

EMR and Health

Quarterly report on electromagnetic radiation, health and well-being

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Wireless & health

Does wireless radiation affect people's health—and is it safe to even ask the question?



On 16 February, ABC TV's 'Catalyst' aired a program on wireless radiation called 'Wi-Fried?' that sparked a media backlash of the ugliest kind.

The theme of the program, presented by award-winning journalist, Dr Maryanne Demasi, was 'Could WiFi-enabled devices be harmful to our health?'—a question of importance to every single Australian.

Demasi revealed that people may be using wireless devices in ways that expose them to more radiation than allowed by the Australian standard. She reported that the International Agency for Research on Cancer had concluded that mobile phone radiation may possibly cause cancer. She showed that studies found that mobile phone radiation damaged sperm and was linked to increased brain tumour rates in heavy and long-term users. She said that Lloyds of London does not provide insurance cover for injuries caused by electromagnetic radiation; that children's brains absorb more radiation than those of adults and that some countries have stricter radiation standards than Australia.¹

These are indisputable facts—and Dr Demasi provided documentary evidence on the Catalyst website to support her claims.

Nevertheless, within 24 hours, the program, Demasi and Professor Devra Davis, who appeared on the program, were all under fire.

'I was particularly disappointed to see "Wi-Fried" air yesterday in the guise of *science journalism*, and felt it important to reassure other viewers that the fringe position provided by Dr Davis and associates is merely that, a fringe position that is not supported by science,' said Dr Rodney Croft, head of the Australian Centre for Electromagnetic Bioeffects Research.²

The Australian Radiation Protection and Nuclear Safety Agency accused the program of 'raising concerns' about the health effects of wireless radiation.³ 'Media Watch' criticised Demasi for previous, unrelated programs and accused her report of being 'shockingly one-sided',⁴ supporting its claims with views that that were, well, shockingly one-sided.

Two other vociferous critics of the program were Drs Bernard Stewart and Simon Chapman. Professor Stewart was quoted as saying the program was "scientifically bankrupt" and "without scientific merit"⁵ while Dr Chapman was quoted as saying, 'That is just complete rubbish. It is just crap.'⁶

Yet, according to Catalyst, Drs Stewart and Chapman were both invited to appear on the program but declined to accept. 'Had they agreed to be interviewed, their views would have been included as well,' Catalyst said.

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First mobile phone label

The City of Berkeley's mobile phone warnings have been given the green light to go ahead. On 27 January, Judge Edward Chen ruled in the United States District Court of Northern California that the wireless industry's injunction against the city's phone warnings was dissolved.¹ This allows Berkeley to proceed with its plans to issue warnings with all mobile phones sold or leased.

The text of the warning messages that will accompany mobile phones is as follows: 'To assure safety, the Federal Government requires that cell phones meet radio frequency (RF) exposure guidelines. If you carry or use your phone in a pants or shirt pocket or tucked into a bra when the phone is ON and connected to a wireless network, you may exceed the federal guidelines for exposure to RF radiation. Refer to the instructions in your phone or user manual for information about how to use your phone safely.'

Berkeley is the first city in the US to introduce such a warning. Other cities have introduced right-to-know bills aimed at informing people about risks of mobile phone radiation—including Maine, Oregon, Pennsylvania, Hawaii and California—but none has so far been legislated.

'Our cell phone ordinance supports the public's right to know by informing cell phone buyers of radio-frequency safety standards established by the Federal Communications Commission. We believe that the proper role -- and responsibility -- of government is to alert the public to potential safety concerns,' Mayor Bates told *EMR and Health*.

1. <https://assets.documentcloud.org/documents/2699590/Jan-27-2016-Chen-Ruling.pdf>

Risks for young and elderly

Young people, the aged and those with cancer are the most likely to be at risk from radiofrequency (RF) radiation, according to a recent paper in 'Reviews on Environmental Health.'

In their review of the scientific literature, Dr Mary Redmayne and Professor Olle Johansson, found that exposure affected a number of biological processes differently according to age. These may result in different effects on health and well-being.

'We took a new approach with this paper. We were particularly interested in comparing results of research that considered more than one age group. Because there are many natural changes over a lifetime, we reported on these first so as to put the research into life-stage context. Then we reported what the research had shown, and then on the implications for differently aged people. We followed this procedure for each topic examined, such as cognitive function,' Dr Redmayne told *EMR and Health*.

The research showed that RF radiation affects brain wave patterns and the coherence of brain wave patterns in both hemispheres. The interhemispheric coherence of brain waves in young people exposed to RF was similar to that of young people with ADHD. They also observed that some brain wave patterns reported from exposure to phone radiation were similar to those in people with one kind of epilepsy.

The authors found that RF exposure increased oxidative damage—responsible for aging and disease—and reduced levels of the hormone melatonin, which plays a vital role in counteracting this damage. Redmayne and Johansson report that because foetuses, babies and the elderly have low levels of melatonin, they may be particularly at risk from exposure. In teenagers, melatonin levels may be affected, not just by RF radiation, but also by exposure to the blue light of wireless devices _____

RF radiation affects different types of stem cells, responsible for replacing cells in regenerating organs, the authors said. It can inhibit the repair of DNA in stem cells and damaged stem cells can contribute to cancer and malformations in the foetus. This has serious ramifications for pregnant women's use of wireless devices.

