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### **The new Australian standard for protecting workers from occupational exposure to radiofrequency radiation**

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**Introduction:** Workers in various industries are often exposed to radiofrequency (RF) radiation at levels much higher than what's encountered in the every-day environment. To protect workers from the harmful effects of RF radiation, the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) published a national RF exposure standard in 2002. Since then, there has been a considerable body of science further addressing the relation between RF radiation and adverse health effects.

**Material and Methods:** ARPANSA developed a new RF exposure standard by assessing the latest evidence on the effects of RF radiation and examining new guidelines on limiting exposure published by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) in 2020. ARPANSA also consulted with various stakeholders including relevant industries in developing the new standard.

**Results:** In February 2021, ARPANSA published a new RF exposure standard to protect workers and the general public. The new Australian standard has adopted the exposure limits of the 2020 ICNIRP guidelines and it includes specific requirements for the management of risk to workers. Australia is one of the first countries in the world to harmonize with the updated ICNIRP guidance. **Conclusions:** The exposure limits in the new Australian standard protect workers from all scientifically substantiated adverse health effects of RF radiation. It can be used by industry to manage risk in different settings and regulatory authorities for controlling occupational RF exposure.

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### **The Development of Mobile Communication System and Human Health Risks**

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The introduction of new 5G communication networks may change the current electromagnetic environment. 5G mobile networks will transmit 35% of the total traffic and can cover up to 65% of the world's population in 2024. EMF are health risk factor: under occupational, general public exposure, and by electromagnetic field (EMF) emitters' use. The problem of occupational and general public electromagnetic safety due to 5G communication systems implementation is very important. Mobile communication system development leads to frequency ranges elevation (from 450, 850-900 and 1,800-2,100 MHz at 1-3G, up to 2.6 GHz at 4G standard and up to 10-40.5 GHz at 5G standard) without enough 2-5G EMF exposure human health risks data. The development of 2-5G EMF risk problem management includes: the need to improve hygienic regulations; new methods of EMF control enhancements suitable for new frequency rangers, cellular standards, widespread radio channels, beamforming technology; as well as study of new risks (connected to new EMF sources) in order to assess and reduce the likelihood adverse effects. It is very important to carry out experimental studies directed to find the possible biological effects of

current and future mobile communication standards EMF frequency ranges. Carried out comparative study directed to assessment of 2-4G and 5G EMF chronic exposure biological effects, as well as the new base station EMF exposure assessment pilot study results allowed the prospective direction of occupational and general public electromagnetic safety directions under 5G mobile communication system development.

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### **A systematic review on occupational exposure to radiofrequency electromagnetic fields and risk of cancer: preliminary results from an Italian research project**

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**Introduction:** The aim of the systematic review (SR) is to evaluate available scientific evidence from human studies on the possible associations between occupational exposure to radiofrequency (RF) electromagnetic fields (EMF) and risk of cancer.

**Methods:** The SR is part of the Italian research project BRIC 2018 – ID 06, supported by INAIL (PROSPERO code: CRD42020200202), and is conducted according to PRISMA statements. All the studies on workers with documented occupational exposure to RF-EMF (frequency range: 3 kHz - 300 GHz) and medical diagnosis of cancer are considered for inclusion. Original research published in English language in peer-reviewed international journals are included, with no restriction for publication period.

**Results:** According to a preliminary evaluation of SR results, the studies have been focused on different types of cancer, including brain tumors and various other. A major problem is that, with the exception of a few studies applying a detailed exposure assessment based on individual RF exposure data, in the large majority of the studies the evaluation of occupational RF-EMF exposure is affected by various types of bias. Moreover, in many of the job categories enrolled in the studies, a co-exposure to other occupational carcinogens is expected, potentially affecting the overall results.

**Conclusions:** The SR is still ongoing, but preliminary results suggest that the heterogeneity of the available studies, both considering job categories and outcomes evaluation, as well as various bias in the exposure assessment, limits the possibility of a pooled quantitative synthesis of the studies' results.

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### **Measurement of leisure time solar ultraviolet exposure - Further step to better understanding the mechanisms of skin cancer**

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