Issues in Mobile Communications

THEMES FROM THE NOVEMBER 2006
CONFERENCE ON MOBILE COMMUNICATIONS:
HEALTH, ENVIRONMENT AND SOCIETY

Brussels, Belgium[1]

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[1] Organized by the European Commission (EC), GSM Europe (the European Interest Group of the GSM Association — the trade association for GSM operators and suppliers to the GSM industry), and the Mobile Manufacturers Forum (MMF) — an international association of radio equipment manufacturers.

Executive Summary

Building on the success of previous conferences, the 3rd Mobile Communications Seminar *Health, Environment & Society* was held 20-21 November 2006 in Brussels. The two-day seminar was jointly sponsored by the European Commission (EC), GSM Europe/GSM Association and the Mobile Manufacturers Forum. The seminar, *Risk Assessment, Risk Evaluation, Deployment Risks* brought together many of the issues associated with electromagnetic fields and public health, emphasizing the evolution of the relationship between public involvement and science-based policy. It is now recognized that responding to public concerns will require an approach beyond the laboratory. While the scientific effort is not yet complete, communication is now seen as the bridge to bring science to policy-makers and then on to the public.

Science

The first session provided updates by a range of highly qualified experts representing the diverse scientific disciplines needed to acquire a firm grasp of the issues surrounding electromagnetic fields (EMF) and health. No new scientific results were presented and no evidence was offered to contradict the generally accepted premise that biological effects from radiofrequency (RF) EMF are directly related to heating. To date, science has not shown a causal relationship between low-level exposures to RF EMF and health effects but the scientific effort continues.

Responding to concerns over whether the science used for policy is complete and independent, scientists stressed that it is not the results but rather the quality of the experimental method that imparts a study's authority. Researchers bear an obligation to put in place procedures to maintain a study's independence and credibility. It was widely recognized that science should serve as the foundation of public policy, but if it is to do so, the science must be respected not only by other scientists but by the public as well.

Public Policy

Speakers added perspective by agreeing that while high-quality science is essential, it is but the first step in developing public policy. Studies must be evaluated and a scientific consensus formed. The accepted state of the science is then submitted to a risk assessment so that regulators can carry out their obligation to form balanced public policy. Though questions linger about discrimination in what comprises accepted science, conference delegates endorsed the science-based process and acknowledged that standards adopted at the national level should provide simplicity and consistency. Further, because mobile communications contribute less than 10% of the RF environment, a uniform policy would allow regulators to focus on characteristics of exposure and prepare for a future crowded with new technologies.

Network Deployment

Although there was encouragement for harmonization of national standards, a review of national programs demonstrated the necessity for each country to tailor its approach in

keeping with its own unique customs and needs. This was particularly true for planning and network deployment practices, where responsibility lies at the Member State level.

Despite the impediment it causes, the public has demonstrated a poor understanding of and perhaps a limited inclination to learn about mobile communications and health. The proceedings made clear that risk perception is shaped by objective and subjective factors. Risk management therefore must incorporate both scientific and socio-political concerns. Each speaker called for increased cooperation and a commitment to communication.

Risk Communication

Underscoring that communication is more than education, the final session focused on efforts to communicate with the public about potential and perceived risks from mobile telecommunications facilities. Speakers highlighted the importance of responsiveness, clarity and transparency in communications.

The controversial issue of mast siting found common ground. Support was sounded for a model program that favors citizen involvement and a commitment to communication. The Australian approach, where carriers voluntarily adopted a legally enforceable Code of Practice, has met with success. Government programs that provide information, accountability and a focus on personal contact have been shown to deliver good outcomes.

The session brought to light new information that has further complicated the challenge of effective communication. New research into risk perception has validated that concern isn't necessarily the product of a lack of information. Studies reveal that advice designed to alleviate fear and help individuals exert personal control has had the unintended effect of amplifying concerns. This paradoxical effect associated with the precautionary principle has called into question any further use of this approach. These findings are reinforced by other studies that show, despite a concerted effort toward education, public concern has not shifted over time. There remains a serious discrepancy between the realities of science and technology and what the public perceives.

People prefer to come by information through a trusted source, and not everyone concerned about RF EMF and health feels represented by one of the three major stakeholder groups: activists, industry or government. When it concerns health matters, Europeans say that university scientists and health officials are among their most trusted sources. Because new information is continually emerging and must be communicated at every turn, these finding suggest the need to provide health information through partnerships with groups trusted by the public.

Citizens digest more than just the facts when forming a judgment. Conference participants concluded that, when it comes to information and messages regarding RF EMF and health, the delivery is crucial.

