of RF/MW sources.

The Swiss Federal Office of Communications (known by its German acronym, BAKOM) covers GSM, radio and TV towers—TETRA and point-to-point antennas will be added later. The Munich Web site is the most comprehensive, listing mobile phone, broadcast, public safety and taxi radio antennas.

The U.K. maps, which are difficult to navigate, give the name of the mobile phone service provider at each location, as does the city of Zurich. BAKOM identifies radio and TV broadcasters but not the owners of GSM antennas. Munich has opted to omit the names of all the tower operators.

The height of each tower and the output power are included in the U.K. maps. For GSM antennas, BAKOM and Zurich classify power output in one of four categories—from “very small” (<10W) to “large” (>1,000W). For radio and TV transmitters, BAKOM specifies the precise power output in watts.

The Munich site offers information on the frequency and the type of signal (analog or digital) at each location, but not the output power. It also gives the distance between a transmitter and the closest place where people spend time.

The federal authorities in Germany are planning to make information on telecom antennas available to the public, according to *EMF Monitor*, a German newsletter based in Hannover.

No details are yet available, however. The Munich site is maintained by the Department of Health and Environment, which is controlled by the local Green Party.

The Zurich maps have a unique feature. You can obtain the precise distance between an antenna and any other location—such as a particular building or another antenna site. This makes it easy to identify which antennas are close enough to each other (<100m) to be considered as a single source under the city’s interpretation of Switzerland’s 4 V/m limit (see p.5).

### U.S. Data Available at a Price

The U.S. government has no plans to make the location of mobile phone antenna sites available to the public. In fact, the Federal Communications Commission (FCC) does not even have such information.

The FCC’s Wireless Telecommunications Bureau requires its licensees to register antennas only if towers are higher than 200 ft (61 m) or if they raise “environmental issues,” according to FCC spokesperson Meribeth McCarrick.

Many state and local governments have more extensive data because they issue zoning and construction permits, McCarrick told *Microwave News*. Whether they make this information available to the public is a “local zoning issue,” she said.

Janet Newton, the director of the EMR Network in Marshfield, VT, said she does not know of a single city or state that has done so. The EMR Network is concerned with radiation exposures from telecom towers and other sources.

Information on U.S. antenna sites is available at a price. For instance, Tower Maps, a consulting firm based in Lovettsville, VA, has a database on more than 220,000 sites in North America. Prices start at \$495 per county. For details, call (540) 822-5092, or go to <[www.towermaps.com](http://www.towermaps.com)>.



# FROM THE FIELD

## Meeting Notes

• The next meeting of **COST281**, the European committee on the potential health effects of mobile phone radiation, will be held in London, November 12-13. A discussion of a draft report on the radiation impacts on children is on the agenda (see p.10). The U.K. **Mobile Telecommunications and Health Research Program** (MTHR) will meet earlier that same week. On November 11, MTHR will hold a session that is open to the public, followed by a closed session the next day.

• Dr. **Michael Repacholi** will review “WHO’s Assessment of the Health Effects of EMF Exposure”—one of three plenary lectures—at the **27th URSI General Assembly** in Maastricht, the Netherlands, on August 21. URSI Commission K on Electromagnetics in Biology and Medicine has scheduled ten different sessions for platform presentations as well as a number of additional poster sessions during the weeklong conference. The full program is now posted on the Web; see listing at right.

• The December 2001 issue of *Radiation Protection in Australasia* features 11 papers presented at the March 2001 conference, **The RF Spectrum: Managing Community Issues**. The contributions are diverse. Dr. **David Mercer** of the University of Wollongong asks government agencies to stop portraying the public as scientifically ignorant and prone to panic, the media as sensationalistic and the RF community as having reached a consensus on potential health impacts, barring the need for precautionary policies and increased research funds. On the other side of the spectrum, Dr. **Vitas Anderson** of EME Australia, his consulting firm in the Melbourne suburbs, warns against using the precautionary principle to appease the public: There will be economic and legal consequences and science-based standards will be undermined. A few copies of the issue are still available at A\$20 each. The journal is published by the Australasian Radiation Protection Society (ARPS). Order from: Judi Anderson, ARPS Secre-

## New Listings

May 31: **International Seminar on EMFs, New Technologies and Health**, Congress Hall, Ljubljana, Slovenia. Contact: Dr. Peter Gajšek, (386+1) 244-1493, Fax: (386+1) 244-447, E-mail: <peter.gajsek@ivz-rs.si>, Web: <www.gov.si/ivz>.

July 5-6: **Theory and Evidence of EMF Biological and Health Effects**, Catania, Sicily, Italy. Contact: Dr. Michael Kundi, E-mail: <michael.kundi@univie.ac.at>, Dr. Wilhelm Mosgoeller, E-mail: <wilhelm.mosgoeller@univie.ac.at>, or Dr. Livio Giuliani, E-mail: <l-giuliani@libero.it>, or Fax: (39+041) 504-0189, E-mail: <ispeslvenezia@tin.it>.

