

EMR and Health

Quarterly report on electromagnetic radiation, health and well-being

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Mobiles & cancer

One of the best animal research programs ever conducted has found evidence linking mobile phone radiation with cancer.

On 27 May, the US National Toxicology Program (NTP) released the results of a rodent study¹, considered to be too important to keep till the final results of its \$25-million research program are published in late 2017.

The NTP study found increased numbers of tumours—malignant gliomas of the brain and schwannomas of the heart—among exposed animals. Both types of tumours are consistent with tumours found in human studies.

The rats were exposed to mobile phone radiation (ten minutes on & ten minutes off) for the equivalent of nine hours of exposure a day, beginning in utero and continuing till they were two years of age. Exposure was to the types of frequencies and modulations commonly used in mobile communications—a 900 MHz signal with GSM or CDMA modulation.

The rats were exposed to different signal strengths — whole body SAR [Specific Absorption Rate] levels of 1.5, 3 or 6 Watts per kilo (W/kg). (The US standard specifies a SAR of 1.6 W/kg for mobile phones next to the ear.) The number of tumours increased with the strength of the signal.

The greatest effects were found in males:

- malignant gliomas occurred in males exposed to all GSM-modulated signals and males exposed to a 6 W/kg CDMA, but control rats had no gliomas.



- glial cell hyperplasia (which can lead to gliomas) was found in males exposed to all GSM-modulated signals and to 1.5 and 6 W/kg CDMA-modulated signals, but not in controls.
- schwannomas of the heart occurred in males in all groups of males exposed to GSM and CDMA-modulated signals and incidence increased with strength of exposure. No schwannomas of the heart occurred in controls.
- Schwann cell hyperplasia of the heart occurred in 3 males exposed to CDMA- and one male exposed to GSM-modulated signals but not in controls.

The link between the exposure and the tumours is compelling. 'We've had internal deliberations that have consistently led to groups of people having about a 70% to 80% of the people that look at this study feel that there is a significant association between radiofrequency radiation and the tumors and the outcomes that we see in the
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(Continued from page 1)

study,' Dr John Bucher, Associate Director of the NTP, said at a press conference.

The NTP results are important because they are among the largest, most complex studies ever conducted by the NTP. The study is the 'largest and most comprehensive' of those on animals and mobile phone radiation Dr Ronald Melnick, a senior Toxicologist at NTP, told *Microwave News*, which broke the story on the NTP study.²

they strengthen the IARC's 2011 classification of radiofrequency radiation as a Class 2B ('possible') carcinogen. The IARC's decision to classify RRF as a class 2B ('possible'), rather than 2A ('probable') carcinogen, was made on the basis of 'limited' evidence from animal studies—a limitation which this study helps redress.

'[G]iven the widespread global usage of mobile communications among users of all ages, even a very small increase in the incidence of disease resulting from exposure to RFR could have broad implications for public health,' the authors of the NTP study said.

'Dr Bucher said, 'We've brought these findings to the attention of the scientific community and the public for the reasons that ... we do have a suspicion that in the human studies there are increases in gliomas and schwannomas. The fact that these are the same tumors sites that we're seeing these small increases is of interest to us and we feel that it contributes to the conversation.'

While the Australian Mobile Telecommunications Association called for caution in interpreting the study's results³, Dr David Carpenter, Institute for Health and the Environment at the University of Albany, called the study a 'game changer'⁴.

1. Wyde, Michael et al, 'Report of Partial findings from the National Toxicology Program Carcinogenesis Studies of Cell Phone Radiofrequency Radiation in Hsd: Sprague Dawley® SD rats (Whole Body Exposure)', <http://biorxiv.org/content/early/2016/05/26/055699.full.pdf+html>
2. *Microwave News*' Setting the Record Straight on NTP Cell Phone Cancer Study', <http://microwavenews.com/news-center/ntp-nyt>
3. AMTA, <http://www.amta.org.au/amta/news/51105.experts-call-for-caution-over-us-animal-study-findings-on-radio-waves-and-health>
4. *Microwave News*, 'Cell Phone Radiation Boosts Cancer Rates in Animals; \$25 Million NTP Study Finds Brain Tumors', May 25, 2016, <http://microwavenews.com/news-center/ntp-cancer-results>

'The study found increased numbers of tumours—malignant gliomas of the brain and schwannomas of the heart—among exposed animals

EHS and the law, Australia

On Friday 19 August, an information session on electromagnetic hypersensitivity (EHS) and the law was held in Croydon, Victoria.

Speakers included 1960s pop icon Ronnie Burns, who suffers from EHS, and barrister Raymond Broomhall from Michael Kirby Chambers in Tasmania.

The meeting discussed a range of issues related to EHS, from the Australian standard for radiation exposure, to medical diagnoses and legal options available to people with this condition.