Introduction

Building on the success of previous conferences,[2] the 3rd Mobile Communications Seminar *Health, Environment & Society* was held 20-21 November 2006 at the Center A. Borschette in Brussels, Belgium.[3] Once again the two-day seminar was jointly sponsored by the European Commission (EC), GSM Europe/GSM Association (GSMA) and the Mobile Manufacturers Forum (MMF), and hosted by DG Enterprise and Industry. The objective of the seminar, *Risk Assessment, Risk Evaluation, Deployment Risks*, was to ensure that all stakeholders, especially new accession states and members of the public, have direct access to the latest information on the state of the science, risk management techniques and public policy.

The seminar brought together many of the issues associated with electromagnetic fields (EMF) and public health, emphasizing the evolution of the relationship between public involvement and science-based policy. The prepared remarks and open discussions clearly demonstrated the challenges of melding science, uncertainty, and public concern into policy that provides the public with both the assurance of protection and the services they have come to value.

Background

European citizens have fueled explosive demand for mobile phones but at the same time, they harbor concerns about the possibility of health effects. Over time, public concerns have abated little despite research deeming the prospect of health effects less and less likely. It is now recognized that responding to public concerns will require an approach beyond the laboratory. While the scientific effort is not yet complete, communication is seen as the bridge to bring science to policy makers and then on to the public.

The sponsoring organizations exerted a special effort to diversify the attendance so all participants could benefit from a range and balance in points of view. This outreach resulted in about 175 delegates from 26 countries representing the scientific community, industry, academia, the media, activist groups and policy makers, including national regulators and representatives of the EC.

Opening Remarks

Conference sponsors opened each day by welcoming the participants and sharing their individual perspectives on the issues. As session chairs, they helped to frame the themes that would emerge during the formal remarks and come into clearer focus through the open discussions.

On behalf of the EC, Mr. Mark Bogers, team leader, Electrical Sector, EC, DG Enterprise and Mr. John F. Ryan, head of Unit C2 Health Information, EC DG SANCO (department for health and consumer protection) welcomed participants and shared their hope that the

[2] 20-21 January 2004, http://gsmworld.com/gsmeurope/events/health_seminar/index.html and 23-24 September 2004, http://www.gsmworld.com/gsmeurope/events/hes_seminar2/index.html

[3] Presentations from the event are available on the conference website, http://www.gsmworld.com/gsmeurope/events/hes_seminar3/index.html

efforts to broaden participation and bring together a range of perspectives at this conference would be successful. They encouraged the assembly to participate in the discussions so that their views can guide policy makers and lead to improved dialog on the issues surrounding public health and EMF.

Ryan established the purpose of the proceedings by invoking Article 152 of the European Community Treaty's wide-ranging call to improve public health. He provided an introduction to past and future activities at the EC level regarding science, public health, risk management, risk assessment and public information. In particular, he reviewed the 1999 Council EMF Recommendation (1999/519/EC) limiting EMF exposure of the general public and the July 2006 preliminary opinion on possible effects of EMF on human health issued by the Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR). Ryan noted that the SCENIHR report will be finalized by March 2007 and the scientific opinions it expresses will be taken into account by the EC when drawing up a new implementation report in the course of 2007.

Ryan framed the upcoming actions by acknowledging political and scientific developments since the adoption of the first recommendation in 1999. Ryan noted that the content of the report will reflect the enlargement of the European Union (EU) and, if necessary, will take into account scientific developments that have emerged during the intervening years. Ryan explained that policy-makers have an obligation to submit new information to a risk assessment and then to apply its merit when formulating public policy.

Ms. Kaisu Karvala, chair of GSM Europe and TeliaSonera vice president in Brussels, shared some statistics about the growth in European mobile telephony and the accompanying need for a continually accelerating number of base stations. Karvala set the stage for many of the issues that would emerge over the two days when she provided some basic information:

- Unprecedented growth in consumer demand for mobile phones, especially higher-data-rate services such internet, video and music has led to market penetration (GSM and 3GSM) in Europe reaching 85% and 3GSM subscribers increasing at a cumulative annual growth rate of 330%.
- In order for mobile phones to function, it is a technological necessity that base stations are located nearby.
- Accompanying increasing mobile phone use is an increasing public rejection of base station sites.
- Public concern over exposure to EMF signals centers on mobile communications though they are typically 1) a small fraction of the guidelines and 2) less than 10% of the total radio-frequency (RF) environment, which is dominated by broadcast television and radio.
- The World Health Organization (WHO) declared that "With more and more research data available, it has become increasingly unlikely that exposure to

electromagnetic fields constitutes a serious health hazard, nevertheless, some uncertainty remains." [4]

Following up on the need for research, Karvala emphasized the industry's history of supporting science: financial support for research and philosophical support for scientific consensus serving as the basis for policy. Despite this stance, industry spokespersons fare poorly as trusted sources of health information. She noted that they are believed by only 16% of the EU population; politicians fare even worse at 10%; whereas university scientists and health officials are highly regarded by 65% and 85% respectively.[5] In order for society to achieve the benefits that these consumers demand, Karvala called for greater scientific leadership and a commitment to cooperation by industry, scientists and policy makers.

