

# EMR and Health

Quarterly report on electromagnetic radiation, health and well-being

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## Courts recognise mobile phone-cancer risks

Two recent legal judgments strengthen the link between mobile phone radiation and brain tumours.

Italian courts have independently found in favour of two plaintiffs who developed acoustic neuromas following long-term mobile phone use. Acoustic neuromas are benign tumours located in the canal between the brain and inner ear—close to the position in which mobile phones are normally held.

A court in the city of Ivrea found that telecommunications employee Roberto Romeo's brain tumour was caused by his use of the mobile phone issued by his employer for work.<sup>1</sup> He used the phone for three hours a day for 15 years and developed the acoustic neuroma, subsequently becoming deaf in one ear.

In its deliberations, the court refused to take into consideration research funded by the telecommunications industry. It found that the cancer was 'more likely than not' to be caused by Romeo's mobile phone use and awarded him an annual pension of between 6,000 and 7,000 euros.

As a result of the decision, the Codacons consumer protection agency is pushing for



the introduction of health warnings about safer mobile phone use for consumers.

A second judgment in Florence also favoured the plaintiff, a worker who developed an acoustic neuroma after using a mobile phone for two to three hours a day for ten years. The court found 'a high probability of a connection between cellular [phone] use and illness'. It ordered INAIL, the Italian Workers' Compensation Authority, to compensate the affected worker.<sup>2</sup>

These judgments are not the first to link mobile phone use with brain tumours. In 2012, Italy's Supreme Court recognised that businessman Innocente Marcolini's brain tumour was caused by his heavy mobile phone use. Marcolini used his phone for five to six hours a day for about 12 years.

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Australia-first: Legal seminar on wireless devices (page 8)

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# Authority's suppressed health warning released

Following a judgment in the Sacramento Superior Court, fact sheets on the risks of mobile phone radiation have been released to the public after being suppressed by the agency that drafted them: the Californian Department of Public Health (DCPH).

Judge Shellyanne Change ordered the release of the documents, following court action by Dr Joel Moskowitz, Director of the Center for Family and Community Health at Berkeley School of Public Health. The release was opposed by the CDPH on the basis that it might alarm cell phone users.

The CDPH began developing the fact sheet in 2009 and prepared 27 versions of the document over the next six years. All versions have now been made public.

In the April 2014 fact sheet, the CDHC admitted the risks of mobile phone radiation and offered advice about how to reduce exposure. Referring to studies showing a link between long-term mobile phone use and brain tumours it states, 'these studies suggest that regular cell phone use increases the risk of developing some kinds of brain cancer. Some studies have also linked exposure to EMFs from cell phones to fertility problems.'

The fact sheet explains that children are more vulnerable to mobile phone radiation than adults and suggests that 'parents may want to limit their child's cell phone use to texting, important calls, and emergencies.' It lists pregnant women as well as children and teens among those who 'can also follow the tips for reducing exposure'. Its text is reproduced below.

The UC Berkeley School of Law, the Environmental Law Clinic and First Amendment Project filed the lawsuit on behalf of Dr Moskowitz in the Sacramento Superior Court in 2016.

Speaking of his legal victory, Dr Moskowitz told *EMR and Health*, "Perhaps, in the future public health departments in the U.S. will be less likely to suppress the efforts of their health professionals to alert the public of potential harms."

## Text of April 2014 version of the CDPH fact sheet 'Cell Phones and Health', (marked 'Draft and Not for Public Release')

To lower your exposure to EMFs from cell phones:

Increase the distance between you and your phone by:

- Using the speaker phone.
- Sending text messages.
- Use a headset and carry your phone away from your body. EMFs from wireless (Bluetooth) and wired headsets are usually weaker than those from a cell phone.
- Keep your phone away from your body. A cell phone that is on can emit EMFs even when it is not being used. Do not sleep with your cell phone near you or carry it in a pocket or directly on your body unless the phone is turned off.

Limit your cell phone use when reception is weak or increase the distance between you and the phone. When your phone shows only one or two bars, it is emitting stronger EMFs than when three, four, or five bars are showing.

Reduce the amount of time spent talking on a cell phone.

- Keep cell phone calls short, even when using a wireless or wired headset.
- Use speaker phone mode or a corded phone for longer conversations. Corded phones produce very weak EMFs.

Take off your headset when you're not on a call. Wireless and wired headsets emit EMFs even when you are not using your phone.

Do not rely on devices that claim to shield or neutralize EMFs from cell phones. These devices have not been shown to reduce exposures.

