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Serious Safety Concerns about 5G Wireless Deployment in Australia and New Zealand

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Sir,

Despite warnings of hundreds of scientists actively engaged in research on biological/health effects of anthropogenic electromagnetic radiation/fields (EMR/EMF)[1] and worldwide protests by professionals and the public[2] that have pushed many cities in Europe to declare moratoriums on fifth generation wireless technology (5G) deployment, Australia and New Zealand are rushing ahead with 5G - without addressing safety concerns. Simply put, 5G is untested for safety on humans and other species and the limited existing evidence raises red flags. The extra complexity of 5G and the serious safety concerns arise from multiple factors:

- 5G carrier waves are higher frequency microwaves (wavelengths in the mm range, hence called 'millimetre waves') hitherto used in limited applications such as radar and non-lethal weapons.
- Extremely complex modulation patterns involving numerous frequencies form novel exposures.
- Beam formation characteristics can produce hotspots of high unknown intensities.
- A vast number of antenna array will add millions of microwave transmitters and thereby greatly increase human exposure

This massive leap in human exposure to RF-EMR from 5G is occurring in a setting where the scientific evidence from radiofrequencies used so far (for 1G-4G, WiFi etc.) overwhelmingly indicates biological interference[3,4] –indicating the need to reduce exposure. It is concerning that leading experts in the field[5] hypothesised the possibility of thermal spikes (from beam forming 5G mm waves that transfer data with short bursts of high energy) causing tissue damage even after short exposures under the current exposure guidelines - putting children and some animals at an increased risk due to smaller body size. Even working within the entirely thermally-based current regulatory process, they pointed out 5G mm waves might cause damage to tissue and "may lead to permanent tissue damage after even short exposures, highlighting the importance of revisiting existing exposure guidelines"[5]. Microwave experts who have worked with the US Air Force have hypothesised on 'Brillouin Precursors' when beam forming fast mm waves create moving charges in the body which penetrate deeper than explained in the conventional models, and causing tissue damage.[6] Such effects of mm waves could have potentially devastating consequences for species with small body size and also creatures that have innate sensitivity to EMF, which include birds and bees.[7] Unfortunately, non-thermal effects and chronic effects are not being addressed at all in the current guidelines.[8]

We, scientists and medical doctors from Australia and New Zealand who have been conducting our own independent research on the health impacts of RF-EMR, would like to urge the Australasian Radiation Protection Society (ARPS) to take an active role to encourage investigation into this contentious issue. Australia and New Zealand have the world's highest and second highest cancer incidence rates out of 185 countries respectively.[9] Our region also has the highest rates of allergic immune diseases on a global scale.[10] When we examine the biological effects of RF-EMR presented in the scientific literature (ORSAA database is the largest categorised database of peer-reviewed studies on RF-EMR),[11] and applying the

Bradford Hill criteria, we find evidence suggesting a causal link with many chronic diseases, including cancer, cardiovascular disease, immune diseases and neurodegenerative diseases.[12-16] Moreover, it has been found that Australia has relatively high RF-EMR exposure levels.[17] Therefore, it is extremely concerning that no medical input has been made in the health risks assessment process on the part of government health departments.

We have previously pointed out that the health risk assessment used by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) is flawed after we analysed 1955 peer-reviewed studies (of which 68% showed biological effects) as well as ARPANSA's TRS-164 report.18-20 However, ARPANSA has simply rejected our claim without presenting any evidence to substantiate their position.[21] We are extremely concerned that ARPANSA continues to make assurances of safety about RF-EMR in general and also in regards to the new and untested 5G. This jeopardises the safety of Australians because the Australian health bodies/professionals solely depend on ARPANSA's advice. The situation in New Zealand is very similar. We urge ARPANSA and the respective health departments of Australia and New Zealand to present the primary scientific studies that can support their claims of safety for RF-EMR, and 5G in particular – to our knowledge they do not exist.

Strong claims of safety made by ARPANSA

A public information sheet published by ARPANSA in 2019[22] claimed that: "At exposure levels below the limits set within the ARPANSA safety standard, it is the assessment of ARPANSA and international organisations such as the World Health Organization (WHO) and the International Commission on Non-Ionising Radiation Protection (ICNIRP) that there is no established scientific evidence to support any adverse health effects from very low RF EME exposures to populations or individuals." It further stated: "Dr Ken Karipidis, Assistant Director of ARPANSA's Assessment and Advice Section is an expert on how radiation affects the human body."