Representing the third sponsor as chair of MMF, Mr. John Welch, Motorola vice president of Global Government Relations in Washington, DC, provided context by bringing attention to the evolution of technology and ideas. Welch shared his view that the subject matter of this third conference demonstrates an evolution—even since the first conference less than three years earlier—of a continuing interest in science but a scope expanded to include best practices, risk assessment and communications.

Welch observed that science has answered many questions and, no doubt, will continue to do so. Even though the WHO's International Agency for Research on Cancer (IARC) studies are approaching scientific milestones, and possibly even capstones, Welch believes that public perception of issues surrounding EMF and health will continue to develop. If this prediction bears true, perhaps constructive dialogue and cooperative policy development will comprise the next set of challenges. Welch reiterated the goals of the conference—shared by sponsors and participants alike—to assemble a fair representation of interested groups of stakeholders and to provide a forum for serious and open discussion.

Keynote Address by Dr. Maria Hietanen:
European Actions to Address Public Concerns and Reduce Scientific Uncertainty

In her keynote address, Dr. Maila Hietanen, who wears many hats as head of the Non-Ionizing Radiation Research at the Finnish Institute of Occupational Health in Helsinki, Finland, vice chair of EU COST 281[6] Action, vice chair of the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and representative of the Finnish Presidency of the EU, introduced the conference themes with an overview of EU activities designed to address public concern, encourage open discussion, share knowledge and reduce scientific uncertainty about mobile communications. She

[4] http://www.who.int/peh-emf/about 2006
[5] EuroBarometer 58, March 2003
[6] COST, an acronym for European Cooperation in the Field of Scientific and Technical Research (COST), does not fund research itself but is a coordinating framework for research at European level. COST 281 Action is within COST-Telecommunication Information Science and Technology and focuses on Potential Health Implications from Mobile Communication Systems.

acknowledged the importance of health issues to EU citizens and the high value placed on open communication from government.

Hietanen recalled the roots of EU EMF legal and regulatory activities and then turned to introduce recent Europe-wide programs that have successfully coordinated national and international EMF research. The EU 6th Framework (FP6) Coordination Action EMF-NET and COST 281 programs cast a truly a wide net, Hietanen said. COST 281, just completed, had 25 signatory countries and, along with the WHO, the ICNIRP, and the European Bio-Electromagnetic Association, held joint meetings around the world in order to advance understanding of potential health implications from mobile communication systems. In addition, it provided exposure data and statistical expertise for risk management and risk communication. For its part EMF-NET has identified national and institutional EMF research programs. Further, over the last two years, it has reviewed research agendas, provided interpretation and, through dozens of work packages, has disseminated research findings of research on biological effects of EMF. Its Rapid Response Team, workshops and publications have provided a bridge from the laboratory to policy makers, bringing science information to public health professionals and into the workplace and the home.

Hietanen rounded out her presentation by providing information and contact information for national-level programs and pointing out opportunity for public comment. Her concluding remark reminded all participants not to forget the benefits to society, commerce and personal life we enjoy from electric power and modern telecommunications. She quoted the 1999 EMF Recommendation, "Actions on limiting the exposure of the general public to electromagnetic fields should be balanced with other health, safety and security benefits that devices emitting electromagnetic fields bring to the quality of life in such areas as telecommunications, energy and public security."

Session I: Scientific Perspective

The first session provided the scientific perspectives of a range of highly qualified experts. Each represented the depth and breadth of the diverse scientific disciplines needed to acquire a firm grasp of the issues surrounding EMF and health.

Toxicologist Dr. Carmela Marino of Italy's Ente per le Nuove Tecnologie, l'Energia e l'Ambiente (ENEA), began her talk by listing some of the most important completed and ongoing animal studies worldwide. These include the FP6 program PERFORM A—results of which are now being published—and the US National Institute of Environmental Health Sciences lifetime bioassay of RF EMF carcinogenicity and other endpoints, just getting underway. Marino outlined the FP5 GUARD experiments that have found no effect of mobile phone exposure on hearing in animals. European researchers have also been instrumental in the effort to confirm, if possible, Soviet-era animal studies of the effects of RF exposure on the immune system and the blood-brain barrier she pointed out. Thus far, the studies have found no effects, but the Soviet replications are not yet complete.