The meeting also heard of the development of an EHS-safe haven in Victoria—and more details of that will be made available as they come to hand.

The meeting was extremely well-attended and its progressed, according to organisers, was marked by a tangible sense of hope among the participants.

EHS is not recognised by Australian authorities, even though European medical practitioners have developed criteria for diagnosing the condition (see page 9) and Spain has recently awarded compensation to a telecommunications engineer for EHS symptoms developed as a result of his work (see page 7).

EMR Australia is contacted by people experiencing symptoms from exposure to electromagnetic radiation on a daily basis.

France recommends precautions

On 8 July the French government released an 'expert appraisal' recommending precautions to reduce children's exposure to radiofrequency radiation from wireless devices. The report was published by the French Agency for Food, Environmental and Occupational Health & Safety (ANSES) —which provides input to the Ministries of Health, Agriculture, the Environment, Labour and Consumer Affairs—following input from various stakeholders.

The report found that children are exposed to expanding range of wireless technologies, often exposed to numerous sources such as tablets, mobile phones and connected toys. 'Moreover, unlike previous generations, children today are, for the most part, exposed to multiple sources of radiofrequencies from a very early age and even potentially from the *in utero* development phase,' the report said.

The report found that 'children can be more exposed than adults, because of their small size, their morphological and anatomical features, and the characteristics of some of their tissues.'

The authors did not draw any conclusions about whether radiofrequency radiation affected children's behaviour, auditory functions, development, reproduction or immunity or whether exposure was carcinogenic. However, they did find a possible effect on cognition—although it was uncertain whether effects were due to exposure of technology use.

Nevertheless, the report recommended:

- that all radio devices, especially those used by children, are subject to the regulations that apply to mobile phones;
- that wireless devices comply with regulatory standards when in contact with the body.

The report also recommended that parents encourage children to use mobile phones in a 'reasonable' manner, for example, avoiding use at night and limiting the frequency and duration of calls.

It further recommended that studies be conducted to investigate the effects of wireless technologies on mental health—including stress, addiction and depression—as well as family relationships and school performance.

The ANSES report, 'Exposure to Radiofrequencies and child health,' June 2016, is available in French at: <https://www.anses.fr/en/system/files/AP2012SA0091Ra.pdf> and a release in English is available at <https://www.anses.fr/en/content/exposure-children-radiofrequencies-call-moderate-and-supervised-use-wireless-technologies>.

'The report also recommended that parents limit encourage children to use mobile phones in a 'reasonable' manner'

Doctors urge caution for pregnant women

Over one hundred medical practitioners, scientists and public health experts have issued a warning to pregnant women to reduce their exposure to wireless radiation.

In a Statement issued on 1 July, the doctors advised women to take simple precautions to prevent the developing foetus from harm. The statement refers to the vulnerability of the foetus to environmental exposures and the importance of protecting it during critical windows of development. The doctors called for the development of technologies to reduce pregnant women's exposure and more research on the effects of wireless radiation on the foetus.

One of the signatories of the statement is Dr Hugh Taylor, Professor of Women's Health at Yale University. He has previously shown that mice exposed to wireless radiation developed ADHD-like symptoms. 'There's essentially no downside to being cautious and protecting your baby,' he said. 'Why not do it?'

The Statement is part of the BabySafe project was organised by two not-for-profit organisations. It can be seen at <http://www.babysafeproject.org/joint-statement.html> and the signatories to the Statement can be found at: <http://www.babysafeproject.org/signatories.html>

RESEARCH UPDATES

ELF fields (from electrical sources)

Cancer

Power-frequency magnetic fields promoted cancer in a study from Italy. Researchers exposed rats to either a magnetic field, formaldehyde or both. (Formaldehyde may be carcinogenic but is commonly found in household materials, including particle board, carpet adhesive and some personal care items.) Males exposed to both had significantly more tumours and cancers than those exposed to either agent alone. (Soffritti, M et al, *Am J Ind Med* 59(7):509-21, 2016.)

Memory

Magnetic fields may have deleterious effects on memory, according to research from Tehran. Students from four schools completed activities on working memory. Those who attended schools located closer to a substation, with an average magnetic field of 2.4 mG, had poorer results than those who attended schools further away. (Ghadamgahi, M et al, *Environ Monit Assess* 188(6):355, 2016.)

RF/wireless radiation

Oxidation

Wireless radiation causes oxidative stress and could damage health, say scientists from Finland and India. They exposed rats to a wireless signal of 2.45 GHz for 2 hours a day for 35 days. Exposed animals showed evidence of oxidative damage and histological changes to their brains, livers, testes, kidneys and spleen. (Chauhan P et al, *Electromagn Biol Med*: Jun 30:1-11, 2016.)

