



Non-Ionizing Radiation & Children's Health

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POSTER

PLATFORM PRESENTATION

French children exposure to 50 Hz magnetic fields

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One of the persistent questions about electromagnetic fields and health is the statistical association in the epidemiological studies between ELF magnetic fields and increased risk of childhood leukaemia, without causal relationship. This has led to the IARC classification as IIb for ELF magnetic fields for children mean exposure higher than $0.4 \mu\text{T}$ over 24 h. Few data were available about population exposure in France, that is why the Health Ministry initiated a study about the personal exposure of the French population to 50 Hz magnetic fields, in order to quantify, but also to study the main sources of exposure.

The study aimed to measure personal exposure of 1000 children (0-14 years) and 1000 adults. The protocol consisted in measuring the ELF magnetic field at the closest point of the subject during 24 h with an EMDEX II meter (ENERTEC, USA), and in collecting all useful data to analyse these measurements, such as electric appliances at home, electric networks close to home, etc. It is important to note that the subject is wearing the EMDEX during the whole day, and so the magnetic field is measured during all activities and not only at home. The recruitment of subjects (based on random selection over all France) and the collection of data was done in 3 winter periods by MV2, a pool institute. RTE and ERDF (grid network operators) gave the characteristics of electric networks close to each address, from low voltage to 400 kV, including the train network and substations. The statistical analysis of results was done by SUPELEC, a French school of engineers.

The database includes 977 children. The mean exposure is $0.09 \mu\text{T}$ (arithmetic), and $0.02 \mu\text{T}$ (geometric). The proportion of children with an arithmetic mean higher than $0.4 \mu\text{T}$ is 3.1% over 24 h (but this does not probably reflect personal exposure), and 1.1% out of the period of sleep. The sources of these exposures and the interpretation in term of personal exposure will be discussed.

We used rank tests to compare subpopulations of the database. One of the results is that children are less exposed than adults.

We defined variables from all collected data, in order to characterize the mean exposure, but the results showed that it is not possible from these variables to build a predictive model of the exposure.