Human Exposure to Extremely Low-Frequency Electromagnetic Fields Being Researched

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No. 01

Editorial

This summer, the annual joint meeting of the Bioelectromagnetics Society (BEMS) and the European Bioelectromagnetics Association (EBEA) was held June 24-29 in Piran, Slovenia. At this BioEM2018 conference, ICNIRP (International Commission on Non-Ionizing Radiation Protection) presented the draft of its new guidelines for the frequency range from 100 kHz to 300 GHz. The guidelines for extremely low-frequency fields remain unchanged for now.

As noted in earlier bulletins, the Finnish radiation legislation is currently being revised. For the time being, the new radiation act and the decree on non-ionizing radiation are still underway. The event on radiation protection held by the Finnish Radiation and Nuclear Safety Authority (STUK) in Jyväskylä, Finland, May 24-25, 2018, planned to focus on the new legislation. It will not, however, be finalized until the end of the year or early next year. This will be followed up in the next bulletins.

Again, I have found new scientific publications of interest for this bulletin. This time, some of the topics are a bit different than what has been dealt with before. I also included a paper on honey bees for a change, while the main focus will continue to be on human research.

The current bulletin starts more traditionally, with papers on childhood leukemia. Paper no. 02 discusses residential mobility and how it may affect studies on childhood leukemia. Paper no. 03 proposes an explanation for thunderstorm asthma and leukemia risk near power lines, defining thunderstorm asthma as acute asthma response to pollen-laden air during thunderstorms.

Paper no. 04 presents the results of an experiment where volunteers were exposed to magnetic fields (of up to 50 mT) to investigate the effect of exposure on tremor. No less interesting is the Finnish pilot study on maternal exposure to intermediate frequency magnetic fields from electronic article surveillance systems and potential reproductive outcomes.

Once again, the bulletin concludes with papers on occupational exposure. Paper no. 08 is a study on hematolymphopoietic cancers, while no. 09 focuses on ALS.

Hope you enjoy reading this summary in English!

Leena Korpinen, Professor
Editor-in-chief, Situation Report Bulletin

Leena Korpinen is currently a specializing physician in the field of clinical physiology and nuclear medicine at North Karelia Central Hospital, and an adjunct professor at the University of Tampere.

No. 02

Residential Mobility and Childhood Leukemia

Editor-in-chief's comment: Using data collected earlier for the California Power Lines Study, the researchers examined how residential mobility may have affected studies on environmental exposures and childhood leukemia. They found confounding by mobility to be an unlikely explanation for the associations observed between childhood leukemia and exposure to magnetic fields from power lines.

Source:

Amoon A T, Oksuzyan S, Crespi C M, Arah O A, Cockburn M, Vergara X, Kheifets L. Residential mobility and childhood leukemia. Environmental Research 164 (2018) 459–466.

No. 03

A Proposed Explanation for Thunderstorm Asthma and Leukemia Risk Near High-Voltage Power Lines: a Supported Hypothesis

Editor-in-chief's comment: The author attempts to offer an explanation for thunderstorm asthma and leukemia risk near power lines, defining thunderstorm asthma as acute asthma response to pollen-laden air during thunderstorms. She demonstrates a series of events leading to increased deposition and retention of ionized particles in airways and suggests that this could explain both adverse health outcomes.

Source:

Redmayne M. A proposed explanation for thunderstorm asthma and leukemia risk near high-voltage power lines: a supported hypothesis. Electromagnetic Biology and Medicine 2018.

No. 04

Effects of a 60 Hz Magnetic Field of Up to 50 milliTesla on Human Tremor and EEG: a Pilot Study

Editor-in-chief's comment: The research group examined the possible effects of magnetic fields on human neuromotor control by applying an MF exposure to the cortex of ten volunteers and simultaneously measuring, for example, physiological tremor. The researchers concluded that, while showing no effect on human motor control, the results should be considered with caution due to the limited number of study participants.

