Vol 2 No 2, 2006

EMR and Health

Electromagnetic radiation, health and well-being

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Powerlines and childhood leukemia

Japanese scientists have found a strong link between childhood leukemia and magnetic fields.

High magnetic fields in the bedroom may increase the risk of childhood leukemia by up to five times. This is the finding of a new Japanese study published recently.

The research was conducted in five urban areas in Japan, home to over ten million children and accounting for over half of the Japanese population below 15 years of age. The locations yielded 312 children with either acute lymphoblastic leukemia (ALL) or acute myelocytic leukemia (AML).

To identify the children's exposure, the researchers took measurements of magnetic fields around the house. These included spot measurements in different rooms and outside the house and continuous measurements in the child's bedroom for a period of a week. Readings for all subjects were conducted within a short time span to prevent variations in magnetic fields from seasonal changes in electricity use.

The results showed that the risk of leukemia was increased for children exposed to magnetic fields of 4 milligauss (mG) or more, but not for children at lower exposures.

The researchers found that children exposed to 4 mG or more had 2.56 times the normal risk of ALL and AML. However, the really startling connection was for ALL. Children exposed to 4 mG or more had 4.67 times the risk of this disease.

> Children exposed to 4 mG or more had nearly five times the risk of acute lymphoblastic leukemia.

The results were not affected by socio-economic factors such as parental education, smoking, alcohol consumption or type of residence.

The study's results are consistent

(Continued on page 11)

New Australian standard is available for public comment. See page 3.

Mobile phone towers & health

Austrian researchers have found effects from mobile phone towers on surrounding populations.

The controversial question of whether radiation from mobile phone towers affects health and wellbeing is the topic of a new Austrian study published in April in the journal, Occupational Environmental Medicine. The study is the second to consider the connection and has found effects that cannot be dismissed as psychosomatic.

The study was conducted by Dr Hans-Peter Hutter and three colleagues from the Institute of Environmental Health at the University of Vienna. Set in Austria, it examined the effects on people living near ten mobile phone towers in the urban environment of Vienna and the rural district of Carinthia.

Hutter tested for effects from the antennas on a range of subjective symptoms, on sleep quality and on cognitive performance. He also organised readings of exposure levels in the homes of most of the participants and categorised them into three exposure categories: <0.1; 0.1-0.5 and >0.5 mW/cm^2.

The results showed evidence of effects from radiation.

Hutter found that the risk of some of the subjective symptoms increased with increasing exposure from the towers. This was true for:

- headaches where the risk trebled in the highest exposure category;
- tremor, where risk was 2.3 times greater in the highest exposure category;
- cold hands or feet, where risk was 2.5 times greater in the highest exposure category;
- loss of appetite, where risk was 2.4 times greater in the highest exposure category;
- exhaustion, where risk was twice as high in the highest exposure category,
- tiredness, where risk doubled in the highest exposure category
- concentration problems, where risk was 2.5 times higher in the highest exposure category.

Cognitive performance also showed some effects from exposure. Hutter found that the highest exposure group had a tendency to respond slightly more quickly to tests of visual perception - and to be less accurate in their responses.

Sleep appeared to be affected by exposure from the towers to some extent. More sleep problems were reported in the highest exposure category and also by people with greater concerns about the towers.

Not all the effects identified could be regarded as psychosomatic, according to Hutter. Subjects were not made aware that the focus of the study was on the effects of their local mobile phone tower and most of the subjects reported no concern about the tower.

The study focused on radiation from phone towers used by GSM mobile phone networks (operating at around 900 MHz). Third generation networks operate at higher frequencies and it is these that have been most frequently reported as causing symptoms.

Exposures in this study were all very much lower than those allowed by international standards. The average exposures a faction of levels allowed by international standards. It should be noted that these limits protect against the heating effects of radiation and not biological effects such as those considered in this study.

Ref: Hutter, H-P et al, *Occup Environ Med* 63 307-313, 2006; <http://oem.bmjournals.com.cgi/content/full/63/5/307>

Towers implicated in Australian brain tumour cluster

Have mobile phone towers contributed to an increased risk of brain tumour in an Australian university?

Five cases of brain tumour have been diagnosed in staff members on the top two floors of the Royal Melbourne Institute of Technology (RMIT) in the last month. This brings the number of tumours in workers on these floors during the last seven years to seven, two of which are malignant.

The two Telstra mobile phone antennas on the roof of the building have been an obvious focus of attention as experts seek an explanation for the tumour cluster. "The grouping of tumours with a tower immediately above was too strong a coincidence to ignore.," said Matthew McGowan State Secretary of the National Tertiary Education Union.

