

EMR and Health

Quarterly report on electromagnetic radiation, health and well-being

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Mobile - tumour link news

Heavy or long-term mobile phone use has been once again linked to an increased risk of some brain tumours.

Scientists from France have found that using a mobile phone may have carcinogenic consequences—at least under some conditions.

'We show that heavy mobile telephone use, 896 or more hours of calls over a lifetime, may be associated with the development of brain tumours. In these people, the risk of a positive association between telephone use and the development of brain tumours was increased for those who used the telephone for more than 15 hours per month,' said Isabelle Baldi from the University of Bordeaux, one of the study's authors.

The study¹ looked at mobile phone users from four areas in France between 2004 and 2006. It found that regular mobile phone users—those who made one call a week for at least six months—had virtually no increased risk of tumours. However, people with the heaviest use—those who had used a mobile phone for 896 or more hours—had more than double the risk of gliomas and meningiomas.

The authors point out that 896 hours is equivalent to 30 minutes of mobile phone use a day—not just for one day, but every day.

Risks were higher for temporal tumours, occupational and urban mobile phone use.

Because the number of subjects in the highest exposure group was small, it is hard to extrapolate the results of the study to the broader community. Nevertheless, the



results are similar to those observed in larger studies. The WHO's Interphone Study found higher rates of gliomas and meningiomas in long-term and heavy users², as did studies by Professor Lennart Hardell and his team.³

Based largely on the results of these studies, the International Agency for Research on Cancer (IARC) classified mobile phone radiation as a Class 2B carcinogen in 2011.

1. Baldi I, Bouvier G, Coureau G, et al. Mobile phone use and brain tumours in the CERENAT case-control study. *British Occupational and Environmental Medicine*. 2014.
2. Interphone Study Group, *Int J Epidemiol* 39 (3):675-94, 2010.
3. Hardell, L et al, *Pathophysiology*. 2013 Apr;20(2):85-110; *Int J Oncol*. 2013 Dec;43(6):1833-45.

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Belgian phone labels

The Belgian government has introduced legislation to limit children's exposure to mobile phone radiation and to help consumers make informed decisions when purchasing new mobile phones.

As from 1 March this year, it is illegal to sell a mobile phone designed for children under the age of seven. Nor can advertisers promote the use of mobile phones for children of this age—in stores, on TV and radio, in magazines, brochures or on the internet.

According to the Belgian government, the purpose of this legislation is to 'moderate the supply and demand of mobile phones in young children.'

Secondly, information about SAR levels must be readily available to consumers. SAR—or Specific Absorption Rate—is the amount of radiation absorbed into the head while using a mobile phone and lower SAR levels indicate lower absorption than higher SARs. The new legislation requires SAR information to be available in stores, on the internet and in all advertisements..

Retailers are now required to display a poster with information about SAR levels and the information 'Think of your health—use your cell phone sparingly, prefer the use of a headset and choose one with a SAR value (SAR) that is low.' (See image below.)

The new rules apply to GSM and smartphones and failure to comply could result in fines.

According to the Federal Office of Public Health, Safety and the Environment, the measures are precautions designed to prevent possible health effects. It refers to results of studies by the Interphone and Swedish teams that both found evidence of increased rates of some brain tumours for long-term, intensive phone use and the decision by the International Agency for Research on Cancer (IARC) to classify mobile phone radiation as 'possibly carcinogenic to humans'. It also called into question the thermal basis of international radiation standards.

The Federal Office also said that many experts recommend that children's mobile phone use be restricted. It pointed out that children's brains absorb twice as much radiation as those of adults and their cervical cord absorbs ten times as much.

It further said, 'some limited scientific evidence indicates that intensive use of mobile phones may generate an increased risk of brain cancer. In addition, almost everyone uses a mobile phone. Thus even slightly increased risk may have a relatively large impact on health.'

The Federal Office has suggested a number of tips to reduce people's exposure to mobile phone radiation:

- limit call duration;
- avoid trusting devices that claim to reduce or cancel radiation;
- use a headset;
- use the speaker function;
- message rather than call;
- call only in good reception areas;
- choose phones with lower SARs;
- avoid using a mobile phone while driving.

(http://health.belgium.be/eportal/19089508_FR?#.U0ILm1fWmF4)

Pensez à votre santé



Utilisez votre téléphone portable avec modération, privilégiez l'usage d'une oreillette et choisissez un appareil ayant une valeur DAS faible.

- A: pour DAS < 0,4 W/kg
- B: 0,4 ≤ DAS < 0,8 W/kg
- C: 0,8 ≤ DAS < 1,2 W/kg
- D: 1,2 ≤ DAS < 1,6 W/kg
- E: 1,6 ≤ DAS ≤ 2 W/kg

Israeli ruling

On 24 April the Israeli government took a step closer to banning WiFi in schools.

For some time, the Israeli Supreme Court has been the setting for a legal battle between government departments and a coalition of citizens concerned about the effects of WiFi radiation on children, among them lawyer Dafna Tachover, who suffers from electromagnetic hypersensitivity (EHS).

