

**John Bailar  
1932-2016**

*Remarks by Miron L. Straf  
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John Bailar had a remarkably distinguished career. His research so changed the prevailing views of cancer that, in one way or another, it affected most of us.

Adam Grant's book, *Originals*, describes how it is that non-conformists move the world. John Bailar was a non-conformist. Often a contrarian, he challenged the status quo, but always with sound statistical science. In doing so, he moved the world of cancer oncology.

A funny thing happened to John on his way to obtaining a medical degree and becoming a doctor: he became a statistician. His medical dissertation under Colin White at Yale was on a challenging problem of medical statistics. Following his medical internship, he went to the National Cancer Institute and later obtained his Ph.D. in statistics from American University, where he met his wife, Barbara.

One of his assignments at the Cancer Institute was to work on the Connecticut Tumor Registry. He painstakingly sought to add information about the individuals in the registry and their cancers, traipsing around some three dozen hospitals across the state and personally abstracting records of about 6,000 patients, often working late into the night. Tumor registries in those days were how we learned, for example, about cancer incidence and survival.

At the Cancer Institute, he was made head of the Demography Section where he challenged the utility of the two National Cancer Surveys that had been conducted in the 1930s and 1940s, because it was not clear whether the difference between them was real or due to improved methods. He proposed a three-year survey, centered on the 1970 census, which was approved and led to the Third National Cancer Survey and eventually the Surveillance, Epidemiology and End Results program, which was a font of information about cancer. And it was information collected according to the same rigorous standards that John Bailar laid out.

After a stint in the Veterans Administration, he returned to the Cancer Institute to lead a new program in cancer control. There he clashed with others on the prevailing view of mammography screening. All knew that such screening could reduce breast cancer mortality by one-third in women aged 50 or more, but there was no evidence that it was beneficial at younger ages. The Cancer Institute Director, Frank Rauscher, eventually agreed and revised the guidelines for mammography.

In those days, the radiation doses were far higher than those today, so there were greater risks of screening. Today's guidelines are different. For his work on breast cancer screening, John Bailar was awarded the Public Health Service Commendation Medal.

John's research has been on the boundary between medicine and statistics. His book with David Hoaglin, *Medical Uses of Statistics*, now in its third edition, has been one of the most influential works on the subject for physicians and other healthcare experts.

After leaving the Cancer Institute, John served as a senior scientist at the Environmental Protection Agency and the Department of Health and Human Services. He then went to Harvard University; then to McGill University, where he chaired the Department of Epidemiology and Statistics; and later to the University of Chicago, where he was the founding chair of the Department of Health Studies.

John was a great teacher and mentor. That was because he cared more about how students would receive the message rather than how skillfully it was presented.

At the National Academies of Sciences, Engineering, and Medicine, John became a scholar in residence. But more, he served on over 40 study committees, 11 of them as chair. In addition, he was one of the most prolific reviewers of Academies reports during and after his membership on the Academies' Report Review Committee, perhaps the most important committee of the Academies. We who worked at the Academies all knew that, if John Bailar might be reviewing our study, it had better be grounded on strong statistical principles.

John received many honors. Foremost among them were the MacArthur Fellowship (the "genius award") in 1990; election that year to the *Collegium Ramazzini*, an international academy of scientists with leading roles in environmental and occupational health; and election to the National Academy of Medicine in 1993.

Perhaps the greatest challenge that John levied against prevailing wisdom was his critique of how the nation was battling cancer. Many of us witnessed the fallout from his research at the time. Others of you may have read it in Siddhartha Mukherjee's biography of cancer, *The Emperor of all Maladies*, or watched the PBS documentary based on that book. Here is the story, as excerpted from Mukherjee's book:

It was in 1985, some 14 years after President Nixon's declaration of the "War on Cancer," when Harvard biologist John Cairns attempted to measure the progress against cancer. Even with relatively liberal estimates about lives saved, he concluded that less than one in twenty patients diagnosed with cancer in America, and less than one in ten of the total number of patients who would die of cancer, had benefitted from the advances in therapy and screening.

What was lacking in his conclusions, however, was some measure of the *comparative* trends in cancer mortality over the years—whether more or less people were dying of cancer in 1985 as compared to 1975. In May 1986, less than a year later, John Bailar and his colleague Elaine Smith provided this analysis in the *New England Journal of Medicine*.

John rejected the metric widely used by doctors: changes over time in survival rate, such as the fraction of patients diagnosed with cancer who are alive five years after their diagnosis.

The increase in survival rates is subject to many biases, such as an increase in the time from diagnosis to death because of a screening test.

John also knew that, as populations age, rates of cancer mortality increase. He thus used a statistical technique that is second nature to us now: age-adjustment. He looked at rates within each age cohort and then calculated what the rate would be in a standard population that does not change over time. Once the distributions of cancer mortality at different times were fitted into the same standard population, their rates could be compared over time.

John Bailar and Elaine Smith showed that, between 1962 and 1985, cancer-related deaths actually *increased*, by almost 9 percent. Cancer, the authors revealed, was not declining in the United States. With this article, Mukherjee reports, John Bailar shook the world of cancer oncology.

There is no evidence, he wrote with Smith, “that some thirty-five years of intense and growing efforts to improve the treatment of cancer have had much overall effect on the most fundamental measure of clinical outcome—death.”

“We are losing the war against cancer,” they said. The intense effort focused largely on improving treatment must be judged a “qualified failure.”

In using that phrase, “qualified failure,” John Bailar was “declaring his own war—against the cancer establishment, against the NCI [National Cancer Institute], against a billion-dollar cancer-treatment industry.” As Mukherjee further noted:

One reporter described him as a “thorn in the side of the National Cancer Institute.” Doctors railed against Bailar’s analysis, describing him as a naysayer, a hector, a nihilist, a defeatist, a crank.

Others later noted that cancer is too complex to be measured by age-adjusted mortality alone in order to decide on future investments in cancer research and practice. But John Bailar was not advocating the superiority of this measure, he was proving a point articulated by John Cairns, that the only intervention every known to reduce the aggregate mortality for *any* disease in a population was prevention.

John Bailar argued that prevention, as a strategy, had been neglected by the National Cancer Institute in its monomaniacal focus on cures. That mind set—a focus on cure rather than prevention—persists in many corners of the National Institutes of Health today.

In the history of medicine, no significant disease had ever been eradicated by a treatment-related program alone. What drives down decline in deaths are efforts to prevent the disease.

Most likely, the increase in cancer mortality reported in the Bailar-Smith article was the result of increases in smoking rates in the 1950s. The article led to a shift in perspective that, as Mukherjee pointed out, “contributed to the moment at which the war on cancer became a war on smoking.”

So this is how I will remember John to the end of my days: A compassionate friend, a good mentor, a caring individual, a brilliant scientist, but, perhaps most of all, as a nonconformist who moved our world.