HANDBOOK for Health Care Research

Second Edition

ROBERT L. CHATBURN, RRT-NPS, FAARC
Research Manager, Respiratory Institute
Cleveland Clinic
Cleveland, Ohio

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Dedication

Allied health professionals are rarely given formal training in research methodology. And, even when they are, it is never more than a cursory overview. The real learning happens in apprenticeship. One must have a good mentor who can pass on the benefit of his or her knowledge and experience. I have been blessed with three of the best mentors a person could have.

The first is Marvin Lough, MBA, RRT, FAARC. Marv gave me my first job in the profession and helped me create a dedicated research position. He taught me that it is not what a person holds in memory that counts, but rather what he knows how to find. He has exemplified in every way what it means to be a professional, a leader, and a gentleman.

The second is Frank P. Primiano, Jr., PhD. Frank has the most disciplined, logical, and penetrating mind that I have ever encountered. He taught me the basic skills of a scientist. He taught me that brilliance lies in paying attention to the details and the supreme importance of defining and understanding the words you use. Most importantly, he taught me, “If you explain something so that even a fool can understand it . . . then only a fool will understand it.”

The third is Terry Volsko, MHHS, RRT, FAARC. I have never met anyone with a greater hunger for knowledge or a stronger will to succeed. She has been a brilliant and tireless colleague, an insightful critic, and a compassionate friend.
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Preface

Learning to conduct research is like learning to ride a bicycle: reading a book is not much help. You need to learn by doing, with someone holding you up the first few times. Yet, the student of health sciences research must be familiar with basic concepts that can be studied by reading. The trick is for an author to select the right topics and present them in a way that is both relevant and interesting.

*Handbook for Health Care Research, Second Edition,* is the result of my research experience in the field of respiratory care over the last 30 years. I have selected topics and statistical procedures that are common to medical research in general as well as to allied health care in particular. It is by no means an exhaustive treatise on any particular aspect of medical research. Rather, it is a practical guide to supplement specialized statistics textbooks, although it can function as a stand-alone text for a short course in research for a two- or four-year respiratory care or other allied health program. In fact, this book grew out of the notes I used for seven years to teach research at Cuyahoga Community College.

On one level, the book is geared for the student or health care professional who wants to become involved with research. Basic concepts are presented along with real-world examples. Naturally, because I am a respiratory therapist, the examples focus on respiratory care. However, the concepts are applicable to any area of medical research. I have tried to keep the theory and mathematics at the most elementary level. I assume that the reader will have basic computer skills and will have access to software that will handle the math. For that reason, unlike many books on the topic, this book gives no probability tables for calculating things like the critical values of the $t$-statistic. Computers have made hand calculations all but obsolete. What the student really needs to know is which procedure to use, when to use it, and why to use it.

For the experienced researcher, the book is organized for easy look-up of basic research procedures and definitions. When you are in the middle of a project, you do not want to have to dig through pages and pages of theory when you simply want to be reminded of which test to use or how to format the data for computer entry.

Not every health care professional will be directly involved with research. However, everyone will be involved with the results of research. Most will be involved with some sort of continuous quality improvement project, which will inevitably require familiarity with research techniques. Therefore, this book, if nothing else, is an excellent tool to help you become an “educated consumer” of research. After all, how can you appreciate the information in professional journals if you do not even know what a $p$ value is? Researchers who publish
in journals are trying to sell you their ideas. If you do not understand the procedures they use to generate their ideas and the language they use to sell them, you could end up “buying a lemon.”

New to the Second Edition

For the Second Edition of Handbook for Health Care Research, the tables and figures have been fully updated and revised. Chapter 6, “Reviewing the Literature,” has been rewritten to reflect the latest Internet resources. Appendix I is brand-new, and it provides valuable insight for improving your scientific writing skills. Chapter 15, “The Abstract,” has been revised, and a new model paper is presented in Appendices V and VI.

Features of Handbook for Health Care Research

Several features in this book are unique. For example, the descriptions of statistical tests are standardized in a practical format. For each procedure, a hypothetical (or sometimes real-world) study problem is introduced, the hypothesis is stated, the data are given in the format that they are entered into the computer, and then a detailed report from an actual statistical program is given.

Another unique feature is Chapter 15, which focuses on writing the stand-alone abstract. The new researcher’s first experience with publishing research will usually be in the form of an abstract rather than a full-text article. For this reason, I have placed particular emphasis on how to write an abstract that will pass peer review. There are model abstracts that have been published in Respiratory Care, along with examples of abstracts that show what not to do. I review each example in detail and explain the mistakes made. These detailed examples are intended to give the reader a mentor, someone looking over his or her shoulder and providing help and encouragement. In fact, this text is written in a conversational style throughout. This helps to illustrate the relevance of each new concept that might otherwise seem dull and intangible.

Finally, Appendix I is an unique tutorial for improving your science writing, authored by Matti Mero, an experienced copyeditor for Respiratory Care. As a copyeditor for a major medical journal, Matti has seen every kind of mistake. His suggestions will help you avoid them and make the experience of peer review much easier once you submit your manuscript for publication.

Also included in the appendices is a model manuscript that was published in Respiratory Care. I include the comments of the peer reviewers along with the authors’ responses. One of the biggest obstacles for new researchers is that they have a hard time accepting critical comments about a manuscript they have submitted for publication. Many, maybe even most, are so discouraged that they do not make the suggested revisions, and their work goes to waste. My hope is that by reading actual reviewers’ comments and the authors’ responses, you will understand that (1) every researcher, no matter how experienced, will be criticized, and (2) the
criticism leads to a better product if you follow through. I always tell my students that the first thing they have to learn is to put their egos on the shelf.


Acknowledgments

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About the Author

Robert L. Chatburn, RRT-NPS, FAARC, is an Adjunct Associate Professor in the Department of Medicine at the Lerner College of Medicine of Case Western Reserve University and a Fellow of the American Association for Respiratory Care. Mr. Chatburn is currently the Clinical Research Manager of the Respiratory Institute at the Cleveland Clinic. Previously, he was the Technical Director of respiratory care at University Hospitals for 20 years. He is the author of nine textbooks and over 240 publications in medical journals. He is an Associate Editor of Respiratory Care and is recognized internationally as a research scientist and authority on mechanical ventilation and pediatric respiratory care.

Mr. Chatburn was born and raised in the Cleveland area. He received an AS degree from Cuyahoga Community College and a BS degree from Youngstown State University. He began his career at Rainbow Babies & Children’s Hospital in 1977. In 1979 he was promoted to research coordinator. In 1986 he took the position of Technical Director of pediatric respiratory care and in 1995 annexed the adult division as well. In 1997 he became Adjunct Assistant Professor of pediatrics at Case Western Reserve University and was promoted to Adjunct Associate Professor in 1998. In 2006 Mr. Chatburn became Clinical Research Manager of the Respiratory Institute at the Cleveland Clinic. Mr. Chatburn was among the first 13 people awarded fellowship in the American Association for Respiratory Care in 1998 and was the recipient of the 2007 Forrest M. Bird Lifetime Scientific Achievement Award.

Contributing Authors

Charles G. Durbin, Jr., MD, FAARC
Professor of Anesthesiology and Surgery
University of Virginia

Matthew Mero, MA
Respiratory Care

David J. Pierson, MD
Medical Director, Respiratory Care
Harborview Medical Center
Professor of Medicine
University of Washington