

# EMR and Health

Quarterly report on electromagnetic radiation, health and well-being

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## The low-down on sperm and wireless devices

Increasing evidence links wireless radiation from mobile phones, WiFi and other wireless equipment with sperm damage and infertility.

Ever since the connection was first made in 1962, evidence has been growing that radiofrequency (wireless) radiation damages the testes and may contribute to infertility. Now scientists have reviewed the latest research to show just what damage exposure has caused and to suggest that the reason for this may have to do with free radicals.

'Radiofrequency electromagnetic field exposure from cell phones or other sources of microwaves adversely affect male fertilizing potential of spermatozoa', say scientist from Finland, the US and South Africa, writing in the December issue of *Reproductive Biology and Endocrinology*.

According to the authors, the testes is 'the most radiosensitive organ', not just because it contains growing and maturing sperm, but because it has a high water content, making it more vulnerable to exposure. Wireless radiation from mobile phones and/or WiFi can damage the testes in a range of ways. It can:

- reduce sperm count and increase cell death
- reduce sperm motility and viability
- affect sperm structure, eg decreasing the size and weight of



seminiferous tubules which can reduce sperm viability.

- stimulate the production of free radicals which can reduce sperm numbers and viability
- disrupt hormones such as testosterone, which is needed for sperm development and function
- cause genetic damage, including DNA breaks, changes in chromosomes and micronucleus formation.

Exposure to a range of wireless devices in everyday use could contribute to levels of infertility that are expected to affect as many as 15% of the population in some countries, the authors say.

Supplementation with antioxidants has been shown to reduce harmful effects of exposure and may be beneficial for reproductive health.

Kesari, KK et al, 'Radiations and male fertility', *Reprod Biol Endocrinol.* 2018 Dec 9;16(1):118.

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# US Senator advises precaution for 5G

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Patrick Colbeck, a Senator from Michigan, and his wife Angie, have developed a 'Policy Guidance Regarding Wireless Radiation' in which they recommend precautions regarding the rollout of 5G technologies.

'The Internet of Things offers much in the way of convenience, economic opportunity and efficiency,' the Colbecks write. 'Depending upon how it is deployed, however, it also offers significant risk to our health, personal privacy, and national security. If we ignore these risks, the consequences include the loss of life and personal liberty.'

The document refers to evidence that wireless radiation results in harmful effects on health, including 'clear evidence' of cancer. It also refers to privacy and security risks of 5G networks, citing a document by a Michigan utility which states that 'technology systems are vulnerable to disability or failures due to hacking, viruses, acts of war or terrorism'.

The Colbecks say that governments need to ask: "Do the perceived benefits for our citizens outweigh the risks?" They say that, 'If duly elected representatives of the people are unable or unwilling to ask this question and respond accordingly with sound policy decisions that impact all of our citizens, we believe that individual citizens should be empowered to make those decisions for themselves.'

The document makes the following recommendations.

## **Promote Wired Rural Broadband**

'Many rural communities are pursuing adoption of 5G networks as a means of accessing high speed internet connections. Rather than deploy 5G "small" cells throughout rural communities, telecommunication companies should be encouraged to provide high speed internet access via wired technologies such as fiber optic cables. These wired systems are more reliable, more secure and provide higher speed access than wireless networks.'

## **Lower Human Wireless Radiation Exposure Thresholds**

If the FCC were to lower the Human Exposure Thresholds currently specified ... telecommunication companies would be incentivized to consider the adverse health impacts of technology prior to rolling it out to the public. If the FCC is unwilling to do so, responsibility for the definition of human exposure limits should be reassigned to the EPA, CDC, or FDA.'

## **Restore Local Control**

'Remove prohibits on state and local units of government from regulating the placement of wireless transmitters in their communities. This policy would allow communities to designate themselves as "Wi-Fi" free zones providing safe haven for people suffering from electro-sensitivity.'

