Conclusions from the DMF Workshop on "Acute Health Effects"

1. What was the situation like before the start of the DMF?

Former evidence on acute health effects of high frequency fields of mobile telecommunication was mostly based on self reports from concerned persons or on observations by physicians.
There had been only very few epidemiological studies, providing inconsistent results. Most of these studies had major limitations such as misclassification of exposure, selection bias, confounding, etc. Personal dosimeters for use in large field studies had been missing.
Most frequently addressed sources of EMF-exposure in relation to health complaints in recent years were base stations, most frequent symptoms attributed to mobile telecommunication were sleep disorders and headache.
Beside a slight sleep promoting effect most laboratory studies showed no effect of EMF on sleep.
Results of behavioral studies were contradictory, showing positive, negative or no influence of EMF on reaction times and cognitive performance.
Approx. 2 % of the population reported to be electromagnetic hypersensitive (EHS). EHS persons suffer from a variety of subjective symptoms (a list of 36 complaints was generated in a former research project) which they attribute to EMF at very low exposure levels.
Most of the double-blind provocation studies did not show a causal relationship between symptoms and exposure to EMF. Moreover there is no reliable evidence that EHS individuals are able to discriminate between active and inactive conditions of weak high frequency fields (e.g. "on" or "off" status of a mobile phone) in a double-blind exposure situation.
Part of the population is, however, electrosensible, i.e. those persons have a lower perception threshold, e.g. for low frequency electric currents. Electrosensibility is, however, normally not associated with electromagnetic hypersensitivity.

2. What has been achieved by the projects? What are the lessons learned?

Epidemiological studies of the DMF will allow an improved assessment of the relation between subjective symptoms and the fields of base stations. This is due to improvements concerning: • the consideration of potential confounders, • the exposure assessment (personal dosimeters), • the statistical power.
The cross-sectional study among adults (n=30.000) provided nationwide representative data on the percentage of mobile phone base stations closer than 500m to private households (53 %), on the percentage of people concerned about base stations (28 %) and the percentage of people with health complaints attributed to base stations (10 %).

No effects from exposure to GSM and UMTS mobile phone signals on visually screened sleep parameters have been found under laboratory conditions in young healthy male volunteers.
Shielding of EMF did not improve sleep quality in EHS volunteers tested in their homes under blinded conditions.
In transcranial magnetic stimulation EHS people display a diminished ability to discriminate a sham from a magnetic pulse to their head, while their objective perception threshold under verum stimulation is comparable to controls.
EHS individuals display an altered cortical excitability compared to controls.
EHS persons are a very heterogeneous group; electromagnetic hypersensitivity cannot be explained by a simple model.

3. Where do we still have gaps?

The long term use of mobile telephone systems is not fully covered by the programme.
The programme did not fully cover laboratory studies concerning sleep parameters of females, elderly, and children. Results on cognition and behavior are awaited soon.
Time course of EHS over a long period should be examined. Prerequisites for effective therapeutic measures have to be established. But these are not necessarily issues for a radiation protection research programme.

4*. Can we define minimum standards for future work?*

If epidemiological studies on health effects from electromagnetic fields of base stations are performed they should include individual exposure assessment by means of dosimeters. If possible, other sources of HF-EMF exposure should additionally be measured in order to be able to distinguish the effects from EMF exposure due to base stations from those of other sources such as use of mobile phones.
Future studies have to be double blind, cross over and placebo controlled. Within subject controls, a well controlled dosimetry and a sufficient number of volunteers are necessary.
EHS is a serious health problem for the affected individuals, but probably not a radiation protection problem any more. If further studies are performed standardised criteria for description of EHS persons should, however, be established and applied. Taking into account the heterogeneity of the EHS group subjects should be described from a multidimensional point of view and subgroups should be defined. There is a need for a better risk communication with affected individuals especially regarding causal relationship to electromagnetic fields.

5. Are there findings that have an impact on guidelines or on standard settings?

Not so far. But results of ongoing studies should be awaited.