

HANDBOOK

for Health Care Research

Second Edition

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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.

Brief Contents

Section I Introduction	1
1 Why Study Research?	3
2 Ethics and Research	9
3 Outcomes Research	17
Section II Planning the Study	29
4 The Scientific Method	31
5 Developing the Study Idea	37
6 Reviewing the Literature	45
7 Designing the Experiment	59
Section III Conducting the Study	79
8 Steps to Implementation	81
9 Making Measurements	93
10 Basic Statistical Concepts	121
11 Statistical Methods for Nominal Measures	187
12 Statistical Methods for Ordinal Measures	205
13 Statistical Methods for Continuous Measures	213
Section IV Publishing the Findings	241
14 The Paper	243
15 The Abstract	255
16 The Case Report	267

17	The Poster Presentation	281
Appendix I	Basic Science Writing	287
Appendix II	Glossary	321
Appendix III	Peer Review Checklists	331
Appendix IV	Answers	335
Appendix V	Model Paper	343
Appendix VI	Response to Reviewers	357

Contents

Preface	xix
About the Author	xxiii
Section I Introduction	1
1 Why Study Research?	3
Health Care Education	3
Critical Evaluation of Published Reports	4
Continuing Education	4
Professional Accountability	5
Administration of Health Care Services	5
Continuous Quality Improvement	6
Evaluating New Equipment and Methods	6
Validating Manufacturers' Claims	6
Questions	7
2 Ethics and Research	9
Institutional Review and Human Subjects' Rights	10
Functions of the Institutional Review Board	10
Composition of the Institutional Review Board	11
Approval of the Institutional Review Board	11
Informed Consent	12
Background	12
Role Today	12
Revocation of Consent	13
Ethical Issues	13
Basic Principles	13
Objective Patient Care	15
Reporting Research Results	15
	vii

Questions	16
Reference	16
3 Outcomes Research	17
A Brief History	17
Understanding the Jargon	18
Outcomes Research: Focus and Methods	19
The Outcome of Outcomes Research	23
Examples from Respiratory Care	24
Benchmarking	25
Summary	27
Questions	27
References	28
Section II Planning the Study	29
4 The Scientific Method	31
The Scientific Method	31
Step 1: Formulate a Problem Statement	31
Step 2: Generate a Hypothesis	31
Step 3: Define Rejection Criteria	32
Step 4: Make a Prediction	32
Step 5: Perform the Experiment	33
Step 6: Test the Hypothesis	33
Steps in Conducting Scientific Research	33
Develop the Study Idea	33
Search the Literature	34
Consult an Expert	34
Design the Experiment	34
Write the Protocol	34
Obtain Permission	34
Collect the Data	35
Analyze the Data	35
Publish the Findings	35
Questions	35

5	Developing the Study Idea	37
	Sources of Research Ideas	37
	Developing a Problem Statement	38
	Judging the Feasibility of the Project	40
	Significance of the Problem	40
	Measurability of the Problem	41
	Time Constraints	41
	Availability of Subjects	41
	Cost and Equipment	41
	Experience	42
	Summary	42
	Questions	42
	Reference	44
6	Reviewing the Literature	45
	Conducting the Literature Search	46
	Scope of the Review	46
	Sources of Information	46
	Books	46
	Journal Articles	47
	Databases	47
	Bibliographic Databases	48
	Citation Databases	49
	Synthesized Databases	49
	Portals	50
	Electronic Journals and Books	50
	General Internet Resources	50
	Suggestions for Conducting Searches	50
	How to Read a Research Article	51
	Selecting a Research Paper to Read	52
	Organization of Research Papers	53
	What Is in a Title?	54
	The Abstract	55
	How to Read the Actual Paper	55
	Summary	57
	Questions	57
	References	58

7	Designing the Experiment	59
	Samples and Populations	59
	Methods of Obtaining a Sample	60
	Basic Concepts of Research Design	62
	Experimental Designs	63
	Pre-Experimental Designs	64
	Quasi-Experimental Designs (Case Control)	64
	True Experimental Designs (Randomized Control)	66
	Analysis of Variance	68
	Validity of Research Designs	71
	Non-Experimental Study Designs	73
	Retrospective Studies	74
	Prospective Studies	75
	Case Studies	75
	Surveys	75
	Correlational Studies	76
	Questions	76
	References	78
	Section III Conducting the Study	79
8	Steps to Implementation	81
	Writing the Study Protocol	81
	Creating a General Plan	81
	The IRB Study Protocol Outline	82
	Funding	87
	Data Collection	87
	The Laboratory Notebook	88
	Specialized Data Collection Forms	88
	Computers	89
	Questions	91
9	Making Measurements	93
	Basic Measurement Theory	93
	Accuracy	94
	Precision	94
	Inaccuracy, Bias, and Imprecision	96

