

Project Progress Summary

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Title of the project	INTERNATIONAL CASE CONTROL STUDIES OF CANCER IN RELATION TO MOBILE TELEPHONE USE	
Acronym of the project	INTERPHONE	
Type of contract		Total project cost €4.536.441
Contract number QLK4-CT-1999-01563	Duration 63 Months	EU contribution €3.850.035
Commencement date 1 February 2000	Period covered by the progress report 1 February 2000 - 30 April 2005	
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Key words Cancer, mobile phone, radio frequency radiation, brain, epidemiology		

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Objectives:

The increasing world-wide use of mobile telephones has generated considerable interest in the possible health effects of exposure to radio frequency (RF) radiation. The objective of the INTERPHONE study is to determine whether mobile telephone use increases the risk of cancer and, specifically, whether the radio frequency (RF) radiations emitted by mobile telephones are carcinogenic.

This objective is being achieved through case-control studies of tumours which, if RF is carcinogenic, would be those most likely to be related to mobile telephone use as they occur in the cells which receive most of the exposure.

The studies include:

- brain tumours (glioma and meningioma).
- tumours of the acoustic nerve;
- tumours of the parotid gland;

Under the current contract, the studies were carried out using a common core protocol in nine countries: seven member states of the European Union (Denmark, Finland, France, Germany, Italy, Sweden, UK) and two associated states (Israel and Norway). In addition, studies were also conducted in Japan, Australia, New Zealand and Canada with separate funding. Joint analyses of the data from the national studies has been conducted centrally.

In order to maximise the power of finding a risk if it exists, the studies mainly focused:

- on tumours in relatively young people (30-59 - who had the highest prevalence of mobile phone use 5 to 10 years ago) and
- on regions within the participating countries with longest and highest use of mobile phones

Results and Milestones:

Case ascertainment and interviewing

The INTERPHONE study is now complete with 6,579 cases and 7,654 controls interviewed for a total of 14,233 interviews. The length of the ascertainment of cases has been between 24 and 36 months depending on the centre.

Determining exposure to RF radiation from mobile phones

The extensive work involved in compiling information to derive a measure of exposure for each subject in the study has been completed. Information on specific absorption rate (SAR) for different models of telephone has been obtained from manufacturers and various laboratory tests. Information on power levels in different countries and different use circumstances has been obtained from network operators, and from validation studies using software modified phones that measure the output power over the duration of each call. An algorithm has been devised which will be applied to the personal information provided by each subject on period of use, type of telephone used, pattern of use and network operator used.

Determining occupational exposure to electro-magnetic fields (EMFs)

The interview includes questions about employment in jobs or industries most likely to

involve sources of exposure to EMFs. A considerable amount of work has been involved in putting together a matrix of measurements for each of the sources of exposure included in the study questionnaire. An algorithm has been agreed upon to determine a cumulative estimate of exposure to different frequency bands.

Validation of responses to mobile phone use questions

All countries have undertaken a prospective validation study using the software modified phones (SMPs) provided by four manufacturers and/or recordings made by operators. A sample of people in each centre agreed to participate and to subsequently answer questions about their mobile phone use in an interview conducted in the 6 to 12 months following. The results of the SMP validation study are currently in press. A retrospective, longer-term, validation was also conducted in Italy, Canada and Australia including data on cases and controls enrolled in the study.

Tumour localisation

Because exposure to RF from mobile phones is very localised, it is important to know exactly where each tumour is located in order to determine the likelihood of exposure at the origin of the tumour. MRI scans and radiological reports have been therefore been examined by neuro-radiologists to determine, as far as possible, the position of the origin and the extent of each tumour. This process is complete for most cases in most countries. Completion of the localisation for the remaining cases is dependent on the availability of local neuro-radiologists.

Data clean-up and preparation for analyses

All interview data have been submitted to IARC where they have been validated and prepared for analysis.

Analyses

Denmark and Sweden have published the results of their analyses of national data on risk of acoustic neurinoma and brain tumours and all other centres have publications in preparation or submitted. The Nordic countries and the UK have combined their data for acoustic neurinoma and the results have been published.

Analyses of the international data set have been completed and the publications are in preparation.

Benefits and Beneficiaries:

Given the ubiquitous presence of mobile phones around the world with subscribers numbering in the hundreds of millions, it is essential that concerns about possible health effect be addressed. It is hoped that information from the INTERPHONE study, which is the largest by far to date, will answer the question whether mobile phones are carcinogenic or not. The study results may provide useful directions for mobile phone manufacturers, network operators and regulatory bodies in pursuit of consumer safety.

Future Actions (if applicable):