The claim of "no established scientific evidence to support any adverse health effects" is rejected by several thousand peer-reviewed scientific studies[3] that have demonstrated biological/health effects: oxidative stress, DNA damage, mitochondrial/cell membrane damage, disruption of neurotransmitter levels, altered immune/endocrine functions, cancer initiation/promotion, some of which we highlighted in our previous papers.[18-20]

We find it intriguing that ARPANSA has made a health risks assessment without involving medical expertise. ARPANSA's in-house RF-EMR expert Dr. Karipidis has reported academic training in physics and epidemiology, while the International EMF Project at the WHO is headed by an electrical engineer with an apparent shortage of biomedical expertise within that unit as well as the NGO professional body they depend on for advice – ICNIRP.[20] The lack of clinicians and biomedical experts within the ARPANSA expert panel for TRS-164 (four individuals with academic training limited to physics, psychology and epidemiology) and their seriously questionable conclusions that we have previously pointed out, appear to mislead the Australian medical system. While physical scientists are able to read scientific studies and learn that RF-EMR exposure can alter the transcription of certain genes, alter levels of certain neurotransmitters, hormones, enzymes, cytokines, antioxidants etc, how do they interpret the significance of these biological effects in a health context without biomedical training and experience providing an in-depth knowledge of biology: including

biochemistry, physiology, and clinical medicine? A health risk assessment of this nature requires input from a large panel of multidisciplinary experts – particularly with biomedical backgrounds.

Similarly, the health risk evaluation of RF-EMR in New Zealand has been undertaken without medical expertise. A publication that questioned this risky approach by one of the authors (SP) was unilaterally retracted by the journal based on an anonymous complaint despite three thousand downloads in three months.[23] Further, the same author was denied an author response to a rebuttal of a publication in the New Zealand Medical Journal.[24] What is becoming apparent is that those who are trying to refute claims of safety by highlighting poor risk management philosophy, conflicts of interest, and inadequate expertise by government scientists, are being gagged.

Dr. Karipidis was advising Australian clinicians in an article[25] titled "What do GPs need to know about the new 5G network?" This report claimed "Dr Ken Karipidis, Assistant Director of the Australian Radiation Protection and Nuclear Safety Agency's (ARPANSA) Assessment and Advice Section, wants GPs and their patients to know there is no evidence to support the concern that 5G technology, which uses radio waves and emits low-level radiofrequency (RF) electromagnetic energy (EME), will cause harms to the public." We quote Dr. Karipidis in that report: "There's been a lot of research into whether radio waves cause adverse health effects, and the only established health effects of radio waves are very high power levels, where they raise temperature." This article further claimed: "While the increased presence of 5G base stations is often perceived negatively, Dr Karipidis has found this to be more of a psychological issue than a cause of genuine harm."

While our previous papers[18-20] alone provide ample scientific evidence for low-intensity non-thermal biological effects, refuting the obsolete notion that RF EMR causes thermal effects only ("raise temperature"), we now request ARPANSA to provide details of their research that found "a psychological issue than a cause of genuine harm". We understand that extensive research needs to be conducted to rule out biochemical, and physiological causes before suspecting a psychological origin underlying health complaints. To our understanding, such research has not been done by ARPANSA or any other body in Australia or New Zealand.

Furthermore, ARPANSA produced a separate public information sheet[26] titled "Misinformation about Australia's 5G network" in which they made a range of questionable claims of safety:

"*Higher frequency radio waves are already used in security screening units at airports, police radar guns to check speed, remote sensors and in medicine and these uses have been thoroughly tested and found to have no negative impacts on human health*."

"*ARPANSA and the World Health Organization (WHO) are not aware of any well-conducted scientific investigations where health symptoms were confirmed as a result of radio wave exposure in the everyday environment*."

We request ARPANSA to produce the scientific evidence from peer-reviewed literature that supports the above claim – that thorough testing of security screening units at airports, police radar guns, and remote sensors used in medicine has been conducted and found to have no negative impacts on human health. Given the chronic exposure scenarios expected with 5G microwaves for the entire population, unlike acute exposures with security scanners or limited occupational exposures of radar, establishing the evidence of safety is of paramount importance. We urge ARPANSA to publish a list of these studies confirming safety in

this journal for evaluation by the professional community in radiation protection in our region.

Contrary to the ARPANSA claims, when we examined the limited number of studies that investigated effects of mm waves (carrier waves of 5G), we found concerning evidence. When we searched for airport screening/radar safety studies we could not find a single Australian/New Zealand investigation. Studies from elsewhere appear to have mostly found evidence of biological impact. For example, a study by researchers at Shiraz University, Iran[27] published in 2013, but later retracted without an expressed reason, reported a high prevalence of neuro-behavioural problems in the occupationally exposed people significantly associated with their time at work. Their test cohort of airport radar personnel exposed to mm waves (14-18 GHz) revealed neurological, behavioural and cognitive problems despite being young (33 ± 6.8 years). We contacted the authors and they informed us that their publication was retracted due to pressure from the government authorities (that researchers would face litigation unless they withdrew the publication). Their findings were similar to a number of studies that have found adverse health effects in people exposed to radar.[28-30] Neurological problems (such as migraine, headache and dizziness) were found in exposed residential populations around military radar in a study in Cyprus with a dose response (worse closer to the radar towers).[28] However, the authors of this military-funded study attempted to attribute their findings to antenna visibility or aircraft noise without evidence to substantiate this claim and also ignoring a large body of evidence demonstrating that RF-EMR exposure can cause neurological symptoms. Moreover, researchers at University of Washington Medical Center had previously reported an increased risk of testicular cancer in personnel exposed to hand-held police radar units.[29]

