

EMR and Health

Electromagnetic radiation,
health and well-being

INSIDE THIS ISSUE

Mobiles/ADHD link3
 ARPANSA's precautions 3
 Research updates 4-5
 Updates from around the globe 6-7
 Mobiles & brain tumours 7
 Electromagnetic hypersensitivity7
 Probably carcinogen? 9
 Risks of wireless technology9
 Watt's the Buzz? 10
 Electric sense 11
 Pedestrian risks 12
 Products & services 12

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Legal victory

A landmark Australian legal decision may pave the way for EHS sufferers to receive compensation for workplace injuries.

After a seven-year battle, a Victorian man has scored a legal win that entitles him to compensation for injuries suffered at work that aggravated his electromagnetic hypersensitivity (EHS).

On 28 February the Administrative Appeals Tribunal of Australia determined that the Federal Government agency responsible for reducing workplace injuries and disease, Comcare, should pay Dr Alexander McDonald compensation for aggravation of an injury suffered in the course of his work.

Dr McDonald, a Principal Research Scientist at the Commonwealth Scientific and Industrial Research Organisation (CSIRO) - currently on leave without pay—describes this victory as a win for people with EHS. 'People who do not have the ability to move away from the causes of the condition will get some benefit from a decision where this condition is recognised,' he told *EMR and Health*.

Dr McDonald was diagnosed with EHS in 1993 and his diagnosis was subsequently confirmed by another doctor. He suffered from headaches, nausea, migraines and dizziness when exposed to electronic equipment and reactions sometimes lasted for weeks.

When he began work at the

'People who do not have the ability to move away from the causes of the condition will get some benefit from a decision where this condition is recognised.'

CSIRO, Dr McDonald was provided with an administrative assistant so that he did not have to use a computer and this arrangement allowed him to work successfully for a number of years.

However, in 2006 the Organisation required Dr McDonald to take part in a three-month trial working with electrical and electronic equipment, including a computer, PDA and Blackberry. Within minutes of switching on his computer, he developed severe symptoms—nausea and migraines—that lasted for several days. The following year, the CSIRO required Dr McDonald to undergo a second trial of electronic equipment at work. This resulted in more serious symptoms, including dizziness, disorientation, nausea, pain, tinnitus, eczema and migraines.

The decision of the Administrative

(Continued on page 2)

(Continued from page 1)

Appeals Tribunal overturned three decisions by Comcare refusing Dr McDonald compensation.

In announcing his decision, Deputy President JW Constance said, 'I am satisfied that during the trials in 2006 and 2007, when Dr McDonald was exposed to increased EMF at work, the symptoms from which he suffered became worse and have continued to be worse than they were before the trials commenced. ... I have found that he suffered increased dizziness, disorientation and nausea which lasted longer than previously. He also suffered from eczema, tinnitus and from pain in the left side of his skull prior to the onset of migraine headache.'

The court did not come to a decision about whether or not Dr McDonald's condition could be defined as electromagnetic hypersensitivity. According to President Constance, 'it is immaterial as to whether those symptoms have a determinable pathological cause or whether the cause is purely psychogenic.'

In his judgment, President Constance said, 'I am satisfied on the balance of probabilities that Dr McDonald has suffered either:

- ◆ An aggravation of his sensitivity to EMF; or,
- ◆ An aggravation of his symptoms by reason of his honest belief that he suffers from the condition of EMF sensitivity and that his exposure to EMF associated with the trials has worsened his sensitivity.'

He went on to say the 'those practitioners of the view that Dr McDonald suffers from migraine and not EMF sensitivity have not advanced a convincing argument to exclude EMF sensitivity.'

Comcare has described Dr McDonald's injury as 'effective radiation, unspecified' - a classification that appears in the International Classification of Diseases register.

Following the judgment, Comcare agreed to accept liability for Dr McDonald's injury from 3 April, 2006—that is, the earliest of the date ranges suggested by the Tribunal—

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and to pay him compensation from that date.

'Though the decision was in my favour, I'm still required to apply for the compensation,' Dr McDonald said, in the hopes that the information will help other people undertaking similar legal action.

The Tribunal judgment allows Dr McDonald to apply for compensation as specified in the SRC Act 1988, including some medical expenses, 75 percent of his salary, long-service leave and recreation leave from the date of injury, as well as 75 percent of his compensation/leave salary.

Most of the legal costs in the case are to be borne by Comcare but Dr McDonald says that there is still a 'significant legal cost' that he will have to meet.

At the time of writing, he has yet to receive any compensation payment.

Why did Dr McDonald undertake the expensive and drawn-out legal proceedings in the first place? 'The main reason was to acknowledge that the condition exists,' he said, indicating he hopes that other people with EHS will obtain benefit from the decision.

'Hopefully employers will recognise when people have symptoms that might be associated with the workplace and treat workers with respect and compassion. I would imagine it's in the interests of society to get the maximum amount of productivity from people who want to work.

To deny them that is not only unjust but counter-productive.'

Dr McDonald says he would prefer to return to work at the CSIRO than to continue to receive the compensation payments. However, the presence of wireless devices in the office makes that difficult and he has yet to hear whether the CSIRO is willing to help with his workplace rehabilitation.

Dr McDonald expressed concerns about Australia's lack of precaution in exposing the community to ever-increasing levels of radiation—such as NBN towers, smart meters and wireless radiation in schools. 'Health concerns that are real are not being addressed. People are simply being told the same thing: that national and international standards have been met. This is analogous to a restaurant saying that all food standards have been met and then putting peanuts in the food of someone who is allergic to them.

