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

## Discussion Continues on the Health Impacts of Extremely Low-Frequency Electric and Magnetic Fields



### ***Situation Report Bulletin 1 / 2012 - published 14 June 2012***

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No. 01

### ***Editorial***

Another six months has passed by, so it's time to publish a new situation report bulletin. In the previous bulletin, I promised I'd get back to the EU Directive being prepared on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) in this bulletin. As far as I know, the directive proposal is still being discussed within EU institutions, so there is nothing new to report on it.

At least three interesting conferences or similar events have been organised in the past six months. The International Commission on Occupational Health (ICOH) held a congress in Cancún, Mexico, in March. The ICOH Scientific Committee of Radiation and Work contributed some scientific content to the congress, but the presentations mainly dealt with ionising radiation and UV radiation.



Childhood Cancer 2012, a scientific conference on childhood cancer, was held in London in April. The topics discussed also included leukaemia and the risk factors related to it. The presentations are available on the conference website, if you are interested in further reading on this subject. The 7th ICNIRP NIR Workshop was organised by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) in Edinburgh in May. What especially caught my attention was that the health effects of intermediate frequencies (10 kHz – 10 MHz) were discussed more than before. There are, however, surprisingly few research results published on the effects of intermediate frequencies. These frequencies can be found in applications related to smart electricity networks, for example, so the topic may be quite interesting in the future from the perspective of the users of electricity networks.

Quite a few scientific articles have been published since the previous bulletin. Several articles discuss the association between childhood leukaemia and magnetic fields. One of them includes calculations on the estimated overall population attributable risk of leukaemia cases caused by exposure to electromagnetic fields. Another study examines the way policy decisions are made, sometimes based on insufficient information. The topic can be approached from a wide range of perspectives.

While looking for material for this bulletin, I found so many articles on childhood leukaemia that it started to look rather an unbalanced collection. In the end, I managed to find articles on some other themes as well. One group, for example, has studied whether maternal exposure to magnetic fields from high-voltage power lines is associated with the risk of birth defects. The researchers conclude that the study did not provide support for the assumption that exposure to magnetic fields during early pregnancy would increase the risk of birth defects in offspring. This is a positive piece of news for all who might have worried about the issue.

Finally, I'd like to mention two more articles. I found quite an interesting article that explored whether the magnetic fields generated by incubators might influence melatonin production in newborns. I don't remember seeing any similar studies before. The bulletin again concludes with an article related to occupational exposure; this time it's a study on various blood chemistry parameters in employees.

Hope you enjoy reading this summary in English!

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

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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

### ***Concern that Magnetic Fields from Power Lines Cause Cancer***

Editor-in-chief's comment: The writer notes that some people are concerned that exposure to magnetic fields may cause adverse health effects, particularly childhood leukaemia. He thinks public health authorities should understand the reasons for this ongoing concern and identify effective ways to address it. It will be interesting to see if this article is going to have an impact on the authorities' actions.

Source:

Repacholi M. Concern that "EMF" magnetic fields from power lines cause cancer. *Science of the Total Environment* 426 (2012) 454-458

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No. 03

### ***Impact of High Electromagnetic Field Levels on Childhood Leukaemia Incidence***

Editor-in-chief's comment: The article gives a critical evaluation of the epidemiological and biological evidence of a relation between exposure to electromagnetic fields and childhood leukaemia. The potential impact is also estimated through calculations. The researchers note that none of the proposed biological mechanisms by which extremely low-frequency electromagnetic fields might cause childhood leukaemia have been confirmed.

Source:

Teepen J C and van Dijck J A A M. Impact of high electromagnetic field levels on childhood leukemia incidence. *Int. J. Cancer*: online (2012)

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No. 04

### ***Children and Adults Exposed to Low-Frequency Magnetic Fields at the ICNIRP Reference Levels***

Editor-in-chief's comment: This study assessed the variations of the electric fields induced in children and adults and compared the exposure at reference levels defined by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) with the basic restrictions as function of anatomy. The researchers recommend extending the evaluation using a sufficient set of different anatomical models. They think it would also be interesting to study positions other than standing postures.