RF radiation was shown to reduce levels of the protein CD95 which plays a role in cell death. Because malignant cells can benefit from the loss of CD95, the authors suggest that people with cancer should take steps to reduce their exposure to wireless radiation.

'Education of those preparing for parenthood, parents, and of their children needs to be prioritized, with the minimum steps being, (a) advice to minimize exposure of the foetus and growing children of all ages to RF-EMR, and (b) how to do this,' the authors said.

Redmayne, M and Johansson, O, 'Radiofrequency exposure in young and old: different sensitivities in light of age-relevant natural differences', *Rev Environ Health*, 2015 Dec 1;30(4):323-35

'Education of those preparing for parenthood, parents, and of their children needs to be prioritized'

Science and Wireless 2015

On 8 December the Australian Centre for Electromagnetic Bioeffects Research (ACEBR) and RMIT University hosted its 'Science and Wireless 2015' forum in Melbourne. The forum was open to the public and aimed to update the audience on the status of research on wireless radiation being conducted in Australia, and to a lesser extent, overseas.

Dr Andrew Wood from Swinburne University, described research to see whether RF-exposure affected workers protective clothing. Dr Sarah Loughran, from Wollongong University, said that mobile phone radiation affects brain activity, especially in high exposure situations, but that this could be a thermal response. Professor Elena Ivanova, from Swinburne University, described studies in which her team found that different types of cells (prokaryotic, eukaryotic cells and human blood cells) exposed to 18GHz showed membrane permeability. Professor John Finnie described efforts to replicate a 2010 study which found that mobile phone radiation protected against two characteristics of Alzheimer's Disease in mice. Other presentations considered how magnetic fields could impact membrane channels and proteins and yeast cells.

Keynote speaker, Dr Bernard Veyret from France, explained that effects he had observed were likely to be thermal.

The presentations can be downloaded from RMIT University's website at: <http://www.rmit.edu.au/research/research-institutes-centres-and-groups/multi-partner-collaborations/acebr/about/>

CDC under the spotlight

The US Centers for Disease Control and Prevention (CDC) has found itself the centre of scrutiny following revelations by the *New York Times*,¹ which obtained 500 pages of internal CDC emails, relating to the CDC's advice about mobile phone use on its website.

In 2014 the CDC published on its website precautionary advice for mobile phone use, including the statement 'We recommend caution in cell phone use.' This advice was supported by CDC's Director, Dr Christopher Portier, who was a member of the IARC team which classified radiofrequency radiation from mobile phones as a Class 2B ('possible') carcinogen.

The 1 January article revealed that, after the CDC published its precautionary advice, it was questioned about the changes by officials and asked whether states might face litigation for allowing the use of phones in schools and libraries. Shortly after the CDC published its precautionary amendments, it withdrew them.

The Environmental Health Trust,² which reviewed the CDC emails, reported that the CDC obtained assistance to rework its mobile phone advice from Dr Kenneth Foster, who has links with the mobile phone industry.

The amended webpage:

- removed the statement 'We recommend caution in cell phone use';
- removed a recommendation to keep mobile phones away from pacemakers;
- removed reference that children may have a higher risk of developing problems in the future if mobile phone radiation does cause health problems;
- did not report the IARC classification of mobile phone radiation as possibly carcinogenic.

1. *New York Times*, 1.1.16, <http://www.nytimes.com/2016/01/02/technology/at-cdc-a-debate-behind-recommendations-on-cellphone-risk.html>

2. ehtrust.org

(Continued from page 1)

Unfortunately, none of the negative responses to the program addressed the aforementioned issues raised by Demasi or the scientific evidence she presented. Rather, the attacks concentrated on the program in general and the presenter herself.

This is not a scientific debate. It's an unscientific assault that stoops to the lowest level of personal degradation and threatens investigative journalism itself.

Why?

Perhaps the answer lies in the words of Plato, quoted by one respondent to the program: 'They deem him their worst enemy who tells them the truth.'

But don't believe us. If you're unsure whether Demasi's claims have merit, why not read the references she provided¹ and make up your own mind?

Editor

1. <http://www.abc.net.au/catalyst/stories/4407325.htm>
2. <http://acebr.uow.edu.au/index.html>
3. http://www.arpansa.gov.au/News/whatsnew/news1_160217.cfm
4. <http://www.abc.net.au/mediawatch/transcripts/s4411611.htm>
5. <http://thenewdaily.com.au/life/2016/02/17/abc-catalyst-wifi-wrong/>
6. <http://www.smh.com.au/technology/sci-tech/abcs-catalyst-criticised-for-linking-wifi-with-brain-tumours-20160216-gmw45o.html>
7. <http://www.abc.net.au/catalyst/stories/4408824.htm>

RESEARCH UPDATES

ELF fields (from electrical sources)

Cancer

Magnetic fields can promote cancer, according to a major new study from Italy. Researchers exposed 650 rats to a magnetic field of 200 or 10,000 mG, from before birth, for their entire lives *and* exposed them to a single dose of ionizing radiation when they were 6 weeks of age. The exposed rats had increased rates of mammary gland (breast) cancers, schwannomas of the heart and leukemia/lymphoma. The authors suggested their results called for a 're-evaluation of the safety of non-ionizing radiation.' (Soffritti, M et al, *Int J Radiat Biol*, Feb, 1-13 2016.)

