

Obituary

Harold A. Kahn (1920–2009): A Remembrance of a Life Devoted to Public Health

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Harold Aaron Kahn was one of those many unsung heroes of the post-World War II movement in epidemiology and public health around the world. He played key roles in many of the early epidemiologic cohort studies important to resolution of the diet-heart hypothesis, produced a key monograph on the risks of smoking and health (1), and founded the Framingham Eye Study. However, most of all, he was an outstanding teacher, whether it was in the classroom, one-on-one, or as the author of one of the groundbreaking textbooks in statistical methods in epidemiology.

Harold Kahn, or Hal as he was known to friends and colleagues, was born on January 4, 1920, in New York City. He graduated from high school at the age of 15 and then was admitted to the prestigious College of the City of New York, which offered free tuition to all admitted. There he completed a Bachelor of Science degree in biology in 1939. In 1940, he married Lenora Polsky—the love of his life—and their romance lasted for 67 years, until Lenora's death in 2006.

After taking the civil service examination, he was assigned a job as a surveyor, working on the construction of the Pentagon. During World War II, he served as a statistician in the US Public Health Service, with responsibility for studying venereal disease prevalence and trends. His first 4 publications were devoted to the study of syphilis. At the same time, he continued to study at night, earning a master's degree in statistics from American University in 1949 and completing all but a language requirement that would have earned him a Ph.D. Most of his career was then spent in the US Public Health Service.

During his distinguished career, Hal was involved with a number of the most famous prospective studies of the 20th century. In 1950, he joined the newly formed National Heart Institute. After completing several other assignments, he returned to the National Heart Institute in 1961, where he served as the Director of Statistics for the Framingham Heart Study in the mid-1960s. It was while working on the Framingham Study that he wrote one of his most influential papers: In 1966, he and Dr. Thomas Dawber pub-



lished a paper in which they proposed what has come to be known as the “Framingham method” (2). In that method, all of the risk factor data collected at each of the 2-year study examinations are entered into a pooled repeated-measures model to assess the risk of disease within each 2-year period (3). That is, rather than simply looking at cumulative incidence to date, Hal “used as the dependent variable the risk of disease during a 2-year period” (4, p. 62). The

procedure, which assumes that each 2-year examination is independent of subsequent ones, has been shown to be equivalent to the Cox proportional hazards model with time-dependent covariates, and it continues to be used to this day (5).

Hal was also part of the group at the National Heart, Lung, and Blood Institute that helped set up the Puerto Rico Heart Health Study. However, 2 cardiovascular prospective studies that he played a key role in were the Yugoslavia Cardiovascular Heart Disease Study (6) and the Israel Ischemic Heart Disease Study (7). For 3 years (1966–1969), he lived in Israel, where his efforts were crucial to the development and success of the Israel Ischemic Heart Disease Study. When Hal arrived, he immediately took over a very complex procedure of editing the detailed dietary intake questionnaire data, as well as other parameters (8). Almost overnight, or so it seemed, we were talking about multiple linear regression and analysis of variance and covariance. The next step was introduction of the logistic risk function, as initially proposed by Cornfield et al. (9), for estimation of mutually adjusted predictive ability estimates of the probability of developing a disease according to risk factors. Kahn was a pioneer, a fresh breeze in what at times had threatened to become a statistical desert. Consultations were frequent, and Hal's teaching ability stood out immediately. Everyone was impressed by his patience and dedication. The youngest members of the study coordinating center found themselves gaining knowledge and insight. With the backing of William Zukel, the National Heart, Lung, and Blood Institute Project Officer, even the most menial data clean-up task was converted from a burden to tolerate into something to look forward to, because there was so much to learn and develop.

Hal then went on to become chief of the Office of Biometry and Epidemiology for the National Eye Institute during 1971–1975. It was here that he broke new ground once again and developed the Framingham Eye Study (10). After retiring from the US government, he taught at Johns Hopkins University, where he became a tenured professor of epidemiology. Upon his retirement from Hopkins, he served as a consultant and visiting professor at Hebrew University and at Loma Linda University in California (11), and then went back to Hopkins. Among other projects, he created an epidemiologic research unit in Rome for Merck Sharp & Dohme. Late in life he returned to his interest in dietary survey methods, and he became involved in promoting the importance of developing biomarkers for validating questionnaire methods (12).

In 1983, he published the first edition of what was one of the first books on statistical methods in epidemiology (13). It was intended as an introductory text for students with very little experience in mathematics, much less statistics. The focus of the book then and in its second edition was to teach basic principles so that students could understand the development of different statistical methods and the reasons and rationale for their use in certain situations. The textbook was revised under a new title in 1989 (14).

Hal was a member of a group of distinguished statisticians that included Jerry Cornfield, Nathan Mantel, Paul Meier, Olli Miettinen, and others. Norman Breslow must

have had this group in mind when he noted that “some of the most important statistical procedures were developed originally by practitioners on an empirical or intuitive basis,” only to be proven correct by theoreticians a few years later (15, p. 77). The example Dr. Breslow specifically mentions is Hal's development of the “Framingham” repeated-measures analysis technique.

