Risikoforschung: Luxus oder Notwendigkeit?

Science Brunch 12, Zürich

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Director EMEA
Mobile Manufacturers Forum

Overview of the MMF

- International association of radio equipment manufacturers
  - Representing around 80% of global handset sales; and
  - The providers of the majority of global network infrastructure
- Association's focus: health, safety, accessibility and the environmental sustainability of wireless telecommunications equipment
- Technology neutral, globally, acting at national and international level
- Key areas of activity: research and standards support, regulatory harmonisation and public communications
- Members include: Apple, Cisco, Ericsson, Intel, Motorola, Nokia, Samsung, Nokia-Siemens Networks, Sony Ericsson, TCT Mobile (Alcatel Mobile Phones)

MMF und EMF-(Risiko)Forschung

- Ziel: wissenschaftlich konsistente und global harmonisierte Standards
- MMF fördert Forschung zu “Gesundheit und Sicherheit von Mobilfunkgeräten”
- MMF orientiert sich an WHO:
  - International EMF Project
  - WHO Research Agenda
  - WHO-Empfehlungen
- Einzelstaatliche Wünsche sind mit MMF’s globalem Ansatz nicht immer vereinbar.

The MMF Bioelectromagnetics Research Program

M. Milligan, T. Persson, S. Lang, J. Elder • Mobile Manufacturers Forum, B-1030 Brussels, Belgium • Ericsson Research, Ericsson AB, SE-164 80 Stockholm, Sweden • Nokia Corporation, Espoo, Finland • Motorola Labs, Motorola, Fort Lauderdale, Florida, USA

MMF Mobile Manufacturers Forum

Further details on the MMFs Research Program can be found at www.mmfai.org

The MMF (Mobile Manufacturers Forum) is an international association of radio equipment manufacturers whose members include Alcatel-Lucent, Ericsson, Mitsubishi Electric, Motorola, Nokia, Nokia-Siemens, Panasonic, Philips, Sagem, Samsung, Sony Ericsson and T& A Mobile Phones. The MMF was formed in 1998 to support key research projects, as well as to cooperate on standards, regulatory issues and communications activities concerning health and mobile telephony.

The research program of the MMF is adopted from the WHO Research Agenda that recommends areas in which further studies are needed or would be useful. In supporting research, the MMF seeks to sponsor projects jointly with national and international health and scientific research bodies. The MMF also encourages all research findings to be published in peer-reviewed scientific journals to ensure openness and transparency in our research programs. The following constitutes the main parts of the current MMF research program.

Independence of MMF Funded Research

The MMF utilizes the following measures and principles to ensure scientific independence in supported research projects:

- WHO agenda as a framework
- Funded in conjunction with government or other third parties
- No more than 50% industry funding
- Independent project management
- Government research quality standards eg: GLP
- All results published in peer reviewed journals

PROGRAM 1 – PERFORM A

This program included work in Europe that has been led by the Fraunhofer Institute in Hannover, Germany. The work, co-funded by the MMF, the GSM Association (GSMA) and the European Commission was undertaken under the 5th Framework program. These projects will be presented in EBEA Session 6 on April 12. The program included the following projects:

PERFORM A Laboratories
Scientific Coordinator – J. Bushman

PERFORM Substudy	Topic	Sub-Area	Principal Investigator	Institution
PERFORM-A1	2-yr Chronic Bioassays	WISTAR rats at 3 dose levels	E. Ruedin	RCC Switzerland
PERFORM-A2	GSM 900 & GSM 1800	B6C3F1 mice at 3 dose levels	J. Bushman	Fraunhofer Institute Germany
PERFORM-A3	Replication studies	Pim1 Transgenic Lymphoma Bioassay	G. Oberto	RBM Italy
PERFORM-A4	GSM 900	DMBA initiated Mammary Tumor Bioassay	R. Hruby	ARCS Seibersdorf, Austria
Dosimetry	Exposure systems	Construction and Dosimetry	N. Kuster	ITIS Switzerland

PROGRAM 2 – PERFORM B

The Perform-B program involved both in vivo and in vitro replication studies and was co-funded by the MMF, GSMA and several national governments. The projects included:

PERFORM B Laboratories
Scientific Coordinator – B. Veyret

PERFORM Substudy	Topic	Principal Investigator	Institution
PERFORM-B1	Activity of the enzyme ODC in cell cultures following RF exposure. Replication of work by the Litovitz group	B. Billaudel	CNRS
		J. Naarala	Univ Kuopio Finland
PERFORM-B2	Genetoxicity studies following RF exposure. Replication of work suggested increased sister chromatid exchange	C. Marino	ENEA Rome, Italy
		D. Lloyd	NRPB – Cytogenetics Group UK
PERFORM-B3	Spatial working memory in rodents. Replication and extension of Lai et al research	Z. Sienkiewicz	NRPB – NIR group ULP France
		J. C. Cassel	
Dosimetry		N. Kuster	ITIS Switzerland

PROGRAM 3 – INTERPHONE

This project is a population based case control study of cancer in relation to mobile telephone use, and involves 13 countries, with coordination being provided by the International Agency for Research on Cancer (IARC). The project is co-funded by the MMF, GSMA, the European Commission and several national governments.

Participating Countries

- Australia
- Canada
- Denmark
- France
- Finland
- Germany
- Israel
- Italy
- Japan
- New Zealand
- Norway
- Sweden
- UK

Expected number of cases:

Brain Tumors	5100
Acoustic neuroma	1100
Malignant parotid gland tumor	100

PROGRAM 4 – Human Studies

The MMF is supporting a research program being undertaken at the Karolinska Institute in Sweden, that includes investigations on:

- Effects on sleep and EEG with exposures before sleep
- Biological correlates to subjective symptoms
- Skin hypersensitivity response
- Reaction time
- Cardiovascular reactions and subjective symptoms.

PROGRAM 5 – Replication Studies

This program has supported a number of projects seeking to replicate or confirm earlier studies.

1 Zhejiang University, H.Chiang

This project was a replication study paralleling the DMBA study undertaken under the Perform-A program (Yu *et al.* Radiat Res 165:174-180).

2 Pacific Northwest National Laboratory, J. Morris

This project is an attempted replication of earlier work on the Blood Brain Barrier

3 WHO French Russian Immunology Study, B. Veyret and Y. Grigoriev

This project is a collaborative project under WHO coordination to attempt replication of earlier Russian

PROGRAM 6 – MTHR Research Program

The UK established a national research program in which the MMF and UK network operators provide joint funding with the UK Government. "The program consists of many projects, including:

(Epidemiology)

1 UK Case control study of adult brain tumours. Collaborative project.

2 Case-control study of risk of brain tumours and acoustic neuroma in relation to use of mobile phones. Institute of Cancer Research.

3 A case-control study of risk of leukaemia in relation to use of mobile phones. Institute of Cancer Research.

4 Cohort study of mobile phone users (pilot study). Epidemiology and Public Health (DEPH), Imperial College and Environmental Epidemiology, Karolinska Institute.

5 Case control study of cancer incidence in early childhood and proximity to mobile phone base stations. Imperial College.

(Human Studies)

6 Effects on blood pressure. Department of Medical Physics and Clinical Engineering Royal Hallamshire Hospital.

7 Study to evaluate the effects of mobile telephone usage on labyrinthine function. Department of Neuro-otology, National Hospital for Neurology and Neurosurgery.

8 Mobile cellular communication and cognitive functioning. Department of Psychology, University of Essex.

9 The effect of mobile phone use on symptoms and neuroendocrine function in 'normal' and 'hypersensitive' users. Mobile Phone Research Unit, King's College.

10 Hypersensitivity symptoms associated with electromagnetic field exposure. Department of Psychology, University of Essex.

(Driving)

11 Conversations in cars: The relative hazards of mobiles phones. Transport Research Laboratory.

(Dosimetry/engineering)

12 Interaction of emerging mobile telecommunications systems with the human body. Applied electromagnetics Group, Department of Electronics University of York.

13 Assessment of specific energy absorption rate (SAR) in the head from TETRA handsets. National Radiological Protection Board.

14 Measurement of the dielectric properties of biological tissue at microwave frequencies. MCL.

15 Traceability for mobile telecommunications and health research. CETM National Physical Laboratory.

(In vitro and in vivo)

16 Cellular and sub-cellular effects of microwave radiation in the simple model nematode Caenorhabditis elegans (Replication). School of Life and Environmental Sciences, University of Nottingham.

17 Effect redox signalling and calcium homeostasis. The Babraham Institute, Cambridge.

18 The effects on brain physiology and function. NRPB.

19 Personal dosimetry of RF radiation, NRPB.

(Social)

20 Communicating uncertainty: Mobile telecommunication health risks. Psychology Department, University of Surrey.

PROGRAM 7 – Mechanism Studies

This program involved a number of individual theoretical studies examining the plausibility of different mechanisms for RF interaction with the human body.