In a mid-April meeting, the Court heard that a government lawyer had failed to provide requested data about the incidence of EHS in schools.

The court responded by issuing a 'conditional injunction' to ban the use of wireless internet in schools. The injunction will become effective on 15th July unless, by that time, the Government proves to the Court that it cannot use wired internet connections in schools. (correspondence, Dafna Tachover)

Low-EMR housing

Europe's first low-radiation, low-chemical housing complex has been finished. The building, which comprises 15 units, blocks radiation from nearby transmitters and uses only minimal electricity.

The building was conceived by the Healthy Life and Living Foundation, whose head, Christian Schifferle, is sensitive to EMR and chemicals. The land for the building was donated by the city of Zurich. (naturalnews.com, 16.04.14.)

Canadian report

The Royal Society of Canada has published the results of its review into the country's radiation standard.

Commissioned by Health Canada, the 'Review of Safety Code 6: Potential Health Risks of Radiofrequency Fields', is a 165-page report that reaffirms the status quo. It says, 'the balance of evidence at this time does not indicate negative health effects from exposure to RF energy below the limits recommended in the Safety Code. However, research on many of these health effects is ongoing and it is possible that the findings of future studies may alter this balance of evidence.'

Similarly, the report fails to find evidence of electromagnetic hypersensitivity. It says, '... there is no firm evidence for the hypotheses that people with IEI-EMF can perceive RF energy at levels below the limits in SC6 or that there is a causal link between exposure to RF energy and their symptoms.' As is often the case, the authors equated EHS with the ability to consciously and immediately perceive symptoms during exposure—even though many people experience delayed reactions.

The report is available online at: <https://rsc-src.ca/en/expert-panels/rsc-reports/review-safety-code-6-2013-health-canadas-safety-limits-for-exposure-to>



Australia's RF standard

Australia's radiation authority has concluded that there's no need to tighten the country's radiation standard. After a review of the science by four appointed experts, the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) released its 68-page report in March.

It came to precisely the opposite conclusion to that of the BioInitiative Report by independent scientists discussed below.

The ARPANSA report concluded 'The examination of the science in this area from January 2000 till August 2012 by the Expert Panel indicates that the Basic Restrictions of RFS3 [the existing standard] are still valid for protection against known adverse effects.'

(Continued on page 10)

“the variability in the science supports the rationale for a precautionary approach.”

BioInitiative 2014

A group of independent scientists, the BioInitiative Working Group, claims that there is increasing scientific evidence of harmful effects from wireless radiation. In its April update of the 2012 BioInitiative Report, the Group released the results of studies conducted up to 2014.

Dr Henry Lai reviewed studies published between 2007 and 2014. He found evidence of genetic damage in 65% of relevant studies on RF radiation and 83% on fields from electrical sources. He found evidence of neurological effects in 68% of studies on RF radiation and 90% on fields from electrical sources.

The update also found that 88% of relevant studies showed evidence that exposure to electromagnetic fields increased levels of free radicals.

New studies also show increased risks of malignant brain tumours from mobile phone use, the Group said. 'Epidemiological evidence shows that radiofrequency should be classified as a known human carcinogen. The existing FCC/IEE and ICNIRP public safety limits are not adequate to protect public health,' it said.

The Group called for schools to use wired internet connections and called wireless exposure 'an unregulated experiment on children's health and learning'.

The report can be found at www.bioinitiative.org.

“Epidemiological evidence shows that radiofrequency should be classified as a known human carcinogen.”



RESEARCH UPDATES

ELF fields (from electrical sources)

Fertility

Being exposed to magnetic fields before birth may reduce fertility in women.

Scientists exposed pregnant mice to a magnetic field (3 mT) for four hours a day throughout pregnancy. When their offspring were examined, they showed more damage to oocytes (immature ova) and follicles (which are involved in menstruation) than unexposed females. The authors suggest these effects could potentially reduce their ability to reproduce. (Roshangar, L et al, *Adv Biomed Res*,3:76, 2014.)

Anti-theft systems

Cashiers are exposed to different types of magnetic fields from electrical equipment and antitheft devices at or near their workstations. Finnish researchers measured intermediate fields of 2 to 40 mG and ELF fields of 0.3 to 45 mG at cashiers' seats. They found that cashiers could be exposed to even higher fields of 1890 mG—above the guidelines of the International Commission on Non-Ionizing Radiation Protection—when they passed between the antitheft devices. (Roivainen, R and Eskelinen, T et al, *Bioelectromagnetics*, 35(4):245-50, 2014.)

Membrane effects

How do electric fields from the power system affect the cell membrane? To test this, G Neves and colleagues exposed pancreatic β -cells to a 60Hz field of different intensities and found that exposure changed the membrane potential in the cells. (Neves, GF et al, *Acta Biotheor*, 19 March, 2014.)