Socialisation

Mobile phone radiation may retard brain

development and impair social development, according to a study from China. Researchers exposed chick eggs to a 900 MHz signal for 10 hours a day for 16 days. After they hatched, the exposed chicks were slower to aggregate with others, showed less 'belongingness' and weaker vocalisation. Exposure also may have retarded the growth of the cerebellum. (Zhou, Z et al, *BMC Neurosci* 17(1):36, 2016.)

WiFi

In the first study of its type, scientists investigated the effects of WiFi radiation on mercury fillings. They filled 20 extracted teeth with mercury-amalgam fillings and placed half 30cm from a WiFi router that was transmitting data to and from a laptop. The researchers found that the fillings in the teeth exposed to WiFi radiation released more mercury than the unexposed teeth. The toxicity of mercury has implications for human health. (Paknahad, M et al, *J Environ Health Sci Eng* 14:12, July 13, 2016.)

Autoimmune disease

The Vitamin-D receptor (VDR) is associated with chronic inflammatory and autoimmune diseases and is susceptible to Electrosmog, especially microwave radiation. 64 patients with autoimmune disease wore a shielding cap during sleep and 90% of them reported improvements in their symptoms. The authors suggest that reducing electromagnetic exposure may be necessary for the treatment of autoimmune disease. (Marshall, TG and Heil, TJ, *Immunol Res*, Jul 13, 2016.)

Eye problems

Smart phones may cause eye symptoms, according to a study from Korea. From a survey of 715 teenagers, researchers found that greater use of smart phones was associated with more eye symptoms, including blurring, redness, visual disturbance, secretion, Inflammation, lacrimation and dryness. (Kim, J et al, *Ophthalmic Epidemiol* 23(4) 269-76, 2016.)



'Mobile phone radiation may retard brain development and impair social development.'

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 (μ T)

0.1 mT = 1000 mG

0.01 mT = 100 mG

1 μ T = 10 mG

Hz Hertz - a measure of frequency (cycles per second).

Megahertz (MHz) - million Hz

GigaHertz (GHz) thousand million hertz

Health

How healthy are intensive mobile phone users and how well do they sleep? To answer these questions, Iranian researchers conducted a study involving 450 Occupational Health and Safety students from five universities. They found that half the students reported poor sleep and 68% were unhealthy. They also found that intensive phone use was associated with somatic symptoms, social dysfunction, anxiety, severe depression and poor sleep. (Eyvaziou, M et al, *Chronobiol Int* 33(3):293-300, 2016.)

Water molecules

Russian scientists have proposed a mechanism to explain how microwave radiation affects biological molecules. They show evidence that microwave radiation breaks the hydrogen bond in water and suggest that water absorbs microwave radiation at millimeter and submillimeter frequencies. They propose a model to show how this occurs and say that it could cause biological effects. (Nikiforov, VN et al, *Biophysics* 61(2):213-16, 2016.)

Myelination

The authors report the case of a woman who developed symptoms of seizures, ataxia, vertigo and headaches—similar to symptoms she had experienced from West Nile virus some years previously. She experienced the symptoms at home in her flat, but not when away from it. The symptoms disappeared when her neighbour removed his modem hotspot and reappeared when a second neighbour installed a modem hotspot. The authors suggest that the wireless exposure and West Nile virus had similar effects on her nervous system. (Johansson, O and Redmayne, M, *Electromagn Biol Med* Jun 29:1-5, 2016.)

Base stations

Living near a mobile phone base station could be a risk for babies and foetuses, according to a study from Greece. Researchers exposed rats to base station radiation of 3.7 V/m for 12 hours a day during and after pregnancy. Rats exposed during pregnancy had increased heart rates; bodies of newborns differed in size from unexposed rats and changes were observed in the hippocampus of 22-day old rats.

(Stasinopoulou, M et al, *Reprod Toxicol*, Aug 17, 2016.)

Cancer

FM broadcast transmitters may disturb the immune system and contribute to cancer, according to a study from Sweden. O Hallberg obtained information from 23 countries in Europe about FM transmitters and cancer incidence. He found that there was a link between cancer incidence and the strength of the FM signal. The results are consistent with a previous study that found a link between FM transmitters and reduced immunity. (Hallberg, Ö, *Electromagn Biol Med*, June 29:1-5, 2016.)

Other studies showing effects from RF radiation

- Rats exposed to mobile phone radiation for 2 hours a day for 3 months developed 'severe' pathological changes in the brain. (Hussein, S et al, *J Chem Neuranat* 78:34-5, 2016.)

Electromagnetic hypersensitivity (EHS)

Survey

A Japanese team conducted a survey devised by UK researchers on 127 people claiming to have electromagnetic hypersensitivity and over a thousand controls. They found that symptoms could be categorised as affecting the nervous system, skin, head, auditory and vestibular systems, musculoskeletal system, allergies, sensory and heart/chest. Additionally, the researchers validated the reliability of a previous Japanese questionnaire for surveys on EHS. (Hojo, S et al, *Bioelectromagnetics*, 21 June, 2016.)