Linearity	97
Calibration	98
Sources of Bias (Systematic Error)	99
Sources of Imprecision (Random Error)	104
Measuring Specific Variables	105
Pressure	105
Flow	108
Volume	111
Humidity	115
Signal Processing	117
Recording and Display Devices	118
Questions	119
10 Basic Statistical Concepts	121
Preliminary Concepts	121
Definition of Terms	122
Levels of Measurement	122
Significant Figures	124
Zeros as Significant Figures	125
Calculations Using Significant Figures	125
Rounding	126
Descriptive Statistics	126
Data Representation	126
Measures of the Typical Value of a Set of Numbers	133
Measures of Dispersion	135
Propagation of Errors in Calculations	137
Correlation and Regression	138
Inferential Statistics	142
The Concept of Probability	142
The Normal Distribution and Standard Scores	144
Sampling Distributions	147
Confidence Intervals	150
Error Intervals	152
Data Analysis for Device Evaluation Studies	157
Interpreting Manufacturers' Error Specifications	161
Hypothesis Testing	164
Type I and II Errors	170

xii CONTENTS

Power Analysis and Sample Size	172
Rules of Thumb for Estimating Sample Size	176
Clinical Importance Versus Statistical Significance	180
Matched Versus Unmatched Data	180
Questions	181
Reference	186
11 Statistical Methods for Nominal Measures	187
Describing the Data	187
Characteristics of a Diagnostic Test	188
True- and False-Positive Rates	191
True- and False-Negative Rates	191
Sensitivity and Specificity	192
Positive and Negative Predictive Value	192
Diagnostic Accuracy	193
Likelihood Ratio	193
Receiver Operating Characteristic (ROC) Curve	193
Correlation	195
Kappa	195
Phi	196
Comparing a Single Sample with a Population	197
Binomial Test	197
z Test	198
Comparing Two Samples, Unmatched Data	199
Fisher Exact Test	200
Comparing Two or More Samples, Matched Data	201
McNemar Test	201
Comparing Three or More Samples, Unmatched Data	202
Chi-Squared Test	202
Questions	203
12 Statistical Methods for Ordinal Measures	205
Describing the Data	205
Correlation	206
Spearman Rank Order Correlation	206
Comparing Two Samples, Unmatched Data	207
Mann-Whitney Rank Sum Test	207

Comparing Two Samples, Matched Data	208
Wilcoxon Signed Rank Test	208
Comparing Three or More Samples, Unmatched Data	209
Kruskal-Wallis ANOVA	209
Comparing Three or More Samples, Matched Data	210
Friedman Repeated Measures ANOVA	210
Questions	211
13 Statistical Methods for Continuous Measures	213
Testing for Normality	213
Kolmogorov-Smirnov Test	213
Testing for Equal Variances	214
<i>F</i> Ratio Test	214
Correlation and Regression	216
Pearson Product-Moment Correlation Coefficient	217
Simple Linear Regression	218
Multiple Linear Regression	219
Logistic Regression	220
Comparing One Sample to a Known Value	222
One-Sample <i>t</i> Test	222
Comparing Two Samples, Unmatched Data	223
Unpaired <i>t</i> Test	223
Comparing Two Samples, Matched Data	226
Paired <i>t</i> Test	226
Comparing Three or More Samples, Unmatched Data	227
One-Way ANOVA	228
Two-Way ANOVA	230
Comparing Three or More Samples, Matched Data	233
One-Way Repeated Measures ANOVA	233
Two-Way Repeated Measures ANOVA	235
Questions	239
Section IV Publishing the Findings	241
14 The Paper	243
Selecting an Appropriate Journal	243
Writing Style	243

xiv CONTENTS

Types of Authors	244
Types of Readers	244
Indexing	244
Peer Review	244
Getting Started	245
Authorship	245
The Rough Draft	245
The Structure of a Paper	247
Title	247
Abstract	247
Introduction	248
Methods	248
Results	249
Discussion	250
Conclusion	250
Illustrations	250
Submission for Publication	251
First Steps	251
Peer Review	251
Revision	251
Production	252
Mistakes to Avoid	252
Questions	253
15 The Abstract	255
Background	255
Specifications	255
Content Elements	256
Format	256
Model Abstract	257
Model Abstract #1: Mid-Frequency Ventilation:	
Optimum Settings for ARDS	257
Model Abstract #2: Laboratory Evaluation of Three Stockpiled	
Portable Ventilators	258
What Not to Do (Analysis of Rejected Abstracts)	260
Abstract #1: Quality Improvement Using Therapist-Driven Protocols	260
Review of Abstract #1	260

Abstract #2: Comparison of Whole-Body Plethysmography (WBP) with In-Line Pneumotachography (ILP) for Neonatal Pulmonary Function Measurements	261
Review of Abstract #2	262
Abstract #3: Effect of PEEP in Patients with Congenital Diaphragmatic Hernia	263
Review of Abstract #3	263
Abstract #4: Simulation of Closed-Chest Compression Using a Mechanical Test Lung	264
Review of Abstract #4	265
Summary	265
Questions	266
16 The Case Report	267
Who Should Write It?	268
Attributes of a Reportable Case	269
A New Disease or Condition	269
A Previously Unreported Feature or Complication	270
A Particularly Instructive Example of a Known Condition	270
A Case Illustrating a New Diagnostic Test or Monitoring Technique	270
A New Treatment Modality	270
A New Outcome of Treatment	271
Steps in Preparing a Case Report	271
Identification of an Appropriate Case	271
Review of the Pertinent Literature	272
Consultation and Discussion	272
Planning the Paper and Assignment of Roles and Authorship	272
Further Investigation of the Case	273
Preparation of the First Draft	273
Preparation of Tables and Illustrations	273
Consultation and Discussion	274
Manuscript Revision	274
Preparation and Submission of Final Draft	274
Structure of a Case Report	274
Introduction	275
Case Summary	275
Tables and Illustrations	276

