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US state issues guidelines for reducing exposure

The US state of Maryland has published guidance for the public and government agencies aimed at reducing children's exposure to electromagnetic fields.

The 'Guidelines to Reduce Electromagnetic Field Radiation' were developed by the state's Children's Environmental Health and Protection Advisory Council (CEHPAC), whose aim is to identify environmental hazards that may affect children's health and recommend solutions for them.

According to the Council, it's important to reduce children's exposure because, 'while the science is still evolving, there are broad concerns about exposure to RF radiation.' It refers to research showing that exposure is linked to brain cancers, tumours of the acoustic nerve and salivary glands, sperm damage, headaches, and problems with learning, memory, hearing, behaviour and sleep.

The Guidelines also point out that 'children may be at greater risk than adults from exposure to RF energy.' This is because the developing brain is more vulnerable, they have thinner skulls and smaller heads and the potential for more years of exposure than adults.

The Council's Guidelines recommend three basic strategies for reducing overall exposure to electromagnetic fields:

- increasing the distance from the source
- minimising the amount of time spent using wireless devices
- and choosing safer (non-wireless) technologies instead.

The Guidelines also offer recommendations to reduce exposure to radiation from mobile phones and other wireless devices. They include:

- not using cordless phones
- keeping mobile phones away from the head and body, minimising time spent on mobile phone calls and texting rather than calling
- using wired, rather than wireless devices and connections
- keeping wireless devices away from the body
- keeping devices in airplane mode

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New light on wireless radiation and cancer

In a review published in late February, four experts discuss the evidence of risk and point out problems with the way the industry is being regulated.

The authors consider the evidence that wireless radiation is a cancer risk, including:

- the 2011 decision by the International Agency for Research on Cancer (IARC) that classifed radiofrequency radiation as a Class 2B ('possible') human carcinogen
- the 2018 study by the US National Toxicology Program (NTP) which showed that mobile phone radiation caused cancer, cardiac and DNA damage in rodents
- the 2018 and 2019 studies from the Ramazzini Institute which reported parallel findings
- reports from Switzerland and the European Union which concluded that electromagnetic fields are probably carcinogenic for humans
- conclusions by other scientists that wireless radiation is carcinogenic or probably carcinogenic.

The authors point out that not all researchers agree that wireless radiation is a cancer risk. 'While some that have questioned the causal nature of the relationship may be well-meaning, a disproportionate number of those who discount the data are in the direct or indirect employ of the affected telecom industries,' they say.

'It is important to note that such dismissive studies presume that the sole biological impact of RFR is a consequence of heating,' the authors write. 'This presumption ignores a substantial body of independent studies finding that RFR induces numerous adverse biochemical changes affecting the formation of free radicals, the rates of cell growth and death, and cellular membrane transport. These changes are widely reported in organisms as diverse as plants, animals, and humans.'

The authors also refer to the 'manufacturing of doubt', a practice that has been used by the industry to discredit findings that wireless radiation could be harmful.

The authors conclude that 'There is a plethora of both experimental and epidemiological evidence establishing a causal relationship between EMF and cancer and other adverse health effects including adverse effects on fetal development and the endocrine system. Increases in biochemical alterations such as DNA damage, increased production of free radicals and other signals found to be predictive of cancer and other degenerative diseases have been clearly demonstrated.'

Are we not protected by radiation standards for limiting exposure?

The authors say that the two major bodies that dominate international standards-setting – the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and the Federal Communications Commission (FCC) – only address the heating effects of radiation and not the growing body of evidence on non-heating effects of exposure.

'Industry and regulatory authorities should have the safety of the public as their paramount concern,' the authors write. 'However, the boundaries separating the regulator from the regulated are frequently blurred.'

Paul Ben Ishai, Devra Davis, Hugh Taylor, Linda Birnbaum, 'Problems in evaluating the health impacts of radio frequency radiation,' Environmental Research, 2023, 115038, ISSN 0013-9351, https://www.sciencedirect.com/science/article/abs/pii/S0013935122023659

5G harms workers

Two Swedish researchers have reported severe effects in two men, both IT workers living and working near a 5G transmitter operating at 3.5GHz.

Case study 1

The first man, aged 57, worked in an office directly below a base station transmitting 3G and 4G signals from May 2019 until November 2021 without experiencing any problems. In November 2021 a 5G transmitter was installed on the roof. The man didn't spend much time in his office until April 2022 when he began working and sleeping below the transmitter. By May he had developed headaches that only occurred when he was in the building and disappeared when he left it.

He also developed a range of other uncomfortable symptoms, some of which he rated as severe or 'unbearable'. '(T)he most severe symptoms were headache, arthralgia [joint pain], tinnitus, concentration and attention deficiency, fatigue, early wake-up, and skin burning.'