Diagnosis

Dr William Rea, Director of the Environmental Health Center at Dallas, has outlined various techniques that can be used to diagnose chemical and electromagnetic hypersensitivity. (Rea, W, *Rev Environ Health*, 2016, <http://www.degruyter.com/abstract/j/reveh.ahead-of-print/reveh-2015-0021/reveh-2015-0021.pdf>)

'Russian scientists have proposed a mechanism to explain how microwave radiation affects biological molecules.'



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'Intensive phone use was associated with somatic symptoms, social dysfunction, anxiety, severe depression and poor sleep'

Chronic diseases

Chronic, germless diseases are on the rise and taking a huge toll on our physical and financial health—and the cause of the problem is not being addressed.

In a paper aimed to stimulate awareness and research, author Richard Lear, an alumni of Brown University in the US, invites scientists to further investigate the issues he raises.

According to Lear, the past 25 years has seen an unprecedented increase in chronic diseases including autism, Alzheimer's, diabetes, sleep apnoea, celiac disease, ADHD, asthma, depression, bipolar disease in the young, osteoarthritis, lupus, IBD, CFS, fibromyalgia, MS and hypothyroidism. On average, Americans suffer from 2.1 chronic diseases, he says, and the annual cost is US\$2.5 trillion.

The cause may be a tiny molecule called peroxydinitrite.

In his paper, Lear refers to the work of Dr Pal Pacher and fellow researchers who found that peroxydinitrite was linked to over 60 chronic diseases. It causes oxidative stress, nitrate stress, chronic inflammatory states, mitochondrial dysfunction as well as autonomic dysfunction. ¹

The relevance of this work to our readers is that peroxydinitrite can be triggered by exposure to electromagnetic radiation. Professor Martin Pall has shown that electromagnetic exposures activates voltage-gated calcium channels in cell membranes, allowing calcium to flood into the cell. This leads to the production of nitric oxide, peroxydinitrite as well as free radicals that cause oxidative stress. ²

To what extent might electromagnetic radiation be contributing to chronic diseases? At this stage, we don't know for sure, but it appears to be a connection worth investigating.

1. Lear, Richard, 'The Root Cause in the Dramatic Rise of Chronic Disease' (draft paper), <https://app.box.com/s/iyjuzrxtkx3gpblu4vmt0wjrgsxykuzc>
2. Pall, ML, 'Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric symptoms, including depression', *J Chem Neuroanat*, Aug 21, 2015.

Environmental sensitivities

People with environmental sensitivities, such as sensitivities to electromagnetic radiation (ES), are being marginalised, disadvantaged and categorised as mental health patients, says Professor Pamela Reed Gibson, a psychologist from James Madison University in the US.

'Despite physiological findings of inflammation (Belpomme et al., 2015), hypoperfusion in the temporal lobes upon chemical exposure (Orriols et al., 2009), a change in the permeability of the blood brain barrier specifically for EHS (Johansson, 2015), and other findings, ES remain marginalized and treated only by environmental physicians, who themselves are marginalized by mainstream medical "science" for their efforts,' Prof Gibson said, writing in the June issue of 'Ecopsychology'.

According to Dr Gibson, environmental sensitivities have a huge impact on a considerable number of affected groups. They can cause job loss and homelessness, damage relationships, and prevent people from spending time in places so as to connect with others.

People with ES are the result of 'a society-wide disorder that includes excessive faith in and reverence for technology and industry,' Prof Gibson says. The current economic climate obliges them to suffer so that others can profit from technology.

'I do not believe that the concepts of chemical or electrical hypersensitivity can ever be addressed in isolation from the generational slide in the acceptance of unreal environments,' she says.

Dr Gibson's excellent paper—'The Hidden Marginalization of Persons with Environmental Sensitivities', *Ecopsychology*, 8:2, 2016—can be found at: <http://online.liebertpub.com/doi/pdfplus/10.1089/eco.2016.0003>



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UPDATES FROM AROUND THE WORLD

Spain

On 6 July the High Court of Madrid awarded the status of total permanent disability to a telecommunications engineer suffering from electromagnetic hypersensitivity. The engineer had a hospital report which described his symptoms of headache, tinnitus, insomnia, mood changes, nervousness, irritability and aggression when he was exposed to electromagnetic fields and which improved away from exposure. The Court considered the applicant to be disabled in terms of undertaking work in his profession, but able to work in nonexposed environments. (http://noticias.juridicas.com/actualidad/jurisprudencia/11248-una-sentencia-considera-por-primera-vez-la-amp;quot;electrosensibilidadamp;quot;-como-causa-de-incapacidad-permanente-total/?utm_source=RSS_Feed&utm_medium=rss&utm_campaign=RSS_Syndication [in Spanish])

Turin's WiFi plans

The Italian city of Turin has announced plans to reduce levels of electromagnetic

pollution. Mayor Chiara Appendino, announcing the city's five-year plan, said that the city would like to reduce exposure in government buildings, including schools, while ensuring that citizens are still able to connect. (*The Local*, 25.07.16.)

