

EMR and Health

Electromagnetic radiation,
health and well-being

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Editor.....	Lyn McLean
Sub Editor	Sarah Evans

Publisher EMR Australia Pty Ltd

ABN 82 104 370 658

PO Box 347,

Sylvania Southgate NSW 2224

Tel: 61 2 9576 1772

Web: www.emraustralia.com.au

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EMR and autism

Researchers from the US propose a link between electromagnetic fields and autism.

The physiological problems that are observed in patients with autism spectrum conditions are almost the same as those observed in subjects exposed to electromagnetic radiation, say Martha Herbert and Cindy Sage in two papers published in the journal *Pathophysiology*.

Autism spectrum conditions (ASCs) have become more prevalent in the years since exposure to electromagnetic fields and wireless radiation have increased dramatically. Some of the biological changes that occur in people with these conditions are present in other chronic health problems.

'DNA damage, immune and blood-brain barrier disruption, cellular and oxidative stress, calcium channel, disturbed circadian rhythms, hormone dysregulation, and degraded cognition, sleep, autonomic regulation and brainwave activity all have commonalities between ASCs and EMF/RFR,' the authors concluded.

Herbert and Sage observed that abnormalities in people with autism are consistent with mitochondrial damage which has shown to be caused by exposure to EMR.

Similarly, people with ASCs often have low levels of melatonin and melatonin is often disrupted by EMR.

Other parallels between symptoms of ASCs and the effects of EMR that have been documented in scientific

'DNA damage, immune and blood-brain barrier disruption, cellular and oxidative stress, calcium channel, disturbed circadian rhythms, hormone dysregulation, and degraded cognition, sleep, autonomic regulation and brainwave activity all have commonalities between ASCs and EMF/RFR.'

literature include:

- ◆ disturbed sleep
- ◆ immune problems
- ◆ changes to neurons
- ◆ brain inflammation
- ◆ changes to sensory processing
- ◆ dysregulation of the autonomic nervous system
- ◆ breaches of the blood-brain barrier.

The remarkable convergence of symptoms does not prove that EMR causes ASCs, the authors say. But it does suggest that EMR may be contributing to these conditions, especially in exposed fetuses.

'We argue that the evidence is sufficient to warrant new public exposure standards benchmarked to low-intensity

(Continued on page 12)

Malignant tumours

Long term use of mobile and cordless phones increases the risk of developing malignant brain tumours.

In the first study to investigate a latency period of 25 years or more, Swedish researchers have found that long-term mobile phone use is associated with an increased rate of malignant brain tumours.

The study was conducted by Lenart Hardell, an oncologist from University Hospital in Orebro, and his team. It included Swedish men and women diagnosed with brain tumours during the period 2007 to 2009.

Some of the key findings of the study were as follows.

- ◆ Analogue phone users had 1.8 times the expected risk of malignant brain tumours and people who had used the phones for 25 years or more had 3.3 times the risk.
- ◆ 2G phone users had 1.6 times the risk of malignant tumours, increasing to double the risk for 15-20 years of use.
- ◆ 3G mobile phone users had 1.6 times the risk of malignant tumours and no long-term data were available because the technology is comparatively new.
- ◆ People who had used cordless phones for 15-20 years had double the rate of malignant tumours.

Using a mobile or cordless phone on the same side of the head as that where the tumour was located resulted in even stronger associations.

Higher rates of tumours were found in the temporal lobes—which is close to the position where the mobile phone is held.

When Hardell looked at the people who had used wireless phones for the greatest number of hours, the risks were greater.

- ◆ Analogue phone users had

nearly eight times the rate of malignant tumours.

- ◆ Digital and cordless phone users each had over three times the risk.
- ◆ 3G phone users had over five times the risk.

This is equivalent to just 40 minutes of phone use per day for ten years—a figure that is surpassed by many phone users today.

Hardell's most recent study helps explain why the link between mobiles and tumours has often been overlooked. 'Our results indicate that such an effect would be apparent after more than a 20-year use of mobile phones, and thus be too early to be found in cancer registries,' the authors say.

The authors suggest that mobile phone radiation could cause the tumours by free radical damage to DNA. 'These findings support the idea that low energy RF-EMF that is insufficient to directly induce DNA strand breaks may nonetheless produce genotoxic effects in the form of DNA base damage.'

Hardell's team has conducted numerous studies on the link between mobile and cordless phone use and the risk of brain tumours and his findings contributed to the 2011 decision by the International Agency for Research on Cancer to classify radiofrequency radiation as a class 2B carcinogen. Last issue we reported his observation that people who had used a digital or cordless phone for more than 20 years had over eight times the normal rate of acoustic neuromas.

(Hardell, L et al, 'Case-control study of the association between malignant brain tumours diagnosed between 2007 and 2009 and mobile and cordless phone use', *Int J Oncol*, 43: 1833-1845, 2013, 10.3892/ijo.2013.2111)

World's First EHS zone

A project is underway to establish the world's first EMF-free zone for people with electromagnetic hypersensitivity (EHS). On Thursday 30th October, politicians, councillors, scientists and representatives of the EHS community met at the site under consideration in Dubon in the Hautes Alps of France.

