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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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Acknowledgments

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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.

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