

EMR and Health

Quarterly report on electromagnetic radiation, health and well-being

Vol 14 No 3 June 2018

Residential exposure



New Australian study investigates magnetic field exposures in homes.

Australian investigators have shown that high magnetic fields are often found in residences, whether or not they're located close to high voltage power lines.

In a study published in the journal *Measurement* Dr Malka Halgamuge and Lyn McLean, report on electromagnetic fields present in a hundred Australian homes.

'Our results show that high magnetic fields are often present in typical homes,' said Dr Halgamuge, a lecturer in electrical engineering at the University of Melbourne. 'They can be present from microwave ovens, conductive water pipes, meter boxes, and wiring, as well as external sources such as power lines, transformers and substations.'

The study analysed 3163 measurements of magnetic fields from 100 houses in different parts of Australia and provides data for appliances, different locations, conductive plumbing and other sources. It found that fields of above 4 milliGauss – a level classed as a possible carcinogen by the IARC – were present in many situations, with the potential of exposing residents in high-use locations such as beds.

The results also showed that some

brands of appliances generated much higher magnetic fields than others, suggesting that appliances can be designed in ways that reduce exposure to users.

'Our results highlight the importance of measuring fields in every home,' said Lyn McLean, Director of EMR Australia PL. 'That way people can identify the magnetic fields that are present and take steps to reduce their exposure.'

Reducing exposure is a common-sense approach to dealing with potential risks and is in line with every-day precautions such as wearing seat belts, installing pool fences or warning signs for slippery floors and with policies for wearing sun hats in schools, the authors say.

Halgamuge and McLean suggest measuring fields in the home to check where high sources are present so that they can be avoided or corrected before locating high-use furniture in a position that would expose people.

They also offer detailed advice on how to reduce exposure throughout the home and workplace and from electrical equipment.

(Continued on page 2)

In This Issue

Wi-Fi—a threat to human health	3
Research updates	4
More phones recalled	5
Australian research centre	5
5G by the back door?	6
Mental health problems	6
Landline phone recommendation	6
Problems using a landline?	6
Wi-Se kids	8
Wireless modem solutions	8
Kids on phones	8
Tinnitus	9



Publisher EMR Australia Pty Ltd

ABN 82 104 370 658

PO Box 347,
Sylvania Southgate NSW 2224

Tel: 61 2 9576 1772

Web: www.emraustralia.com.au

© EMR Australia Pty Ltd, 2018.
Information contained in this newsletter does not constitute medical advice and EMR Australia PL disclaims any liability incurred as a consequence of its use. Contents may not be reproduced without permission.

(Continued from page 1)

Bedrooms

- Locate beds away from wiring and equipment that generate high fields. Turn off electric blankets at the power point at night.

Study

- Keep electrical equipment as far as possible from the body.
- Don't use laptops on the lap.

Kitchen

- Locate electrical equipment that generates high fields away from places where people spend time.
- Keep away from electrical equipment that is operating and microwave ovens (operating or not) when preparing food.

Loungeroom/family room

- Locate furniture in places with low magnetic fields.

Laundry and bathroom

- Don't hold hairdryers close to the body/head for long periods of time.
- Wait till the iron heats to the desired temperature before using it (for sensitive people).

Other appliances

- When buying new appliances, choose ones with low magnetic fields eg battery operated alarm clocks for the bedroom.

Other recommendations

Workers and employers can reduce exposure if they:

- keep workstations away from electrical equipment and wiring that generate high magnetic fields
- inform staff about what fields are present in the workplace
- design equipment to reduce the user's exposure to magnetic fields, for example by keeping the motor as far from the body as possible
- develop appropriate workplace policies.

Planners and builders can reduce exposure if they:

- do not install meter boxes on bedroom walls
- wire homes so as to minimise magnetic field exposure
- do not build near high voltage power lines, whether above or below ground.

Malka N Halgamuge and Lyn McLean, 'Measurement and analysis of power-frequency magnetic fields in residences: Results from a pilot study', *Measurement*, Volume 125, September 2018, Pages 415-424.