September 29-October 2: **THz-BRIDGE Workshop on Terahertz Radiation in Biological Research**, Palazzo dei Congressi, Capri, Italy. Contact: Giulia Bartolomei, ENEA, PO Box 65, 00044 Frascati, Italy, (39+06) 9400-5605, Fax: (39+06) 9400-5607, E-mail: <thz-bridge@frascati.enea.it>, Web: <www.frascati.enea.it/THz-BRIDGE/Workshop>.

## Selected Upcoming Meetings

(For a complete list, see MWN, N/D01, J/F02 and M/A02.)

August 17-24: **27th General Assembly of the International Union of Radio Science (URSI)**, Exhibition and Congress Center, Maastricht, The Netherlands. Contact: Dr. Leon Kamp, Dept. of Applied Physics, Eindhoven University of Technology, PO Box 513, NL-5600 MB Eindhoven, The Netherlands, (31+40) 247-4292, Fax: (31+40) 244-5253, E-mail: <URSI2002@tue.nl>, Web: <www.ursi-ga2002.nl>.

October 7-11: **2nd International Workshop on Biological Effect of EMFs**, Aldemar Paradise Royal Mare Hotel, Rhodes, Greece. Contact: Prof. Panos Kostarakis, (30+1) 650-3129, Fax: (30+1) 653-2910, E-mail: <conf2002@imm.demokritos.gr>, Web: <www.uoi.gr/conf\_sem/bioeffects>.

tariat, PO Box 7108, Upper Ferntree Gully, VIC 3156, Australia, E-mail: <arps@21century.com.au>.

## Across the Spectrum

“There are a handful of [mobile phone] studies. None has shown an increase in cancer risk. But I don’t think the existing studies are good enough to draw any conclusions.”

—Dr. **Anders Ahlbom**, Karolinska Institute, Stockholm, and chair, ICNIRP Standing Committee on Epidemiology, quoted by Per Snaprud, “Facts About Cell Phone Radiation” (in Swedish), *Dagens Nyheter* (Sweden), *LördagSöndag* (weekend magazine), p.15, March 9, 2002

Convenience 1, Fear 0. Consumers have shown little interest in the specific absorption rate information included now with all new-model mobile phones sold in Australia, according to the chief executive officer of the Australian Mobile Telecommunications Association (AMTA), Ross Monaghan.

—Rachael Quigley, “Consumers ‘Show Little Interest’ in Data on Mobile Phone Radiation: Associations,” *Canberra Times* (Australia), p.16, April 22, 2002

If exciting progress (e.g., “evidence of the existence of a unified biological system, EM field theory”) does not emerge in the next two to three years, there is little doubt that a continued decline in both membership and the importance of BEMS and other like societies will result.

—“The Bioelectromagnetics Society’s Long Range Plan,” distributed with the *Bioelectromagnetics Newsletter*, March/April 2002

“We are the law in this area—not the guards or the government in Dublin. And what we say is done. We are implementing the will of the people; they want you out of here. You have an hour to leave or we’ll empty this revolver in your head.”

—One of five masked, armed men threatening workers erecting a Digiphone mobile phone base station in Hackballscross, County Louth, Ireland, as reported by John Lee and Maeve Sheehen, “Technology in the Sights of Terrorism,” *Sunday Times* (Republic of Ireland edition), p.16, February 17, 2002; Digiphone has dropped its plan for the site

## Brillouin Precursors: Robert Adair, Albanese and Oughstun

### Ten Million Times Too Weak

April 19, 2002

To the Editor:

In an interview published in your last issue, Prof. Kurt Oughstun pontificates on Brillouin precursors. He and Dr. Richard Albanese argue that pulses in the background emissions of the PAVE PAWS defense radar system on Cape Cod produce these precursors, which then affect the health of those who are exposed to these emissions.

To borrow phrasing from Mary McCarthy, just about every word Oughstun and Albanese say about PAVE PAWS, including the “and”s and “the”s is wrong. However, I will limit myself here to brief comments on two central points: (a) possible biological effects of Brillouin precursors, and (b) conditions for the existence of such precursors.

Brillouin precursors are bumps in the electric field at the beginning and end of pulses of high-frequency radiation found after those pulses have been strongly absorbed by passing through water or tissue. The precursors will occur only if the original pulses entering the tissue have turn-on and/or turn-off times much smaller than the basic period of the radiation (2.2 nanosec for PAVE PAWS).

Oughstun’s graph (*MWN*, M/A02, p.12), which is in accord with my own calculations, shows that given an incident PAVE PAWS pulse with instantaneous turn-on and turn-off times, at a depth of 25 cm in the brain (of an elephant or whale?) the amplitude of the precursors is about three times that of the rest of the pulse.

The energy density in that pulse at that depth is about 10,000 times less than on the surface, and the energy in the precursors is no more than 1/1,000 of the pulse energy—or about 1 part in 10,000,000 of the energy of the original very weak innocuous background pulse. In short, the precursors are too weak by at least a factor of 10,000,000 to affect biology.