In Italy, a series of animal experiments has not found significant effects from exposure to various RF mobile phone signals, Marino noted. Further, work in several cell lines has shown no genotoxic effects from RF signals alone, nor did they enhance damage from known toxic agents such as X-rays. Marino invited participants to examine a very useful EMF-NET report published in February 2006 that evaluated the strength of cancer evidence from laboratory studies as "sufficient," "limited," "inadequate," or "suggestive of a lack of effects." Results from a few large studies are yet to be reported, but overall the high quality research conducted to date continues to suggest that biological effects from RF exposure are related directly to heating, which has been known for some time. Overall, the majority of data from RF EMF in vitro and in vivo studies are negative and do not suggest any health effect from exposure within existing guidelines, Marino summarized.

In his talk, Dr. Tuomo Karjalainen, a program officer from the EU DG Research - Environment, said that the EU FP7 is now embarking on its ambitious plan to develop methods to understand the interactions between environment and health, to address risk assessment needs and to improve analysis of the economic impact of prevention strategies. Providing policy support to EU planners is a major goal, while keeping an eye on the FP7 priority diseases, he said. Reviewing funding, Karjalainen said that FP7 will last 7 years instead of 5 with an average annual budget of €50.5 billion, 75% higher than in 2006. For non-ionizing radiation research and monitoring, this means an increase from about €225 million in 2006 to €350 million in 2013. Creating new collaboration opportunities and career development for younger researchers are special goals for FP7, he added. For the public, Karjalainen strove to make clear how to find information on the many EU EMF-related FP5 and FP6 environment and health project work packages and many useful websites.

Dr. Elisabeth Cardis, head of the Radiation Group at the WHO's IARC and coordinator of the 13-nation INTERPHONE Study of head and neck tumor risk with mobile phone use, outlined study methods and designs that have been carefully coordinated among participating countries so that national data can be pooled to provide the largest epidemiological study ever conducted on the risk of these tumors. Also, large effort has gone into coordinating exposure assessment and assessing the potential impact of biases to make it as accurate as possible, she said. The coordinator stressed that support for the study, coming in part from industry, has been held at arm's length by firewalls to strictly maintain the scientific independence and integrity of this work.

Cardis expects the final pooled analysis of data from 13 study-nations to be submitted for publication in early 2007. She also said the IARC evaluation of evidence for RF EMF carcinogenicity will likely be held in June 2008 and the resulting IARC monograph could be published in 2009. Like other speakers in this session, Cardis stressed that science must provide the foundation for public policy, and the INTERPHONE Study was specifically designed to be a major contribution to knowledge about possible mobile phone cancer risks.

A review of the WHO's International EMF Project was presented by Eric van Rongen of the Health Council of the Netherlands, who spoke on behalf of Dr. Emilie van Deventer, acting director of the WHO EMF Project. van Rongen began by recalling that the project was started in 1996 to assess health and environmental effects of non-ionizing radiation and to provide support to national authorities in their development of sound management policies for EMF. With one ear always tuned to public concern, the WHO Project has sponsored dozens of scientific meetings over the past 10 years and has developed reports, consensus statements, research agendas and recommendations, fact sheets, an EMF research database, a well-used website, model legislation, risk communication tools and more, all in several languages. All this effort and knowledge will contribute to the authoritative WHO RF EMF risk assessment and Environmental Health Criteria monograph on human health risk, if any, from exposure to mobile telecommunications and RF devices, von Rongen said. It will be prepared by a task group of experts sometime in 2007 or 2008, the WHO has estimated.

Session II: Public Policy Implications

Following the update and discussion of scientific advances, speakers added perspective by agreeing that while high-quality science is essential, it is but the first step in developing public policy.

Dr. James Bridges, chair of the EU SCENIHR and professor emeritus of toxicology and environmental health at the University of Surrey, UK, discussed the application of the scientific method to EU policy. By way of background, he explained some of the features and limitations of the scientific approach. For example, the scientific method can, at times, be a blunt instrument because it does not always lend itself to definitive answers and cannot address open questions. As a result, research often focuses on refining the details of what is already known rather than the more complex undertaking of identifying what is *not* known. These shortcomings become especially apparent when science must be applied to public policy. Nevertheless, Bridges noted, if any health effects from EMF do exist, science offers the most objective path to improve our understanding.

Dr. M.G. Delfini of the Directorate for Chemicals, Waste, Radiation Protection of the Netherlands Ministry for Housing, Spatial Planning and the Environment, expanded on the theme of science and policy to include the role of the public. Delfini presented her thesis that the complications that result from each party's unique characteristics call for delicate and thoughtful interactions. Acknowledging that uncertainty will continue to shape the form of these relationships, she appealed to each party of this science/policy-makers/public triumvirate to accept its responsibility for clear and open communications.

