

Different Research Perspectives on Exposure to Extremely Low-Frequency Electromagnetic Fields



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No. 01

Editorial

The summer is full of different congresses. One of those already held, on 5–9 June in Hangzhou, China, was the annual BioEM conference (BioEM2017) on electromagnetic fields. BioEM is the annual joint meeting of the Bioelectromagnetics Society (BEMS) and the European BioElectromagnetics Association (EBEA). This year, the event features included different workshops on topical issues. Short abstracts for the presentations held at the conference are available online (www.bioem2017.org).



As I mentioned in the previous bulletin (2/2016), the Finnish radiation legislation is currently being revised. The new radiation act has been circulated for comments but will not, as far as I know, come into force until 1 January 2018. Also, work has progressed on the preparation of other regulations. The decree of the Ministry of Social Affairs and Health on restricting public exposure to non-ionizing radiation is currently being circulated for comments until 14 August. This will be followed up in the next bulletins.

As for extremely low-frequency electromagnetic fields, it is particularly interesting to see what kind of regulations will be in place for public exposure, with the binding Government Decree (388/2016) on occupational exposure already in force. A number of different standards on the exposure of workers are also being currently produced, especially at the European level.

I have found some interesting scientific publications for this bulletin. The first paper discusses the association between childhood leukemia and environmental exposure, including but not limited to electromagnetic fields. It was interesting to find that research has been carried out in respect of other environmental factors as well.

The next paper focuses not only on extremely low-frequency but also on intermediate-frequency electromagnetic fields. A few years ago, the issue was raised at different conferences that no research had been conducted on intermediate-frequency fields so far. That situation seems to have changed now.

This bulletin presents research results from a number of European countries, including those from a Danish study on the association between exposure to magnetic fields from power lines and childhood asthma. Another paper outlines a study on electromagnetic interference with pacemakers caused by everyday electric and magnetic fields. This widely researched topic has not usually been one of the themes in this bulletin. I decided to include this paper, however, as active implantable devices are becoming increasingly common.

As many times before, the bulletin concludes with papers on occupational exposure. This time there are two of them, dealing with amyotrophic lateral sclerosis (ALS) and central nervous system disease.

Hope you enjoy reading this summary in English!

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No. 02

Environmental Exposure and Risk of Childhood Leukemia: an Overview

Editor-in-chief's comment: The researchers brought together the results of a number of different studies on the relationship between childhood leukemia and environmental exposures, including not only electromagnetic fields but also factors such as pesticides and radon. They concluded that this overview did not establish any environmental factor as a major contributor to the global childhood leukemia burden.

Source:

Schüz J, Erdmann F. Environmental Exposure and Risk of Childhood Leukemia: An Overview. Archives of Medical Research 47 (2016) 607–614, <http://dx.doi.org/10.1016/j.arcmed.2016.11.017>.

No. 03

Exposure to Extremely Low and Intermediate-Frequency Magnetic and Electric Fields among Children from the INMA-Gipuzkoa Cohort

Editor-in-chief's comment: The aim of this study was to characterize the exposure of children to extremely low-frequency and intermediate-frequency electric and magnetic fields on the basis of the Basque INMA-Gipuzkoa cohort. The researchers observed that, compared to previously reported levels, the children of this cohort were exposed to very low levels of ELF magnetic fields in all settings. As for IF electric and magnetic fields, the exposure levels were similar in all settings.

Source:

Gallastegi M, Jiménez-Zabala A, Santa-Marina L, Aurrekoetxea JJ, Ayerdi M, Ibarluzea J, Kromhout H, González J, Huss A. Exposure to extremely low and intermediate-frequency magnetic and electric fields among children from the INMA-Gipuzkoa cohort. Environmental Research 157 (2017) 190–197, <http://dx.doi.org/10.1016/j.envres.2017.05.027>.



No. 04

Re-Examining the Association between Residential Exposure to Magnetic Fields from Power Lines and Childhood Asthma in the Danish National Birth Cohort

Editor-in-chief's comment: The research group examined, using data from the Danish National Birth Cohort, the risk of asthma in children whose mothers were exposed to magnetic field levels above 0.2 μT during pregnancy. Moreover, they measured the exposure of the children to extremely low-frequency magnetic fields. They did not find evidence that residential exposure to magnetic fields during pregnancy or early childhood increased the risk of childhood asthma.

Source:

Sudan M, Arah OA, Becker T, Levy Y, Sigsgaard T, Olsen J, Vergara X, Kheifets L. Re-examining the association between residential exposure to magnetic fields from power lines and childhood asthma in the Danish National Birth Cohort. PLoS ONE (2017) 12(5): e0177651.

