Australia

Report on EMF Activities

10th International Advisory Committee on EMF

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Summary of National Activities
ARPANSA Report: WHO Collaborating Centre for Radiation Protection

Governmental actions

The Government continues to provide $1m pa for the EME Program (recently renewed until 2009). This program supports research into and provides information to the public about health issues associated with mobile phones, mobile phone base stations and other communications devices and equipment. The EME program is coordinated by the Committee on Electromagnetic Energy Public Health Issues (CEMEPHI) which is run by ARPANSA and includes representatives from other government departments and authorities. Research is an important component of the program.

Research

The Australian research program is managed by the National Health and Medical Research Council (NHMRC), has funding of $0.7m pa and a charter to conduct research into EME issues of relevance to Australia and to complement overseas research activities.

Funding of all projects is based on scientific merit and a consideration of recommended priorities for EME research identified by the WHO. There have been three completed funding rounds. The third round (2003) provided funding for a Centre of Research Excellence in Radiofrequency EME with funding of $0.5m pa over five years.
Current research projects include:

- The Australian component of the Interphone Study;
- Investigation of human physiological responses (brain reactions, sleeping patterns, biological clock) to exposure to mobile phone type radiation (completed-submitted);
- Investigation of the effects of radiofrequency radiation from long term mobile phone use on vision and hearing (part of the large-scale Blue Mountains Eye Study)(completed); and
- The sensitivity of human event-related potentials to mobile phone emitted electromagnetic fields (completed-submitted).

The Australian Centre for Radiofrequency Bioeffects Research (ACRBR) has been established at the RMIT University in Melbourne (http://www.acrbr.org). Seven doctoral students are enrolled for Centre projects. Currrent projects include:

- Molecular Modeling of RF Interaction with Heat Shock Proteins
- Neurophysiological endpoints in human subjects exposed to specific low frequency modulations of EM fields
- Influence of electromagnetic emissions from mobile phones on nervous function in the human brain and heart

- In vivo neurobiology studies at the IMVS
- In vitro and in vivo neurobiology studies at Swinburne (eg The effects of 915 MHz modulated RF radiation on a syngenic bloodbrain barrier model)
- RF sensitivity and effect consistency in humans
- Dosimetry

Standards

RF

ARPANSA ***Radiation Protection Standard for Maximum Exposure Levels to Radiofrequency Fields 3 kHz to 300 GHz***. Published 2002 and available at: www.arpansa.gov.au/rps_pubs.htm
Telecommunications are regulated by the Australian Communications Authority - a new standard based on the ARPANSA Standard, titled: 'Radiocommunications (Electromagnetic Radiation - Human Exposure) Standard 2003' can be downloaded at:
www.aca.gov.au/aca-home/legislation/standards/index.htm#radiocommunications

Code of Practice

The Australian Communication Industry Forum Code for the ***Deployment of Mobile Phone Network Infrastructure*** (ACIF C564:2004 available at www.acif.org.au/publications/codes) was revised in 2004. The Code specifies the best contemporary practices in the areas of design, installation and operation of radiocommunications infrastructure and requires the application of a precautionary approach to the deployment of infrastructure and contains obligations on carriers to consult.

ARPANSA EME report (a reporting requirement under the ACIF Code)

The report summarises the estimation of maximum cumulative radiofrequency (RF) electromagnetic energy (EME) levels at ground level emitted from the existing and proposed antennas at the [*Carrier*] Mobile Phone Base Station at [*Location*]. Maximum EME levels estimated are at distances of 5m, 50m, 100m, 200m, 300m, 400m, and 500m from the base station. The procedures for making the estimates have been developed by the Australian Radiation Protection And Nuclear Safety Agency (ARPANSA). These are documented in the ARPANSA Technical Report; "Radiated EME Exposure Levels - Prediction Methodologies" which is available at http://www.arpansa.gov.au (currently under revision – new version gives more prominence to sites of special interest)

ELF

An ARPANSA WG was established in 2003 to draft a new ELF standard (by end -2005).

- ARPANSA will use induced tissue electric field and the avoidance of magnetophosphenes as the appropriate Basic Restriction (BR) [nb in ICNIRP the BR is induced current density J and in IEEE the induced tissue electric field E]
- Can compare the two approaches ($J = \sigma E$), if we assume a value of σ appropriate to tissue. This is not simple, because the magnetophosphene occurs in a specific layer in the retina of the eye, where σ is not clearly defined and the averaging criteria are imprecise
- Must decide if avoiding MP also protect against other possible bioeffects, which do not immediately manifest themselves?
- Are retinal E fields in the range 10–100 mV/m the appropriate predictor of MP occurrence?
- How precise can we be?
- Below these levels, what is the likelihood of long term adverse changes (particularly linking to leukaemia)?