5G

On 14 July the US Federal Communications Commission (FCC) approved the Spectrum Frontiers Proceeding. This will allow the FCC to allocate spectrum for fifth generation (5G) wireless technology that operates at faster speeds than current technologies and thus expands the range of wireless functions. 5G technology has been championed by FCC Chairman, Tom Wheeler.

Canada

The government of Ontario has announced the formation of a Task Force for Environmental Health to address health problems thought to affect about five percent of people in Ontario. The group, which will be comprised of 15 stakeholders, will raise awareness about Environmental

health problems such as MCS, ME and Fibromyalgia, improve patient care and address gaps in knowledge. (Media Release, Myalgic Encephalomyelitis Association of Ontario, 26.05.16.)

Smart meters

Smart meters are not the way forward, according to the electricity industry itself. At the industry's Eurelectric, meeting in June, participants said that smart electricity grids can be developed in other ways, including improving electricity storage and use of renewable energy. A senior representative from Germany's distribution operator said that smart meters could not be economically viable for the industry. (EurActiv.com, 16.06.16.)

Pope's advice

Pope Francis has urged people to stop spending time sitting down playing video games and staring at computer screens and instead to become in directions that help create a more just world. The Pope delivered his message at the village of Brzegi in Poland. (*The Independent (UK)*, 31.07.16.)

Environmental Sensitivities Symposium 2016



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Canada's precautionary recommendations

On 6 June, Canada's House of Commons Standing Committee on Health released a report on 'Radiofrequency electromagnetic radiation and the health of Canadians', which was presented to the House of Commons 11 days later.

The report details the results of the Committee's investigations into the adequacy of Canada's radiation standard, Safety Code 6, following months of evidence by witnesses.

According to the report, 'the vast majority of witnesses and briefs recommended lowering the RF exposure limits in Safety Code 6' and many reported evidence, both scientific and anecdotal, of adverse effects at exposures below the limits of the Canadian and international (ICNIRP) standards.

The report states that 'The Committee agrees that the potential risks of exposure to RF fields are a serious public health issue that needs to be brought to the attention of Canadians so that they have the knowledge to use wireless devices responsibly and are able to make decisions about the use of wireless devices in a manner that protects their health and the health of their families.'

The Committee produced a series of 12 recommendations (below) and is awaiting a response to these from the Canadian government.

The 42-page report can be read in full at: http://www.c4st.org/images/hesa-2015/412_HESA_Rpt13-e.pdf.

<p>Recommendation 1</p> <p>That the Government of Canada, in collaboration with the health departments of the provinces and territories, examine existing cancer data collection methods to improve the collection of information relating to wireless device use and cancer.</p>	<p>Recommendation 5</p> <p>That the Government of Canada continue to provide reasonable accommodations for environmental sensitivities, including electromagnetic hypersensitivity, as required under the <i>Canadian Human Rights Act</i>.</p>	<p>Recommendation 8</p> <p>That the Government of Canada develop an awareness campaign relating to the safe use of wireless technologies, such as cell phones and Wi-Fi, in key environments such as the school and home to ensure that Canadian families and children are reducing risks related to radiofrequency exposure.</p>
<p>Recommendation 2</p> <p>That Statistics Canada consider including questions related to electromagnetic hypersensitivity in the Canadian Community Health Survey.</p>	<p>Recommendation 6</p> <p>That Health Canada ensure the openness and transparency of its processes for the review of Safety Code 6, so that all Canadians have an opportunity to be informed about the evidence considered or excluded in such reviews, that outside experts are provided full information when doing independent reviews, and that the scientific rationale for any change is clearly communicated.</p>	<p>Recommendation 10</p> <p>That Health Canada conduct a comprehensive review of all existing literature relating to radiofrequency fields and carcinogenicity based on international best practices.</p>
<p>Recommendation 3</p> <p>That the Government of Canada, through the Canadian Institutes of Health Research, consider funding research into electromagnetic hypersensitivity testing, diagnosis and treatment, and its possible impacts on health in the workplace.</p>	<p>Recommendation 7</p> <p>That the Government of Canada establish a system for Canadians to report potential adverse reactions to radiofrequency fields.</p>	<p>Recommendation 11</p> <p>That the Government of Canada, through the Canadian Institutes of Health Research, consider funding research into the link between radiofrequency fields and potential health effects such as cancer, genetic damage, infertility, impairment to development and behaviour, harmful effects to eyes and on the brain, cardiovascular, biological and biochemical effects.</p>
<p>Recommendation 4</p> <p>That the Canadian Medical Association, the Royal College of Physicians and Surgeons, the College of Family Physicians of Canada and the World Health Organization consider updating their guidelines and continuing education materials regarding the diagnosis and treatment of electromagnetic hypersensitivity to ensure they are based on the latest scientific evidence and reflect the symptoms of affected Canadians.</p>	<p>Recommendation 8</p> <p>That an independent scientific body recognized by Health Canada examine whether measures taken and guidelines provided in other countries, such as France and Israel, to limit the exposure of vulnerable populations, including infants, and young children in the school environment, to radiofrequencies should be adopted in Canada.</p>	<p>Recommendation 12</p> <p>That the Government of Canada and manufacturers consider policy measures regarding the marketing of radiation emitting devices to children under the age of 14, in order to ensure they are aware of the health risks and how they can be avoided.</p>