Other

- Magnetic fields increased the permeability of mitochondrial membranes. (Feng, B et al, *Int J Radiat Biol* Feb 5:1-8, 2016.)

RF/wireless radiation

Testis

A mother's exposure to mobile phone radiation may affect the reproductive capacity of her son. Turkish scientists exposed pregnant rats to a 900 MHz mobile phone signal during 7 days of pregnancy. They found that offspring had altered sperm quality and death of large numbers of cells in the seminiferous tubule epithelium. (Odaci, E et al, *Biotech Histochem*, 2016 Jan;91(1))

Heart

Similarly, mobile phone use in pregnancy may affect her child's heart. Scientists exposed pregnant rats to a 900 MHz mobile phone signal during pregnancy and found that her offspring showed various signs of heart damage. (Türedi S et al, *Electromagn Biol Med*, 34(4):390-7, 2015.)

Children's brains

Children's brains do absorb more radiation than adults' brains, say researchers from the USA and Brazil. Their skulls are smaller and thinner and have different electrical properties to adults'. Higher exposures could 'have more severe implications in the young,' the authors said. (Fernandez-Rodriguez, C et al, <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?reload=true&arnumber=7335557>)

Plants

Wireless radiation can have a harmful effect on plants, say researchers from Belgium and Sweden. They exposed two groups of cress seeds to different levels of wireless radiation. The seeds exposed to the lowest levels of radiation (2-3 $\mu\text{W}/\text{m}^2$) grew normally. Those exposed to 70-100 $\mu\text{W}/\text{m}^2$ —primarily from base stations—failed to germinate. When the more highly exposed seeds were moved to a lower field, they began to germinate after two days. The authors suggest that 'the prodigious wireless technology may affect and seriously impact nature'. (Cammaerts MC and Johansson O, *Phyton, International Journal of Experimental Botany*, 84: 132-137, 2015.)

Sleep

How much do university students use their mobile phones after lights-out and how does it affect their sleep? To answer these questions, Iranian researchers surveyed 358 medical students. They found that 60% of them used their phones after lights-out and this caused insomnia which may have affected their learning and the quality of the medical care they provided. (Zarghami M, *Iran J Psychiatry Behav*



A selection of studies showing effects of exposure

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

Sci ;9(4), Dec 2015.)

Adults' sleep

Similarly, adults' sleep is affected by their mobile phone use, according to a study from Flanders. The researchers examined the sleep patterns and electronic media used of 844 adults, 60% of whom took their phones into their bedrooms at night. They found that texting or calling after lights-out was related to more fatigue and later waking in adults in their 40s and shorter sleep in people in their 60s. (Exelmans, L and Van den Bulck, J, *Soc Sci Med*, 148:93-101, 2016.)

Immunity

Mobile phone radiation affected immunity in the blood of healthy volunteers. In blood samples exposed to the radiation from a smartphone for 30 minutes, neutrophils (white blood cells involved in immunity) were activated. (Lippi, G et al, *Clin Chem Lab Med*, Feb 12, 2016.)

Blood-brain barrier

Mobile phone radiation could increase the permeability of the blood-brain-barrier (BBB) whose role is to prevent harmful substances from entering the brain. Turkish researchers exposed male and female rats to mobile phone radiation of 900 and 1800 MHz. They found that 1800 MHz increased permeability of the BBB in males and 900 MHz increased permeability in females. Effects occurred at low (nonthermal) levels of exposure. (Sirav B and Seyhan N, *J Chem Neuroanat*, Dec 23, 2015.)

Spine

Mobile phone radiation may cause damage to the spinal cord, according to research from Turkey. Researchers exposed young rats to mobile phone radiation of 900 MHz for one hour for 25 days. At the end of that time, the rats were found to have 'pathological' changes, including loss of myelin sheath. (Ikinci A et al, *J Chem Neuroanat*, Dec 17, 2015.)

Tinnitus

Brazilian researchers conducted a review of studies concerned with electromagnetic radiation and tinnitus. They concluded that 'there might be a common pathophysiology between ... electrosensitivity and tinnitus' and advised precautionary use of mobile

phones to prevent the condition. (Medeiros, LN and Sanchez, TG, *Braz J Otorhinolaryngol* 82(1):97-104, 2016.)

Menstruation

Could radiofrequency radiation affect reproduction in women? To answer this question, researchers investigated exposure levels and symptoms among a group of 349 female factory workers. They found that menstrual disorders increased with the intensity of exposure and were greater than in unexposed controls. (Xu, Y et al, *J Occup Environ Med*, 58(2):148-53, 2016.)

Other studies showing effects from RF radiation

- A slight increase in gliomas was found in people using a mobile phone on the same side of the head as their tumour. (Yoon, S et al, *Environ Health Toxicol*, Dec 21, 2015.)
- Mobile phone radiation of 1.8 GHz affected acetylcholinesterase which is involved in learning, memory and neurodegenerative diseases. (Valbonesi, P et al, *Int J Radiat Biol*, 92(1):1-10, 2016.)
- Mobile phone radiation caused inflammatory responses in saliva of the human parotid gland. (Siqueira EC et al, *J Oral Pathol Med*, Feb 14, 2016.)