However, Mr McGowan told EMR and Health, "the truth is we don't know the cause".

Testing is still underway and its results are not yet available. "We are asking for the testing to be expanded to include other forms of radiation (such as EMR from electrical cables etc)," said Mr McGowan, "and we have got agreement from the Uni to an expert panel, agreed with the union to oversee the process."

The Union also asked for a health check of university workers on site and is seeking the closure of the top two floors of the building.

Investigations into the RMIT tumour cluster are presently underway by WorkCover and the University has also promised an inquiry.

In the meantime, the Electrical Trades Union has placed a ban on work by its members on or near mobile phone towers while they are operating until the safety of such electromagnetic radiation emissions can be proven.

Precaution in new Australian Wiring Standard

Public comment is invited on plans to include precautions to reduce electromagnetic fields in wiring rules.

Australian and New Zealand Wiring Rules, presently being updated, are to contain an appendix listing guidelines for reducing electromagnetic fields (EMFs).

The document, which is being developed by Standards Australia, is currently open for public comment until 30 June.

In its present form, the appendix lists a number of recommendations for reducing magnetic fields in line with a policy of prudent avoidance. Among them are the following suggestions:

1. arranging active, neutral and earth wires in the same circuit so that the fields, to some extent, cancel each other out
2. running wiring for circuits for appliances that use a high current (ovens, water heaters etc) away from high use areas (lounge rooms) or long exposure areas (bedrooms)
3. locating substations in buildings away from heavily occupied or sensitive areas
4. locating the meter box away from the bedroom wall where the bed head would be expected to be found
5. designing computer rooms in schools so that students are not exposed to the backs of monitors (as they can emit higher fields than the front).

Spokesman for the Energy Networks Association (ENA)*, Kevin Nuttall, says that the precautionary appendix is in line with the ENA's own precautionary policy which results from the lack of scientific consensus on the health question. "Public exposure to EMF can occur from wiring and facilities not owned by the electricity supply industry. The industry therefore considered it appropriate to propose some precautionary "informative" advice in the Wiring Rules about reducing EMF."

According to Mr Nuttall, "there was an acknowledged lack of information among electrical contractors and electricians about what could be done to reduce EMF exposure. ENA felt that the best approach to overcome this was to include some advice in the Wiring Rules about reducing EMF."

According to electrical engineer John Lincoln, the precautionary annex is a great step towards ensuring that

(Continued on page 11)

Mobile phones a brain tumour risk

Researchers have shown a new link between malignant brain tumours and the use of mobile and cordless phones.

Long-term use of mobile phones may increase the risk of developing malignant brain tumours, according to a new study from Sweden's National Institute for Working Life.

According to Dr Kjell Hansson Mild, who led the study, the results show that heavy mobile phone users have a 240% risk of developing such a tumour.

In the largest such study to date, the researchers used data from their two previous studies on the use of mobile and cordless phones. The study involved 2200 people with cancer and an equal number of controls.

The researchers found an increased risk of brain tumour among people who used a phone for more than 2000 hours. This equated with approximately ten years of mobile phone use and the risk was as follows:

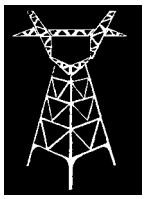
- analogue mobile phone users had 5.9 times the risk
- digital mobile phone users had 3.7 times the risk
- cordless phone users had 2.3 times the risk.

When Mild considered the connection between the brain tumour and use of a phone on the same side of the head, the connection was as follows:

- analogue phone users had 2.1 times the risk

(Continued on page 5)

Research Updates



ELF Fields (from electrical sources)

Australian researchers have found "weak" evidence that occupational exposure to 50/60 Hz magnetic fields increases the risk of non-Hodgkin lymphoma (NHL). The team of researchers from Monash University and the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) assessed the magnetic field exposure of 694 people with NHL diagnosed between 2000 and 2001. They found that the most-exposed workers had approximately one and a half times the normal risk of the disease and this increased to 1.59 times for people exposed five years previously. (Karipidis, K et al, *Occup Environ Med,* Mar 21, 2006.)

Both alternating magnetic fields and static (DC) magnetic fields can affect the binding abilities of receptors, according to a study from France. J Espinosa and team exposed rat brain cells to 50 Hz, 400 Hz and DC magnetic fields. Both DC and 50 Hz fields at low (mT) levels of exposure produced statistically significant changes but the effect was greater for 50 Hz exposures. (Espinosa, JM et al, *Bioelectromagnetics,* April 10, 2006.)