## **Promote Removal of Wi-Fi from Schools**

'Young children including babies in the womb are much more sensitive to adverse health impacts than fully developed adults. In this light, we should follow the lead of countries such as Israel and France by prohibiting Wi-Fi networks in schools and encouraging hardwired internet connections where necessary.'

## **Promote Alternative Autonomous Vehicle Technologies**

'Encourage automotive manufacturers to pursue autonomous vehicle technology that does not require a 5G network or other technologies that result in broad-based risk of adverse health impacts.'

'Policy Guidance Regarding Wireless Radiation', <https://www.senatorpatrickcolbeck.com/wp-content/uploads/2018/09/Wireless-Radiation-Brief.pdf>

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## 5G: Coming, ready or not.

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2019 will be the year of 5G.

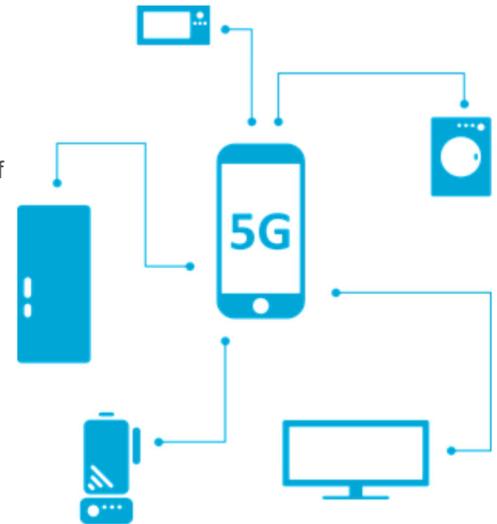
Fifth generation wireless technology means more wireless connections, more antennas and more radiating equipment.

It differs from earlier generations of wireless technology in that it will allow electronic machines to communicate with each other without any involvement by people. Known as the *Internet of Things*, it will connect billions of devices within and around our homes and workplaces. For example, it will take 'smart' homes to a new level, it will support driverless vehicles and virtual reality.

5G antennas will incorporate new technologies. They will use 'Massive MIMO' (multiple input, multiple output) technology which allows an antenna to both transmit and receive information at the same time. One of the features of MIMO antennas is that they can perform 'beam steering'. In other words, an antenna will transmit a beam of radiation towards users and devices, instead of transmitting it in all directions.

5G mobile phones will no longer be assessed for compliance with regulatory limits using measurements of SAR (Specific Absorption Rate). Instead, compliance will be based on measurements of power density (amount of power per volume).

5G will initially work in conjunction with 4G antennas and operate at frequencies of 3.5 GHz. However, in the future, it's planned to operate at much higher frequencies: 26–28 GHz and 38–42 GHz. Frequencies above 30 GHz have tiny (millimetre) waves that can only connect over short distances, so they will require smaller cells. This means that, antennas will be located closer together and closer to homes, schools and workplaces.



We'll see the introduction of 5G in 2019 but its reach will expand over coming years.

But that is not the end of the story. Research is already being conducted on sixth generation wireless technology.

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*'antennas will be located closer together and closer to homes, schools and workplaces'*

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## Mobile phones and cancer

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There is more evidence than ever linking mobile phone radiation with cancer, say investigators from the US. Anthony Miller and colleagues reviewed human studies conducted since 2011—the year when the International Agency for Research on Cancer (IARC) classified radiofrequency (RF) radiation as a Class 2B ('possible') carcinogen.

The authors identified nine studies showing that mobile phone users had increased risks of glioma brain tumours—slow moving and often malignant tumours.

They identified four studies showing an increased risk of non-malignant tumours of the vestibular nerve. This nerve, linking the ear with the brain, is located close to the position in which mobile phones are often held during calls.

According to the authors, there is now sufficient evidence, from both human and animal studies, to classify RF radiation as a Class 1 carcinogen.

As well as these tumours, the authors suggest that cancers of the breast, testes, thyroid and leukemia may also be associated with exposure.

They also suggest that future research should investigate the effects of mobile phone radiation on people's hearing, vision, memory and reaction times.