Other

Myopia

Myopia in children is on the rise and increased use of screen-based activities is contributing, say scientists from China. The scientists tested children from 60 primary and middle schools in China. They found that the incidence of myopia increased with age, from nearly 36% in children aged 6 to 8 to over 80% in children aged 16 to 18. Among the factors that influenced the incidence of myopia was distance between the computer screen and the eyes, time spent outdoors, and the time spent watching TV and playing on the computer. (Zhou, J et al, *Zhonghua Liu Xing Bing Xue Za Zhi* 37(1):29-34 2016.)

'results called for a 're-evaluation of the safety of non-ionizing radiation'



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'A mother's exposure to mobile phone radiation may affect the reproductive capacity of her son'

Electromagnetic hypersensitivity

Recent studies shed new insights on the condition of electromagnetic hypersensitivity (EHS).

Diagnosis and treatment

A group of 17 scientists from six nations has produced the EUROPAEM EMF Guideline 2015 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses'.¹

Their paper reports the results of Professor Belpomme's study on 1200 people with EHS and/or multiple chemical sensitivity (MCS). 'Both EHS and MCS ... appear to paint a common picture of inflammation-related hyper-histaminemia, oxidative stress, autoimmune response and BBB [blood-brain-barrier] opening, and a deficit in melatonin excretion.'

As a first step, the authors recommend that sufferers measure fields at home and work and take action to reduce their exposure.

The authors also recommend a number of diagnostic tests as well as treatments, including oxidation, treating intestinal problems, improving nutrition, detoxification, improving mitochondrial function, reducing inflammation, sauna, exposure to natural light, oxygen therapy, exercise, drinking good quality water and appropriate dental care.

EHS perspective

The Swedish government classifies EHS as a 'functional impairment' - that is, a difficulty that limits the sufferer's ability to engage in certain essential activities of life.² This means that sufferers are not 'seen as patients but citizens reacting to an inferior environment,' said author, Professor Olle Johansson of Karolinska Institute. As a result of this approach, sufferers are not subjected to a battery of diagnostic tests and are not prescribed psychiatric treatments—as is recommended in many countries, including Australia.

The Swedish approach to EHS also enables sufferers to obtain economic support and legal protection.

In his paper, Professor Johansson describes the results of his research which showed that EHS people exposed to electromagnetic radiation had skin damage consistent with other forms of radiation exposure. Specifically, he found changes in the numbers and behaviours of mast cells, which are involved in pain, itching, edema and erythema—symptoms that are reported by many EHS sufferers.

EHS is not a nocebo effect

No, electromagnetic hypersensitivity is not a psychological (nocebo) effect, says M Dieudonné from France. After interviewing 40 people claiming to have EHS, Dr Dieudonné determined that symptoms appeared before people began questioning the effects of electromagnetic fields on their health—and not as a result of their negative perceptions about technology.

1. Belyaev, I et al, 'EUROPAEM EMF Guideline 2015 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses,' *Rev Environ Health*, 30 (4):337-71, 2015.
2. Johansson, O, 'Electrohypersensitivity: a functional impairment due to an inaccessible environment', *Rev Environ Health*, 30(4):311-21, 2015.
3. Dieudonné, M, 'Does electromagnetic hypersensitivity originate from nocebo responses? Indications from a qualitative study', *Bioelectromagnetics* 37(1), 14-24,

'No risk' project

Documents developed in Sweden during the 1990s showing a connection between electromagnetic fields and symptoms are once again in the public domain.

The documents were produced by the Swedish Union of Clerical and Technical Employees in Industry (SiF). They presented results of several surveys which found that office workers experienced a range of uncomfortable symptoms and recommended strategies for reducing exposure in the IT environment.

They were later withdrawn and have not been in the public domain for some years.

The documents have recently been published online by Dr Don Masich of EMFacts and are now freely available at: <http://www.emfacts.com/norisk/>

They are entitled:

- 'No Risk in the IT environment'
- 'Hypersensitive in IT Environments'
- 'The Healthy Office newsletter (1999)'
- 'Working environment for people and computers'.

EMR-free property for sale

- located Byabarra, NSW, 40 mins from Port Macquarie
- secluded valley
- clean-living environment: EMR- and chemical-free
- previously home for EHS sufferer
- \$549,000 (all reasonable offers considered)
- contact Dirk Collins, 0417 970 286 dcollins@hassellstudio.com

UPDATES FROM AROUND THE WORLD

Italy

An Italian town has turned off WiFi in its schools. The Mayor of Borgofranco, Livio Tola, made the decision to remove WiFi from both primary and secondary schools because of concerns about the impact of radiation on children's health. The schools will continue to provide internet access by wired computers. (La Stampa Cronache, 08.01.16.)

Cyprus

The government of Cyprus has begun a campaign to reduce children's exposure to wireless radiation. Launched in December, the campaign aims to protect children by lessening their exposure and includes public awareness activities. A survey of teenagers in Cyprus found that 6% spend more than 15 hours a day using multimedia devices. Another found that multimedia use adversely affected teens' mental and physical health, relationships, self-respect and weight. (Balkan News, 11.12.15.)

