

Mobile phones and health in a Nutshell

A guide for journalists prepared by the AusSMC

This is part of the *Science in a Nutshell* series produced by the AusSMC. This document provides a simple explanation of the health issues related to mobile phone use and includes information on telecommunications towers and power lines.

If you would like to know more about the safety of mobile phones, please contact the AusSMC by email (info@smc.org.au) or call us on 08 7120 8666.

Why are there concerns about using mobile phones?

Mobile phones communicate by producing signals called radio waves, also known as radio frequency (RF) radiation. Television and radio signals are transmitted in the same way.

Radiation has a bad reputation, largely due to high frequency radiation such as X-rays. These are 'ionising radiation' and can damage our cells and DNA in sufficiently high doses. The radio waves given off by mobile phones are lower frequency radiation that does not have enough energy to cause this damage and are known as non-ionising radiation.

Does using mobile phones affect the human body?

The radiation produced by mobile phones generates heat and may affect biological material, such as the human body. They can penetrate the body's tissues but energy absorption is generally greatest at the surface. However, the body's normal heat regulation processes should carry any heat away.

Mobile phones are like 2-way radios. They transmit radiation when the user speaks, but this transmission falls to very low levels when the user is listening. The handset is most often held against the ear which means the emissions are close to the head and brain.

The Australian 2002 Radiation Protection Standard sets limits for mobile phone radiation exposure, so that any temperature increase of the body's tissues is much less than that experienced in the course of everyday life, which is typically about 1°C.

Do these changes in the body pose a health risk?

Current research has not convincingly shown that radiation from mobile phones can cause health problems. Some individual studies have suggested links with cancer but it is difficult to either prove or disprove. This is partly because;

- cancers can take a long time to appear
- relatively few people who are exposed to something that is known to cause cancer (such as smoking, alcohol consumption or an inherited risk), will actually go on to develop it
- it is often difficult to pinpoint the precise cause of cancer in anyone

- some studies rely on people having accurate memories of how much they used their mobile phone in the past (sometimes ten years or more)

The final results of *Interphone* – a major international study of mobile phones and brain tumours conducted by the International Agency for Research on Cancer – were published in 2012 and found no increases in the risk of brain tumours associated with regular mobile phone use (i.e. glioma, meningioma and acoustic neuroma).

How can exposure to mobile phone radiation be reduced?

Although no one knows for sure whether using a mobile phone is a health risk some people may want to limit their exposure and in particular limit the exposure of children while their brains are still developing. Since radiation from mobile phones comes from the handset and the antenna, the most effective way to reduce exposure is to have the phone further from the body.

Ways to reduce exposure include:

- use a hands-free device
- text messaging
- shorter phone calls
- use a landline
- use the phone in an open area because the signal strength transmitted from the handset is weaker compared with when it is used indoors or in a car

Do telecommunications towers pose a health risk?

Mobile phone towers receive mobile phone signals and connect them to the general telecommunications network. The signals sent by towers travel mostly as a horizontal beam, angled only slightly towards the ground. This means that people working in a building directly below an antenna should be exposed to very low levels of radio waves. However, the intensity of the radiation increases slightly as you move away from the tower to where the signal reaches the ground, before dropping off as you get further away. The towers expose people to less radiation than a mobile phone handset, but more continuously. There is no evidence that mobile phone towers pose a health risk.

What about powerlines?

Powerlines carry alternating electric currents, which generate electric and magnetic fields. These are different to the electromagnetic radiation produced by mobile phones. They are at much lower frequencies and produce different biological effects.

Electric and magnetic fields, such as those produced by powerlines, are classified as “possibly carcinogenic to humans” by the World Health Organisation. (Coffee is also in this category). This is based on some population studies that have shown evidence of an association between exposure to magnetic fields and childhood leukaemia. However, ‘association’ does not necessarily mean that exposure to electric and magnetic fields has caused childhood leukaemia.

Acknowledgments:

Australian Centre for Radiofrequency Bioeffects Research (ACRBR)

Michael Abramson, Professor of Clinical Epidemiology, Monash University.

Associate Professor Andrew W Wood. Research Director, Australian Centre for RF Bioeffects Research, Brain Sciences Institute, Swinburne University of Technology.

Ray McKenzie. Research Director, Dosimetry, ACRBR.

Further information:

The International Agency for Research on Cancer Interphone Study

<http://interphone.iarc.fr/index.php>

Australian Radiation Protection and Nuclear Safety Agency:

<http://www.arpansa.gov.au/>

Australian Centre for Radiofrequency Bioeffects Research <http://www.acrbr.org.au>

World Health Organisation: <http://www.who.int/mediacentre/factsheets/fs193/en/>

Australian Science Media Centre (AusSMC)

This fact sheet has been prepared by the AusSMC, an independent organisation that provides scientific information and experts for the news media.

Australian Science Media Centre (AusSMC)

PO Box 237

RUNDLE MALL SA 5000

Ph: 08 7120 8666

www.smc.org.au

Updated: August, 2006