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The English version is a summary of the more extensive situation report bulletin in Finnish.

# Decades of Research into the Health Effects of Electric and Magnetic Fields

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Contents


Tampere University of Technology, Department of Electronics and Communications Engineering
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No. 01

## *Editorial*

After the summer, the year saw another series of diverse events on electromagnetic fields. Examples include the 8th International Workshop on Biological Effects of Electromagnetic Fields, held in September in Varna, Bulgaria, and the European Economic and Social Committee public hearing on electromagnetic hypersensitivity on November 4 in Brussels. Related material can be found on the respective websites.

The World Health Organization (WHO) published a draft monograph on radio frequency fields that was open for expert consultation until mid-December. The monograph is available on the WHO website.

At the national level, the preparation of national regulations implementing Directive 2013/35/EU of the European Parliament and of the Council on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) is still underway.

During the summer, the Ministry of Social Affairs and Health of Finland (STM) submitted a request for an opinion, open until August 31, on the needs to reform the national legislation regarding radiation. The new Council Directive 2013/59/EURATOM of December 5, 2013, laying down the basic safety standards for protection against radiation, must be transposed into national legislation by February 6, 2018, and the plan is to coincide the transposition with an overall reform of the radiation protection legislation. As a source of non-ionizing radiation, extremely low-frequency electric and magnetic fields fall within the scope of radiation protection regulations. The request for an opinion and the relevant assessment memorandum on the required radiation protection reform can be found on the STM website.

Once again, I have found some fascinating scientific articles for this bulletin. This time, the bulletin starts with articles on field exposure and childhood leukemia. My attention was drawn to the fact that, according to one of the authors, the discussion on whether extremely low-frequency magnetic fields are causally linked with childhood leukemia has been ongoing for almost four decades.

A couple of the articles discuss the association between magnetic field exposure and different physical symptoms. This has already been extensively explored in earlier bulletins, but there are again some interesting observations.

The bulletin ends, as many times before, with articles on occupational exposure. This time, the research focus covers areas such as brain tumor risk.

Hope you enjoy reading this summary in English!

Leena Korpinen,
Editor-in-chief, Situation Report Bulletin
Tampere University of Technology, Environmental Health

The Finnish situation report bulletin includes summaries of the following publications, preceded by the editor-in-chief’s comments.

No. 02

## *Magnetic Fields Exposure and Childhood Leukemia Risk: A Meta-Analysis Based on 11,699 Cases and 13,194 Controls*

Editor-in-chief's comment: The research group performed a meta-analysis based on earlier studies on the association between childhood leukemia and magnetic field exposure. They were able to identify a statistically significant association between childhood leukemia and exposure to magnetic fields of > 0.4 µT when compared with the reference level < 0.1 µT. The authors concluded that the results indicate a potential association between magnetic field exposure level and childhood leukemia.

Source:

Zhao L, Liu X, Wang C, Yan K, Lin X, Li S, Bao H, Liu X. Magnetic fields exposure and childhood leukemia risk: A meta-analysis based on 11,699 cases and 13,194 controls. Leukemia Research 38 (2014) 269–274.

No. 03

## *Assessment of Bias in a Survey of Residential Magnetic Fields in Melbourne, Australia*

Editor-in-chief's comment: The research group assessed the potential selection bias in one of their earlier studies, in which they had randomly selected homes from a telephone directory to measure residential magnetic fields. The group identified selection and self-selection bias, among other things, but concluded that it did not greatly affect the population-level assessment of exposure to residential magnetic fields.

Source:

Karipidis K K. Assessment of bias in a survey of residential magnetic fields in Melbourne, Australia. Radiation Protection Dosimetry (2014), pp. 1–10.

No. 04

## *Childhood Leukemia Not Linked with ELF Magnetic Fields*

Editor-in-chief's comment: The author analyzed data from earlier studies on the association between childhood leukemia and magnetic field exposure applying a new, pooled approach that did not exclude any exposure metric or field source. The author concluded that the assumption of a link between exposure to extremely low-frequency magnetic fields and childhood leukemia is no longer plausible, and hence the ELF MF classification as possibly carcinogenic needs revision.