Document released pursuant to *Moskowitz v. CDPH, Sac. Super. Ct. No. 34-2016-80002358*

# Maryland recommends WiFi precautions in schools

An advisory Council to the City of Maryland has issued a report recommending precautions to reduce children's exposure to wireless radiation in schools. The report, by the Maryland Children's Environmental Health and Protection Advisory Council, recommends 'limiting exposures as much as feasibly practical, without negatively impacting education.'

The Council initiated the review of wireless radiation after receiving a request to do so from a member of the public. The request was in line with its responsibilities to 'gather and disseminate information ... on how to reduce, treat, and eliminate children's exposures to environmental hazards to further the public's understanding of the environmental hazards that may potentially affect children.' The Council held a series of meetings that were open to the public and considered a range of evidence, including information about precautions being adopted in other countries. Its report was, published in December 2016 and is now available online.

'There are thousands of papers that have accumulated over decades and are now accumulating at an accelerating pace, as our ability to measure impacts become more sensitive that document adverse health and neurological impacts of EMF/RFER', said pediatric neurologist and neuroscientist Dr Martha Herbert in her submission to the Council.

The Council's report outlines a series of recommendations (below) for reducing children's exposure to WiFi radiation in schools. It also recommended that the Maryland Department of Health and Mental Hygiene ask the United States Department of Health and Human Services to petition the Federal Communications Commission (FCC) 'to revisit the exposure limit to ensure it is protective of children's health and that it relies on current science.'

It also recommended that its report be shared with relevant government agencies in Maryland and the Federal government.

The Maryland State Department of Education should recommend that local school systems:

- Consider using wired devices.  
Where classrooms have internet access with a wireless connection, WiFi can be turned off and wired local area network (LAN) can provide a reliable and secure form of networking for as many wireless devices as necessary without any microwave electromagnetic field exposure.  
  
If a new classroom is to be built, or electrical work is to be carried out in an existing classroom, network cables can be added at the same time, providing wired network access with minimal extra cost and time.
- Have children place devices on desks to serve as barrier between the device and children's bodies
- Locate laptops in the classroom in a way that keeps pupil heads as far away from the laptop screens (where the antennas are) as practicable.
- Consider using screens designed to reduce eyestrain.
- Consider using a switch to shut down the router when it is not in use.  
Teach children to turn off WiFi when not in use.  
  
Consider placing routers as far away from students as possible.  
  
Share this document with teachers and parents.
- The General Assembly should consider funding education and research on electromagnetic radiation and health as schools add WiFi to classrooms.
- The Maryland Department of Health and Mental Hygiene should provide suggestions to the public on ways to reduce exposure:
  - Sit away from WiFi routers, especially when people are using it to access the internet.
  - Turn off the wireless on your laptop when you are not using it.
  - Turn off WiFi on smartphones and tablets when not surfing the web.
  - Switch tablets to airplane mode to play games or watch videos stored on the device.

Maryland Children's Environmental Health and Protection Advisory Council, 'Wifi Radiation in Schools in Maryland' , Final Report, December 13, 2016 , [http://phpa.dhmh.maryland.gov/OEHFP/EH/Shared%20Documents/CEHPAC/MD\\_CEHPAC\\_SchoolWiFi\\_022017\\_final.pdf](http://phpa.dhmh.maryland.gov/OEHFP/EH/Shared%20Documents/CEHPAC/MD_CEHPAC_SchoolWiFi_022017_final.pdf)

# RESEARCH UPDATES

## ELF fields (from electrical sources)

### ALS

Occupational exposure to power-frequency electromagnetic fields may increase the risk of developing amyotrophic lateral sclerosis (ALS), the most common type of motor neurone disease. Researchers from the Netherlands observed a group of over 120,000 men and women aged 55-69 for 17 years. 136 had died of ALS. People with jobs with highest exposure were more than twice as likely to develop ALS as those with lower-exposure jobs. (Koeman, T et al, *Occup and Environ Med*, <http://dx.doi.org/10.1136/oemed-2016-103780>)

### Brain tumours

Workers exposed to high magnetic fields had a higher risk of brain tumours in a study from Sweden. The scientists found that workers with higher exposures had 2.75 times the risk of developing astrocytoma grade IV. (Carlberg M et al, *Am J Ind Med* Apr, 2017.)

### Central Nervous System

Danish researchers investigated central nervous system diseases in a group of over 32,000 men employed by electricity utilities between 1900 and 1993. They found that the workers with higher magnetic field exposures had increased risks of dementia, motor neurone disease, multiple sclerosis and epilepsy. (Pedersen, C et al, *Int Arch Occup Environ Health* 20 Apr, 2017.)