Nigeria

Nigeria plans to introduce mandatory setbacks for mobile phone base stations from residences. Dr Lawrence Anukam, Director-general of the National Environmental Standards and Regulations Enforcement Agency, advised that the Agency would require a 10-metre setback. This decision follows residents' complaints about the towers, including concerns about emissions. (Leadership, 13.12.15.)

Indonesia

The Indonesian Minister of Women's Empowerment and Child Protection would like to ban children's use of mobile phones in elementary schools. Yohana Yembise told campaigners at a UNICEF event in Jakarta that she is concerned about children's exposure to pornography, addiction and communication problems with parents. She urged families to spend more time connecting in person. (Jakarta Post, 20.11.15.)

Spain

The City of Tarragona in Spain is introducing measures to help people who suffer from electromagnetic hypersensitivity (EHS) and related syndromes that will come into operation on 1 July.

According to the Government, about 3.5% of the city's population suffers from what it calls Central Sensitivity Syndromes (CSS), which includes EHS, Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS), Multiple Chemical Sensitivities (MCS) and Fibromyalgia (FM). These conditions impact, not just the sufferers' physical and mental health, but create social and financial difficulties for them and their families.

The Liga SFC/SSC Association worked with the City to develop an eight-pronged strategy to support affected people This includes:

- diagnosing and conducting a census

of affected people';

- providing sufferers with support, including food subsidies and reduced bills;
- creating chemically- and electromagnetically-safe housing;
- reducing pesticide use throughout the City;
- educating social workers about the Syndrome;
- improving working conditions for City staff with CSS.

The city is to finalise the plan by the end of June and to communicate it to associations of affected people. It also plans to write to the Governments of Catalonia and Spain urging them to adopt a similar program and to educate the wider community about CSS. <https://affectadasporlosrecortessanitarios.wordpress.com/2015/11/29/good-news-first-rescue-plan-for-people-with-css/>

SHIELDING CLOTHING

High quality underwear for blocking high frequency radiation is now available in Australia.

The Antiwave garments, made in Germany, protect against wireless radiation from 20 KHz to 18 GHz, covering signals from mobile phones and base stations, WiFi, radio and TV transmitters, as well as radar.

Its shielding effectiveness has been demonstrated in tests by Professor Pauli from the University of the Bundeswehr in Munich.

The newly-developed fabric is comprised of 90% cotton, 8% polyamide and 2% silver, but contains absolutely no nanosilver particles. It is antistatic and antibacterial and can be laundered easily without losing its shielding effectiveness.

The garments are available in a range of sizes for both men and women.



For more information, contact EMR Australia at emraustralia.com.au or 02 9576 1772.



Devra Davis

The Honourable Professor Devra Davis is an award-winning scientist, author of over 200 scientific publications, scientific advisor to US and international organisations and founder of the Environmental Health Trust. She was a member of a team of scientists awarded the Nobel Peace Prize in 2007.

In November 2015, Dr Davis visited Australia, presenting public lectures in Sydney and Melbourne. The following summary is from her 18 November talk at the University of NSW: 'The truth about mobile phone and wireless radiation: what we know, what we need to find out, and what you can do now'.

There are almost seven billion mobile phones in use, all of them tested on standards that are almost 20 years old. These standards are based on the amount of radiation absorbed by a 220 lb (99.8 kg) male who only talks on his phone for a six minute period. That doesn't represent the exposure that most people, especially young children, would be receiving.

But is this radiation safe?

Mobile phone radiation is highly problematic for membranes of the cell and 3G mobile phone radiation is more toxic than radiation from 2G phones. One of the reasons for this is that the radiated signal from a mobile phone is not a continuous but pulsed. Other aspects of the signal that can contribute to its effects on cells include its frequency, amplitude, pulse, the wavelength and the information it carries. However, not all studies have considered these aspects of a signal and that helps explain why they have not always found effects.

A particular concern is the use of mobile phones and other wireless devices by young children. (For example, there are potties with ipads.) Computer modelling shows that mobile phone radiation penetrates almost all the way through the head of a three-year-old, much further than it does in an adult's head, and it's absorbed by the foetus.

“Computer modelling shows that mobile phone radiation penetrates almost all the way through the head of a three-year-old”

Yet research has shown that mobile phone radiation is potentially harmful to children and fetuses. Studies have shown that exposure caused brain damage in newborn rats, damaged DNA, affected memory and performance in newborn rats, was linked with memory problems in adolescents who were heavy mobile phone users and reduced the viability of human sperm (potentially contributing to infertility). In a study in which mobile phone radiation prevented normal development of brains and behaviour, the author advised pregnant women in his care not to expose the foetus to microwave radiation.

In 2011 the International Agency for Research on Cancer (IARC) classified mobile phone radiation as a 'possible' carcinogen. When the announcement was made, IARC Director, Christopher Wild, advised people to reduce their exposure to this radiation. In light of the evidence that has emerged since that classification, it's now more likely that mobile phone radiation is a 'probable' carcinogen.

