a different kind of data set/research question. These case studies form the basis of a biostatistics/epidemiology course taught to students with a background of two or three semesters of biostatistics at the University of California, Berkeley. The data sets used in each case study are available in ASCII format from a website.

The potential advantage of this kind of book is that it allows the author to cover a relatively wide range of material in relatively little space. Thus a number of methods appear which are not usually found in such textbooks; examples include the bootstrap, principal components analysis, non-parametric regression. A surprising gap in the methods presented is any discussion of how to deal with data in which observations cannot be assumed to be independent, for example when repeated measurements have been made on individuals or when some form of cluster sampling has been used. Another notable absentee is any mention of the Bayesian approach.

A disadvantage of this kind of book is that the reader is not provided with much of a framework in which to locate the different methods presented. Furthermore, as indicated in the title, the emphasis is almost entirely on data analysis with very little discussion of such key epidemiological concepts such as bias, confounding and effect modification.

My attention was first drawn to Chapter 3, entitled ‘Randomized Trial’, by the contents list which indicates that the reader will learn about bootstrap estimation and permutation tests among other things. The data set presented includes 48 patients with Alzheimer’s disease randomly allocated to receive a treatment or placebo. The data comprise each individual’s treatment allocation, and the result of a memory recall test at baseline and 6 months post-treatment. The analytical approach adopted surprised me somewhat. First, the analyses largely focussed on the change between baseline and follow-up (the ‘change score’). No mention was made of the disadvantages of this approach,¹ or of the advantages of using analysis of covariance instead. Indeed, analysis of covariance was not mentioned in this chapter though an analysis of covariance model does appear in a chapter on multivariable linear regression. Second, the analysis of change scores was almost entirely based around statistical significance testing and the resultant P-values. The reader is presented with four statistical methods to test the null hypothesis that the mean change scores in the two treatment arms are equal: the t-test; the Wilcoxon rank sum test; a test based on the bootstrap; a randomization test (with one-sided P-values presented in each case but without any discussion of one-sided versus two-sided tests).

Only in passing is a 95% confidence interval for the mean difference mentioned and the conclusion at the end of the chapter mentions only the test results stating that patients on active treatment have ‘significantly less deterioration’ than patients on placebo. There is no discussion of statistical versus clinical significance. I went back to Chapters 1 and 2 to see whether these contained any discussion of the relative merits of confidence intervals and P-values. Chapter 1 is entitled ‘Measurement of Trend’ and, like Chapter 3, presents the results of a number of statistical significance tests but gives very little space to confidence intervals. Chapter 2, ‘Odds Ratio and Relative Risk’, does better with a discussion of confidence intervals for the odds ratio at least appearing before the P-values. The data set used for the case study of odds ratios comprises mother-infant pairs in whom the outcome is binary (low birthweight or not) and two risk factors are considered (maternal smoking and ethnicity). One oddity of this section is that the author states that there are two distinct ways to describe the association between smoking and low birthweight, one ‘model-free’ and one model-based. However, all the analyses presented appear to be based on the assumption that the binomial probability model underlies the data—as one would expect. In some of the methods the model may be implicit rather than explicit, but I remain to be convinced that any of them are truly model-free.

Another oddity is the way in which the author presents the analysis of case-control data. There are two chapters dealing with such data. The first chapter deals with an individually matched case-control study (two controls per case). Unsurprisingly the chapter ends with a discussion of conditional logistic regression. The second case-control chapter presents an unmatched study to investigate the influence of vitamin use on risk of neural tube defects, controlling any confounding effects of ethnicity. Somewhat surprisingly, the author chooses to analyse these data using Poisson regression. However, the results are then used to derive estimates of log odds ratios and hence odds ratios. Why did the author not demonstrate instead the use of logistic regression to analyse an unmatched case control study—which is surely what everyone does in practice?

In summary, I am entirely persuaded of the merit of the overall approach of this book. More importantly, some of the approaches suggested do not constitute what I would consider standard or best practice. This book will not be top of my list to recommend to students or colleagues.