### Pacemakers

German researchers have found that everyday exposures to electromagnetic fields can disrupt the function of pacemakers. A Napp and team exposed 119 volunteers with pacemakers to fields from electrical appliances under different conditions. They found that fields from an electric drill disrupted 16% or 61% of pace

makers and fields that complied with US exposure limits would have disrupted 4% or 34%. (Stunder, D et al, *Circulation* 135 (9):907-909, 2017.)

## RF/wireless radiation

### WiFi in schools

Last issue EMR and Health reported on the Australian study 'Exposure to radiofrequency electromagnetic fields from WiFi in Australian schools' conducted by ARPANSA scientists (March 2017, p 1). Australian and New Zealand scientists have described the results as 'misleading' and not typical of normal wireless classrooms in a criticism published in the same journal in April. (Leach VA et al, *Radiat Prot Dosimetry* 1-3, DOI: <https://doi.org/10.1093/rpd/ncx048> )

### Brain tumours

Heavy use of mobiles has been once more associated with increased rates of brain tumours. A Bortkiewicz and team conducted a meta-analysis of 24 studies involving over 76,000 participants. They found that using a mobile phone for more than 10 years increased the risk of intracranial tumours and that using it for 1640 hours or more increased the risk of ipsilateral acoustic neuromas by 255%. The findings are in line with the IARC's classification of this radiation as a Class 2B ('possible') carcinogen, the authors wrote. (Bortkiewicz A et al, *Int J Occup Med Environ Health* 30(1):27-43, 2017.)

### Brain tumours

M Prasad and team conducted a systematic review of studies on the link between mobile phone use and brain tumour incidence. They found that there was a link between long term mobile phone use (over 10 years or 1640 hours). Further, the better-conducted studies were more likely to find an association with brain tumours, whereas poorer quality



*'Workers exposed to high magnetic fields had a higher risk of brain tumours'*

### 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

studies did not. (Prasad, M et al, *Neurol Sci* Feb 17, 2017.)

### More on brain tumours

Does mobile phone use increase the risk of glioma brain tumours? To answer this question, scientists from China conducted a metaanalysis of 11 studies involving more than 6028 people with brain tumours and nearly 1200 controls. They found that using a mobile phone for 10 years or more more than doubled the risk of developing gliomas. (Yang et al, *Plos One*, 04.05.17.)

### Behavioural problems

Mobile phone radiation may cause unhealthy behavioural changes. Researchers exposed mice to a signal of 835 MHz for 5 hours a day for 12 weeks. They found that exposure damaged the myelin sheath in neurons of the cortex and that mice exhibited hyperactive behaviour. (Kim, JH et al, *Sci Rep* 7:41129, Jan 2017.)

### WiFi and behaviour

Exposure to WiFi radiation may affect the development of an infant's brain, according to the results of a study from Tunisia. Scientists exposed pregnant rats to a WiFi signal for two hours a day throughout gestation. They found that offspring had 'adverse neurological affects', including oxidative stress and chemical changes affecting neurodevelopment. (Othman, H et al, *Environ Toxicol Pharmacol* 52:239-47, 2017.)

### Microorganisms

Wireless radiation may reduce the effectiveness of antibiotics, according to a study from Iran. Investigators exposed two infections bacteria (*Listeria monocytogenes* and *Escherichia coli*) to signals from a 900 MHz mobile phone and a 2.4 GHz WiFi router. They found that exposure made these microorganisms resistant to antibiotics, a finding that could have implications for managing infectious diseases, the authors said. (Taheri, M et al, *Dose Response* 15(1), Jan 2017.)

### Diabetes

Children who spend long periods using screen-based devices have a greater risk of developing type 2 diabetes, according to a study from the UK. Z Kmietowicz studied 4,500 primary schools children from 3

English cities. Those who spent most time looking at TVs, phones or tablets had higher body fat ratios and higher levels of the hormone leptin that controls appetite and insulin resistance. The authors suggested that reducing children's screen-based activities might reduce levels of type 2 diabetes. (Kmietowicz Z, *BMJ*, 356:j1301, 2017.)

### Other studies showing effects from RF radiation

- Exposing young mice to a 10 GHz microwave signal resulted in harmful effects on the brain and memory. (Sharma, A et al, *Mol Cell Biochem*, May 3, 2017.)
- Adolescent rats exposed to 900 MHz mobile phone signals for 1 hour a day developed unhealthy changes in the brain. (Aslan, A et al, *Biotech Histochem*, May 16 1-7, 2017.)
- Mice with candida and exposed to 900 MHz mobile phone signals had a higher death rate and more yeast in tissues than unexposed mice. (Bayat, M et al, *Saudi J Biol Sci*, 24(4):907-14, 2017.)
- Based on results of experiments with chick pea seeds, Pakistani researchers recommended 'cell phones and laptop should not be used unnecessarily' because of the genotoxic and carcinogenic effects they observed. (Qureshi, ST et al, *Saudi J Biol Sci* 24 (4):883-91, 2017.)
- Wireless radiation affected blood glucose and body temperature in a diabetic man. (Kleiber, C, *Electromag Bio Med*, 19 May, 2017.)