Does mobile phone radiation cause brain cancer in adults? Brain tumours take a long time to develop. Studies on survivors of the Hiroshima atomic bomb explosions found no increase in brain tumours in the general population till 40 years had passed. Yet already studies are showing increased rates of brain

tumours in people who have been using mobile phones for just 10 years.

Some countries are already taking action to address the risks of mobile phone radiation. France has banned the advertising of mobile phones to children. Canada has described mobile phone use as a 'serious public health issue'. And the US City of Berkeley has introduced right-to-know legislation to educate the public that manufacturers advise holding phones away from the body.

The secondary insurance industry doesn't provide cover for health effects of mobile phone use. Mobile phone manufacturers have admitted the potential for risk and for litigation and provide advice for reducing exposure – although this is often hard to find. The iPhone warning to reduce exposure to the radiation they emit can be found at: [settings—general—about—legal—RF exposure](#). Telstra texts customers with a link to information on its website about how to reduce exposure.

Professor Davis's lecture in Sydney can be seen at <https://www.youtube.com/watch?v=EwS-aHB-zHk&feature=youtu.be#sthash.1d7nSAUD.dpuf> and her presentation in Melbourne at: <http://www.eng.unimelb.edu.au/engage/events/lectures/davis-2015>

Dariusz Leszczynski

Professor Dariusz Leszczynski has two doctorates and a docentship in biochemistry, was Research Professor and Head of the Radiation Biology Laboratory at the Radiation and Nuclear Safety Authority (STUK) in Finland and spent 18 years conducting experimental work on electromagnetic fields and health. He was a member of the IARC Working Group that classified radiofrequency radiation a class 2B carcinogen.

In late 2015 Professor Leszczynski visited Australia, giving lectures in Sydney and Melbourne. The following summarises his 9 December presentation at Monash University: 'Wireless radiation and human health policies: how reliable is the scientific evidence?'

All human health policies should be firmly based on science and the epidemiological (population) studies that are considered the most important are case-control studies in which people with a condition are compared to those without it. In 2011 the International Agency for Research on Cancer (IARC) classified RF radiation as a class 2B carcinogen based mainly on the results of two case-control studies: the Interphone study and studies by Dr Lennart Hardell and his team in Sweden—all which found increased risks of brain tumours among heavy and long-term mobile phone users. This finding is all the more significant considering that the Interphone study considered that 'regular' mobile phone users made only one call a week for six months—a far cry from typical phone use today— and this would mean the study was likely to *underestimate* brain tumour risks.

Since 2011, more research has strengthened the evidence linking mobile phone use to brain tumours. Firstly, the French CERENAT study found increased brain tumour risks in, not regular, but avid mobile phone users. Secondly, a study by Lerchl's team¹ that replicated result of Tillmann et al² found that mobile phone radiation promoted tumours in the lungs and livers of animals exposed to radiation levels that complied with international standards. Thirdly, a study by Schmid and Kuster³ showed that using a mobile phone operating at 900 or 1800 MHz can expose the skin, blood and muscle to more than 40 watts per kilo—whereas many studies have exposed cells to a maximum of two watts per kilo. This could explain why cell studies have not confirmed the risks shown by epidemiological studies and why the mechanism underlying the effects is still elusive. Increasing the strength of the exposure is likely to affect exposed cells. For example, Dariusz conducted experiments in which he exposed cells to 10 watts per kilo and observed very considerable effects—but the continuation of those experiments was discouraged by scientists from Motorola.

"In my opinion, the currently available scientific evidence is sufficient to upgrade the carcinogenicity of cell phone radiation from the possible carcinogen (Group 2B) to the probable carcinogen (Group 2A)."

Some epidemiological data that has not shown increased brain tumour risks is flawed. The Danish cohort study had several weaknesses, such as excluding corporate (heavy) mobile phone users and assuming that a person's mobile phone subscription was a good proxy indicator of their radiation exposure. The UK's Million Women Study did not consider a typical sample of the population and lumped people who spoke for a few minutes or a few hours a week in the same exposure category. Studies that look at brain tumour trends—such as cancer registry data—are not reliable because trends could be influenced by many factors and not just a single carcinogen.

'In my opinion, the currently available scientific evidence is sufficient to upgrade the carcinogenicity of cell phone radiation from the possible carcinogen (Group 2B) to the probable carcinogen (Group 2A).'

It is claimed that there is consensus among scientists that mobile phone radiation has no proven health effects and that such effects are unlikely. However, there is no such consensus and the views of scientists on the risks of mobile phone radiation have never been studied.

Even though the available science doesn't prove that mobile phone radiation causes cancer, there is enough evidence to show that it could—not just possibly—but probably cause health problems. It's certainly untrue to claim that there is no risk and the fact that effects are being shown at exposures allowed by international standards shows that these standards are not adequate to protect users. Certainly, the scientific evidence that mobile phone radiation may be harmful is sufficient to justify applying the Precautionary Principle.

Most epidemiological studies suffer from problems in determining how much actual radiation exposure subjects received and better

(Continued on page 11)

Research bias?

Australia's peak research body has launched two written attacks on a prominent scientist.

