



# Non-Ionizing Radiation & Children's Health

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POSTER

PLATFORM PRESENTATION

## Examples of children's exposure to ELF magnetic fields

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### Background

In everyday life, children are exposed to ELF-MF in many situations, and from various sources. In this paper we present examples of ELF-MF levels measured in various research projects in Finland and in Italy. The aim of the paper is to analyze common children's exposure situations, to find out the sources possibly relevant in practice.

### Examples of MF exposures

An example of circumstance involving an exposure to ELF-MF in children is walking near/under power line cables: under 400 kV power lines the maximum (max) MF measured was 8.2  $\mu\text{T}$  (21 lines, measurement height 1m), while under 110 kV power lines it was 2.3  $\mu\text{T}$  (10 lines, height 1m) and above 110kV underground cables 5.0 $\mu\text{T}$  (7 cables, height 0 m) and 1.7  $\mu\text{T}$  (7 cables, height 1 m). Other important sources of children' exposure in the buildings are the electrical system and devices. In apartments the max exposure was usually above 0.4  $\mu\text{T}$  (8 apartments, height m), but in apartments above the indoor distribution, the average (max) exposure resulted 6.5  $\mu\text{T}$  (13 distributions, height 0 m from floor), and in the detached house 0.1  $\mu\text{T}$  (one house, 1 m). In the kitchen, the MF levels resulted 0.3-0.5  $\mu\text{T}$  (height 1.0-1.7 m, distance 0.2-0.3 m), and 2.5-4.2  $\mu\text{T}$  (height 1.0-1.7 m, distance 0.4 m) respectively in front of oven and of microwave oven. All reported data are from spot measurements obtained with instantaneous rms meters.

Using dosimeters, in Italy, the median TWA exposure at home, measured in 513 subjects, resulted 0.03  $\mu\text{T}$  (5°-95° percentiles: 0.01-0.24  $\mu\text{T}$ ); these levels are most likely representative of the exposure of children living in the same houses. In an ice hockey match, the MF max exposure was 2.8  $\mu\text{T}$ , in an amusement park 0.9  $\mu\text{T}$ , when travelling (train/boat/car) 1.7  $\mu\text{T}$ , and when running 0.8  $\mu\text{T}$ . The exposure in kindergartens was evaluated in Italy: in 10 teachers the arithmetic mean of TWA personal exposure, based on 3 school-days, presumed as being identical to exposure in children of the same school, was 0.02  $\mu\text{T}$  (SD 0.01), the geometric mean 0.008 $\mu\text{T}$ .

### Conclusion

Even if ELF-MF exposure in children is usually low, various common situations were identified inducing levels easily exceeding 0.3- 0.4  $\mu\text{T}$ , such as being near power lines, cables, electrical systems and some devices at home (e.g., the microwave oven), and in various other situations, such as amusement parks. Levels induced by other sources, like medical equipment (e.g. in cribs, etc.) and also toys and trams should be analyzed more thoroughly.