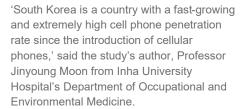
EMR and Health

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Mobiles and brain tumours

A new study from South Korea shows that mobile phone use can increase the risk of brain tumours



In fact, mobile phone ownership has increased from zero in 1991 to 57% (2000), to 97% (2009) and 135% (2019).

'[I]n current society, nearly all people are using their mobile phones not only for calling but also for nearly everything in their daily lives, such as searching for information (web-surfing), watching videos (YouTube), connecting to social network services (Facebook or Tweeter), recording schedules, etc.,' says Moon. 'What is worse is that they use their mobile phones as a morning alarm device, leaving their mobile phones beside their head all night.'

To determine whether mobile phone use was a brain tumour risk, Moon compared brain tumour rates with the number of mobile phone subscriptions. He acknowledged that this was a fairly 'crude' approximation of exposure, but that exposure was hard to determine, given that people now use mobile



phones at varying distances from their body and not just against their heads.

The study found that mobile phone exposure increased risks of three benign brain tumours and three malignant brain tumours:

- benign neoplasm of meninges; benign neoplasm of brain and other parts of central nervous system; and benign neoplasm of brain, supratentorial
- malignant neoplasm of cerebellum, except lobes and ventricles; malignant neoplasm of the frontal lobe; and malignant neoplasm of the temporal lobe.

Moon said that the presence of malignant brain tumours in the frontal lobe and temporal lobes is consistent with exposure to mobile phone radiation and recommended that people take steps to reduce their exposure.

Jinyoung Moon, 'The relationship between radiofrequency-electromagnetic radiation from cell phones and brain tumor: The brain tumor incidence trends in South Korea,' Environmental Research, Volume 226, 2023, 115657, ISSN 0013-9351.

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EHS workshop—what the experts said

On 13 April some of the world's leading experts, including scientists, MPs and lawyers, came together to share their knowledge about electromagnetic hypersensitivity. The workshop, entitled 'Electromagnetic-Hyper-Sensitivity: The State of Science', was hosted by the European Parliament and held in a wifi-free environment so sufferers could attend.

Electromagnetic hypersensitivity is the experience of symptoms or illness when exposed to man-made electromagnetic fields. It affects men, women and children, and some sufferers have experienced such hardship that they've taken their own lives.



The meeting began with a welcome to attendees by Parliamentary MP Michèle Rivasi who assured them that 'the medical and scientific community at the international level is united in the momentum to secure the recognition of electrohypersensitivity.' Here is a snapshot of talks by some of the experts and links to the video and transcript can be found below.

Dr Yael Stein

Dr Yael Stein, a physician and researcher from Israel, pointed out that 'there is a lot of data' on the link between microwaves and symptoms. She referred to:

- symptoms of diplomats in Cuba (Havana Syndrome): 'loud noises and they had headaches and head pressure and dizziness';
- research by Dr Alan Frey 'about noises that people hear which are caused by microwaves';
- an MD's report of a 50-year-old man exposed to microwaves. 'In the beginning he had a sudden heating sensation and erythema. But later on, he suffered headaches, insomnia, irritability, emotional liability';
- irradiation of the American Embassy in Moscow (1952 1966) of 'up to 18 microwatts per centimetres square' [Below ICNIRP limit of 10,000,000 microwatts / sq m Ed], resulting in symptoms 'like depression, irritability, weakness, difficulty concentrating, memory loss.'

Stein also described the experiences of her patients. 'Many of them have sleep difficulties. Many of them become anxious, even up to panic, because they don't know what's happening to them. They become very weak. Some of them have instability, dizziness, falls, nausea. Some of them have earaches and they hear sounds. Some of them describe heart palpitation, tightness in the chest, the muscle cramps, abdominal cramps, joint pain. It's a very wide range of symptoms. But you see that the patients usually don't have all of them. They have two or three specific ones for each patient out of all this range. And the patient will have the same symptoms every time they're exposed.'

