Australian Government
Australian Radiation Protection and Nuclear Safety Agency

Fact Sheet 13

Mobile Telephones and Health Effects

There is no clear evidence in the existing scientific literature that the use of mobile telephones poses a long-term public health hazard (although the possibility of a small risk cannot be ruled out).

Introduction

Hand held mobile telephones have transformed the telecommunications industry. These devices can be used to make telephone calls from almost anywhere. Communication between a mobile phone and the nearest base station is achieved by radiofrequency (RF) electromagnetic fields.

Basis of Health Concerns

Concerns have been raised about the level of RF emissions to which the brain is being exposed when using a mobile phone having potential health consequences, particularly brain cancer. In response, a major project, INTERPHONE, has been organised. The INTERPHONE project is a multi-national series of epidemiological studies testing whether using mobile phones increases the risk of various cancers in the head and neck. The project comprises national studies from 13 different countries, which are coordinated by the International Agency for Research on Cancer (IARC), an agency of the World Health Organization (WHO). A pooled analysis of all the brain tumour results has suggested no overall risk for moderate mobile phone use by adults for up to 10 years. Pooled analyses of all the brain tumour and acoustic neuroma results have suggested no overall risk for moderate mobile phone use by adults for up to 10 years. The pooled analyses suggested the possibility of an increased risk of glioma and acoustic neuroma in the group representing individuals with the highest cumulative call time. However, limitations of the methodology prevent conclusions of causality being drawn from these observations. The pooled analyses also pointed out that the possible effects of long-term heavy use of mobile phones require further investigation. Further information on the project is available from the IARC website at **www.iarc.fr/en/research-groups/RAD/RCAd.html**.

In 2011 IARC reviewed all the available evidence in relation to RF fields and cancer (see **www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208_E.pdf**). Based on the limited association between wireless phones (mobile and cordless phones) for glioma and acoustic neuroma and inadequate evidence for other types of cancers, IARC classified RF fields as a "possible human carcinogen".

Known Effects of RF Exposure

When biological tissue is exposed to sufficiently high levels of RF exposure, the tissue is heated and damage may occur. The ARPANSA *Radiation Protection Standard Maximum Exposure Levels to Radiofrequency Fields - 3kHz to 300 GHz* is based on the well-established thermal effects of exposure to RF fields. The exposure limits are set well below levels where any significant heating occurs. The Standard also sets limits for pulsed radiation that are intended to eliminate possible effects where heating is not evident (non-thermal effects).

All mobile telephones marketed in Australia must satisfy the regulatory requirements of the Australian Communications and Media Authority (ACMA), as well as that part of the Australian Standard that sets limits on the power output of a mobile telephone. Therefore, use of a mobile telephone is not expected to cause significant heating in any part of the body, including the brain.

Some research has indicated that non-thermal effects resulting from low-level RF exposure may also occur. However, the existence of these effects and their implications has not been sufficiently established to allow for them in the Standard.

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No Clear Evidence of Cancer

A few animal studies suggest that exposure to weak RF fields can accelerate the development of cancer. Further studies are required to establish their reproducibility and the existence or otherwise of a dose-response relationship. Whether these results are relevant to users of mobile telephones is not clear. In any event, these results cannot be dismissed at this stage.

The results from epidemiological studies are often difficult to interpret because exposure levels were either not measured or impossible to determine from the data provided. In general, however, this type of study will be useful in identifying possible links between mobile telephone use and cancer risk. Complementary cellular and animal research is required to establish any cause-and-effect relationship and the biological mechanisms involved.

ARPANSA continues to closely monitor the research being conducted in this area.

On the specific issue of brain cancer occurring in users of these telephones, it is important to note that such cancers existed before the introduction of mobile telephones. It is simply not possible to identify the cause of any single case of cancer. Long-term studies to investigate whether mobile telephone users have a greater incidence of, say, brain cancer than the general population have not been completed.

A WHO fact sheet on mobile telephones (see **www.who.int/mediacentre/factsheets/fs193/en/index.html)** states "While an increased risk of brain tumors is not established, the increasing use of mobile phones and the lack of data for mobile phone use over time periods longer than 15 years warrant further research of mobile phone use and brain cancer risk".

Government Research Funding

Commencing in 1996, the Government provides $1 million dollars per annum for the Electromagnetic Energy (EME) Program. This program supports research into and provides information to the public about health issues associated with mobile phones, mobile phone base stations and other communications devices and equipment. The program recognises public concern, and the need to ensure standards and public health policies continue to be based on the best available scientific information.

The EME program is coordinated by the Committee on Electromagnetic Energy Public Health Issues (CEMEPHI), which includes representatives from the Department of Broadband, Communications and the Digital Economy (DBCDE), the Department of Health and Ageing, ARPANSA, the ACMA, and the National Health and Medical Research Council (NHMRC). The program has three elements:

- an Australian research program (managed by the NHMRC) to conduct research into EME issues of relevance to Australia and to complement overseas research activities
- continuing Australian participation in the WHO's International Electromagnetic Field (EMF) Project which assesses the health and environmental effects of EME exposure
- a public information program (managed by ARPANSA) to provide information to the public and the media.

Conclusion

There is no clear evidence in the existing scientific literature that the use of mobile telephones poses a long-term public health hazard (although the possibility of a small risk cannot be ruled out).

Users concerned about the possibility of health effects can minimise their exposure to the RF emissions by: limiting the duration of mobile telephone calls, making calls where reception is good, using a 'hands-free' attachment or speaker options, or by texting. Given the lack of any data relating to children and long term use of mobile phones, and their potentially long life-time use of them, ARPANSA recommends that parents encourage their children to limit their exposure by reducing call time, by making calls where reception is good, by using hands-free devices or speaker options, or by texting.

More information is available from the ARPANSA website www.arpansa.gov.au.