'Some people are affected at extremely low levels of radiation and there's nowhere for them to hide.

'The rights of those who want technology are given precedence over the rights of those who are harmed by it.'

The judgment goes a long way to validating the experiences of people who suffer symptoms from exposure to electromagnetic fields—whether their symptoms are found to be psychological or physical.

Dr McDonald has no doubt that his own symptoms are biologically-based and not psychological. 'I don't know whether a place is going to have high emissions, but, when I feel the radiation, I find it does have WiFi or other EMR-emitting electronic equipment. Of course, that brings me and my medical practitioner to the natural conclusion there's a physical problem.'

Dr McDonald hopes the legal judgment will help bring about more precaution in Australia and, perhaps, overseas. 'Precaution occurs only as the result of successes from these sorts of legal proceedings,' he said.

A transcript of the judgment can be found at: <http://www.austlii.edu.au/au/cases/cth/aat/2013/105.html>

(Continued on page 8)

Mobiles/ADHD link

Children's use of mobile phones may be contributing to ADHD.

A peer-reviewed study from Korea has found that children who use mobile phones may be more at risk of developing attention deficit and hyperactivity disorder (ADHD), particularly if they have been exposed to lead.¹

The first study of its kind, it involved over 2400 students from 27 elementary schools in 10 Korean cities over a two-year period. The researchers conducted physical examinations and chemical tests on the children and obtained information about children's mobile phone use and behaviour from their parents.

At first testing, 10.4 percent of children displayed ADHD symp-

ptoms—such as inattention and restlessness—and this number decreased to 8.4 percent when the students were followed up two years later.

The researchers found that owning a mobile phone or sending text messages did not increase the risk of ADHD symptoms. However, the amount of time spent talking on the phone did—but only in children who had high blood levels of lead. This is probably because the mobile phone is used close to a child's head for voice calls, but not for texting, the authors suggested.

They also found that children who played games on mobile phones were more at risk of ADHD symptoms, irre-

spective of the amount of lead in their blood.

The decline in ADHD symptoms over time was greater among children who stopped using mobile phones, than those who continued using them. 'Therefore, preventing the use of mobile phones in children may be one measure to keep children from developing ADHD symptoms,' the authors said.

The study is the first long-term study to examine the effects of mobile phone and lead exposure on a large population of children. The authors say their findings point to the need for fol-

(Continued on page 12)

ARPANSA's precautions

Australia's radiation authority advises how to reduce exposure from wireless technology.

ARPANSA has broken the mould with its recent fact sheet on electromagnetic radiation.

Called, 'How to reduce exposure from mobile phones and other wireless devices', the fact sheet provides useful tips for users of mobile phones, cordless phones, baby monitors and wireless computer networks.

'The technology is very new and it's impossible to be completely sure there isn't some risk,' the fact sheet states. 'This is particularly true for children where there is little research evidence.'

The fact sheet was produced by ARPANSA (The Australian Radiation Protection and Nuclear Safety Agency) in co-operation with the EME Reference Group of stakeholders and has been in development for some time. It was released to the press in early March.

In its opening statement, the AR-

PANSA fact sheet reads, 'Overall, the evidence suggests that the radiofrequency [RF] electromagnetic energy [EME] emissions of mobile phone handsets are not harmful to the user.' This statement was not part of the original draft that was approved by the Reference Group.

Nevertheless, the fact sheet includes some useful suggestions.

For mobile phones, it advises that people can reduce exposure by:

- ◆ 'using a wired ear-piece/microphone hands-free accessory
- ◆ using the phone on speaker mode
- ◆ texting rather than talking
- ◆ keeping the phone a distance from the body, as recommended in your user's manual
- ◆ even placing your thumb be-

tween the phone and your ear.'

Cordless phone users can reduce exposure by:

- ◆ 'using speaker mode
- ◆ limiting the length of the call
- ◆ keeping your distance from the cordless phone base unit
- ◆ using a wired land-line phone.'

The fact sheet warns against the use of so-called protective devices. 'Some products that attach to the phone are advertised as neutralising any harmful effects. Their claims are not consistent with current scientific knowledge and it is difficult, if not impossible, to verify any benefits,' it says.

The fact sheet can be found on the ARPANSA website at: http://www.arpansa.gov.au/radiationprotection/factsheets/is_Wireless.cfm

Research Updates



ELF fields (from electrical sources)

More evidence that living near a high voltage power line is a risk factor for childhood leukemia comes from a study from France. Investigators looked at the addresses over 2700 cases of acute childhood leukemia diagnosed between 2002 and 2007. They found that children living within 50 metres of a line had 70% more chance of developing leukemia than those living further away. (Sermage-Faure, C, *Br J Cancer*, April 4, 2013.)



Exposure to electromagnetic fields can cause memory problems typical of Alzheimer's Disease. D Jiang and team exposed 2-month old rats to pulses of EMF. They found that exposure 'can cause long-term impairment in ... cognition and memory, resulting in AD-like symptoms.' They authors suggest this might be a result of free radical damage caused by the exposure. (Jiang, DP et al, *Arch Med Res*, Mar 19, 2013.)



