

Main issues are explained with clarity and mathematical rigor, and its wide variety of practical examples, developed from empirical data obtained in different countries around the world, makes the exposition extremely attractive. Intergeneration of fiscal equity under population aging, sustainability of pension systems, and accounting for health-care benefits for future retirees are examples of policy problems in population forecasts and their uncertainty. Indeed, statistical demography is a necessary tool for key social policy issues such as pension and health-care systems in the developed countries, estimation of the size of elusive populations, unemployment, epidemiology, and other hot areas. It is relevant that some statistical theories and methodologies for estimating and forecasting of births, deaths, and migration are presented in a multistate setting.

The first chapter of the book introduces the role of statistical demography, statistical inference, time series, bias and sampling errors, and other topics, with some basic statistical notation and preliminaries, allowing the future design of short specific courses. For example, a self-contained introduction to statistical demography can be taken from Chapters 2, 4, 5, and 6, with Chapters 2 and 4 defining a potential shorter course on biometrics. An introduction to demographic data sources and their quality can be taken from Chapters 2, 3, 4, 10, and 12. And from Chapters 4, 6, 7, 8, 9, and 11 we can obtain an introduction to demographic forecasting, mainly for pensions and public finances.

The exposition meets standard requirements for mathematical statisticians, demographers, actuaries, and epidemiologists, assuming some knowledge of differential and integral calculus, matrix algebra, probability theory, and regression analysis. The book is supported by updated references, an author index, and a subject index. Many figures illustrate concepts and examples throughout the book.

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AMSTRUP, S. C., McDONALD, T. L., and MANLY, B. F. J. (eds) **Handbook of Capture–Recapture Analysis**. Princeton University Press, Princeton, New Jersey, 2005. xv + 313 pp. US\$49.50/£32.50 (paperback), ISBN 0-691-08968-X.

Capture-mark-recapture (CMR) methods are a rapidly expanding area of biometrics where development of new statistical models, model selection procedures, and computer software has given biologists a valuable set of tools for tackling questions in population and community ecology. The essays in this edited book provide a useful overview to CMR methods by describing classical and new models with statistical notation accompanied by the analyses of example data sets. This book is a good introductory text for graduate students working at the interface of ecology and statistics. It will be a basic

reference for biometricians with an interest in models for estimation of demographic parameters, but is less comprehensive than the recent textbook of Williams, Nichols, and Conroy (2002).

The book contains 10 chapters that can be subdivided into five main sections. First, Chapters 1 and 10 are bookend chapters that provide a general introduction and synthesis. Second, Chapters 2 and 4 consider classical and new developments in closed population models for live encounter data. Closed population models are often used for estimation of population size. Third, Chapter 3 introduces classical Cormack–Jolly–Seber (CJS) models for open populations and live encounter data, used for the estimation of apparent survival and encounter rates. Chapters 5 and 8 discuss newer extensions of CJS models, including temporal symmetry models for estimation of recruitment and population change, robust design models for estimation of temporary emigration, and multistate models for the estimation of state-specific demographic parameters. Fourth, Chapters 6 and 7 discuss models for analysis of dead recovery data, both alone and jointly with live encounter data. Lastly, Chapter 9 and the appendices provide an overview of the software tools that are available to implement mark-recapture analyses.

A major strength of the book is that the chapters are well written and the notation will be easy to follow for a reader without training in biometrics. However, the book could have benefited from better organization. If the book is read in sequence, the flow is disjointed because the chapters alternate between closed and open population models, and also between models for live encounter and dead recovery data. Editorial flaws are limited. The authors attempted to standardize notation across all chapters but a few minor discrepancies remain. For example, the formula for corrected quasi-AIC_c values is given in Chapter 5 but not in the introductory Chapter 1, and the number of estimated parameters is variously denoted as either P (p. 18) or K (p. 100).

For newcomers to CMR methods, one of the best ways to become familiar with the models is to reanalyze example data sets where the results are already known. The authors extend this opportunity to the reader by providing the encounter histories that accompany many of their illustrative analyses. Photographs of capture and marking techniques for wildlife populations provide additional color. Despite being an introductory text, this book will likely offer new ideas to readers familiar with CMR methods. Two new topics that caught my interest included continuous time models for closed populations and applications of multistate models in stratified sampling.

The book falls short in the treatment of two issues, one technical and one philosophical. One issue that is common to most CMR analyses is a need for initial goodness-of-fit (GOF) tests to assess the fit of the global starting model to the data in the encounter histories. If necessary, lack of fit can be addressed by calculation of a variation inflation factor (\hat{c}) and by adjustment of model selection criteria. Adjustments for lack of fit are a critical issue that warranted a separate chapter, but is not mentioned in Chapter 1, and is treated by most authors as a side issue related to model selection. At the time of writing, the main GOF procedures available were CJS model tests and a parametric bootstrap

method, but a new median \hat{c} procedure based on logistic regression is beginning to receive wider use.

