

EMFs

Mobile 'Phones

The Radiocommunications Agency (RA), which is an Executive Agency of the Department of Trade and Industry (DTI), has begun a systematic audit of emissions from mobile phone base stations. Their aim is to confirm that emissions fall below thresholds set in international guidelines. Masts near to schools are the principle initial subjects of this survey, in response to suggestions made in the **Stewart** report.

Report of the Stewart Group: www.iegmp.org.uk

Department of Health have responded to the Stewart report: www.doh.gov.uk/mobile.htm

Mobile phone network operators in the UK have agreed to comply with international guidelines (set by International Commission on Non-Ionising Radiation Protection (ICNIRP)).

Exposure to radio wave emissions from base stations has been calculated to be thousands of times lower than the maximum levels stipulated by the ICNIRP guidelines. It would seem unlikely that harm of the type envisaged by ICNIRP would result from such exposure.

A complete and current map of the locations of all mobile 'phone base stations is available under the heading **Sitefinder** and can be found on-line at the RA website. RA Audit website: www.radio.gov.uk/document/ra_info/ra377.htm

. The 'Sitefinder' Mobile Phone Base Station Database is a national database of mobile phone base stations and their emissions.

Planning Issues

Siting of mobile 'phone masts has become an issue for planning authorities. New guidance for planners **Policy Planning Guidance Note 8: Telecommunications** (PPG8) includes advice on consultation, especially with schools and colleges of FE.

Health is an issue that can be considered by planning authorities. The above guidance (PPG8) advises that if a proposed mobile phone base station meets the International Commission on Non-Ionising Radiation Protection (ICNIRP) guidelines for public exposure, it should not be necessary for local planning authorities to consider further the health aspects and concerns about them. The ICNIRP guidelines for public exposure, which the IEGMP recommended should be adopted, are five times more stringent than the guidelines observed previously.

International EMF Project

The International EMF Project brings together current knowledge and available resources of key international and national agencies and scientific institutions in order to arrive at scientifically-sound recommendations for health risk assessments of exposure to static and time varying electric and magnetic fields in the frequency range 0-300 GHz. This range includes static (0 Hz), extremely low frequency (ELF, >0 - 300 Hz), intermediate frequencies (IF, 300 Hz - 10 MHz) and radio-frequency fields (RF, 10 MHz - 300 GHz).

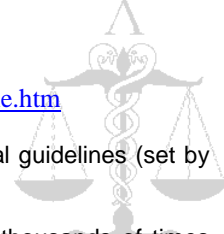
This Project has been devised to provide authoritative and independent peer-review of the scientific literature, and identify and fill gaps in scientific knowledge by establishing protocols for the conduct of research using compatible and comparable methodologies, and by encouraging more focused research that should lead to better health risk assessments in the EMF domain. The International EMF Project:

- reviews the scientific literature on biological effects of EMF exposure;
- identifies gaps in knowledge requiring research that will improve health risk assessments;
- encourages a focused agenda of high quality EMF research;
- formally assesses health risks of EMF exposure after the required research is completed;
- encourages internationally acceptable uniform standards;
- provides information on risk perception, risk communication, risk management; and,
- advises national programmes and non-governmental institutions.

All activities are coordinated and facilitated by the WHO Secretariat.

International organizations supporting and participating in the Project include European Commission (**EC**); International Agency for Research on Cancer (**IARC**); International Commission on Non-Ionizing Radiation Protection (**ICNIRP**).

The scientific work is conducted by **ICNIRP** and independent WHO scientific collaborating institutions, including National Radiological Protection Board (UK).



Details and results can be found on-line at <http://www.who.int/emf>.

WHO and ICNIRP would generally be regarded as the source of definitive opinion on this subject. Their views will be influential in establishing a duty of care and causation.

ICNIRP Guidelines at mobile 'phone frequencies

The ICNIRP guidelines in this range are based on concerns over direct heating effects resulting from energy absorption.

Energy absorption from RF fields in tissues is measured as a **specific absorption rate (SAR)** within a given tissue mass. The unit of **SAR** is Watts per kilogram (W/kg). SAR is the basic dosimetric quantity for RF fields between about 1 MHz and 10 GHz.

An **SAR** of at least **4 W/kg** is needed to produce adverse health effects in people exposed to RF fields in this frequency range. Such energies are found tens of meters away from powerful FM antennas at the top of high towers, which makes these areas inaccessible.

Most adverse health effects that could occur from exposure to RF fields between 1 MHz and 10 GHz are consistent with responses to induced heating, resulting in rises in tissue or body temperatures higher than 1°C

Mobile phone handsets are low-powered RF transmitters, emitting maximum powers in the range of 0.2 to 0.6 Watts. RF fields penetrate exposed tissues to depths - that depend on the frequency - up to a centimeter at the frequencies used by mobile phones. Clearly, there needs to be consideration given to local absorption rates, especially when devices are held close to the body.

ICNIRP has defined localised exposure guidelines for the head.

