

Sholom Wacholder: In Memoriam (1955–2015)

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We are sad to report that Sholom Wacholder died from prostate cancer in October, 2015. We worked for three decades with Sholom, our statistical mentor and close friend. He was a deep and amazingly insightful thinker and editor, often making suggestions on how to express or clarify the main point and simple meaning, among his many gifts. As we write these words, we miss his invariably voluminous and discerning "Tracked Changes." But, incredibly, he died far too soon and cannot help us as we grope for words to describe his unique qualities, academic contributions, and influence on so many people.

Cancer Epidemiology, Biomarkers & Prevention readers are well aware that Sholom was one of the leading biostatisticians working in the field of cancer epidemiology. He was an extremely important contributor to the molecular epidemiology literature, coauthoring 400 papers, 27 in *Cancer Epidemiology, Biomarkers & Prevention* alone. Several of his collaborative papers have >1,000 citations. But his most notable achievements are not reflected in his high H-index nor his distinguished CV but through his capacity to influence others. His reach was much greater, more personal, and harder to quantify, maintaining particularly strong and intellectually deep ties throughout the NCI, especially among statisticians elsewhere at NIH but also within the broader biostatistics and epidemiology community. As two notable examples, he loved the intellectual camaraderie of the American Epidemiologic Society, and had enduring connections with colleagues trained at the University of Washington where he obtained his PhD.

There has been an international outpouring of grief and sense of loss among colleagues following his death. He worked until the final days, addressing with characteristic analytic precision and passion his many research interests. With sad irony, those interests included cancer screening, and he talked

frequently about the balance between overtreatment and population benefit in prostate cancer screening. His complete dedication to the reasoned pursuit of scientific truth, even as a dying patient, was remarkable.

Sholom was born on June 29, 1955, in Fort Worth, Texas, to Dr. Rabbi Ben Zion Wacholder and Touby (Kamil). His father, a Holocaust survivor and Talmudic scholar, was an author of many books and world authority on the Dead Sea scrolls. His mother earned a Masters Degree in Microbiology from Cal Tech. The family settled in Cincinnati where his father assumed a Professorship at Jewish University. Sholom was introduced to biostatistics at the University of Cincinnati working with Dr. Ralph Buncher while obtaining his BA in mathematics. After his PhD in Biomathematics in Seattle, he assumed an Assistant Professorship at the McGill University and was then recruited to the NCI, where he remained for the rest of his life. He leaves a wife and two sons.

Brilliance among statisticians is common, and some of Sholom's greatest contributions were intensely collaborative and "applied" reflecting his concern for improving the human condition through knowledge and truth. He was a coauthor who consistently contributed much more than his authorship position indicated. Countless times, he clarified for an epidemiologic research team the best design, study conduct, analysis, or presentation without expectation of commensurate recognition. As editor, consultant, or collaborator, he contributed conceptual clarity derived from deep understanding. His selflessness and collegiality led to a never-ending stream of requests for consultation, collaboration, and speaking engagements.

He consciously chose to focus on applications embedded in epidemiologic research, rather than furthering his also-impressive statistical theoretical contributions (e.g., on study designs, inherited genetic risk estimates, and false-positive probability). By his own estimation he was an introvert, the intellectual son of a famous rabbi who pursued truth as his passion using statistics as his approach. But, he trained himself so effectively to interact personally with his many co-workers that he became part of the social glue of our community of physicians, epidemiologists, and statisticians. He had decided that to be a statistical thought leader required a deep understanding of study content and procedures. In doing so, he often pushed his colleagues to return with fresh perspectives to fundamental research principles. He thus spent "inefficient" but vital time sitting in meetings fretting over the fine details of studies. To do so, he was often found away from his office, tending to visit group after group like an itinerant rabbi.

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Nevertheless, he could be reached reliably on Sundays in his office, where he came to do uninterrupted thinking.

For Sholom, work and friendship blended together. Many of his best friends were work friends, and when he came to consult on a topic, he mixed the personal, the philosophical, and the didactic with the task at hand, such that few work meetings with him were short. Fascinating tangents were to be expected, and in the midst of an exploration of fundamental concepts, extended discussions would break out on related and sometimes unrelated topics, such as calculations of the calendar or the history of ancient Greece.

Although his interests were extremely broad, he was also a "finisher." Human papillomavirus (HPV) infection was just one of his interests, in which we copublished more than 100 papers together. He was the spirit and analytic force behind the NCI HPV program. In typical fashion, he became an expert on virtually all aspects of HPV natural history, cervical carcinogenesis, and related prevention research. This permitted him to offer statistical advice and conceive designs that were so thoughtful that they tended to be simplifying, integrative, and fundamental. His ability to penetrate a subject allowed him to contribute in the same way to occupational health, to genomics, to smoking studies, and on and on.

In keeping with his love of data, after he passed away, we sent a single e-mail request out to some known colleagues (with apologies to those we missed), asking simply, "If you had to choose one thing that Sholom taught you, what would it be?" We got dozens of responses. It is telling that no one repeated the same intellectual contribution, revealing how deep and influential he was. Significantly, the majority mentioned some aspect of his wisdom and humanity.

The aggregate of the admiring comments yield a true reflection of his character, with descriptions including: "generosity," "someone to emulate," "hope of humanity," "joyously and enthusiastically relentless about study design," "outstanding insights," "shining example," "smiling, kind, a bridge that connected worlds," "an artist with his statistics," "faith in the power of reason," "joy of discussing an issue together aiming at the truth," "most humble scholar," "passion for his work," "genuine," "uncanny ability to ask the right questions," "generous, kind, funny, and wise," "down to earth," "deep epidemiologic reasoning," "built from first principles," "taught me how to think," and "path-breaking work."

[He taught me that] "There is no study design or analysis that won't be improved, sometimes dramatically, by discussing it with

many others (even if the discussion includes multiple unrelated topics as well)."

"One of the most impressive things I learned from Sholom is to become a collaborator rather than a co-worker, as a statistician working with nonstatistical scientists... we need to understand the related scientific background and regard collaborating scientists' problems as our problems."

"Sholom was an artist with his statistics, applying only as much of it as needed to get to the answer...and in such a way that everyone could understand it."

"...The early meetings were chaotic. Discussions would last for hours but meetings would conclude and it was unclear if progress had been made. One day, Sholom appeared with a document. Somehow, out of the chaos, he emerged with a simple and clarifying solution."

"Sholom showed me that, although it may not increase your productivity today, thinking for the sake of thinking is where important science begins."

"What I will remember most about Sholom is his strong concern for the less powerful. Not just making sure that the fellows got a fair shake in our system, but that our cleaning lady, who he knew by name, was doing well."

[In response to my hesitation to ask a question...] "He proceeded to use the example of Passover tradition to explain how fostering curiosity and exchange between junior and senior scientists both informs and connects us. I found his gesture very genuine and also telling about his commitment to family, community, and faith."

"On a more personal note, what Sholom taught me is why use the complex when the simple will suffice. Pull out the big (statistical) guns only when all other (simpler) approaches have failed."

"Sholom's major influence on me and on my work was, and continues to be, his "first principles," which regularly forces me to deeply consider existence itself and whether my actions are working for the common good."

There can be no doubt, as shown by the consistency and strength of these testimonials, what we have lost. We never hosted a tribute for him before he died, in line with his continued optimism about his condition. Now, we are left wishing he could have heard how thoroughly he succeeded in the world of science as a "mensch," mentor, and sage and how much he will be missed.

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