The authors cite the major papers for each set of CMR models, but potential applications are not well developed. Examples from linguistics and social and computer sciences are only briefly mentioned in Chapter 4 (p. 72). In ecology, advanced models for open populations have led to a resurgence of interest in animal demography including the first quantitative estimates of breeding propensity, and even estimation of demographic parameters for unobservable life stages (Sandercock, 2006)! Closed population models have great utility, and have been used to estimate the number of song elements in the vocal repertoire of birds, the size of plant populations, and the species richness of communities. Overall, the book could have done more to promote the utility of CMR models by exploring a wider array of empirical examples.

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CROWLEY, J. and ANKERST, D. P. (eds) **Handbook of Statistics in Clinical Oncology, 2nd edition**. Chapman & Hall/CRC, Boca Raton, Florida, 2006. 617 pp. US\$89.95/£49.99, ISBN 0-8247-2339-2.

Clinical research in the field of oncology continues to thrive. Cancer research continues to be a primary focus of research funded by the U.S. federal government, and has increasingly become a major focus for the pharmaceutical industry as the demand (and profits) associated with cancer therapeutics has increased. This continued emphasis on cancer research has been accompanied by an explosion in technology-enhanced assessment of possible prognostic and predictive factors, novel endpoints (such as functional imaging-based scans), and other tumor markers. Thus, an overview of current topics in clinical oncology is welcome. The *Handbook of Statistics in Clinical Oncology*, edited by Drs Crowley and Ankerst, attempts to provide such an overview. This is an expanded and revised second edition of a text that was initially well received by the community.

The book is comprised of 33 chapters, grouped into 6 sections. The first section is devoted to phase I trials and includes five chapters that discuss in detail the choice of endpoints, theory and practice of the designs in phase I cancer clinical trials, particularly the continual reassessment methods with toxicity-based endpoints, and pharmacokinetic analyses. Recent work in the literature on dose escalation designs for bivariate outcomes and multiple agents could have been included for completeness. Section 2 addresses phase II study design. The four chapters in this section cover in comprehensive detail the standard frequentist approaches to phase II

trials. The chapter on the use of time-to-event endpoints is particularly helpful, as with novel agents, there is a (at least perceived) need to move away from the usual phase II endpoint of tumor response. There is little discussion of newer Bayesian approaches, and no discussion of the increasing emphasis on laboratory endpoints that accompany phase II trials.

The section on phase III trials spans seven chapters. The first few chapters in this section provide an overview of the randomization procedures and their impact on analyses, factorial designs including a detailed discussion of power considerations in the presence of interactions, design issues in noninferiority trials, and implications on sample size and design characteristics when the proportional hazards assumption is violated. The latter set of chapters deals with monitoring of trials including an interesting Bayesian approach to early stopping for futility and success, and methods to analyze quality of life and economic endpoints. A comprehensive list of references makes up for a lack of detail and depth of discussion of some concepts in this section. As with phase I trials, recent work on newly emerging designs for biomarker studies incorporating genetic or other prognostic factors could have been included.

Section 4 on exploratory analysis and prognostic factors is a refreshing and well-thought-out addition. A detailed discussion of sample size calculations for prognostic factor studies is a unique and useful feature. The discussion of some of the commonly used statistical tools to identify predictive and prognostic factors (prognostic model), although mostly comprehensive, does not address issues such as prevalence of a factor, sample size considerations, and use of the c -statistic to assess prediction accuracy. A highlight of the section is Chapter 21, which discusses an intuitive analytical tool that combines clinical outcome with biologic data to monitor clinical trials.

Considerations for analysis of high-dimensional data sets such as microarray and proteomic data are discussed in the six chapters comprising the fifth section of the book. Various types of microarray and genetic data are discussed and basic concepts necessary for understanding proteomic data structure are given. The chapters provide a good initial overview of objectives commonly addressed in these data sets including normalization, class comparison, class discovery, class prediction, and multiple comparisons. An overview of the methods available to address these objectives and how they work are also included. While the chapters apply the methods to real data sets, the reader will need to do further investigation before being able to choose their analysis methods, as the pros and cons of the different analysis methods are not discussed. The chapter discussing software, where to find it, how to choose a tool, data resources, and how to contribute software is a refreshing, practical read and openly points out areas needing further work.

Finally, Section 6 provides an overview of a variety of topics that are important but not included in standard texts. Peter Thall contributes an interesting, though somewhat theoretical, proposal for exploring between-trial heterogeneity in single arm trials. The excellent nontechnical discussion of competing risks, which is very helpful for the practicing statistician, is noteworthy. The closing three chapters are devoted mainly to a discussion of proper practices that, although most