Women who use a sewing machine in their employment received higher than average occupational exposure, according to a study from Hungary. J Szabo and team monitored the exposure of seamstresses at work and found average magnetic fields of 7.6 mG. (Szabo, J et al, *Bioelectromagnetics* April 18, 2006.)

Canadian researchers have investigated the sensitivity of subjects to extremely small electromagnetic fields. A Legros and A Beuter tested 24 volunteers to see if they responded differently when magnetic fields were turned on or off. They found that some subjects showed greater evidence of postural tremor under exposure conditions. (Legros A et al, *Neurotoxicology,* April 16, 2006.)

Radiofrequency radiation (from telecommunications sources)

From Finland comes the first evidence that mobile phone radiation affects regional cerebral blood flow in humans. S Aalto and team studied the effects of mobile phone use on 12 volunteers. They found that using a mobile phone decreased blood flow beneath the antenna in the inferior temporal cortex and increased it in the prefrontal cortex. (Aalto, S et al *J Cereb Blood Flow Metab* 22 Feb, 2006.)

Research from Sweden has shown genetic changes resulting from mobile phone use. I Belyaev and team exposed rats to a GSM mobile phone signal of 915 MHz for two hours. Subsequently the rats were studied for changes to chromatin conformation (a stress response), DNA breaks and gene expression. They did not find an increase in double-strand DNA breaks or in chromatin conformation, but they did find effects on different genes, including those connected with the function of neurotransmitters, blood-brain barrier and melatonin. (Belyaev, IY et al, *Bioelectromagnetics,* March 1 2006.)

Mobile phone radiation may affect people's response times according to new research from Turkey. F Esen examined the effects of this radiation on the central nervous system and found delayed response times. "...the findings point to the potential risks of mobile phones on the function of CNS and consequently, possible increase in the risk of phone-related driving hazards." (Esen, F and Esen, H, *Int J Neurosci* 116(3):321-9,. 2006.)

Researchers in Turkey have shown that long-term use of mobile phones is associated with hearing loss. M Oktay and S Dastag studied the hearing of men who had never used mobile phones, men who used the phones for 10 - 20 minutes a day and men who had used them for about 2 hours a day for four years. They found that heavier mobile phone users were less able to detect sounds, particularly at certain frequencies. (Oktay, MF , Dastag, S, *Electromagn Biol Med,* 25(1):13-21, 2006.)

Australian researchers have found further evidence that mobile phone radiation affects cognitive function. V Keetley and team studied the effects of digital phone radiation on 120 volunteers during 8 tests. They found that exposure impaired reaction times but that there was some improvement on a test involving working memory. (Keeltley, V et al, *Neuropsychologia,* April 14, 2006.)

Other papers

An Australian paper discusses the residential studies that have shown an association between magnetic fields and child leukemia Mark Elwood considers the methodology of a number of individual residential studies and the 2 metaanalyses in which they were included. (Elwood, M, *Bioelectromagnetics* 27, 2006.)

Other studies showing effects

Effects were found for these studies:

- ELF exposure stimulated formation of free radicals (Frahm, J et al, *J Cell Biochem,* April 5, 2006.)
- RF exposure adversely affected cardiovascular system (Vangelova, K et al, *Int J Hyg Environ Health* 209 (2):133-8, 2006.)
- Metallic implants enhance RF fields in the body & increase power absorption. (Virtanen, H et al, *Bioelectromagnetics* Apr 18, 2006.)
- ELF caused changes in proliferation in fungi which could be changed by changing either exposure or time of exposure. (Berg, A and H, *Electromagn Biol Med* 25 (1):71-7, 2006.)
- Low frequency electric field disturbed cardiac activity in an insect. (Es'kov, EK, *Biofizika* 51(1):153-5, 2006.)
- Electric fields retarded the recovery of crushed nerves in rats. (Aydin, MA *et al, Bioelectromagnetics,* April 10, 2006.)
- Exposure to static fields in MRI produced transient effects on immune cells. (Salerno, S et al, *Int J Radiat Biol* 82(2):77-85, 2006.)
- There is some interaction between magnetic fields of induction cook tops and metallic implants. (Irnich W & Bernstein, AD, *Europace* 8 (5):377-84, 2006.)