Pierre Le Ruz, President of the Centre for Research and Independent Information on electromagnetic radiation, said that the site is promising. Tests showed that it had low electromagnetic fields—but a power line and transformer may need to be buried to further reduce exposure. Mobile phone companies will also be asked to reduce exposure at the site.

One of the instigators of the project is local Mayor, Jean-Claude Gast who was touched by the plight of EHS sufferers living in a cave in the area.

The next step in the process is for people with EHS to visit the site to see whether it meets their needs.

It is expected that the site will contain accommodation for people with the condition and a medical centre for treatment. It could be up and running within two to three years. (*Le dauphine.com*, 31.10.13.)



Bedding risks

Mattress choice may impact cancer risks.

Sleeping on a spring-coil mattress could increase the risk of developing cancer, according to researchers from Sweden and Finland. In a paper published in *Advanced Studies in Medical Sciences*, Örjan Hallberg, Paavo Huttunen and Olle Johansson presented the results of their study into cancer incidence and sleeping habits in four countries.

They found that the incidence of breast cancer remained relatively constant in Denmark and Sweden before 1955 and increased after 1958. In Denmark the incidence was 42 per 100,000 people annually, whereas it is currently 80,000 per 100,000 in Sweden and 95 per 100,000 in the US.

The authors found a similar increase in melanoma levels in Denmark, Sweden and the US after 1955.

These cancer increases corresponded with the introduction of FM radio.

Remarkably, there was no such increase in cancer and melanoma rates in Japan over the same period.

To explain this anomaly, the authors

hypothesized that cancer incidence could be related to the amount of time spent sleeping on a metal-coil mattress. In Sweden, Denmark and the US, approximately 70 percent of the population sleep on metal coil mattresses, whereas most people in Japan do not.

To test their theory, the researchers measured the fields on the surface and just above mattresses with metal coils and beds without and assessed the impact on a person lying on their side on the mattress.

They found that the part of the body closest to a metal-coil mattress had lower fields because the currents in the body and those in the metal effectively cancelled each other. However, above the mattress, at the part of the body furthest from the mattress, the fields were higher—caused by reflected and standing waves.

‘These measurements show clearly, that a metal spring mattress is capable of changing electromagnetic fields and creating new standing

waves, which may disturb the immune system and be harmful to health if a person is sleeping in such an environment,’ the authors wrote.

The theory that standing waves can harm the part of the body furthest from the mattress is supported by data showing that most people sleep on the right side of their body for longer than they do on the left and that the left side of the body is more prone to both breast cancer and melanoma.

Further, people in western countries who spent more time sleeping on a metal-coil mattress had higher risks of cancer, whereas in Japan, longer sleep reduced cancer incidence.

If their hypothesis proves sound, the authors suggest there could be a very simple way for people to reduce cancer risks—to sleep on a non-metal mattress.

The study, ‘Cancer Incidence vs Population Average Sleep Duration on Spring Mattresses’ will be published next year. (Hallberg Ö, Huttunen P, Johansson O, *Adv Stud Med Sci* 2014; 2: 1-15.)

French recommendations

A French environment authority recommends precautions to reduce exposure.

On 15 October the French Agency for Food, Environmental and Occupational Health & Safety—ANSES—released a report updating its position on radiofrequency radiation.

In announcing the release of the report, the Agency wrote: ‘This update has not brought to light any proven health effect and does not result in any proposed new maximum exposure limits for the population. However, limited levels of evidence do point to different biological effects in humans or animals. In addition, some publications suggest a possible increased risk of brain tumour, over the long term, for heavy users of

mobile phones. Given this information, and against a background of rapid development of technologies and practices, ANSES recommends limiting the population’s exposure to radiofrequencies – in particular from mobile phones – especially for children and intensive users, and controlling the overall exposure that results from relay antennas. It will also be further developing its work on electro-sensitive individuals, specifically by examining all the available French and international data on this topic that merits closer attention.’

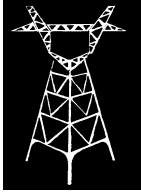
ANSES recommended limiting exposure to RF radiation, especially for

vulnerable groups, in the following ways:

- ◆ ‘for intensive adult mobile phone users (in talk mode): use of hands-free kits and more generally, for all users, favouring the purchase of phones with the lowest SAR_{10g} values;
- ◆ ‘reducing the exposure of children by encouraging only moderate use of mobile phones;
- ◆ ‘continuing to improve characterisation of population exposure in outdoor and indoor environments through the use

(Continued on page 12)

Research Updates



ELF fields **(from electrical sources)**

Exposure to electromagnetic fields may contribute to miscarriages, according to research from Iran. F Shamsi Mahmoudabadi and colleagues conducted a study on 58 pregnant women and 58 women who had suffered miscarriages—collecting questionnaire information and measuring exposures in their homes. They found that women who had suffered miscarriages had higher home exposures than women who had not. The authors concluded that exposure to these fields ‘is probably related to early spontaneous abortions.’ (Shamsi Mahmoudabadi, F et al, *J Res Health Sci*, 13 (2): 131-134, 2013.)



