

## Summary of Key EMF Epidemiologic Research – Executive Summary

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A total of 38 researchers or teams (35 individuals and three teams of two each) from 12 nations were interviewed between September 2003 and March 2004 by telephone, in person at the European Bioelectromagnetics Association Congress in Budapest, or, in a few cases, by e-mail. Most respondents were epidemiologists, medical doctors, or physicists.

Of the 38 researchers or teams interviewed in this survey, 19 have at least one epidemiologic study of extremely low frequency (ELF) electric and magnetic fields (EMF) ongoing or planned. Half of the studies take place in occupational settings, and half in residential settings. Six or seven of the studies explore EMF exposure and childhood leukemia risk. Among the planned adult occupational epidemiologic studies, the endpoint most often mentioned was cancer, followed by cardiac or heart-rate variability (HRV) effects, depression, amyotrophic lateral sclerosis (ALS) and Alzheimer's disease, acoustic neuroma, and reproduction.

A slight majority of the respondents to this survey felt that a new study of childhood leukemia risk among relatively highly exposed ( $> 0.3$  or  $0.4$  microtesla) children is needed. Those who felt that more epidemiologic work is needed to test the magnetic field–childhood leukemia association further did not agree on the form this might take. Many acknowledged the lack of a bias-free strategy for identifying larger numbers of highly exposed subjects. On the other hand, of those respondents who felt that such a study would not be informative, a few said that “a bright new idea” could change their minds. For example, a breakthrough in defining “dose” would be persuasive for some. Others suggested that investigating methodological questions (for example, exploring selection bias in existing studies) and sources of high exposure would be more productive than launching a new epidemiologic effort.

Responses to questions about contact current as a possible exposure of interest in childhood leukemia research revealed that the hypothesis is not yet universally understood. Of the 38 researchers who responded, 10 had not heard of the contact current hypothesis or knew too little about it to offer an opinion. Five more were aware of the theory but had no opinion on it. Of the remaining 23, a little more than half (mostly from the United States) believed that the concept is worth pursuing.

In this survey, 14 respondents said that they did not know enough about the HRV hypothesis to comment, or were aware of it but did not have an opinion on the usefulness of further study. Of the remaining 24, slightly more than half pointed out that recent studies have not offered evidence for the HRV hypothesis, diminishing their interest in further study.

An open-ended question gave respondents an opportunity to identify any topic related to ELF-EMF that they might choose to study if limitations (of funding and time, for example) were not a concern. Fifteen respondents, the most to agree on any one approach, said that they would undertake further epidemiologic research on ELF-EMF and childhood leukemia risk after finding a way to gain access to residentially highly exposed populations, or a way to test a new hypothesis. Three respondents specified research on selection bias in childhood leukemia studies. Eight respondents asserted that the next steps should be concerned with adult disease, while seven others were most interested in the replication of key laboratory studies. Three specifically mentioned that they would like to assess contact current exposure to test that hypothesis.

Based on responses regarding ELF-EMF public health policy, it is clear that researchers are most concerned about the European Parliament's pending decision on whether to adopt a directive on worker safety. Elsewhere in the world, few, if any, policy changes on ELF-EMF exposure are expected.

Finally, when asked to name the top EMF issue for public health today, a majority identified mobile phones or mobile phone base stations. Respondents noted that they did not necessarily give this response because of scientific evidence, but rather because of public concern and the large number of people exposed.