Late last year, the Australian Centre for Electromagnetic Bioeffects Research (ACEBR) published a criticism of comments by Professor Devra Davis after she presented a number of public lectures in Australia (see page 8). In her talks, Professor Davis discussed peer-reviewed scientific evidence for harmful effects of wireless radiation. Following her talks, Dr Rodney Croft, Director of ACEBR, posted comments on the ACEBR website saying Professor Davis's comments were a 'Misrepresentation of EMF Science' and that 'such views are not supported by science'.¹

EMR and Health asked Dr Rodney Croft what comments he believed were not supported by science.

'Making a link between mobile phones and asbestos is completely unjustified,' he replied. 'Certainly her opinion doesn't fit with the scientific consensus.'

On 17 February, ACEBR launched a second salvo at Professor Davis, following the screening of ABC's Catalyst program on wireless radiation. Dr Croft wrote, 'the fringe position provided by Dr Davis and associates is merely that, a fringe position that is not supported by science. There is very strong scientific consensus that, even after considering such personal views as Dr Davis' [stet], there is no substantiated evidence that the low levels of radiofrequency emissions encountered by mobile telecommunications can cause any harm.'

We asked Dr Davis whether her comments were personal views reflecting a fringe position.

She told *EMR and Health* 'There is an extensive scientific literature confirming that mobile phone radiation can damage sperm and pregnancy at current levels of use.' She provided a list of studies on harmful effects of wireless radiation (summarised below)² and actions taken by international governments to protect their citizens—too extensive to reference in full here.

Professor Davis is not alone in her views that wireless radiation may be harmful. In 2011 the International Agency for Research on Cancer classified radiofrequency (wireless) radiation as a Class 2B ('possible') carcinogen based on studies which found increased rates of brain tumours in heavy and long-term use of mobile phones that complied with Australian and international standards. In 2015 200 scientists appealed to the World Health Organisation and European Union to strengthen radiation standards in order to protect public health. Further, the governments of many countries have taken action to reduce public exposure to wireless radiation—including France, Belgium, India, Israel and Taiwan.

ACEBR's comments raise the question of its impartiality. If the Centre has adopted the opinion that wireless radiation is safe, can the public have confidence in the impartiality of its scientific investigations?

1. <http://acebr.uow.edu.au/news/index.html>
2. Aldad TS, et al, (2012) *Scientific Reports*; 2, 312 (brain, hyperactivity and memory effects); Agarwal A et al, (2009). *Fertil Steril.* (4), 1318-25. (oxidation in semen); Atasoy HI et al, (2013). *Journal of Pediatric Urology.* 9(2), 223-9. (DNA damage); Avendaño C et al, (2012). *Fertility Sterility.* 97(1), 39-45. (decreased sperm motility and DNA fragmentation)

EHS respite

Sivani House Bed and Breakfast provides a new concept in rest and relaxation.

Situated in a beautiful rural environment and shielded to block radiofrequency radiation, the B&B offers a reprieve from the electromagnetic radiation of everyday life.

This historic cottage, lovingly restored by handywoman Karen Bruno, is located in Blackwood, Victoria, just an hour's drive from Melbourne. It features a luxury bedroom with ensuite and sitting area, as well as spacious dining room.

There are plenty of peaceful WiFi free walks along the Lerderderg River and many gardens to visit.

Karen moved to Blackwood after she found that her neighbours' WiFi equipment was affecting her health. She has applied her knowledge about shielding EMR to her new property to create an environmentally safe haven for guests.

Karen plans to conduct workshops and seminars on the issue on electromagnetic radiation and assist people to live more safely in their own homes.

To find out more about Sivani House B&B, you can contact Karen on 0390185458



(Continued from page 9)

ways are needed for doing this in future studies. Minutes of using a cell phone is a very poor proxy for estimation of radiation absorbed by the user. Using it leads to unreliable analyses where persons with differing actual radiation exposures are analysed in the same exposed group. One exciting possibility is to obtain accurate exposure information from the apps installed on smart phones. One such app, Quanta, was developed by the company Cellraid Ltd (www.cellraid.com)

Professor Leszczynski's slides for this presentation, including references for the studies mentioned above, are available at: <https://between-rockandhardplace.files.wordpress.com/2015/12/leszczynski-monash-december-9-2015.pdf>

1. Lerchl, A et al, *Biochem Biophys Res Commun*, Apr 17;459(4):585-90, 2015.
2. Tillman, T et al, *Int J Radiat Biol*, 86 (7):529-4, 2010
3. Schmid G and Kuster N, *Bioelectromagnetics*, 36(2):133-48, 2015.



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WATT'S THE BUZZ?

Telco's warning

Telstra has been texting customers with a link to the mobile phone safety tips on its website at telstra.com/mobiletips. It sent 15 million messages in the 12-month period, according to its 2015 annual report. (Telstra Annual Report 2015, p 34)

Ideology

Here's another idea for irradiating your body. A US company has developed the 'smart bra' - underwear that collects biometric data and transmits it, via wireless radiation, to the wearer's wireless device. (<http://omsignal.com/pages/omsignal-bra>)

We've reported previously the case study of four women who developed breast tumours in precisely the locations where they stored their mobile phones.

No tax for telco

Hutchison Vodafone paid no income tax in the 2013-2014 financial year, despite generating a total income of \$3,567,085,248. The telecommunications giant is one of 579 corporations which paid no income tax during the period, according to information released by the Australian Tax Office. (ABC News 17.12.15.)