Brain tumours

Might workers exposed to high magnetic fields be more at risk of brain tumours? To see if this was the case, T Sorahan

studied a group of over 73,000 workers from the Central Electricity Generating Board of England and Wales employed between 1973 and 2010. The author found an increased risk of meningioma for the most exposed workers but did not dismiss the possibility that the findings may have been caused by chance. (Sorahan, T, *Occup Med (Lond)* 64(3):157-65, 2014.)

MRI symptoms

Workers exposed to high fields from MRI scanners in the Netherlands reported symptoms such as vertigo and a metallic taste in the mouth. Symptoms occurred during 16 to 39% of their shifts and there was a relationship between the symptoms and the strength of the field the workers were exposed to. (Schaap, K et al, *Occup Environ Med* Apr 8, 2014.)

OCD

Scientists observed OCD-like behaviours in mice exposed to a high magnetic field (10 Gauss) eight hours a day for various lengths of time. They attributed the symptoms to increased levels of nitric oxide in different parts of the brain that was observed in exposed animals. (Salunke, BP et al, *Pharmacol Biochem Behav*, Apr 26, 2014.)

Foetal effects

Researchers from Britain and the US investigated the birth weight of children born to parents living near a source of high magnetic fields—such as a high voltage powerline. They found that women who lived close to such a source had babies with lower birth weights than women living further away. (de Vocht, F and Lee, B, *Environ Int*, May 6, 2014.)

Cognitive problems

It's possible that working in a high magnetic field could affect cognitive performance. Z Davanipour and team concluded, from a study of over 3000 Mexican Americans, that those who worked in high magnetic fields had more than three times the rate of severe



The author found an increased risk of meningioma for the most exposed workers

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 (μ T)

0.1 mT = 1000 mG

0.01 mT = 100 mG

1 μ T = 10 mG

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

Megahertz (MHz) - million Hz

GigaHertz (GHz) thousand million hertz

cognitive dysfunction. Smoking and age accentuated the problems. (Davanipour, Z et al, *Br J Med Res* 4(8), 2014.)

Other studies on ELF exposure

- Exposure to ELF changed synaptic plasticity in rats. (Komaki, A, *Brain Res* April 12, 2014.)

RF/wireless radiation

Mobile phone symptoms

A survey of Polish mobile phone users has found that many experience unpleasant short-term symptoms. People who spent long periods on their phones reported headaches, fatigue and warmth around the ear. Symptoms often disappeared within two hours of a call, but some persisted for more than six hours afterwards. (Szyjowska, A et al, *Int J Occup Med Environ Health*, Apr 1, 2014.)

Semen quality

Further evidence that mobile phone radiation affects semen quality comes from a review and meta-analysis that considered studies published before May 2013. The review of human and cell studies showed that the radiation adversely affected semen quality. The meta-analysis showed that mobile phone radiation had harmful effects on sperm in animal and cell studies but not in human studies. (Liu, K *Andrology*, Apr 3, 2014.)

Stress

To see whether mobile phone radiation affects the central nervous system, scientists exposed rats to a GSM mobile phone signal (of 1.8 GHz) for three days. The animals did not show anxiety or memory problems, but they did show behaviours that indicated stress. (Júnior, LC et al, *Neurol Res* Jan 2014.)

Effects on the foetus

A mother's mobile phone use can affect the brain of her children, according to a study on the behaviour and physiology of

young rats. Scientists exposed unborn rats to a mobile phone signal (900 MHz) for six hours a day throughout the pregnancy and subjected them to various tests after birth. They found that mobile phone affected learning and memory and had a negative impact on cognitive performance, compared to unexposed rats. (Razavinasab, M et al, *Toxicol Ind Health*, 6 March, 2014.)

Skin effects

Mobile phone radiation could have harmful effects on the skin which is the first organ to be exposed. To test this hypothesis, Turkish scientists exposed rats to a GSM (900 MHz) signal for 20 minutes a day for 3 weeks. They found that exposure caused changes to skin levels of hydroxyproline which is involved in collagen metabolism. (Çam, ST et al, *Cell Biochem Biophys*, 24.04.14.)

Free radicals

Potentially harmful effects of mobile phone radiation were found in a study from China. Q Hou and team exposed cells of mouse embryos to an intermittent 1800 MHz GSM signal for up to eight hours. During this time, the signal was switched on for 5 minutes and off for ten. The researchers found that exposed cells had more oxidative stress and cell death than unexposed cells. (Hou, Q et al, *Electromagn Biol Med* March 25, 2014.)

Oxidative stress

M Ragy exposed rats to a 900 MHz signal an hour a day for 60 days. Exposed rats had signs of increased peroxidation and decreased levels of antioxidants in the brain, liver and kidneys. Rats recovered after 30 days without exposure. (Ragy, MM, *Electromagn Biol Med* Apr 8, 2014.)

Protecting against oxidative stress

In another study, scientists exposed rats to base station radiation and found that they had lower levels of antioxidant enzymes than unexposed rats. Those which had been treated with vitamin C during exposure had less oxidative stress, indicating that vitamin C provided a protective effect. (Akbari, A et al, *Toxicol*
(Continued on page 9)

People who spent long periods on their phones reported headaches, fatigue and warmth around the ear.



