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

## Review of International Exposure Guidelines Underway



***Situation Report Bulletin 2 / 2009 – published 30 December 2009***

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No. 01

### ***Editorial***

A review of the international electromagnetic exposure guidelines is underway both by the European Union and the International Commission on Non-Ionizing Radiation Protection (ICNIRP). As already mentioned at the end of my editorial in the previous bulletin, I was expecting new information from the ICNIRP. The new guidelines have not yet been published; however, in autumn 2009, the ICNIRP gave us the opportunity to have a look at their draft in advance. This time they wanted to receive feedback before announcing their



final guidelines. As far as I remember, they have not asked for comments in this way before, but in today's virtual world it is easy to gather feedback through the Internet even for this kind of purpose. The new element in the ICNIRP proposition is that current density values have been replaced by internal electric field values in the human body. Otherwise the proposed exposure limits seem to have remained unchanged with regard to the electric system.

Even though the new guidelines could not yet be included in this bulletin, other interesting information will be provided. We start with a couple of articles presented at the BioEM2009 conference, an annual event for researchers in the field that offers them the opportunity to check out the latest global research trends. Issues related to mobile phones were highlighted at this year's conference, whereas low-frequency fields were discussed to a lesser extent.

Radiation Protection Dosimetry had several articles that discussed childhood leukaemia and various environmental factors as possible risk factors for the disease. It was interesting to note the large number of factors already studied in relation to childhood leukaemia. Not all of the articles have been included here, but I tried to pick the most interesting ones.

In addition to childhood leukaemia, this bulletin also discusses other types of cancer and occupational exposure. The reviews are meant to focus on public exposure, but I also included a few articles on occupational exposure, as research results from the employee sector may reveal some new information that is important from the perspective of the general population as well.

The last article in the bulletin is my own article. It discusses occupational exposure at 400 kV substations and power lines. I thought it might interest our readers – and, obviously, it is nice to be able to report that such an extensive study has reached a stage where it could be published at international level.

The 'Occupational exposure to EMF' conference held in Umeå, Sweden, on 6–8 October 2009 – during the Swedish EU presidency – provided a forum for the different parties to share their views on the occupational exposure directive currently being revised. Professor Jarmo Elovaara had been invited to the conference to review the present situation from an electrical engineering perspective. The main purpose of his presentation was to voice the opinion of the electricity transmission industry on the employee directive questionnaire used by the Commission to seek the views of the various stakeholders on the alternative wordings of the directive, with a view to establishing a formulation that could be approved.

I hope you will find the other articles of interest too and enjoy reading this summary in English!

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



No. 02

### ***Measurement Results Near 110 kV Transmission Lines and Underground Power Cables Presented at the Davos Conference***

Editor-in-chief's comment: Exposure to electric and magnetic fields near 110 kV transmission lines and underground power cables is clearly below public exposure guidelines.

Source:

Lehtelä R, Laurila T, Österholm L, Korpinen L. Magnetic field exposure of 110 kV underground power cables. BIOEM 2009 (Joint Meeting of The Bioelectromagnetics Society and the European BioElectromagnetics Association), June 14-19, 2009, Davos, Switzerland

Österholm, L., Laurila, T., Lehtelä, R., Korpinen, L. Measuring exposure to electric and magnetic fields near 110 kV transmission lines in Tampere region. BIOEM 2009 (Joint Meeting of The Bioelectromagnetics Society and the European BioElectromagnetics Association), June 14-19, 2009, Davos, Switzerland.

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No. 03

### ***Exposure Assessment and Other Challenges in Non-Ionising Radiation Studies of Childhood Leukaemia***

Editor-in-chief's comment: This article discusses exposure to electromagnetic fields (including radiofrequency fields) and its relationship to childhood leukaemia, while noting how difficult it is to study this matter. It also highlights how rapid changes in technology lead to increased exposure..

Source:

Kheifets L and Oksuzyan S. Exposure assessment and other challenges in non-ionizing radiation studies of childhood leukaemia. Radiation Protection Dosimetry 2008;132(2):139-147

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No. 04

### ***Exposure to Electromagnetic Fields and the Risk of Childhood Leukaemia***



Editor-in-chief's comment: This article discusses exposure to electromagnetic fields and its association to childhood leukaemia. The study also includes radiofrequency fields. The researchers say no clear links have been established, but recommend further research.

Source:

Schüz J and Ahlbom A. Exposure to electromagnetic fields and the risk of childhood leukaemia: a review. *Radiation Protection Dosimetry* 2008;132(2):202-211

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No. 05

### ***Do Electromagnetic Fields Enhance the Effects of Environmental Carcinogens?***

Editor-in-chief's comment: Interesting perspectives on studying a possible cancer risk. This article discusses, for example, whether this is a case of a combined effect requiring exposure not only to electromagnetic fields, but also to chemical or physical agents.