Source:

Leitgeb, N. Childhood leukemia not linked with ELF magnetic fields. Journal of Electromagnetic Analysis and Application (2014), 6, 174–183.

No. 05

## *Childhood Cancer and Exposure to Corona Ions from Power Lines: an Epidemiological Test*

Editor-in-chief's comment: The research group had previously reported an association between childhood leukemia in England and Wales and proximity of the child's address at birth to high-voltage power lines. They have now tested whether exposure to corona ions blown away from power lines by the wind could explain these results. The test did not, however, disprove the corona-ion hypothesis, nor did it provide support for it.

Source:

Swanson J, Bunch K J, Vincent T J, Murphy M F G. Childhood cancer and exposure to corona ions from power lines: an epidemiological test. J. Radiol. Prot. 34 (2014) 873–889.

No. 06

## *Everyday Exposure to Power Frequency Magnetic Fields and Associations with Non-Specific Physical Symptoms*

Editor-in-chief's comment: The research group used personal exposure meters to measure ELF MF exposure in Amsterdam, the Netherlands, and the participants in the study reported their non-specific physical symptoms in a questionnaire. As only one man scored "moderately high" on the somatization scale, the group decided to proceed with the analyses of only the women. With the study being exploratory and in a relatively small sample (48 women), the research group concluded that the results could not give any evidence for causality.

Source:

Bolte J F B, Baliatsas C, Eikelboom T, van Kamp I. Everyday exposure to power frequency magnetic fields and associations with non-specific physical symptoms. Environmental Pollution 196 (2015) 224–229.

No. 07

## *Symptom Attribution and Risk Perception in Individuals with Idiopathic Environmental Intolerance to Electromagnetic Fields and in the General Population*

Editor-in-chief's comment: The research group compared a sample of the general population recruited via an Internet panel to individuals sensitive to electromagnetic fields, recruited via a non-governmental organization (NGO). The group investigated the differences in EMF-related health perception between people within the general population reporting sensitivity or non-sensitivity to EMF, and people who had registered themselves as sensitive to EMF at an

NGO. The conclusion was that sensitive individuals recruited via the Internet panel differed from those recruited via an NGO, who reported a higher frequency of non-specific symptoms.

Source:

van Dongen D, Smid T, Timmermans D R M. Symptom attribution and risk perception in individuals with idiopathic environmental intolerance to electromagnetic fields and in the general population. Perspectives in Public Health 2014 134: 160.

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No. 08

## *Occupational Exposure to Extremely Low-Frequency Magnetic Fields and Brain Tumor Risks in the INTEROCC Study*

Editor-in-chief's comment: The research group examined the association between occupational exposure to extremely low-frequency magnetic fields and brain tumor risks. There was no association between lifetime cumulative ELF MF exposure and glioma or meningioma risk. However, there were positive associations between cumulative ELF MF exposure 1 to 4 years before the diagnosis/reference date and glioma or meningioma risk, with somewhat weaker associations in the latter case.

Source:

Turner M C, Benke G, Bowman J D, Figuerola J, Fleming S, Hours M, Kincl L, Krewski D, McLean D, Parent M-E, Richardson L, Sadetzki S, Schlaefer K, Schlehofer B, Schüz J, Siemiatycki J, van Tongeren M, Cardis E. Occupational exposure to extremely low-frequency magnetic fields and brain tumor risks in the INTEROCC study. Cancer Epidemiol Biomarkers Prev 2014; 23(9); 1863–72.

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No. 9

## *Epinephrine, DNA Integrity and Oxidative Stress in Workers Exposed to Extremely Low-Frequency Electromagnetic Fields (ELF-EMFs) at 132 kV Substations*

Editor-in-chief's comment: The research group observed that individuals working in the vicinity of live power lines were vulnerable to EMF-related stress. Preventative measures were suggested.

Source:

Tiwari R, Lakshmi N K, Bhargava S C, Ahuja Y R. Epinephrine, DNA integrity and oxidative stress in workers exposed to extremely low-frequency electromagnetic fields (ELF-EMFs) at 132 kV substations. Electromagn Biol Med, Early Online: 1–7, 2014.

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