

## **Children's Health & Wellbeing in the 21<sup>st</sup> Century – 10<sup>th</sup> November 2014**

The Castle Hill High School's P&C recently organized an information session titled "Children's Health & Wellbeing in the 21<sup>st</sup> Century". A panel of guest speakers addressed potential health risks arising from exposure to mobile and wireless electromagnetic radiation (EMR) that is part and parcel of everyday life for most Australian children – at homes and at schools these days. There is some credible scientific evidence of harm although scientists still don't fully understand exact cellular mechanisms behind these adverse biological reactions brought about by this form of radiation called microwaves or radiowaves.

The convener of the session was Prof. Katherine Georgouras OAM, a dermatologist and a resident of the Hills Shire. After a brief welcome by the Principal Mrs. Vicki Brewer, the P&C President Mrs. Anne-Maree Kinley and a couple of members outlined the school's journey on a fact-finding mission on mobile and wireless technologies. Starting from the school community's concerns about the new Telstra mobile base station which was built directly opposite the school (on the RSL building) despite the school's protest last year, this quest for knowledge was fuelled by conflicting evidence. These controversies are raised by health and regulatory authorities in different countries and amongst scientists, with most industry-independent experts expressing serious concerns. After finding that schools are left on their own to decide how to employ the "Precautionary Principle", the P&C and the school decided to arm themselves with as much knowledge as they could so that they can make the most informed decision regarding the use of mobile and wireless technologies. This approach is very much in line with the school's motto "Truth is Strength". The school community felt that keeping up with the scientific knowledge in the area of electromagnetic radiation (EMR) research is vital to minimise any potential health risks in the 21<sup>st</sup> century.

Mrs. Carolyn Vanderklauw a former software engineer in the mobile phone industry turned school teacher, gave a good overview of the changing EMR landscape around the school. Measured EMR fields before and after the installation of the Telstra mast showed a large increase in ambient EMR levels at CHHS although they meet the current Australian public exposure standards. The school community is concerned about the opinion of many international expert groups who claim that current public exposure standards used in Australia (based on the 1998 guidelines of International Commission on Non-Ionizing Radiation and Protection – ICNIRP), are not protecting the public from long-term health risks. For example, Switzerland, Italy, Russia and China have standards 100 times more stringent public exposure levels than here. Castle Hill High School P&C is the first and only school body to be represented in the Electromagnetic Reference Group (EMERG) established by Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) to bring input from the Australian public.

Mrs. Elizabeth Madders a commerce graduate with business background and head of the P&C's mobile/wireless technology subcommittee shared excellent tips on how to minimise EMR exposure with so many transmitting devices which are in use these days such as WiFi routers, wireless-enabled laptops, iPads, smart phones, cordless phones, baby monitors, wireless games consoles. Keeping devices away from bodies, using wireless functions only when absolutely necessary and installing switches to WiFi routers in school settings and switched off when not in use are very effective measures. Mrs Madders quoted ARPANSA FACT SHEET 14 – "the technology is very new and it's impossible to be completely sure there isn't some risk. This is especially true for children where little research is evident".

It is noteworthy that Australia's first ever case of workers compensation based on electro-hypersensitivity (increased sensitivity to electromagnetic radiation) was won by a CSIRO government employee in 2013. This is a clear indication that EMR exposure needs to be taken now as a serious occupational health and safety issue. Electro hypersensitivity (EHS) is considered as a functional

impairment. Affected individuals are already supported and especially catered for in Sweden. It is called Microwave Sickness in Russia and symptoms include headache, chronic fatigue, dizziness, nausea, and insomnia.

Prof. Dariusz Leszczynski, an internationally renowned expert on radiation health from the University of Helsinki, Finland and a former head of radiation biology laboratory of the Finnish Radiation Protection Agency made a detour to speak at this info session on his way to a workshop at the University of Wollongong. He was amongst the 30 experts the World Health Organization's International Agency for Research on Cancer (IARC) consulted in 2011 to evaluate the cancer risk of radiofrequency EMR. He has many years of research expertise in the area. Prof. Leszczynski cautioned the users of mobile and wireless technologies on their potential adverse effects of EMR. He explained the current status of research pointing out the limitations and flaws of many studies that give unreliable data. In particular, actual exposure levels are not taken into account. For example, the Danish Cohort Study which is often used to defend the safety of mobile phones only considered how long an individual subscribed to a mobile phone contract. This approach put two people who had subscription for 10 years, one with very low use (low exposure) and one with very high use (high exposure) in the same category jeopardising results in that investigation of brain cancer. There are now three large case-controlled studies which included several thousand brain cancer cases and control individuals in which data show an increased risk of brain cancer after 10 years of mobile phone use. These are large multinational IARC's Interphone study, a Swedish study lead by neurosurgeon Dr. Lennart Hardell and the CERENAT study in France published their findings early this year. In general, findings indicate 30 minutes per day usage of a mobile phone over 10 years doubles the risk of brain cancer. Because these individuals have used mobile phones which were deemed to be safe, this is clear evidence for a risk associated with mobile phones.