Help for EHS sufferers

The Dutch EHS Foundation has published the results of a survey of people with electromagnetic hypersensitivity (EHS) which provides positive news for others with the condition.

'We have demonstrated that people who are sensitive to certain EMFs and show symptoms of EHS may well help themselves, once the nature of the EMF source has been identified and neutralized,' the authors wrote.

Sixty eight people with EHS completed questionnaires describing their symptoms both before and after implementing methods to reduce their exposure. About half the respondents also suffered from chronic fatigue syndrome, fibromyalgia, multiple chemical sensitivity or post traumatic stress disorder. Most respondents reported sensitivity to other environmental stresses such as sound, odour, cleaning products and (sun)light. Some experi-

enced symptoms from power-frequency sources, others from wireless sources and some from both. For people who reacted to electrical sources, symptoms were most likely to be provoked by 'dirty' electricity.

The results showed that, when people took steps to reduce their exposure, symptoms often improved.

The five most effective strategies for improving symptoms from electrical sources were:

- removing energy-saving lamps
- earthing electrical devices
- reducing PC radiation
- shielding electrical cables
- applying conductive wall paint.

Methods of reducing exposure from external sources of wireless radiation included wearing shielding clothing, sleeping under a shielding canopy and shielding walls and windows.

The survey showed that the majority of symptoms reported by respondents, could be improved by reducing exposure. The greatest improvement occurred in symptoms of fatigue, sleep problems, restlessness, feeling a tight band around the head, headaches, depression and concentration problems.

'Removing or shielding from the triggering EMFs, by whatever means, often alleviates the symptoms, within a few days,' the authors found.

The article can be downloaded free at: https://www.academia.edu/27260236/Electrohypersensitivity_EHS_in_the_Netherlands_A_Questionnaire_survey

Guideline for EHS prevention, diagnosis & treatment

A group of European doctors and scientists has published a Guideline for preventing, diagnosing and treating health problems from electromagnetic exposure aimed at helping both doctors and their patients.

The starting point, the authors say, is for the doctor to take a detailed medical history, including a history of exposure to electromagnetic fields, and to conduct a number of diagnostic tests. The paper outlines a list of tests that can be conducted.

The next step is an to measure and reduce the patient's electromagnetic exposure. The authors recommend precautionary exposures to low frequency (electrical) sources of 1 mG and, for sensitive people, 0.3 mG. For WiFi frequencies, they recommend night-time exposure of $1 \mu\text{W}/\text{m}^2$ and, for sensitive people, $0.1 \mu\text{W}/\text{m}^2$.

'The primary method of treatment should mainly focus on the prevention or reduc-

tion of EMF exposure that is reducing or eliminating all sources of EMF at home and in the workplace,' the authors suggest.

However, they recommend 'restraint' with products that are claimed to 'neutralise' or 'harmonise' electrosmog.

Reducing exposure can have great benefits. The authors say, 'if a detrimental EMF exposure is sufficiently reduced, the body has a chance to recover and EHS symptoms will be reduced or will vanish.'

The authors also recommend treatments to enhance immunity and reduce stress. Among their recommendations are to:

- reduce the overall burden of pollutants on the body;
- reduce oxidative/nitrosative stress which produce free radicals in cells;
- treat intestinal dysfunction;

- optimise nutrition;
- control inflammation;
- normalise mitochondrial function
- and detoxify the body.

Other therapies that can be helpful in some cases are drinking more good-quality water, obtaining more sunlight, oxygen, exercise, sleep, minimising blue light, dental medicine, some saunas and connection to the Earth's natural electromagnetic field.

Belyaev, I et al, 'EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses', *Rev Environ Health*, 25 July, 2016.