Wi-Fi—a threat to human health

There is sufficient evidence to say with confidence that Wi-Fi radiation causes a range of harmful effects on the body, says Professor Martin Pall, Professor Emeritus of Biochemistry and Basic Medical Sciences at Washington State University.

According to Pall, Wi-Fi radiation has seven harmful effects on the body. It causes:

- oxidative stress—the generation of free radicals—that is involved in most chronic diseases
- DNA damage—that can cause cancer and gene mutations in sperm and damage the foetus
- calcium overload—possibly caused by activation of the TRPV1 receptor
- apoptosis (cell death)—that is related to neurodegenerative diseases
- neuropsychiatric effects
- effects on sperm quality and quantity
- and endocrine changes.

He says these effects occur at non-heating levels of exposure—ie levels that comply with international standards—and there has been evidence of many of them since the 1970s.

Pall says that these effects are likely to be cumulative. In other words, they may not be apparent or may be reversible in the early days of exposure, but they may be observable or irreversible over longer periods of time. This is of particular concern, given that Wi-Fi is so commonly present in many homes, schools and workplaces.

One the reasons that Wi-Fi radiation is so biologically active, Pall suggests, is that this radiation is both pulsed (pulsed signals affect the body more than nonpulsed signals) and polarised.

Pall explains that Wi-Fi radiation, like other types of electromagnetic fields, affect the body by activating voltage-gated calcium channels in the cell membrane, causing an excess of calcium to flow into cells. This can lead to increased production of nitric oxide, resulting in biochemical changes that could account for all of the seven effects described above.

Not only do electromagnetic fields affect voltage-gated calcium channels in humans, but they can do so in humans, causing oxidative stress and DNA damage.

Exposure can also affected voltage-gated sodium, potassium and chloride channels. Pall says, 'The electrical forces on the voltage-sensor are stunningly strong, something like 7.2 million times stronger than the forces on the singly charged groups in the aqueous phases of the cell.'



'The placement of Wi-Fi into schools around the country may well be a high level threat to the health of our children as well [as] being a threat to teachers and any very sensitive foetuses teachers may be carrying,' says Pall. This is because foetuses and children have smaller and thinner skulls, more stem cells and decreased DNA repair, making them particularly vulnerable to exposure.

Pall, ML, 'Wi-Fi is an important threat to human health' *Environmental Research* 164:405-16, 2018.

Professor Martin Pall

'the placement of Wi-Fi into schools around the country may well be a high level threat to the health of our children as well [as] being a threat to teachers and any very sensitive foetuses teachers may be carrying'

RESEARCH UPDATES

ELF fields (from electrical sources)

Powerlines and bees

High magnetic fields, such as from powerlines, were shown to have harmful cognitive and motor effects on bees in a study by researchers from Brazil and the UK. The authors found that exposed bees had poorer learning, changes in flight dynamics and were less successful in foraging for food. They suggested that exposure could impair the bees' ability to pollinate crops. (Shepherd, S et al, *Sci Rep* 8(1) 7932: May 21, 2018.)

Other studies

- Rats exposed to a power frequency electromagnetic field showed changes in brain lipid profiles. (Martinez-Sámano et al, *BMC Neurosci* 19(1):31, May 2018)

RF/wireless radiation

Kids' use of wireless

To find out how young people use wireless technologies, French researchers interviewed 288 volunteers aged 10 to 25 between March 2011 and March 2015. They found that:

- 84% made regular mobile phone calls;
- 97% sent SMSs
- 88% used WiFi for ten hours each week
- 56% used a cordless phone at home.

The older the individuals, the more they tended to use wireless technologies. (Remen T and Lacour B, *Rev Epidemiol Sante Publique* May 30, 2018.)

Testes

Mobile phone radiation could have harmful testicular effects on the young. Researchers exposed three-week old mice to a mobile phone signal of 1800 MHz, either when dialing, receiving or on standby, for three hours a day for 120 days. They observed that exposed mice had testicular damage (smaller seminiferous tubules, reduced sperm count, reduced testosterone) and higher levels of oxidative stress. They concluded that oxidation could cause cell death leading to reduced testicular function. (Shahin, S et al, *J Cell Physiol*, Apr 10, 2018.)