Studies showing no Effects

No effects were found for:

- pulsed electromagnetic fields on PC12 and HL60 cells in rats (Sontag, W et al, *Radiat Environ Biophys*, Apr 20, 2006.)
- breast cancer from bed heating devices (Feychting M et al, *Cancer Causes Control,* 17(4):553-8, 2006.)
- mood disorders or malignancy from disruption of melatonin by EMF. (Touitou, Y, *Cancer Causes Control*., (4):547-552, 2006.)
- the chemical Belousov-Zhabotinsky (BZ) reaction by a low frequency magnetic field (Sontag, W, Bioelectromagnetics. 27(4):314-9, 2006.)
- lymphoma development in one strain of mice by 1 mT fields (Sommer, AM et al, *Radiat Res* 165(3):343-9, 2006.)
- human lymphocytes from a field of 0.23, 0.47 or 0.7 mT. (Hone P et al, *Radiat Prot Dosimetry*, Apr 5, 2006.)
- mobile phones on short-term auditory function (Mora, R et al, *Ear Nose Throat J,* 85 (3):162-3, 2006.)
- sensitive subjects' ability to perceive mobile phone signals (Rubin, GJ et al, *Brit Med J* 332 (7546):886-991, 2006.)

Abbreviations

RF radiofrequency radiation (including mobile technology)

ELF extra-low frequency radiation (including electrical sources)

EMF electromagnetic fields (often used alternatively for ELF)

mG milliGauss (measurement of magnetic field)

T Tesla - alternative measurement of magnetic field; also millitesla (mT) and microtesla (μT)

- **0.1 mT = 1000 mG**
- **0.01 mT = 100 mG**
- **1 μT = 10 mG**

Hz Hertz - a measure of frequency (cycles per second).

- **Megahertz (MHz) - million Hz**
- **GigaHertz (GHz) - thousand million hertz.**

(Continued from page 3)

- digital phone users had 1.8 times the risk
- cordless phone users had 1.7 times the risk.

Mild also investigated the connection between phone use for more than ten years and high grade astrocytomas. He found:

- analogue users had 2.7 times the risk
- digital users had 3.8 times the risk
- cordless phone users had 2.2 times the risk.

The study has important implications for mobile phone use.

It suggests that both a long latency period and a large time span (at least ten years) are needed to see the brain tumour connection. This means that the brain tumours that have so far been identified may just be the tip of the tumourogenic iceberg. "Since the use of cellular and cordless telephones has increased during most recent years it is too early to detect a change of brain tumour incidence in cancer registries," say the researchers.

So what should mobile phone users do in the meantime? It may be time to take precautions now. "Don't use a mobile phone without a hands-free," Dr Mild told EMR and Health.

And what does it say about the adequacy of existing international radiation standards? Mild replies, "Well, all phones are presumably below the accepted standard and still we see this!"

Reference:

Hardell, L et al, *Int Arch Occup Environ Health,* March 16, 2006. Available on line at: http://www.arbetslivsinstitutet.se/pdf/060331MildHardell_Article.pdf.

EMR Protection

A German company has developed an economical and convenient shielding method for low and high frequency electromagnetic fields.

Whether to prevent uncomfortable symptoms, to take precautions for health or to protect equipment from electromagnetic interference, shielding is an effective tool in reducing the impact of electromagnetic radiation. As radiation-emitting technologies become more and more widely used in our society, the benefits of shielding grow.

Germany company Yshield has developed an easy and affordable way of shielding that is available to expert and layman alike. It has a range of shielding paints and fabrics that are suitable for domestic and workplace use.

"Compared to other shielding products, the paint has a number of advantages," says company spokesman Bernhard Liebl. "Its shielding capacity has been tested and certified by an independent laboratory. There's the ease of application. If you want, you can do this type of shielding work by yourself without needing to employ a construction professional and it's environmentally safe."

The paints provide protection against high frequency (HF) and low frequency electromagnetic fields. They contain a conductive carbon base which, unlike shielding paints containing metal particles, does not corrode or oxidise over time.

The paints are suitable for use by people with electromagnetic or chemical sensitivity. They are water-based and contain no toxic solvents, plasticisers, film-forming agents, for example, and they have been well-received by the building biology community in Europe.

The effectiveness of both the paints and the fabrics has been tested by the University of the German Federal Armed Forces.

High frequency shielding paint

This paint blocks high frequency electromagnetic radiation from communications sources to a frequency of 18 GHz. This includes signals from mobile phone antennas, TV and radio antennas, CB radio antennas, wireless networks (WLAN), cordless phones etc.

One coat of paint has been found to block up to 99.99% of incoming radiation (The thicker the paint, the greater the protection.)

Low frequency shielding paint

This paint protects against low frequency electric fields from electrical sources such as power lines, wiring, electrical equipment or machinery.

It blocks up to 100% of the external field, providing a sufficient area has been covered.