### WHO EMF Project on Brundtland’s Precautionary Approach to Phones

*In our last issue, we reported on an interview with Dr. Gro Harlem Brundtland in which she advised a precautionary approach to the use of mobile phones. Brundtland is the director general of the World Health Organization (WHO) in Geneva. At the time, we could not reach Dr. Michael Repacholi of WHO’s International EMF Project. In mid-April, after we went to press, Dr. Leeka Kheifets, who works with Repacholi, offered the following comment:*

In the interview with the Norwegian newspaper, Dr. Brundtland clearly states that: “We don’t have backing in science at this stage for going out with warnings about cell phones. But I believe one should be cautious and not use cell phones more than is necessary.” She then refers to the EMF study.

WHO’s International EMF Project is actively promoting research [on mobile phone radiation]. As part of the EMF study, the issue of the precautionary principle will be studied closely. In earlier publications, WHO has also advised “concerned individuals” to limit their use of cell phones. WHO cannot see any inconsistencies or contradictions in any of these statements.

But the instantaneous turn-on and turn-off used in Oughstun’s calculations and graph are a mathematician’s artifact. Real systems, like PAVE PAWS, radiate the low frequencies that make up the precursors inefficiently and turn the pulse on and off relatively slowly. When I put the real PAVE PAWS turn-on and turn-off times in my calculations, I find no precursors at all. (Such calculations are quite simple.)

So in summary, (a) precursors are innocuous—and (b) they don’t exist.

However, to my mind, that is not the only lesson to be learned or, perhaps, even the most important lesson. If a scientist comes to you and says that he has studied the flight of animals and has concluded that elephants can fly by wiggling their ears, you do not conclude that he has just made a mistake—after all, we all make mistakes—but you never believe anything he says again. Oughstun and Albanese: After your indictment of Brillouin precursors for their effects on biology, I will never believe anything you two ever write on science.

Robert Adair, PhD

Department of Physics, Yale University  
New Haven, CT 06520  
<adair@hepmail.physics.yale.edu>

### Membrane Depolarization May Occur

May 3, 2002

To the Editor:

With a simple sinusoidal signal in tissue, the negative half cycle of the signal cancels the prior positive half cycle so there is no net voltage except within a single cycle (about 2 nanosec at PAVE PAWS frequencies).

However, when a Brillouin precursor occurs at the leading edge of an electromagnetic pulse, or when there is phasing or steep amplitude modulation, this balancing may not occur and a net voltage can exist in tissue for some time (several nanoseconds to milliseconds). I believe this will cause membrane depolarization.

To support this concern, I direct your attention to poster P-116\* by members of the Air Force Radiation Research Labs at Brooks AFB at the upcoming BEMS meeting in Quebec City.

Richard Albanese, MD  
San Antonio, TX  
<jelena-2@swbell.net>

\*W. Rogers et al., “Extension of the Single-Pulse, Contact Stimulation Strength-Duration Curve Down to 5 Nanoseconds,” Poster No.P-116, to be presented at the 24th Annual Meeting of the Bioelectromagnetics Society, Quebec City, Canada, June 23-27, 2002.

### Detailed Measurement Program Needed

April 26, 2002

To the Editor:

In a letter I wrote last November to the PAVE PAWS Public Health Steering Group, I argued that it is absolutely critical that an independent set of time-domain measurements be taken of the electric and magnetic field pulses emitted by the individual elements of the PAVE PAWS radar and that, with this detailed information, the penetration of pos-

sible pulse sequences may be accurately computed in known dispersive bodies such as water, muscle, etc., thereby beginning to directly address the health and safety issues that are central to this entire study.

Robert Adair sent me a highly personal and vitriolic response, which stated in part, "I do know that time-domain measurements will be useless—and quite difficult to implement."

Sifting through the rhetoric, Adair's scientific argument emerges: "As to the strange pulse effects, etc. that Albanese advances...for the most part they simply don't exist. Albanese's cartoons of such wave-forms have about the same relation to reality as Donald Duck cartoons. Phenomena such as Brillouin precursors—manifestly harmless as they are—are insignificant."

This letter concludes: "All in all, you are pronouncing voodoo science. I don't know your motives, but your irresponsible letter can help no one and can be damaging to the Air Force and its role in the defense of the United States—my country and my Air Force—and I resent your writing that letter." Such comments merit no reply.

In his letter to *Microwave News* Adair first admits that "Brillouin precursors are bumps in the electric field..." but then once again states that precursors are "innocuous" and "don't exist." He not only contradicts himself but his statements are contrary to a large body of pub-

lished scientific research. Important applications of Brillouin precursors have been reported by R.W. P. King and T. T. Wu of Harvard University as well as others, on such diverse topics as undersea communications and hyperthermia treatment.

Although the precursor field amplitudes from PAVE PAWS may indeed be too small to produce thermal effects, that is not the reason for my concern. As I told *Microwave News*, my concern lies entirely with nonthermal effects, particularly with the possibility that a single Brillouin precursor could open small channels through cellular membranes. In order to answer these and related health questions regarding the PAVE PAWS system, we need a detailed measurement program.