Stein explained what she had observed about patients with EHS. She said, 'they have normal anatomy and you can't see it, but when you do functional MRIs, then you see that actually, that the connections inside their brains are different from other people. They actually have neural damage or their brain has become different. Either that or they were initially different from other people. 'They are sort of hyper-stressed. A sympathetic nervous system works too much, and the parasympathetic nervous system is not functioning. So, what they need, what helps them is qigong is breathing exercises. I know some clinics give GABA, and some clinics give melatonin to help them sleep. But regular medications, I have seen very, very few patients that respond to it. And the last thing is that in the long term, they do not get back to normal behaviour levels. They cannot be exposed. They cannot go in the public transport.'

Stein also discussed the characteristics of people who develop EHS. She said, 'many of them really do have a genetic, genetic hypersensitivity. They are hypersensitive in their characters, in their behaviours and they are sensitive to other things as well. The second thing I saw is, some kind of, I call it priming, an event in early childhood. Many, many of the patients

have a story. If you really dig in, and I'm good at occupational history-taking, you find things like a response to vaccines in early childhood, or a child who's very sick with some disease, with some fever in early childhood, or someone who fell and hit their head. There is some trauma.'

Dr Dimitri Panagopoulos

Dr Dimitri Panagopoulos, from the University of Athens, explained why man-made electromagnetic fields (eg a mobile phone with an intensity of 0.1 milliwatts per square centimetre near the head) are much more damaging than natural electromagnetic fields (like the radiation from the sun which is 100 times stronger).

'The answer is that solar, natural radiation is not polarized, while all anthropogenic [man-made] fields are totally polarized. And what do the totally polarized fields do?'

'They can produce constructive interference and they can amplify their intensities at certain locations, which natural fields, non-polarized, cannot do. And moreover, the polarized and coherent fields can force all charged particles to oscillate in parallel and in phase with them.

'And we are talking now talking about living tissue, we are talking about the free, the mobile ions which are in billions inside every single cell and tissue, and they are forced to oscillate in parallel and in phase with these fields. And this initiates biological effects.'

Is there scientific evidence that electromagnetic fields can harm the body?

Panagopoulos says that there are thousands of scientific studies on this topic. 'About 65% to 70% of them ... saw effects. ... But if we look at studies that have used real-life signals [as opposed to simulated signals – Ed], then more than 95% of them do show effects.'

If asked to summarise the way effects take place, Panagopoulos says, 'I would say man-made ... polarized, electromagnetic exposure causes dysfunction of voltage-gated ion channels in cell membranes. This dysfunction alters the intracellular concentrations of critical ions such as calcium and potassium, and sodium and structure of the voltage-gated channels on cell membranes and how the dysfunction of those channels can cause all these effects that we're talking about.'

Is the situation getting better or worse with more generations of technology? Panagopoulos says, 'We have more pulsations and the unexpected variations of the signal, they become more and more with every new generation. So, taking this situation, we can reasonably expect that with every new generation, we have more intense biological and health effects. That's my expectation.'

Do international (ICNIRP) guidelines for radiation protection actually protect us?

Dr Yael Stein points out a problem with the way the standards average exposures over time. She says, 'you cannot base safety standards on averages. The body, the biology does not recognize the average. It's like you hit someone's arm five times with a hammer, then average, it doesn't hurt them. But actually, it hurts them a lot for a short while, and part of the time it doesn't hurt them. You cannot average this.'

Dr Panagopoulos also has concerns. He says, 'we can see that the threshold intensities for which biological and health effects are recorded are thousands of times and even millions of times, in some cases lower than the recommended limits by ICNIRP [International Commission on Non-ionizing Radiation Protection].'

Dr Dominique Belpomme

Professor Dominique Belpomme is a specialist in oncology at Paris University and chairman of the French Association for Research on Treatments Against Cancer (ARTAC).

He described the results of a study on 2000 people with EHS and related conditions in which he looked for biological markers. '[W]e worked on a cohort of 2000 people. It's ... the largest group of people that has been studied. Then each patient has been examined. It is not a questionnaire that has been submitted to them for them to fill in. It is an examination, a medical examination with a diagnosis, a proper diagnosis, a neurological physical exam and you'll see, that contrary to what the WHO says, certain symptoms are objective.'

He found that 'EHS and MCS [Multiple Chemical Sensitivity] are associated in 25% of the cases and shared identified symptoms and biological changes in the framework of a common neurological syndrome.'