Exposure to electromagnetic fields from power sources can have a detrimental effect on liver function. In a study from China, X Liu and team compared the health of factory workers with various levels of exposure. The more exposed groups showed changes that were detrimental to liver function. (Liu, X et al, *Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi* 31 (8):599-601, 2013.)



Magnetic fields may have detrimental effects on the brains of foetuses and newborns, according to research from Hungary. T Balassa and team chronically exposed rats either in utero or for 7 days shortly after birth. They found that both treatments affected the hippocampus and exposure soon after birth affected the neocortical area of the brain. They concluded that these fields have ‘significant effects on basic neuronal functions’ in

the developing brain. (Balassa, T et al, *Int J Dev Neurosci.*, Sep 6, 2013.)



Could being exposed to magnetic fields increase the risk of breast cancer? To answer this question, Chinese researchers reviewed 23 studies published between 1990 and 2010. They found that overall the studies showed a very small increased risk for exposed women but the risk was slightly higher for premenopausal women or women who were estrogen receptor positive. (Chen, Q et al, *Plos One*, 8(7), 2013.)



Radiofrequency radiation **(from telecommunications sources)**



Could foetal exposure to mobile phone radiation affect the testicles of newborns? That was the case in a study by H. Hanci and team from Turkey. The researchers exposed pregnant rats to a signal of 900 MHz for a week during pregnancy. After birth, exposed rats showed more detrimental effects on the testes—including decreased diameter of somniferous tubules and DNA oxidation—than rats unexposed as fetuses. (Hanci, H et al, *Reprod Toxicol*, Oct 1, 2013.)



Mobile phone radiation causes free radical damage that may lead to tumours, according to A Burlaka and team. The Ukrainian scientists exposed embryos of Japanese quails to mobile phone signals of 900 MHz for up to 360 hours. Exposure led to ‘significant overproduction of free radicals’ and DNA damage that could, the au-

thors suggested, have carcinogenic consequences. (Burlaka, A et al, *Exp Oncol* 35(3), 219-225, 2013.)



Wireless technologies may have harmful effects on the young, suggested researchers from Turkey. A Ozorak and colleagues exposed rats to WiFi and mobile phone signals of 2.45 GHz, 900 MHz or 1800 MHz for one hour a day during pregnancy or after birth. They found that exposure from both WiFi and mobile phone radiation had detrimental effects on the animals’ livers. It caused oxidative damage by increasing lipid peroxidation and iron levels and decreasing antioxidants, copper and reduced glutathione. (Ozorak, A et al, *Biol Trace Elem Res* Oct 8, 2013.)



Vitamin E may have a protective effect against mobile phone damage. X Gao and colleagues from China exposed pregnant rats to a 900 MHz mobile phone signal for three hours a day for 21 days and treated some with vitamin E. Treatment with Vitamin E diminished the free radical damage and problems with energy metabolism caused by radiation exposure. (Gao, X, *Wei Sheng Yan Jiu* 42 (4), 642-6, 2013.)



Fourth generation mobile phone radiation affects the brain. In the first study on Long Term Evolution (LTE) technology, Chinese researchers exposed volunteers to a mobile phone signal for 30 minutes at the right ear and took MRI images of the brain before and after exposure. Exposure affected not just the part of the brain closest to the phones, but the left hemisphere as well. (LV, B et al, *Clin Neurophysiol* 201, Sep 4, 2013.)

The link between mobile phone radiation and brain cancers should be considered causal, say two researchers from Sweden. L Hardell and M Carlberg reviewed the literature on wireless radiation in light of nine criteria for causality that were described by Bradford Hill in 1965 and are known as the Bradford Hill

Criteria. Hardell and Carlberg concluded that mobile phone radiation can be considered to *cause* gliomas and acoustic neuromas and said that the international Agency for Research on Cancer should classify the radiation as a Group 1 (rather than Group 2B) carcinogen. (Hardell, L and Carlberg, M, *Rev Environ Health* 28(2-3)97-106, 2013.)



Ginseng was shown to protect against radiation damage in a study from Korea by D Maskey and colleagues. The researchers exposed mice to RF radiation for one month. Pre-treating mice with ginseng prevented changes to levels of calcium binding proteins—changes which can cause brain damage. (Maskey, D et al, *Biomed Res Int* Aug 29, 2013.)



Mobile phone radiation may adversely affect the nervous system. S Köktürk and colleagues chronically exposed rats to 900 MHz signals before and after birth. Exposed rats had degeneration of Purkinje brain cells. These effects were prevented by treatment with extract from *Lycopersicon esculentum*—a variety of tomato with medicinal properties. (Köktürk, S et al, *Exp Ther Med* 6(1):52-6, 2013.)



Radiation from short-wave diathermic devices used in physiotherapy may cause health problems for workers and patients, according to Polish research. J Karpowicz and K Gryz undertook measurements of 12 such devices and

found hazardous fields up to 62 cm from them. People with implantable medical devices could have been adversely affected up to 90cm from a device, the authors said. (Karpowicz, J and Gryz, K, *Biomed Res Int*. 2013:150143, 2013.)



Two European researchers have devised a simple test to gauge the effects of wireless radiation. They have found that exposure to mobile and cordless phones, WiFi routers and similar devices affects the locomotion of ants. (Cammaerts, MC and Johansson O, *Electromagn Biol Med*, Aug 26, 2013.)