In his concluding remarks, Adair states that "I will never believe anything you ever write on science." The last time someone said something like that to me, he took his baseball and went home to his mommy. I bid him good riddance.

Kurt Oughstun, PhD  
College of Engineering & Mathematics  
University of Vermont  
Burlington, VT 05405  
<oughstun@emba.uvm.edu>

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## Hot New Papers

**Frank Groves et al., including Robert Tarone, John Boice and Gilbert Beebe, "Cancer in Korean War Navy Technicians: Mortality Survey After 40 Years," *American Journal of Epidemiology (AJE)*, 155, pp.810-818, May 1, 2002.**

"This study reports on over 40 years of mortality follow-up of 40,581 Navy veterans of the Korean War with potential exposure to high-intensity radar...Deaths from all diseases and all cancers were significantly below expectation overall and for the 20,021 sailors with high radar exposure potential. There was no evidence of increased brain cancer in the entire cohort...or in high-exposure occupations....Nonlymphocytic leukemia was significantly elevated among men in high-exposure occupations but in only one of the three high-exposure occupations, namely, electronics technicians in aviation squadrons (SMR=2.2, 95% CI: 1.3, 3.7)....This is the second follow-up of a cohort of U.S. Navy veterans with possible microwave exposure from radar units aboard ships or in airplanes during the Korean War [the first was the Robinette study, *AJE*, 112, pp.39-53, 1980]....The strengths of our study include its size and long duration of follow-up. The weaknesses of the study include the lack of dosimetry for microwave exposures and other occupational and environmental chemical exposures, misclassification of exposures due to the reliance on job titles, the absence of exposure information after Naval duty...."

*Reprints:* F. Groves, Medical University of South Carolina, Charleston, E-mail: <grovesf@muscf.edu>.

**Satoru Takahashi et al., "Lack of Mutation Induction with Exposure to 1.5 GHz Electromagnetic Near Fields Used for Cellular Phones in Brains of Big Blue Mice," *Cancer Research*, 62, pp.1956-1960, April 1, 2002.**

"The possible mutagenic potential of exposure to 1.5 GHz electromagnetic near field (EMF) was investigated using brain tissues of Big Blue mice (BBM). Male BBM were locally exposed to EMF in the head region at 2.0, 0.67 and 0 W/Kg specific absorption rate for 90 min/day, 5 days/week, for 4 weeks. No gliosis or degenerative lesions were histopathologically noted in brain tissues, and no obvious differences in Ki-67 labeling and apoptotic indices of glial cells were evident among the

groups. There was no significant variation in the frequency of independent mutations of the *lacI* transgene in the brains. G:C to A:T transitions at CpG sites constituted the most prevalent mutations in all groups and at all time points. Deletion mutations were slightly increased in both the high and low EMF exposure groups as compared with the sham-exposed group, but the differences were not statistically significant. These findings suggest that exposure to 1.5 GHz EMF is not mutagenic to mouse brain cells and does not create any increased hazard with regard to brain tumor development....The present experiment was limited to only 4 weeks and does not directly reflect the human situation because cellular phones are often used much longer in daily life. However, the 4-week experimental duration was sufficient because we focused on whether EMF exposure can cause mutations in brain DNA *in vivo* and whether EMF exposure possesses initiating activities on brain carcinogenesis. The manifestation time for fixing mutations is varied among tissues, depending on their proliferation activity. A sampling time of 4 weeks is generally recommended to examine the genotoxic effects in lower proliferating tissues such as brain. Regarding the effects of 1.5 GHz EMF near field exposure on brain tumor development, a long-term experiment using rats is in progress in our laboratory."

*Reprints:* S. Takahashi, Nagoya City University Graduate School of Medical Sciences, Japan, Fax: (81+52) 842-0817, E-mail: <sattak@med.nagoya-cu.ac.jp>.

**D. Maisch, J.Podd and B. Rapley, "Changes in Health Status in a Group of CFS and CF Patients Following Removal of Excessive 50 Hz Magnetic Field Exposure," *Journal of the Australasian College of Nutritional & Environmental Medicine*, 21, pp.19-23, April 2002.**

"The present paper briefly reports the results of a small-scale pilot study utilizing 49 subjects suffering from [Chronic Fatigue Syndrome (CFS)] or ongoing [Chronic Fatigue (CF)], who were exposed to varying strength magnetic fields in their home environment. Some subjects were found to have prolonged exposure to magnetic fields >2 mG, which was used as a benchmark level. These subjects (group A) were provided with advice and assistance regarding reducing their exposure level. The re-



mainder of the subjects (group B: <2mG exposure level) were given no such advice or assistance. Changes in health status in both groups were recorded over a 6-month period...Of the 49 subjects, 14 had prolonged magnetic field exposures >2mG (28%), and of these 14, 9 were over 4mG (18%). Interestingly, only two of the 14 exposure situations were due to proximity to power lines....Group B (exposure <2mG) consisted of 34 subjects with a group average exposure of 0.67 mG.... 55% of the more highly exposed subjects (group A) reported definite improvement in their symptoms....[O]nly 14% [of group B] reported a definite improvement....An unexpected change in this pilot study was a marked improvement in sleep quality for the group A subjects."