SIMON COUSENS

Reference


Relying on an impressive array of archival sources that covers a geographical range from Africa to India, Italy to Vietnam, Samuel Cohn Jr argues that the disease commonly known as the Black Death was something other than the rat-based bubonic plague whose bacillus was discovered in 1894. Cohn charges scientists and historians alike with having ignored, denied and even changed contemporary testimony when it conflicts with notions of how modern plague should behave. Cohn’s work re-examines the epidemiological evidence of the late-medieval plague and concludes that its cycles, seasonality, contagion, speed of transmission, the age and sex of its victims, and the occupational and topographical incidence of mortality not only differentiates late-medieval from modern plague, but also freeing from suspicion two supposed protagonists of Western civilization—the rat and the flea. Furthermore, Cohn reassesses the connection between the Renaissance in Europe more broadly and finds that from ‘the utter despondency felt with the
plague’s first strike, contemporaries expressed a new sense of confidence’ (p. 4)—a confidence derived from the swiftness with which Europeans adapted to their new bacillus. Moving beyond the geographical limitations of the Sudhoff collection, Cohn engages the earliest extant burial records, letters, wills and testaments, saints’ lives, chronicles and other plague tracts to challenge our fundamental assumptions of the disease. Cohn’s ad fontes approach to the subject confirms the devastation and terror of the disease, but also brings to light distinct differences between the malady and the modern plague, such as speed of transmission, virulence and mortality, seasonality, and the ability to acquire immunity. The sources comment at length on the seeming ‘universalism’ of the disease; that is, it appeared to move with lightning speed and hit far-reaching geographical areas within a short period of time. Alongside this ‘universalism’ writers were concerned by its virulence and high rate of mortality, with many referring to it as the ‘Big Death’. The pattern of deaths further differentiates the two according to Cohn. For the late medieval disease, deaths occurred in a pattern along household clusters, with a significant number of infected people directly linked to exposure to another infected person within the same household. This pattern of deaths does not hold true for modern plague. Moreover, while the late-medieval disease attacked those in closest physical proximity to the infected (the doctors, priests, gravediggers and notaries), 19th and 20th century plague researchers found the ‘safest place during plague was the plague ward of hospitals’ (p. 123).

In terms of its seasonality, plague could occur at any time of year and could last through the year in places with wide variations in temperature and humidity. This seeming lack of seasonal specificity in light of narrow climatic restrictions on the reproductive cycle of the insect raises questions concerning the role of the rat and flea. Furthermore, Cohn claims that there is no extant account of a rat epizootic preceding a plague outbreak and those sources that do mention rats or mice do not single out rodents from other animals. Despite the problematic nature of the source material, Cohn suggests a possible pattern: autumn plague in the colder northern and central parts of Europe as well as the northernmost areas of Italy and summer outbreaks in the warmer zones of the Mediterranean. Cohn admits the often contradictory nature of this evidence, but challenges epidemiologists to re-examine such trends for alternate explanations.

Man’s ability to acquire natural immunity differentiates the two eras of plague most strikingly. During the second phase of plague immunity to the disease led to a new sense of medical progress and the records reveal a sense of optimism characterized by a tendency to move away from the astrological and omnipotent explanations prevalent in the earlier phase to social and political ones. Instead of a deep sense of despair and pessimism, by the second phase the sources reflect a new sense of optimism based on the efficacy of recipes and remedies. The quick acquisition of natural immunity to the disease furthered this growing sense of optimism as lowered mortality rates indicated successful medical intervention. This sense of optimism and hope spread beyond the medical realm and laid a foundation for the Renaissance not only in Italy but in far-reaching regions affected by the disease. Furthermore, man’s ability to survive the disease paralleled changes in his understanding of it and significantly altered his psychological and cultural experiences as the disease recurrent throughout early modern Europe.

Fear of a repetition of the vast mortality typical of the late-medieval disease influenced the ground-breaking discoveries of the bacillus and the aetiology of modern plague in the 19th and 20th centuries. Histories of the disease of the past led to an unprecedented international scientific response on the one hand, but on the other, it led to a delay in the discovery of the modern plague’s epidemiology. Cohn cites case after case where scientists were aware of the distinctions in the diseases’ microbiology but went to almost ridiculous links to ‘square the circle’, maintaining the fallacy. Time and again scientists such as Manson, Hankin and Hirst confronted the difficult issues of speed of transmission and viability of contagion, but allowed the historical past to accompany them into the laboratory. Furthermore, he argues that the historical and scientific communities have overlooked and undervalued the role of the British in India. Untapped archival resources of the Indian Plague Commissions (documents based on fieldwork and data gathered by military and medical officials) bring to light the significant role the British played in epidemiological studies of a modern plague.

While modern scientific knowledge has generally enhanced our understanding of the medical world of the past, in the case of the plague it has been a hindrance. Contemporary scientists and historians continue to ‘square the circle’, for it has been much easier to ‘amend the paradigm than question the disease’ (p. 42). Cohn challenges the work of Le Roy Ladurie, Norman Cantor, Paul Slack, Ann Carmichael, Gottfried and Michael Dols (among others) for losing sight of, or explaining away, the evidence. ‘Even the most cited text on the BD, Boccaccio’s Decameron’, he argues, ‘is far from being the iron-clad testimony for cutaneous identity across the centuries’ (p. 81). Cohn’s reassessment of oft-overlooked evidence (much of which is included in impressive appendices) and ability to look beyond modern plague as an explanation will challenge historians and scientists alike to re-evaluate the late-medieval and early modern malady. Well-conceived and well-argued, The Black Death Transformed will remain an important work for many years to come.

Michele Clouse


Just and Lasting Change is a book about development and health. Development, primarily, and how health can be both a catalyst and a product of development. In the post-colonial world, most communities and states share a legacy of poor health indices and marginal existence for the majority of its members. There is progress, yes, in terms of falling infant mortality and rising per capita incomes; yet, this is too slow to benefit millions of people. The emerging health technologies of gene manipulation and highly expensive vaccines seem far removed from the immediate problems of hunger, malnutrition, ignorance, and poor living conditions, which account for the majority of the ills of