The paper can be downloaded free at: <http://www.degruyter.com/downloadpdf/j/reveh.ahead-of-print/reveh-2016-0011/reveh-2016-0011.xml>

WHO and EMF

The World Health Organisation's EMF Project and the International Commission on Nonionizing Radiation Protection (ICNIRP) are often referred to as the ultimate authorities on electromagnetic fields and promote standards for international adoption. How did these agencies achieve pre-eminence and how to they support their claims to it?

The answers to these questions and more can be found in a paper, published recently in the journal 'Engaging Science, Technology, and Society', by Dr David Mercer of Wollongong University.

Mercer reports that the WHO's EMF Project was established in 1996 by ICNIRP and its roles included providing countries with information about EMF and promoting the adoption of ICNIRP's standards. These standards were devised to protect against a limited number of effects caused by EMF, such as the heating effects of wireless radiation. Neither ICNIRP nor the WHO gave real consideration to a precautionary approach, which might help protect against other effects.

According to Mercer, the WHO EMF Project has used three strategies to establish and maintain its pre-eminence and to encourage governments to adopt its standards.

The first of these is 'the use of technological determinist rhetoric' - in other words, projecting the message that the path of technological development is inevitable and we just have to put up with it. However, people do have the choice to influence the direction technology takes, says Mercer, referring to the development of safer technologies, such as fibre optics.

A second strategy the WHO and ICNIRP use is what Mercer calls the 'bespoke model of science' - where science is adjusted to fit in with policy, rather than policy to fit in with science. By way of illustration, he cites examples of criteria established by the EMF Project which ensure that studies focused on the thermal effects of radiation—not those on its biological effects—are the more likely to be taken seriously.

The third strategy these agencies adopt is what Mercer calls 'cultural cartography' - ie drawing the line at what science is acceptable and what is not. This includes these authorities projecting their own approach to science as 'scientific' and 'rational' and criticising alternative ones.

'The EMF project has not only engaged in constructing EMF scientific knowledge, an approach to EMF regulation and an institutional infrastructure to support these aims, but by combining these elements, has also built a powerful "hybrid" political/epistemic WHO EMF Project world,' he writes.

Despite this, Mercer says that the WHO and ICNIRP have not gone unchallenged. Not only have critics pointed out the limitations of their science and drawn attention to the funding these agencies have received from industry, but some countries have rejected the standards they have developed and promoted in favour of more precautionary limits. Additionally, there have been some successful law suits, lodged by people claiming to be affected by EMF, despite the fact that their exposure complied with ICNIRP's standards.

Mercer, David, 'The WHO EMF Project: Legitimizing the Imaginary of Global Harmonization of EMF Safety Standards', *Engaging Science, Technology, and Society* 2 (2016), 88-105, 2016.

Science and Wireless, 2016

The Australian Centre for Electromagnetic Bioeffects Research (ACEBR) will be hosting Science & Wireless 2016 at RMIT University on 22 November.

The focus of this year's event will be a keynote presentation on 'Radiofrequency radiation applications in treatment of Alzheimer's disease' followed by a brief review of ICNIRP exposure guidelines and 5G standards. A facilitated Q&A panel discussion with the ACEBR Chief Investigators and guest presenters will provide opportunities for open discussion on the topics, followed by informal conversations during the poster session over drinks and light snacks.

The meeting will be held on Tuesday 22nd November, 4 - 7 pm at Storey Hall, Building 16, RMIT University, Melbourne.

Admission is free and program and registration details are available at:

www.rmit.edu.au/events/all-events/conferences/2016/november/science-and-wireless-2016

New community group is an ace idea



ACE news! A new Australian community organisation dealing with EMR is to be launched in October.

Australians Choosing Electromagnetic-safety (ACE) is a voluntary community organisation formed by individuals and groups who say it's time for change.

'The Australian public has been dealt a poor hand when it comes to exposure to EMR,' says ACE cofounder, Jane Saegar.

'Legislation seems to entirely favour the industry and there are few, if any, rights for the community. Despite decades of lobbying by individuals and groups, the Federal and state authorities have taken virtually no notice of community concerns.'

According to ACE, Australia now lags far behind many other countries in protecting the health of the public from electromagnetic radiation. Countries such as Russia, Switzerland, Luxembourg, Belgium, Poland, Slovenia, Greece, Israel, India and Italy have introduced more protective exposure limits than Australia's. Additionally, many countries have taken action to reduce public exposure. For example, France has banned WiFi in schools and preschools; Belgium has banned the sale of mobile phones to young children; Israel has limited WiFi use in schools, Haifa (Israel) has removed WiFi from schools, Argentina requires wired internet connections in schools, Berkeley (USA) requires warnings to be provided with all phones sold; Canada has recommended precautions to reduce exposure.