(Miller, AB et al, 'Cancer epidemiology update, following the 2011 IARC evaluation of radiofrequency electromagnetic fields (Monograph 102), *Environmental Research* 6 Sept 2018.)

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## 5G—a great risk

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5G radiation is a risk to human health, says Dr Martin Pall, a Professor Emeritus of Biochemistry and Medical Science at Washington State University. In a paper published online, Pall has outlined the scientific evidence which, he says, provide 'a high level of scientific certainty' for eight harmful effects caused by electromagnetic fields, including cancer. These fields, he says:

1. 'Attack our nervous systems including our brains leading to widespread neurological/neuropsychiatric effects and possibly many other effects. This nervous system attack is of great concern.
2. 'Attack our endocrine (that is hormonal) systems. In this context, the main things that make us functionally different from single celled creatures are our nervous system and our endocrine systems – even a simple planaria worm needs both of these. Thus the consequences of the disruption of these two regulatory systems is immense, such that it is a travesty to ignore these findings.
3. 'Produce oxidative stress and free radical damage, which have central roles in essentially all chronic diseases.
4. 'Attack the DNA of our cells, producing single strand and double strand breaks in cellular DNA and oxidized bases in our cellular DNA. These in turn produce cancer and also mutations in germ line cells which produce mutations in future generations.
5. 'Produce elevated levels of apoptosis (programmed cell death), events especially important in causing both neurodegenerative diseases and infertility.
6. 'Lower male and female fertility, lower sex hormones, lower libido and increased levels of spontaneous abortion and, as already stated, attack the DNA in sperm cells.
7. 'Produce excessive intracellular calcium [Ca<sup>2+</sup>]<sub>i</sub> and excessive calcium signaling.
8. 'Attack the cells of our bodies to cause cancer. Such attacks are thought to act via 15 different mechanisms during cancer causation.'

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*Pall predicts that 5G wireless technology will be 'a risk to human health'*

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These effects, says Pall, occur at levels of exposure too low to cause heating, although Australian and international standards consider only the heating effects of exposure. There is evidence that effects are irreversible, he says, including neurological effects, reproductive effects, cardiac effects and effects on DNA, including mutations.

Pall believes that electromagnetic fields may be particularly dangerous for the young. They've been shown to affect embryonic stem cells and increase DNA damage. Effects on calcium channels may also cause autism. 'It follows, he says, that the placement of Wi-Fi into schools and the not uncommon placing of cell phone towers on schools may well both be a high level threat to the health of our children as well as being a threat to teachers and any very sensitive fetuses teachers may be carrying'.

Pall predicts that 5G technology will be particularly dangerous because of the large numbers of antennas, the high energy they will emit, the high pulse rate and their ability to impact on calcium channels.

*Martin L Pall, '5G: Great risk for EU, US and International Health! Compelling Evidence for Eight Distinct Types of Great Harm Caused by Electromagnetic Field (EMF) Exposures and the Mechanism that Causes Them', <http://peaceinspace.blogs.com/files/5g-emf-hazards--dr-martin-l.-pall--eu-emf2018-6-11us3.pdf>*

## Mobile phones and the thyroid

Mobile phone use may contribute to increased rates of thyroid tumours, say US researchers.

Scientists have shown that long-term and heavy mobile phone use increased the risk of developing microcarcinomas (small thyroid cancers) in a study published in late October in the *Annals of Epidemiology*.<sup>1</sup>

Researchers, from the Yale School of Medicine and the Connecticut Health Department studied close to a thousand people in Connecticut between 2010 and 2011.

They found that people had a higher risk of developing these tumours if they:

- used a mobile phone for more than 15 years
- used a mobile phone for more than two hours a day
- made a high number of mobile phone calls and
- spent long hours on their mobile phone.



Thyroid cancer is on the rise in Australia. Approximately 2700 people are diagnosed with it each year, more of them women than men. It's the most common cancer diagnosed in women between the ages of 25 and 29 and the third most common cancer in women between the ages of 25 and 49.