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PURCHASE

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Exposure to a pulsed signal did not affect IVF-fertilization success in mice. (Hafizi, L et al, *Cell J* 15(4):310-5, 2014.)

Birds & communications towers

A US department has questioned the country's communications standards. In a letter to the Department of Commerce, the US Department of the Interior expressed concerns about the impact of communications towers on birds, especially protected migratory birds. In it, Willie R Taylor, Director of the Office of Environmental Policy and Compliance, said that the towers could damage wildlife in two significant ways.

In the first instance, injury and death occur when birds collide with towers and their wired supports. The letter referred to a study which found that hundreds of birds collided with unlit towers in two regions of the US each night.

An enclosure appended to the letter also referred to evidence that radiofrequency radiation from the towers adversely impacts the birds. It referred to a 2005 study which found a link between radiation from towers and 'breeding, nesting and roosting' near towers. The study found evidence of abandoned nests, deteriorations in plumage, movement problems, and death in a number of species. Another study found adverse effects of mobile phone radiation on chicken embryos.

The enclosure further stated that 'the electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today.' (Letter by Willie R. Taylor, United States Department of the Interior, to Mr Eli Veenendaal, National Telecommunications and Information Administration, 07.02.14.)

Mobiles and parents' behaviour

The use of mobile phones is affecting parent's relationships with their children, according to a study from Boston, US.

In the study, by Jenny Radesky and team, researchers observed 55 groups, comprising at least one adult and one or more children under ten, while they ate in a fast food restaurant. As the researchers watched, they recorded mobile phone use and behaviour of those in the group—especially the degree to which adults paid attention to either their phone or their children.

The study found that 16 of the 55 adults were more absorbed in their phones than their children. Some were almost continuously involved in using their phone—either typing or swiping the screen—and their gaze was focused on the screen throughout the meal.

The adults who used their phones to make calls kept some eye contact with their children, even if they appeared absorbed by their conversation.

Children responded to the lack of parental attention in different ways. Some appeared to accept it and amused themselves. Others 'started to exhibit limit-testing or provocative behaviours'. The phone-absorbed parents tended to ignore this behaviour for a while and then 'react with a scolding tone of voice', according to the authors.

Children were less likely to use a mobile phone than their parents, but some parents gave their children phones apparently to entertain or control them.

(Jenny Radesky et al, 'Patterns of Mobile Device Use by Caregivers and Children During Meals in Fast Food Restaurants', *Pediatrics* 153(4), 2014.)

Remaking 2 Australian standards

Two Australian standards that affect the amount of mobile phone radiation to which the public can be exposed are due to be automatically repealed this year. They are:

- the *Radiocommunications (Electromagnetic Radiation — Human Exposure) Standard 2003* and
- the *Radiocommunications (Compliance Labelling — Electromagnetic Radiation) Notice 2003*.

Broadly speaking, the standards address radiation levels and compliance labelling of mobile phones.

The Australian Communications and Media Authority (ACMA) planned to remake the standards with minimal changes and opened this proposal to public comment in March and April.

EMR Australia has suggested to the ACMA that the remaking of this legislation offers a great opportunity to introduce mobile phone labels containing SAR levels—(Specific Absorption Rate) - ie the amount of radiation absorbed by the skull during mobile phone use. Our submission on this proposal is can be seen at: <http://emraustralia.com.au/>

The Consumers Health Forum of Australia (CHF), the national peak body representing the interests of Australian healthcare consumers, has an online page: 'Conversations about Electrohypersensitivity at http://ourhealth.org.au/tags/electro-hypersensitivity#_U2bLgCjWmF6

UPDATES FROM AROUND THE WORLD

Legal Action

An Italian organisation has taken legal action aimed at forcing the Ministry of Health to inform people about the risks of mobile phone radiation. On 20 March the APPLE Association and Mr Innocente Marcolini launched the action in the Court of Lazio Region. It seeks restrictions on the advertising of mobile phones, guidelines discouraging children's use of mobiles and labels warning users of potential cancer risks. In 2012 the Supreme Court ordered that Mr Marcolini receive compensation for a brain tumour caused by radiation from his mobile phone. (APPLE press release 20.03.14.)

Research program

A new European research project will investigate the health effects of electromagnetic fields. The Generalised EMF Research using Novel Methods (GERoNiMO) project involves researchers from 13 countries and 19 research institutions. Funded by the European Union, it is led by Professor Elisabeth Cardis. Its aim is to assess the effects of EMF on cancer, neurodegenerative disease, behaviour, reproduction and aging. (Crealradiation.com)

ARPANSA's webpage

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) has launched a new webpage on its site. The new page covers the activities of the EME Reference Group (EMERG), a stakeholder group hosted by ARPANSA which meets twice annually. EMERG has been in operation since 1996 but its activities have, to this point, been unreported to the public. The new page will contain deidentified minutes of meetings and, according to ARPANSA, provides 'visibility of the group and its activities to the general public' The page can be found at: <http://www.arpansa.gov.au/AboutUs/Committees/emerg.cfm>

