Radiofrequency Fields

The facts about safety

TV and radio transmitters

Cellphones

Cellsites

Cordless phones

Baby monitors

Radio-controlled toys

In recent years the explosion of new technologies has made our lives easier, more exciting, and in many ways, safer.
Several everyday items use radio and microwave signals to operate (radiofrequencies). In fact, anything that is radio-controlled uses these signals.

That includes such things as cellphones, cordless phones, radio-controlled toys, some baby monitors and microwave ovens.

However, long with these new technologies have come some concerns about the possible harmful effects that may have. One example is fear about the rapid increase in the number of cellphone transmitter sites.

This leaflet tells you what researchers currently know about possible effects, what is being done in New Zealand to safeguard your health, and where you can go to get more information.

What are radiofrequency (RF) fields?

Radiofrequency (RF) fields (or radio waves) come from the towers and antennas that produce and transmit radio and telecommunication signals.

The RF fields make up the electromagnetic wave, or radiation, which is the radio signal. This is non-ionising radiation. It is quite different to the ionising radiation from x-rays and radioactive materials.

RF fields are also different from the low frequency magnetic fields found around power lines and electrical appliances. Any possible effects on health from electromagnetic fields from these sources should not be confused with the effects of RF fields.

How are we exposed to them?

RF fields are all around us. Fields from natural sources are very weak.

RF field sources in the home include microwave ovens, cordless phones, baby monitors and radio-controlled toys.

Outside the home, people who work in the broadcasting, transport and communications industries can have higher exposure when they work close to RF transmitting antennas and radar systems.

Some industrial processes also use RF fields, such as in the use of dielectric heaters for wood lamination and the sealing of plastics.

According to World Health Organisation (WHO) figures, overall, the level of RF field exposure from household appliances is low. This has been confirmed by measurements made in New Zealand.

Workplaces are required to develop health and safety plans to ensure that exposures are within acceptable limits.

What are the effects of exposure to RF fields?

A lot of research has been done over the past 50 years into the effects of RF fields and electromagnetic radiation.

Above certain exposure levels, subtle changes in the behaviour of experimental animals have been observed. These are believed to be related to slight heating produced by RF fields.

Analysis of studies of the health of people who have had long-term exposures does not add up to cause for concern. No clear consistent effects have shown up in studies of long-term exposures. What the studies do show is that, if there are any risks, they must be very small.

Currently, WHO consider that there is no persuasive evidence that exposure to RF fields might shorten people's life expectancy or increase the risk of cancer or pose other dangers to health. The WHO is co-ordinating an international project to provide greater certainty in our understanding.

What protections are there?

Many people are naturally concerned about RF exposure.

New Zealand has developed a Standard (NZS2772.1:1999) with guidelines to control levels of exposure to RF fields. This has been based on the latest international and WHO recommendations.

Exposure limits have been set at least 50 times lower than the level where they might start to affect health.

As an example of what is considered a safe level of exposure, people who live near, or go past, cellphone sites and telecommunications antennas are exposed to less than one percent of the limit set by the New Zealand Standard. In a very few cases, the levels may reach five or ten percent of the Standard.

The Standard also includes a requirement that, regardless of the recommended limits, exposures should be kept at the lowest level possible.

The ministry is also continuing to monitor developments overseas and is contributing to the WHO project.

While New Zealand Standards are voluntary, they can be used by local bodies as a yardstick for deciding whether to give consent to build and operate radio transmitters.

How safe are cellphones and their transmitter sites?

Cellphones have rocketed in popularity in recent years as they have become a cheap and easy way to keep in touch while on the move.

The demand for more phones has created a need for more transmitter sites to provide good coverage. This has caused concern among people living or working near planned sites.

The siting of radio transmitters, including cellphone sites, is governed by the Resource Management Act 1991. People in the community can have a say about it when their local council prepares its District Plan. Some applications may also be heard at a hearing, which allows further opportunity for input. Contact your local council for information about the rules which apply in your area.

Cellphone site antennas are usually mounted at least 15 metres above the ground, either on a building or a mast.

They transmit a fan shaped beam of RF waves roughly parallel to the ground. This means the RF levels beneath them on the ground are low and well within the international guidelines. Where the sites are mounted on buildings, the beam is directed outward, so people inside are not highly exposed.

Although the number of cellphone sites is increasing, many of the new sites are designed to cover a small area. This means that they can operate at lower power.

The Ministry of Health staff at the National Radiation Laboratory have measured exposures to radio transmissions near a number of cellphone transmitters throughout New Zealand.

On average, the highest exposure is less than one hundredth of the maximum allowed in the Standard.

Cellphones are weak transmitters. The exposure Standard applies to exposure from phones (and other hand-held transmitters) as well as the base stations. The major telecommunication networks only allow phones which comply with the Standard to connect to their networks.

User tips

If you are concerned about possible risks, there are some simple things you can do to reduce your exposure.

- Limit the length of your calls
- Use a car kit or hands-free kit
- Use the phone outside or near a window (this may allow the phone to automatically reduce its power output).

Can they interfere with other electrical equipment?

Most medical equipment is designed to meet standards that protect against interference. However, cellphones, cordless phones and other hand-held transmitters can sometimes interfere with equipment such as some heart pacemakers, but only if the phone antenna is very close (within 20 cm). The same is possible with breathing ventilators and power wheelchairs. Many hospitals require cellphones to be switched off in areas containing critical equipment.

Where to go for more information

If you would like more information about RF fields, or want to keep up to date with developments, you can contact:

The National Radiation Laboratory
PO Box 25099, Christchurch
Phone: 03 366 5059
Fax: 03 366 1156
Internet: http://www.nrl.moh.govt.nz

The National Radiation Laboratory (NRL) is a unit of the Ministry of Health. Its role is to provide a regulatory function in the area of radiation health, and to provide independent radiation protection advice.

New Zealand, January 2000. Code 1103