Discussion	276
References	276
Common Mistakes in Case Report Writing	277
Tunnel Vision	277
Insufficient Documentation of Case	277
Insufficient Documentation of Intervention	277
Poor Patient Care	278
Erroneous Premise	278
Submission to the Wrong Journal	279
Literary Inexperience	279
Inadequate Literature Review	279
Ineffective Illustrations or Tables	279
Poor References	279
Technical Mistakes	280
Failure to Revise the Manuscript After Editorial Review	280
Questions	280
17 The Poster Presentation	281
Layout	281
Template	282
Questions	283
Appendix I Basic Science Writing	287
Introduction	287
Questions to Ask About Your Words	290
Did I Include Explanations That Are Not Necessary for My Audience?	291
Did I Use the Right Word or Term?	292
Wrong Word by Definition	292
Unnecessary or Incorrect Long Term	293
Wrong Form of the Word	295
Wrong Preposition	296
Did I Use Acronyms and Technical Terms Correctly?	297
Did I Use Terms Consistently?	298
Did I Create Unnecessary and/or Problematic Data Categories?	299
Did I Include Error or Range Values for All Numbers?	300
Is the Sentence Logically Organized?	300
Does the Sentence Use the Correct Voice?	301

Is the Sentence Too Long or Too Short?	303
Does the Beginning of the Sentence Have an Obvious Logical Connection to the Previous Sentence?	304
Does the Sentence Say Something That Really Needs to Be Said?	305
Is It Redundant?	306
Do Not Restate for Emphasis	306
Scrutinize Commonly Used Phrases for Redundancy	307
Did I Phrase It Tentatively?	308
Is the Syntax Convoluted, Peculiar, or in a Literary Style?	309
Are There Confusing Word Strings?	311
Do Any of the Words Contradict Each Other?	311
Did I Lay Out the Information in Chronological Order?	312
Did I State the Topic and Then Stay on Topic?	313
Did I Put the Information in the Right Format (Text, Table, or Figure)?	314
Is There Redundancy Among the Sentences?	317
Is the Information in the Right Part of the Report?	318
Is There Redundancy Between Parts of the Report?	318
Does the Abstract Follow These Rules?	319
Appendix II Glossary	321
Appendix III Peer Review Checklists	331
Original Study Checklist	331
Device/Method Evaluation Checklist	332
Case Study Checklist	334
Appendix IV Answers	335
Chapter 1: Why Study Research?	335
Chapter 2: Ethics and Research	335
Chapter 3: Outcomes Research	336
Chapter 4: The Scientific Method	337
Chapter 5: Developing the Study Idea	337
Chapter 6: Reviewing the Literature	338
Chapter 7: Designing the Experiment	338
Chapter 8: Steps to Implementation	339
Chapter 9: Making Measurements	339
Chapter 10: Basic Statistical Concepts	340

xviii CONTENTS

Chapter 11: Statistical Methods for Nominal Measures	341
Chapter 12: Statistical Methods for Ordinal Measures	341
Chapter 13: Statistical Methods for Continuous Measures	342
Chapter 14: The Paper	342
Chapter 15: The Abstract	342
Chapter 16: The Case Report	342
Chapter 17: The Poster Presentation	342
Appendix V Model Paper	343
Abstract	344
Introduction	345
Methods	346
Results	349
Discussion	353
References	354
Appendix VI Response to Reviewers	357
Reviewer #1	357
Reviewer #2	358
Reviewer #3	359
Index	361

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 a 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.

I hope *Handbook for Health Care Research, Second Edition*, becomes your practical go-to guide.

Acknowledgments

Much thanks to David J. Pierson, MD, for writing Chapter 16, “The Case Report.” David first wrote this chapter for my book *Fundamentals of Respiratory Care Research*—now long out of print—and then the chapter reappeared in the *First Edition* of this book. Fortunately, David’s advice is timeless.

Mathew “Matti” Mero, MA, is the author of the new Appendix I, “Basic Science Writing.” Matti is a copyeditor for *Respiratory Care* and has a unique perspective honed from many years of rooting out mistakes and rounding the rough edges of countless authors (me among them). What he writes is pure gold, and you are not likely to find anything like it in other books. I am indebted to Matti for catching many a “slip of the pen” over the many years that I have been submitting manuscripts to *Respiratory Care*.

Charles G. Durbin, Jr., MD, FAARC, of the University of Virginia Health System, Charlottesville, contributed to Chapter 6, “Reviewing the Literature,” based on a paper he published in *Respiratory Care* in October 2009, pages 1366–1371. Charlie has been a friend and colleague for many years.

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.

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