We make a special note the findings of researchers at the Institute for Medical Research and Occupational Health of Croatia on people occupationally exposed to marine radar (including mm waves at 9.4 GHz) compared to those without such occupational exposure.[30] They found that exposure was associated with increased oxidative cell damage – including DNA damage and reduced antioxidant defence. They concluded: "Results suggests that pulsed microwaves from working environment can be the cause of genetic and cell alterations and that oxidative stress can be one of the possible mechanisms of DNA and cell damage." In 2017, we presented to ARPS (and ARPANSA) evidence from 216 peer-reviewed studies (89% of 242 studies from 26 countries) that found oxidative stress associated with RF-EMR exposure.[19] On the basis of that and the evidence of implication of oxidative stress in disease pathology,[31] we urged Australian authorities to take measures to reduce the exposure of people to RF-EMR to prevent deleterious effects on health from oxidative stress such as DNA damage, but our calls have been ignored/dismissed without counter-evidence.

In a quick investigation of the literature into the effects of mm waves, we extracted all the papers from the ORSAA database that mention millimetre waves in the abstract. Table 1 below compares the number of these papers that report significant biological effects for exposures versus those that report no effects versus those that are uncertain.

Study Outcome	Number of studies	Percentage of total
Effect	53	77.9%
No Effect	13	19.1%
Uncertain Effect	2	2.9%
Total	68	100%

Table 1: *Outcomes of publications investigating millimetre waves based on the ORSAA database.*

While there are no epidemiological studies on mm waves from Aust-NZ region, we would like to also highlight that the highest RF-EMR exposure source at the ABC's Toowong studios where a breast cancer cluster was identified (site now demolished) was also a mm wave source: "The THL RF Hazard control document[10] indicates that the most prominent RF source is the 7 meter satellite dish on the TV Building rooftop, operating at 14 Ghz. The three VHF Comms 3-metre antennae have high maximum power and operate between 168 and 172 MHz. Overall the RF sources on site cover a wide range of frequencies and power outputs."[32]

While acknowledging that sufficient data do not exist to draw conclusions, it cannot be ruled out that RF exposure, including the mm wave exposure, at the Toowong site, contributed to the development of those breast cancers (other disease statistics were not investigated) given that there is strong evidence linking RF-EMR exposure to cancer.[12-13]

Chief Medical Officer's statement

Recently the Chief Medical Officer of Australia, Prof. Brendan Murphy on behalf of the Australian Government's Department of Health issued a statement[33] on the safety of 5G. In this statement Prof. Murphy declared: "*I'd like to reassure the community that 5G technology is safe*." While it appears that the CMO is operating on the advice of ARPANSA, we would like to request the Department of Health to provide the list of studies that provide the scientific evidence for this claim of the safety of 5G. It would be appropriate to publish this evidence on the department's website for evaluation by anyone.

Australian Parliamentary Inquiry on 5G

Unlike the 2001 Australian Senate Inquiry on the health effects of RF-EMR,[34] the current Australian parliamentary inquiry on 5G has not addressed the potential health impacts of 5G deployment by calling on independent expert witnesses. Despite the vast majority of the 500+ submissions from the general public expressing concern about the potential adverse health effects, very little hearing time was allocated to investigating those concerns. Out of the total hearing time (1065 minutes), only 6% was allocated for opponents of 5G, while 91% was provided to proponents (based on our analysis of public hearings). Not a single medical expert was called upon as a witness. In an extraordinary move prior to the completion of the inquiry, the government announced that it would allocate $9 million of public funds to educate the public on 5G (and counter so-called "misinformation" warnings of detrimental health effects). Based on the scientific evidence we have collated and analysed, we are extremely concerned about the lack of independent and medical expertise in this area and the rush in Australia and NZ to deploy 5G without adequate safety testing.

Unfortunately, the questionable conduct of regulatory agencies such as ARPANSA and WHO's international EMF Project[35] with conflicts of interest due to funding links to the wireless industry remains to be investigated. While more open questioning and protests are appearing in Europe and North America, there is a strong media censorship on the 5G safety issue in Australia and New Zealand. In aforementioned regions, there is some level of engagement on the part of government bodies in response to warnings of adverse health effects of anthropogenic EMF/EMR by expert medical bodies[36,37] (despite industry opposition). The gagged situation in our region is a major blow to the evidence-based approach to health management, and science in general. As informed scientists and clinicians, we urge an open discussion on the safety of 5G in order to protect public health. Planetary electromagnetic pollution[38] is already excessive and it is impacting on the health and wellbeing of life on Earth. Therefore, the plan to deploy

30,000 satellites in space and millions of 5G transmitters on Earth without any formal health or environmental assessments is both reckless and negligent.

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