No. 05

Magnetic Fields Exposure from High-Voltage Power Lines and Risk of Amyotrophic Lateral Sclerosis in Two Italian Populations

Editor-in-chief's comment: The researchers tested the hypothesis that there is a relationship between exposure to magnetic fields and the risk of amyotrophic lateral sclerosis (ALS). The study was carried out in two regions in Italy, one northern and one southern. The researchers found that a residence near high-voltage power lines, with magnetic fields of $\geq 0.1 \mu\text{T}$, was not associated with an excess ALS risk. In their view, the results appear to confirm that exposure to magnetic fields from power lines is not associated with increased ALS risk in the general population.

Source:

Vinceti M, Malagoli C, Fabbi S, Kheifets L, Violi F, Poli M, Caldara S, Sesti D, Violanti S, Zanichelli P, Notari B, Fava R, Arena A, Calzolari R, Filippini T, Iacuzio L, Arcolin E, Mandrioli J, Fini N, Odone A, Signorelli C, Patti F, Zappia M, Pietrini V, Oleari P, Teggi S, Ghermandi G, Dimartino A, Ledda C, Mauceri C, Sciacca S, Fiore M, Ferrante M. Magnetic fields exposure from high-voltage power lines and risk of amyotrophic lateral sclerosis in two Italian populations. Amyotrophic Lateral Sclerosis and Frontotemporal Degeneration 2017, 1–7.



No. 06

Electromagnetic Hypersensitivity (EHS) in Occupational and Primary Health Care: a Nation-Wide Survey among General Practitioners, Occupational Physicians and Hygienists in the Netherlands

Editor-in-chief's comment: The research group performed a national survey in the Netherlands among occupational hygienists, occupational physicians, and general practitioners in order to examine electromagnetic hypersensitivity (EHS). About one-third of the respondents had ever been consulted by one or more EHS subjects. A majority of these professionals felt insufficiently informed about electromagnetic fields and health.

Source:

Slottje P, van Moorselaar I, van Strien R, Vermeulen R, Kromhout H, Huss A. Electromagnetic hypersensitivity (EHS) in occupational and primary health care: A nation-wide survey among general practitioners, occupational physicians and hygienists in the Netherlands. *International Journal of Hygiene and Environmental Health* 220 (2017) 395–400.

No. 07

In Vivo Study of Electromagnetic Interference with Pacemakers Caused by Everyday Electric and Magnetic Fields

Editor-in-chief's comment: This study sought to determine the interference thresholds of pacemakers and to ascertain different conditions for electromagnetic interference. The 119 patients with pacemakers who participated in the study were exposed to 50-Hz electric and magnetic fields at different pacemaker sensitivity settings. According to the research group, electromagnetic interference may occur even under daily life exposure conditions.

Source:

Stunder D, Seckler T, Joosten S, Zink MD, Driessen S, Kraus T, Marx N, Napp A. In Vivo Study of Electromagnetic Interference With Pacemakers Caused by Everyday Electric and Magnetic Fields. *Circulation* 2017, 135: 907–909.



No. 08

Occupational Exposure and Amyotrophic Lateral Sclerosis in a Prospective Cohort

Editor-in-chief's comment: The researchers analyzed the association between occupational exposure and ALS using the prospective Netherlands Cohort Study on diet and cancer. They concluded that the results strengthen the evidence suggesting a positive association between exposure to extremely low-frequency electromagnetic fields and ALS, while they did not replicate earlier positive findings for other occupational exposures.

Source:

Koeman T, Slotje P, Schouten LJ, Peters S, Huss A, Veldink JH, Kromhout H, van den Brandt PA, Vermeulen R. Occupational exposure and amyotrophic lateral sclerosis in a prospective cohort. *Occupational and Environmental Medicine*, published online on 29 March 2017.

No. 09

Occupational Exposure to Extremely Low-Frequency Magnetic Fields and Risk for Central Nervous System Disease: an Update of a Danish Cohort Study among Utility Workers

Editor-in-chief's comment: The research group investigated the risks for dementia, motor neuron disease, Parkinson's disease, multiple sclerosis and epilepsy in men who had been employed at utility companies supplying Denmark with electricity.

Source:

Pedersen C, Poulsen AH, Rod NH, Frei P, Hansen J, Grell K, Raaschou-Nielsen O, Schüz J, Johansen C. Occupational exposure to extremely low-frequency magnetic fields and risk for central nervous system disease: an update of a Danish cohort study among utility workers. *International Archives of Occupational and Environmental Health*, published online on 20 April 2017.

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