Further, Australian authorities have launched attacks on individuals who have even discussed the risks of wireless radiation—including attacks on visiting Professor Devra Davis and Catalyst journalist, Dr Maryanne Demasi.¹

ACE plans to work in conjunction with other community groups to bring important issues about electromagnetic safety to the attention of Australian authorities and media and to stimulate informed and intelligent debate.

If ACE plays its cards right, the community could just come up trumps.

You can see more about ACE at www.acesafety.org.au.

1. <http://acebr.uow.edu.au/news/index.html>; ARPANSA's current version replaces a more emotive version: http://www.arpansa.gov.au/News/whatsnew/news1_160217.cfm

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Magnetic fields and the brain

Humans have a sixth sense—and it's magnetic, according to geophysicist Joe Kirschvink.

It's long been known that animals have a magnetic sense. Migratory birds and fish have it, and so do lobsters, worms, snails, frogs and newts. Mammals such as wood mice and mole rats use it to determine the position of their nests. Cattle and deer align their bodies along magnetic fields when they graze and dogs face north or south to relieve themselves. However, the question of whether humans have a magnetic sense has been equivocal.

However, that may be changing, based on Kirschvink's latest research.

Beginning in 2014, Kirschvink conducted a series of experiments in a shielded lab at the California Institute of Technology. Each subject was placed in a dark Faraday cage that screened out external magnetic fields. On his/her head was a skullcap containing electrodes. The subject was exposed to a rotating magnetic field, similar to the Earth's magnetic field, in their responses recorded by EEG.

Kirschvink found that when the magnetic field was rotated in an anticlockwise direction, the subjects generated less alpha waves, showing that neurons recognised the changed magnetic fields. He also found a response when the magnetic field moved in an up/down direction. Not only did he find consistent results in all 24 subjects at his lab, but also in subjects in a Tokyo lab which replicated his experiment.

Science Magazine, 'Maverick scientist thinks he has discovered a magnetic sixth sense in humans', 23.06.16.

Skin & other problems of electronic devices

Electronic devices are causing a variety of skin problems in some patients, say Dr Monica Corazza and team, writing in the June issue of the journal 'Dermatitis'.

'Modern technologies are increasingly becoming new sources of dermatological concern causing either new disorders or reappearance of traditional dermatological conditions,' the authors said. 'These skin manifestations will probably increase over time with the use and pervasive popularity of electronic devices.'

From a review of the relevant research, the scientists found that use of different technologies is associated with particular problems.

People who play video games intensively have developed a repetitive strain injury known as 'PlayStation thumb', pain, stiffness, numbness, tingling; contact dermatitis, and thrombosis from inactivity.

PC users have developed friction-related skin problems known as 'computer palm', 'mouse finger', 'mousing callus' and 'keyboard wrist pad'.

PC and laptop users have developed allergic reactions, especially to nickel. Some laptop users have developed brown-red patches on their skin (Erythema ab igne) caused by heat. Computer users have also developed 'screen dermatitis', characterised by increased numbers of allergy-causing mast cells and decreased numbers of Langerhans cells.

Mobile phone users have reported facial dermatitis caused by allergies to nickel and chemicals in the phones.

'Recognizing and removing these emerging offending agents is the most effective intervention,' the authors advised.

Corazza, M et al, 'Modern Electronic Devices: An Increasingly Common Cause of Skin Disorders in Consumers', *Dermatitis* 27(3), 2016.



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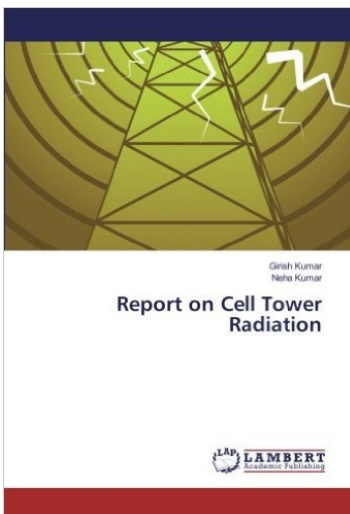
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Book on tower radiation



This report is a compilation of more than 200 scientific peer reviewed references on mobile phone and base station radiation hazards. It covers advantages and disadvantages of mobile phone technology, the radiation pattern of phone tower antennas, the norms adopted by various countries, theoretical and measured radiation power at various locations, biological effects on humans - the brain, eye, ear, skin, nervous system, heart, cognitive issues, infertility, cancer, etc.

Not only humans but several birds like sparrows, insects like butterflies and bees, and plants and animals have been affected by high power phone tower radiation. At the end of the report, suggestions are offered as for solving problems from this hazardous exposure.

Available on Amazon: <https://www.amazon.com/Report-Tower-Radiation-Girish-Kumar/dp/3659909696>

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