To establish how magnetic fields affect the heart, Iranian researchers exposed fertilized chicken eggs to magnetic fields of different strengths and examined the effects on the chickens after birth. They found that exposure caused a series of harmful effects, including increases in cell death and decrease in energy-producing mitochondria in the animals' hearts. They recommended precautions for protecting young people from possible harm. (Shams Lahijani, M et al, *Int J Radiat Biol*, 89(4):234-42, 2013.)



Magnetic fields may have a harmful effect on reproduction—at least in fruit flies. D Panagopoulos and team from Greece, exposed the insects to strong magnetic fields for the first five days of life. They found that exposure decreased reproduction by up to 4.3% and, the stronger the magnetic field, the more pronounced the effects on reproduction. The decline in reproduction, they found, was due to DNA damage and death in reproductive cells caused by exposure. (Panagopoulos, DJ et al, *Cell Biochem Biophys*, Mar 23, 2013.)



Other studies on ELF exposure

- ◆ Exposing human blood to a 50Hz magnetic field activated platelet aggregation which can contribute to blood clots. (Sagdilek, E et al, *Electromagn Biol Med* 31(4):382-93, 2012.)
- ◆ Exposure to EMF increased sodium currents in the brains of rats. (He, YL et al, *PLoS One*, 8(1), 2013.)
- ◆



Radiofre- quency radia- tion (from telecommuni- cations sources)



Is mobile phone radiation a cancer risk? In a review, S Szmigielski found that 3 meta-analyses showed that long-term use of mobile phones was associated with an increased risk of brain tumours. The largest, the Interphone Study, found no overall risk but an increased risk for heaviest phone use. The author said that all of

the studies had weaknesses and, because there is little evidence about long-term effects, experts advise precautions, especially for children. (Szmigielski, S, *Electromagn Biol Med*, 2013 Jan 15)



The same author reviewed evidence of RF effects on the immune system. The majority of studies showed effects on immune function are possible. He concluded that short-term exposure to weak fields may temporarily stimulate some immune functions, while prolonged irradiation inhibits those functions. (Szmigielski, S, *Sci Total Environ* 454-455C:393-400, April 3, 2013.)



Does mobile phone radiation affect newborns and infants? To answer that question, E Ozgur and team exposed rabbits prenatally and at the age of one month to mobile phone radiation of 1800 MHz. They found that exposure changed different parameters in the blood chemistry. Similar studies should be used to establish appropriate standards for protecting the young, the authors suggested. (Ozgun E et al, *Cell Biochem Biophys*, Mar 24, 2013.)



Mobile phone radiation may affect pregnancy, according to research from India. S Shahin and colleagues examined the effects of exposing 12-week old mice to 2.45 GHz signals for 2 hours a day for 45 days. They found that exposure resulted in a range of negative outcomes including DNA damage and decreased antioxidant activity. They concluded that exposure increased oxidative stress, potentially leading to 'DNA strand breaks in the brain cells and implantation failure/resorption or abnormal pregnancy in mice.' (Shahin, S et al, *Appl Biochem Biotechnol* 169(5):1727-51, 2013.)



A French study released in April shows that mobile phone radiation disrupts a number of biological processes. A Pelletier and Team exposed 13 young rats to a 900 MHz signal continuously for 5 weeks. Exposure affected the rats' temperature control, their ability to feel sated by food and interrupted their REM sleep (important for learning and memory). (Pelletier, A et al, *Environ Sci Pollut Res Int* Nov 10, 2012.)



Microwave radiation affects the thymus—but antioxidants can help. Serbian researchers exposed rats to microwave radiation with or without supplements of melatonin. They found that microwave exposure caused harmful effects such as cell death, DNA fragmentation and oxidative stress. However, pretreatment with melatonin counteracted these effects. (Sokolovic D et al, *Gen Physiol Biophys* 32(1):79-90, 2013.)



The antioxidant melatonin protected against oxidative damage in a study from Turkey. G Aynali and team exposed rats to WiFi (2.45 GHz) radiation for 1 hour a day for 28 days and found oxidative stress in mucosa of the larynx and trachea. Pretreatment with melatonin helped prevent damage. (Aynali, G et al, *Eur Arch Otorhinolaryngol* 270 (5):1695-700, 2013.)



Chinese scientists have found that mobile phone radiation has a harmful effect on the expression of proteins. C Zhijian and team exposed human B-cell lymphoblastoid cells to a mobile phone signal of 1.8 GHz for 24 hours. They observed 20 proteins were upregulated and 7 proteins downregulated. The proteins affected played a role in DNA repair and cell death. (Zhijian, C et al, *Biochem Biophys Res Commun* 433(1):36-9, 2013.)



What causes melanomas? It's not exposure to sun, say Swedish researchers O Hallberg and O Johansson. By analysing melanoma statistics in Nordic countries, the investigators showed an increase in melanoma incidence that parallels the increasing proliferation of FM radio transmissions. They observed an increase in melanomas of the face and head after 2005, when mobile phone use became widespread. The authors suggested the cause of the melanoma epidemic is a disturbed immune system and concluded, 'the melanoma epidemic is a result of the modern man-made environment that forces us to live and sleep in invisible but still unhealthy electromagnetic smog'. (Hallberg, O and Johansson, O, *Cancers* 5, 185-204, 2013.)



Mobile phone radiation caused oxidation and genetic damage in earthworms, in a study from Croatia. Researchers exposed *Eisenia fetida* worms to a mobile phone signal of 900 MHz for 2 or 4 hours with and without modulation. All exposures caused significant genetic damage and the damage was made worse by the modulated signal. (Tkalec, M et al, *Ecotoxicol Environ Saf* 90:7-12, 2013.)