Cognition

WiFi radiation had a harmful effect on cognition in study conducted in India. Male rats were exposed to different frequencies of wireless radiation for a hour a day for 28 days. Rats exposed to 2450 MHz, a frequency used for WiFi, showed poorer cognitive function and adverse effects on mitochondria, cholinergic function and amyloidogenesis—seen in Alzheimer's Disease. (Gupta, SK et al, *J Biosciences* 43(2):263-76, June 2018.)

Brain and genes

Mobile phone radiation had a harmful effect on the hippocampus of mice exposed to a GSM signal for two hours. Exposure changed the expression of 178 genes that play a role in important functions, including cell cycle, DNA replication, cell death, the nervous and immune systems and cancer. (Fragopoulou, AF et al, *Brain Behav*, May 22, 2018.)

Ear canal

Mobile phone radiation can damage hair follicle cells in the human ear, according to research from Turkey. Scientists analysed hair follicle cells taken from people who did not use a mobile phone and those who used a phone for up to half an hour a day

(Continued on page 7)



'Rats exposed to 2450 MHz ... showed poorer cognitive function and harmful effects on mitochondria, cholinergic function and amyloidogenesis'

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

More phones recalled

Last issue we reported that the French government had recalled the HAPI 30 mobile phone, manufactured by Mobiwire, because it failed to comply with the country's exposure limits. Now four more phones have been recalled.

On 29 May the French National Frequencies Agency (ANFR) announced that it was issuing a recall of the NEFFOX X1 TP902 phone, saying 'Measurements revealed an overshoot of 0.52 W/kg above the regulatory limit of 2 W/kg (Watts per kilogram).'

The same day, the Agency announced the recall of the Alcatel PIXI 4-6", the Echo Star Plus and the Huawei Honor 8, all for exceeding the limits of the standard.

In 2016, the French government updated the way it assessed mobile phone compliance with its standard. Whereas previously phones were measured at a distance of 25 mm from the head, they are now measured at a distance of 5mm from the head—a distance that more accurately, though not entirely, reflect the way in which people hold mobile phones while talking.

(ANFR press release 1 <https://www.anfr.fr/toutes-les-actualites/actualites/telephone-neffos-x1-tp902/#menu2> (in French); ANFR press release 2 <https://www.anfr.fr/fr/toutes-les-actualites/actualites/depassement-du-das-tronc/#menu2> (in French))

Australian research centre

The Australian Centre for Electromagnetic Bioeffects Research (ACEBR) has entered a new phase of its existence. In April, the Centre began a new five-year funding and research period.

In this evolution of the Centre, Dr Sarah Loughran replaces Dr Rodney Croft as Director.

Among the research programs to be conducted are studies on:

- the effects of melatonin, temperature and radiofrequency radiation (RFR) on brain waves during sleep;
- the effects of RFR on cognition in children aged 4 to 9;
- whether RFR causes a risk by membrane permeation;
- whether some cell receptor proteins are sensitive to RFR;
- differences in cells from healthy volunteers and those with electromagnetic hypersensitivity.

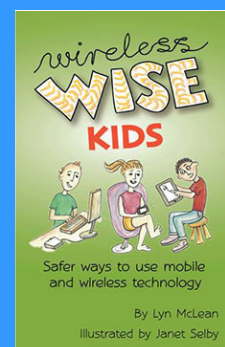
Information about the new arrangement was presented at the 5th Asian and Oceanic Congress on Radiation Protection – AOCRP5 – in May.

Books by Lyn McLean

'The Force'



'Wireless-wise Families'



'Wireless-wise Kids'

for everything you need to know about keeping your family EMR-safe
emraustralia.com.au

5G by the back door?

Australian carriers are rolling out or preparing to roll out networks of microcells—small, radiating antennas located on lamp posts or similar structures close to homes and schools.

In some cases, residents are being informed that the antennas are for VoLTE technology (voice-over-LTE) used for mobile phone and data communications.

As microcells of this nature are planned for fifth generation networks, we wonder whether the networks currently being rolled out will be transitioned to 5G.

Mental health problems

To see how mobile phone use affects mental health, researchers from Serbia assessed 785 students from two universities in Serbia and Italy.