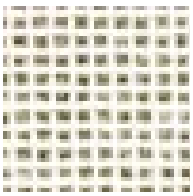
Radiofrequency engineer Jerry Lin claims that painting his apartment, which was located near a mobile phone tower, with the shielding paint resulted in huge improvements in his sleep. "I painted my bed room and living room. Now I can sleep very well. I took measurements before and after I applied the paint. Before shielding the readings were 200 microwatts per square meter; and now they are below 0.7 microwatts per square meter."

For users outside Europe, the paints come in powdered form to be mixed with water before application. Being carbon-based, they are black in colour and can be sealed and repainted in the desired shade.

For maximum protection, the paints should be grounded and a purpose-designed grounding plate is available with instructions for installation.

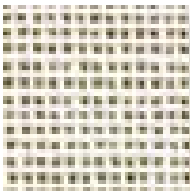
The company also has a range of fabrics that reflect high frequency radiation and are suitable for use as curtains or bed canopies. All contain silver-coated copper thread and are washable and can be ironed.

Naturell Fabric



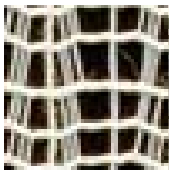
This maximum-strength shielding fabric reflects 99.99% of HF radiation at 1 GHz. It is a white, semi-transparent and made of cotton.

Evolution Fabric



This is a white, semi-transparent synthetic fabric that reflects 99.9% of HF radiation at 1 GHz.

Topas Fabric



This is a very transparent white synthetic fabric that reflects 99% of HF radiation at 1 GHz.

Ordering

The shielding paints and fabrics are available in Australia from EMR Australia. Contact our office for details by phone on 02 9501 2665 or email at office@emraustralia.com.au.

How to shield a home or workplace with shielding paint

1. Identify the location of the field that you wish to block.

Correctly identifying the location of the incoming signal allows you to identify the most appropriate surfaces to shield. Because the shielding materials reflect the RF signal, you will want to make sure that this reflection does not increase the exposure in another room or area.

You can best identify the location of the incoming signal by either taking measurements yourself or organising someone else to do so.

2. Prepare the surface.

Remove grease or oil stains and wallpaper that is water-soluble. Sand smooth surfaces that do not have good adhesion. You may need to coat porous or highly absorbent surfaces.

3. Calculate the quantity.

One litre of interior paint covers 7 - 10 square metres of wall, depending upon thickness of coat and absorption of the surface.

4. Prepare the paint

Do this by mixing each one-litre packet with exactly 0.65 litres of water for the HF-paint. Be sure to follow the applicable handling and processing instructions, as the instructions are different for different types of paint. Mix thoroughly, preferably using an electric mixer.

5. Ground the painted surface.

Attach the Ground-Connection-Set ESP by following the instructions so that the low-frequency fields are conducted to earth.

6. Seal and repaint surface.

Allow between 12 and 24 hours for shielding paint to dry. Paint with a thick coat of latex sealing paint (avoid sodium silicate paints).

This home has been painted with HF shielding paint.

Shielding paint has been covered with sealer and top coat.

Exposure at one location inside the house reduced from 193.9 μW/cm² before shielding to 00.1 μW/cm² after shielding.

The German Building Biology Institute Neubeuern (IBN) (www.baubiologie.de/site/english.php) has produced Guidelines for Sleeping Areas that recommend precautionary limits to different sources of exposure to prevent long-term effects.

It recommends the following limits for sleep places:

- 50 Hz electric fields: 1 - 5 V/m (compared to International Guidelines of 5000 V/m for general public)
- 50 Hz magnetic fields: 0.2—1 mG (compared to international guidelines of 1000 mG for general public)
- pulsed Radiofrequency radiation: 0.1 - 5 μW/m² (compared to international guidelines of 95,000 μW/m²).

News from around the globe

UK power line report

A UK committee has recommended that houses not be built under high voltage power lines. The report is the work of the Stakeholder Advisory Group on Extremely Low Frequency Electromagnetic Fields (SAGE). The Group was established by the Department of Health in 2004 in response to a study by Dr Gerald Draper which found an increased risk of childhood leukemia among children living near high voltage lines in Britain.

Though SAGE's report has not yet been released, its contents have been glimpsed by Britain's *Telegraph* newspaper. The newspaper reports that the SAGE document presents four possible scenarios for ensuring that powerlines are not in close proximity to homes. These include stopping construction of new homes near power lines and of power lines near homes and the purchase of all existing homes near high voltage lines.

The cost of these measures has been estimated at between £3 billion and £7 billion. (*Telegraph,* 29.04.06.)