Google loon

Sri Lanka is to become the first country to receive universal wireless exposure via high altitude balloons. Project Loon, as it's called, will deliver 4G wireless access via helium-filled balloons located 18 km above earth in the stratosphere. Google plans to extend the project to other remote locations. (ABC.net.au, 17.02.16.)

Good viewing and resources

Catalyst: Wi-Fried?

On 16 February, ABC TV aired the catalyst program 'Wi-Fried?' In it, investigative journalist, Dr Maryanne Demasi explores whether our wireless devices could be putting our health at risk. Dr Demasi interviews, among others, Professors Devra Davis and Dariusz Leszczynski, Frank Clegg, Former CEO of Microsoft, Canada. You can see the program online at:

<http://www.abc.net.au/catalyst/stories/4407325.htm#comments>

WiFi in schools

'Health concerns over Wi-Fi technology exposure in schools' aired on Fox 5 in the US in mid February and can be seen at: <http://www.fox5dc.com/news/92157185-video>

Professor Devra Davis

A public lecture at UNSW Law School, Sydney, 18 November 2015: 'Wireless Devices: what we know; what we do not know; and what we can do now,' with comments by Dr Charles Teo can be seen online at:

<https://www.youtube.com/watch?v=EwSaHB-zHk&feature=youtu.be>

Legal Seminar

Printed notes and four-hour audio recording of the seminar by UNSW Law Faculty: 'Wireless Devices: Risk Regulation Compliance and Liability' is available for \$44 at: www.cle.unsw.edu.au

Professor Dariusz Leszczynski

Presentation at the UNSW, 27 November, 2015 on 'Mobile phone radiation and blood-brain barrier - effects of mobile phone radiation on human endothelium', available at:

<https://betweenrockandhardplace.files.wordpress.com/2015/11/sydney-november-27->

Celebrating 20 years

In February the team at EMR Australia celebrated 20 years of helping Australians. We'd like to take this opportunity to share some of the highlights and challenges of this time with you.

Our story begins with the formation of a small committee of Sutherland Shire Environment Centre in 1996. It was called the EMR Alliance of Australia (EMRAA). Its founder was Betty Venables, who suffered from electromagnetic hypersensitivity, and her particular interest was power lines and fields from electrical sources. EMRAA quickly established a national membership and Lyn McLean, working closely with Betty began producing a quarterly newsletter for members called 'EMRAA News'. Twenty years and 81 issues later, the report is still published quarterly in the form of 'EMR and Health'.

In mid 1996 Betty resigned from EMRAA due to ill-health. However, EMRAA continued to operate under the administration and leadership of Lyn McLean and John Lincoln. The organisation grew as new members joined, and workloads increased as more and more people turned to it for help. EMRAA wrote submissions to government and industry, addressed two Senate Inquiries (Telecommunications Bills, 1997 and EMR Inquiry, 2000) and provided speakers for public meetings. It represented the community on federal committees, including several standards-setting committees and the ACIF committee that developed Australia's first code for the siting of mobile phone base stations. These were busy times!

On 25 March 2002 the EMRAA team launched the EMR Association of Australia (another 'EMRAA'). The purpose of the new organisation was to provide independent information about EMR and health; to help people reduce exposure; to work with government and industry to develop regimes to protect public health' to serve as a central organisation for disseminating information and for providing community feedback to government and industry.

The Association was active in all these roles. It was involved in the development of a new standard for powerlines and in the committees that reviewed the ACIF telecommunications code (now a code of the Communications Alliance). Representatives attended regular meetings of ARPANSA's EMR Reference Group, spoke at various conferences and gave media interviews. The Association worked with councils to develop a model development control plan for telecommunications facilities for councils. Lyn McLean's first book 'Watt's the Buzz?' was published by Scribe publications and she continued to produce the organisation's quarterly newsletter reporting on national and international news. Throughout this period the Association responded to literally thousands of calls and emails from people needing help and information.

The demands were enormous and the helpers too few. In 2004 the Association came to an end, unable to sustain the workload as a voluntary community organisation.

In the same year, Lyn McLean established EMR Australia PL, to support her voluntary work helping and representing the community. EMR Australia is dedicated to educating Australians about EMR in their everyday environments and to helping them with EMR-related problems. To this end, Lyn wrote her books 'The Force— living safely in a world of electromagnetic pollution' (published 2004 and updated in 2015) and 'Wireless-wise Kids' and she continues to produce a quarterly publication 'EMR and Health', (available free online). Some of our readers have been with us since the very first issue of EMR News in 1996!

Today EMR Australia is busier than ever. Each day we respond to numerous phone calls and emails asking for help with EMR-related problems. We provide advice on creating

EMR-related problems. We provide advice on EMR-safe homes and work places and using technology more safely.

To provide help to Australians is our raison d'être. So it is to all of you who contact us, that we owe our being.

I would like to take this opportunity to thank some very special people who have played pivotal roles, especially Bob Walshe OAM, Sarah Evans, Jenni G and Dr Malka Halgamuge—to name a few.

Finally, we thank all our readers for their support and look forward to the next 20 years!



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