'How about combining both what we call the mixed syndrome EHS plus MCS? Well, we have a much larger number of symptoms. We have skin injuries, and these are clear, objective symptoms. We have 46% of skin injuries when patients have both EHS and MCS against 5% in MCS patients. But there are things that can only be seen when you examine the patient. So, balance disturbances, imbalance issues, balance disorders and we've also identified a crippling ictus which is paralytic ictus. Well, these ladies become paralysed all of a sudden. They are totally paralysed and one limb or two limbs are suddenly paralysed and the paralysis disappears a little while afterwards. ... This is typical of EHS, only it also occurs when EHS is associated with MCS. There is more confusion when the syndrome is the mixed syndrome. There is more sleep disturbance and ear, nose, throat issues. So, the symptoms are much wider and much stronger when both pathologies are associated.'

Belpomme reports that he found some markers such as histamine, nitrogen oxidative stress and certain stress proteins. However, 'In between 14 and 24% of the cases, we have not found markers. So, the markers are not an exhaustive, a comprehensive solution to everything.'

Belpomme's study found abnormalities in brain scans of patients that he showed to the audience.

He said, 'We have evidence that is strong enough that the relationship between EHS and electromagnetic fields is very likely. We reject the idea of a psychiatric or psychosomatic theory. There are so many such theories around. We know that MCS is recognized at the international level as a somatic condition. If in 25% of the cases, EHS is associated with MCS, it can be psychological.'

Belpomme found a close connection between MCS and EHS. '[I]n 10% of the cases MCS actually precede the occurrence of EHS. So, there might be a chemical cause that appeared before the occurrence of electrohypersensitivity'. He concluded, 'So, in my view, MCS and EHS are part of the same neurological disorder.'

Dr Andrew Marino

Dr Marino is a US biophysicist and lawyer with decades of experience in the field of bioelectromagnetics. He pointed out several key problems in obtaining reliable scientific information.

'How is it possible to conclude that there were no real effects? That the complaints of the people who have the syndrome are psychological or psychosomatic psychiatric but not real? That failure was the only possible result of the published laboratory research because invariably, it was funded and controlled by stakeholders. Their research designs used a linear reductive model exclusively. If a little energy really does something, then twice as much energy should do twice as much. If it doesn't, then we reject the hypothesis initially that it did something. In addition to the limitation of a linear reductive model, the assumption was made that heat production was the only possible coupling mechanism between electromagnetic energy in the body.'

Another problem has to do with money. 'There aren't any sources of funding for unbiased investigators,' he says. 'Consequently, the outlook for people suffering from the syndrome, the electromagnetic hypersensitivity syndrome, is bleak.'

Dariusz Leszczynski

Prof Dariusz Leszczynski, journal editor, advisor and former researcher, believes that EHS is real. He said, 'there is known, well-known phenomenon of individual sensitivity. ... We know that there is individual sensitivity to other types of radiation, like ionizing radiation, ultraviolet radiation, ultrasound. Everything depends on how much of this radiation we are applying to human beings. And so, logically ... individual sensitivity to wireless radiation must exist.'

He explained what's wrong with the way studies on EHS have been conducted in the past and why the results aren't necessarily reliable.

(Continued on page 8)

Mobile phones and blood pressure

A new study by Professor Xianhui Qin and team from China shows a link between mobile phone use and hypertension (high blood pressure).

'Hypertension is one of the leading preventable risk factors for cardiovascular diseases and premature death worldwide,' the authors said, pointing out that it affected over 24% of men and 20% of women worldwide in 2015. It's a major risk for heart attacks and stroke and is one of the leading causes for premature death globally. 'Therefore, it is urgent to identify more modifiable factors to improve the primary prevention of hypertension and reduce its associated severe disease burden.'

To test the link between mobile phone use and hypertension, the team examined health and phone use of volunteers enrolled in the UK Biobank, a biomedical database for research. Altogether 212,046 people were included in the final analysis after a 12-year follow-up.

Here is what they found.

- People who used mobile phones for more than 30 minutes a week had 'significantly' (a 12%) higher risk of hypertension than those who used mobile phones for less than 30 minutes a week.
- People with longer weekly use of mobile phones (30 minutes or more) and a genetic predisposition to hypertension had the highest (33% greater) risk.

How might mobile phone use contribute to hypertension?

The authors suggested three potential mechanisms.

 They considered the position of the body during a call could play a role but said this couldn't account fully for the results.