## EHS

Researchers from France analysed samples of saliva and urine from people with electromagnetic hypersensitivity (EHS) and controls. They found that people with EHS had higher levels of alpha amylase which, they suggested, could imply the activation of the sympathetic adrenal medullar system. (Andrianome, S et al, *Int J Radiat Biol*, May 3:1-24, 2017.)

*'using a mobile phone for 10 years or more more than doubled the risk of developing gliomas.'*



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*'Exposure to WiFi radiation may affect the development of an infant's brain'*

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## Cyprus reduces WiFi in schools

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The Cyprian Minister of Education and Culture has called for strong measures to protect children from wireless radiation in schools and preschools.

In a decree issued 31 January 2017 and addressed to directors of kindergartens and primary schools, Minister Christ Chatziathanasiou recommended that precautionary and preventative measures be taken to reduce exposure of school children.

The decree calls for the disabling of WiFi networks in all public kindergartens in Cyprus.

It states that WiFi in primary schools should be limited to administrative uses and that the Ministry will not be installing any more wireless equipment in schools.

Where schools and students choose to use wireless networks, they must install switches so that the wireless access points can be turned off when not in use. Moreover, schools must obtain the consent of parents and guardians to allow children to participate in wireless-based activities.

The decree is available, in Greek, at <http://ehtrust.org/wp-content/uploads/Egkyklios-Jan-17.pdf>

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## Mobile phone warning from Romania

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The Romanian Consumers' Association has released a string of recommendations aimed at reducing people's exposure to radiofrequency radiation from mobile phones and other mobile devices.

The Association recognises that children are at greater risk from this radiation than adults and say that 'electromagnetic pollution is the most insidious form of pollution known so far'.

The recommendations states:

- 'Do not allow children younger than 12 years to use a mobile phone, except in emergencies. ...
- 'Limit the use of mobile phones and, most importantly, the length of calls. ...
- 'During the call ... switch to speaker function. ...
- 'Don't carry the phone in your pocket close to any vital organ (eg heart) or belt. ...
- 'When making a call, wait for your listener to answer before putting the phone to your ear..
- 'Don't make a call when the signal strength is low. ...
- 'Don't use mobile phones where there are flammable products. ...
- 'Don't use mobile phones inside a metal shell such as cars or lifts. ...
- 'Keep a distance of 1m from a person speaking on a mobile phone and don't use your mobile phone in places like a train station, train or bus, where they expose people around you to passive radiation.
- 'At night, turn off the mobile phone ... or keep it 2 metres from the body.
- 'Use scientifically-validated mobile phone protection.
- 'Don't buy a mobile phone with a high SAR. ...'

(<http://www.ziaristionline.ro/2017/03/10/pericolele-grave-ale-radiatiilor-telefoanelor-mobile-tabletelor-si-tehnologiei-wireless-feriti-va-copiii-cititi-si-dati-mai-departe-recomandarile-asociatiei-pentru-protectia-consumatorilor-din-rom/>)



The easy-to-use Pocket PF5 meter measures magnetic *and* electric fields from power-frequency sources.

Available from EMR Australia

# UPDATES FROM AROUND THE WORLD

## International

Almost 40 international organisations have endorsed a letter to the World Health Organisation criticising the membership of the Core Group involved in drafting the WHO Environmental Health Criteria. The letter alleges that the scientists in this committee 'refused to accept new scientific evidence of potential health risks from non-thermal, low-intensity radiofrequency radiation' and have relationships with industry that tarnishes their independence. (Media release, <http://www.peccem.org/DocumentacionDescarga/Plataforma-Estatal/notasprensa/European.coordination.press.release-february-2017.pdf>)

## Russia

Similarly, the Russian National Committee on Nonionizing Radiation Protection (RNCNIRP) has sent a letter of concern to the WHO about the RF Working Group. The letter says, 'the WG is not balanced and does not represent the point of view of majority scientific community studying effects of RF.' The letter says that the WHO group do not recognise the nonthermal effects of radiation and thus 'the guidelines of ICNIRP\* are irrelevant to the present situation when the majority of population over the world is chronically exposed to non-thermal RF from mobile communication.' (Letter to Maria Neira, Director Public Health and Environment, WHO, signed by Oleg A Grigoriev.)

