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## Mobile phones and your health

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### Summary

- The current international consensus is that mobile phones don't cause cancer or promote the accelerated growth of existing tumours.
  - Cancer can take many years, even decades, to develop. Population studies so far have only monitored the health effects following a few years of mobile phone use.
  - Using a mobile phone while driving significantly increases the risk of traffic accidents. Talking on a hand-held mobile phone while driving is illegal in all states and territories of Australia.
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Because mobile phone use is so widespread (it was estimated in 2011 that there were around five billion mobile phone users), public concerns about the possible health effects of mobile phones receive a lot of coverage in the media. Because so many people use mobile phones, medical researchers are concerned that any associated health risks, even small ones, could cause significant public health problems.

It is important to understand the risks and possible effects of mobile phone use, and make up your own mind about how you use your mobile phone.

### Health concerns over mobile phone use

Mobile phones communicate with base stations using radiofrequency (RF) radiation. If RF radiation is high enough, it has a 'thermal' effect, which means it raises body temperature. There are concerns that the low levels of RF radiation emitted by mobile phones could cause health problems such as headaches or brain tumours.

### Research into mobile phones and health risks

Intensive international research has found no conclusive or convincing evidence that mobile phones are damaging to health in the short or long term. However, in May 2011, the World Health Organization (WHO) classified RF radiation as 'possibly carcinogenic for humans, based on an increased risk for glioma, a type of brain cancer'.

The release of this WHO statement prompted many people to call for a 'precautionary approach' to mobile phone use. Research is ongoing.

### Radiation in relation to mobile phone use

Radiation is a combination of electrical and magnetic energy that travels through space at the speed of light. It is also referred to as electromagnetic radiation (EMR).

Radiation is classified into two broad groups:

- ionising radiation (IR) – which is capable of causing changes in atoms or molecules in the body that can result in tissue damage such as cancer. Examples of IR include x-rays and gamma rays
- non-ionising radiation (NIR) – which doesn't cause these changes, but can prompt molecules to vibrate. This can lead to rises in temperature, as well as other effects. Examples of NIR include ultraviolet radiation in sunlight, visible light, light bulbs, infrared radiation, microwave energy and radiofrequency energy.

### How the mobile phone system works

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The mobile phone system works like a two-way radio, and includes the individual handset and the base stations. Base station antennae are mounted high off the ground (on a tower or roof) to get the widest coverage. A mobile phone has a radio receiver and a transmitter.

When you make a call, your phone uses radiofrequency (RF) radiation via its antenna to 'talk' to a nearby base station. Once the base station has received your signal, your call is directed through the landline phone system.

Mobile phone base stations emit relatively constant levels of RF radiation. The handsets emit levels of RF radiation that vary depending on three things:

- how long you use the phone
- how close you hold the phone to your body
- how close you are to the base station. If the link to the base station is weak, the handset increases its radiation level to compensate.

The levels of RF radiation from the handset, to which your head is exposed, are around 100 to 1,000 times more intense than exposure from base stations.

### **Australian mobile phone system regulations**

It is estimated that the RF radiation from a mobile phone held against your ear will heat a localised area of your face and, to a lesser extent, your brain, by a fraction of a degree. This is less than the heating caused by, for example, exercise. However, high levels of RF radiation overheat body tissues and cause damage.

The Australian exposure limits for RF radiation from mobile phones is set far below the level at which any meaningful heating occurs. All mobile phones in Australia must meet the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Standard RPS 3, which is enforced by the Australian Communication and Media Authority (ACMA).

### **Research into mobile phones and your health**

There have been many studies throughout the world on RF radiation and its effects on the body. There is a big difference between a biological effect – an effect on the body – and a health effect.

For example, RF radiation from a mobile phone has the biological effect of raising the temperature in a localised area of the brain by a fraction of a degree. This biological effect doesn't automatically carry any health risks. The human body is equipped to deal with very wide variations in temperature without experiencing harm.

### **Mobile phone use and cancer**

Because RF radiation is a form of non-ionising radiation, it cannot cause cancer. There is no other known biological way that RF radiation could be carcinogenic.

### **Mobile phones and other possible health effects**

While research continues into whether or not mobile phone use causes health problems apart from cancer, no negative health implications have yet been found.

Mobile phone use can also have other indirect health effects. For example:

- Electronic equipment – it is possible for RF radiation to interfere with medical electronic equipment if the equipment is vulnerable to the field. Handsets should be turned off in hospital buildings.
- Road accidents – studies show that using a mobile phone while driving greatly increases the risk of traffic

accidents. Talking on a hand-held mobile phone while driving is illegal in all states and territories of Australia.

### **Precautions to reduce mobile phone radiation exposure**

Evidence so far suggests that mobile phones aren't harmful, but long-term risks and consequences are yet to be clarified.

If you are concerned, you can reduce your exposure to RF radiation by:

- choosing a mobile phone model that has a low specific absorption rate (SAR), which refers to the amount of RF radiation absorbed by body tissues
- using a landline phone if one is available
- keeping your mobile phone calls short
- using a hands-free kit
- not carrying your mobile phone close to your body when it is switched on
- being wary of claims that protective devices or 'shields' can reduce your exposure to RF radiation – there is no evidence to suggest these devices work. In fact, they can increase RF radiation, because the phone will automatically increase its RF output to combat the effects of the shield to get the best level of communication.

### **Where to get help**

- Your doctor
- Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Tel. (03) 9433 2211
- Australian Communication and Media Authority (ACMA) Tel. (03) 9963 6800

### **Things to remember**

- The current international consensus is that mobile phones don't cause cancer or promote the accelerated growth of existing tumours.
- Cancer can take many years, even decades, to develop. Population studies so far have only monitored the health effects following a few years of mobile phone use.
- Using a mobile phone while driving significantly increases the risk of traffic accidents. Talking on a hand-held mobile phone while driving is illegal in all states and territories of Australia.

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