Oxidative damage also occurred in the eyes of rats exposed to mobile phone radiation in Iran. G Jelodar and team exposed the animals for 45 days and found that those who had been given antioxidants had less damage. (Jelodar, G et al, *Int J Radiat Biol* 89 (2):128-31, 2013.)



How does mobile phone radiation affect the embryo? To answer this question, Japanese researchers exposed the embryos of Japanese quails to a GSM mobile phone signal either after or before and during brooding. They ob-

served beneficial or harmful effects, including genetic damage, depending on the duration of exposure. (Tsybulin, O et al, *Int J Radiat Biol*, April 11, 2013.)

Other studies showing effects from RF exposure

- ◆ Mobile phone radiation affected auditory nerves but Bluetooth headsets did not. (Mandala, M et al, *Laryngoscope*, Apr 25, 2013.)



Studies showing no effects

- ◆ No harmful effects on memory and learning in rats exposed to a 50 Hz magnetic field. (Wang, X et al, *Bioelectromagnetics* 25 Jan, 2013.)
- ◆ No harmful effects on cognition in mice exposed to 21 kHz for 1 hour a day for 2 weeks. (Win-Shwe, TT et al, *J Toxicol Sci* 38(2):169-76, 2013.)
- ◆ No observed effects on pregnancy or foetal development in women exposed to magnetic fields. (Mahram, M and Ghazavi, M, *Arch Iran Med* 16 (4):221-4, 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 restrictions

In March the Belgian Government announced it will implement measures to protect children from mobile phone radiation. Public Health Minister Laurette Onkelinx said there will be a ban on the sale of mobile phones to children both in retail outlets and online. No advertisements for mobile phones will be screened during children's TV programs or on the internet. (*Together online*, <http://www.togethermag.eu/articles/mobile-phones-be-banned-children>)

French wireless ban

On 18 March, the French National Assembly announced legislation that promotes the use of wired computer connections as opposed to wireless connections, introduced by Greens Party MP, Isabelle Attard.

'The precautionary principle must oblige the state and local governments to protect children, especially the younger ones, from the effects of radiation,' it said.

The proposed ban was subsequently eliminated but the bill states that 'the precautionary principle must incite the State and regions to protect children, notably the youngest, from the influence of waves'. (<http://isabelleattard.eelv.fr/le-principe-de-precaution-applique-aux-ondes-electromagnetiques-enfin-inscrit-dans-la-loi/>)

Compensation payment

On 6 March, the Haaretz newspaper reported that an Israeli communications company will make a compensation payment to a customer who developed ear cancer after using a mobile phone.

The company, Partner Communi-

cations, has reportedly reached a settlement with the customer. (*Haaretz*, 06.03.13)

Teachers' resolution

On 6 March the Los Angeles Teachers' Union, representing 40 000 workers, passed a resolution on EMR in schools. It states that, 'all employees and stakeholders should be informed when there are changes in their exposure to environmental hazards including electromagnetic radiation and ...all stakeholders and the public should be notified of any actual and potential hazards.'

The resolution supports the use of technologies that do not expose teachers to additional EMR. (<http://ehtrust.org/la-teachers-union-passes-resolution-to-ensure-safety-from-hazardous-electromagnetic-fields-emf-in-schools-including-emf-emissions-from-wireless-technology/>)

European Directive

Three European bodies have agreed on a directive to protect workers from exposure to electromagnetic fields. The Council of the European Union, the European Parliament and the European Commission agreed on 26 March to implement an updated Directive to protect workers from the risks of EMFs, including the conduct of risk assessment, health surveillance and protection.

The Directive is expected to be adopted into legislation by Member States by mid 2016. (eu2013.ie/news/news-items/20130328emfpr)

Energy concerns

A report by the Melbourne Centre for Energy Efficient Telecommunications (CEET) has predicted a huge increase in energy consumption from

cloud and wireless technologies.

'Wireless is an energy monster, it's just inherently inefficient,' CEET Director Dr Kerry Hinton said when interviewed.

The report predicted that energy consumption from cloud and wireless technologies will grow by up to 460 percent—equivalent to the energy used by about 4.9 million cars.

The Centre hopes that the report will lead to changes in the way that these technologies are managed in the future. (*Business Spectator*, 11.04.13.)

Tetra for USA

The controversial TETRA radio system that has been associated with health problems in the UK, may be introduced to the US.

UK radio company Sepura PLC has announced its plans to sell TETRA products in the US by the end of 2013. This follows a decision by the Federal Communications Commission to waive rules preventing the use of the technology. (<http://www.tetra-applications.com/item.html&objID=15672>)

Industry rules

President Barak Obama has appointed an industry lobbyist as Chairman of US telecommunications regulator, the Federal Communications Commission (FCC).

Tom Wheeler has been intimately connected with the telecommunications industry. He headed the National Cable Television Association and the Cellular Telecommunications and Internet Association. He also raised funds for Mr Obama's presidential campaign.

Mr Wheeler has yet to be confirmed in his position by the Senate. (*New York Times*, 08.05.13.)

San Francisco's no-go phone law

San Francisco's Board of Supervisors has decided to back down on legislation requiring warning labels on mobile phones.

The legislation, proposed in 2010 by then-Mayor Gavin Newsom, would have required all mobile phones to be sold with warnings about radiation risks and information about SAR levels.

