

Electromagnetic Fields

Do mobile phones, powerlines, etc. cause cancer?

Mobile phones, television transmission and overhead power cables have been widely reported as hazardous. A basis for concern over electromagnetic fields exists primarily because some reports indicate increased risk of leukaemia among electrical engineers.

Are some exposures worse than others?

Electromagnetic radiation is of differing wavelength depending on the source. No type of electromagnetic radiation has been definitely shown to cause cancer in humans (as has tobacco smoke, asbestos, x-rays or ultraviolet light). The extent of evidence for different sources is shown in the table below.

Source	Evidence of hazard
MOBILE PHONES	<ul style="list-style-type: none"> ● Most significant source of non-occupational electromagnetic fields. ● Energy may be absorbed as indicated by tissue heating. Less absorption of energy occurs when phone in pocket or on belt. ● Weak epidemiological evidence linking mobile phones to brain and other cancers. ● Further studies known to be underway.
MOBILE BASE STATIONS	<ul style="list-style-type: none"> ● Less absorption of energy than phone usage. ● Weak evidence in relation to childhood leukaemias, including negative studies (very few studies).
HIGH POWER TRANSMISSION AND DISTRIBUTION LINES	<ul style="list-style-type: none"> ● Many studies provide equivocal evidence of childhood leukaemia, lymphomas and cancers of the central nervous system. ● Cancer risk dependent on proximity of residence to field source.
TV AND RADIO TRANSMISSION TOWERS	<ul style="list-style-type: none"> ● Less energy than power lines. ● Very weak evidence in relation to childhood leukaemias, bladder cancer and skin cancer.
ELECTRICAL APPLIANCES	<ul style="list-style-type: none"> ● Some very weak evidence of a hazard. ● Available studies include possible association between risk of leukaemia or brain cancer and appliance usage.

Decreasing Evidence of Hazard



Electromagnetic Fields - Information for GPs

If electromagnetic fields (EMF) do cause cancer, what's the mechanism?

Current understanding of the biological impact of EMF is primarily concerned with absorption of heat energy. It is not known whether the use of mobile phones, etc. (see Table) causes cancer in humans and relevant experimental studies (including tumours in transgenic mice) are difficult to interpret.

What's safe and what's not? Are some brands better than others?

In the absence of conclusive data, no electrical appliances or exposure to associated EMF can be categorised as unsafe. 'Safety' may be adopted as a marketing ploy by some manufacturers. Use of 'hands-free' accessories for mobile phones results in absorption of less energy than 'against the head' systems, and some individuals may be reassured as a consequence. Likewise patients may wish to follow manufacturers advice regarding shielding or output from particular models. Given the minimal evidence of adverse effects, no health based data are available relevant to brand discrimination. Current evidence shows that exposures to EMF, (emitted by power lines, television and radio transmission and mobile phone base stations) are too low to produce health effects on the wider community.

Patient concerns: Should we relocate our child to another school?

Patients may be informed that exposure to EMF found around the home, the office or near power lines is not a hazard to human health. No basis exists for relocating housing or changing schools as a means of reducing the likelihood of malignant disease. In Australia and overseas, funding has been allocated for the continued epidemiological and experimental study of EMF. Some authorities consider such studies an unjustified use of limited resources in light of the negative evidence already available.

Keeping things in proportion: Reduced exposure to EMF in relation to smoking cessation or sun protection as a means of preventing cancer.

A range of measures to prevent cancer - primarily involving not smoking, but extending to reduced alcohol consumption, sun protection, increased intake of fresh fruit and vegetables, use of breast and cervical screening services - are established. In comparison to these considerations, concern about EMF and cancer can be categorised as a distraction.

Further reading: McCann J, 1998, Cancer risk assessment of extremely low frequency electric and magnetic fields: a critical review of methodology. *Environmental Health Perspectives* 106: 701-717. Miller RD, Neuberger JS, Gerald KB, 1997, Brain cancer and leukemia and exposure to power-frequency (50- to 60-Hz) electric and magnetic fields. *Epidemiologic reviews* 19: 273-293.

Websites: The Australian Radiation Protection and Nuclear Safety Agency;
http://www.health.gov.au:80/arpansa/is_anten.htm
The World Health Organisation; <http://www.who.int/emf/>

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