sistance, elastance, and intrinsic positive end-expiratory pressure with a microprocessor-controlled ventilator improves ventilator management of the most critically ill patients. However, the authors point out that, although the newest ventilators can make those measurements, the algorithms those machines use are not up to date. For example, they show data suggesting that intrinsic positive end-expiratory pressure is nearly always underestimated and that elastance is nearly always overestimated by the algorithms in the newest ventilators. They suggest continuously recording basic measurements from the ventilator into an online system that makes the calculations with more accurate algorithms. Chapter 29 describes how the forced oscillation technique can measure respiratory mechanics. The forced oscillation technique has the advantage that it can be used with patients undergoing either invasive ventilation or NPPV without interrupting the ventilatory cycle.

The last 2 chapters review treatments for acute respiratory distress syndrome and acute lung injury (ARDS/ALI). Chapter 30 focuses on the "open lung" approach, which involves mechanical ventilation maneuvers that reopen atelectatic lung units and then prevent recurrent collapse, thereby preventing or at least minimizing ventilator-induced lung injury. Chapter 31 examines the evidence that favors prone positioning for ARDS/ALI patients.

This symposium volume covers an incredibly broad portion of the spectrum of pulmonary disease. Initially, it seems more a cacophony than a symphony; however, a careful examination of the range of topics reveals a number of overarching themes:

1. NPPV and minimally invasive techniques to measure pulmonary function are being developed. Opto-electronic plethysmography seems to hold particular promise.
2. Simultaneous use of several techniques (eg, CT, MRI, and opto-electronic plethysmography) has yielded astonishing new insights into the pathophysiology of pulmonary disease.
3. Data from several research fronts indicate that the impact of pulmonary disease is very heterogeneously distributed in the lungs, so the most successful evaluation and treatment techniques will take that into account.
4. Much of the abnormal behavior of the asthmatic airway can be explained by disturbances in the cycle of increasing/decreasing airway diameter that occur normally during the ventilatory cycle.
5. The most successful treatment strategies for severe pulmonary disease (especially ARDS/ALI) will use continuous, real-time monitoring of pulmonary mechanics to enable treatment tactics that respond immediately to changes in patient condition as the disease process evolves.

Although the articles in this symposium volume are for the most part clear and well written, they do demand from the reader a rather sophisticated background in respiratory physiology, respiratory physics, basic biology, and statistics. The book contains much useful and interesting information; however, its greatest assets are the many new and thought-provoking concepts presented.

Good editorial work on this volume resulted in a very similar structure to the articles throughout the book. The major concepts of each article can be quickly discerned from the first and last section of the article, and if the reader wishes to delve deeper, information is presented clearly and concisely, and concepts are well developed in the remainder of each article. Figures are clear and well drawn, and the figure legends are thorough. Color is used sparingly, but to great advantage.

The most glaring editorial weakness I found in the book was the foreword. Such a book should have its objectives clearly and unambiguously laid out at the beginning. Instead the foreword is awkwardly written and does not represent the book's contents particularly well. In my opinion it does not begin to do justice to the overall quality of the book or to the intriguing ideas presented.

This volume certainly should be included in the collection of any good medical library, but it is not a book that most respiratory therapists will need on their bookshelf. However, for anyone interested in research or even just exploring some of the newest concepts in pulmonary physiology and medicine, it would be a worthwhile read. In addition, anyone preparing advanced lectures, review articles, or textbooks on any respiratory care topic would be well advised to consult it.

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Manual of Pulmonary Function Testing, 8th edition. Gregg L Ruppel MEd RRT RPFT FAARC. St Louis: Mosby/Elsevier. 2003. Soft cover, illustrated, 523 pages, $44.95.

Manual of Pulmonary Function Testing by Gregg Ruppel, now in its eighth edition, is a detailed instruction book on pulmonary function testing (PFT) It is directed toward beginning and advanced respiratory/pulmonary students, but I believe it is also a great reference tool for a PFT department or primary care clinic that performs PFT. This edition describes many of the PFTs, coaching techniques, and interpretation strategies. The first 6 chapters describe indications for pulmonary testing, coaching techniques, quality control issues while testing, and interpretation of the results. Some of the tests discussed are spirometry, lung volumes, diffusion capacity, and blood gases.

In Chapter 7 Ruppel discusses cardiopulmonary exercise testing, including the appropriate protocols, equipment, and interpretation of flow-volume loops. New to this edition is a chapter on pediatric and infant pulmonary testing. Chapter 9 deals with specialized testing regimens such as those used for bronchial provocation (methacholine challenge, histamine challenge, exercise challenge), pre-operative testing, disability testing, and indirect calorimetry. Chapter 10 talks about the various types of testing equipment and includes information on some of the newer portable spirometers designed for use in primary care practices. Chapter 12 discusses quality control in the PFT laboratory.

Chapter 1 provides an overview of indications for PFT and serves as an introduction to the subsequent chapters. