

# Power-frequency magnetic fields and childhood brain tumors: a case-control study in Japan.

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## Abstract

### BACKGROUND:

The strength of the association between brain tumors in children and residential power-frequency magnetic fields (MF) has varied in previous studies, which may be due in part to possible misclassification of MF exposure. This study aimed to examine this association in Japan by improving measurement techniques, and by extending measurement to a whole week.

### METHODS:

This population-based case-control study encompassed 54% of Japanese children under 15 years of age. After excluding ineligible targeted children, 55 newly diagnosed brain tumor cases and 99 sex-, age-, and residential area-matched controls were included in the analyses. The MF exposures of each set of matching cases and controls were measured in close temporal proximity to control for seasonal variation; the average difference was 12.4 days. The mean interval between diagnosis and MF measurements was 1.1 years. The weekly mean MF level was defined as the exposure. The association was evaluated using conditional logistic regression analysis that controlled for possible confounding factors.

### RESULTS:

The odds ratios (95% CI) for exposure categories of 0.1 to 0.2, 0.2 to 0.4, and above 0.4 microT, against a reference category of <0.1 microT, were 0.74 (0.17-3.18), 1.58 (0.25-9.83), and 10.9 (1.05-113), respectively, after adjusting for

maternal education. This dose-response pattern was stable when other variables were included in the model as possible confounding factors.

## **CONCLUSIONS:**

A positive association was found between high-level exposure-above 0.4 microT-and the risk of brain tumors. This association could not be explained solely by confounding factors or selection bias.

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