Mobile Phones and Cancer

Origin of the controversy

Over the past 20 years, mobile phone use has become an everyday part of many people’s lives.

Mobile phones are low-powered radio devices that transmit and receive microwave radiation. They operate at frequencies between 450 and 2,700 MHz with peak powers in the range of 0.1 to 2 watts.¹ Concerns have been raised that mobile phones cause cancer – specifically brain tumours, as they are held close to the head when they are used.

There is clear evidence that high-energy (ionising) radiation – such as x-rays, and (gamma) γ-rays – cause cancer, genetic defects and weaken our immune system. So it is only natural that the media and public would also be wary of low-energy radiation such as extremely-low-frequency (ELF) radiation (electricity), radiofrequency (RF) radiation and microwaves. As a result, mobile phones and their base stations, as well as power lines, are major areas of public concern.²

Current evidence

Mobile phones

In the last 20 years, a large number of studies have investigated whether mobile phones are a health risk. Many studies have been conducted on mobile phone use and its link to cancers of the head and brain – such as meningioma, glioma and acoustic neuroma. Brain function – such as changes in cognitive performance or brain activity – has also been examined.

Case-control Studies

Most studies to date have been case-control studies, where researchers compare mobile phone use among people with and without cancer. These studies are retrospective; they rely on people remembering how often and for how long they used their mobile phone in the past.

The largest case-control study to date is the INTERPHONE study, which included over 5,000 people with head and neck cancer from 13 countries. The study started in 2000 and results were published in 2010 and 2011.³⁴ The researchers found that mobile phone users had no increased risk of glioma or meningioma. There was some suggestion that glioma risk was increased slightly amongst the heaviest users of mobile phones, but the elevated risk may have been the result of chance, reporting bias or confounding. Similar results were found by a smaller French case-control study in 2014.⁵

Cohort (Prospective) Studies

Prospective studies are considered more reliable than case-control studies because they don’t rely on people’s memories about their exposure.

In October 2011, a very large Danish study of over 350,000 people found no link between mobile phone use and risk of any type of brain tumour.⁶ This study followed healthy mobile phone subscribers from 1982, the year mobile phones were introduced into Denmark, to see how many developed cancer. People were followed for an average of around 10 years. This result was confirmed in 2014 by a prospective study of nearly 800,000 UK women, which found that mobile phone use was not associated with an increased incidence of brain cancers.⁷
In 2011, the International Agency for Research on Cancer (IARC) evaluated all scientific research investigating the health effects of mobile phones and, somewhat controversially, classified mobile phone use – and other radiofrequency electromagnetic fields – as ‘possibly carcinogenic to humans’ (IARC Group 2B). This means there is limited evidence that radiofrequency radiation causes cancer in humans and animals. This evaluation was influenced largely by the INTERPHONE study discussed above.

Ongoing Research

As the prospective studies to date have only looked at mobile phone use for about 10 years, we don’t know if using a mobile phone for longer has any effect on brain cancer risk. COSMOS is a large study that has been set up to look at the long term health effects of the use of mobile phones and other wireless technologies after 20 to 30 years. It includes researchers from the UK and four other countries and will monitor 250,000 people who regularly use mobile phones. The MOBI-KIDS study, involving 13 countries, is investigating health effects in children.

Base stations

Mobile phones communicate by transmitting radio waves through a network of fixed antennas called base stations. Base stations emit radio frequency (RF) waves at high power levels. The strength of the RF field is the greatest near its source, and drops off greatly with distance. Hence the antennas are positioned high up and surrounds are often fenced off. Public access is highly regulated where field strength may exceed safety limits.

The strength of the RF fields must comply with safety limits imposed by the Australian Communications and Media Authority (ACMA). These limits are based on Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) recommendations. RF signal levels in all areas of public access are within guidelines, by a factor of 100 or more.

A review by the World Health Organization on the effects of RF fields from base stations showed no increase in the incidence of cancer in both animals and humans.

Summary

Mobile phones are in widespread use and so it is important to continue to investigate and monitor any potential public health impact. Although there remains some uncertainty, current scientific evidence indicates that a link between typical mobile phone use or mobile base stations and cancer is unlikely. There is inconsistent evidence to suggest that very heavy users of mobile phones may have a slightly increased risk of cancer. Research to date has not been able to examine the long-term effects of mobile phone use, but this is now an active area of research.

Further reading

References