Hypersensitivity in France

For the first time, a French authority has granted financial assistance to a person with electromagnetic hypersensitivity. The MDPH Essone has made an initial grant for shielding equipment and will provide monthly supplements for a three-year period. The man who has been classified as disabled, developed electromagnetic hypersensitivity in 2011. (<http://www.journaldelenvironnement.net/article/dans-l-essonne-l-electrosensibilite-reconnue-comme-un-handicap.45060>)

WiFi report

On 20 March, the New Zealand Ministry of Health published a report on the health effects of WiFi in schools. Based on measurements from two schools, the Ministry concluded that emissions complied with the country's standard and, therefore, 'WiFi in schools does not pose a health risk to children or staff.' The report didn't address potential risks from exposure to long-term, non-heating effects of radiation exposure. (<http://www.health.govt.nz/publication/snapshot-study-wifi-in-schools>)

Phone ban

The Japanese city of Kariya has begun a campaign to stop children from using smartphones and other mobile technologies after nine pm. From 1 April, parents have been asked to take children's smartphones and keep tabs on their online activities. The initiative aims to reduce address children's excessive phone and online activities and to reduce online bullying. (*Telegraph (UK)* 24.03.14.)

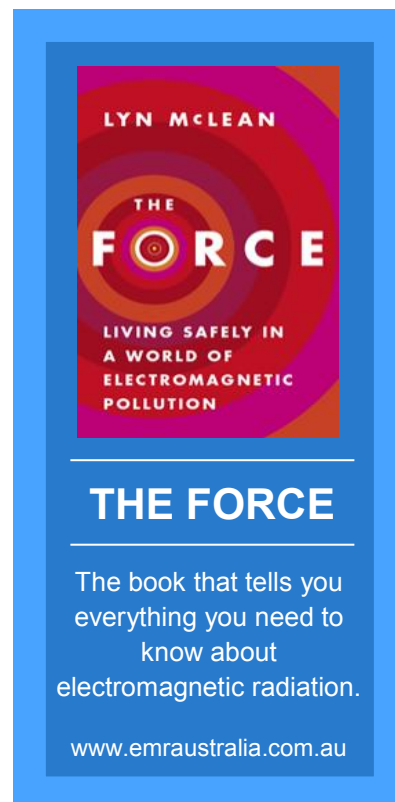
Phone tower down

A Russian court has ordered that a mobile phone base station is to be dismantled following a successful suit by a resident living nearby. Nikolai Lesnikov took legal action against phone company MTS after it installed a base station approximately 20 metres from his home, even though the

emissions from the base station complied with the country's standard. The court found in Lesnikov's favour, agreeing that the company had abused Lesnikov's constitutional right to a favourable environment. (*ITAR-TASS*, 11.04.14.)

Nature first

A South Australian primary school has chosen the bush over WiFi for its students' education. Upper Sturt Primary School has decided against installing WiFi as a result of concerns about the impact on students' health. Instead, students access the internet through data points and spend time developing the school's Heritage Bushland as part of their studies. (*Adelaide Advertiser* 18.02.14.)



Steve's story

Steve Weller describes his experience of electromagnetic hypersensitivity.

I am 45 years of age and have been using computers all my adult life. I am an IT professional with a Bachelor of Science degree. I was an earlier adopter of technology and discovered, quite by accident, that I was sensitive to certain electromagnetic frequencies.

My earliest memory of being sensitive to radiofrequencies was in late 2001 when wireless networking was beginning to become popular. I had no preconceived ideas or fears about the technology nor was I aware that RF could be potentially harmful. I bought the most powerful wireless Wi-Fi router available at the time, capable of transmitting 108Mbps per second and having an effective range of 100m+, which was twice as fast and twice the range of more common wireless routers at the time.

On first using my router I began to feel pressure in my head, pressure in my chest, tingling sensations in my hands and face within a few minutes of use. I also noted (and so did my wife) that my temperament changed from my normally relaxed manner to being more agitated and short tempered when using my Wi-Fi enabled router. After turning off my wireless router, I was left with a headache that persisted for several hours. At first, I did not associate it with my use of wireless. It was only on subsequent usage that I felt the same symptoms. If I persisted for longer durations I found that, on top of the symptoms mentioned above, I felt a burning sensation in my intestinal region and the pressure on my chest would sometimes lead to my heart beating irregularly (arrhythmia) followed by stronger than normal heart beats (as if my heart was trying to jump out of my chest).

I soon realised that a consistent pattern was developing when using my wireless router and symptoms that I was feeling.

I can only use a mobile phone near my head for 30 seconds or so before I find



myself swapping the phone to my other ear due to severe discomfort that I feel. Today I rarely use my mobile phone and only keep it for emergencies. I switch it to flight mode most of the time, but if I do need to use it, I operate it using hands free.