A note of less satisfaction was expressed by Dr. Pierre Le Ruz, professor emeritus and president of the Scientific Committee on Independent Research and Information Centre on Electromagnetic Radiation (CRIIREM), France. Le Ruz also endorsed the suitability of a scientific basis to policy but his interpretation of the science is at odds with those of the scientists presenting in Session I. His application of the science calls for lower

standards and restrictions on use by children. Le Ruz also said he favors establishing "mobile-free zones" to serve as refuges for EMF hypersensitive people.

On a final note of this session, Mr. Michael Milligan, MMF secretary general, again declared support for transparency. In this case, the discussion focused on the influence of policy-makers and the public on the research process. Milligan told the attendees that he recognizes that public skepticism accompanies industry funding but yet, he explained, industry is committed to supporting quality research. To meet the challenge this dilemma poses, industry has adopted a three-faceted approach of independence, accountability and transparency. Funding decisions are based on the research agenda of independent organizations (e.g., WHO, IARC), the project's ability to produce high-quality science and the promise of advancing science at a faster pace. Government and other stakeholders' involvement and the use of third parties for all financial and reporting functions provide firewalls to prevent any direct relationship between funders and researchers. Lastly, this approach requires that all results—regardless of outcome—be published in the open literature. MMF and GSMA are supporting more than €35 million in EMF research projects.

Session III: Network Deployment

The third session was devoted to issues of deployment, each speaker calling for communication and cooperation.

Mr. Alan Freeman, chair of the Health and Environment Working Group, GSM Europe, and manager of Health and Environment Policy for the O2 Group, shared his perspective on deployment delays in Europe. Despite expert opinion on the lack of a health threat,[7] many Europeans actively oppose base station sitings. Freeman traced deployment delays in several European countries to a general lack of public understanding. Freeman stressed the need to communicate 3 messages:

- Local base stations are essential for mobile phone operation.
- Base stations must be located where customers want to use their phones.
- Mobile phone RF EMF is non-ionizing radiation—it is not the product of radioactivity.

Stressing that deployment delays are an ongoing problem, Freeman called for clear, uniform regulation and a commitment to risk communication.

Mr. Mark Jarvis, principal consultant, Mason Communications Ltd., brought an economic and social perspective to deployment delays. Jarvis reported that the 3G (enhanced system offering voice, internet, video) rollout by the UK operators (3, O2, Orange, T Mobile and Vodafone) is well behind that of (the voice-centric) 2G. Mason's benchmarking shows that together these operators face an average delay in site acquisition of 22 weeks. In 2005, this represented a lost revenue opportunity of €428 million. As network deployment advances, the incremental cost of serving each additional percent of the population increases substantially. This situation leaves little incentive to serve rural areas with 3G, despite evidence for a positive economic impact

[7] WHO Fact Sheet No. 304

on rural businesses. Jarvis observed that more network sharing would help to minimize investment risk, but he predicted that before such a practice could take hold, governmental support would be necessary.

Mr. John Roman, chairman of the WiFi Alliance Task Group on Health and Science and manager of Global Spectrum Assessment and Policy for Intel Corporation, provided a look into the future with his vision of emerging technologies and a wireless world of connectivity anywhere, anytime. Roman reviewed the capabilities of a range of technologies—not only those that are available today, but those that are on their way or only envisioned. These wireless technologies are low-powered and designed to operate well within the international RF safety limits. With networks offering "triple play" (voice, video, data) services, he predicts that business will "unwire" to boost the productivity of the increasingly mobile workforce. Roman applied his past deployment experiences in calling for active partnerships. He concluded that industry will need to undertake active corporate stewardship and regulators will need to bring the public consistent, balanced information.

On a final note of the first busy day of the conference, Dr. Jack Rowley, director of Research and Sustainability for the GSM Association, touched on the themes of science, policy, communication and risk. He reiterated that the public has a poor understanding of and perhaps a limited inclination to learn about mobile phone operation. Emphasizing that communication is not education, he sees that continued scientific research is necessary but insufficient. Perception of risk is shaped by objective and subjective factors. Risk management therefore incorporates both scientific and socio-political factors. Recalling Karvala's opening remarks, Rowley also declared the need for communicating health information through partnerships with groups trusted by the public.

With regard to regulatory policy, Rowley favors simplicity and consistency. One component of his prescription includes separating health and planning issues. Standards, based on international scientific consensus, should be adopted at the national level in order to avoid fragmentation of authority. Further, a uniform, scientifically based process would result in non-discriminatory protection and prepare for a technology-crowded future. Discontinuing the current regulation-by-technology process would allow regulators to focus on characteristics of exposure rather than on individual technologies.

