Hail and Farewell
NIOSH's Joe Bowman Dies at 73

An Expert on Exposure Assessment, He Never Gave Up

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Members of the EMF/RF research community are not known as risk takers. Some have sold their souls, but most simply follow the prescribed dogma: They keep a low profile and eke out a grant or contract here and there.

In this environment, original ideas are rare and greeted cautiously. Just last week, a well-known researcher came up with a new and possibly significant finding. The closing paragraph of the paper reads almost like an apology. It's not conclusive, it needs replication, interpret with caution, he warned. Yes, of course, it's a new hypothesis.

Joe Bowman, who died on July 14, was different. As one colleague told me on hearing the news last week, "Joe was honest and he had guts." These are two qualities in very short supply in the world I cover. Importantly, Joe knew what he was doing. His expertise was exposure assessment, a critical part of epidemiology.



Joe Bowman

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Joe spent most his career at the National Institute for Occupational Safety and Health (NIOSH) in Cincinnati, joining the agency in 1978, a few years after earning his doctorate in physical chemistry from the University of Wisconsin. He left for the University of Southern California in 1984 but came back to NIOSH in 1991 and stayed.

While at USC, Joe worked on what became known as the Peters-London study. It was a repeat of the Savitz study, which in turn was a repeat of the Wertheimer-Leeper study —the one that first made the connection between power lines and childhood leukemia. The USC study would have better exposure assessment, which meant collecting lots of data on EMF exposures from all sorts of sources. That was Joe's responsibility.

The Peters-London study came out in 1991 and it too showed an EMF link to childhood leukemia. But there were complexities and uncertainties that begged explanation. Joe kept working and came up with some provocative results. In 1995, he published a hypothesis paper showing that the association with leukemia became stronger when the Earth's magnetic field was taken into account. (See: "Bowman's Brave New Theory of Geomagnetic Resonances.")

"Bowman has struck boldly, like a swashbuckling scientist," Abe Liboff, the former coeditor of *Electromagnetic Biology and Medicine,* told us back then. "He deserves a lot of credit for looking at the Earth's magnetic field in the context of epidemiology." No one followed up.

A few years later, Joe and Duncan Thomas at USC published some further analyses of the USC data and offered some new inferences. The link was definitely there, but something was still missing —an as yet unidentified exposure metric. No one followed up.

Over the last 20 years, Joe worked on a number of other projects at NIOSH but his focus remained on trying to explain what was going on with EMFs. He participated in the Interphone and INTEROCC projects. Over time, NIOSH lost interest in EMFs and it became more and more difficult for Joe to pursue that missing metric.

A Last Letter to the Editor

Then, last year, an EPRI group headed by Leeka Kheifets published a follow-up study in *Cancer Causes & Control.* It's a most peculiar piece of work. It's another study on childhood leukemia; Kheifets, a former EPRI employee, broke no new ground, indeed she went in the opposite direction. The exposure assessment was limited to a *single* source of EMFs, high voltage transmission lines. Everything else was ignored, including distribution lines, often a major contributor to total EMF exposure. She did not find much, or as she put it, no "clear evidence" of a leukemia risk among children from power lines.

Joe was in a quandary. He did not have permission to make a public comment from NIOSH management, and yet he could not let this pass without comment.

In May, a letter appeared in the journal in response to the Kheifets paper. It attempted —very politely— to set the record straight. Here's how it began:

> "In a case–control study of childhood leukemia and residential magnetic fields (MF) in California, Kheifets and colleagues recently reported a weak non-significant association from an exposure evaluation that only included high-voltage transmission lines (HVTL). However, our 1999 paper reported a significant association in a study of Los Angeles County, California's largest metropolitan area, with similar methods applied to all types of electric lines near a subject's residence. By comparing these two studies, the relative merits of the MF exposure assessment methods and risk estimates can be assessed, providing lessons for future epidemiologic studies of residential MF carcinogenicity."

Near the end, the letter explained why this was so important:

> "With these methodologic innovations, our study found significant associations with childhood leukemia with residential MF > 0.125 μT [1.24 mG] well below the 0.4 μT [4 mG] which the WHO found to be the lower limit on childhood leukemia risks in a meta-analysis."

The letter was signed by USC's Duncan Thomas. But his coauthor was missing. "Joe was the ghost writer of the letter," Thomas told me. "He wrote the first draft and then we worked together to finalize it."

Thomas went on to say that Joe had hoped that somebody would take an interest and mine the huge EMF database that he had assembled. Joe himself planned to spend some of his remaining time doing just that.

When I last spoke to Joe, he said that his doctors had given him about another year or two to live and he would use that time to see if he could make some more progress. Sadly, his cancer was much more aggressive than anyone predicted; within a few weeks he was gone.

We talked about that letter as well as another paper that Kheifets and an all-star cast of coauthors had just published in the *British Journal of Cancer.* "What was the point?" I asked him. "Just muddying the water," he replied.

Joe Bowman, Duncan Thomas, Leeka Kheifets, NIOSH, EPRI, ELF EMFs, childhood leukemia, cyclotron resonance, Abe Liboff,

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