

THIRD EDITION

Pulmonary Function Testing

A PRACTICAL APPROACH

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Contents

Preface	v
Acknowledgments	vii
Reviewers	ix
Contributing Author	xi
Chapter 1 Forced Spirometry and Related Tests	1
Chapter 2 Lung Volumes	69
Chapter 3 Single-Breath Carbon Monoxide Diffusing Capacity	113
Chapter 4 Airway Resistance by Body Plethysmography	143
Chapter 5 Cardiopulmonary Exercise Test	159
Chapter 6 Six-Minute Walk Test	201
Chapter 7 Exercise-Induced Bronchoconstriction Test	211
Chapter 8 Bronchial Challenge Testing with Pharmacological Agents	223
Chapter 9 Maximal Inspiratory and Expiratory Pressures	257
Chapter 10 Pediatric Pulmonary Function Testing	263
Chapter 11 Blood Gases and Associated Technologies	281
Chapter 12 Pulmonary Function Testing Reference (Predicted) Values	333

Appendices

A	Answers to Self-Assessment Questions	343
B	Conversion of Volumes	347
C	Mathematics of Boyle's Law	351
D	Pulmonary Terms, Symbols, and Definitions	353
E	Calculation of Mean and Standard Deviation	359

Index	361
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Preface

Pulmonary function tests are used to evaluate a broad range of lung disorders, including airflow obstruction, restrictive disorders, exercise limitations, and bronchial hyperreactivity. The information obtained from these tests enables the practitioner to recognize impairment, determine patients' responses to therapy, and follow the progress of disease. Today, these tests are performed by a range of healthcare workers, including respiratory care practitioners, nurses, medical assistants, and industrial (occupational) hygienists. Typically, these workers receive minimal classroom instruction and often learn their skills from others on the job. They may have sought but not found an appropriate practical how-to manual, finding instead books that are too theoretical or books that cover many topics, not all of them relevant.

The third edition of this book maintains the same general philosophy and purpose of the first two editions—to provide a practical entry-level textbook for students and a reference for those performing the tests. This edition contains some necessary and welcome updates, and focuses on the more commonly performed tests and strives to keep the material workable from an instructor's perspective. Hence, less commonly performed and ordered tests (e.g., gas distribution, ventilatory drive, forced oscillation) and certain extensive topics (e.g., bronchoscopy) that require more than a chapter to discuss properly have been deliberately excluded.

The basic organization and presentation of the content has been maintained in most chapters. Each chapter is a self-contained unit that typically has a brief historical perspective as well as any pertinent background material. This is followed by relevant physiology, instrumentation, techniques, calculations, quality control, basic elements of interpretation, and infection control. Each chapter concludes with references, self-assessment questions, and, in most chapters, case presentations.

The first three chapters discuss the most commonly ordered and performed tests: spirometry, lung volumes, and single-breath carbon monoxide diffusing capacity. Chapter 4 discusses airway resistance, and Chapter 9 discusses maximal inspiratory and expiratory pressures, tests commonly performed in many hospital pulmonary function laboratories. Chapters 5 through 7 discuss different exercise tests—cardiopulmonary exercise test, 6-minute walk, and exercise-induced bronchoconstriction test. Chapter 8 discusses bronchial challenge testing, including methacholine challenge and the mannitol challenge test. Chapters 10 and 11 are new additions and present brief and practical descriptions of pediatric pulmonary function testing and blood

gases, respectively. Chapter 12 presents a discussion of reference or predicted equations to help evaluate observed results. Finally, there are a number of appendices that present more detailed and helpful information on a variety of topics.

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The *Third Edition* of *Pulmonary Function Testing: A Practical Approach* evolved from the *First* and *Second Editions*. There were many individuals who provided advice and support for those works, and I extend a special thanks to them. The staff at Jones Bartlett & Learning, including Maro Gartside and David Cella, were helpful in the development of this new edition, and I want to offer a special thank you to them.

Some of the special illustrations in this *Third Edition* were included in previous editions and are the result of the artistic talents of Leigh Landskroner.

My heartfelt thanks to Reuben Cherniack and Charles Irvin for their encouragement, insight, guidance, and knowledge they have given me over the years.

My special thanks to Bruce Toben, RRT-NPS, CPFT, for his contributions to this *Third Edition*. His knowledge and insight for the chapter on arterial blood gases and associated technologies have made it a stronger text. Also, special thanks to Pam Leisenring, RRT, for her input and contributions on pediatric pulmonary function testing.

Finally, I want to thank my wife, Tammy, for her encouragement, suggestions, patience, and support during the preparation of this new edition.

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