

Exposure to high-frequency electromagnetic fields at work not associated with brain tumors

July 31 2018



Westerbork radio telescope. Credit: Tim van der Kuip

No clear associations were found between occupational exposure to high frequency electromagnetic fields (EMF) and risk of glioma or

meningioma in one of the largest epidemiological studies performed to date. However, the findings highlight the need for further research on radiofrequency magnetic fields and tumour promotion, as well as possible interactions with other frequencies and with chemicals.

High-frequency [electromagnetic fields](#) are a form of non-ionising radiation and comprise intermediate frequency (3kHz-10MHz) and radio frequency (10MHz-300 GHz). Based on limited animal and epidemiological evidence, they were declared by WHO's International Agency for Research on Cancer (IARC) in 2011 as possibly carcinogenic to humans, but few recent studies have provided evidence regarding [exposure](#) at work. "This is the largest study of brain tumours and occupational high-frequency EMF exposure to date," explains senior author Elisabeth Cardis, head of the radiation programme at ISGlobal.

The researchers developed a source-exposure matrix based on measurements collected from the literature for EMF sources reported by the study participants. With this tool plus detailed individual data, they estimated individual RF and IF exposure at work and analysed the possible association with risk of glioma or meningioma, two of the most frequent [brain tumours](#) in adults. The INTEROCC study, performed under the umbrella of INTERPHONE and supported by the European project GERoNiMO, comprised 2,054 glioma cases, 1,924 meningioma cases and 5,601 controls from seven countries. Occupational sectors that involved exposure to electromagnetic fields included working with or near radar or telecommunication antennas, medical diagnosis and treatment equipment, and microwave drying ovens, among others.

Despite the major improvements in estimating exposure, this large case-control study provided no clear evidence for a positive association between cumulative high-frequency EMF exposure and glioma or meningioma risk. However, the number of exposed participants was small: only 10 percent of the participants were exposed to radio

frequencies and less than 1 percent were exposed to intermediate frequencies, which limited the statistical power to find clear associations, if they exist.

"Our individualised exposure assessment approach is an important improvement over previous efforts to assess high-frequency EMF exposure risks. Although we did not find a positive association, the fact that we observed indication of an increased risk in the group with most recent radio [frequency](#) exposure deserves further investigation," explains first author Javier Vila.

"We also need to investigate possible interactions with other frequencies, and with chemicals," adds Cardis.

More information: Javier Vila et al, Occupational exposure to high-frequency electromagnetic fields and brain tumor risk in the INTEROCC study: An individualized assessment approach, *Environment International* (2018). [DOI: 10.1016/j.envint.2018.06.038](https://doi.org/10.1016/j.envint.2018.06.038)

Provided by Barcelona Institute for Global Health (ISGlobal)

Citation: Exposure to high-frequency electromagnetic fields at work not associated with brain tumors (2018, July 31) retrieved 26 April 2024 from <https://medicalxpress.com/news/2018-07-exposure-high-frequency-electromagnetic-fields-brain.html>

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