- 2. 'Second, the high frequency of mobile phone use might be linked to adverse mental health and sleep disorders, both of which can lead to vascular damage, and in turn, result in elevated blood pressure,' they said.
- 'Third, some previous studies have shown that the RF-EMF of mobile phones can cause a number of harmful effects at the molecular and cellular levels, including DNA damage, oxidative stress, and inflammation, all of which might contribute to the pathogenesis of hypertension,' the authors suggested.

The results of the study suggest the importance of fully exploring the relationship between mobile phone use and hypertension for public health.

'If further confirmed, our study suggests that reducing the time spent using mobile phones to make or receive calls may play a role in the primary prevention of hypertension in the general population,' the authors wrote.

Ziliang Ye et al, Mobile phone calls, genetic susceptibility, and new-onset hypertension: results from <u>212 046 UK Biobank participants</u>, <u>European Heart Journal - Digital Health</u>, 2023; ztad024,



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Are we safe?

Are we being protected from the harmful effects of wireless radiation?

One of the world's most eminent scientists thinks not.

In the June issue of the journal of the US Institute of Electrical and Electronics Engineers, Professor James C Lin explains just what is wrong with the international standards and guidelines that are supposed to protect us.

Lin reviewed the radiation limits recommended by three influential bodies – the FCC, and the revised limits of the ICNIRP and ICES.* He concluded that the revised limits are not appropriate to adequately protect us from long-term exposure. 'The revised RF exposure limits make allowances only to worry about heat with RF radiation,' he said. 'These limits are devised for restricting short-term heating by RF radiation and aim to prevent increased tissue temperatures. Thus, they are not applicable to long-term exposure at low levels.'

He referred to the decision made by the International Agency for Research on Cancer (IARC) to classify wireless radiation as a Class 2B ('possible') carcinogen. It was based on research showing increased risks of glioma brain tumours and benign vestibular schwannomas in heavy or long-term mobile phone users.

But what IARC lacked at the time was good supporting evidence from animal studies.

That evidence came a few years later. In 2018, the US National Toxicology Program published its findings that rats exposed to mobile phone had increased rates of a rare malignant tumour of the heart (schwannoma). This was a significant study. Lin said, 'The study was the largest health effect animal investigation performed by researchers at the NTP, arguably, the largest animal health study conducted of cell phone RF radiation.'

These findings were confirmed soon after by another large animal study, this time from Italy (the Ramazzini Institute). It, too, found an increased rate of schwannomas of the hearts of male rats exposed to mobile phone radiation.

Together, these studies should have been enough to elevate the IARC's risk rating for mobile phone radiation. Lin said, 'The latest animal data should help to upgrade the classification to the "probably carcinogenic" category, if not elevate it to a higher level.' But that's not what happened. Instead, the standards-setters ignored it.

Lin also referred to the conclusions of a paper by the International Commission on the Biological Effects of Electromagnetic Fields (ICBE-EMF) late last year. It pointed out that numerous assumptions underlying the standards-setting process are, in fact, scientifically flawed.

Lin, too, suggests current the radiation limits have passed their use-by date. He said, 'Instead of advances in science, they are predicated on assumptions using outdated exposure metrics, thus their ability to protect children, workers, and the public from exposure to the RF radiation or people with sensitivity to electromagnetic radiation from wireless devices and systems. Furthermore, the limits are based on outdated information and circumvent important animal data. These issues are even more relevant in the case of millimeter-wave radiation from 5G mobile communications for which there are no adequate health effects studies in the published literature. Finally, the guidelines do not adequately address conclusions from scientific organizations, such as the IARC. Thus, many of the recommended limits are questionable from the standpoint of scientific justification for the safety and public health protection.'

Professor James C Lin is an Electrical Engineer, life member of the Institute of Electrical and Electronics Engineers (IEEE) and former member of the International Commission on Non-ionizing Radiation Protection (ICNIRP).

*FCC – Federal Communications Commission (USA); ICNIRP – International Commission on Non-ionizing Radiation Protection; ICES – International Committee on Electromagnetic Safety

J. C. Lin, "RF Health Safety Limits and Recommendations [Health Matters]," in *IEEE Microwave Magazine*, vol. 24, no. 6, pp. 18 -77, June 2023, doi: 10.1109/MMM.2023.3255659, You can see details about the ICBE-EMF article <u>here</u>.

