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French population exposure to 50 Hz magnetic fields : first results in Ile-de-France and Rhône-Alpes regions

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In 1979, a study indicated that childhood cancers might be linked to extremely low frequency (ELF) magnetic field (Wertheimer, 1979). Leaning on numerous epidemiological studies, the International Agency for Research on Cancer classified in 2001 ELF magnetic field as "possibly carcinogenic to human". These conclusions were based on a statistical association found in some epidemiological studies, unconfirmed by experimental results, between childhood leukaemia risk and a mean exposure over 24h higher than $0.4\mu\text{T}$. The French population exposure to 50Hz magnetic field is not known. The exposure inside houses near power lines was assessed in the Côte-d'Or department (Clinard, 2004). But it was the buildings' exposure and not the persons' one. So the "Direction Générale de la Santé" (French Health Ministry) initiated a study on the French population exposure, named EXPERS. This communication gives preliminary results of the first measurement campaign in the Ile-de-France and Rhône-Alpes regions.

A sample of 551 voluntary persons has been randomly taken from telephone lists. Each one has worn an EMDEX II (Enertech, USA) recording magnetic field (MF) each 3 s during 24h, has filled a timetable corresponding to the time of measurement and a questionnaire with informations on his socioprofessional data and on his house.

We present here results on 458 persons, which can be split into 209 children (0-14 years) and 249 adults. The other have been withdrawn from this analysis because their measurements were not corresponding entirely to their exposures. The observed arithmetic and geometric means are respectively $0.05\mu\text{T}$ and $0.03\mu\text{T}$ for children, $0.08\mu\text{T}$ and $0.04\mu\text{T}$ for adults.

Two aspects of the exposure have been particularly studied:

- the search for the most discriminating MF descriptors from a hierarchical clustering classification followed by CART method (Classification And Regression Tree). This led to a distribution of the persons into two groups. The most discriminating chosen descriptors are the arithmetic mean, the geometric mean and the median.

- the identification, by linear and logistic regression methods, of the factors that lead a person to be more exposed.

These factors are:

- o for children: to live in a building

- o for adults: to live in a city with more than 2.000 habitants, to spend time in rail transport and in shopping centers.

From the house addresses, the transmission and distribution system operators (RTE and ERDF) will indicate the presence of electric installations.

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