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EU EMF Directive Raises Questions

A recent assessment of the implementation of the EU Physical Agents (Electromagnetic Field) Directive reveals that the defined exposure limits could have negative impacts in the developing field of magnetic resonance imaging. British scientists who conducted the assessment highlight the need for a prompt revision of the directive.

In response to the growing concern about health and environmental impacts of electromagnetic fields (EMF), the EU has recently introduced the Physical Agents (Electromagnetic Field) Directive. By defining occupational exposure limits for EMF with frequency range from 0 Hz to 300GHz, the directive aims to protect the workers from adverse potential harmful effects of all types of occupational exposure to EMF. All member states are required to incorporate this new directive into national legislation by 2008.
However, without putting into question the laudability of the directive, British scientists have raised the question of the apparently unintended implications of its implementation in the domain of interventional magnetic resonance (MR) procedures in Europe.

In a recently published paper, scientists involved in MR research and practices in UK, have discussed the appropriateness of the exposure limits defined by the directive for interventional MR procedures. In particular, they focused their attention on magnetic resonance imaging (MRI) known for its major clinical benefits such as avoiding x-ray radiation exposure of both patients and staff and precise accuracy in detecting structural abnormalities of the body.

The comparison between the EMF exposure and action limits defined by the directive and the likely maximum exposure to EMF in the MRI environment has revealed that workers who are close to the MR scanner during imaging are exposed to levels substantially above the limits. This is particularly true for time-varying magnetic field (frequency range from 110Hz to 5kHz) where the action value for exposure may be exceeded by 40 times.

Consequently, the implementation of the directive will make any work in proximity of MR scanner during imaging illegal. According to the authors, this would prevent many types of MR intervention and cripple the developing field of interventional MR within EU. Furthermore, such legislation would lead to a return to x-ray guided procedures (i.e. CT scan) even though there is no scientific evidence that indicates that health risks from MR scanning exceed those from CT scanning.

The authors, thus, put in question the scientific evidence on which the limits are based and consider the appropriateness of the limits for interventional MRI. Their analysis shows that:

1) the scientific bases for the EMF exposure levels in MRI are incomplete and inconclusive, and

2) a recent statement released by ICINRP[1] aimed at MR community specifically is far less restrictive.

To conclude, the authors urge for a prompt revision of the EU directive's implications for occupational exposure to MRI. They point out this need on the grounds of the uncertain nature of the scientific evidence and the much less restrictive recommendations in the 2003 ICINRP statement specifically related to MRI. They also highlight that more research, particularly at MR gradient frequencies, is urgently needed.

[1] International Commission on Non-Ionizing Radiation Protection that publishes reports, statements and guidelines on non-ionizing radiation safety. These guidelines are used in the EU directive on Physical Agents (Electromagnetic Fields)

Source: Hill, D.L.G. et al (2005) "Impact of Electromagnetic Field Exposure Limits in Europe: Is the future of interventional MRI safe?", Academic Radiology 12(9): 1135-1142.
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