Other studies showing effects from RF exposure

- ◆ Mobile phone signals of 1800 MHz caused short-term changes to the central nervous system. (Moretti, D et al, *Bioelectromagnetics* Aug 1, 2013.)
- ◆ Subjects exposed to a RF signal near the ear had changes to brain waves in different regions of the brain. (Lv, B et al, *Clin Neurophysiol*, Sept 4, 2013.)



Studies showing no effects

- ◆ Working in magnetic fields did not increase the risk of breast cancer in Chinese textile workers. (Li, W et al, *Am J Epidemiol* 178(7),1038-45, 2013.)
- ◆ Young rats exposed to mobile phone radiation did not develop testicular damage. (Tumkaya, L et al, *Toxicol Ind Health* Oct 4, 2013.)

Electromagnetic hypersensitivity

Scientists from Sweden looked at the relationship between people's exposure to different kinds of environmental sources. From questionnaires to nearly 3,500 subjects, they determined that there was a greater overlap between intolerance to chemicals/buildings/EMF and sound than would be expected to occur. They wondered whether the different types of environmental intolerance might share a common mechanism or whether sufferers might be similarly predisposed to acquire them. (Palmquist, E, *Int J Hyg Environ Health* Aug 19, 2013.)



Problematic phone use

Chinese scientists have found a link between problematic mobile phone use and suicide. From a survey of over 5000 adolescents, they found that 10% had problematic phone use and that those with problematic phone use were more likely to consider or attempt suicide. (Wang PW et al, *Compr Psychiatry*, Oct 19, 2013.)



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.

Updates from around the globe



Belgian phone ban

'Together Magazine' has reported that the Belgian Government is planning to ban the sale of mobile phones to young children because of concerns about the risks to children's health.

Health Minister Laurette has advised that the Government will not allow sales of mobile phones to children under seven years of age either in shops or online. It will also ban the advertising of mobile phones to children on TV, radio and the internet. (*Expatica.com* 24.10.13.)

Smart decision

The Queensland Government will not be forcing smart electricity meters on householders. According to a discussion paper released in September, customers will be able to choose whether or not to have the meters installed.

The report noted that the cost of rolling out smart meters in Victoria has blown out to over \$2 billion—compared with the \$900 million the state government had originally estimated. (*Tech World*, 11.09.13.)

EHS gathering

In August a group of French people suffering from electromagnetic hypersensitivity (EHS) met in an isolated region in Drôme. During the three-day gathering, the attendees called on the government to establish a radiation-free zone where they can live safely.

The attendees included some people who are so sensitive to electromagnetic signals that they are unable to live in conventional housing and must cover themselves with shielding fabric.

One woman developed symptoms after the installation of WiFi at a university where she worked. Another, a former Professor of technology, developed sensitivity after working in a room with 24 computers and took early retirement. A third developed EHS at the age of 14 after a mobile phone tower was installed near her home. (*Le Monde* 30.08.13.)

Malaysia –call for caution

The National Parents and Teachers Association (NPTA) of Malaysia has called for precautions to protect teachers and students from wireless radiation.

The call comes in response to the construction of mobile phone base stations inside schools to deliver 4G technologies. Over seven thousand base stations have already been constructed and the project is expected to be completed in late 2014.

The Chairman of the NPTA Datuk Ali Hasan said that construction should cease until the technology has been proven safe. He called on the government to undertake a study on the health effects of radiation from the towers on children. (<http://www.fz.com/content/national-pta-wants-study-telco-towers-school>)

Internet addiction

A study by Nihon University in Japan, has revealed that over eight percent of students aged 12 to 18 are addicted to the internet. Their symptoms include obsession with online activities, depression, deteriorating academic performance, deep vein thrombosis and, sometimes, sleep problems.

So great is the problem, that the Japanese government is planning to establish specialized camps to address

the issue. The camps, which will be wireless-device-free, will encourage the development of interpersonal skills and outdoor activities and provide counseling services. (*CNET*, 30.08.13.)

WiFi turned off

Parents in Winlaw, Canada have succeeded in persuading the local school board to turn off WiFi at the local elementary school based on concerns for their children's health.

One of the parents who lobbied the Board recommended that WiFi removal become a district-wide policy as is the case in the Saanich School District. (*Nelson Star* 09.05.13.)

Chips for people

In September the US Food and Drugs Administration approved the use of implantable computer chips for people. The Verichip, manufactured by Applied Digital Solutions, can be inserted under a patient's skin with a syringe. When scanned, the chip releases a code that can be used to access the patient's medical history.

The possibility that the chip could be used to track people has raised privacy concerns. (*NBC News* 12.09.13.)

Smart solution

A Victorian man has removed a smart meter on his property by Powercor following health problems experienced by his daughter. In a letter to the CEO of the power company, the man explained that he took the action when the electrical company failed to respond to his concerns. The man installed an analogue meter and returned the digital smart meter to the power company's office. (*Media Release* 14.10.13.)

