THE AUTHORS REPLY

In Dr. Milham’s comments about our recent pooled analysis of studies of extremely low-frequency magnetic fields and childhood brain tumors, he misrepresented our findings when he said, “If extremely low-frequency magnetic fields have no effect on childhood brain tumor incidence as the authors claimed . . .” (1, p. 360). As he noted, what we actually concluded was, “These results provide little evidence for an association . . .” (2, p. 752).

His approach to identifying patterns in the data was to count odds ratios above and below 1.0. Dr. Milham then used the sign test, which assumes independent observations. The odds ratios reported in Table 4 of our original article (2) were in fact highly dependent, as they were all computed on the same data set by using the same statistical model. They differed mainly in the control covariates included. Hence, the independence assumption was violated, and the sign test was therefore not a valid procedure. Dr. Milham’s results are simply a reflection of the fact that in this particular data set, the odds ratio for the ≥0.4-μT exposure category versus the <0.1-μT exposure category tended to be slightly above 1 and the odds ratio for the 0.1- to <0.4-μT exposure category versus the <0.1-μT exposure category tended to be slightly below 1, a pattern that could easily have been due to chance, misclassification, or bias. Using Dr. Milham’s method, any authors could make their findings statistically significant with an arbitrarily small P value simply by increasing the number of analyses performed on the same data.

A sign test that is based on which side of the null value the odds ratio falls ignores important information that is available on the strength and consistency of the associations. The purpose of the pooled analysis is to examine the cumulative data fully, and this is a vast improvement over summaries of the nature he used.

Although it is possible that there is genuinely a reduced odds ratio between 0.1 and 0.4 μT and an increased odds ratio above 0.4 μT, in our view, the absence of a monotonic exposure-response relation is one of the factors that indicates that the association may not be a causal one. It was consideration of this and other factors discussed in our article that led to our measured conclusion that the results provided little evidence of an association between extremely low-frequency magnetic field exposure and childhood brain tumors.

ACKNOWLEDGMENTS

Conflict of interest: none declared.
REFERENCES


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DOI: 10.1093/aje/kwq414; Advance Access publication December 24, 2010