The position of the thyroid gland may make it particularly vulnerable to mobile phone radiation. It's located in the front of the neck, close to where people hold their phones.

Dr Joel Moskowitz, Director of the Centre for Family and Community School of Public Health at the University of California, suggests that these findings may be the tip of the iceberg. 'Because smart phones are more likely to have cell antennas located in the bottom of the phones than earlier cell phone models, the peak radiation exposure from a smart phone is more likely in the neck than the brain,' he says.<sup>2</sup>

Time will tell whether smart phone use substantially increases rates of thyroid tumours and whether children, whose smaller heads puts their necks closer to the position of a mobile phone, are at particular risk. In the meantime, it may be wise to reduce exposure to smart phone radiation.

1. Luo, J et al, 'Cell phone use and risk of thyroid cancer: a population-based case-control study in Connecticut', *Epidemiology*, 29 Oct, 2018, s://www.annalsofepidemiology.org/article/S1047-2797(18)30284-9/abstract

2. <https://www.saferemr.com/2014/07/is-mobile-phone-use-contributing-to.html>

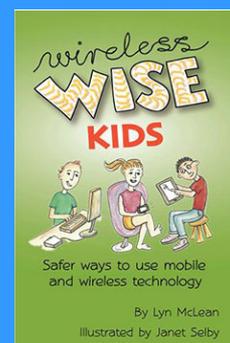
### Books by Lyn McLean



#### 'The Force'



#### 'Wireless-wise Families'



#### 'Wireless-wise Kids'

for everything you need to know about keeping your family EMR-safe  
[emraustralia.com.au](http://emraustralia.com.au)

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## Educators say NO

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San Franciscan educators are calling for safer technologies in schools.

On 25 June, the United Educators of San Francisco, which represents over 6000 staff), passed a resolution recommending precautions to reduce exposure of students and teachers to radiofrequency (wireless) radiation. The decision followed evidence, reported by the US National Toxicology Program, of increased brain and heart tumours and genetic damage in exposed rodents.

The resolution calls for:

- discussion and publication of mobile phone guidelines developed by the California Department of Public Health;
- the development of best practices for mobile devices to reduce RF in schools
- posting RF safety guidelines in every classroom.

<http://www.uesf.org/news/san-francisco-educators-pass-resolution-calling-for-safer-technology-standards-for-all-san-francisco-schools/>

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## Mayors say NO

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The US Federal Communications Commission (FCC) has introduced legislation to reduce local control of rights-of-way, saving carriers money as they install 5G technologies, but removing control from local authorities.

But these authorities are not taking the new rules lying down.

A recent Conference of Mayors issued a statement objecting to the FCC's intrusion into local affairs and threatening to take legal action. "The Conference of Mayors strongly opposes these proposals and calls on the agency to change them; absent such changes, the Conference and its members will seek relief in federal court to overturn this unprecedented overreach by the FCC."

Seattle is among the cities planning to contest the FCC ruling in court. In a media release by the City, Mayor Jenni Durkan and Attorney Pete Holmes said of the FCC order, 'It impedes local authority to serve as trustees of public property and to fulfill cities' public health and safety responsibilities while establishing unworkable standards. This will increase costs and impose an unreasonable burden on local governments.'

Other cities planning legal action against the FCC include New York, Boston and Portland .

(<https://www.usmayors.org/2018/09/10/statement-by-u-s-conference-of-mayors-ceo-executive-director-tom-cochran-on-fccs-order-proposing-to-usurp-local-property-rights/>;

<http://durkan.seattle.gov/2018/10/mayor-durkan-and-city-attorney-holmes-announce-seattle-will-appeal-fccs-proposed-rules-that-strip-local-authority-over-5g-rollout/>)

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*'...reduce exposure of students and teachers to radiofrequency (wireless) radiation.'*

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## School advises wireless safety

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Castle Hill High School in NSW has published advice warning students and staff about safer ways of using mobile phones.

