

PREFACE TO THE THIRD EDITION

and summary of prefaces to the first two editions

This book, through its several editions, has continued to adapt to evolving areas of research in epidemiology and statistics, while maintaining the original objective of being non-threatening, understandable and accessible to those with limited or no background in mathematics. Two new areas are covered in the third edition: genetic epidemiology and research ethics.

With the sequencing of the human genome, there has been a flowering of research into the genetic basis of health and disease, and especially the interactions between genes and environmental exposures. The medical literature in genetic epidemiology is vastly expanding and some knowledge of the epidemiological designs and an acquaintance with the statistical methods used in such research is necessary in order to be able to appreciate new findings. Thus this edition includes a new chapter on genetic epidemiology as well as an Appendix describing the basics necessary for an understanding of genetic research. Such material is not usually found in first level epidemiology or statistics books, but it is presented here in a basic, and hopefully easily comprehensible way, for those unfamiliar with the field. The second new chapter is on research ethics, also not usually covered in basic textbooks, but critically important in all human research. New material has also been added to several existing chapters.

The principal objectives of the first edition still apply. The presentation of the material is aimed to give an understanding of the underlying principles, as well as practical guidelines of “how to do it” and “how to interpret it.” The topics included are those that are most commonly used or referred to in the literature. There are some features to note that may aid the reader in the use of this book:

- (a) The book starts with a discussion of the philosophy and logic of science and the underlying principles of testing what we believe against

the reality of our experiences. While such a discussion, per se, will not help the reader to actually “do a t-test,” I think it is important to provide some introduction to the underlying framework of the field of epidemiology and statistics, to understand why we do what we do.

(b) Many of the subsections stand alone; that is, the reader can turn to the topic that interests him or her and read the material out of sequential order. Thus, the book may be used by those who need it for special purposes. The reader is free to skip those topics that are not of interest without being too much hampered in further reading. As a result there is some redundancy. In my teaching experience, however, I have found that it is better to err on the side of redundancy than on the side of sparsity.

(c) Cross-references to other relevant sections are included when additional explanation is needed. When development of a topic is beyond the scope of this text, the reader is referred to other books that deal with the material in more depth or on a higher mathematical level. A list of recommended texts is provided near the end of the book.

(d) The appendices provide sample calculations for various statistics described in the text. This makes for smoother reading of the text, while providing the reader with more specific instructions on how actually to do some of the calculations.

The aims of the second edition are also preserved in this third edition. The second edition grew from feedback from students who indicated they appreciated the clarity and the focus on topics specifically related to their work. However, some users missed coverage of several important topics. Accordingly, sections were added to include a full chapter on measures of quality of life and various psychological scales, which are increasingly used in clinical studies; an expansion of the chapter on probability, with the introduction of several nonparametric methods; the clarification of some concepts that were more tersely addressed in the first edition; and the addition of several appendices (providing sample calculations of the Fisher's exact test, Kruskal–Wallis

test, and various indices of reliability and responsiveness of scales used in quality of life measures).

It requires a delicate balance to keep the book concise and basic, and yet make it sufficiently inclusive to be useful to a wide audience. I hope this book will be useful to diverse groups of people in the health field, as well as to those in related areas. The material is intended for (1) physicians doing clinical research as well as for those doing basic research; (2) for students—medical, college, and graduate; (3) for research staff in various capacities; and (4) for anyone interested in the logic and methodology of biostatistics and epidemiology. The principles and methods described here are applicable to various substantive areas, including medicine, public health, psychology, and education. Of course, not all topics that are specifically relevant to each of these disciplines can be covered in this short text.

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