Sweden

Report on EMF Activities

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Gert Anger, Swedish Radiation Protection Authority (SSI), Stockholm, Sweden
Kjell Hansson Mild, National Institute for Working Life (NIWL), Umeå, Sweden

New policies and legislation:
The SSI has proposed a stronger revision of its regulation from 1995 concerning Drying with Microwaves. It will contain among others an obligation on the operator to announce the use of this technique to SSI in every case.

The National Board of Health and Welfare, in collaboration with three other authorities (SSI, The Swedish National Electrical Safety Board and The National Board of Housing, Building and Planning), has recently issued an information paper concerning EMF from Power Lines and Health Risk. It is a revision of the Precautionary Principle for National Authorities on EMF from 1996, and it now takes into consideration new research results from the last years and the precautionary approach of the national environmental code from 1999.

Authorities from Denmark, Finland, Iceland, Norway and Sweden have published a Nordic position paper on Mobile Telephony and Health. They pointed out that there is no scientific evidence for adverse health effects from mobile telecommunication systems, but that some scientific uncertainty and knowledge gaps could justify a precautionary attitude regarding the use of handsets for mobile telephony.

The two first annual reports from 2003 and 2004 of SSI:s International Independent Expert Group on EMF have been published (SSI Report 2005:01). In the 2004 report some of the main results of several European research programs are discussed including recent epidemiological data of the Interphone study. Also the extent to which children might be more sensitive to EMF - including the outcomes of the WHO-conference held during last summer – is touched upon. The precautionary approach to EMF by SSI is well in line with the risk evaluation of the expert group.

Public concern:
The roll-out of the 3G mobile telephone system has been fast in Sweden. In spring 2005 the population coverage was about 90 %. The rapid launch has created considerable concern and opposition among certain groups of the general population, but objections and appeals against the new system has decreased during the last time.

Public information activities:
In autumn 2004 and spring 2005 SSI and the National Board of Health and Welfare offered a series of six regional one-day training courses on Mobile Telephony and Health to Swedish municipalities. Altogether more than 300 regional and municipal employees and politicians attended the courses with very positive response.

During autumn 2004 and spring 2005 SSI arranged the Transparency Forum,TF, a series of three open two-days seminars regarding the 3G roll-out where all stakeholders, authorities, industry and NGO:s including interest groups could express their opinions. The basis for TF is a risk communication model (RISCOM) for delicate situations, which has been tested earlier by SSI for the nuclear waste issue with good results. A key element in TF is that all stakeholders are involved on equal terms in the planning and realization of the project. The seminars covered: Roles and responsibilities of the different

organisations, the Scientific basis for risk assessment and Risk management and precautionary principles. An evaluation of this project will be published later this year.

The National Institute for Working Life arranged a 4-day course in measurement technique for EMF in workplaces. The attendees were occupational safety engineers and occupational hygienists. NIWL has also been holding information meetings with decision makers, politicians, and county officials about EMF in general and specially about base station radiation. There is a general trend to an increased interest in questions about EMF from universities and high schools in that they are more and more asking for help to include EMF in various courses.

Research activities
The research in Sweden has been going down in activity lately due to lack of funding. Sweden does not have a national program devoted to EMF, and the researcher have been experience more difficulties lately to find economical support for new studies. However, some results have been presented during the past year:

Epidemiology. A few studies on mobile phone use and brain tumor has been published recently. The Karolinska Institute published their Interphone results on both benign and malignant tumors. For the acoustic neurinoma an increased relative risk of 3.9 (95%CI 1.6-9.5) was found for ipsilateral tumors, but no overall increased risk was seen. For malignant tumors no risk increase was found, but the study had a low number of user with long-term use and therefore they note that a carcinogenic effect after a very long induction time would remain undetected. Hardell and associates have presented a study on salivary gland tumors and use of cellular or cordless phones, and they found no association for these tumors. In extended analyses of use of phone in urban and rural areas an effect of rural living was seen for digital cellular telephones. Living in rural areas yielded an odds ratio (OR) of 1.4(95% CI 0.98 to 2.0), increasing to 3.2 (95% CI 1.2 to 8.4) with 5-year latency time for digital phones. The corresponding ORs for living in urban areas were 0.9 (95% CI 0.8 to 1.2) and 0.9 (95% CI 0.6 to 1.4), respectively.

A study of RF sealer workers showed that the operators were exposed to rather intense electric and magnetic fields. In total, 11 out of 46 measured RF plastic sealers exceeded the ICNIRP reference levels. RF operators, especially the ready-made clothing workers had a slightly disturbed two-point discrimination ability compared to a control group. RF operators had a significantly lower heart rate (24 h registration) and more episodes of bradycardia compared to controls.

A study of breast cancer and exposure assessed by linkage to a newly developed job-exposure matrix based on personal magnetic field measurements on women has been presented. All risk estimates were close to unity regardless of exposure cutpoint or choice of exposure parameter. The overall odds ratio for women exposed to 0.30 microT or more was 1.01 (95% CI 0.93 to 1.10). The size of the study allowed for estimates with good precision also in subgroups where previous studies have suggested increased risk, but the findings do not support the hypothesis that magnetic fields influence the risk of female breast cancer.

In vitro and in vivo. In a laboratory study it was shown that MF-exposure (50 Hz, 20 min, 10-200 mikroT) significantly improved survival rate in chicken embryos that were subjected to UV-irradiation. The protective effect was seen only after vertical MF exposure, whereas horizontal exposure was inefficient in this respect. The mechanism behind the protective effect by MF is unclear, although the authors suggest that induction of HSP70 protein could be involved. Accordingly, they also showed that the MF exposure indeed gave rise to increased levels of this stress protein.

Results from exposure of human lymphocytes to UMTS/3G mobile phones signals showed adverse affects that persisted for long time after exposure.

Dosimetry and measurements. Exposure to magnetic field from a spot welding machine can be quite high, and calculations showed that at an operator position of 34 cm away from the machine the

maximum induced current density was below the ICNIRP basic restriction. But if the operator was closer to the machine, the basic restriction was exceeded. An important finding of the present article is that the basic restriction can be exceeded although the MF spatially averaged over the whole body is well below the reference level.

Electrosurgical units (ESUs) that are commonly used in operating suites employ radiofrequency (RF) energy for cutting and coagulation, and operate at different frequencies in the range 0.3–5 MHz. Recent measurements showed that around the electrode and cables, electric and magnetic fields can be substantial. The local exposure of the surgeon's hand was estimated to exceed 15 kV/m for the electric field and the corresponding value for the magnetic field was 16 mT. These values exceed the suggested international reference levels at 0.5 MHz (610 V/m and 4 mT, respectively).