\* International Committee of Nonionizing Radiation Protection, associated with the WHO, whose Guidelines are promoted by the WHO and form the basis of many countries' standards.

## France

Paris has introduced stricter limits for radiation exposure. Following discussions with telecommunications

companies, Mayor Anne Hidalgo announced, that exposure limits would be reduced from 7 V/m (volts per metre) to 5 V/m, equivalent to a 30% reduction of exposure at 900 MHz. This will make exposure limits in Paris lower than those of any other European city. The new arrangements will also increase the consultation period for installing antennas from two to four months. (<https://www.telecompaper.com/news/paris-to-adopt-more-stringent-emf-radiation-standards--1186734>)

## Spain

A Spanish court has awarded a full disability pension to a man suffering from electromagnetic hypersensitivity, multiple chemical sensitivity and fibromyalgia. The 47-year-old Rubén FB has been living in an isolated rural location cared for by his wife. The Castellon court's judgement also allows the man's wife to claim a carer's benefit. (El Periódico Mediterráneo, 14.03.17.)

## Canada

Earl Grey Senior Public School has banned the use of mobile phones in school buildings. In a letter to parents, principal Bill Vatzolas wrote, 'This policy change is the result of conversations with our staff, parents and students as we collectively look to minimize distractions in the classroom and reduce the inappropriate uses of the devices during the school day.' Parents have been asked to contact their children by ringing the office. (*City News* 16.02.17.)

## Australia

A Byron Bay resident has won a five-month campaign to have a smart meter removed from the home. The smart meter was installed by Origin Energy without the owner's knowledge. After an appeal to the NSW Energy

Ombudsman, the owner was advised that the smart meter could be replaced, at the cost of \$250, for an analogue meter. (*Byron Echo*, 22.03.2017.)

## India

The Supreme Court of India has ordered that a mobile phone tower be shut down following complaints that the radiation it emitted caused the plaintiff's cancer. Harish Chand Tiwari told the court that he had been irradiated by a neighbouring tower for 14 years, as a result of which he developed Hodgkin's Lymphoma. The Court ordered the phone tower to be deactivated within seven days of the judgment. (*Times of India*, 12.04.17.)

## Japan

The Japan Paediatric Association and the Japan Medical Association are distributing a poster for display in medical clinics, warning about the risks of excessive use of smart phones. The poster points out that the cost of heavy phone use is reduced sleep, academic performance, brain function, physical strength, vision, and communication ability. (*The Mainichi* 16.02.17.)

(Continued from page 1)

Nine peer-reviewed studies have found a link between heavy or long-term mobile phone use and acoustic neuromas, including the 13-country Interphone study and studies by Swedish oncologist Professor Lennart Hardell.

1. Associated Press, 20.04.17 ;
2. Corriere Della Sera, 24.04.17 ([http://www.corriere.it/cronache/17\\_aprile\\_24/danni-uso-cellulare-un-altra-sentenza-firenze-56a2eac4-2922-11e7-a532-a1780cddea55.shtml?refresh\\_ce-cp](http://www.corriere.it/cronache/17_aprile_24/danni-uso-cellulare-un-altra-sentenza-firenze-56a2eac4-2922-11e7-a532-a1780cddea55.shtml?refresh_ce-cp))

## Wireless Devices—Minimise Your Legal Risks

### Do you know the legal risks of using wireless devices in your business or organisation?

This is the first seminar in Australia to show you how to protect yourself from the legal liability that you may face for exposing others to wireless radiation in your business or organisation. Learn practical solutions to reduce your legal risks now and into the future.

**Keynote speaker: Raymond Broomhall LL.B, barrister from Michael Kirby Chambers.**

This seminar will show you what you need to know about this emerging legal issue and how to protect yourself from liability now and into the future.



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**<https://www.eventbrite.com.au/e/wireless-devices-minimise-your-legal-risks-tickets-34961503799>**

## Speech problems in kids

Children's use of hand-held wireless devices is retarding their speech development, according to a study by scientist and paediatrician Dr Catherine Birken.

She and her colleagues studied 894 children aged 6 to 24 months from Canada between 2011 and 2015..

They found that 18-month-old children were spending an average of 28 minutes a day using handheld devices such as smart phones and tablets.

They also found that children who used these devices for the longest periods of time were most delayed in expressive speech development. For each 30-minute increase in handheld screen time, the researchers found a 49 percent increased risk of expressive speech delay.