Not only was Hal an outstanding statistician; he instantly understood the ideas of Cornfield, Mantel, and Miettinen, and he knew how to teach and communicate those ideas in ways that were unique. That is why his textbook was so influential and popular (13, 14). He could also be exceptionally insightful, as when he developed the Framingham method for the analysis of repeated examination data. He was also a genius at getting studies going—whether the Israel Ischemic Heart Disease Study, the Yugoslavia Cardiovascular Heart Disease Study, or the Framingham Eye Study.

Hal's personality made him a born leader. He was charismatic, warm, friendly, and approachable, yet he had a presence that commanded respect. He came alive almost like a vaudeville actor at times—like Al Jolson or Eddie Cantor—when he was in charge of a project or teaching. He encouraged thoughtful discussion and debate. However, disagreeing with him always made you work 3 times as hard, because you never wanted to disappoint him with sloppy or poorly-thought-out arguments. At just the right moment, he was able to lighten a discussion with a story or a joke; yet at other times, he was so very shy and withdrawn.

We believe that Hal's greatest skills were in leading and in teaching. His work with the Framingham Study, in Israel, at the Eye Institute, and in writing the textbook are great examples of his brilliance as a leader and teacher. He contributed, in a selfless way, so very much to public health around the world. We both feel that that our lives and our careers profited greatly by our associations with Hal. Hal was a kind, wonderful man whom we both feel privileged to have had the opportunity to work with and to call a friend.

Harold A. Kahn died at the age of 89 on Thursday, April 9, 2009.

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REFERENCES

1. Kahn HA. *The Dorn Study of Smoking and Mortality Among U.S. Veterans: Report on Eight and One-Half Years of Observation*. (National Cancer Institute Monograph no. 19). Bethesda, MD: National Institutes of Health; 1966:1–125.
2. Kahn HA, Dawber TR. The development of coronary heart disease in relation to sequential biennial measures of

- cholesterol in the Framingham Study. *J Chronic Dis*. 1966;19(5):611–620.
3. Cupples LA, D'Agostino RB, Anderson K, et al. Comparison of baseline and repeated measure covariate techniques in the Framingham Heart Study. *Stat Med*. 1988;7(1-2):205–222.
 4. Feinleib M. The Framingham Study: sample selection, follow-up, and methods of analysis. In: Garfinkel L, Ochs O, Mushinski M, eds. *Selection, Follow-up, and Analysis in Prospective Studies: A Workshop*. (National Cancer Institute Monograph no. 67). Bethesda, MD: National Institutes of Health; 1985:59–64, 77.
 5. D'Agostino RB, Lee ML, Belanger AJ, et al. Relation of pooled logistic regression to time dependent Cox regression analysis: the Framingham Heart Study. *Stat Med*. 1990;9(12):1501–1515.
 6. Kozarević D, Pirc B, Dawber TR, et al. Prevalence and incidence of coronary disease in a population study. The Yugoslavia Cardiovascular Disease Study. *J Chronic Dis*. 1971;24(7):495–505.
 7. Kahn HA, Herman JB, Medalie JH, et al. Factors related to diabetes incidence: a multivariate analysis of two years observation on 10,000 men. The Israel Ischemic Heart Disease Study. *J Chronic Dis*. 1971;23(9):617–629.
 8. Balogh M, Kahn HA, Medalie JH. Random repeat 24-hour dietary recalls. *Am J Clin Nutr*. 1971;24(3):304–310.
 9. Cornfield J, Gordon T, Smith WW. Quantal response curves for experimentally uncontrolled variables. *Bull Int Stat Inst*. 1961;38(3):97–115.
 10. Kahn HA, Leibowitz HM, Ganley JP, et al. The Framingham Eye Study. I. Outline and major prevalence findings. *Am J Epidemiol*. 1977;106(1):17–32.
 11. Kahn HA, Phillips RL, Snowdon DA, et al. Association between reported diet and all-cause mortality. Twenty-one-year follow-up on 27,530 adult Seventh-Day Adventists. *Am J Epidemiol*. 1984;119(5):775–787.
 12. Kahn HA, Whelton PK, Appel LJ, et al. Validity of 24-hour dietary recall interviews conducted among volunteers in an adult working community. *Ann Epidemiol*. 1995;5(6):484–489.
 13. Kahn HA. *An Introduction to Epidemiologic Methods*. New York, NY: Oxford University Press; 1983.
 14. Kahn HA, Sempos CT. *Statistical Methods in Epidemiology*. New York, NY: Oxford University Press; 1989.
 15. Breslow N, Discussion II. In: Garfinkel L, Ochs O, Mushinski M, eds. *Selection, Follow-up, and Analysis in Prospective Studies: A Workshop*. (National Cancer Institute Monograph no. 67). Bethesda, MD: National Institutes of Health; 1985:77.