In late August/early September 2011, Powercor rolled out wireless enabled smart meters in my street. I resisted the installation of a smart meter. However, not having a smart meter installed on my property did not help me as I became severely affected by my neighbours' two smart meters that were installed next to my bedroom 3m away. It was soon after installation that I found I was waking at specific times every night. Sometimes I felt like someone had taken a long sharp needle and quickly pushed it into my head. Once awoken, I found it very difficult to fall back to sleep. Every morning I would wake up with a serious headache which would last all day and make concentration and performing simple duties quite difficult. On a number of occasions I would wake up with a feeling of pressure on my chest and my heart beating irregularly. I was feeling the very same symptoms that I had previously experienced with my wireless router.

[Steve's sensitivity increased with continued work-related exposures.]

I had become sensitised to things that normally did not bother me. Standing near transformers (phone chargers, laptop power modules, light dimmers) left me feeling the same very symptoms I felt when exposed to wireless RF. Standing near my electric hotplate and range hood also affected me. I became allergic to my deodorant which I had been using for 10 years without issue. I had constant headaches, felt extremely lethargic and completely lost motivation to do anything with the family. I would wake up feeling just as tired when I got out of bed in the morning as I had before I went to bed. I even found that I had become a rudimentary mobile phone base station detector. I could sense a mobile phone tower well before I even saw it.

I can no longer drive through suburbs where smart meters have just been rolled out without developing a serious headache that can last for days. I have been to my local GP many times and he is at a loss to explain what is wrong with me. Blood tests, ECG tests all come back as normal. I was referred to a neurologist. He suggested I have an EEG and MRI to verify that I do not have any brain disorders or tumours. Of course the results came back negative.

It is important to understand that when I say I feel a headache, it is not a normal headache. It is a constant pressure and dull ache in my head. My face feels drained like I have been doing a 24 hour shift and sometimes can be accompanied by a prickling feeling over my skin (head and face) when in the presence of microwave RF frequencies.

I know without a doubt that wireless RF is causing these issues because when I go to remote areas where there is very low EMR I feel fine after several days.

Mech Methods, Apr 25, 2014.)

Protective effects

In a similar study, scientists found a protective effect from garlic. Rats exposed to a 2.45 GHz signal had DNA damage in brain tissues and plasma as well as oxidation in plasma. Pretreatment with garlic reduced these effects. (Gürler HS et al, *Int J Radiat Biol*, May 21: 1-15, 2014.)

Ipads

With 140 million iPads® in use, scientists investigated whether the iPad2® could interact with implantable cardioverter defibrillators. They found that 33 percent of the defibrillators were affected when the iPad2® was placed directly over on top. The results could have implications for wearer's safety, the authors suggest. (Kozik, TM et al, *J Am Heart Assoc* 3(2), 2014.)

Neural effects

Mobile phone radiation had harmful neural effects in a study on rats. The authors found that exposure to 2.856 GHz for five and 15 minutes resulted in neural cell death through its affects on energy-making mitochondria. (Zuo,H et al, *Int J Med Sci*, 11(5):426-35, 2014.)

Brain tumours

A meta-analysis of 29 papers on mobile phone use and brain tumours found a small increased risk among long-term users. The authors found up to 40% increased risk of gliomas and up to 30% increased risk of acoustic neuromas. They recommended continued monitoring of phone users for tumours. (Lagorio,S and Rössli, M, *Bioelectromagnetics* 35(2):79-90, 2014.)

Salivary changes

To evaluate the effects of mobile phone radiation on the parotid gland, scientists collected samples of saliva from 86 volunteers. They found that people who used their mobile phones on the right side of their head had changes in protein concentrations and salivary flow rate on the corresponding side of the head. (Hashemipour, MS et al, *J Laryngol Otol*, 1 -9, Apr 17, 2014.)

Neuronal damage

Mobile phone radiation caused neuronal damage in rats. Investigators exposed young and adults rats to a mobile phone signal for two hours a day for 60 days. Exposure caused oxidative stress, reduction of antioxidants, reduced brain weight in young rats and other examples of neuronal damage. (Motawi, TK et al, *Cell Biochem Biophys*, May 7, 2014.)

Testicular damage

WiFi radiation caused testicular damage in a study of rats. The animals were exposed to 2.45 GHz for three hours a day for three weeks. At the end of that time, there was evidence of structural damage to the testes. (Almášiová, V et al, *J Toxicol Environ Health A*, 77(13), 747-50, 2014.)

Other studies showing effects

- The hippocampus of rats exposed to microwave radiation had changes in microRNAs which are involved in gene expression. (Zhao, L et al, *J Mol Neurosci*, Apr 22, 2014.)
- Mobile phone radiation was associated with cell death in rats. (Yilmaz, A et al, *Eur Rev Med Pharmacol Sci*, 18(7):992-1000, 2014.)
- Rats exposed to microwave radiation had reduced spatial memory. (Qiao, S et al, *PLoS One* 9(4), 2014.)
- Epileptic responses to WiFi signals were caused by calcium ion influx in rats. (Ghazizadeh, V and Naziroğlu, M, *Metab Brain Dis*, May 3, 2014.)
- Mobile phone radiation caused structural damage in the cochlea of rats. (Seckin, E et al, *J Laryngol Otol*, May 1, 2014.)