Reprints: D. Maisch, Australia, E-mail: <emfacts@trump.net.au>.

**S. Dasdag et al., "Effects of Extremely-Low-Frequency Electromagnetic Fields on Hematologic and Immunologic Parameters in Welders," *Archives of Medical Research*, 33, pp.29-32, January-February 2002.**

"Electric arc welding is known to cause considerable exposure to ELF EMFs. Welders handle cables that carry currents in the range of 100-500 amperes very close to their bodies. Normally, a welder directly grasps a handle with the cable during welding, and sometimes the cable is in contact with other parts of the body (wearing the cable over the shoulder is common). A [magnetic field] survey...showed levels of several hundred microtesla just 10cm from the trunks of welders....The study was carried out on 16 male welders and 14 healthy males between 20 and 40 years of age from the same geographic area and with similar lifestyles....Some of the hematologic and immunologic parameters under investigation were similar in both groups. Although T lymphocyte surface antigens, such as levels of CD4 and CD8, were found to be lower in the welders than in the control subjects (p<0.001, p<0.05), the hematocrit levels of the welders were found to be higher than those of the control subjects (p<0.05). However, the differences observed were not clinically significant. ELF EMF intensities in the welding areas varied between 0.1 and 0.25 mT [1-2.5G]....These results suggest that ELF EMFs do not affect the hematologic and immunologic parameters of welders."

Reprints: S. Dasdag, Dicle University, Turkey, Fax: (90+412) 248-8440, E-mail: <dasdag@dicle.edu.tr>.

## ***Stress Protein Activation by GSM: Key to Cancer and BBB Effects?***

**Dariusz Leszczynski et al., "Nonthermal Activation of the hsp27/p38MAPK Stress Pathway by Mobile Phone Radiation in Human Endothelial Cells: Molecular Mechanism for Cancer- and Blood-Brain Barrier [BBB] Related Effects," *Differentiation*, 70, pp.120-129, May 2002.**

"[I]t is here hypothesized that mobile phone radiation-induced activation of hsp27/p38MAPK-dependent cellular stress response might: (i) lead to the development of brain cancer due to the inhibition of cell apoptosis and (ii) cause increased permeability of [the] BBB due to stabilization of endothelial cell stress fibers. Stress proteins are known to regulate cell apoptosis. RF-induced deregulation of apoptotic processes might be a risk factor for tumor development because it could lead to the survival of cells that 'should' die [as suggested by French et al., see *MWN*, J/A01]. We suggest that the apoptotic pathway regulated by hsp27/p38MAPK might be the target of RF radiation. Hsp27, stress protein shown in this study to be affected by mobile phone radiation exposure, is a member of a family of small heat shock proteins that is ubiquitously expressed in most cells and tissues under normal conditions....We propose that the induction of hsp27 phosphorylation and increased expression by RF exposure shown in this study to occur *in vitro*...might be the molecular signaling event that triggers the cascade of events leading to the increase in BBB permeability....Proving or disproving this hypothesis using *in vitro* or *in vivo* models will provide evidence to either support or discredit the existence of some of the potential health risks suggested to be associated with the use of mobile phones." (See also p.8 and *MWN*, J/A01.)

Reprints: D. Leszczynski, STUK, Helsinki, Finland, E-mail: <dariusz.leszczynski@stuk.fi>.

## **"MICROWAVE NEWS" FLASHBACK**

### ***Years 20 Ago***

- A New York State appeals court unanimously upholds a worker's compensation award to the widow of Samuel Yannon, a New York Telephone Co. technician who worked near MW transmitters on top of the Empire State Building. The company appeals again.
- The solicitor-general's office in Ottawa, Canada, is the latest to report a cluster of abnormal pregnancies among its VDT operators.
- Dr. Ken Klein takes over as head of the DOE's research program on EMFs and health, as its 1983 budget is cut to zero.

### ***Years 10 Ago***

- Susan and David Reynard file suit against NEC America and GTE Mobilnet, alleging that the use of a cell phone promoted the development of Susan's brain tumor.
- Concerned over EMF exposures, the Utility Workers Union asks Detroit Edison to adopt a policy of prudent avoidance.

- In Connecticut, a week after U.S. Sens. Christopher Dodd and Joseph Lieberman called for national studies to investigate possible radar-cancer links, Governor Lowell Weicker signs a bill outlawing the use of hand-held radar units by the police.

### ***Years 5 Ago***

- "I believe this is the first animal study showing a true nonthermal effect," declares Dr. Michael Repacholi after revealing that more than twice as many mice exposed to GSM radiation developed lymphoma, compared to controls.
- Electric utility workers with over 20 years of exposure to EMFs are three times more likely to develop ALS (Lou Gehrig's disease), according to Dr. David Savitz of the University of North Carolina.
- Motorola threatens to sue U.K.-based Microshield Industries for printing "deceptive" and "grossly misleading" brochures for their mobile phone shields. The company demands that Microshield stop distributing materials that imply cell phones are not safe.

