Book Review

Eras in Epidemiology: The Evolution of Ideas
By Mervyn Susser and Zena Stein


In this book, Mervyn Susser and Zena Stein present the historical and scientific foundations of 2 companion papers published in 1996, entitled “Choosing a Future for Epidemiology,” which were written by Mervyn and Ezra Susser, their son (1, 2). These papers grouped into 3 “eras” the various ways in which health scientists had, in the past, been framing hypotheses about population health states for both research and intervention. In the “sanitary statistics” era, which dominated most of the 19th century, disease was viewed as resulting from filth and air pollution (miasma) and as leading to sanitary action. During the “infectious disease” era (from about 1870 to 1945), the concept of germs as infectious and contagious living organisms replaced the focus on miasma and stimulated the development of bacteriology laboratories, microbe isolation, disinfection, quarantine, and mass vaccination. In the “chronic disease” era, germs gave way to risk factors: health determinants with black-boxed mechanisms. These risk factors served to identify modifiable targets for preventing epidemics of noncontagious, chronic diseases, like cancer and atherosclerotic disorders. However, they proved useless in confronting the emergence of epidemics such as that of acquired immunodeficiency syndrome (AIDS). The containment of these epidemics required a new concept, which Susser and Susser called “eco-epidemiology” and which they saw blooming in the development of social and life-course epidemiology, multilevel analyses, and other cross-dimensional approaches.

This book demonstrates that the “Choosing a Future” papers were the tip of an iceberg of erudition about the history of medicine, public health, and epidemiology. The first 23 chapters constitute a prelude to the republication of the 2 “Choosing a Future” papers (chapters 24 and 25) and of the excellent 10-years-after discussion by Dana March and Ezra Susser, “The Eco- in Eco-Epidemiology” (3) (chapter 26).

The book is organized around era progression. Grossly, chapters 1–7 are about the vision of diseases as caused by inhaled particles emanating from filth, and the implications of this in public health strategies. In the 19th century, health reformers in England and France promoted the development of drainage, sewage, clean streets, and other means of removing human excrement, organic waste, and dead animal bodies (all alleged sources of miasma) from the urban environment. The apparent efficacy of these sanitary interventions blinded health scientists and reformers to the flaws of the miasma model. They were unable to draw the necessary conclusions from the findings of people like Snow and Semmelweis, whose research indicated that contagious agents were playing a role. Chapters 8–14 are dedicated to the “infectious disease” era, during which the discoveries of Pasteur, Koch, Klebs, and other bacteriologists provided a means of diagnosing the presence of an infectious agent. Chapter 12, for example, retraces the modernization of the New York City Department of Health, led by Hermann M. Biggs, to a laboratory of hygiene. Chapters 15–19 are about the “chronic disease” era, in which Susser and Stein place the development of the study methods comprising most of today’s epidemiology textbooks. These methods were used to identify risk factors, the most notable being tobacco smoking. Converging public health actions successfully broke the growth of the lung cancer epidemic, and possibly the cardiovascular disease epidemic. However, the AIDS epidemic, discussed in chapter 23, typifies the limitations of the “risk factor” concept: Knowing that the disease was caused by a virus was not enough to eradicate it. The disease entailed an intricate combination of social, microbiologic, and biologic factors, which had to be considered simultaneously in order to devise a successful public health strategy. The last 7 chapters outline the scientific developments in the social and biologic health sciences that, according to Susser and Stein, may lead to a new era in which diseases like AIDS will be fought simultaneously at the cellular, individual, and community levels.

Two profound beliefs lie at the heart of Susser and Stein’s vision of unfolding eras and concepts. The first is that the triad of agent, host, and environment provides a fundamental framework for epidemiologic research. Any progress in the measurement of one of the 3 components opens opportunities for epidemiologists to accrue new knowledge about health and disease. These breakthroughs may be so important that they can catapult health research into a new era. The book does not attempt to trace the history of epidemiology or public health but instead highlights the milestone refinements of the triad. Each era is primarily characterized by the concepts that allowed effective public health action to take place, not by the specific role epidemiologists played. Consider the epoch, according to Susser and Stein, dominated by the idea that germs were solely responsible for disease. Most of the knowledge was provided by laboratory sciences, and most public health action was based on laboratory data. The role of population studies during that period was not prominent. It even tended to be countercurrent, as when Joseph Goldberger, in one of the most...
significant achievements of epidemiology during the first half of the 20th century, refuted the belief that pellagra was an infectious disease.

The second firm conviction of Susser and Stein is that epidemiologic research should not be separated from its application: "The substance of epidemiology is the study of the occurrence, cause, and control of health disorders and illness" (p. 5). Cause and control belong to the same substance. Susser and Stein's heroes are therefore those who have contributed to the global understanding of the causes of diseases and/or who have put these innovative ideas into practice. They come from all venues of the health sciences and beyond. They comprise, to name a few from the 19th century, Edwin Chadwick (chapter 6), Alexandre Parent-Duchatelet (chapter 6), William Farr (chapter 7), Louis Pasteur (chapter 7), John Simon (chapter 9), and Robert Koch (chapter 10). Those from the 20th century include Joseph Golberger and Edgar Sydenstricker (chapter 14), Sidney Kark (chapter 20), and MacFarlane Burnet (chapter 22).

The moral of this book could be that, in science, both methods and perspective matter. "The causes of diseases sought by any scientist, medical or other, are bound to be limited by their concepts and by the frame of reference within which they work; these guide and generate operations in terms appropriate to theory" (p. 22). Susser and Stein's methods and perspectives have been shaped by about half a century of public health research and activism, during which they were physically in the Northern Hemisphere and spiritually in the Southern Hemisphere. Writing as epidemiologists for epidemiologists, they have assembled the historic support for a limpid message, which I would summarize as follows: "Fellow epidemiologists, focusing on public health action will allow you to keep an eye on the big picture about diseases in populations; remain alert to any scientific breakthrough that sheds new light on the mode in which agent, host, and environment interact; adapt your methods and concepts accordingly; and contribute to the saving of lives."

Take a tip from ones who've tried.

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REFERENCES

Alfredo Morabia (e-mail: amorabia@qc.cuny.edu)
School of Earth and Environmental Sciences, Queens College, City University of New York, New York, NY 11365

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