Prof. Leszczynski explained the criteria needed for the application of the precautionary principle and showed evidence to support it.

Dr. Mary Redmayne flew in from Melbourne where she is a post-doctoral Research Fellow at Monash University's Department of Epidemiology. She is researching the health and well-being effects of exposure to radiofrequency radiation. As well as her research, her passion is educating parents and professionals to make informed decisions on advising children about using transmitting devices safely. She presented scientific evidence to show children absorb greater amounts of radiation and are more vulnerable than adults. Dr. Redmayne highlighted the following in relation to children:

- Increased conductivity, especially in bone marrow (10 times more), deeper energy penetration
- Greater RF absorption rate than adults
- Increased vulnerability of the developing nervous system
- Longer total period of use than adults – as children are starting to use EMR emitting devices such as iPads at a much younger age

Dr. Redmayne shared her own PhD research findings on high school students in New Zealand, as well as other research data. There have been demonstrated adverse effects by mobile and cordless phones on children's wellbeing particularly in the form of headaches. Feeling tired at school, after device use the previous night, has also been found. Moreover, research studies have revealed that children who use mobile phones have their cognitive functions impaired. The users tend to act fast (reduced reaction times) but their accuracy was lower in testing cognitive tasks. EMR can change brain waves as demonstrated by EEG traces by different research groups. Dr. Redmayne also highlighted research evidence indicating damage to the nervous system, particularly to the myelin sheath which insulates the nerve cells like the rubber insulation layers around electric cables. Degeneration of myelin causes multiple sclerosis (MS). The research data linking EMR exposure to nerve cell damage is very concerning.

Prof. Ray Kearney OAM is attached to the Department of Infectious Diseases & Immunology at University of Sydney which he headed previously. He still maintains full academic status and continues with teaching after retirement. He was a NSW state finalist for the Australian of the Year Award in 2005 and in 2007 was awarded a Medal of the Order of Australia for his voluntary contributions to public health, his campaigning for cleaner alternative fuels and conservation.

Professor Kearney gave a great introduction to environmental health by drawing an analogy of the interdependence of species for survival in their environment containing a threat to one of the species. His talk focused on the importance of the hormone melatonin which is disrupted by EMR and other environmental factors such as light at night and fluoride in water. He then considered the subsequent 'knock-on' effects

Most of life on earth is influenced by the 24-hr cycles determined by sunrise and sunset. This circadian rhythm affects animals' sleeping and feeding patterns, brain wave activity, hormone production and other biological activities vital to the daily cycle, health and well-being. Melatonin is a hormone produced especially at night in the pineal gland. Its secretion is stimulated by the dark and inhibited by light. Extra-pineal tissues and organs also synthesize melatonin but are not subjected to light/dark regulation. Locally generated melatonin (e.g., gut and bone-marrow) is consumed by the tissues in which it is produced as a protective mechanism of oxidative stress (cell damage caused by reactive oxygen species, mostly free radicals).

Melatonin is a powerful antioxidant and is one of the few antioxidants that can penetrate into the cell's mitochondria and protect them from oxidative damage which is one of the significant drivers of degenerative diseases. Melatonin in the nucleus is beneficial as DNA is a very sensitive target of free radical damage. Unlike the antioxidants Vitamin C or glutathione, which are only active in aqueous (watery) phase and Vitamin E, which is only active in lipid (oily) phase of biological tissue, melatonin is effective in both aqueous and lipid phases as potent cell protector. Unlike Vitamin E and Vitamin C, which cannot readily cross the blood-brain barrier, melatonin easily crosses the blood-brain barrier. Melatonin also helps control weight gain.

Melatonin has been proven to inhibit growth of a diverse range of human tumour types including melanoma and certain kinds of breast cancer. However, such effects follow a bell-shaped dose-response where neither a low nor a high dose is as effective as maximum naturally occurring physiological levels. This tumour-controlling action seems related to changing the balance between apoptosis (a highly sophisticated natural mechanism of killing cells which are not functioning properly or a threat to the organism) and mitosis (normal cell division promoting growth) in favour of the former. In contrast, inflammation (body's response to tissue injury) and low melatonin levels can shift the balance (dormancy) to rapid tumour growth. Clearly, melatonin is an all-important protector against cancer.

Eleven of the 13 published epidemiologic residential and occupational studies are considered to provide (positive) evidence that high extremely low frequency (ELF) magnetic field exposure can result in *decreased* melatonin production. EMR can reverse the anti-tumour effects of melatonin. Recent findings provide support that radio frequency-EMFs play a role both in the initiation and promotion stages of cancer development. Studies confirm previous results of an association between mobile and cordless phone use and malignant brain tumours. These effects must be considered seriously as human life is based on electric impulses and any deviation from nature by exposure to man-made forms of EMR from the foetal stage can affect normal morphogenesis and functionality.

Prof. Kearney explained that there are conflicting conclusions of the effects of EMR on health - ranging from *"There are no conclusive direct hazards to human tissue as a result of electromagnetic radiation."* (WHO and International Commission on Non-Ionizing Radiation and Protection - ICNIRP) to *"the statement is completely and blatantly untrue!"* (2012 Bio-Initiative Report: <http://www.argotheme.com/organecyberpresse/IMG/pdf/BioInitiativeReport2012.pdf> ).

What is clearly evident is the subjectivity of the WHO's IARC working party in its review of the evidence of EMR and Cancer - <http://monographs.iarc.fr/ENG/Monographs/vol102/mono102.pdf>

In this IARC Report, when evidence shows 'no effect' the findings are not commented upon. However, when EMR is reported to have an adverse effect then repeatedly one reads statements inferring that *"The Working Party regarded the studies as having a very weak or insignificant association ...."* and continue a subjective critique of the published findings. The inference is that the IARC Working Party does not respect/accept the views of the editors and referees of the respective prestigious journals which have published findings of a cause and adverse effect relationship involving EMR. This anomalous conduct borders on 'scientific misconduct' where falsification and fabrication of data are among its criteria and the key motive is to deceive. For example, *"The Working Group considered this study to be uninformative due to its small size and crude statistical methodology"*. (See p. 187). Surely this is a criticism not only of the research group by the IARC Working Party but also of the respective journal editor and referees who reviewed the research paper before its acceptance for publication. There are many instances of this in the IARC Report.

Dr. Priyanka Bandara is a local Hills resident and an independent researcher/educator in environmental health. She was previously an academic clinical researcher and a manager in the NSW health system at Westmead (Public and Children's) and Royal Prince Alfred Hospitals and the Faculty of Medicine at the University of Sydney. Her professional focus has shifted from understanding disease pathobiology to protecting particularly children from preventable environmental illnesses.

Dr. Bandara explained that Australia's current regulation of public EMR exposure depends on outdated standards based on acute thermal effects (short-term tissue heating effects). Several thousand peer-reviewed scientific reports indicate biological effects (see [www.bioinitiative.org](http://www.bioinitiative.org)) independent of heating effects that are being ignored by our exposure standards. Further, modelling of EMR absorption used for current standards doesn't cover smaller heads of children. Standards followed by our government agency ARPANSA are based on 1998 guidelines of the professional body ICNIRP, non-governmental organization without accountability to the public.

She pointed out many errors made by human society whereby hundreds of man-made agents once declared safe but later found to be toxic – asbestos, tobacco, thalidomide and lead, to name a few. In most cases there were many decades of delay between the time scientists give health warnings to when public authorities take action to protect public health. The industries involved attempted to counter claims of harm by industry-paid scientists, whilst the government authorities failed to take the necessary action.

She shared some research findings, including evidence of DNA damage in human cells caused by exposure to mobile phone radiation from the REFLEX study funded by the European Union. She said between 2006 and now, there are 84 studies indicating DNA damage by EMR, according to Prof. Henry Lai at Washington University who is currently preparing a review for publication. This is in addition to a published review in 2009 which summarised 49 studies showing DNA damage. DNA damage is central to development of cancer. She further shared published peer-reviewed studies showing interruption by EMR to electrical activity of the human heart and brain of healthy volunteers. It is very concerning that these interruptions were caused by levels of EMR currently allowed by the Australian exposure standards.

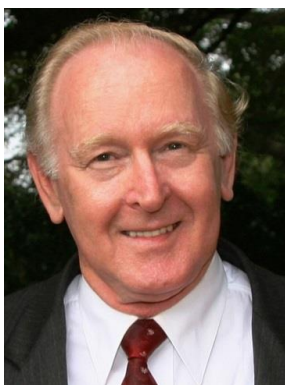
Dr. Bandara explained how EMR appears to be an environmental stressor acting along with other toxic pollutants to stimulate the immune system (body's defence system) and how prolonged stimulation leads to immune dysfunction and thereby disease. She strongly advocated prudent avoidance with children who are more sensitive by opting for wired alternatives to wireless and to use mobile phones and cordless phones only in emergencies as well as to encourage adults to minimise their exposures. Already manufacturers give fine print warnings in manuals to keep mobile phones and other devices

such as iPads away from bodies as they would otherwise exceed even the current exposure standards which are disputed as not protective enough. Dr. Bandara pointed out that it is a real concern that most people are completely unaware of these hard to find warnings and have no idea that these devices are not meant to be held against the bodies.

In response to the questions from the audience, the Principal Mrs. Brewer said that the school will review current modes of operation in order to bring about changes that will reduce EMR exposure of students and staff.

The highly engaged audience remained well past the time allocated for questions and the event was a great success.

**Prof. Ray Kearney OAM**



**Dr. Mary Redmayne**



**Prof. Dariusz Leszczynski**



**Dr. Priyanka Bandara**