Rowley's thoughts on regulatory models for wireless network deployment foreshadowed the upcoming session on risk communication experiences in different countries. Rowley noted that fragmented national authority can cause confusion and delay, and yet he emphasized that any one single regulatory model should not be applied in every country. The regulatory environments, traditions and expectations of democratic participation all work together to affect program success, he said.

Session IV: Risk Communication Tools and Experiences

The focus of the final session was the experiences—successes and failures—and advice from university researchers, industry and government representatives regarding efforts to communicate with the public. Speakers shared information on best practices,

government and cooperative efforts and research on public perception of risks from mobile telecommunications facilities.

- Context for National and Cooperative Programs

Dr. Peter Gajšek, director of the Institute of Non-Ionizing Radiation, Slovenia, addressed the issue of EMF risk communication and the legal framework of standards and regulation in 10 new and candidate EU states, where human exposure limits can be as much as 2 orders of magnitude lower than the ICNIRP-based EU standard. He suggested that although there are some experimental differences underpinning a divergent Eastern European stance (differences in documentation and dosimetry, for example), the lower limits are more likely a result of differences of interpretation and philosophy. Eastern countries, noted Gajšek, possess a different concept of health and have different cultural responses to interpreting science and risk. "It is a common opinion that EU values are set too high and do not protect from possible low-level, chronic exposure," said Gajšek, adding, "In general, the new members would rather accept EU recommendations as a minimum requirement and then introduce lower limit values in national legislation."

This situation presents a significant challenge for harmonization with the EU, he pointed out, particularly in Russia, Bulgaria and Poland. Nevertheless, harmonization is occurring in a *de facto* manner because of business, economic and political pressure as countries join the EU. Still, in many cases, there is no plan for risk communication and some jurisdictions may choose to protect “sensitive areas” for non-scientific reasons, Gajšek observed. Despite a keen interest in standards and public health, 7 of the 10 countries have no code of conduct for operators regarding consultation with the public and most countries have no agency responsible for communicating with the public about EMF.

To address the disparity, in 2003 Gajšek’s institute launched a project to assess public attitudes and improve dialogue. Among other findings, Gajšek said the public is concerned most about mobile phone base stations in 9 of 10 countries and very concerned about power-line EMF in 3 of 10. Those who wish to promote EU-harmonized exposure limits based on sound science should focus on local media, physicians and politicians, he suggested. The opportunity is at hand to form European-style expert panels to address public concerns, he concluded, and for now the public seems willing to listen.

Mr. Mike Wood, Telstra National manager and chair of the Electro-Magnetic Energy (EME) Strategy Task Force of the Mobile Carriers’ Forum (MCF), an industry group representing four carriers, reflected on the Australian experience. Through MCF, Telstra, Optus, Vodafone and Hutchison Telecoms have transformed the deployment process. Responding to communities’ concerns about base stations and health, Wood said that carriers, regulators and activists worked together to create an agreed-upon process. The outcome, a Code of Practice, employs precautionary behaviors in the siting and design of mobile telecommunications base stations. This code was developed and adopted voluntarily yet it is enforceable by government—with significant penalties for breaches. Wood shared his observation that the program has brought about a sea of change in the

rate of deployment—in its first year, 1,500 new sites were deployed—and he credits its success to the openness of the process and the commitment of the parties.

Mr. Michael Frank of T-Mobile Hungary reported that public concern appears low in his country, but at the same time, authorities' concerns are delaying a 3G rollout. Despite fierce competition, Hungarian operators have signed a letter of intent to build public trust cooperatively. Operators have been working to involve authorities early in network planning, respond quickly to public concerns, contribute to EMF research and support a national database and other educational resources. Progress has been slow on this ambitious agenda, Frank said, but their early efforts, modeled on other industry collaborations in Western Europe, seem promising. Despite the competitive atmosphere in Hungary, cooperation can deliver public trust and reduce fear, he said.

- Research on Communication and Public Perception

Shifting the subject from the operating frameworks used in individual countries, the next series of speakers shared results of their research on public perception—from the public's underlying understanding of mobile phone operation to the effects of information campaigns and precautionary advice.