They found that the students who experienced anxiety tended to be those who sent more text messages and those who spent less time browsing the internet.

They also found that students who experienced most stress tended to be those who spent more time talking on their phones and those who kept their phones less than a meter away from their beds.

Višnjić A et al, *Int J Environ Res Pub Health* 15(4): Apr, 2018.)

Landline phone recommendation

If you want to reduce your exposure to radiofrequency (RF) radiation, the best type of phone you can use is a corded landline phone—that has no cordless function. Phones of this sort emit no RF radiation whatsoever.

If you're looking for a corded phone, you could check out the Vtech T1300 phone from Officeworks. It has a handsfree speaker function so you don't have to hold the handset against your head and other useful features.

It retails for \$48.

Problems using a landline?

Even so, some people, especially those who are very sensitive, experience symptoms when they use a corded landline phone.

Here's a solution that may help some people.

You can purchase and install a D-Link DSL-16MF, a line filter that eliminates high frequency 'line noise'. The filter is available from Officeworks for around \$20.

'students who experienced most stress tended to be those who spent more time talking on their phones'



**MEASURE
YOUR
EXPOSURE**

**ELF AND WIRELESS
METERS FOR HIRE OR
PURCHASE**

www.emraustralia.com.au



(Continued from page 4)

and those who used a phone for up to an hour a day. They found that mobile phone users had more DNA damage in hair follicles than non users and that DNA damage increased with length of mobile phone use. (Akdag M et al, *Electromagn Biol Med* Apr 18:1-10, 2018.)

Kidneys

Scientists exposed the kidney cells of human embryos to a 2.4 GHz wireless signal for one hour and found evidence of oxidative stress and cell death. Cells treated with the antioxidant Selenium showed less evidence of damage. (Özsobaci, N et al, *J Trace Elements in Med and Biol* 13.04.18.)

Embryos

Exposing the embryos of zebrafish to wireless radiation, resulted in a number of harmful effects. Exposed embryos showed evidence of reduced growth, oxidative stress, cell death, changes in the metabolism of cholesterol and stress. (Piccinetti, CC et al, *Ecotoxicology Environ Safety* 154:268-79, June 2018.)

Autism spectrum disorders

More kids are suffering from autism spectrum disorders and more are using electronic equipment than ever before. Is there a connection? To answer this question, Indonesian scientists studied the connection between children's screen habits and a range of symptoms related to autism spectrum disorders. They found that

- children who viewed screens for up to 3 hours a day had delayed language and short attention spans;
- Those who viewed screens for more than 3 hours a day had delayed language, short attention spans and were hyperactive.

(Hermawati D et al, *Intractable Rare Dis Res* 7(1):69-71, 2018.)

Other studies

- When wild myrtle, a species resilient to environmental stresses, was exposed to GSM mobile phone

radiation it showed evidence of oxidative stress. (Stefi, AL et al, *Flora* 243:67-76, 2018.)

- Chinese university students showed a high level of mobile phone dependence and this was associated with impulsivity. (Mei, S et al *Int J Environ Res Public Health* 15(3), Mar 2018)

New research database

The Oceania Radiofrequency Scientific Advisory Association (ORSAA) has published details about a new searchable database of papers on nonionising radiation that it has developed. An analysis of studies in the database shows that:

- there are three times as many papers showing effects as papers showing no effects;
- studies funded by industry are more likely to report no effects;
- studies not funded by industry are more likely to report effects.

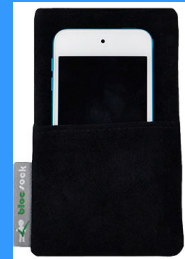
(Leach, V et al, *Rev Environ Health* June 6, 2018.)

Electromagnetic hypersensitivity

Swedish investigators compared 91 people who reported having electromagnetic hypersensitivity (91) with over three thousand healthy controls. They found that people with EHS tended to suffer from exhaustion, anxiety, back/join/muscle disorders, depression and migraine. They were also more likely to be female, middle aged and in poor health. Many had had the condition for over ten years and reported that their symptoms began after being heavily exposed to EMR or exposed over a long period. (Gruber MJ et al, *Scand J Psychol* May 9, 2018.)