EHS recognised

Electromagnetic hypersensitivity has been recognised as a disability in France. A 56-year-old graphic designer, no longer able to work on a computer, has been classified as disabled by the Department of House Disability. The worker suffers from headaches, fatigues, concentration and memory problems, dizziness, burning, nausea and sleep problems when exposed to EMR.' (*La Nouvelle République*, 05.11.13.)

Tower shutdown

A Ukrainian local council has instructed mobile phone carriers to dismantle several base stations, leaving residents of the alpine town of Yaremche with virtually no mobile phone coverage. The decision followed complaints of increased cancer rates following the installation of the antennas. Carriers say they will challenge the decision in court and the council is planning to hold public hearings on the issue. (<http://rt.com/news/ukrainian-town-mobile-network-083/>)

EU recommends precautions

A draft report released by a committee of the Council of Europe, recommends urgent action to protect children from harmful effects of wireless radiation. After reviewing evidence on the impacts of the radiation, the 84-member committee released a number of recommendations.

- ◆ Standards should be established for long-term exposure (current standards related to short-term exposure).
- ◆ Wireless devices should be clearly labeled with information about potential health risks.
- ◆ Wireless devices should be banned from classrooms.
- ◆ Education campaigns should be established to advise people about the risks of wireless radiation.

The report will be submitted to the Parliamentary Assembly for approval. (Telegraph, 24.11.13)

Smart meter signal

US researcher Sam Milham wrote to Don Maisch advising that signals from smart meters are generating a pervasive form of electromagnetic pollution. Here is his letter, reproduced with permission.

Dear Don,

In the last couple of winters, I have made dozens of measurements of electrical pollution in the grid, building wiring, the earth and in the air with a 2 channel Fluke 199 B oscilloscope in southern California where over 2 million smart meters have been deployed. The ground measurement uses 40 feet of wire between two ground probes (screw drivers). The building wiring measurements look at the 60 Hz waveform and the electrical pollution (dirty electricity) riding on it after passing it through a high pass filter. The primary neutral to earth voltage (PNEV) is

measured between the utility transformer ground wire at the base of a power pole and a ground probe connected to it by 40 feet of wire. The air measurements use a collapsible 23 inch antenna attached to an oscilloscope BNC terminal.

The bad news is that a 50 KHz signal is present everywhere in urban and very rural areas, in the grid, in the earth, in building and house wiring, in the PNEV, and in the air. It originates in the switching power supplies of smart meters. The type of smart meter doesn't seem to matter. The oscilloscope peaks match exactly, for the two meters being studied simultaneously. The ground voltage is higher in areas where smart meters have been deployed. (<http://www.emfacts.com/2013/09/grid-electrical-pollution-dirty-power-and-smart-meters/>)

Base station insurance risk

Building owners who allow a mobile phone carrier to construct a base station on the building may risk legal action, says insurance expert Gloria Vogel, writing in the August issue of *Claims Journal*.

Approximately a quarter of a million workers in the US may be overexposed to radiation, Vogel said. This could include maintenance workers, window cleaners or workers installing nearby equipment.

At present many eligible workers have not taken legal action against those responsible. This is not necessarily because they were not injured by RF radiation, but because they were not aware that they had been overexposed. However, that could change, said Vogel, with the media attention that would accompany a legal action of this nature.

Describing the situation that exists in the US, Vogel said that the owners of buildings where antennas are installed would be the ones to face the music in

the event of a legal action by an overexposed worker.

Even though a building owner's lease agreement with a telecommunications company contains an indemnity clause, this would not guarantee the owner's immunity.

The reality is, she says, that building owners would be held to account for the injuries. 'In reality, the lease language indemnity provision merely buys the landlords and their insurers a lawsuit against well-financed CWSPs [commercial wireless service providers] with a litany of possible legal defenses.'

Litigation for RF-injuries is a phenomenon waiting to happen. 'As the population of workers becomes aware of the hidden RF hazards and their potential for exposure, claims will likely be filed by the thousands, and long term litigation will result, in similar manner to the way asbestos evolved,' Vogel said. (Vogel, Gloria, *Claims Journal* 21.08.13, <http://www.claimsjournal.com/news/national/2013/08/21/235352.htm>)

Science and Wireless 2013

Australia's new wireless research centre launched with a public forum in Melbourne

On 27 November, the Australian Centre for Electromagnetic Bioeffects Research (ACEBR) hosted a public forum entitled 'Health and Future of RF Technologies' at the city campus of RMIT University.



At the forum, Dr Carl-Magnus Larson (pictured)—the CEO of the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) - officially launched the virtual Centre by pretending to cut a virtual ribbon. He said he is looking forward to seeing the results of the Centre's research.

The ACEBR is a virtual centre—a research consortium with members and associates from different parts of Australia and overseas. It is a reincarnation of the previous research consortium—the Australian Centre for Radiofrequency Bioeffects Research which closed due to lack of funding. Director of both Centres, Professor Rodney Croft (below), was MC of the 27 November forum.



RF technologies

Professor Andrew Wood (below) gave an overview of new RF-emitting technologies. He began by observing the enormous changes that have taken place in our homes in the last 100 years and said 'we're moving to a wireless world'.