It's official

Britain's Health Protection Agency (HPA) has acknowledged the existence of electrical hypersensitivity. At its first meeting on 2 March, the HPA's EMF Discussion Group responded to the RDP report on Electrical Sensitivity prepared by Dr Neil Irvine last year. "It was agreed that it was a step forward that this important report acknowledged that the condition of hypersensitivity exists and that it affects some people in the population."

The meeting considered that there is a need to understand the mechanisms that cause ES and to look at treatments that have been reported as helpful. (http://www.hpa.org.uk/radiation/understand/radiation_topics/emf/emfdg/emfdg_minutes_2_3_06.pdf)

Cordless phone warning

A German government agency has issued a warning about the use of cordless (DECT) phones. "According to current scientific knowledge nationally and internationally, there are indications for biological effects of high frequency electromagnetic fields which are the means of transmission for DECT phones", said the Federal Agency for Radiation Protection (BfS) in a press release of 31 January.

The Agency advises that DECT phones are usually the highest source of high frequency radiation inside a home, because the "base station" is continually transmitting signals.

"To prevent possible health risks, the BfS recommends minimising personal radiation exposure." For people who continue to use cordless phones it recommends:

- locate the base station away from high use areas;
- make short calls only
- use the latest generation of phones which are emission free when not in use.

(http://www.bfs.de/bfs/presse/pr06/pr0602)

Telco licence halt?

A suit has been filed in a US court seeking to stop the imminent auction of new telecommunications licences. Ms Maria Gonzales filed the suit in the District Court for the Eastern New York District on 27 April. She is seeking an injunction to prevent the Federal Communications Commission from auctioning 1122 licences for the operation of an Advanced Wireless Service (AWS) across the US without preparing an environmental impact statement (EIS). According to Ms Gonzales, failure to prepare the EIS violates the National Environmental Policy Act of 1969.

The licence auction is expected to bring in $ 1 167 037 500 (US).

(EMR Policy Institute, Press release 02.05.06 <http://www.emrpolicy.org/litigation/case_law/index.htm>)

Sonar kills whales

The UK navy has recognised that its military sonar may be causing the death of whales and other marine mammals. Scientists have found evidence that the low frequency signals it uses, which travel hundreds of kilometres, are causing the mammals to become disoriented and rise too quickly to the surface, resulting in death from decompression (similar to the bends in humans). The signal appears to be interfering with the whales' ability to navigate.

The navy is responding by developing software to detect the presence of marine mammals within just over 2 km of their ships. If mammals are detected, the sonar will be turned off. (*Sunday Times,* 26.03.06.)

University takes precautions

A Canadian university has rejected the installation of wireless internet services across campus. Dr Frederick Gilbert, President of

Lakehead University in Ontario, has decided not to allow WIFI services in those areas of campus served by the existing fibre optic network. Gilbert, a biologist, says he based his precautionary decision on scientific evidence indicating potential health risks from long-term RF exposure. (*IT Business* 23.01.06.)

Politics and towers

A new political party has been established in Sweden to address the issue of mobile phone towers. The Folkets Vilja (People's Will) was established by Donald Forsberg and will field candidates in the September national elections.

The party's stance on mobile phones requires that the deployment of new wireless technologies should be postponed until it has been scientifically proven that they do not cause any long-term negative effects on human health and the environment, including birds and animals. It seeks to apply the "principle of caution until proved harmless" which is enshrined in legislation in both Sweden and the European Union.

According to spokesman Tomas Fasth, "More and more people are getting sick because of the new wireless microwave-based communication systems like UMTS and TETRA. Many of the affected people can no longer work, some are suffering so badly that they are forced from their homes due to nearby antenna clusters on towers, masts and buildings. (correspondence)

Conference on Precaution

The first national conference on precaution is being held in the US from 9 to 11 June. Organised by the Center for Health, Environment and Justice, the three-day Conference will feature speakers, workshops and tools for addressing environmental hazards. The conference will be held in Baltimore, Maryland. (www.besafenet.com)

Computers & postural pain

Computer-related activities appear to increase the incidence of neck, shoulder and lower-back pain, according to new research.

Researchers in Finland conducted a survey of adolescents' computer use and their incidence of neck and shoulder pain (NSP) and lower back pain (LBP).

They found that young people who used computers had a higher rate of neck and shoulder pain than non-computer-users. The risks were:

- 1.3 times higher for using computers 2-3 hours a day;
- 1.8 times higher for using computers 4-5 hours a day;
- 2.5 times higher for using a computer for 42 hours or more a week;
- 1.7 times higher for using the internet for 42 hours or more a week.

