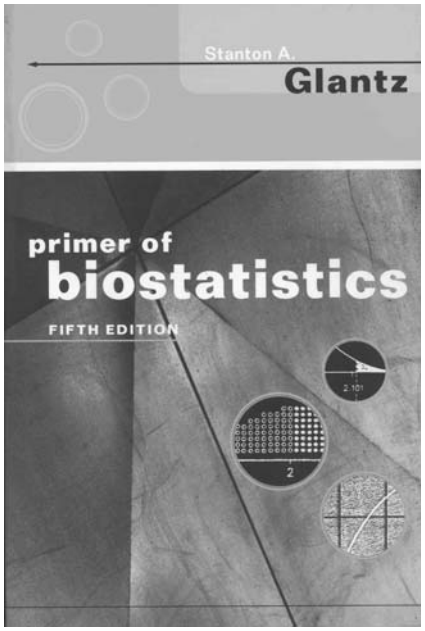
Reviews

edited by Beth Notzon



PRIMER OF BIOSTATISTICS, 5TH ED. STANTON A GLANTZ. NEW YORK: MCGRAW-HILL; 2002. 489 PAGES. SOFTCOVER $39.95. ISBN 0-07-137946-0.

Too much of the statistical reporting seen in the medical literature represents a "sorry state of affairs", writes Stanton A Glantz in *Primer of Biostatistics*. The inappropriate use of statistical tests, or insufficient descriptions of the tests used, can lead researchers to present results that may not be accurate and that can inappropriately influence clinical care and health policy.

Glantz, a professor at the University of California, San Francisco (UCSF), has made a name for himself through his research on and clear pronouncements about the tobacco industry. (The back cover blurb indicates that the tobacco industry has twice sued UCSF, unsuccessfully, to try to stop Glantz's work.) This straightforward approach is also apparent in *Primer of Biostatistics*. He wasn't afraid to take on big tobacco and isn't afraid to point out the problems in his fellow researchers' statistical analysis either.

In *Primer of Biostatistics*, Glantz sets out to show that statistical analysis is really quite comprehensible. He uses a step-by-step approach in presenting the derivation and application of basic statistical techniques, which helps to remove the clouds that can obscure an understanding of statistics. His ample use of sources from the medical literature to provide examples of statistical applications make this text particularly useful for writers, editors, and others involved in medical research.

Most common statistical techniques are covered in this book. Two that are not discussed in detail—multivariate analysis and logistic regression—are beyond the scope of an introductory text like this one; citations for further reading on these topics are included.

One of the beauties of statistical analysis is that even the advanced techniques build on the basic methods discussed in the book. Glantz starts out simply by describing the measures used to summarize data. The derivations of the mean and the variance, both of which not only describe data but are integral to more advanced statistical techniques, are presented. The use of a median instead of a mean to describe skewed data is also discussed. These descriptive measures are the first of many informational bits that will allow a reader to critique the presentation of data in the literature with insight.

Glantz devotes several pages to a description of the standard error of the mean and how it differs from the standard deviation. The two numbers describe different aspects of data, and the standard error of the mean is typically smaller. Medical investigators therefore often use the standard error of the mean to describe their data because it makes their data look better, he writes. But using it this way is an attempt to fudge the numbers, he indicates. "Data should never be summarized with the standard error of the mean", Glantz writes, expressing himself with his trademark clarity. Authors and editors will probably be more careful in presenting the standard error of the mean—and readers more careful in scrutinizing such presentations—as a result of this information. Common tests used to check for differences between groups—*t* tests and the group of related techniques generally referred to as analysis of variance, or ANOVA—get considerable attention. Glantz shows that the mathematics underlying these tests are simple enough for anyone with a grasp of basic algebra to understand, and he uses examples from the medical literature to illustrate the explanations. He also discusses the situations in which these tests are appropriate to use and their limitations.

The *t* test seems to be everywhere in the medical literature, and, Glantz writes, it's often found in places it shouldn't be. Research he published in 1980 found that of the 142 original articles published in one volume of a medical journal, 27% made inappropriate use of a *t* test in comparisons of more than two groups. The original copyright of *Primer of Biostatistics* was in 1981, and it is in its fifth edition. One wonders whether the situation has improved any since then; updating this reference would be helpful in any future editions.

The discussion of simple linear regression in the text covers the basics of this common statistical method. Multivariate

analysis is often more useful than simple linear regression, however, inasmuch as many studies by necessity involve examining several variables' effect on an outcome. The regression information provided here would provide a solid foundation for further reading on multivariate analysis.

Glantz takes the time to discuss how the *P* value of 0.05 typically used to determine statistical significance gained such prominence. No mathematics is involved here; it was "an arbitrary decision by one person", Ronald A Fisher, who preferred the 5% value in a 1926 paper describing crop yields, Glantz writes. Aha! Another mystery of statistics solved.

Several additional statistical methods, the difference between parametric and nonparametric tests and when to use each, and a table indicating the appropriate application of common hypothesis-testing statistical methods are all included. The use of simple, invented data collected from an imaginary sample of Martians helps in understanding the derivations of many of the methods discussed.

The book assumes no prior knowledge of statistics, although only a truly committed novice would want to wade through this material unaided. The text is particularly helpful for those with some statistics background who need a convenient, compact reference to look up what a test does, how it's derived, and when it should be used. It can help readers to evaluate the use and presentation of statistical methods in the literature and thereby potentially improve the quality of results presented.

