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

Electric and Magnetic Fields of Power Lines – a Diversity of Research Perspectives Explored

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Contents

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No. 01

Editorial

This summer started with a busy congress period. The first week of June saw the 31st International Congress on Occupational Health in Seoul, South Korea, held by the International Commission on Occupational Health (ICOH). This year, the agenda included topics such as occupational exposure to electromagnetic fields and the potential interference of electric and magnetic fields with cardiac pacemakers and implantable cardioverter defibrillators. The event was followed by the BioEM2015 conference in California.

The European Commission and its Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) have now published the final "Opinion on potential health effects of exposure to electromagnetic fields (EMF) 2015", with similar conclusions to those drawn in the 2009 Opinion. The report is available for a closer look on the SCENIHR website.

At the national level, the preparation of national regulations implementing Directive 2013/35/EU on the "minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields)" is still underway. EU guidance on the Directive is currently being produced and will possibly be available before the end of the year.

Once again, I have found some intriguing pieces of research for the bulletin. As many times before, the bulletin starts with papers on field exposure and childhood leukemia. Another paper discusses power lines from an entirely different perspective, comparing charged nanoparticle concentrations near high-voltage power lines and busy roads. I decided to include this paper because, although not about electric and magnetic fields, the topic is one that has kept coming up in people's conversations. Now there is some research data available to build on.

Towards the end of the bulletin, there is a paper reporting on the magnetophosphene perception of volunteer individuals exposed to 50 mT magnetic fields. Their descriptions of the phenomenon make for quite interesting reading.

The last article deals with occupational exposure. This time the focus is on oxidative stress.

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

Estimating Magnetic Fields of Homes near Transmission Lines in the California Power Line Study

Editor-in-chief's comment: The authors describe how exposure to magnetic fields was assessed in a California-based case-control study investigating the risk of childhood leukemia. The conclusion was that a high specificity had been achieved in exposure assessment, which is essential in examining the association between distance to or magnetic fields from power lines and childhood leukemia risk.

Source:

Vergara XP, Kavet R, Crespi CM, Hooper C, Silva JM, Kheifets L. Estimating magnetic fields of homes near transmission lines in the California Power Line Study. Environmental Research 140 (2015) 514–523.

No. 03

Childhood Leukemia and 50 Hz Magnetic Fields: Findings from the Italian SETIL Case-Control Study

Editor-in-chief's comment: The research group investigated the relation between childhood leukemia and exposure to extremely low frequency magnetic fields in an Italian case-control study. The average measured level of magnetic field induction was 0.04 μT, with 0.6% of the cases and 1.6% of the controls exposed to magnetic fields above 0.3 μT. The measurements were performed in the room that had been the child's bedroom one year before diagnosis. The research group concluded that, despite the potential bias, the results may contribute to future meta- and pooled analyses.

Source:

Salvan A, Ranucci A, Lagorio S, Magnani C on behalf of the SETIL Research Group. Childhood leukemia and 50 Hz magnetic fields: findings from the Italian SETIL case-control study. International Journal of Environmental Research and Public Health 2015, 12, 2184–2204.

No. 04

Increased Risk of Childhood Acute Lymphoblastic Leukemia (ALL) by Prenatal and Postnatal Exposure to High-Voltage Power Lines: a Case-Control Study in Isfahan, Iran

Editor-in-chief's comment: This study aimed to evaluate the role of pre- and postnatal exposure to electromagnetic fields in the incidence of childhood acute lymphoblastic leukemia (ALL). The researchers compared 22 newly diagnosed ALL cases to 100 age-matched controls in Isfahan, Iran. In conclusion, they suggested that pre- and postnatal

exposure to high-voltage power lines, living in polluted regions, as well as a family history of leukemia could be described as risk factors of ALL in a low socioeconomic status Iranian population.

Source:

Tabrizi MM, Bidgoli SA. Increased risk of childhood acute lymphoblastic leukemia (ALL) by prenatal and postnatal exposure to high voltage power lines : a case control study in Isfahan, Iran. Asian Pacific Journal of Cancer Prevention, 16 (6), 2347–2350.

No. 05

Symptom Reporting after the Introduction of a New High-Voltage Power Line: a Prospective Field Study

Editor-in-chief's comment: The research group used pre- and post-tests to investigate the influence of the construction of a new power line on self-reported health complaints and causal beliefs. At baseline, symptom reports did not differ between residents living close to the power line and those living farther away. However, nearby residents were more certain that their symptoms were caused by the power line. The study thus suggested that the new power line had a negative impact on the health perception of nearby residents already before being put into operation. The questionnaires used may also have had an effect on the results.

Source:

Porsius JT, Claassen L, Smid T, Woudenberg F, Petrie KJ, Timmermans DRM. Symptom reporting after the introduction of a new high-voltage power line: a prospective field study. Environmental Research 138 (2015) 112–117.

No. 06

Comparison of Charged Nanoparticle Concentrations near Busy Roads and Overhead High-Voltage Power Lines

Editor-in-chief's comment: The research group compared the concentrations of charged nanoparticles near busy roads and high-voltage power lines. Power lines are known sources of corona ions, which readily attach to aerosols, making this an interesting research topic. The researchers observed that the concentrations of both positive and negative charged nanoparticles were significantly higher near roads than under power lines.

Source:

Jayaratne ER, Ling X, Morawska L. Comparison of charged nanoparticle concentrations near busy roads and overhead high-voltage power lines. Science of the Total Environment 526 (2015) 14–18.

No. 07

Electric Blanket Use and Risk of Thyroid Cancer in the Women's Health Initiative (WHI) Observational Cohort

Editor-in-chief's comment: The aim of this study was to assess whether magnetic fields from electric bed heaters, such as electric blankets and heated water beds, often used in close proximity and prolonged periods of time, are associated with the development of thyroid cancer in post-menopausal women. No association was found between the use of such heaters and the risk of thyroid cancer.

Source:

Kato I, Young A, Liu J, Abrams J, Bock C, Simon M. Electric blanket (EB) use and risk of thyroid cancer in the Women's Health Initiative (WHI) Observational Cohort. Women & Health. DOI: 10.1080/03630242.2015.1050545.

No. 08

Anecdotal Report of Magnetophosphene Perception in 50 mT 20, 50 and 60 Hz Magnetic Fields

Editor-in-chief's comment: The research group provided a descriptive anecdotal report of the magnetophospene perception of eight individuals exposed to 50 mT MF at 20, 50 and 60 Hz. The experiment involved localized exposure, with a single-blind procedure, of the right side of the head at eyeball level. The volunteers reported light perception in the form of lines of different shapes, sparkling in black and white.

Source:

Souques M, Plante M, Ostiguy G, Goulet D, Deschamps F, Mezei G, Modolo J, Lambrozo J, Legros A. Anecdotal report of magnetophosphene perception in 50 mT 20, 50 and 60 Hz magnetic fields. Radioprotection.

No. 09

A Cross-Sectional Study on Oxidative Stress in Workers Exposed to Extremely Low Frequency Electromagnetic Fields

Editor-in-chief's comment: Based on this study, there is no reason to believe that continual exposure to electromagnetic fields might induce oxidative stress in power company staff.

Source:

Li L, Xiong D, Liu J, Li Z, Zeng G, Li H. A cross-sectional study on oxidative stress in workers exposed to extremely low frequency electromagnetic fields. International Journal of Radiation Biology, May 2015; 91(5): 420–425.

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