The telecommunications industry successfully appealed the legislation in a federal court last year. Following this decision, the Board of Supervisors voted in early May to permanently waive the legislation in return for the industry's agreement not to charge them for legal fees. (*SF Gate* 08.05.13.)

Indian report

A report for the Department of Telecommunications (DoT) has found a link between radiation levels from transmitters and cancer.

The report documented cancer clusters in different areas of Mumbai. In one, six people from five families developed cancer over a six year period.

Concerned by the incidence of cancer, some residents have undertaken legal action against the telecommunications companies. (*DNA India* 07.04.13.)

Where can we live?

This is the title of a YouTube film clip about two women with electromagnetic hypersensitivity.

You can see it—and find out about a documentary from which it is clipped—online at <http://www.youtube.com/watch?v=5QxAzzicjn4&feature=youtu.be>

Smart meter class action

Californians who believe they have been harmed by the radiation from smart meters are eligible to join a class action law suit that is being prepared by Liz Baris and The People's Initiative. You can hear Liz talk about it at http://www.youtube.com/watch?v=1Vlnuuu_al.

Mobiles & brain tumours

More evidence that mobile phone radiation contributes to brain tumours comes from a recently-published paper by Victoria Benson and colleagues from the United Kingdom.¹

In what's called a prospective study, the researchers asked nearly 800 000 middle-aged women to report their mobile phone use between 1999 and 2005 and then followed-up their health for seven years. Prospective studies are often considered a more reliable method of ascertaining exposure than estimating phone use *after* a tumour has developed.

Benson found that women who had used mobile phones for ten years or more developed nearly two and a half times the number of acoustic neuromas that would be expected. Their risk increased the longer they used the phones. Acoustic neuromas

are a rare, non-malignant tumour located near the ear.

A 2012 review found that ipsilateral mobile phone use for ten or more years increased the risk of acoustic neuromas by 80% and those who had used it longest had over two and a half times the risk.²

The Benson study also found that women who had used mobile phones five years or more had double the risk that nonusers had of developing pituitary gland cancers.

1. Benson, VS et al, 'Mobile phone use and risk of brain neoplasms and other cancers: prospective study', *Int J Epidemiol*, 8 May, 2013.

2. Hardell, L et al, 'Use of mobile phones & cordless phones is associated with increased risk for glioma & acoustic neuroma', *Pathophysiology* Dec 20, 2012.

Electromagnetic hypersensitivity

In a study published in April, Turku University researchers reported on the condition of electromagnetic hypersensitivity (EHS) in Finland.

From an analysis of questionnaires completed by 194 people with EHS, Marjukka Hagström and colleagues investigated symptoms, perceived sources of the health problems and effectiveness of various therapies in dealing with the condition.

The study showed that, before they developed EHS, many of the respondents had allergies and an average of more than 10 health symptoms.

During the acute phase of their illness, the average number of symptoms increased to nearly 27. The most common of these were stress (60%), sleeping problems (59%), sore joints (58%) and fatigue (57%). Other common symptoms included back ache, muscle tension, headaches, dry skin and light

sensitivity.

The most commonly reported triggers for symptoms were personal computers (50.8%), mobile phones (47%) and lighting (21%).

In dealing with their EHS, most respondents had tried more than five types of treatments. The most effective were changes to diet (69%), nutritional supplements (68%), exercise (61%) and physical treatments (such as shiatsu, chiropractic, reflexology).

Usually-prescribed treatments, such as psychotherapy and medication, were not found to be helpful.

Avoiding exposure was also found to be beneficial in helping respondents achieve full or partial recovery.

Reference: Hagström, M et al, 'Electromagnetic hypersensitive Finns: Symptoms, perceived sources and treatment, a questionnaire study', *Pathophysiology* April 1, 2013.

(Continued from page 2)

EMR Australia asked Comcare for its comments on the decision, including: what are the implications of the decision for Comcare and will Comcare be issuing advice to employers, for example, to reduce workers' exposure to electromagnetic radiation?

Comcare's reply was a resounding 'No comment.'

The implications of the legal decision have yet to be explored by Australian authorities. Now that the court has determined that exposing workers to radiation levels thousands of times lower than the standards can result in injury, what does that mean for the adequacy of the Australian standard? Do employers have a legal obligation to minimise workers' exposure? Will we see other compensation claims from employees exposed at work? Will we see compensation claims against utilities who expose people to smart meter or mobile phone tower radiation involuntarily.

Only time will tell.

Probable carcinogen?

Mobile phone radiation could be a probable human carcinogen, according to a team of international experts. In a paper to be published as a commentary in the journal *Pathophysiology*, the five authors claim that the risks warrant 'sensible policies' to protect public health now.

In 2011 the International Agency for Research on Cancer (IARC) classified mobile phone radiation as a 'possible' human carcinogen—a classification also applied to DDT, dry cleaning chemicals and jet fuel.

In their paper, the authors argue that this classification should be revised—to 'probable human carcinogen'—following the publication in 2012 of a study by Lennart Hardell. It found that young people had over four times the risk of gliomas and nearly seven times the risk of acoustic neuromas.

This increase is greater than has been found for other environmental carcinogens, the authors noted. 'None of today's established carcinogens, including tobacco, could have been firmly identified as increasing risk in the first ten years or so since first exposure.'

Yet brain cancer may not be the only consequence of mobile phone use. The paper refers to leukemias, behavioural problems and other problems that have been linked to use.