The American Academy of Pediatrics advises against the use of screen devices by children under 18 months of age.

Julia Ma, 'Is handheld screen time use associated with language delay in infants?' Meeting of American Academy of Pediatrics, San Francisco, 6 May, 2017, ScienceDaily, 4 May 2017, <[www.sciencedaily.com/releases/2017/05/170504083141.htm](http://www.sciencedaily.com/releases/2017/05/170504083141.htm)>.

## Epigenetic effects

Exposing children to electromagnetic fields has been linked with harmful effects on their memory, learning, cognition, attention and behaviour—effects that are consistent with symptoms of ADHD and autism.

The conventional view has been that exposures are only damaging if they break chemical bonds—a view upon which most international standards are based. However, this view does not explain the damage, such as that above, that is being seen from exposures that comply with these standards.

This damage can be caused, not just by the breaking of chemical bonds, but by epigenetic mechanisms that regulate genes, say Cindy Sage and Ernesto Burgio, writing in the May issue of the journal 'Child Development'. 'Epigenetic drivers are the most likely causes, and persistent exposures contribute to chronic dysfunction and addiction that can overwhelm adaptive biological responses,' they say.

Sage and Burgio believe that wireless radiation 'is our largest modifiable and preventable childhood contaminant' and recommend reducing children's exposure by using wired rather than wireless connections. Reducing environmental exposures, they suggest, is the first step in addressing children's neurodevelopmental and neurobehavioural problems and should be considered before resorting to behavioural and chemical interventions.

Sage C, Burgio E, 'Electromagnetic Fields, Pulsed Radiofrequency Radiation, and Epigenetics: How Wireless Technologies May Affect Childhood Development', *Child Dev*, 2017 May 15. doi: 10.1111/cdev.12824

## How effects occur in the brain

Dr Andrew Marino has been investigating the effects of electromagnetic energy for forty years and was involved in the ground-breaking research of Dr Robert Becker (author of 'CrossCurrents'). In a paper published recently in the journal 'Electromagnetic Biology and Medicine', he explains the mechanism by which this exposure affects the body.

Marino and his colleagues exposed ten volunteers to a mobile phone-like signal of 1 GHz—but without any sensory clues or fields from mobile phone batteries—that was approximately half the strength of the US limits for mobile phone exposure. The signal was repeatedly turned ON for four seconds and off for eight seconds and electroencephalogram recordings were taken to see if the brain could tell the difference between the ON and OFF states.

It could.

Marino found that the heat from the signal was sensed by warmth-sensing neurons in the trigeminal nerve on the cheek and that this occurred at skin temperatures below those caused by mobile phone radiation. This caused a nerve signal to the brain.

The authors suggest that their research shows that current international standards which preventing only thermal effects on the body do not prevent effects on the brain.

Marino has previously proposed that low frequency fields from electrical sources are detected by sensory cells in the epidermal-dermal junction of the skin, resulting in changes to the opening of ion channels in neurons.

(Marino AA et al, 'Trigeminal neurons detect cellphone radiation: Thermal or nonthermal is not the question', *Electromagn Biol Med* 36(2):123-31, 2017.)

## Mobiles and behaviour problems

Exposing children to mobile phone radiation before birth could increase their chances of developing behavioural problems, attention problems and emotional problems in later life.

These alarming findings emerged from a large, multinational study published in the April issue of *Environment International*.<sup>1</sup> It took a sample of nearly 84,000 mothers and children from Denmark, Korea, the Netherlands, Norway and Spain and examined their progress over time.

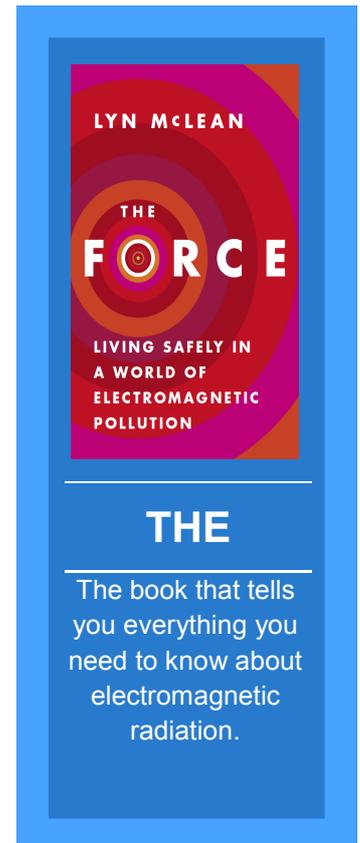
The authors found that mothers who did not use mobile phones during pregnancy—over a third of the sample—had children with the least behavioural and emotional problems. The more mobile phone use the mothers reported, the more likely their children were to develop hyperactivity, inattention, behavioural problems or emotional problems.