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## New Books

Vladimir Binhi, *Magnetobiology: Underlying Physical Problems*, 485pp., \$149.95, London: Academic Press, 2002. Contact: <[www.academicpress.com](http://www.academicpress.com)>.

Binhi, who is at the Russian Academy of Sciences' General Physics Institute in Moscow, develops a theoretical framework to explain "the biological action of weak low-frequency magnetic fields, whose energy is incomparable by far with the characteristic energy of biochemical transformations." According to the late Dr. Aleksandr Prokhorov, a Nobel laureate in physics, Binhi has succeeded. In the foreword, Prokhorov wrote that, "Binhi draws on fundamental physical principles to derive a reasonable model" that "agrees well with experiment."

Riadh Habash, *Electromagnetic Fields and Radiation: Human Bioeffects and Safety*, 413pp., \$175.00, New York: Marcel Dekker, 2002. Contact: (800) 228-1160, Fax: (845) 796-1772, Web: <[www.dekker.com](http://www.dekker.com)>.

This reference book on non-ionizing radiation, biology and health is written for a general audience. Its greatest strength is its breadth—EMF and RF sources, dielectric properties of tissue, possible mechanisms of interaction, epidemiological studies and exposure standards. Its greatest weakness is prose that is too often muddled.

Edward Leeper, *Silencing the Fields: A Practical Guide to Reducing AC Magnetic Fields*, 351pp., \$49.50, Boulder, CO: Symmetry Books, 2002. Contact: (303) 442-3773, E-mail: <[edleeper@mymailstation.com](mailto:edleeper@mymailstation.com)>.

Dr. Nancy Wertheimer's partner in pioneering research on childhood cancer, Leeper offers "good low-cost ways to mitigate magnetic fields—as a precaution." Much of the information here is for electricians who are installing or troubleshooting electrical wiring, but homeowners will also find useful advice—for instance, on working with electric utilities to address problems with distribution lines.

Rüdiger Matthes, Jürgen Bernhardt and Michael Repacholi, eds., *Biological Effects, Health Consequences and Standards for Pulsed Radiofrequency Fields*, 422pp., \$60.00, Oberschleißheim, Germany: ICNIRP, 2002. Contact: EarthPrint, Stevenage, U.K., Fax: (44+1438) 748-844, E-mail: <[customerservices@earthprint.com](mailto:customerservices@earthprint.com)>, Web: <[www.earthprint.com](http://www.earthprint.com)>.

Papers presented at a November 1999 seminar in Erice, Sicily (see also *MWN*, J/F00). The contributors include many current and former members of ICNIRP.

Lyn McLean, *Watt's the Buzz? Understanding and Avoiding the Risks of Electromagnetic Radiation*, 260pp., Aus\$30.00 (US \$17.15), Melbourne, Scribe Publications, 2002. Contact: E-mail: <[scribe@bigpond.net.au](mailto:scribe@bigpond.net.au)>, Web: <[www.scribepub.com.au](http://www.scribepub.com.au)>.

McLean, an activist who leads the EMR Association of Australia (EMRAA), provides an accessible, well-illustrated survey of health concerns related to radiation from power lines, household appliances, cell phones and other sources, with suggestions on how to reduce exposures. (See also p.18.)

## CONSUMER REPORTS

**Waiting for a Definitive Answer...**In a letter appearing in the June issue of *Consumer Reports*, a reader writes that he is "appalled" that the magazine's guide to cell phones did not touch on possible radiation risks (see *MWN*, J/F02). The editors reply, in part, that: "We didn't mention radiation and cell phones because studies in Europe and the U.S. have yet to demonstrate definitively that cell phone radiation is harmful."

## PEOPLE

Dr. **Howard Cyr** is the new interim chief of the radiation biology branch and manager of cell phone studies at FDA's Center for Devices and Radiological Health (CDRH) in Rockville, MD. Cyr takes over from Dr. **Russell Owen**, who left the center to join the EPA in Research Triangle Park, NC (see *MWN*, J/F02). Meanwhile, the FDA-CDRH is searching for a permanent replacement. Cyr, whose research has focused on UV and ionizing radiation, got his doctorate in biophysics from Penn State University in 1972. FCC's Dr. **Robert Cleveland** and Motorola's Dr. **Joe Elder**, formerly with the EPA, were graduate students in the same department during Cyr's time at Penn State.... Dr. **Gayle Woloschak** of the Argonne National Lab outside Chicago has become the 11th member of the NAS-NRC committee investigating possible health impacts of the USAF's PAVE PAWS radar on Cape Cod (see *MWN*, J/F02 and M/A02). Dr. **Evan Douple**, the director of NAS-NRC's Board on Radiation Effects Research, declined to reveal whether Woloschak has clearance to see classified documents. He said that this was the NAS-NRC policy—although previously *Microwave News* was told which members of the PAVE PAWS panel and NRC staff hold security clearances. Among Woloschak's interests are mechanisms for the development of radiation-induced tumors. She won a \$467,000 grant from the EMF RAPID program to study possible changes in gene expression following exposure to power-frequency magnetic fields (see *MWN*, S/O94).... As expected, Dr. **Thomas Tenforde** was elected president of the National Council on Radiation Protection and Measurements (NCRP), replacing **Charles Meinhold** (see *MWN*, J/F02). **Ron Petersen** and Dr. **Marvin Ziskin** were reelected to the NCRP's board of directors. Dr. **Jerrold Bushberg** of the University of California, Davis, has been elected to the council.... On May 23, Governor Michael Leavitt presented Dr. **Om Gandhi** of the University of Utah, Salt Lake City, with the Governor's Medal for Science and Technology.

