

HEALTH ASPECTS OF RADIO FREQUENCY ELECTROMAGNETIC FIELDS

- A Danish research program in an international framework

Joachim Schüz, Christoffer Johansen, Jørgen H. Olsen

Institute of Cancer Epidemiology, Danish Cancer Society, Copenhagen

This research program combines four research projects (the fourth is Ivar Sønbo's project, which is in a separate abstract).

1) A retrospective cohort study of mobile phone subscribers

Background and research objectives

The objective of this study is to investigate cancer risk and the risk of diseases of the central nervous system (CNS) among Danish mobile telephone users. This study is an extended follow-up of a large nationwide cohort of 420 095 persons whose first mobile telephone subscription was between 1982 and 1995, who were followed through 2002 for cancer incidence and through 2005 for hospitalisations due to CNS diseases.

Methodology

Standardised incidence ratios (SIRs) were derived by dividing the number of observed cases in the cohort by the number expected in the Danish population. With regard to cancer, a total of 14 249 cancers were observed (SIR 0.95; 95% confidence interval [CI]= 0.93 to 0.97) for men and women combined.

Results

No increases in SIR were found for brain tumors (SIR 0.97), acoustic neuromas (SIR 0.73), salivary gland tumors (SIR 0.77), eye tumors (SIR 0.96) or leukemias (SIR 1.00). The SIR for brain tumors in long-term subscribers of ≥ 10 years was 0.66 (CI= 0.44 to 0.95) but there was no trend with time since first subscription. The SIRs for smoking-related cancers were decreased among men, while they were increased among women. Additional data on income and smoking prevalence, primarily among men indicated that early mobile telephone subscribers had a higher income and a healthier life-style. A comparison between subscriber data and self-reported mobile telephone use showed fair agreement. The risk of CNS disease is currently being analyzed. Our study provides no evidence for an association between tumor risk and mobile telephone use among either short-term or long-term users.

2) A multinational prospective cohort study of mobile phone users (Cosmos study)

Background and research objectives

The objective of this study is to set up a cohort of mobile phone users to investigate whether use of mobile phones has adverse health effects.

Methods

The study is specifically designed to examine possible small risks after long induction periods. The design of the study is a prospective cohort study with an internal comparison of exposure groups, i.e., intensive users versus occasional users. For this purpose, the sampling frame was based on data from all Danish mobile phone operators. The study is carried out as a multinational collaborative study, with partner centres in Sweden, Finland and in the UK. Exposure is assessed by a self-administered questionnaire, with questions on current mobile phone use, start of mobile phone use, and various lifestyle factors that are potential confounders in the evaluation of the risk of a variety of endpoints. Additionally, traffic records are downloaded from network operators. The endpoints of the study are incidence and mortality of several cancers, neurodegenerative diseases, cerebrovascular diseases, and health symptoms, like headache, sleep disorders, or general well-being. The follow up on disease endpoints will be done by linking the cohort with cancer registries, national registries of patients, and mortality registries. Changes in symptoms will be assessed by having questions on the baseline and the repeated questionnaires. In Denmark, the launch of the study was in autumn 2007 with a first sending out of 100 000 invitation letters. As of March 2008, 21 770 persons have replied. A repeated questionnaire on mobile phone usage and symptoms will be send out every 4 years. First descriptive investigations on acute effects are planned as soon as the cohort is established, while chronic outcomes will be added after further follow up over the next decade. The Institute of Cancer Epidemiology in Copenhagen acts as the coordinating centre of the international consortium.

Results

A second sending out of invitation letters will be done in autumn 2008. Thus, we anticipate having the cohort finally established in early 2009. Both Sweden and the UK plan to launch the study within this year. First descriptive results will therefore become available next year.

3) A multinational case-control study on brain tumours in children and adolescents (Cefalo study)

Background and research objectives

The objective of the study is to investigate whether the use of mobile phones increases the risk of developing brain tumours in children and adolescents in the age group 7-19 years.

Methods

The design of the study is a population-based case-control study. The case group comprises primary brain tumour cases in the respective age group who were diagnosed between March 2004 and May 2008. Population-based controls are randomly selected from population registries to compile the comparison group. Exposure is assessed during face-to-face interviews with the child and at least one of the parents. Additionally, downloads of traffic data of mobile phone use will be provided from the network operators. The study is a multinational collaborative study according a joint study protocol, with partner centres in Sweden, Norway and Switzerland. In Denmark, out of 77 eligible cases ascertained until March 2008, 66 have agreed to participate, 3 declined participation and 8 are pending. Among controls, the response rate is 81%. The field phase will commence until December 2008. The Institute of Cancer Epidemiology in Copenhagen acts as the coordinating centre of the international consortium.

Results

The analysis phase will start immediately after the end of the field phase in early 2009. We expect results to become available during late 2009.