The man moved out of the office to a location away from 5G antennas and his symptoms disappeared within a month. However, he now experiences headaches and arthralgia when he visits high-radiation locations.

Case study 2

The second man, aged 42, worked and slept in the same building, on the floor below the base station. After the 5G antenna was installed, he developed symptoms, too. 'He experienced worsened insomnia, tendency of depression, anxiety/panic, emotivity, headache, concentration/attention deficiency and to a lesser extent irritability, tinnitus, dizziness, balance disorder, confusion, and hair loss.' He also experienced toothache, even though his teeth had previously been healthy and problem-free.

The man moved away from the office to a rural location without 5G and his symptoms disappeared rapidly.

Microwave illness

The symptoms the men developed are typical of microwave syndrome/illness, sometimes known as electromagnetic hypersensitivity. They include insomnia, heart palpitations, tinnitus, skin problems, headaches and neurological effects and often disappear when exposure ceases.

The authors say, 'The presented symptoms in this case study after the deployment of 5G are typical for the microwave syndrome. They appeared after the deployment of a 5G base station on the roof right above the office and disappeared after the reduction of microwave exposure when the men left the office.'

Radiation levels

The researchers measured the levels of radiation in the offices of both men. The peak maximum levels they measured for the 57-year-old man (case study 1) were 1,180,000 $\mu W/m^2$ (office) and 501,000 $\mu W/m^2$ (sleeping area). For the 42-year-old man, they were 613,000 $\mu W/m^2$.

These levels are within the range allowed by the Australian standard and the Guidelines of the International Commission on Non-Ionizing Radiation Protection (ICNIRP) on which it is based. However, these protect only against the heating effects of radiation. 'Thus, humans are completely unprotected against all nonthermal effects of real-life exposure to microwaves/RFR from modern technology such as 3G, 4G, 5G. The harmful effects include cancer, DNA damage, oxidative stress, neurological, and other biological effects that may impair health,' the authors say.

The authors believe that their study is one of the first to examine health problems in people exposed to real-world 5G signals. They say that it 'adds to previously available studies that show that the microwave syndrome or illness appears at levels much below the current guidelines recommended by the ICNIRP.'

Nilsson M, Hardell L. Development of the Microwave Syndrome in Two Men Shortly after Installation of 5G on the Roof above their Office. Ann Clin Case Rep. 2023; 8: 2378. ISSN: 2474-1655; https://www.anncaserep.com/open-access/development-of-the-microwave-syndrome-in-two-men-shortly-after-9589.pdf&_ss=r

5G—who says it's safe?

The telecommunications industry tells us that 5G radiation is safe. So does the Australian government.

But is it really?

It's time to take a closer look at the evidence, say scientists from the Oceania Radiofrequency Scientific Advisory Association (ORSAA) in a journal article published in late January.

And that's just what they've done. The authors used the ORSAA database* to identify and examine 295 studies on 5G millimetre waves and determine what effects they found, if any. The results showed that the majority of the studies did show bio-effects which can lead to downstream effects on the body.

'The overall picture emerging from the existing knowledge base suggests a range of biological effects, some with strong evidence (>90% of studies), that may have potential health implications,' the authors concluded.

Among the most common effects were:

- biochemical changes
- effects on cell membranes
- effects on cell proliferation
- changes to gene expression
- effects on immunity
- changes to the brain/nervous system
- and genetic damage.

These effects have not been addressed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) which sets guidelines for exposure on which the standards of many countries, including Australia's, are based.

They ORSAA team pointed out that it is still too early to draw any definite conclusions about the safety of 5G mm waves because we have only a small body of studies and, of course, it's too early to see the results of long-term exposure.

Nevertheless, the research is sufficient to draw two conclusions, they say.

1. 'For scientists … there is an urgent need for further focused research to be conducted;

2. For policy makers, there is enough smoke to suggest the risk of fire, and therefore there is an urgent need for protective policy.'

The writers refer to a number of apparently convincing but flawed arguments that are commonly used to convince the public that 5G millimetre waves are safe.

- These waves are already used in airport body scanners (but with different waveforms and lengths of exposure).

- They only penetrate a few millimetres into the skin (but can affect nerves, protective bacteria and the skin's immune functions).

- We can use laboratory-generated 5G signals to assess safety (but they differ in a number of important ways from real-world signals which should be used instead).

- The results aren't reliable because they haven't been replicated (but there is little funding available for replications studies).

- Only heating effects of exposure can damage the body (but harmful effects are frequently found at below-heating levels of exposure).

- We can average exposure over time and amount of exposed tissue (but this doesn't take into account other issues such as the effects of strong peaks of exposure).

'The evidence presented above suggests that there are credible risks of biological interference effects for frequencies planned for 5G, occurring well-below ICNIRP reference limits. Given the ubiquitous and often non-sensual nature of man-made wireless radiation exposures, the presence of even a small number of significant bio-effects requires follow up with more focused research,' the authors conclude.