The risk of lower back pain also increased with the number of hours spent using computers. It was:

- twice as high for using computers for more than 5 hours a day;
- 1.7 times higher for using computers for more than 42 hours a week;
- 1.8 times as high for using the internet for more than 42 hours a week;
- twice as high for playing digital games for more than 5 hours a day.

The researchers concluded that the threshold for neck and shoulder pain seemed to be 2-3 hours of computer use a day; for lower back pain it was more than 5 hours.

The research, led by Dr P Hakala, appeared in the March issue of the European Journal of Public Health.

Static Electromagnetic Fields

The World Health Organisation (WHO) has recently reviewed the effects of high static magnetic fields on human health. These fields are found in electric trains, TV or computer cathode-ray screens, aluminium production, gas welding and in medical applications such as MRI.

WHO states that "It is not possible to determine whether there are any long-term health consequences even from exposure in the millitesla range because, to date, there are no well-conducted epidemiological or long-term animal studies."

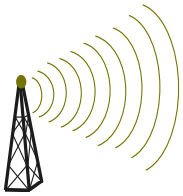
As a consequence, it recommends precautions "to protect the public and workers from possible adverse effects". These include:

- keeping a distance from the fields that may pose a risk
- enclosing fields
- staff education.

WHO also recommends protection of medical staff and patients (particularly children and pregnant women) and workers in industries producing high magnetic fields.

The WHO's findings have been published in Environmental Health Criteria Monograph No 232 and are summarised in a fact sheet (no 299) which can be found on line at <http://www.who.int/peh-emf/publications/reports/ehcstatic/en/

Watt's the Buzz!!!



As Australia's electrical grid reaches capacity, the CSIRO (Australian Commonwealth Scientific and Industrial Research Organisation**),** is developing technology to reduce electricity consumption. The system involves the use of smart technology that can monitor prices and consumption and allow users to turn off equipment at certain times. The Organisation has invited electrical utilities to become sponsors of the project. (*Australian IT,* 18.04.06.)

Tower ban

Mexican county of Rio Arriba has placed a temporary ban on the construction of new telecommunications towers. The ban, which will be in place until the end of January next year, will give the county administrators time to develop new regulations for the infrastructure. The county commissioner who introduced the ban says he wants to allow members of the public more input about the siting of the towers. (*New Mexican* 31.03.06; http://www.freenewmexican.com/news/41626.html#)

Crooks tread a straight path

US prison officials are using technology to keep offenders on the straight and narrow. Paroled criminals are being fitted with ankle bands containing Global Position Systems (GPS) with navigational functions. The anklets emit signals that enable the wearer to be tracked so that officials can monitor their movements. The pilot program is being conducted in San Bernardino, California. (*Australian IT,* 17.03.06.)

Phone ban in schools

Officials in Bavaria, Germany, have banned children's use of mobile phones in schools. The new regulation, which aims at preventing children's access to unsuitable content during schools hours, will not prevent students from keeping their mobile phones - turned off - at school.. (*Seattle Post-Intelligencer* 28.03.06.)

More high frequencies

The use of third generation (3G) mobile phones to access the internet is growing. A recent survey has found that around 28% of mobile phone users worldwide are now using their phones for this purpose. Brian Cruikshanks of market research firm Ipsos believes the trend will continue, taking over some of the functions of the computer. (*Australian IT* 24.04.06.) 3G mobile phones use higher frequencies than their 2G counterparts and have been associated with more adverse effects in some reports.

Stealth by Quasar

Want to make sure the contents of your mobile phone conversations remain secret? Use a quasar.

Japanese scientists have proposed using the radio signal emitted by quasars from outer space to encrypt secret communications. The concept is the brain child of Ken Umeno, from Tokyo's National Institute of Information and Communications Technology. Umeno suggests that the randomness, the strength and the wide frequency range of the quasar signal would make them ideal for the purpose. To unscramble the message, sender and receiver would need to be "tuned into" the same quasar at the same time. The scientist predicts that the technology could be useful for embassies, financial institutions and other high-security businesses. (*New Scientist,* 29.03.06.)

TV on the Go

Mobile phone giant Nokia predicts that using mobile phones to watch TV will be common place by 2008. Trials of mobile phone TV have so far proven successful with consumers and mobile phone and broadcast companies appear keen to pursue the technology. (*Australian IT,* 03.03.06.)

Ads target phones

Mobile phones may become the next big target for advertisers, believes Bruce Akhurst, CEO of Sensis in Australia. According to Mr Ackhurst, sending ads to mobile phones of locals is likely to be the next trend in advertising. He predicts that businesses will target potential shoppers who will use their mobile phones to check product information and prices and will make purchases with them. (*Australian IT,* 28.04.06.)

