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# Executive Summary

Health Council of the Netherlands. Health effects of exposure to radiofrequency electromagnetic fields: Recommendations for research. The Hague: Health Council of the Netherlands, 2003; publication no. 2003/03

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Exposure to electromagnetic fields generated by mobile telecommunication equipment is a growing source of concern in the population. Anxiety increases that such exposure may lead to adverse health effects. The Health Council of the Netherlands was asked by the Government, partly because of a motion of the Second Chamber of Parliament, what research might be performed in the Netherlands to obtain a better insight into possible health effects of exposure to electromagnetic fields. In this report the Electromagnetic Fields Committee of the Health Council makes proposals to this end.

In earlier reports the committee has given an overview of the scientific knowledge with respect to health effects of electromagnetic fields. On the basis of this understanding and an inventory of ongoing research, it indicates the most important gaps in knowledge and which questions should be answered first to meet public disquiet. The committee proposes various types of studies: *in vitro*, *in vivo*, human experimental, epidemiological and dosimetry and model studies.

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## Centre of expertise

Before discussing what research might be performed in the Netherlands, the committee strongly recommends to establish a Centre of expertise regarding health effects of electromagnetic fields. One of the tasks of this centre, that should have an academic setting, should be to combine and expand the knowledge that is presently available in the Netherlands within several relatively isolated operating research groups. Furthermore it should coordinate research in the Netherlands, guard its broad outlines

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and gear it to the worldwide scientific developments. The Centre of expertise should also have a role in academic teaching activities on this subject. These tasks can only be realized if a coordinator is appointed with a broad knowledge of electromagnetic field issues.

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### ***In vitro* studies**

The committee recommends to perform *in vitro* studies in the Netherlands into the interaction of electromagnetic fields and chemical and physical agents. Especially in the working environment combined exposure frequently occurs. A better knowledge of its possible effects is very important.

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### ***In vivo* studies**

According to the committee it is not advisable at this time to make proposals for animal studies to be performed in the Netherlands. The most important questions for which this type of research is indicated, are being studied elsewhere.

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### **Human experimental research**

Health complaints are a major source of public anxiety and adequate data on the relation between such complaints and electromagnetic field exposure is virtually lacking. The existence of sensitive subpopulations cannot be excluded. Therefore experimental human studies are urgently needed. The committee proposes to focus on studies of subjective complaints, under the condition that the effects can be objectively established.

This type of research, that is of an experimental nature and takes place under controlled conditions, can very well be performed in the Netherlands. A small-scale study is currently being carried out. The committee recommends to expand the possibilities to perform this type of research in the Netherlands. In order to obtain a better understanding of possible causal relations it is essential that various exposure characteristics are being investigated, for instance field strength, frequency and pulse shape.

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### **Epidemiological studies**

The committee thinks it is important to investigate the incidence of adverse health effects in relation to the use of mobile telephones and living near GSM base stations or

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radio and television transmitters in the Netherlands. A two tier approach is recommended:

- to perform an experimental epidemiological study into the occurrence of subjective health complaints in people living near GSM base stations. Also the effects of providing information and of monitoring should be assessed.
- to perform a large-scale cohort study into the relationship between electromagnetic field exposure and a variety of health effects, including cancer. Important requisites for such study are that the exposure can be quantified, that there is sufficient exposure contrast and that the study extends over a sufficiently long period of time. The most important variable should be the use of a mobile telephone, but also living near radio and television transmitters could be investigated. This study could be incorporated in cohort studies presently ongoing in the Netherlands. Alternatively, participation in studies being set up elsewhere could be considered.

The committee doubts the usefulness of studying the incidence of cancer and other diseases in people living near GSM base stations. The most important reason for this is that such people are exposed to only very low field strengths, also if these are considered relative to field strengths from other sources such as radio and television transmitters. Before proposals for this type of research should be requested, its feasibility should be investigated. In Germany such studies are currently being set up. The experiences gained with that could be used. These arguments do not apply to radio and television transmitters. Therefore these have been suggested as sources to be included in the cohort study mentioned above.

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### **Dosimetry and model studies**

Current exposure limits have been drawn up for so called far field exposures. In practice, however, exposures in the near field increasingly occur. This is especially the case with the use of a mobile telephone, because the antenna of such devices are close to the body. The committee therefore thinks that studies should be performed in the Netherlands how the basic restrictions can be translated into reference levels under near field exposure conditions. This means that a better insight is necessary into the relation between the SAR and easily measurable quantities such as the electric and magnetic field strength and the power density of the electromagnetic field. Also more knowledge is needed on the interaction of electromagnetic fields and biological structures.

There is also a need for adequate modelling of the fields generated by an antenna and for research into modelling of the known effects of electromagnetic field exposure (the heating in the radiofrequency range).

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In order to support the dosimetry of especially the epidemiological studies the committee recommends to develop suitable measuring devices that can register field strength data over a wide frequency range in the living and working environment over a set period of time.

The committee finally makes a plea to establish a specialized group of experts that should be responsible for the dosimetical aspects of the various studies to be performed in the Netherlands. This will prevent that such highly specific expertise has to be developed in each individual research group. Also the dosimetry can be performed by the same groups of experts, which increases the quality of the studies.

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### **Further recommendations**

The committee thinks it is of the utmost importance that collaboration be established between researchers from the Netherlands and other countries. One of the reasons being to create the possibility to qualify for additional financing of studies in the Netherlands from international sources, such as the 6<sup>th</sup> Framework Program of the European Union.

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### **Time frame**

In the request for advise the time scheduling of the studies is asked for, especially within the context of the WHO's International EMF Project. The final report of this Project with respect to radiofrequency electromagnetic fields is scheduled for the end of 2004. It is not realistic to expect that results from studies to be performed in the Netherlands according to the present proposals will be available by then.

The committee stresses, however, that also the WHO Project cannot give the definite answer to the question whether exposure to electromagnetic fields may lead to adverse health effects. Especially the question whether long-term exposure to the fields generated by the antennas of mobile telephones and their base stations may result in disease needs a longer period of observation than until 2004. Therefore also after completion of the WHO International EMF Project the possible occurrence of health effects should be constantly monitored. The studies proposed in this report are aimed at that. The committee does think that, should the proposals from this report be adopted, it is necessary that funds are made available at short notice, in order to allow the tendering of research proposals and to perform the studies. This is important in order to join in with the international research efforts. Additionally, research in the Netherlands is of importance because of its high social relevance and the concern about possible health effects of mobile telecommunication.

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## **Organization**

The committee proposes to accommodate the research formulated in this report with the Netherlands Organization for Scientific Research (NWO) and the Netherlands Organisation for Health Research and Development (ZonMw) with respect to the biological subjects, and with the Foundation for Technical Sciences (STW) with respect to the technical subjects.