Among the many wireless technologies in current use are solar PV inverters, CFLs, door openers, baby monitors, induction hobs, LANs, Bluetooth, RFID, wireless power transfer, airport security scanners, MRI, radar, electronic cash terminals, the NBN network, smart meters and machine-to-machine data transfer.



Professor Wood reported that, in the future, wireless technologies will operate at lower power over shorter ranges and will use more frequencies. There will be more RFID and GHz and TetraHertz applications—such as whole-body airport scanners. Wireless power transfer will send power over distances with radiofrequency signals and body-worn devices will increase Bluetooth exposure.

4G phone technology

Mike Wood, representing the Australian Mobile Telecommunications Association, explained the evolution of wireless technologies since 1987. 1G analogue phones from that era used 850



MHz to deliver only voice data. From 2G in 1993, CDMA in 1999, 3G in 2003, mobile phone technology has evolved to 4G in 2011, using LTE (long term digital) technology to deliver voice, text and very fast data transfer over a wide range of frequencies. In the future, 4G will utilise additional frequency bands, including those from analogue TV when it is switched off.

At the forum, Mr Wood launched a new resource for identifying the location of mobile phone base stations and information about them. Called MobileSiteSafety, the project is an extension of the RFNSA (Radiofrequency National Site Archive) website which hosts this data and has been operating for ten years.

MobileSiteSafety project is an interface for the RFNSA website that can be accessed from mobile phones. It can be used to find the position of the closest mobile phone base station, to find the reports from it and to locate base stations in a given area. It can be accessed at MobileSiteSafety.com.au.

Mr Wood mentioned that levels of radiofrequency radiation from existing base stations have increased over time with the upgrade of base stations to 3 and 4G. There are now approximately 13,500 base stations in Australia and more sites are needed.

Smart meters

Mr Richard Hoy, from the Energy Networks Association, presented a talk on the topic of 'Smart meters and possible health effects'.

He said that smart meters operate at 900 to 2400 MHz and are low power devices of one watt or less that emit short bursts of radiation. The intensity of the signals, he said, decreases with distance from the meters.

The meters are 'similar in frequency and technology to a mobile phone,' he told the audience. While there is no research on the effects of radiation from smart meters, he said the ENA relied on the research on the effects of mobile phone radiation to gauge the impact on people's health.

He presented the views of agencies and results of reports that did not support a link between smart meters and health problems.

'What about people who feel their health has been impacted by a smart meter?' he asked. Unfortunately he did not have an answer.

Base station audit

Mr Michael Bangay presented the results of an audit he conducted with Dr Phill Knipe on the emissions from various Australian base stations. Measurements were taken at the point where highest exposures had been predicted, he told the audience, to test the reliability of ARPANSA's prediction reports. At all sites measured, he said, the predicted RF levels were seven times greater than the actual RF levels measured.

Public health

Dr Stephen Solomon, Chief Radiation Health Scientist of ARPANSA,



spoke about the public health aspects of new wireless technologies.

'There are no established health effects at levels less than the Australian RF standard', he said, referring to the end point of cancer. Yet he recognised that 'there is concern out there.'

He referred to studies that had shown no overall risks of brain tumours from mobile phone use, but did not mention the Hardell studies which have found substantially increased risks for long-term use.

'EHS [electromagnetic hypersensitivity] is not recognised as a medical condition by the medical or scientific community,' he said and referred to studies that had failed to validate the condition.

Over the coming year, ARPANSA will make an assessment of wireless technologies such as WiFi in schools, smart meters, mobile phone base stations, the NBN network, radio and TV transmitters and ambient RF levels.

Discussion

A panel discussion, facilitated by Professor Ray Kemp (pictured), raised further issues about wireless technologies.

A question about which organisation is investigating health effects experienced by the community met with, 'It's an area for future research', from Richard Hoy. 'We're keen to study this,' said Rodney Croft—adding that he didn't think that wireless signals were the cause of people's symptoms. 'There is something happening here,' said Stephen Solomon. We do need to work out a strategy to deal with this.' However, he added that the problem doesn't actually 'sit with any agency.'

Dr Bruce Hocking challenged Dr Solomon's view that there was no evidence of health effects from RF signals. Why, he asked, did the International Agency for Research on Cancer, classify RF as a Class 2B carcinogen if there is no such evidence? He said that this classification raises the possibility that there is an association, even though we



don't understand the mechanism that might cause health problems.

Would the panel take precautions to protect a young baby, they were asked? Professor Andrew Wood said that, even though there is not evidence that RF causes cancer, it's best to take engineering solutions to reduce exposure where possible.

Could the agencies represented on the panel provide information on the nature of signals from a smart meter, the panel was asked? No answer was the resounding reply.

Excellent viewing

Two informative videos about wireless radiation can now be found online.

'Casualty catastrophe': Cell phones and child brains: a video report:

Insurers stop covering for mobile phone use, called the next 'casualty catastrophe' after tobacco and asbestos; phone manufacturers are hit with a class action and personal lawsuits; and there is a warning coming from deep inside your mobile.

<http://rt.com/shows/the-truthseeker/manufacturers-cell-phone-warning-447/>

Wifi in schools

This online video clip is about WiFi/ipads and kids: <http://www.youtube.com/watch?v=GJPTzaNkcUk>

Watt's the Buzz?