Source:

Davarpanah Jazi S, Modolo J, Baker C, Villard S, Legros A. Effects of A 60 Hz Magnetic Field of Up to 50 milliTesla on Human Tremor and EEG: A Pilot Study. International Journal of Environmental Research and Public Health 2017, 14, 1446.

No. 05

Maternal Cumulative Exposure to Extremely Low Frequency Electromagnetic Fields and Pregnancy Outcomes in the Elfe Cohort

Editor-in-chief's comment: The researchers used the Elfe cohort to study the relations between maternal exposure to magnetic fields during pregnancy and reproductive risks such as moderate prematurity and small for gestational age. No significant association was observed between maternal cumulative exposure and the adverse pregnancy outcomes.

Source:

Migault L, Piel C, Carles C, Delva F, Lacourt A, Cardis E, Zaros C, de Seze R, Baldi I, Bouvier G. Maternal cumulative exposure to extremely low frequency electromagnetic fields and pregnancy outcomes in the Elfe cohort. Environment International 112 (2018) 165–173.

No. 06

A Pilot Study on the Reproductive Risks of Maternal Exposure to Magnetic Fields from Electronic Article Surveillance Systems

Editor-in-chief's comment: The Finnish research group conducted a pilot study on exposure to magnetic fields at the intermediate frequency of 8.2 Hz among women working near electronic article surveillance systems and the possible adverse reproductive effects, such as miscarriage, reduced birth weight, and preterm birth. No differences on the risks were observed between exposed and unexposed cashiers, who worked in two different types of stores.

Source:

Khan M W, Roivainen P, Herrala M, Tiikkaja M, Sallmén M, Hietanen M, Juutilainen J. A pilot study on the reproductive risks of maternal exposure to magnetic fields from electronic article surveillance systems. International Journal of Radiation Biology 2018.

No. 07

Extremely Low Frequency Electromagnetic Fields Impair the Cognitive and Motor Abilities of Honey Bees

Editor-in-chief's comment: The researchers investigated how exposure to electromagnetic fields affects olfactory learning, flight, foraging activity, and feeding among honey bees. They found that EMF exposure represents a prominent environmental stressor, potentially impacting on the cognitive and motor abilities of honey bees and thus reducing their ability to pollinate crops.

Source:

Shepherd S, Lima M A P, Oliveira E E, Sharkh S M, Jackson C W, Newland P L. Extremely Low Frequency Electromagnetic Fields impair the Cognitive and Motor Abilities of Honey Bees. Scientific Reports (2018) 8: 7932

No. 08

Occupational Extremely Low Frequency Magnetic Fields (ELF-MF) Exposure and Hematolymphopoietic Cancers – Swiss National Cohort Analysis and Updated Meta-Analysis

Editor-in-chief's comment: The researchers evaluated the possible link between occupational exposure to magnetic fields and different types of hematolymphopoietic cancers in Switzerland. Their analysis of the exposure of 3.1 million workers to extremely low-frequency magnetic fields at different levels provided no evidence for an increased risk of death from hematolymphopoietic cancers in workers exposed. They only observed an increased risk of acute myeloid leukemia in workers exposed to high levels for a longer duration.

Source:

Huss A, Spoerri A, Egger M, Kromhout H, Vermeulen R. Occupational extremely low frequency magnetic fields (ELF-MF) exposure and hematolymphopoietic cancers – Swiss National Cohort analysis and updated meta-analysis. Environmental Research 164 (2018) 467–474.

No. 09

Occupational Exposure to Extremely Low-Frequency Magnetic Fields and the Risk of ALS: a Systematic Review and Meta-Analysis

Editor-in-chief's comment: The research group conducted a review of earlier studies on ALS and occupational exposure to magnetic fields. They recommend that future studies should improve on exposure assessment.

Source:

Huss A, Peters S, Vermeulen R. Occupational Exposure to Extremely Low-Frequency Magnetic Fields and the Risk of ALS: A Systematic Review and Meta-Analysis. Bioelectromagnetics 39:156–163 (2018).

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