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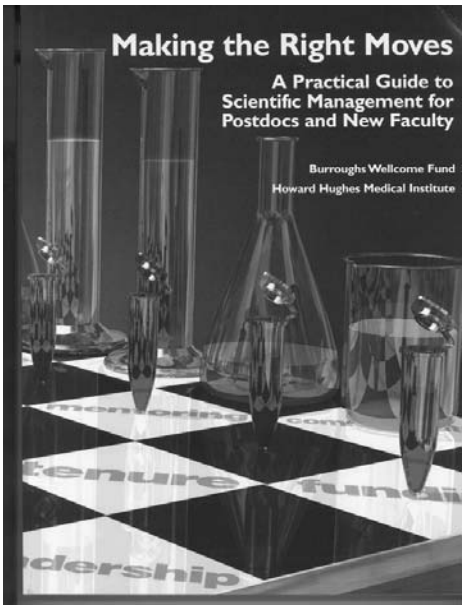

MAKING THE RIGHT MOVES: A PRACTICAL GUIDE TO SCIENTIFIC MANAGEMENT FOR POSTDOCS AND NEW FACULTY. BURROUGHS WELLCOME FUND, NORTH CAROLINA; HOWARD HUGHES MEDICAL INSTITUTE, MARYLAND; 2004, 233 PAGES. SOFTCOVER: FREE OF CHARGE.*

This manual is based on the Course in Scientific Management for the Beginning Academic Investigator held in July 2002 at the Howard Hughes Medical Institute (HHMI) headquarters in Chevy Chase, Maryland. The idea for the course came from comments that Burroughs Wellcome Fund and HHMI staff had solicited over the years from young biomedical scientists who had received research-training or career-development grants from the organizations. The teaching materials have been collected from more than 65 expert contributors in various biomedical, pharmaceutical, and managerial fields. It took about 2 years for the course to take shape. The final program covered a wide array of topics, from laboratory leadership and mentoring skills to getting published and time management.

The manual is intended for laboratory-based biomedical scientists who are just launching their careers: advanced postdoctoral fellows ready to enter the academic job market and new faculty members in research universities, medical schools, and research centers. Much of the material, however, is also relevant to scientists pursuing nonacademic careers. The purpose of the manual is to make beginning scientists more aware of the importance of the managerial aspects of their new positions and to provide them with practical information that will help them succeed as efficient planners and managers of research programs. The manual is also intended to encourage universities, professional societies, postdoctoral associations, and other organizations to develop similar courses in scientific management and to provide them with a foundation on which to base the design of such courses. Burroughs Wellcome Fund and HHMI believe that training in scientific management should be made available to all researchers early in their careers. Not only will the researchers benefit, but the scientific enterprise will benefit as well. The composition of this manual reflects the objectives of the publishers and provides an excellent outline and information for filling in various educational gaps.

*This book can be obtained by calling the Howard Hughes Medical Institute at (301) 215-8500. It is also available online at *www.hhmi.org/grants/office/graduate/labmanagement.html*.

The first chapter, "Obtaining and Negotiating a Faculty Position and Planning for Tenure", offers tips on finding and negotiating terms for a faculty position, outlines the expectations of a faculty position, and offers a timeline to help junior faculty to plan for their academic tenure. The next chapter, "The Scientific Investigator Within the University Structure", takes a critical look at the typical decision-making hierarchies of a research university and an academic health center, discusses professional responsibilities outside the laboratory, and introduces some of the academic offices with which young investigators will interact and the resources available to support their research.

Two chapters deal with the importance of people skills. "Defining and Implementing Your Mission" offers guidance in developing a mission statement for the laboratory and suggests ways to motivate and manage the people in the laboratory. "Mentoring and Being Mentored" explores what it means to be a mentor, particularly as a strategy for facilitating learning and training new scientists. It includes approaches to help new investigators and faculty to become effective mentors and offers advice on how to obtain the needed mentoring. "Staffing Your Laboratory" provides pointers on recruiting a team that will contribute to the success of the research laboratory.

Several chapters offer pertinent information about time management, project management, and data management. These are critical in developing a successful laboratory. "Getting Funded" and "Getting Published and Increasing Your Visibility" discuss those challenging tasks in the competitive environment of biomedical research. "Setting Up Collaborations" and "Understanding Technology Transfer" are particularly relevant at a time when research projects often involve scientists in different departments and different universities and when research findings are often shared with industry and government. The final chapter provides a summary of the course, including an abstract of each session, a summary of the postcourse evaluation and lessons learned, and speakers' biographies.

Several sessions in the course were not developed into separate chapters in the manual, but some of the information from those sessions is included in various chapters. For example, information from the session on budgets is found in the chapter "Getting Funded" and is presented from the standpoint of preparing a grant application. The chapters were reviewed by the speakers, course developers, and other Burroughs Wellcome Fund and HHMI staff.

The manual is not meant to be a comprehensive reference text. It is designed to highlight key points about scientific management that are not readily available in print elsewhere. Likewise, it is not meant to be prescriptive; rather, it is a collection of opinions, experiences, and tips from established scientists and other professionals. The contents of the manual will certainly spark ideas for developing a scientific-management style that suits general readers' personalities and professional situations. The manual can also serve as a resource for organizations that are developing their own courses in scientific management. It is a practical scientific-management manual with a refreshing and pleasant-to-read format.

Dominic Fan

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