1 University of Colorado, F. Barnes

The objective of this project was to investigate the effects of RF fields on biological materials at microscopic and nanometer dimensions. In addition, a second area examined the extent to which small RF fields can modify chemical reaction rates.

2 Purdue University, E. Prohofsky

The project was designed to investigate whether RF absorption could lead to energy accumulation in biologically active modes.

3 University of Pennsylvania, K. Foster

It had the followings tasks: **1.** Determine where RF energy is absorbed by biological molecules and evaluate the possibility of chemical changes over the nanosecond time scale; **2.** Characterize for molecular dimensions and short times the process by which RF energy is thermalized in molecular structures; and **3.** Determine whether energy gradients of sufficient magnitude can exist on the nanometer or sub-nanometer scale long enough to affect biochemical processes.

4 MIT, J. Weaver

The project involved modeling and simulation of RF energy absorption in cellular and subcellular systems including analysis of the transmembrane voltage changes.

5 University of Maine, D. Astumian

This project was designed to investigate possible effects of Radio Frequency fields (RF fields) on ion transport across membranes and separately on the plausibility for significant effects of RF fields on DNA transcription via modulation of the kinetic proofreading mechanism.

PROGRAM 8 – Dosimetry and Measurement

In addition to the above, the MMF supports a number of dosimetry and measurement projects:

1 University of Utrecht, J. Lagendijk – Determination of temperature rise due to partial body (near field) exposure.

2 University of Maryland, C. Davis – SAR inter-comparison. Assurance of calibrated SAR measurements.

3 IT'IS Foundation, N. Kuster – Dosimetry support for experimental studies and standards development.

4 University of South Carolina and ARCS Seibersdorf, M. Ali and G. Schmid – To determine a threshold power level for mobile transmitters below which the peak 1g and 10g averaged SAR is inherently compliant with the respective regulatory agency requirements.

5 Swinburne University, R. Croft – To establish an optimal crossover point for localized SAR and power flux density using temperature rise.

6 IT'IS Foundation, A. Christ – The development of a Virtual Family comprising anatomically correct computer models generated from new generation MRI scans of two adults and two children for use in dosimetric studies and medical applications.

7 ARCS Seibersdorf and Tbilisi State University, G. Neubauer and R. S. Zaridze – To provide measurement and calculation data to derive correlation between basic restrictions and EM fields and optimized free space measurement technologies.

Ein paar persönliche Gedanken
zur Diskussion über

“Risikoforschung:
Luxus oder Notwendigkeit?”

Risikodefinition

- Risiko = Produkt aus Schadensausmaß und Eintrittswahrscheinlichkeit

- Auch in EMF-Risikoforschung gilt:
  - Ein Schaden, ein Ereignis, eine Wirkung braucht eine Ursache.
  - Eintrittswahrscheinlichkeit braucht Kontext

Ziele der Risikoforschung

- Risiken erkennen und quantifizieren
- Risikenadäquate Maßnahmen ersinnen
  - geeignet
  - zweckmäßig
  - verhältnismäßig
- Risiken der Risikovermeidung kennen
- Vorteile risikobehafteter Aktivitäten kennen (bezüglich EMF: Public Health Balance)
- Methodenentwicklung und –verbesserung
- Risikokommunikation

Motivation für Risikoforschung

- Academia:
  - Erforschung von Risiken
  - Verbesserung der Methoden
  - Erhaltung der eigenen Strukturen
- Politik:
  - Heben der allg durchschnittlichen Lebenserwartung
  - Steigerung der allg Lebensqualität/Gesundheit
  - Befördern der eigenen politischen Chancen
- Industrie:
  - Sichere Produkte (ethisch, wirtschaftlich)
  - Versicherungsfunktion im
    - Straf- und
    - Zivilrecht

Risikoforschung ist unumgänglich

…ebenso unumgänglich wie die Diskussion:

- ab wann Risikoforschung erforderlich ist,
- welche Risiken beforscht werden sollen,
- wer die Kosten der Risikoforschung trägt,
- wann wir genug geforscht haben.

Verbesserungspotential

- Klare, demokratisch legitimierte Definition der zu schützenden Werte
- Systematische und wissenschaftliche Identifikation von Risiken
- Informierte und demokratisch legitimierte Priorisierung von Risiken
- Wissenschaftliche Evaluierung getroffener Maßnahmen