- ❑ The localised SARs in the head associated with the use of hand-held radiotelephones must be assessed for each frequency and configuration used.
- ❑ For hand-held radiotelephones used in occupational situations, ICNIRP recommends that the localised SAR in the head be limited to 10 W Kg⁻¹ averaged over any 10g mass of tissue in the head (0.1 W absorbed in any 10 g mass of tissue in the head).
- ❑ For hand-held radiotelephones used by the general public, ICNIRP recommends that the localised SAR in the head be limited to 2 W Kg⁻¹ averaged over any 10g mass of tissue in the head (0.02 W absorbed in any 10 g mass of tissue in the head).

[If all 0.6 watts were absorbed there would be no thermal harm unless it were absorbed in less than 60 g of tissue ~ 60 cm³.]

Mains Power Frequencies

IARC Fact Sheet N° 263 October 2001

Using the standard IARC classification that weighs human, animal and laboratory evidence, ELF magnetic fields were classified as **possibly carcinogenic to humans** based on epidemiological studies of childhood leukaemia. Evidence for all other cancers in children and adults, as well as other types of exposures (i.e. static fields and ELF electric fields) was considered not classifiable either due to insufficient or inconsistent scientific information.

"Possibly carcinogenic to humans" is a classification used to denote an agent for which there is limited evidence of carcinogenicity in humans and less than sufficient evidence for carcinogenicity in experimental animals.

This classification is the weakest of three categories ("is carcinogenic to humans", "probably carcinogenic to humans" and "possibly carcinogenic to humans") used by IARC to classify potential carcinogens based on published scientific evidence.

Two recent pooled analyses of epidemiological studies provide insight into the epidemiological evidence that played a pivotal role in the IARC evaluation. These studies suggest that, in a population exposed to **average** magnetic fields in excess of 0.4 µT, twice as many children might develop leukaemia compared to a population with lower exposures. In spite of the large data base used for this finding, some uncertainty remains as to whether magnetic field exposure or some other factor(s) might have accounted for the observed increased leukaemia incidence.

Childhood leukaemia is a rare disease with 4 out of 100,000 children between the age of 0 to 14 diagnosed every year. Also average magnetic field exposures above 0.4 μT in residences are rare.

While the classification of ELF magnetic fields as possibly carcinogenic to humans has been made, it remains possible that there are other explanations for the observed association between exposure to ELF magnetic fields and childhood leukaemia. In particular, issues of **selection bias in the epidemiological studies and exposure to other field types** deserve to be rigorously examined and will likely require new studies.

In our view, such studies would need to be of the same size as the pooled epidemiological work referred to above. The benefits of such work would have to be potentially quite considerable if it were to attract appropriate funding.

ICNIRP Exposure Guidelines

International guidelines on exposure limits for all EMF have been developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) - a non-governmental organization (NGO) in official relations with WHO and a partner in WHO's International EMF Project. While the ICNIRP guidelines for EMF exposure are based on comprehensive reviews of all the science, the limits are intended to prevent health effects related to short-term acute exposure. This is because **ICNIRP considers the scientific information on potential carcinogenicity of ELF fields insufficient for establishing quantitative limits on exposure.**

Health Physics (1998) **74**(4), 494-522.

<http://www.ICNIRP.de/>

Home Office Communications Advisory Panel

Hazards Associated with Microwave Transmitters HGN(F) 20

A note produced by the Science and Technology Unit.

The note refers to the possibility of working in close proximity to point to point link antennae and is directed to the attention of **firefighters**.

The advice derives from the work of the NRPB.

“ The primary risk is that should human tissue be exposed to microwave fields in excess of the recommended limits, then permanent damage may result to the tissue, particularly to the cornea of the eye.”

The advice applies to transmitting antennae, only.

Identification is suggested as follows:

1. Small dish antennae on domestic properties are most likely to be for satellite receivers.
2. Antennae on radio masts, including police, fire services, broadcasting sites, cellphone sites, commercial properties, industrial premises, public buildings etc. should be assumed to be transmitting.

Guidance

1. In order to minimise the personal risk, the system should be switched off, wherever practicable though taking account of the potential interference with secure and essential radio links.
2. Firefighters should make every effort not to stand directly in front of a microwave antenna, and not to work near the antenna longer than necessary.
3. As a general guide, the larger the microwave transmitting dish, then the greater the power it radiates in the direction to which it is pointing.
4. Persons fitted with cardiac pacemakers or similar devices are advised to avoid working in the immediate vicinity of antenna installations.

Personal Alarms

Personal exposure monitors are now available, emitting an audible sound or visual alarm when users are in danger of over exposure, it is claimed.

1. Narda – Nardalert 884518-0.5
2. Wandel&Golterman – ESM-20 Radman

HGN(F)20 provides contact details for the NRPB, pictures of typical radio antennae and, software references for the calculation of field strengths.
Published 5th August 2000. Circulated 16th October 2001.

Comment

It would seem sensible to provide similar advice anyone who comes into close proximity of such antennae, in the course of their work.

The Radiocommunications Agency is in the process of carrying out a comprehensive audit of radio base stations, measuring compliance with guidelines on emission levels. Results will be freely available on www.radio.gov.uk/document/ra_info/ra377.htm.

