
RE: "CELLULAR PHONES, CORDLESS PHONES, AND THE RISKS OF GLIOMA AND MENINGIOMA
(INTERPHONE STUDY GROUP, GERMANY)"

The findings recently published by Schüz et al. (1), similar to all of the Interphone Study results published to date, have several serious problems. For one thing, in their core findings, the authors report no risk of glioma or meningioma from "regular" use of cellular telephones ("regular" use being defined as at least one incoming or outgoing call per week for 6 months or more), yet there is more than a doubling of glioma risk after more than 10 years of cell-phone use (odds ratio (OR) = 2.2, 95 percent confidence interval (CI): 0.94, 5.11). In addition, among women, they found close to a doubling of the risk of high-grade glioma from "regular" cell-phone use (OR = 1.96, 95 percent CI: 1.10, 3.50). Given the specific problems of the study—all of which would produce underestimation of brain tumor risk—these findings are ominous.

There are three main problems with this study. First, the definition of a "regular" cell-phone user was so minimal that almost all "regular" cell-phone users would not be expected to be at risk, even if cell-phone use were found to create very high risks of glioma and meningioma. As for longer periods of "regular" cell-phone use, Schüz et al. reported that only 14 percent of the glioma cases and 6 percent of the meningioma cases had used a cell phone for 5 years or more; for 10 years or more, the percentages were 3 percent and 1 percent, respectively (1).

To understand that "regular" cell-phone use as defined in this study was so minimal that *risk ought not to be expected*, even if there are high risks of glioma and meningioma from

cell-phone use, consider a hypothetical study of smokers and lung cancer risk. Would we expect to find a risk of lung cancer (which is a high risk among smokers) for smokers who had smoked once a week for 6 months or more, with only 12 subjects (3 percent) having smoked for 10 years or more?

Second, there is a strong possibility of selection bias. Approximately 30.5 percent of Schüz et al.'s controls refused to participate in the study, as compared with only 4.8 percent of glioma cases and 4.9 percent of meningioma cases (1). If a higher proportion of controls who participated—compared with controls who refused participation—used a cell phone, then any risk would have been underestimated. This result—an underestimated risk—seems to be at play in this study.

Such selection bias may explain why the papers by Hardell et al. on the risks of glioma (2) and meningioma (3) reported such diametrically different results. Participation rates were 88 percent of cases and 84 percent of controls in the former study (2) and 88 percent of cases and 89 percent of controls in the latter study (3), and those studies showed larger risks than the Schüz et al. study. For example, Hardell et al. found a high risk of high-grade astrocytoma (OR = 4.5, 95 percent CI: 2.0, 10) for more than 10 years of digital cell-phone use in the glioma study (2), as compared with Schüz et al., who found a much smaller risk of glioma (OR = 2.20, 95 percent CI: 0.94, 5.11) for more than 10 years of cell-phone use (1).

Third, substantial funding for this study, as for all of the Interphone studies, comes from the cell-phone industry, with a resultant but undeclared conflict of interest. Although the authors report that this funding “was governed by agreements that guaranteed Interphone’s complete scientific independence” (1, p. 519), it seems doubtful that this “guaranteed scientific independence” is possible. Researchers’ careers are dependent on receipt of research grants. Even with isolation of funding for a specific study from the researchers themselves, the conflict of interest in such funding is not resolved. Because the researchers know whence their funding has come, the old adage “Don’t bite the hand that feeds you” becomes the effective psychological reality (whether conscious or unconscious).

Friedman and Richter (4) explored this concern by reviewing conflict-of-interest problems among studies published in the *New England Journal of Medicine* and the *Journal of the American Medical Association* during 2001. They found a strong association for studies whose authors had an economic conflict of interest and also reported positive findings ($p < 0.001$, equivalent to greater than 99.9 percent confidence) (4).

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REFERENCES

1. Schüz J, Böhler E, Berg G, et al. Cellular phones, cordless phones, and the risks of glioma and meningioma (Interphone Study Group, Germany). *Am J Epidemiol* 2006;163:512–20. (Advance Access publication January 27, 2006).
2. Hardell L, Carlberg M, Mild KH. Case-control study of the association between the use of cellular and cordless telephones and malignant brain tumors diagnosed during 2000–2003. *Environ Res* 2006;100:232–41.
3. Hardell L, Carlberg M, Hansson Mild K. Pooled analysis of two case-control studies on the use of cellular and cordless telephones and the risk of benign brain tumours diagnosed during 1997–2003. *Int J Oncol* 2006;28:509–18.
4. Friedman LS, Richter ED. Relationship between conflicts of interest and research results. *J Gen Intern Med* 2004;19:51–6.

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