

BOOK REVIEWS

Editor: Petra Macaskill

1. *Alfredo Morabia, A History of Epidemiologic Methods and Concepts.*
2. *Adrian Baddeley and Eva B. Vedel Jensen, Stereology for Statisticians.*

1. A HISTORY OF EPIDEMIOLOGIC METHODS AND CONCEPTS. Alfredo Morabia (editor), Birkhauser Verlag, Basel, 2004. Pages: xvii + 403. Price: €98 (softcover). ISBN: 3-7643-6818-7

Regrettably, few of us as epidemiologists have the inclination and time earlier in our careers to read and think critically about the social and conceptual origins of our discipline. A busy professional life goes by quickly, much of it conducted within a two-dimensional intellectual space without the enrichment available from the historical-epistemological dimension. The imperative of young adulthood is to look ahead, not back.

Having entered the domain of epidemiological research around 1970, I am embarrassed to realize now that I have apparently had neither the time nor discipline to dig out the original writings of William Farr and John Snow—despite my having read about their work in many textbooks and having used their analyses of cholera in London in many classrooms.

But at least I *was* there, on the ground, in early 1970s U.S.A., when ‘modern epidemiology’ began to fire up. As convenor-of-seminars it was my enthusiastic initiative that brought both Olli Miettinen and Ken Rothman—two key players—to visit the School of Public Health, University of North Carolina. Both have contributed comments to this book; both are cited liberally by other writers. I wish, now, that I had understood then just how critical were those unfolding debates on confounding, bias, case-control study design, incidence density and so on—how they were beginning to resolve issues that had been intuitively but not tidily grasped by epidemiologists around mid-century. The central issue of confounding, understood conceptually since the early 1900s, was not named definitively until the 1960s. (When I began at UNC in 1972, several of my senior academic colleagues persisted

in, indeed insisted on, using the term ‘secondary association’.)

This book is a delight to read or peruse. The modestly labelled ‘editor’, in fact, wrote one-third of the book—a masterly synopsis of the history of the central concepts and ideas in epidemiology. Alfredo Morabia, drawing on sharpened insights gained from several years of discussions by the Epistemology Group at the Johns Hopkins University School of Public Health in the late 1980s, has performed a heroic service in drawing together this (120-page) review of the epistemology of the discipline.

The other chapters are predominantly based on papers prepared by participants—epidemiologists and historians—at a workshop in 1996 in Annecy, France. The eminent cast of chapter authors includes epidemiologists Richard Doll, Jan Vandenbroucke, George Comstock, Paolo Vineis, the Sussers (Mervyn and Ezra) and others; the historians include John Eyler and Anne Hardy. (It is unfortunate that the compilation of their chapters, along with several subsequent invited papers and commentaries plus the editor’s ‘epistemological perspective’, has taken another eight years to reach publication in book form.)

The editor writes: ‘Over a period of less than 300 years, the theory of epidemiology has become quite rich. It comprises methods for group-comparisons (i.e. contrasts of exposed *versus* unexposed to potential risk factors, and affected *versus* unaffected by specific conditions) and two sets of concepts. One set rigorously expresses health-related phenomena occurring at the population level (e.g. prevalence, incidence, risks or rates). Another set of concepts is related to the design and interpretation of group-comparisons (e.g. confounding, interaction, bias, causal inference).’ He explores, with many fascinating quotations from our intellectual forebears, all these central methods and concepts.

Morabia argues that epidemiology did not, and indeed could not, emerge as a research discipline until the separate ideas of population health and group comparison were established. The former emerged via the compilation and summarization of medical statistics. Critical ideas about rates, risk, proportions and ratios, to express the health experience of whole groups or populations, did not emerge until the first half of the 19th century.

The idea of group comparison came both from clinical medicine and from social survey research. John Graunt had made some elementary comparisons in the 1660s; Pierre Louis, Ignaz Semmelweis and others in the first half of the 19th century used more formal, explicit, comparisons.

Hippocrates may have been the 'father of medicine', but not epidemiology. He talked of the environment, the weather and food, but only as part of his advice to physicians about things to be taken account of. James Lind (1753) did not quite get there either; he did not think 'populations'. He backed his judgement (and lucked out), comparing six groups of just two persons each to see which dietary intervention alleviated shipboard scurvy. One intervention worked: limes.

Meanwhile, the idea of disease 'causation' within a population had to await an understanding of probability. Before David Hume's philosophical discourse on causation, probability and human nature in the early 18th century, true 'science' depended on the power of experimental demonstration: a prism refracts white light. No need for probability there. But to talk about the relative risks of disease in those drinking faecally contaminated water *versus* those drinking uncontaminated water required the notion both of average risk within the group, and of the fact that for any one individual the health outcome could only be expressed probabilistically, not certainly.

This review does not do justice to the many other interesting, often fine, chapters in this book. Topics range across the development of cohort studies, and of case-control studies, the concept of confounding, theories of bias, Farr's ideas on 'prognosis', the ideas and foibles of John Snow, the concept of bias. There is a review of the development of epidemiologic methods and concepts in major textbooks of the 20th century. Significantly, of the books chosen, all those published before 1970 were by British authors, and all those published later were by American authors. Classical epidemiology is largely grounded in

the work of English researchers and thinkers. 'Modern epidemiology' has largely been forged by Americans—who, via the U.S.A.'s prevailing ideology of individualism, have also imparted an undue emphasis to studying the role of individual-level behaviours, exposures and circumstances in disease occurrence.

Olli Miettinen, perhaps the 'father' of modern epidemiology, is granted the last word in this book. He seeks now (in familiar fashion) to liberate us from the tyranny of cohort and case-control studies by offering a further grand synthesis—this time under the banner of 'scientific medicine'. 'Let us move', he says, 'beyond our traditional focus on the theory of merely etiologic research to concern for the theory of medicine, including the theory of the research that produces the knowledge base of scientific medicine . . . and let us be serious about object design—ultimately in terms of a regression function—before methods design, rejoicing in the consequent relevance of the research without concern for whether it still may be characterized as epidemiologic.'

Having started the Modern Epidemiology ball rolling around 1970, is Miettinen about to start another ball rolling here? I think not. He seems to have overlooked the fact that epidemiological research does much more than illuminate clinical medicine via an understanding of causal influence, disease progression and efficacy of treatment.

Epidemiology is the science of understanding patterns of diseases in groups and populations, and many of its findings potentiate larger-scale social interventions (food production and marketing, air quality, seat-belt usage, physical activity curricula in schools, and greenhouse gas emissions).

We have not travelled this far, over the past three centuries, with our population thinking, our group comparisons and our understanding of confounding and bias to now contract down to servicing the individual-oriented domain of clinical medicine. The mission of epidemiology is much bigger than that.

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