The study is the largest to evaluate the link between prenatal exposure to mobile phone radiation and subsequent behaviour problems in offspring. Further, its advantage over previous studies is that it collected data prospectively, rather than retrospectively—which is prone to recall error. Additionally, the results were consistent across all five population groups.

'While the study found consistent results that women who were high frequency cell phone users during pregnancy were more likely to have children with hyperactivity/inattention problems, the cause of this association is unclear,' Laura Birks, one of the study's authors, told *EMR and Health*. 'To reduce exposure of the fetus to radiofrequency electromagnetic fields, pregnant women can avoid holding the phone near the belly when making or receiving calls, but this is recommended only out of caution and not based on the results of this study,' she said.

Previous research has shown a link between prenatal exposure and behavioural problems in both humans and animals.<sup>2</sup>

1. Birks, L et al, 'Maternal cell phone use during pregnancy and child behavioural problems in five birth cohorts', *Environment International*, 07.04.17.) 2. eg Tamir S et al, 'Fetal Radiofrequency Radiation Exposure From 800-1900 Mhz-Rated Cellular Telephones Affects Neurodevelopment and Behavior in Mice', *Scientific Reports*, 2012; 2 DOI: [10.1038/srep00312](https://doi.org/10.1038/srep00312)



### THE

The book that tells you everything you need to know about electromagnetic radiation.



# WATT'S THE BUZZ?

## Digital devices and children's reading

Giving children digital devices may not be the best way to encourage them to read, according to a new Australian study. Researchers from two Western Australian universities investigated the reading habits of 997 children and found that those who read books daily didn't use electronic devices for reading. Moreover, giving children mobile phones and more digital devices tended to reduce their reading frequency. (Margaret K. Merga and Saiyidi Mat Roni, *Computers and Education*, 109: 187-196, 2017; <http://dx.doi.org/10.1016/j.compedu.2017.02.016> )

## Samsung class action

Electronics company Samsung faces a potential class action for the potential of its Smart TVs to record and relay conversations inside the home. Joshua Siegel, a New York resident filed an action against Samsung in the New Jersey District Court in March. He contends that the company records everything said in front of the TV and may share that information with a third party. (Law 360, <https://www.law360.com/articles/900998/samsung-hit-with-privacy-class-action-over-smart-tvs>)

## 'Smart' meter hacking

Smart meters are vulnerable to hacking and could provide information that could jeopardise a household's privacy and security, according to a report by Nigel Phair from the Centre for Internet Safety at the University of Canberra. The report revealed that smart meters that send information both to and from the household, as is the case with smart electricity meters, can reveal information

about whether occupants are home, household activities, and even what television program the family is watching. Smart meters are being built without any security to protect against these risks and consumers are not being informed about them, the report said. (ABC News, 27.04.17.)

## Load of crap?

Well here's something you don't hear about every day.

Visitors to the toilets at China's Temple of Heaven Park are now required to submit to a facial-recognition scan before receiving their allocation of toilet paper. The new scanners, costing approximately \$950 each, ensure that each person receives only one 60cm length of toilet paper over a 9-minute period. The purpose? To prevent the disappearance of toilet paper from rest rooms in the Park. (New York Times, 20.03.17.)

## Happy families

A 15-year-old Spanish boy has taken legal action against his mother, asking the court to imprison her for nine months for her 'mistreatment' of him. Her crime—taking away his mobile phone away to encourage him to study.

The judge dismissed the application. (news.com.au, 25.03.17.)

## Addiction app

A new app called 'Anti Social' reveals just how much time people are spending on their smart phones—and the results are alarming. Young people are spending approximately three and a half hours a day on social media and some are sending around 150 texts a day.

University of Wollongong technology expert, Professor Katina Michael said that, aside from addiction, smart phone use is cutting into homework time and interfering with basic educational skills. The increasing amount of time spent on technology 'actually decreases students' ability to read and speak to others clearly', she said. (ABC News 22.02.17.)

## Children's RSI

According to the RSI and Overuse Injury Association of the ACT, increasing numbers of parents report that their children are suffering from back and arm pain connected with 'bring your own device' policies at schools. The Association has expressed concern about how children's use of iPads and laptops in at school could impact on both their mental and physical health. (The Canberra Times, 08.04.17.)

