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WHO International EMF Project
Report on activities in Finland from May 2019 to June 2020

General research activities related to EMF health

Leena Korpinen (North Karelia Central Hospital), Rauno Pääkkönen (tmi Rauno Pääkkönen) and Mika Penttilä (Fingrid Oyj) investigated the operation of three different insulin pumps under 400-kV transmission lines. According to the investigation, the pumps worked perfectly during and after the exposure to electric and magnetic fields generated by the transmission lines. The study suggests that the pump users can move safely under the power lines.

Rauno Pääkkönen and Leena Korpinen compared the magnetic fields inside passenger seats of electric, petrol and hybrid cars. The magnetic flux densities of the cars were less than 2.6 µT. The magnitudes of the magnetic fields of petrol cars and hybrid cars were about the same and slightly lower for electric cars. Based on the measurements, values were less than 3% of the guidelines given for the general population or people using pacemakers.

The international collaborative cohort study of mobile phone use and health (COSMOS) is on-going and the Finnish participant is Tampere University (TUNI). The study involves approximately 11,000 Finnish participants who filled in the baseline questionnaires and have been followed up since 2009 - 2010. Third questionnaire round has recently been completed in Finland and linkages to various registers performed or on-going. Call data have been obtained repeatedly from the traffic databases of two major mobile network operators. The first results from international collaborative analyses of health outcomes have recently been published. Even if the amount of mobile phone use showed some correlation with weekly headache, such associations were weakened or disappeared after adjustment for confounding factors (Auvinen et al. Int J Epidemiol 2019). Further, the older GSM/2G showed weaker associations than UMTS/3G despite higher RF-EMF levels. No associations were observed for tinnitus or hearing. Comparable results were also observed in analysis of mobile phone use and sleep disturbances (Tettamanti et al. Environ Int 2020). These first analyses were based on Swedish and Finnish data alone. Cancer incidence has also been compiled for several participating cohorts, but data availability has been a challenge in some countries.

Analyses of brain tumour incidence in the past two decades to evaluate whether there is any hint of a relation to the increase in radiofrequency (RF) electromagnetic field exposure in the population are on-going at TUNI. Various morphological types (meningioma, vestibular schwannoma) are evaluated separately and pediatric cases are also examined to complement earlier analyses of malignant brain tumors in adults.

No association was found between parental occupational exposure to electromagnetic fields and childhood leukemia in the offspring in an international collaborative analysis by the Childhood Leukemia International Consortium (CLIC) including data from the Finnish register-based Case-Control Study of Childhood Leukemia (FRECCLE) (Talibov et al. Occup Environ Med 2019)

University of Eastern Finland (UEF) has conducted experimental and epidemiological studies of intermediate frequency (IF) and RF fields on cancer-related, reproductive, developmental and behavioural/cognitive effects. In addition, a strong research line is ongoing to study induced genomic instability as a mechanistic basis for possible cancer-related effects of extremely low frequency (ELF) magnetic fields. UEF also studies possible enhancing effects of ELF magnetic fields on tumour radiotherapy. UEF has compiled a registry of residential buildings with indoor

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transformer stations. This registry will allow high-quality epidemiological studies on the health effects of ELF magnetic fields, avoiding methodological limitations of previous studies.

STUK (Radiation and Nuclear Safety Authority) and UEF have started a project called Empirical studies on the link between environmental extremely low frequency magnetic fields and Alzheimer's disease (ELFMAD). This project investigates the possible causal relationship between extremely low frequency (ELF) magnetic fields and Alzheimer's disease with new types of experimental models combined with an advanced hypothesis of an interaction mechanism. In addition, this is combined with an epidemiological research. The aim is 1) to investigate whether exposure to ELF magnetic fields has a significant effect on Alzheimer's disease development processes in a cell model utilizing human astrocytes derived from pluripotent stem cells from Alzheimer's disease patients or healthy controls; 2) to confirm the results of the cell experiments in an animal model taking into account the results of the cell experiments and the latest information on the effects of environmental factors on the development of Alzheimer's disease, 3) to elucidate a mechanism that could explain the association between ELF magnetic fields and Alzheimer's disease, and 4) to investigate the association between exposure to ELF magnetic fields of indoor transformer stations and the emergence of Alzheimer's disease.

New policies and legislations regarding EMF exposure

No new policies or legislations have been implemented.

Areas of public concern and national responses

Possible health effects from base stations have been the main area of public concern during the last year. The emerging 5G technology has raised several questions. STUK has been interviewed several times by the media on radiation safety of 5G network.

The citizens' initiative to halt the introduction of 5G network opened in 1 March 2019, received eventually 7536 signatures. Two new citizens' initiatives have been opened during the reporting period. The first one opened in 5 July 2019 and received 2460 signatures. The second initiative opened in 27 May 2020. If an initiative gets at least 50,000 signatures within its 6-month collecting period, the Finnish parliament will have to consider the initiative.

New public information activities

Information on radiation safety of 5G network on STUK's website has been updated and translated into English.

https://www.stuk.fi/web/en/topics/mobile-telephones-and-base-stations/base-stations/5g-network-and-radiation-safety