The authors recommend sensible precautions to reduce exposure, including keeping the phone away from the head and body and preventing children from using them.

(Davis, DL et al, 'Swedish Review Strengthens Grounds for Concluding that Radiation from Cellular and Cordless Phones is a Probably Human Carcinogen'.)

Risks of Wireless technology

Wireless radiation is potentially dangerous and standards are not protecting the population, say two radiation experts. In a paper just published in June, Yuri Grigoriev from the Russian National Committee of Non-Ionizing Radiation Protection and Marko Markov draw attention to the lack of scientific and regulatory activity on an issue which currently affects all life on this planet.

Even though little is known about the effects of non-ionizing radiation, seven billion people are exposed to it. 'There are no criteria for hazard, no monitoring, no research and no prevention,' the authors claim.

Markov and Grigoriev believe that the biological effects of wireless radiation occur at nonthermal levels of exposure and include changes to biological structures, to cell signaling and to important molecules in the body. Wireless signals, they speculate, probably contain information that causes these changes.

The problems are likely to be cumulative,

particularly if repeated exposures occur before the body has time to repair itself from a previous exposure.

The authors say that decades of science shows that wireless radiation in the range 900 to 2500 MHz can have harmful effects on the body, especially the brain. The frequency 900 MHz is particularly effective at deeply penetrating the brain, the authors say, without necessarily heating surface tissue. It's unlikely that people exposed in this way would notice these effects.

Wireless radiation may be particularly harmful for children who absorb more radiation than adults. Not only does mobile phone use by children affect their developing brains, but 'the complex nerve structures in the internal ear that are responsible for normal functioning of the hearing and of the vestibular analyzers.' Moreover, children can't evaluate the risks of mobile phone technology and have a lifetime of exposure.

'Children have a unique vulnerability.

As they grow and develop, there are "windows of susceptibility": periods when their organs and systems may be particularly sensitive to the effects of certain environmental threats', the authors say, referring to advice from the WHO.

Markov and Grigoriev believe international standards are flawed. 'The scientific and medical communities are obliged to ring the bell—the health and standardization institutions must urgently develop recommendations and actions for protection of the civilization and especially children.

'We should stop telling the science, politicians and general population that Wi-Fi is harmless.

'We should better be honest and say that: we do not know what long-term effects might be.' (Markov, M and Grigoriev, YG, 'Wi-Fi technology—an uncontrolled global experiment on the health of mankind', *Electromagn Biol and Medicine*, 32(2):200-208, June, 2013.)

FCC Inquiry

The US telecommunications regulator, the Federal Communications Commission (FCC) has announced a review of telecommunications regulations and the exposure standard and is inviting public comment.

According to the 29 March announcement, one of the key issues it is considering is whether there is a need to reassess the exposure limits it adopted in 1996. International standards have been revised several times since that time.

The FCC is considering whether it should adopt a precautionary approach to electromagnetic fields. 'We ask whether any precautionary action would be either useful or counterproductive, given that there is a lack of scientific consensus about the possibility of adverse health effects at exposure levels at or below our existing limits.'

The Commission has invited comment on consumer education. 'We ask whether the Commission should consistently require either disclosure of the maximum SAR value or other more reliable exposure data in a standard format—perhaps in manuals, at point-of-sale, or on a website.'

Other issues the Commission is considering include:

- ◆ whether to exempt some mobile or portable equipment from compliance;
- ◆ some technical issues such as using specific absorption rate to determine compliance, measuring exposure of medical implants and considering the ear as an extremity—and thus able to be exposed to more radiation.

(Continued on page 12)

Potenza Picena Resolution

International scientists call for precautions to protect public health.

On 20 April, scientists at the international congress on 'Radar, radiofrequency and health risks' held in Potenza Picena, Italy, endorsed a resolution calling for tighter standards to protect the community.

The Resolution states:

- ◆ 'radars use pulsed radiofrequency that causes characteristic biological effects which are more invasive than non pulsed EMF;
- ◆ 'radiofrequency can cause structural changes in enzymes with time reactions of nanoseconds, while the pulsed radiofrequencies emitted by radars occur every millisecond thus suggesting that for every pulsing event several enzymatic changes occur;
- ◆ 'the pulsed signals can induce significant modifications on DNA regulations as an effect of the methylation of the genome;
- ◆ 'scientific literature concludes that biological/health effects can occur at low intensity exposure and chronic exposure can make a living organism more susceptible to the effect of the EMFs;
- ◆ 'ICEMS monograph (*Eur. J. Oncol.*, 2010) concludes that there are non thermal mechanisms of action of EMF (including RF) on the living matter;
- ◆ 'experiments on cell cultures in residential areas in Potenza Picena showed that the radar signal activates apoptosis for

short exposures and cell survival signal after 24 hours of exposure;

- ◆ 'preliminary results of animal experiments show that radiofrequency is a co-carcinogenic agent;
- ◆ 'radiofrequency induces oxidative stress processes in tissues and living organisms;
- ◆ 'different epidemiological studies show that there is a significant increase of health risks on the people exposed to pulsed radiofrequency and more studies need to be done to conclude especially about pulsed radiofrequency;
- ◆ 'scientific literature suggests that for EMF the precautionary principle should be internationally adopted;

'Thus, stricter safety standards for EMF needs to be adopted by governments and public health agencies because the existing ones are obsolete and they are not based on recent literature about biological effects.