Our electric body

How does the developing body know where to put the features of the face, where to put the limbs and all those other amazing facets of our physiology?

It has to do with the body's innate electrical system, says Professor Michael Levin from Tufts University in the US.

In a fascinating experiment, Levin showed that a developing frog embryo generated a series of electrical patterns in the very locations where, a few hours later, the ears, eyes and nose appeared.

In other words, the electrical signals generated a blueprint for these features.

One of the ways the body's electricity is generated is by electrically-charged ions – such as sodium, calcium and potassium. When a cell's numerous ion channels open, these ions move through, changing the voltage of the cell and creating downstream effects. It was voltage changes like these that caused the electrical patterns that foreshadowed the development of the facial features of the developing tadpole.

Levin describes the process like this. '[A]II cells, not just neurons, have ion-channel proteins and pumps that set their resting potential ...; this is now known to be a key parameter regulating cell-level behaviors such as proliferation, differentiation, apoptosis, migration, and directional polarization in a wide range of cells from yeast to human stem cells.'

Levin has shown that changing the body's bioelectrical pattern can change its physical appearance, too. By artificially changing voltage states, he managed to develop worms with heads at both ends of their bodies, for example.

These findings could have therapeutic applications. Levin says, 'the ideal bioelectric interventions will permanently re-set patterns towards which cells work. The role of bioelectric circuits in implementing large-scale decision making in cell collectives offers the opportunity to induce repair of disease states (and not simply to address symptoms)...'

As wireless radiation has been shown to affect the function of ion-channel proteins, and therefore potentially the voltage state, we wonder whether exposure could also affect the development and health of an organism.

Sally Adee, 'The amazing ways electricity in your body shapes you and your health', <u>New Scientist</u> 22 February 2023.

Levin, Bioelectric signaling: Reprogrammable circuits underlying embryogenesis, regeneration, and cancer, Cell (2021), https://doi.org/10.1016/j.cell.2021.02.034;

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'a developing frog embryo generated a series of electrical patterns in the very locations where, a few hours later, the ears, eyes and nose appeared. In other words, the electrical signals generated a blueprint for these features.'

(Continued from page 4)

He also pointed out the difficulties of diagnosing EHS. He said, 'currently, it is not possible to medically diagnose any ailment as being the result of EMF exposures. And these so-called medical diagnosis of EHS are based solely on the anecdotal [reports]'

Leszczynski has conducted a review of how different countries have responded to EHS and concludes with a discouraging summary. He says, 'there is currently no effort to develop health policies for dealing with EHS, no matter what causes EHS. And national governments follow the opinions of WHO, ICNIRP and ICS and are not developing any practical health policy advisories for Self-declared. EHS sufferers'

Klaus Buchner

Dr Klaus Buchner, a university professor, physicist, and MEP made it clear that action needs to be taken on this issue. 'It is not sufficient to do something for the EHS people. We generally have to lower the limits in order to avoid EHS. I think that's a very important thing.'

He talked about some lawsuits taking place and the possibility of successful legal action against local administrations in the future.

'I want to conclude with a very optimistic view by having several such court cases where we use neighbourhood laws. Then we have to change the national legislation.'

European Parliament MP Maria Rivasi concluded the workshop with some profound and encouraging words to the audience.

'It's a hell of a life to be EHS and we should not forget about that,' she said. 'So, it's up to the scientists to find markers, better diagnosis methods, and then it is up to us politicians to find places for them, safe havens for them. And our goal should be to help them move from EHS, their EHS condition, to a normal life.

'I would like to tell you that we're going to support you. We're going to fight for EHS patients because if we are here, it's for you, it's for all these people who are suffering. And we really need to find a way to cure them, to find solutions so that they can lead a better life.'

You can see the video of the workshop <u>here</u> and the transcript of the workshop, edited by Vic Leech, <u>here</u>.

Is wireless radiation the new asbestos?

David Gee is an expert on why it's important to take precautions and what happens when society fails to do so in a timely manner. In his work for the European Environment Agency, he compiled reports on 35 harmful environmental agents, including X-rays, asbestos, lead, tobacco and CFCs.

You can hear Lyn McLean in conversation with David here.

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'We're going to fight for EHS patients