Exposure of European children to electromagnetic fields is below the maximum levels

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Children in Europe are exposed to higher levels of radiofrequency electromagnetic fields (RF-EMF) in cities, but the total average exposure remains well below the limit reference values. These are the main conclusions of a study led by the Barcelona Institute of Global Health (ISGlobal), an institution supported by "la Caixa" Foundation and published in *Environment International*.

In recent decades, new mobile communication technologies have been developed and are rapidly evolving. Today, they represent the main source of RF-EMF to which the population is exposed. There is growing concern regarding possible adverse health effects of long-term exposure to RF-EMF, particularly at a young age when organs and the brain are still developing. Therefore, studies characterizing RF-EMF exposure in children are a priority for the World Health Organisation.

The goal of this study was to measure the environmental exposure to RF-EMF in 529 children between eight and 18 years of age in five European countries: Denmark, the Netherlands, Slovenia, Switzerland and Spain, between 2014 and 2016. Personal exposure measures to RF-EMF (ranging between 87.5 MHz and 6 GHz) were collected using portable "exposimeters" carried by the children for up to three consecutive days. The meters were worn around the waist or carried in a backpack during the day and placed close to the bed at night. In addition, the use of handheld devices (eg. mobile phones) and indoor RF-EMF sources was determined by activity diaries and questionnaires. Six types of frequency bands were defined: total and those related with cordless phones; television and radio antennas; mobile phones; mobile phone antennas (also known as base stations); and WiFi.

Results show that the average total personal exposure was 75.5 microWatts per square meter (?W/m2), a value well below the reference levels of 4.5 to 10 W/m2 established by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). Mobile phone antennas contributed the most to the total exposure, followed by television and radio antennas (mainly FM radio frequency). WiFi and cordless phones contributed very little. Overall, exposure was higher in urban environments, outdoors, while traveling, and during the day (versus night).

Mònica Guxens, senior author of the study, says, "We are not measuring doses that the child receives, for example, by holding a mobile phone next to the head during a call, and which are likely to be higher."

The results also indicate that measurements for total environmental exposure, television and radio antennas, and mobile phone antennas bands were reproducible from one year to another. Laura Ellen Birks, ISGlobal researcher and first author of the study, emphasizes that, "scientists need to continue assessing RF-EMF exposure in children as the use of devices and the sources are likely to vary with the coming years."

More information: Laura Ellen Birks et al, Spatial and temporal variability of personal environmental exposure to radio frequency electromagnetic fields in children in Europe, *Environment International* (2018). DOI: 10.1016/j.envint.2018.04.026

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