'When reputable scientific bodies have issued warnings and government health agencies of some other countries have already started awareness-raising campaigns/taken measures ... to reduce children's exposure to microwave radiofrequency electromagnetic radiation (RF-EMR) from mobile phones and other wireless devices, it is clearly prudent to follow the Precautionary Principle to protect children', the document, written by the schools P&C Association, says.

The P&C has listed 13 steps that people can take to reduce their exposure to radiation from mobile phones and other wireless devices. They include texting rather than calling; using speaker function; keeping phones on airphone mode or OFF; using airtube headsets; keeping phones out of bedrooms and keeping phones away from the body during calls.

The advice has been posted on the school's website and on posters of the safety information have been displayed around the school.

Castle Hill High School is already using WiFi plugs that turn WiFi emissions off when wireless devices are not being used.

<https://castlehill-h.schools.nsw.gov.au/supporting-our-students/parents--carers-and-the-community/p-c/mobile-phone-safety-tips---cyberbullying-information.htm>

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## Mobiles, sleep & mental problems

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Heavy mobile phone use has a damaging effect on sleep and mental health, according to a study published recently in the journal *Sleep*. Researchers from China surveyed over four thousand college students about their mobile phone use, their sleep patterns and mental distress and found a compelling link.

They found that close to a quarter of the students used a mobile phone for more than four hours a day. Heavy mobile phone use was linked with sleep disturbances and mental 'distress' and these symptoms were alleviated by discontinuing heavy mobile phone use. The results show the importance of recognising and preventing heavy mobile phone use, the authors wrote.

Liu, S et al, *Sleep*, Nov 3, 2018, Nov 3. doi: 10.1093/sleep/zsy213

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## Mental health problems for kids

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A study published this month shows that the more time kids aged 2 to 17 spend on screens, the lower their levels of wellbeing.

Those who spent most time on screens (up to 7 hours a day) were less curious, less emotionally stable, had less self control, were more distracted and had more trouble making friends. They were more likely to suffer from anxiety or depression, to be seeing a mental health professional or to be on medication.

Twenge, JM and Campbell, WK, *Preventative Medicine Reports* 12:271-83, Dec 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

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## Court recognises EHS

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A French court has recognised that a telecommunications worker suffered from electromagnetic hypersensitivity (EHS).

On 27 September, the Court of Social Security Affairs of Versailles ruled that symptoms the employee suffered in the role of customer service technician were linked to this condition.

The lawyer representing the employee said that the judgement opens the door for other workers showing symptoms of EHS.

<http://www.leparisien.fr/societe/electrosensibilite-le-malaise-d-un-salarie-reconnu-comme-accident-du-travail-10-10-2018-7915269.php>

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## Trees get the chop

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Trees could get the chop if they interfere with wireless reception, following a judgement in the New Zealand High Court.

The ruling involved a dispute between neighbours over the trimming of trees on the boundary of their properties. Karen and Ian Vickery wanted the trees trimmed because, among other reasons, they interfered with their wireless broadband reception. Their neighbour did not.

Although she accepted the Vickery's WiFi argument, Judge Sally Fitzgerald nevertheless stated that 'undue interference with a wi-fi signal caused by trees could constitute an undue interference with the reasonable use and enjoyment of an applicant's land...'

The decision could open the door for the destruction of trees to facilitate wireless reception. (New Zealand Herald, 18.09.18.)

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## Cancer in Australia

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Bad news for Australians.

The latest data released by the World Cancer Research Fund and the American Institute for Cancer Research shows that Australia has one of the highest cancer rates in the world.

It had the highest cancer rate for men (579.9 per 100,000), the highest cancer rate for women (363.0 per 100,000) and the highest cancer rate for both men and women together (468.0 per 100,000).

Lowest cancer rates were found in Malta (for men), Bulgaria (for women) and Israel (for men and women).

<https://www.wcrf.org/dietandcancer/cancer-trends/data-cancer-frequency-country>

Protect your  
family from  
wireless radiation



Shielding singlets for  
kids & women



Head protection



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