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Book Review

Epidemiolgy, L. Gordis, Fourth ed, 2009, Saunders

This is the ninth consecutive year I have taught the core course in epidemiology in the Executive MPH (EMPH) Program at Columbia University and, not coincidentally, the ninth year I chose as my textbook *Epidemiology* by Leon Gordis. No other epidemiology textbook I know of comes close to meeting the unusual demands of this Program.

The EMPH Program, offered by the Dept. of Health Policy and Management, provides mid-career professionals with skills relevant to management of both public and private health care and research institutions. A selected cohort of students meets for one 4-day weekend per month for two years, taking the same curriculum as the regular MPH students, but with most classes restricted to EMPH enrollees. The course's 42 contact hours are spread over 12 classroom sessions in six months. The students are a mix of physicians, lawyers, hospital administrators, Health Department employees, nurses, and clinical managers. A successful textbook must speak a language accessible to all, cover essential concepts in a way that doesn't put clinicians to sleep, overwhelm non-physicians with medical jargon, or use advanced mathematical methods outside the experience of either group. It must present some of the rich history of the field, not shy away from controversies, yet not give the impression that epidemiology is hopelessly inadequate to meet the needs of public policy. Gordis meets these requirements and more.

The new 4th edition is 36 pages longer than the 3rd, due more to layout changes than to new text. The most obvious feature distinguishing the 4th edition from its predecessor is that the book has been tarted up with color versions of previously black and white drawings. The typeface for most tables was adjusted to match the text. These enhancements make the book's overall look and feel inviting to the student. This is important because the book contains an immense amount of material. Practically no important topic is omitted — there are chapters on basic measures, major observational study designs (cohort and case-control studies), clinical trials, causal inference, bias and confounding, screening, genetics, and surveillance. The 3rd edition had introduced some badly needed material on outcomes and service evaluation, which guest lecturers formerly covered, and this is retained.

The many tables and charts that show disease occurrence statistics over time were updated to the most recently available year. The excellent section on outbreak investigation, with its classic "was-it-the-egg-salad?" example, is still there and some administratively useful procedures have been added to Tables 2–4 "Steps in investigating an acute outbreak."

I have always liked Gordis's treatment of life tables and Kaplan–Meier methods (Chapter 6). Some instructors find it long-winded and overly detailed, but my philosophy of life tables is that every epidemiologist should work an example of both methods by hand at least once to see how the logic works. Gordis presents this superbly. Some useful new material (1 paragraph and four small figures, pp. 126–7) has been added to better explain relative survival rates.

It is remarkable how well Gordis captures the quantitative aspects of cohort studies, case-control studies, and randomized clinical trials using high school level math, well-chosen examples, and excellent illustrations. Chapter 10 on case-control studies has new material on nested studies, a short section on case-cohort studies, and one on case-crossover designs (pp. 194–5). In explaining frequency matching in case-control studies, Gordis states that cases must generally be selected before the controls in order to determine the joint frequency of matching variables. However, investigators who work in hospitals with stable admission practices and computerized admission files can often determine quotas for controls before interviewing begins, permitting concurrent interviewing of cases and controls (Stellman et al., 2003).

Health policy students especially appreciate learning how epidemiological controversies have played out in the public arena. One apt example that Gordis covers at some length is the storm that arose when three separate animal feeding studies found excess bladder tumors in rats fed high doses of saccharin. As a matter of public policy, the animal findings should have obligated the FDA to ban saccharin as a food additive, under the Delaney Amendment to the Food, Drug, and Cosmetic Act, which forbade use of demonstrably carcinogenic compounds as food additives (Epstein, 1979). However, shortly afterwards an NCI case-control study of saccharin and bladder cancer reported no association (Hoover and Strasser, 1980). Other studies followed, nearly all of which were also null (Committee on the Evaluation of Cyclamate for Carcinogenicity, 1985), including one of my own (Wynder and Stellman, 1980). Referring to the NCI study, Gordis states "… the investigators in this study did not confirm the findings that had been reported in animal studies, which had caused considerable controversy and had major policy implications for government regulation." Gordis's account stops there, but there is more to the story. That mandatory ban, duly proposed by FDA Commissioner Donald Kennedy, didn't happen. Intense lobbying, helped along by the soft drink industry's Calorie Control Council, resulted in a saccharin-specific Congressional exception to the Delaney Amendment. The exception was renewed regularly until the Delaney Amendment itself was finally repealed in 1996.

Gordis nicely tackles interaction, which he illustrates (Fig. 15-5) with a French study of alcohol and tobacco use (Tuyns et al., 1977). These well-known IARC data have been reproduced and circulated in epidemiology classes at Columbia for decades. However, Tuyns's subtitle is translated literally as "risks are multiplying," whereas from the context of the article, a better translation might be "multiplicative risks."

In Chapter 17 on health services evaluation there is useful rewriting. New material has been inserted in the section on Outcomes Research, with a presentation of data from the Birkmeyer et al. (2003) study of operative mortality in Medicare patients.

Chapter 19 on policy has two important additions. (1) A section on the impact of hormone replacement therapy findings on policy (pp. 337–9) uses the Women's Health Initiative as an example. (2) There is

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a new section on sources and impact of uncertainty that could be a take-off point for an entire lecture if not another course.

In contrast to the strengths noted above, there is very little material on molecular epidemiology and no chapter on genetic epidemiology per se. A chapter titled "Identifying the roles of genetic and environmental factors in disease causation" introduces elementary concepts of genetics and reviews some of the classic migrant studies, but its hurried treatment of central concepts such as genetic markers, polymorphisms, and microarray technology, and study designs like family and twin studies, as well as the somewhat haphazard sequence of topics make it more difficult to teach from than other chapters. Furthermore, the field is changing rapidly and many examples are in danger of becoming out of date.

Nearly every chapter concludes with a summary, a set of references, and half a dozen or so well thought out multiple-choice exercises that are ideal for self-study. However, the answer key merely indicates the correct choice, which is not very helpful. Therefore, I have developed an annotated set of worked-out solutions to all of the problems that I post on the course website after each chapter is covered.

Selecting a beginning epidemiology textbook can be a daunting task. I was already aware that earlier editions of Gordis had been used successfully in the version of this Core course that is taught to all MPH students at Columbia. It is not as quantitative or methodologically oriented as Szklo and Nieto (2007) or as chronic disease focused as Aschengrau and Seage (2003), both of which have also been used here. Nevertheless, it fully covers the fundamental issues that Bhopal (1997) in his review of 25 textbooks considers essential to a modern text.

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