Dr. Julie Barnett of the University of Surrey in Guildford, UK, presented the results of a 2004 survey designed to gauge public reaction to 9 million UK Department of Health informational leaflets on mobile phones and health that were distributed over 4 years. Citing "significant gaps in our scientific knowledge," the leaflet suggested some precautionary approaches, such as limiting call length, for those who were concerned about potential health effects. Barnett found that 15% of respondents had seen the leaflet, and those who use a mobile phone were significantly more likely to have been aware of it. Of these, only about ¼ could correctly identify the specific advice in the pamphlet, and ¾ did not recognize that the advice came from government. An important finding related to content, Barnett reported, was that precautionary advice increased concern in nearly half of the respondents. Those who initially expressed concern about uncertainties were more likely to have even greater concern in response to precautionary advice. "Concern isn't necessarily a product of lack of information," said Barnett. This unintended consequence of a public information campaign that had been designed to reduce public worry calls into question the rationale for issuing precautionary advice.

Mr. Steve Workman, Vodafone Group EMF manager, followed the theme of innovation in communications with information about public perceptions of mobile phones, base stations and health. As part of Vodafone's goal to engage stakeholders in dialog about health concerns and to provide the basis for useful communication tools, Workman provided details on what is likely the largest survey on public perception of mobile technology. In this 18-country project, 17,000 interviews, conducted in 2003 and again in 2005, revealed that many respondents (a high of 63% in Greece and a low of 13% in Hungary) felt that mobile phones are not safe to use, and that this result did not change significantly over the 2-year interval. Workman reported that within Europe, 22-50% of respondents believe that mobile phones can work without a base station nearby. He suggested that a basic education campaign is needed: "A mobile phone needs a mast!"

Despite any misunderstandings, about half of the population held the pragmatic view that "the benefits of a mobile phone are greater than any claimed health risks."

Although the numbers vary widely by country, many respondents also say they "do not know who to believe" about health risk claims and they sense that mobile operators are withholding information on the subject. Workman concluded that the survey suggests EMF is not a "primary health concern" among mobile phone users, but where there is underlying concern, it is significant and mobile operators may not be taking it seriously enough. However, drawing on the variation of these data among countries, Workman offered a note of caution regarding educational campaigns: "It is not just the facts that are important. Delivery is crucial." Any global strategy for change must be flexible enough to bend in recognition of the significance of local concerns and local customs, he noted.

Ms. Christiane Pölzl of Germany's Bundesamt für Strahlenschutz (BfS), the Federal Office of Radiation Protection, presented an overview of that country's €17 million Mobile Telecommunications Research Program, which included support for risk perception surveys and risk communication activities. A random sample of 2,500 German households was contacted by telephone each year from 2003 to 2006. Respondents were asked to rank their concern about 15 environmental or lifestyle exposures. A close look at the data exposes the difficulty in penetrating public perception through public education efforts, and even the difficulty in ascertaining public opinion through surveys.

Over the years, other risks, air pollution in particular, have been creating higher concern than have mobile phones. Yet, there was significant public concern about EMF and little change in perception from year to year. Respondents named their greatest EMF concerns to be mobile telecommunication transmitters (21%), mobile phones (16%) and EMF in general (15%). Pölzl found that 73% of respondents felt they were informed about EMF (from a little informed to very well-informed), yet 65% reported that they had paid no attention to EMF prior to the survey. Their main sources of EMF information were television, radio, newspapers, people at work and the Internet, in that order. Pölzl noted that in some subgroups (e.g., self-identified hypersensitive persons), concern and perceived impairment were high, advising that "effective risk communication will need to take into account these special information needs."

- Public Information Initiatives

After addressing the results of the most recent research, the agenda shifted to explore some innovative programs designed to connect with the public about their concerns and desire for information.

Malta is the most densely populated country in the EU. The small island nation has one base station for every 1,000 people. Mr. Colin Camilleri, chief technology officer, Malta Communications Authority (MCA), shared the Maltese strategy for coping with public concerns. In 2001, MCA was formed to oversee spectrum monitoring and to serve as the main contact for all EMF-related issues. Because compliance with ICNIRP guidelines is a legal requirement, MCA's 4 technicians routinely conduct about 50 compliance audits

(random and requested) of all electronic communications sources each year. Audits have shown that, of the mobile communications facilities, all were below 5% of the ICNIRP exposure standard and more than 80% were measured at less than 1%. Nevertheless, "the public remains genuinely concerned," he said. Again touching on the theme that information does not necessarily influence risk perception, Camilleri told the group that radio and television transmitting facilities emitted much higher levels of EMF but seemed to elicit little public concern.

With sights set on educating, listening to and communicating with the public, MCA has undertaken a comprehensive stakeholder-involvement program. Communications are carefully planned for a variety of audiences: general public, small communities, special interest groups (e.g., lawyers and judiciary officials, medical professionals, architects, engineers, companies and lobbying groups) and families or individuals. Using a combination of meetings, media, websites, correspondence and house visits, MCA approached specific audiences differently and with messages specifically tailored to their needs and interests. "MCA has to balance technological development with consumer protection," said Camilleri, adding, "a one-size-fits-all approach can have only limited success."