'According to the precautionary principle RF sources should be reduced as low as possible because at now it is not possible to establish a safe limit under which no biological effects can be observed.

'RF sources should be kept far from residential areas. For pulsed RF sources, such radars and Wi-Max antennas, the distance from the EMF source should be even greater because they cause more biologically

(Continued on page 12)

Watt's the Buzz?

Cost of dementia

Dementia is on the increase and is costing the community more than ever. In Australia the disease is already the third leading cause of death and is expected to affect close to a million people by the middle of this century. It's costing the community approximately \$5 billion a year and this could rise to \$83 billion by 2060. (*SMH* 04.03.13.)

Could EMR be playing a role?

Neurodegenerative diseases have been linked to exposure to high magnetic fields.

Wave and pay

Now there's incontrovertible evidence that wireless radiation is harmful. At least to a person's bank account.

US current affairs program *Thirteen Investigates* says that credit cards containing RFID technology emit a wireless signal that make them vulnerable to 'electronic pickpocketing'. The program demonstrated that it's possible, armed with an inexpensive scanner, to collect and record data from other people's credit cards and use it to make purchases.

RFID technology is also being used for other personal documents such as student ID cards and passports. <http://youtube.googleapis.com/v/LAFhTjsQHw%26sns=em>

Talking to distraction

In the past year, mobile phones were used for an estimated 2.3 trillion minutes, say scientists from the US, and this chatter may be having a negative impact on listeners.

Veronica V Galván devised an experiment in which volunteers heard

either a one- or two-sided mobile phone conversation. She found that those who heard the one-sided conversation were more distracted and remembered more of the conversation. She concluded that mobile phone conversations 'may be a common source of distraction causing negative consequences in workplace environments and other public places.' (Galván VV et al, *PLoS ONE* 8 (3): e58579. doi:10.1371/journal.pone.0058579, 2013)

Fashion stakes

Are you suited for life in today's technology-driven society?

A French fashion company wants to see that you are.

Designers from the Smuggler label have developed a suit that protects the user from mobile phone radiation. The pockets are lined with a special shielding fabric containing nickel, stainless steel, aluminium and faux gold that blocks 90 percent of radiation from entering the body. The suit will be launched with the Brand's spring collection. (*Global Post* 21.03.13.)

Kick starting exercise

There's no hiding the amount of time spent idle for wearers of these shoes.

Scientists have created the smart shoe—a shoe containing sensors worn with a wrist accelerometer. Wearers of these devices were monitored to see just how active they were as they went about their household chores and took part in athletic activities.

The information can be used, the scientists say, to improve people's activity levels. (Edgar, SR et al, *Conf Proc IEEE Eng Med Biol Soc*, 6382-5, 2012.)

Consider carefully

Don't drive in the United States!

Drivers in the US are more likely to be distracted by mobile phone calls than their counterparts in Europe, according to an eight-country study. The Center for Disease Control and Prevention study found that 69% of drivers in the US reported talking on a mobile phone while driving at least once in a 30-day period, compared to 21% of drivers in the UK. In the same period, 31% of drivers in the US and Portugal reported sending or reading messages while driving. (Centers for Disease Control and Prevention, *MMWR Morb Mortal Wkly Rep*, 62:177-82, 2013.)

White House rules

What sort of technology do the US President's children use. According to Barak Obama, not as much as many.

In an interview with *The View*, Mr Obama said that his 14 year-old was not given a mobile phone until last year and his younger daughter still doesn't have one.

'They can only use their cell phones on weekends. We don't let them watch TV or use their computers except to do homework during the week,' he told the audience. (*Business Insider*, 08.05.13.)

Addicted tots

Toddlers are using smart phones and iPads so much that they are becoming addicted to them, according to psychologists in the UK.

Children who use the technology for up to four hours a day have shown withdrawal symptoms similar to those from alcohol or heroin withdrawal, including agitation and tantrums and uncontrollable behaviour, said Dr Richard Graham, who runs a technology addiction program.

A survey found that one in seven

parents have been found to allow their babies to use technological gadgets for four hours a day or more of the ten or so hours they are awake. (*Telegraph*, 21.04.13.)

Nightmare exposure

What's the one place you *don't* want your children exposed to EMR? Most parents would agree it's the bedroom, where children spend such a large amount of time.

But not so an inventor from the US.

Juan Murdoch has invented smart pyjamas containing dot patterns that are triggered by a smart-phone or tablet to play a story or song. (*NBC News*, 25.04.13.)

Entertaining kids before bed might be a good idea, but so is protecting their health!

Avian tower protest?

An unusual couple has managed to shut down operation of a Vodafone mobile phone tower in the UK.

The couple—a pair of endangered peregrine falcons—has nested on the tower and may be ensconced for the remainder of the year till their prodigy are fully fledged.

The birds' protected status prevents Vodafone from taking action that might harm them. (*Inquirer* 15.04.13.)

Shocking news

A woman who received electric shocks from the showerhead in her bathroom has won compensation in a multi-million dollar law suit.

Simona Wilson from California experienced health problems — nausea, exhaustion and numbness—from the shocks which were caused by stray voltage (current flowing where it is not intended).

Following this victory, neighbours who have suffered similar problems began preparing for legal action. (*Healthy Living* 21.03.13.)

Electric sense

Electromagnetism underlies the life-sustaining process of pollination.

It's not just colour and perfume that attract bees to a flower. Flowers also use electromagnetic signals to advertise the availability of their pollen to bees in the vicinity.