McCredden JE, Weller S and Leach V (2023) The assumption of safety is being used to justify the rollout of 5G technologies. *Front. Public Health* 11:1058454. doi: 10.3389/fpubh.2023.1058454

Calling all health practitioners

Wireless radiation harms the body and health care practitioners need to do something about it, say Australian researchers in a paper published just before Christmas.

The researchers, from the Oceania Radiofrequency Scientific Advisory Association (ORSAA), conducted an analysis of studies that have been conducted on the effects of real-world wireless radiation on the body, from a database of research the organisation compiled over many years.

'Two-thirds of the relevant epidemiology papers selected from ODEB [the ORSAA database] showed effects associated with increased exposures,' the authors say.

One of the key effects the authors observed was that wireless radiation causes oxidative stress – the generation of free radicals. 'Oxidative stress is now recognized as an underlying cause of many chronic diseases, such as cardiovascular disease and diabetes, Alzheimer's disease and depression,' they say. Furthermore, 'Health conditions promoted by electromagnetic-induced oxidative stress include allergies and atopic dermatitis, autoimmune diseases such as diabetes, eye conditions, and fertility effects.'

The authors also found compelling evidence that wireless radiation causes cancer. They refer to the decision by the International Agency for Research on Cancer (IARC) to classify wireless radiation as a Class 2B ('possible') carcinogen, to large animal studies confirming a link with cancer and to the recent determination by an Italian court that mobile phone radiation caused a plaintiff's brain tumour.

The ORSAA team also found evidence that wireless radiation caused changes to enzymes and protein damage, biochemical changes, changes to cell function or morphology, effects on sperm/testicles, neurobehavioural/cognitive effects, changes to gene expression, haematological effects, cell death, changes to brain waves, immune system damage, hormonal changes, thyroid effects, liver effects and changes in brain development and/or neurodegeneration.

They also pointed out evidence that wireless radiation causes electromagnetic hypersensitivity (EHS) – the experience of unpleasant symptoms as a result of exposure. 'These symptoms include headaches (not the typical headache), head pressure, chest pressure, dysesthesia (skin irritation) and paraesthesia (tingling, prickling, burning sensations), insomnia, concentration difficulties, tinnitus (ringing in the ears), memory issues, dizziness, heart problems such as arrhythmia/palpitations/tachycardia, anxiety, joint pain, chronic fatigue, muscle pain and dermatological effects such as rashes,' they say.

The study provides compelling evidence that humans 'interact with electromagnetic fields even at low power levels.' The authors say that international Guidelines for radiation protection (ICNIRP* Guidelines) do not adequately protect the public from the harmful effects of exposure. This is because:

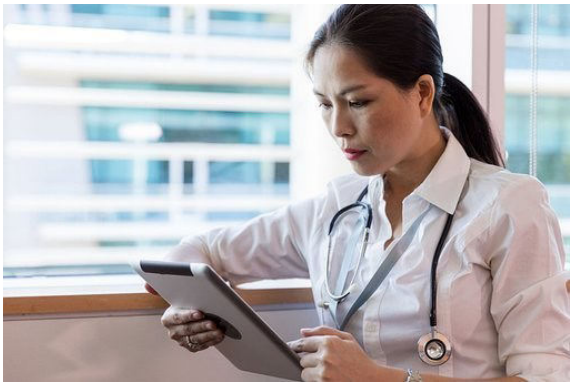
- they only protect against damage caused by heating and not damage caused by other means;
- they don't provide additional protection for children, babies, foetuses, sperm or ovaries;
- and their approach is not consistent with best practices of the International Commission on Radiation Protection.

'[R]radiofrequency signals comprise an ever-present environmental stressor that may contribute to the significant increases in chronic illnesses and mental health issues observed globally', the authors say. They suggest that there is enough evidence to justify health professionals taking action to address the problem.

The authors recommend that health care practitioners should:

- respond appropriately to patient requests to not be exposed in a medical setting, eg switching off or moving sources of exposure;
- keep records of patients who seem to be affected by wireless radiation;
- be aware that radiation-emitting devices may cause distress to some patients;
- educate themselves about the research on the health effects of wireless radiation;
- and provide guidance to patients on how to reduce exposure.

They conclude that 'The extensive evidence base is compelling enough to call for an update in medical education and practice. Out of care for their patients, healthcare workers may develop their understanding using the practical methods introduced in this discussion paper. Furthermore, modern institutional practices need to be reviewed to ensure that any harm from electromagnetic fields is reduced as much as reasonably possible while still providing optimal health care.'