Drinkers Beware

Unruly drinkers may be banned from British pubs with the use of the latest in scanning technology. Six UK pubs have installed a scanning system known as "In Touch" that electronically reads fingerprints of people wishing to enter and compares them with a computer data record. Those with a history as troublemakers are being denied entry. (*Australian IT,* 01.05.06.)

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with the findings of other residential studies. In an analysis of residential studies on power lines in 2000, Dr Sander Greenland found an increased risk of leukemia in children exposed to over 2 mG with increased risk at higher exposures.

In the same year Dr Anders Ahlbom found that children exposed to over 4 mG had double the expected rate of leukemia. In 2001 Sir Richard Doll also found double the risk of leukemia for children exposed to over 4 mG.

As a result of studies such as these, in 2001 the International Agency for Research on Cancer classified magnetic fields of 4 mG and over as possibly carcinogenic to humans. The present study adds weight to this connection.

Four milligauss is one 250th of the recommended public exposure level of the International Commission for Non Ionizing Radiation Protection (ICNIRP) and many international standards, including present Australian guidelines.

According to the authors, the present study has an advantage over previous residential studies by providing more accurate measurements of exposure. This is because week-long measurements were taken as well as spot measurements for each subject; because measurements were taken in close time proximity and because they were taken close to the time of diagnosis.

The study was conducted at the recommendation of the World Health Organisation for residential studies in high exposure countries. It is the first large-scale study of this sort to be conducted outside Europe and the US.

References

1. Kabuto, M et al, *International Journal of Cancer* 22 Feb 2006.
2. Greenland, S et al, *Epidemiology,* 11(6):624-34, 2000.
3. Ahlbom A et al, *Brit J Cancer,* 83(5): 692-8, 2000
4. NRPB, *Documents of the NRPB,* 12(1), 2001.

Birds

Electromagnetic fields are affecting wildlife, say experts

It's not just people who are affected by the electromagnetic fields (EMFs) from power lines. Birds are too, said James Reynolds from the School of Biosciences at Birmingham University in the UK.

Speaking at the 17 March Workshop on the Impacts of Non Ionizing Radiation on Wildlife, Dr Reynolds explained that scientists have documented specific changes in birds exposed to high fields, often as a result of nesting on or near electricity pylons.

At the Workshop, Dr Reynolds presented the results of scientific research which shows that EMFs generally change, though not always consistently, a range of parameters. His presentation reported the results of a paper he published last year with Dr Kim Fernie of Environment Canada.

The researchers observed that, "much of the research has found that EMF exposure has generally affected birds, and most of the effects have been adverse. EMF exposure, either in the field or at environmentally relevant levels in laboratories, has altered the behaviour, physiology, endocrine system and the immune function of birds, which generally resulted in negative repercussions on their reproduction or development." These effects were observed in multiple species.[1]

At least fifteen species of birds now nest on electricity pylons during breeding season, leading to high exposures for relatively long periods of time. This includes white stork, the osprey, the great-horned owl and various species of eagles, hawks and falcons.

The effects of these exposures has relevance to the long-term viability of these bird populations as well as having implications for human health.

1 Fernie K & Reynolds, J *J of Toxicology and Environ Health* Part B, 8:127-140, 2005.

(Continued from page 3)

electrical contractors reduce the public's exposure to EMF. However, he adds that he would like to see the precautions go further still. "No meter boxes should be installed on a bedroom wall," he says, "and the guidance should advise that conductivity in metal water pipes (which often leads to high exposure in homes) can be eliminated by inserting a segment of high-pressure plastic pipe."

A copy of the draft standard is available on line from http://www.saiglobal.com/shop/Script/Details.asp?DocN=MSWD060010ATCRD A copy of EMR Australia's submission to it is available by email on request. Submissions on the draft can be forwarded on line to terry.mcgovern@standards.org.au.

*In late 2005 the ESAA delegated responsibility for electromagnetic fields to the Energy Networks Association (ENA).

Exposure and leukemia survival

Does exposure to electromagnetic fields from the power system reduce the chances of surviving childhood leukemia?

In the first study to explore this question, US researchers have examined the long-term survival of children with acute lymphoblastic leukemia (ALL). They found that children exposed to 3 mG or more had a higher risk of not surviving the disease. However, results were based on small numbers.

Childhood leukemia has been associated with exposure to magnetic fields from powerlines in a number of international studies.

(Foliart, DE et al, *Brit J Cancer* 94:161-164, 2006.)