## Fining parents

Irish parliamentarian Jim Daly believes the state should take action to prevent young children having unrestricted access to the internet. Under his Internet Access for Minors Bill 2017, retailers would not be able to sell internet-enabled devices to children aged below 14 and parents could be fined for allowing young children to own such devices. The MP's concern is to protect children from online pornography. (Irish Independent, 17.05.17.)

## Invisible Rainbow

A new book, The Invisible Rainbow—a History of Electricity and Life, by Arthur Firstenberg, is now available. You can see more at: [http://www.cellphonetaskforce.org/?page\\_id=1427](http://www.cellphonetaskforce.org/?page_id=1427)

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## From smart to senseless

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In the past decade, more than seven billion smart phones have been manufactured, damaging the health of electronics workers and of the planet itself, according to a report published recently by Greenpeace. 'From Smart to Senseless' documents just how costly is the technology that has already seduced two thirds of the world's population.

From a mere 120 million smart phones sold in 2007, the market grew to more than 1.4 billion in 2016. This massive escalation is driven primarily by two factors: users are repeatedly upgrading their phones for more and novel functions and manufacturers are building in obsolescence with designs that prevent users from making simple repairs. And the consequences are enormous.

- The production of smart phones requires the mining of 60 elements, including silver, cobalt and gold, which damages the earth and depletes these reserves. Global supplies of indium are rapidly approaching exhaustion. Plastic cases for the phones are made of oil.
- The short life of smart phones means that vast amounts of electronic waste, and the precious resources they contain, are going to landfill.
- Since 2007, the production of smart phones has consumed 968 TWH—approximately a year's electricity supply for India. Most production occurs in Asia, using coal-generated electricity, and thus substantially contribute to global warming.
- Workers in semiconductor factories claim the hazardous chemicals they are exposed to have contributed to life-threatening illnesses such as cancer.

'We are calling for a new business model, in which smartphone manufacturers take into account the impacts their popular devices are having on our planet, and the desire of consumers to slow down the rate of phones they go through in a decade,' the report says.

The solution, the report concludes, is for mobile phone manufacturers to clean up their act. They could 'make products manufactured using recycled materials with zero use of finite virgin materials'. They should make phones that last longer. They should eliminate the use of harmful chemicals and they should use renewable energy for their activities.

'From Smart to Senseless' The Global Impact of 10 Years of Smartphones', Greenpeace, Feb, 2017, <http://www.greenpeace.org/usa/wp-content/uploads/2017/03/FINAL-10YearsSmartphones-Report-Design-230217-Digital.pdf>

### ECHO TUBEZ

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## The dumb thing about 'smart' meters

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A study from the Netherlands has found that smart meter readings of householders' electricity consumption can be grossly wrong.

Professor Frank Leferink of the University of Twente and colleagues connected nine electricity meters to a range of electronic equipment to see just how accurate their assessment of power usage was. They found that five of the meters recorded that electricity usage to be much higher—up to 582% higher—than actual usage, while two recorded lower electricity usage.

Most inaccuracies occurred when the meters were measuring fields from dimmer switches, energy saving light globes and LED globes.

One of the reasons for the inaccuracies, the researchers said, was the dirty electricity generated by the appliances being measured.

(Frank Leferink, Cees Keyer, Anton Melentjev. 'Static energy meter errors caused by conducted electromagnetic interference', *IEEE Electromagnetic Compatibility Magazine*, 2016; 5 (4): 49)

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## Athens Medical Association

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The Athens Medical Association has released '16 Rules for Safer Use of Wireless Communication'. The Association issued the statement after its meeting on 'Non-Ionizing Radiation, its Effects on Public Health', held on 1 April.

The Association recommends:

- Use your cell phone with caution and make brief calls as necessary.
- Children under the age of 14 should make limited use of cell phones.
- Do not put your cell phone in contact with your head.
- Do not use your cell phone inside a car, train, aeroplane, or elevator.
- Restrict cell phone use when children or pregnant women are near.
- Keep mobile phones away from your body.
- When using your cell phone keep a safe distance from others.
- Do not carry or keep your cell phone inside your pockets.
- At night, disengage Wi Fi on your router and switch off your mobile phone.
- Do not play games on-line and if you do, switch to airplane mode.
- Hands free option is always preferable though may not be completely safe.
- Wireless connections may increase your exposure to microwave radiation.
- Limit Wi Fi connectivity and use hard wired connection whenever possible.
- When signal strength is weak do not attempt to make a call.
- If a landline is available make use of this as a preferred option.
- Disengage Wi Fi, Bluetooth & Data options from your phone when are not needed.

(Environmental Health Trust, <https://ehtrust.org/athens-medical-association-recommends-reducing-electromagnetic-wireless-radiation-protect-public-health>)

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