Source:

Bakker J F, Paulides M M, Neufeld E, Christ A, Chen X L, Kuster N and van Rhoon G C. Children and adults exposed to low-frequency magnetic fields at the ICNIRP reference levels: theoretical assessment of the induced electric fields. *Phys. Med. Biol.* 57 (2012) 1815-1829

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No. 05

### ***Is Newborn Melatonin Production Influenced by Magnetic Fields Produced by Incubators?***

Editor-in-chief's comment: The study assessed melatonin production in a group of newborns exposed to electromagnetic fields. They also evaluated whether removing the babies from the source of magnetic fields can affect melatonin production. They found out that melatonin production increased transiently soon after removing the newborns from incubators. Based on this, the researchers concluded that field exposure might influence melatonin production in newborns. This is an interesting observation, but further studies are needed, as the writers themselves note.

Source:

Bellieni C V, Tei M, Iaconi F, Tataranno M L, Negro S, Proietti F, Longini M, Perrone S, Buonocore G. Is newborn melatonin production influenced by magnetic fields produced by incubators?, *Early Hum Dev* (2012)

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No. 06

### ***Maternal Exposure to Magnetic Fields from High-Voltage Power Lines and the Risk of Birth Defects***

Editor-in-chief's comment: The article describes a case-control study that examined the risk of congenital anomalies associated with maternal exposure to magnetic fields. The data was quite small. In summary, it can be stated that the study did not provide support for the assumption that exposure to magnetic fields during early pregnancy would increase the risk of birth defects in offspring.

Source:

Malagoli C, Crespi C M, Rodolfi R, Signorelli C, Poli M, Zanichelli P, Fabbi S, Teggi S, Garavelli L, Astolfi G, Calzolari E, Lucenti C and Vinceti M. Maternal Exposure to Magnetic Fields from High-Voltage Power Lines and the Risk of Birth Defects. *Bioelectromagnetics* 2011.

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No. 07

### ***Measurement Procedure to Assess Exposure to Extremely Low-Frequency Fields: a Primary School Case Study***

Editor-in-chief's comment: This study focused on children's exposure to extremely low-frequency electromagnetic fields. It was carried out because a significant number of cancer cases in children had been found in a certain area. There are epidemiological situations in which several cases of illness (clusters) may occur in an area, with no known reason being found. These kinds of situations are naturally quite challenging for the individual people concerned, even if no cause is discovered. The article provides solid general information on children's exposure to electromagnetic fields in schools.



Source:

Alonso A, Bahillo A, de la Rosa R, Carrera A, Durán R J and Fernández P. Measurement Procedure to Assess Exposure to Extremely Low-Frequency Fields: a Primary School Case Study. *Radiation Protection Dosimetry* (2012), pp. 1-11

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No. 08

### ***Assumptions in Quantitative Analyses of Health Risks of Overhead Power Lines***

Editor-in-chief's comment: The aim of the study was to assess how uncertain evidence can be used to support policy decisions. The study focused on the health risks related to overhead power lines. It was found out that assumptions that were regarded to be important in quantifying the health risks show a high value-ladenness. The writers think that, given the present state of knowledge, quantification of the health risks of electromagnetic fields is premature.

Source:

de Jong A, Wardekker J A, van der Sluijs J P. Assumptions in quantitative analyses of health risks of overhead power lines. *Environmental Science & Policy* 16 (2012) 114-121

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No. 09

### ***Long-Term Effects of 50-Hz Magnetic Field Exposure on Blood Chemistry Parameters in Healthy Men***

Editor-in-chief's comment: The researchers present some interesting results on issues related to the health of electrical workers. In the future, we may perhaps get results of other possible forms of occupational exposure.

Source:

Touitou Y, Djeridane Y, Lambrozo J, Camus F. Long-term (up to 20 years) effects of 50-Hz magnetic field exposure on blood chemistry parameters in healthy men. *Clinical Biochemistry* 45 (2012) 425-428

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