## STANDARD SETTING

**ICNIRP Explains...**The International Commission on Non-Ionizing Radiation Protection (ICNIRP) has issued a description of its "philosophy and general methodology" for evaluating the scientific literature on possible health risks. For example, in its discussion of reduction (safety) factors, the members of the commission note that, "Uncertainties in the knowledge are compensated for by reduction factors, and the guidelines will accordingly be set below the thresholds of critical effects.... There is no definite basis for determining the precise magnitude of the reduction factors, and the choice of the reduction is a matter of scientific judg-

## Cell Towers

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Edited by **B. Blake Levitt** with chapters contributed by: Carl Blackman, EPA; Robert Cleveland, FCC; Albert Manville, F&WS; Henry Lai and Andrew Marino, among others



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ment. As with all the procedures, setting reduction factors should be free of vested commercial interest." A draft of this document was reviewed by other standard-setting groups, including IEEE's ICES/SCC-28. Ron Petersen, the secretary of ICES, commented that ICES, as well as an IEC committee (TC106), had provided ICNIRP with "extensive and detailed comments," particularly with respect to addressing uncertainty and safety factors: "ICNIRP thanked us for the comments and then ignored each and every one." There has long been tension between the two groups as they vie for control of the standard-setting process (see *MWN*, J/A00). "General Approach to Protection Against Non-Ionizing Radiation" appears in the April issue of *Health Physics* (82, pp. 540-548, 2002). A copy can be downloaded at no charge from the "activities" section of ICNIRP's Web site, <[www.icnirp.de](http://www.icnirp.de)>.

### AS WE GO TO PRESS

**Daubert Dispute Continues...** The Angelos law firm and the cell phone industry are not waiting passively for Judge Catherine Blake to issue her decision on whether the Christopher Newman brain tumor case can go to trial (see *MWN*, M/A02). On May 29 at the request of Jeffrey Silva of *RCR Wireless News*, Blake released a series of letters concerning the publication of the Swedish and Finnish epidemiological studies (see *MWN*, M/A02 and p.6, respectively). Russell Smouse of the Angelos firm notified Blake on April 2, a month after the Daubert hearing ended, that Dr. Lennart Hardell's paper had been accepted by the *European Journal of Cancer Prevention*. He followed up on April 23 to tell the judge that the Finnish paper had been published. Each letter prompted reply comments from Jane Thorpe of Alston & Bird on behalf of the wireless industry defendants.

## Keeping Current: Follow-Up on the News

◆ On May 31, Minnesota Judge Rex Stacey ordered the town of Sunfish Lake to approve Xcel Energy's planned upgrade of a 115 kV power line (see *MWN*, M/A02). The town's denial of a permit was "unauthorized, unreasonable, arbitrary and capricious," ruled Stacey. At press time, the town had not yet decided whether to appeal. But the Power Line Task Force, a local group, will, according to its director, Roger Conant. Stacey's ruling is "replete with errors," Conant said. Stacey's decision is available at <[www.sunfishlake.org/news.htm](http://www.sunfishlake.org/news.htm)>.

◆ *Cell Phone Facts*, the joint FDA-FCC Web site for consumer information on cell phones, is up and running. Issues are addressed in a question-and-answer format. For example, Q: "Do hands-free kits for wireless phones reduce risks from exposure to RF emissions?" A: "Since there are no known risks from exposure to RF emissions from wireless phones, there is no reason to believe that hands-free kits reduce risks...." For more, go to: <[www.fda.gov/cellphones](http://www.fda.gov/cellphones)>.

◆ The five mobile phone-brain tumor lawsuits filed on February 25 by a team led by Mayer Morganroth of Detroit have been moved to the federal court of Judge Thomas Penfield Jackson in

Washington, DC, who consolidated them with the *Michael Murray* suit, which Morganroth filed last November (see *MWN*, N/D01 and M/A02).

◆ The EMR Alliance of Australia is now the EMR Association of Australia Inc. (EMRAA). Headed by Lyn McLean of Sutherland, south of Sydney (see p.16), the EMRAA promotes "a society that enjoys the benefits of technology safely." For more information, go to <[www.ssec.org.au/emraa](http://www.ssec.org.au/emraa)>.