Dark side of electricity

What happens when electricity lights up our world both day and night?

The answer is not all good news.

In his book 'The End of Night', Paul Bogard explores the consequences of living in a society where artificial lights are never completely switched off.

Light has a detrimental effect on wildlife, Bogard says, attracting and repelling creatures of the night, changing their eating habits and enticing them from their habitat.

Light at night is also harmful for humans. It interferes with circadian rhythms which cause sleep problems, stress and conflict. It reduces the production of melatonin which protects against cancer. It can also contribute to cardiovascular problems, miscarriage, obesity and ulcers. (Board, Paul, 'The End of Night: Searching for Natural Darkness in an Age of Artificial Light', *Fourth Estate*, 2013.)

Training for violence

Watching or playing violent screen games develops unhealthy personality traits and changes the structure of the brain, according to scientists at Sydney's Children and Media Conference on 4th October.

The conference heard that screen violence causes viewers to behave more aggressively and to have less empathy. It changes the development of the brain, with heavier exposure causing greater changes. These changes include restricted growth of the prefrontal lobes which are important for self-control and moderating aggression and activation of the right brain which influences negative feelings. (SMH 5-6.10.13.)

Rewired

In a trial of a new procedure, US scientists have succeeded in developing a prosthetic leg that can be controlled by the wearer's thoughts.

The wearer was Zac Vawter, whose lower right leg was amputated after a motor cycle accident some years previously.

In the experiment, Zac was effectively rewired—sensors were applied to the nerves that previously attached to his hamstrings so that they could relay brain signals to a computer and thence to Zac's prosthetic leg.

The army-funded project allows Zac to walk almost as easily as he did before his accident. (*CBS News*, 25.09.13.)

Gaming risks

IT expert Nolan Bushnell has warned about the risks of playing violent video games. The founder of Atari video games, Bushnell said that addicts of these games are susceptible to neurodegenerative diseases and are likely to die younger. The games, he said, affect a part of the brain that allows users to spend long periods of time at play. (*Australian* 20.09.13.)

Resources hoarding

Do you have a stash of gold, lithium or cobalt in your sock drawer?

You do if you have an old mobile phone stored there.

Australians have approximately 23 million out-of-service mobile phones sitting somewhere in their homes, according to mobile recycler Mobile Muster. This is as many old phones as new mobile subscriptions.

These old mobile phones are not just taking up considerable collective space, they're hoarding valuable resources—such as gold, nickel, cobalt and lithium—that can be extracted and

recycled.

For information about recycling your old mobile phone, seemobilemuster.com.au (SMH 11.09.13.)

Cyber-safety

In its pre-election campaign, the Australian Liberal Party promised to tackle the problem of cyberbullying with a Children's e-Safety Commissioner. The party also promised new legislation to force social networks Facebook and Twitter to act quickly to remove harmful posts. This follows the suicide of an Italian teenager following abusive Facebook posts. (*Australian* 17.09.13.)

Fairphone

A Dutch manufacturer has revealed the world's first 'fair-trade' mobile phone at a London Design Festival held in September.

Known as the 'Fairphone', it has several ethical advantages over mobile phones currently on the market. Firstly, it uses tin and tantalum from African mines that are not in conflict zones and where profits are not used to purchase weapons. Secondly, it can be opened and repaired so that it lasts for longer than other phones. Thirdly, it can accommodate multiple SIM cards so that it can be used for both business and personal use—thus reducing the need for people to purchase multiple phones.

The Fairphone is expected to be available in December. (*The Independent* 15.09.13.)

Beware the bins

London recycling bins are being used to track people using WiFi. A hundred bins, which have digital screens to display advertisements, were installed in 2012 by the com-

(Continued from page 10)

pany Renew. Twelve of these have been fitted with technology to track smart phones—determining, for example where the owner is walking or how often.

The data will be sold to retailers who will be able to use it to determine customer behaviours and locations.

As long as the data does not contain individual names and home addresses, the surveillance is legal. (<http://qz.com/112873/this-recycling-bin-is-following-you/>)

Tech accessories

Forget body language!

Now there's no need to pay attention to the subtle clues that indicate whether your companion is feeling annoyed or anxious or pleased. You can use technology instead!

Clothing that reflects the wearer's moods—red for anger, pink for love, blue for calm—was among the many wearable technologies on display at a San Francisco conference in late September.

Other exhibits included shoes that clean the floor as the wearer walks, music players that select a tune to match the wearer's mood and jewellery that keeps tabs on how well the wearer is burning calories.

Are these the accessories of the future?

At least one thing is certain: the technology gives new meaning to the phrase: wearing his heart on his sleeve. (*Australian* 02.10.13.)

Information overload?

As if consumers aren't bombarded by enough advertising as it is!

The latest trend in marketing is for stores to install radiating devices called 'beacons' which use Bluetooth signals to connect with iphones of people within range. The beacons transmit messages about specials that relate to goods in that part of the store.

It is expected that, down the track, they will be used to provide information in museums, art galleries and railways stations. (*The Australian* 26.09.13.)

Electronic networks

International security agencies are mining a rich source of electronic information—people's internet contact lists.