Studies showing no effects

- No increased risk of leukemia was found in children living near broadcast transmitters. (Hauri, DD et al, *Am J Epidemiol*, 179(7):843-51, 2014.)
- Mobile phone use did not cause change to parotid and salivary gland

function. (de Souza, FT et al, *Cancer Epidemiol Biomarkers Prev*, Apr 21, 2014.)

Comment

Why is it that studies on the effects of EMR on the body often have different outcomes?

It could be because of the sex of the animals or even the cells, says Maren Fedrowitz, in an article for the Bioelectromagnetics Society. Male and female cells can behave differently—even when hormones are not involved. Studies should be designed to accommodate these differences, Fedrowitz said. (<https://www.bems.org/node/14322>)

Electromagnetic hypersensitivity

A British researcher has conducted a test on patients with electromagnetic hypersensitivity. M Griesz-Brisson tested 22 people with the condition across a number of parameters. The study showed that many were deficient in essential elements (such as magnesium and zinc), had high levels of toxic chemicals. Lacked



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Children & mobiles – study

Does children's use of wireless devices affect their cognition?

To answer this question, scientists from London's Imperial College and Birkbeck University are beginning a three year study of young teenagers.

Launched on 20 May, The Study of Cognition, Adolescents and Mobile Phones (SCAMP) will investigate the effects of wireless technology on cognitive functions such as memory and attention. Children will be assessed in year 7—the age at which they often acquire mobile phones—and again in year 9. Pupils and their parents will be interviewed about students' technology use and computer tests will be given to assess cognitive performance.

The study is claimed by its investigators to be the largest of its kind.

Cognitive development continues during adolescence. 'It is therefore of critical importance to investigate whether the use of mobile phone and other wireless technologies may impact cognitive development, and this is what SCAMP will do,' said Dr Iroise Dumontheil, a co-investigator of the study.

The study team hopes to enlist about 3000 teenagers and has already sent letters to 160 schools near London inviting their participation.

The study was commissioned by the UK Department of Health and is led by Dr Mireille Toledano from Imperial College London. It's website can be found at: <http://www.scampstudy.org/the-study/schools/>

(<http://www.scampstudy.org>; Birkenbeck University of London, <http://www.bbk.ac.uk/news/mobile-phone-use-and-cognitive-development-during-adolescence>)

(Continued from page 3)

In reaching its conclusions, the ARPANSA team relied heavily on reviews conducted by other bodies—*ICNIRP 2009*, *SCENIHR 2009* and *AGNIR 2012*—and, therefore, reflect the biases of those reports, rather than arriving at an independent assessment.

The report did, however, find that existing limits don't provide the degree of protection for certain body types that was previously thought.

To cover its bases, the report suggested that the ARPANSA standard cannot be guaranteed to protect public health. 'The uncertainty about the absolute safety of exposures below the current RFS3 limits remains and consideration should be given whether the existing precautionary minimization requirements of RFS3 address those uncertainties.'

Again, the report states, '... despite the growth in the body of knowledge over the last 10 years, the variability in the science supports the rationale for a precautionary approach.'

In his review of ARPANSA's report, Professor Dariusz Leszczynski said, 'There seems to be complete lack of any interest in explaining how it is possible that many in vitro studies show effects at exposure levels well below thermal levels of exposure.'¹

The 'Review of Radiofrequency Health Effects Research—Scientific Literature 2000-2012' can be found at <http://www.arpansa.gov.au/pubs/technicalreports/tr164.pdf>

1. <http://betweenrockandhardplace.wordpress.com/2014/04/14/arpansa-report-no-epiphany-just-deja-vu-all-over-again/>

Not to be missed online:

'Look Up' - A spoken word film for an online generation: <https://www.youtube.com/watch?v=Z7dLU6fk9QY>

'Search for a Golden Cage' - a film about electromagnetic hypersensitivity: <http://time.com/golden-cage/>

'Grand Challenges' - The first article in the new Radiation and Health Journal, edited by Professor Dariusz Leszczynski: <http://journal.frontiersin.org/Journal/10.3389/fpubh.2014.00050/full>

More wireless

Australian Telecommunications giant Telstra plans to create new public WiFi networks that its customers can access at no charge.

The new plan, revealed on 21 May, would involve the construction of 8000 wireless hotspots in busy areas around the country. Bandwidth for the project will come from existing customers who are being asked to donate some of their home bandwidth to the network.

Customers who take part in the project will be able to use the network at no expense, provided they have a compatible modem. Telstra plans to charge those who are not customers for access to the network.

(*Australian* 21.05.14.)

WATT'S THE BUZZ?

Digital detox

Australian Opposition Leader Bill Shorten has encouraged people to limit their use of social media. Doing so could improve mental health, interpersonal relationships and enjoyment of life, he said. The Minister encouraged people to take a 48-hour 'digital detox' which might include staying away from computers and mobile phones for a weekend. (*Australian IT*, 22.03.14.)

No escape

What is the one thing that every community on Earth needs—no matter how affluent or impoverished?

