

## Executive summary

The present CCARS report conducts a comprehensive review of the scientific evidence regarding the potential effects of radiofrequency electromagnetic fields (RF-EMF) on human health during the period from 2020 to 2022. This work updates previous reports and reaffirms the absence of conclusive evidence of health risks within the limits established by regulations and guidelines, such as those of the ICNIRP.

In this edition, a diverse methodological approach has been adopted across different chapters. For the first time, the evaluation of literature through a systematic review following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol has been included in chapters related to personal exposure and risk perception studies. In the chapters on in vivo and in vitro studies, as well as clinical and epidemiological studies, methodologies similar to scope reviews have been used, given their breadth and complexity.

In the field of personal exposure to RF-EMF and 5G environments, the report highlights the heterogeneity of methodologies and measurements. Studies ranging from urban areas to hospitals have been analysed, using tools such as spectrum analysers and personal exposimeters. Although exposure levels remain below the recommended limits, complying with the regulations in each case, there is notable variability in methodologies and records, highlighting the need for a more homogeneous approach for more accurate assessment.

In the area of experimental in vivo and in vitro studies, significant progress has been made in understanding the potential effects of RF-EMF, including aspects such as carcinogenesis and genotoxicity. The results of these studies are varied, and some are inconclusive, indicating that most do not show significant negative effects on human health at usual exposure levels.

Clinical and epidemiological studies have not reported significant changes in health effects compared to previous reports. Although variations in the incidence of certain tumours (nervous system, thyroid, etc.) have been observed, to date a direct relationship with the use of mobile telephony has not been established and could be due to other factors such as improved diagnosis, follow-up, aging of the population, other environmental factors, etc. Electromagnetic hypersensitivity continues to be a topic of interest but lacks clear evidence of a causal relationship with RF-EMF exposure and is not recognized as a disease by health authorities.

International agencies and committees maintain that, according to current knowledge, there is no proven link between RF-EMF exposure and significant health risks, as long as the regulations and recommendations of competent institutions (WHO, EU, ICNIRP, etc.) are respected. However, as in any other area of human activity, it is relevant to continue researching, especially with regard to emerging and widely used technologies such as 5G.

The report also highlights the relevance of long-term studies and ongoing international projects, such as the COSMOS Study and WHO projects, which are fundamental to achieving international scientific consensus. In addition, updates to the ICNIRP 2020 guidelines are addressed, and the regulations and norms applicable in various contexts are analysed.

Finally, the report examines the perception of risk associated with RF-EMF, highlighting the influence of subjective and psychological factors. The need for effective communication strategies based on scientific evidence to address public concerns is emphasized.

In conclusion, this CCARS report provides a comprehensive and updated overview of RF-EMF studies and their potential effects on human health, highlighting the importance of ongoing and rigorous research. From the evaluation of the state of science and considering all the studies analysed, it can be deduced that no significant adverse effects on human health are identified, and the need to maintain constant monitoring and evaluation of all mobile telecommunications technologies, including 5G, is emphasized. International collaboration and scientific consensus will be essential to inform future public health policies and safety recommendations.”