Anticipate going to the public comment stage during the third quarter of 2005.

EME field measurements

Radiofrequency fields

An ARPANSA survey of radiofrequency (RF) electromagnetic energy (EME) emissions around 60 mobile phone base stations at capital city locations in Australia has been conducted. Measured base station RFR levels at specified distances from the antenna have been compared with the ARPANSA RF exposure limits and predicted levels. Environmental levels of RFR within 500 m of the nominated base station's location were also measured. A measurement protocol based on the measurement of the control channel/pilot signal was developed (similar to that used in the previous survey). Paper has been submitted for publication. On average, measurements at the location of the highest predicted level were 0.02% of the limits. Predicted levels were always higher and generally more than 30 times higher than the measured level. Predicted levels could be considered to be a reasonable surrogate for measurements when exposure levels around base stations are being considered for compliance requirements.

Base Station Audit Program (in planning phase)

The aim of the program is to verify the ARPANSA RF EME Reports located in the National Site Archive and this would help the public gain confidence in the calculated field strength levels for individual base stations.

A monitoring station would be set up in a suburban location (eg. a typical residential location, identified sensitive areas etc). Automatic readings would be taken at regular intervals (eg. every minute), readings would be downloaded and placed on a website approximately every two weeks. It is anticipated that community groups would be involved in selecting sites.
Measurements taken at five new sites every six months this program would

Extremely low frequency fields - State survey

A survey to identify the distribution of residential magnetic field levels in Victoria will be commenced during June/July 2005. The objective is to determine the distribution of residential magnetic fields. An attempt to relate the measured field with characteristics of the home and environment will also be made.

A pilot study was undertaken to finalise the measurement protocol and to determine the most efficient means of sampling and home recruitment. Average magnetic field levels were approximately 1 mG, although there were variations. The survey identified situations where levels were likely to be high, including inner suburban homes and homes near (high-voltage) transmission lines. Approximately 12% of the homes had levels above 4 mG in areas where children are likely to spend large amounts of time - this was higher than expected although it cannot be taken to be indicative of the true population proportion due to the small sample size of the pilot study. The larger survey will answer some of the underlying questions regarding power frequency magnetic field exposure in Australia.

EME Complaints Registry

The proliferation of sources emitting electromagnetic radiation (EMR) in recent times has seen a growing concern among the general public regarding possible health effects associated with exposure to these type of fields. A centralised complaints mechanism has been established for people to report adverse health effects associated with EMR (0-300 GHz) exposure. In two years of operation only 29 reports have been received. Only one report has been received in 2005. Exposure sources include ELF (12 reports), mobile phone base stations (5), communications infrastructure (5), mobile phones (8), cordless phones (1), UHF 2-way radios (1), HV power lines (3), electricity industry (1), radar (1), welding (1) and MRI (1). Health effects reported include body pain, obsessive compulsive disorder, cyst above ear, loss of memory, and hypersensitivity to EMR, including headaches, nausea, dizziness, eczema, insomnia, lethargy and depression.

Public concerns

Main concerns are:

- Coordinated activities of (anti base station) Action Groups including the advocacy of jammers and vandalism
- mobile phone base stations - undiminished demand to speak at public meetings, especially protesting 3G installation
- Children and mobile phones
- ELF - HV powerlines, residential exposure and childhood leukaemia

Public information

Fact sheets in the ARPANSA CEMEPHI EME series are available on the ARPANSA web site at: www.arpansa.gov.au/eme_pubs.htm

FS 1: Electromagnetic energy and its effects
FS 2: Government action on electromagnetic energy public health issues
FS 3: Australian research into EME
FS 4: The ARPANSA RF exposure Standard
FS 5: About mobile phones
FS 6: About mobile phone networks
FS 7: What about using a mobile phone while driving
FS 8: Potential interference of mobile phones with pacemakers, hearing aids &other devices
FS 9: Australian Research into EME
FS 10: What about broadcast towers and are there any health effects
FS 11: Mobile phones and children
FS 12: About 3G and health (currently being drafted)