Documents released to *The Washington Post* in October revealed that electronic contacts lists—such as email and social media contacts—are being collected by Australian Defense agencies in collaboration with agencies in the US, UK, Canada and New Zealand. The agencies are thought to be collecting in excess of

250 million such lists in a single year.

Greens Senator Scott Ludlam is reported to have criticized the project saying that it created a 'surveillance culture'. (*SMH* 16.10.13.)

Updated EME Report

Last issue we reported that ARPANSA (The Australian Radiation Protection and Nuclear Safety Agency) has updated its EME Report. This is a report containing information about radiation levels from base stations that all telecommunications carriers are required to complete and make available to the public.

ARPANSA has allowed carriers a six-month transition period in which to develop processes they need to implement the revised report format. During that time they can use either the new or superseded report format.

The new report format will be fully implemented by the end of February 2014.

<http://www.arpansa.gov.au/emereports/index.cfm>

<http://www.arpansa.gov.au/emereports/reports.cfm>



New Magnameater

Looking for a new home to rent or purchase? Or perhaps you'd just like to keep a check on the magnetic fields in and around your home.

The new Magnameater is an inexpensive, handy magnetic field meter (gaussmeter) that allows you to make a quick and informed assessment of your exposure.

Because magnetic fields of 4 mG are associated with childhood leukemia and classified as Class 2B carcinogens by the International Agency for Research on Cancer., keeping exposures as low as possible is a priority

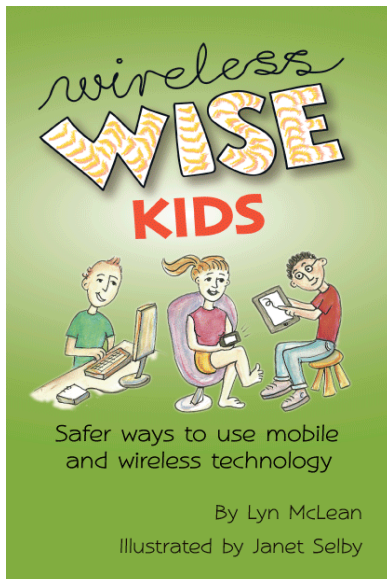
for everyone.

The Magnameater measures the magnetic fields from electrical equipment—power lines, transformers, wiring, appliances—and covers frequencies from 16 Hz to 2000 Hz.

It measures in units of milliGauss (mG) and displays readings on a series of LED lights.

The handy, battery-operated meter comes with a vinyl carry case and a two-year warranty.

The Magnameater is soon to be available from EMR Australia.



A book every family needs
—available from
www.emraustralia.com.au

(Continued from page 3)

- of measurement campaigns;
- ◆ ‘that the development of new mobile phone network infrastructures be subject to prior studies concerning the characterisation of exposures, and an in-depth study be conducted of the consequences of possibly multiplying the number of relay antennas in order to reduce levels of environmental exposure;
- ◆ ‘documenting the conditions pertaining at those existing installations causing the highest exposure of the public and investigating in what measure these exposures can be reduced by technical means.
- ◆ ‘that all common devices emitting electromagnetic fields intended for use near the body (DECT telephones, tablet computers, baby monitors, etc.) display the maximum level of exposure generated (SAR, for example), as is already the case for mobile phones.’

(ANSES announcement: <http://www.anses.fr/en/content/anses-issues-recommendations-limiting-exposure-radiofrequencies>)

‘It is the allowing of machines to be our masters, and not our servants, that so injures the beauty of life nowadays.’

artist William Morris in the 1860s

(*Australian Financial Review*, 12.10.12)

(Continued from page 1)

(non-thermal) exposure levels causing biological disruption.’ the authors say.

The authors advised that doctors should become familiar with the potential risks of EMF exposure and they recommend precautions to reduce exposure for children, especially those with neurological problems. To facilitate this, classroom computers should be hardwired, they said.

(M.R.Herbert and C Sage, ‘Autism and EMF Plausibility of a pathophysiological link’, Part I, *Pathophysiology* (2013), <http://dx.doi.org/10.1016/j.pathophys.2013.08.001>; part II, *Pathophysiology* (2013), <http://dx.doi.org/10.1016/j.pathophys.2013.08.002>)

‘Perhaps the greatest knowledge trap of all is falling foul of the law of unintended consequences.’

Richard Alston—
former Minister for
Communications, Information
Technology



Available from
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EMF Meters

Top quality, economical gauss meters for hire or purchase. Comes with support material.

RF Meters

Easy-to-use meter for measuring radiofrequency radiation from wireless sources, available for hire or purchase. Comes with support material.

Mobile phone shields

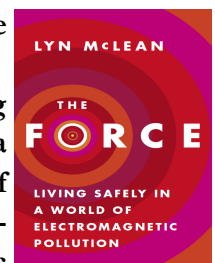
block over 90% of radiation to your head and body.



Shielding paints and fabrics

Fabrics and liquid paints that shield over 99% of radiation—from base stations and other communications equipment.

‘The Force: Living safely in a world of electromagnetic pollution’



by Lyn McLean—everything you need to know about the effects of EMR and how to protect yourself.

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