Mr. Mario Frullone, research director of Fondazione Ugo Bordoni (FUB), Italian Ministry of Communications, shared details on Italy's EMF Monitoring Network—the Blubus Initiative. In the wake of the 2001 3G launch, Italy experienced a groundswell of public opposition. In 2004, a national EMF monitoring network was established. Since then it has collected 47 million measurements from nearly 8,000 sites near schools, public places, hospitals and private residences. Over the years, FUB discovered that 85% of the sites monitored by request were for areas where the fields were very low, yet citizens' concerns were not alleviated by this information.

Officials took note that using the mass media as an intermediary was not an effective communication vehicle. Furthermore, reaching out to activists, while important, was missing a significant audience—those who may have concerns but do not view activist leaders as their representatives. In response, a country-wide communication and monitoring system was implemented. Its most public element, the Blubus (actually a blue bus fitted with communications materials and portable monitoring equipment) travels across the country to meet with citizens and monitor exposure in homes and neighborhoods. The success of the Blubus program can be seen in the 40% reduction in complaints experienced during its two years of operation.

In the last formal presentation of the conference, Mr. John Ryan introduced the EU Public Health Portal. Stemming from the Initiative of Public Health Programme 2003/8, it serves as a single-point information source of health-related information for EU citizens, health professionals and policy-makers. Its contents, presented in 21 different languages, form a tree of information on 48 subjects, each linked to additional information, legislation and relevant organizations. The composition of the editorial board represents 25 member and accession member states as well as international and non-governmental organizations (NGOs). The content is held to high standards of clarity,

trustworthiness and transparency. With 80,000 page-views per month, Ryan anticipates that this portal will address citizens' right to clear, accessible and scientifically sound information.

Discussion

In keeping with the intent of the seminar, the sponsors provided an agenda with ample time for an exchange of views. In addition, over the course of the two days, the speakers, joined by Joseph Agie de Selsaten, President of the NGO Association de Défense et de Réflexion sur la Problématique de champs électomagnétiques (Teslabel), opened several opportunities for discussion. The findings that appeared to be of greatest consequence to the scientists, industry representatives and policy makers were the results of the new research on the precautionary principle, public opinion and risk perception. Yet, this issue found little traction in open discussion, which tended to elicit comments on two long-standing concerns: mast siting and interpretation of the science used in policy formulation.

Responding to a concern raised over insufficient allowance for research, an EC representative explained that their agenda will seek to fill gaps in the current state of knowledge; however, EMF is but one of many issues requiring research attention, such as climate change and air pollution. Further, it was noted that hundreds of millions of euro have been spent on EMF, but even so, the crux of the issue is whether the right projects are being awarded funding.

The most controversial issues discussed over the two days centered on that of "accepted science" (the term "independent science" was rejected as value-laden). Many voiced concern over the apparent lop-sided authority given to larger studies, which were often those showing a lack of association between EMF and health effects. As a point of reference, they noted that the WHO policy contradicts its own EMF database where 80% of the listed epidemiological studies related to base stations report a positive association. Responses to this assertion noted that the studies in question have been criticized by ICNIRP for technical flaws, such as poor exposure assessment and symptom-reporting bias. Scientists from the panel and from the audience stressed that it is not the quantity of experiments but the quality of the experimental method that imparts a study's authority.

Policy makers stressed that scientific work from all quarters is reviewed—regardless of funding source or outcome. Evaluation and assessments are then performed by an autonomous panel. Only those that pass muster as "accepted science" are considered for policy purposes. Despite numerous discussions on the subject, this distinction appeared to never resolve itself among the parties and a note of frustration hung in the air.

On the other hand, another issue of concern to all present, that of procedures for mast-siting, found common ground. Responding to concerns over mast siting, representatives of the EC explained that they consider best practices to be an important feature of siting procedures and they mused about the possibility of a role in information collection and coordination, but they accepted this issue as one best dealt with at local level. Support

was sounded from many stakeholder groups for the Australian MCF approach: voluntary adoption of a legally enforceable Code of Practice.

Closing Remarks

Before concluding the conference, Mr. Mark Bogers acknowledged the diversity of viewpoints represented. He addressed his unease about future use of the precautionary principle in risk communications and also the unease expressed by attendees' concerns about whether the science used for policy is complete and independent. He asserted that the way forward will be likely to include many of the lessons learned from this conference. Bogers concluded the proceedings by thanking the attendees for their contribution to a successful and stimulating conference.