That's right—it's the internet!

At least Facebook's CEO Mark Zuckerberg thinks so. Facebook has created a Connectivity Lab with specialists staff and specialised technologies. The Lab's aim is to develop technologies that can make the internet accessible in every corner of the globe. (*Wall Street Journal*, 27.03.14.)

Doing the circuit

An Australian inventor has created a product that could revolutionise the electronics industry. Ariel Briner, an electrical engineer from Brisbane, has developed a printer that prints designs for circuit boards directly onto plastic or other suitable surfaces. Components can then be attached using glue. This bypasses the present cumbersome and risk-prone method of making circuit boards with acid etching and soldering. The printers are already in production and sell for approximately \$1600. (*The Australian* 04.03.14.)

What next?

First there were smart meters for relating usage information to utilities.

Now Dublin City Council plans to introduce another sort of wireless network—for relating information about quality-of-life issues.

The new network utilizes sensors developed by Irish company Intel which will be attached to buildings, lampposts, drains and other structures. The sensors will transmit information about air quality, the amount of water flowing through drains, noise, temperature and other environmental data using wireless radiation to the Council's headquarters. Intel hopes to introduce similar networks to other cities around the world. (*Irish Independent* 01.04.14.)

Comprehending

How much time does it take you to read?

The answer to that question may indicate the amount of meaning you gain from the content.

In her new book, 'Slow Reading in a Hurried Age', neuroscientist Maryanne Wolf suggests that social media is training users to process lots of content and to read texts that are abbreviated in form. This process, she suggests, may impact negatively on our ability to read deeply and comprehend meaning. (*Times*, 11.04.14.)

New documentary

Mobilize is an investigative documentary that explores the potential long-term health effects from cell phone radiation including brain cancer and infertility. More information is available at: <http://www.mobilizemovie.com/>

Gross motor skills

Today's children may be able to play screen games, but their performance at school is suffering, say educators.

Speakers at the annual conference of the British Association of Teachers and Lecturers said that children's use of screen devices is affecting other important areas of their lives. They lack manipulative skills for play, have social problems, have screen addiction, are often exhausted at school and are not performing to standard in school exams. The speakers called on parents to limit children's use of screen devices. (*Telegraph* (UK), 15.04.14.)

Who needs people?

Here's the perfect technology for people who hate driving—cars that drive themselves.

Google is developing technology for driverless cars that drive themselves and recognise signs and potential hazards. The wireless-based system has been used in trials that have been conducted on thousands of miles of urban streets. The company hopes to have technology for fully automated cars on the market by 2017. (*Associated Press*, 28.04.14.)

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detoxification enzymes and were hypersensitive to some heavy metals. After exposure to a mobile phone, there were changes in brain wave patterns, heart rate and blood pressure. Many reported subjective symptoms which continued after exposure. (Griesz-Brisson, M, *Neuroepidemiology* 41:3-4, pp 275, 2013.)

Investigators have used metabolic and genetic screening to test for 'sensitivity-related illnesses'. They found that people with particular genotypes had a slightly increased risk of developing EHS. (De Luca, C et al, *Mediators Inflamm.* 924184, 2014.)

Blinded by technology?

Opticians have expressed concern that excessive use of smart phones and similar devices may be damaging people's eyesight.

In a survey of 2,200 people aged under 25 years, opticians have found alarming statistics. The survey showed that two thirds of respondents checked their phones 32 times a day; that nearly half were anxious when unable to check their phones and that more than half found that their eyes felt uncomfortable when they looked at the screen for long periods of time. The opticians observed that the average respondent spent seven hours a day looking at a screen.

The devices can damage eyesight because of the position of the smart phones and the light they emit which can interrupt sleeping and affect moods. (*BBC Newsbeat*, 28.03.14.)

EHS video clip

Dr David McDonald is an Australian scientist who has suffered with electromagnetic hypersensitivity since childhood. As a result of exposure at work, David's condition worsened to the point where he was unable to continue in paid employment.

In 2013 David won a seven-year legal battle when the Administrative Appeals Tribunal granted him the right to apply to Comcare for compensation. The case established a legal precedent in Australia and helped validate the condition of electromagnetic hypersensitivity.

David's story was featured in *EMR and Health* vol 9, no 2, 2013. You can now hear him speak about his condition and the legal case on YouTube: http://www.youtube.com/watch?v=sLO25nyauDg&feature=em-upload_owner#action=share

Warning about tablet use

A UK charity established to promote the use of tablets is now urging that the devices be used with caution. The industry-funded charity Tablets for Schools conducted a survey of over 2200 students and found some alarming results.

Nearly half the students surveyed were addicted to their electronic media and around two thirds take these devices to bed.

As a result of its findings, Tablets for Schools issued warnings encouraging children to reduce their use of the devices. These included not using the devices as alarm clocks or immediately before bed, turning them down or off for some of the time and finding other activities to fill their leisure time. (*UK Telegraph*, 09.05.14.)

"Excessive use of smart phones and similar devices may be damaging people's eyesight.."



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