Mobile phone protection

Blocsock mobile phone



pouches block 96% radiation



Wavewall mobile phone cases protect the head, body and the phone



Pro Tubez airtube headsets - latest generation of airtube headsets - keep the phone away from the head

Wi-Se kids

EMR Australia is pleased to announce its new range of Wi-Se shielding singlets for kids.

The singlets are made in Australia from a specialised shielding fabric made of cotton and silver. It shields from 20 MHz to 10 GHz, covering frequencies used for mobile phones, Wi-Fi, tablets and other devices, protecting the vital organs of the body.

Many children spend six hours a day in classrooms with Wi-Fi routers, using Wi-Fi devices. Many international authorities believe that children are more vulnerable to this radiation than adults.

The singlets are available in sizes 6 to 12 and join our range of women's singlets launched last issue.

They are available from <http://www.emraustralia.com.au/shop/protection-shielding/wi-se-shielding-singlets-for-kids>



Wireless modem solutions

Did you know that when the wireless function of your modem is turned 'OFF', it may still be emitting radiation?

Would you like your modem set up in a way that doesn't expose you or your family to radiofrequency (wireless) radiation?

Luke Clancy now provides a technical service to help you do just this.

If you would like help to reduce your exposure to wireless radiation from your modem, you can contact Luke by email at: luke@bigchiefcomputers.com.

Kids on phones

How much time do young people spend on their mobile phones?

Statistics show that teenagers aged 15 to 17 spent over four hours a day on their mobile phones!

In the age group 18 to 24 years, slightly less people —22% of this age group—spent four hours a day on their phones.

Only a small percentage spent less than one hour a day on their phones.

(<https://www.statista.com/statistics/751201/daily-mobile-phone-usage-time-age-france/>)

Tinnitus

Do you have tinnitus? You may be one of the 18 percent of Australians who hear unpleasant ringing, clicking or hissing or buzzing sounds.

Some of our customers have reported that their tinnitus dramatically improved when they reduced their exposure to radiofrequency (wireless) radiation. This is consistent with studies on 'microwave hearing' a phenomenon whereby people perceive radiofrequency radiation as sound.

Here's one woman's story about her symptoms of tinnitus and what happened when she reduced her exposure. She says:

This is something I have suffered with, chronically, for about 20 years. My husband suffers from it, too. Some days and times are so much worse than others, the tinnitus can be so bad we turn up volumes on tv, radio in the car, or even talking to each other, at least two-fold.

I have had my hearing professionally checked many times in the last 15 years. No-one could explain why or even truly understand what I was constantly hearing and dealing with, and how much it impaired my hearing. I did not want to have hearing aids, because when there are no other distracting sound-wave impeding devices (fans, printers, kettles, anything that produces sound while at the same time displacing ambient sound-waves), my hearing is perfect.

Anyway, tonight. Tonight. The most amazing night!

Tonight, hubby and I were talking about how bad "our crickets" were. (This is how we describe the tinnitus we both deal with every day.)

Tonight while we were joking about it, I actually made up a double-layer of shielding to put on my head, covering everything down to my eyebrows and over my ears. My husband laughed his head off when I put it on, and I was laughing too, until I started crying, then bawling my eyes out because, for the first time in almost 20 years, NO CRICKETS. No Tinnitus. It just stopped almost as soon as I put this stupid shielding on my head.

I am still wearing it now, as I type this.

I can't believe it.

I now understand tinnitus is a totally different light, and am convinced there is nothing wrong with my ears, hearing, cochlear, etc.

I am currently firmly convinced that my tinnitus is caused by a radiofrequency signal. The only other time I've had such a 'quiet head' is when we had power outages that also took out mobile phone transmissions (for example, last year, during cyclone Debbie, when we had no power or radio tower emissions for four days).



Wavewall mobile phone cases

Block 85% mobile phone radiation

emraustralia.com.au



BLOC

MOBILE PHONE SHIELDS

Block over 96% of radiation absorbed by the brain.

Available from

www.emraustralia.com.au

EMR AUSTRALIA

Quality meters for sale or hire

Shielding paint, fabrics & window film

books

EMR testing & remediation