◆ The state of Maryland will pay Baltimore attorney Peter Angelos \$150 million for his work on litigation against the tobacco industry, the *Washington Post* reported on April 25 (see *MWN*, J/F02). Angelos could have received up to \$1 billion under his original agreement with the state. He has still not heard whether his cell phone-brain tumor case against Motorola and other wireless companies can go to trial (see above and *MWN*, M/A02).

◆ On May 14, the FTC announced that it is suing Meristar International Inc. in Dallas for marketing mobile phone shields that are ineffective. The agency says that Meristar was in a joint venture with Stock Value 1, one of two companies sued by the FTC in February for similar reasons (see *MWN*, M/A02).

# VIEWS ON THE NEWS

## **The True Risk to Children: Our Ignorance About Health Effects**

The underlying assumption at the heart of the Rome workshop on *Mobile Phones and Children* (see p.1) was that when exposure standards are met, the safety of adults is assured. From that vantage point, speaker after speaker considered possible differences between adults and children to see if the young may be at greater risk.

The central question none of the speakers addressed was the reliability of the 1.6 and 2.0 W/Kg SAR standards. That's not surprising since the sponsors of the meeting—COST281, EBEA, ICNIRP and the WHO—are, in one way or another, committed to ICNIRP's 2 W/Kg limit for mobile phones.

No one wanted to rehash familiar arguments about nonthermal effects or possible cancer and neurological risks, and especially not about leakage through the blood-brain barrier.

But it is these still-open health issues, much more than the possible physical and biological differences between children and adults, that point to a need for precautionary policies—for instance, limiting children's access to mobile phones. This approach was first endorsed by the Stewart panel in the U.K., and later by similar groups in France, Germany and Spain.

Some in China recognize the importance of the large data holes and want to set the standard at 1 W/Kg (see p.1). As Dr. Huai Chiang pointed out last year, the ICNIRP limits are based on short-term health effects, not on the body of literature suggesting that there are biological effects at levels that do not produce heating or stimulation (see p.7).

The Swedish white-collar union, TCO, has opted for an even stricter standard, 0.8 W/Kg.

For its part, the wireless industry insists that setting stricter exposure standards is simply a waste of money because safety has been assured (see *MWN*, M/J99).

Dr. Eric van Rongen of the Health Council of the Netherlands, whose recent report has become a brief for those who see no reason to give children special treatment, takes a pragmatic view. One must deal with the information that is available, he says, and there is no direct evidence showing that children are more sensitive than adults (see p.10).

On the other hand, there are those who emphasize that not all the evidence is in. As Sweden's Dr. Leif Salford said a couple of years ago, mobile phones are "the world's largest biological experiment ever" (see *MWN*, S/O00).

It is an experiment, moreover, in which young people constitute a significant proportion of the exposed population. The BBC reported last year that two-thirds of all British 11-to-15-year-olds own their own mobile phones, and close to nine in ten use one. That's in a country where the Stewart panel advised against this and where a hyperactive press has blared constant warnings about the perils of mobile phones.

In all other branches of environmental health, it is axiomatic that children need special protection because of their special vulnerabilities and because they will be exposed for longer periods of time. So, why not in RF and microwave land? There is nothing to worry about, the experts tell us, because they understand

## **A Mickey Mouse Policy**

In November 2000, just as ABC News was about to air a TV program expressing concern over the use of cell phones by children, the Walt Disney Co. announced that it would no longer allow its cartoon characters to be used to market wireless phones. ABC is a subsidiary of Disney.

This new policy will remain in effect "until there is reliable evidence establishing the absence of any [health] risks," a Disney spokesman said. "The well-being of our customers is our first priority" (see *MWN*, N/D00).

In a recent visit to our local wireless store, we noticed that Mickey Mouse phone covers were still on the shelf. "He is one of our best sellers," the manager told us. Minnie Mouse was also there. Goofy was out of stock, but, she quickly added, "You name it, we can get it."

We then checked the Internet, where we found numerous offers for Nokia faceplates with Disney characters.

Our next step was Disney corporate communications. We asked whether it had changed its policy. Not at all, said Maria Gladowski, a Disney spokesperson. "We stand by it." The company has discontinued licensing its characters for cell phones, she said.

Disney is known to be hard as nails about who gets to use its cartoon characters. Just ask the Florida day care center that was forced to remove unauthorized murals of Mickey Mouse and Donald Duck.

Do we need Disney's permission to call this a Mickey Mouse policy?

everything that needs to be known. And just to be safe, they have added an appropriate safety factor that covers all age groups (see p.17).

Anyone who has followed the shameful history of ionizing radiation exposure standards knows how wrongheaded this argument is. Safety limits were tightened as more research pointed to effects at lower and lower levels. The principle that less exposure is better—call it ALARA—is the way to deal with our general ignorance. Clearly, it should also apply to non-ionizing radiation.

Dr. Luc Martens of the University of Ghent is leading COST 281's short-term project to prepare a report on mobile phone risks to children (see p.10). He and the rest of his committee must not ignore the fundamental uncertainties and assume the heart of the problem away, as was done in Rome.

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