*International Commission on NonIonizing Radiation Protection (ICNIRP)

McCredden JE, Cook N, Weller S and Leach V (2022) Wireless technology is an environmental stressor requiring new understanding and approaches in health care. Front. Public Health 10:986315, doi: 10.3389/fpubh.2022.986315;

The honest science

Dr Dimitris J. Panagopoulos is a world authority on the biological and health effects of electromagnetic fields (EMFs) including radiofrequency (wireless communication – wireless comms) radiation. He is a biophysicist who has conducted extensive experiments and published as a first or sole author more than 40 influential, peer-reviewed scientific papers on the topic. And his first book has just been released.

Called 'Electromagnetic Fields of Wireless Communications: Biological and Health Effects', the book includes cutting-edge knowledge on the effects of man-made EMFs on living systems and contains chapters written by Panagopoulos and other leading experts in the field such as Yakymenko (Ukraine), Miller (Canada), Jagetia (India), De Iuliis (Australia), Belpomme (France), Irigaray (Belgium), Balmori (Spain), and Mohammed (Egypt), among others.

The book answers questions like:

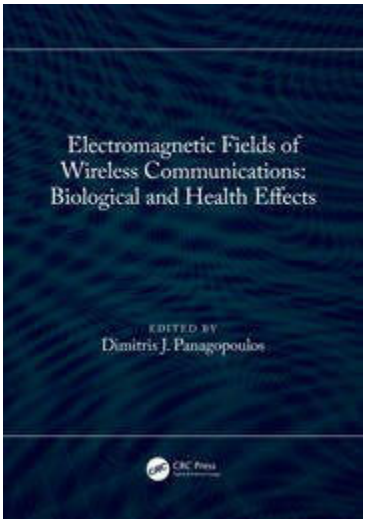
- what should be the exposure limits for wireless-comms radiation?
- do international radiation standards protect us?
- what are the consequences of 5G radiation?
- why does man-made radiation harm the body when natural radiation doesn't?
- what part of a wireless-comms signal causes the biological damage?
- is Specific Absorption Rate (SAR) a good indicator of biological effects? (no)
- can wireless-comms radiation break chemical bonds even though it is non-ionizing? (yes)
- what can scientists do better in the future?

Panagopoulos points out the massive global increase in exposure to wireless-comms radiation and the fact that this radiation differs from that found in nature. 'Therefore, living organisms are not expected to have natural defenses against anthropogenic EMFs,' he says.

Whereas 'Natural EMFs are necessary for maintaining the health and wellbeing of all living organisms on Earth', Dr Panagopoulos says that 'man-made EMFs have been found to produce a great number of adverse biological and health effects. These include changes in key cellular functions; oxidative stress; DNA and protein damage; cell death; infertility; cancer; effects on the immune system; changes in human/animal physiology, such as brain activity; pathological symptoms referred to as electro-hypersensitivity (EHS) etc.'

The book addresses the issue of how much radiation should be allowed for human exposure and whether existing radiation standards protect us.

(Continued on page 8)



(Continued from page 1)

- not using mobile phones in low-signal areas, including vehicles and lifts
- keeping wireless devices out of bedrooms
- using battery-operated alarms, rather than mobile phone alarms
- taking special precautions to reduce exposure when pregnant.

Information on environmental hazards that CEHPAC produces, such as these Guidelines, is used to inform and educate the public, professionals, State agencies, the General Assembly and the Governor.

Maryland Children's Environmental Health and Protection Advisory Council, 'Guidelines to Reduce Electromagnetic Field Radiation', December 2022.

(Continued from page 7)

'Although the majority of peer-reviewed published studies (more than 60%–70%) indicate effects of purely ELF man-made EMFs for field intensities down to less than a few V/m or a few μT, or of pulsed/modulated RF/wireless-comms EMFs for RF intensities down to less than 1 μW/cm2 even for short-term exposures … health authorities responsible for setting exposure guidelines in most countries have adopted limits that are thousands (and even millions, in some cases) of times higher…', Panagopoulos writes.

The book also covers topics such as:

- the biological effects of wireless-comms radiation, including effects on DNA, reproduction, brain activity and cancer
- electromagnetic hypersensitivity
- the effects of wireless-comms radiation on wildlife
- and how wireless-comms radiation causes this damage.

According to Panagopoulos, 'this book will have served its purpose if it contributes toward a "real and honest science" … A science that is applicable to life and works for the benefit of humanity, not for its destruction or enslavement. A science that increases awareness on the safety of our natural environment and our planet Earth, which is in great danger because of the uncontrolled expansion of human technology and the unrestricted use of the natural resources.'

'Electromagnetic Fields of Wireless Communications: Biological and Health Effects', Dimitris Panagopoulos (Ed), is available from CRC Press, Taylor & Francis and you can find out more about it here.

A 20% discount voucher is available here.

'children may be at greater risk than adults from exposure to RF energy'