Source:

Juutilainen J. Do electromagnetic fields enhance the effects of environmental carcinogens. *Radiation Protection Dosimetry* 2008;132 (2):228-231

Juutilainen J, Kumiln T, Naarala J. Do extremely low frequency magnetic fields enhance the effects of environmental carcinogens? A meta-analysis of experimental studies. *Int. J. Radiat. Biol.*, 2006; 82 (1):1 – 12

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No. 06

### ***Environmental Factors and the Risk of Childhood Leukaemia***

Editor-in-chief's comment: An interesting summary on the risk of childhood leukaemia.

According to the author, a large number of studies have been conducted to identify possible risk factors, but the only environmental risk factor that is clearly linked to childhood leukaemia is ionising radiation.

Source:

Portier C. Discussion and summary. *Radiation Protection Dosimetry* 2008;132(2):273-274



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No. 07

***Acute Childhood Leukaemias and Exposure to Magnetic Fields Generated by High-Voltage Overhead Power Lines – A Risk Factor in Iran***

Editor-in-chief's comment: Interesting observations on the way children's exposure in developing countries like Iran differs from that in the West.

Source:

Pour Feizi AAH, Arabi MAA. Acute childhood leukemias and exposure to magnetic fields generated by high voltage overhead power lines - a risk factor in Iran. *Asia Pacific Journal of Cancer Prevention* 2007;8:69-72

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No. 08

***Power Frequency Magnetic Fields and the Risk of Childhood Leukaemia: Misclassification of Exposure From the Use of the 'Distance From Power Line' Exposure Surrogate***

Editor-in-chief's comment: This study clearly demonstrates how difficult it is to assess exposure. According to the researchers, measuring just the distance from power lines is a rather poor method. Instead, they recommend using long-term field measurements or calculations based on distance and power load.

Source:

Maslanyj M, Simpson J, Roman E and Schüz J. Power frequency magnetic fields and risk of childhood leukaemia: misclassification of exposure from the use of the 'distance from power line' exposure surrogate. *Bioelectromagnetics* 2009;30:183-188

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No. 09

***Occupational Electromagnetic Fields and Leukaemia and Brain Cancer: An Update to Two Meta-Analyses***

Editor-in-chief's comment: An updated meta-analysis of occupational electromagnetic field exposure and leukaemia and brain cancer risks. There were some differences compared to earlier observations, but no clear pattern of EMF exposure and outcome risk could be established.

Source:

Kheifets L, Monroe J, Vergara X, Mezei G, Afifi AA. Occupational electromagnetic fields and leukemia and brain cancer: an update to two meta-analyses. *J Occup Environ Med.* 2008;50:677-688



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No. 10

***Occupational Exposure to Low-Frequency Magnetic Fields and the Risk of Low-Grade and High-Grade Glioma***

Editor-in-chief's comment: The researchers found no relationship between occupational exposure to low-frequency magnetic fields and the development of glioma (malignant brain tumour).

Source:

Karipidis KK, Benke G, Sim MR, Yost M, Giles G. Occupational exposure to low frequency magnetic fields and the risk of low grade and high grade glioma. *Cancer Causes Control* 2007;18:305-313

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No. 11

***Long-Term Exposure to Magnetic Fields and the Risks of Alzheimer's Disease and Breast Cancer: Further Biological Research***

Editor-in-chief's comment: Based on a review of earlier research data, this article presents conclusions on the effects of magnetic fields. The researchers come to the conclusion that there are two biological processes of significance.

Source:

Davanipour Z ja Sobel E. Long-term exposure to magnetic fields and the risks of Alzheimer's disease and breast cancer: Further biological research. *Pathophysiology* 2009;16:149-156

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No. 12

***A Literature Review: The Cardiovascular Effects of Exposure to Extremely Low-Frequency Electromagnetic Fields***

Editor-in-chief's comment: This article reviews earlier results and presents ideas for future research on the effects of electromagnetic fields on the cardiovascular system. It has, for example, proved difficult to replicate the studies conducted.

Source:

McNamee DA, Legros AG, Krewski DR, Wisenberg G, Prato FS, Thomas AW. A literature review: the cardiovascular effects of exposure to extremely low frequency electromagnetic fields. *Int Arch Occup Environ Health* 2009;82:919-933

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No. 13

## ***Evaluation of Current Densities Induced in the Human Body by Electric Fields***

Editor-in-chief's comment: A Finnish study that examined whether occupational exposure at 400 kV substations and power lines exceeded the limits recommended in the EU directive proposal; the limits were not exceeded.

Source:

Korpinen LH, Elovaara JA, Kuisti HA. Evaluation of current densities and total contact currents in occupational exposure at 400 kV substations and power lines. *Bioelectromagnetics* 2009;30 (3):231-240.

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The Finnish situation report bulletin is funded by Fingrid Oyj. The Finnish Ministry of Employment and the Economy is contributing to the work of the project's management group. The archive is available at [www.leenakorpinen.fi](http://www.leenakorpinen.fi).