



To the Minister of Housing, Spatial Planning and the Environment

Subject : Advisory letter *Electromagnetic fields and health*
Your reference : SAS/GDE/2007/046920
Our reference : I-784/EvR/iv/673-F1 Publication no. 2007/24E
Enclosure(s) : -
Date : November 15, 2007

Dear Minister,

On 1 June 2007, you requested the Health Council of the Netherlands to provide a brief, initial reaction to three scientific publications:

- Cook, C.M. *et al.* Exposure to ELF magnetic and ELF-modulated radiofrequency fields: the time course of physiological and cognitive effects observed in recent studies (2001-2005). *Bioelectromagnetics*, 2006; 27: 613-627.
- Hardell, L. *et al.* Tumour risk associated with use of cellular telephones or cordless desktop telephones. *World Journal of Surgical Oncology*, 2006; 4: 74.
- Hutter, H.P. *et al.* Subjective symptoms, sleeping problems, and cognitive performance in subjects living near mobile phone base stations. *Occupational and Environmental Medicine*, 2006; 63: 307-313.

You also asked the Health Council to indicate whether the research results were expected to provide grounds for adjusting previous conclusions on the possible health effects of mobile telephony.

I requested the Health Council's Electromagnetic Fields Committee to answer these questions. The Committee studied the articles and discussed them in its meeting of 14 September 2007. The Committee also held its first discussion on a recent article from a research group in Nijmegen, which had received considerable national media attention in the Netherlands:

- Arns, M. *et al.* Electroencephalographic, personality, and executive function measures associated with frequent mobile phone use. *International Journal of Neuroscience*, 2007; 117: 1341-1360.



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The Committee informed me as follows, after incorporating the comments of the Health Council of the Netherlands' Standing Committee on Radiation and Health.

The article by Cook and co-workers is not a publication of new research but provides an overview of a number of recent articles concerned with effects on cognitive and physiological functions. The studies presented reasonably consistent indications that biological effects can occur, especially on alpha waves in the brain. The Committee feels that the indications are considerably less strong that health effects may occur, through this biological mechanism or otherwise. The data Cook presented do not provide any clear indications of health effects, nor do the authors suggest that there may be any.

Studies published before 2001 were discussed in a previous article by the same authors. In addition, new articles on this subject have been published since Cook's paper, such as the article by Arns. All these studies would have to be assessed and included to provide a proper and complete advisory report on possible health effects.

The article by Hardell and co-workers concerns a subject covered by various articles published in recent years: the possible relationship between the use of mobile phones and the occurrence of tumours in the head. Hardell concludes that frequent use of a mobile telephone (such as a GSM telephone) or wireless telephones (such as a DECT telephone) is associated with a higher incidence of various types of tumours in the head. This article arrives at no conclusions other than those repeatedly drawn by Hardell. Previous articles from the same author, with partially overlapping data, were discussed by the Committee in the 2002 advisory report on Mobile Telephones and in the Electromagnetic Fields Annual Report of 2005. The Committee's conclusion at the time was that there were methodological problems with the studies. One example was that a very high number of comparisons were made, some of which gave a positive result. The question therefore arises as to whether these indeed indicated a link or were the result of "fishing" for links. It is precisely for this reason that Hardell's studies should not be assessed in isolation but in relation to other similar studies, such as those from the INTERPHONE programme¹.

¹ Based on a common protocol, INTERPHONE is a research programme in which 13 countries are conducting an epidemiological study of a possible link between the use of a mobile phone and tumours in the head.



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Conclusions on possible health effects should only be based on the overall picture that emerges from the scientific literature, in combination with the strong and weak points of individual studies. Taking a broad overview of this kind as its basis, the Committee concluded in the 2005 Annual Update that there was still no clarity about the extent to which long-term use of a mobile telephone is related to the incidence of tumours in the head and the conclusion in the 2006 Annual Update was that there were no indications that the use of DECT telephones could lead to health problems. These conclusions of the Committee have not been changed by the Hardell paper.

The article by Hutter and co-workers describes a study of the incidence of complaints among subjects living near mobile phone base stations. This subject was also studied by others. The Committee concluded in the 2003 Annual Update that the scientific quality of those studies was inadequate. However, Hutter's study was based on a sound scientific design. The authors concluded that a few symptoms, especially headaches, occurred more frequently among people in locations where a relatively high magnetic field resulting from the presence of a base station had been measured. The results are interesting but required confirmation by similar research. A major problem with research of this kind is that subjects living near mobile phone base stations subjectively attribute complaints to the presence of the base stations. It is true that Hutter and co-workers did their utmost to prevent this distorting the results but owing to the study's non-experimental design, it is nevertheless difficult to draw useful conclusions. Consequently, because this was the first study of its kind, no conclusions can be drawn about cause-effect relationships, as the researchers themselves acknowledge.

The article by Arns and co-workers gives the Committee grounds for debating and doubting the quality and design of the study. A major shortcoming is that in comparing cognitive functions of mobile callers and controls, no correction was made for differences in age and the level of education between the two groups. Moreover, the nature of the study's design (a cross-sectional study) makes it impossible to distinguish between cause and effect. An important given is that the size of the identified effects is within the natural bandwidth. This fact alone means that the study cannot be used as a basis for drawing conclusions about the health effects of using mobile phones. For the time being, any speculation about this lacks a scientific basis.

In summary, on the basis of an initial, brief analysis of the aforementioned four articles, in combination with the scientific literature previously discussed by the Committee, the Committee's



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provisional conclusion is that the results of the four studies provide no grounds for changing its standpoints. The Committee maintains its conclusion that no causal link between health problems and exposure to the electromagnetic fields originating from mobile phones or base stations for mobile telephony has been demonstrated. However, the Committee is of the opinion that further scientific research into any such links is still justified. In 2006, the Committee also recommended such research for the Electromagnetic fields and health research programme, which is also funded by your ministry.

The Committee would like to conclude by stressing that the discussion of results of individual scientific studies is only worthwhile if done in a broader context. This has to include a description of, and comparison with, other studies in the same field, and an assessment of the quality of the publications concerned. It has frequently been the case in the past that the findings of a single study could not be confirmed in similar studies or in replication studies. This is why several studies and proper theoretical insight are generally required to arrive at a balanced opinion on cause and effect that can be used as a basis for policy. The Committee therefore bases its opinion on the possible health effects of exposure to electromagnetic fields on the total scientific onus of proof and not on the results of only one or just a few studies. This does not detract from the fact that new scientific developments may lead to a change of opinion; the Committee will continue to bear this possibility in mind in its findings.

In future publications, the Committee intends to include more extensive discussions of the three subjects in question, namely the effects of using or living near equipment for mobile telecommunications on 1) cognitive performance, 2) the incidence of tumours in the head or 3) the incidence of health complaints. This will include a discussion of the aforementioned articles.

Yours sincerely,

(signed)
Professor M. de Visser
Vice President