'These electrical signals can work in concert with the flower's other attractive signals and enhance floral advertising power,' says Professor Daniel Robert from the University of Bristol in the UK.

In a study published earlier this year, Robert and his colleagues showed, for the very first time, that bees are able to recognise and react to the electrical signals given out by flowers.

To test this, Roberts created artificial flowers with an electrical field that could be turned on or off. When the field was turned off, the bees visited the flowers randomly. However, when it was turned on, they visited the flowers 81 percent of the time.

Secondly, Roberts changed the shape of the electric field around the artificial flowers and found that this affected their appeal for the bees. Bees preferred flowers with fields in concentric rings over those with circular fields.

When bees were given a learning test, they were faster at learning the difference between two colours when electric signals were also available.

How did the bees detect these fields? Roberts speculates that the hairs on a bee bristle when charged, in the same way that a person's hair bristles from static electricity.

Flowers are known to have a negative electrical charge because they are earthed. Bees, on the other hand, have a positive electrical charge acquired by bumping into molecules as they fly through the air. When positive charge meets negative charge, pollen literally jumps from flower to bee and pollination takes place.

In his experiment, Roberts placed electrodes in the stems of petunias and found that, when a bee lands on the flower, it changes the flower's potential and this remains changed for several minutes. He suggests this might be a mecha-



Photo: D. Clarke & D. Robert/Science

nism by which flowers tell bees that their pollen supply is low and to come back later.

'For me, as a sensory biologist, the most important thing is the fact that we could demonstrate that bees can sense weak electric fields at all. This constitutes, a new sensory modality for terrestrial animals, and serves a key function in the biology of pollinators,' Roberts told *EMR and Health*.

Roberts believes the study has broader implications for the environment. 'Any cues or information that bees and flowers can generate and exchange that facilitates their interactions (a form of partnership) is key to many ecosystems. Bees and flowers seem to benefit from this; bees get their resources, flowers get their pollen distributed. Electric [fields], we show, improve on the process, and help bees learn what to do, and where to find their bounty.'

'Important to say, there are economic aspects to it, as pollination supports, as a world wide ecological service, the production of a lot of human food resources.'

'Also, this is only the beginning of a new approach into understanding how insects and plants interact, and I am sure that our awareness of the role of weak electric fields in natural processes is incomplete at the moment,' Roberts said.

Reference: Clark, D et al, 'Detection and Learning of Floral Electric Fields by Bumblebees', *Science Express* DOI: 10.1126/science.1230883

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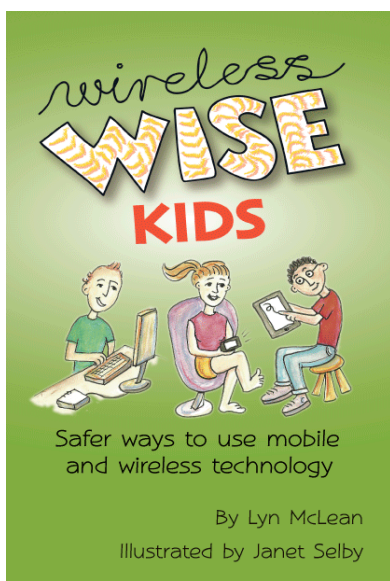
low-up studies.

The Korean study is not the first to have found a link between children's mobile phone use and behavioural problems. In 2008 investigators from the University of Southern California found that children exposed before birth to mobile phone radiation had more behavioural problems than unexposed children.² In a follow-up study with a larger group of children, published mid 2012, the same team confirmed their earlier findings.³

Last year, investigators from Yale University in the US found ADHD-like symptoms in mice exposed to mobile phone radiation. 'Mice exposed during pregnancy had impaired memory, were hyperactive, and had decreased anxiety, indicating that *in-utero* exposure to radiofrequency is a potential cause of neurobehavioral disorders,' they said.⁴

References

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- 2 Divan HA et al, *Epidemiology* 19 (4):523-9, 2008.
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Pedestrian risks

It's well known that talking on a mobile phone increases the risks of traffic accidents—even on par with drink driving.

But it now been shown to be a risk for pedestrians as well.

A study from the Ohio State University, published in April, found that phone-related injuries among pedestrians are increasing, especially among males and people aged below 31.

The authors said this was because pedestrians who use mobile phone are more distracted, are less aware of what's happening around them and more inclined to engage in unsafe behaviour.

'Using a mobile phone while walking puts pedestrians at risk of accident, injury or death,' the authors concluded. (Nasar JL and Troyer, D, *Accid Anal Prev* 3 Apr, 2013.)

(Continued from page 9)

The Commission admits it has a foot in both camps. 'We recognize our responsibility to both protect the public from established adverse effects due to exposure to RF energy and allow industry to provide telecommunications services to the public in the most efficient and practical manner possible.'

Submissions can be made till September.

(<http://www.fcc.gov/document/>

(Continued from page 9)

effects than non pulsed signals.

'Wi-Fi should not be placed in schools and in public areas since they have characteristics of pulsed signals.

'The precautionary principle suggests to use special caution for the younger people and for susceptible such as those with Electromagnetic Hypersensitivity a condition growing in modern societies that makes people sick for exposure to EMF even at low level of intensity.'



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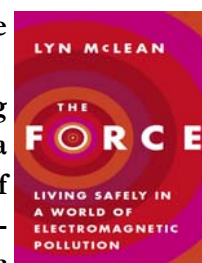
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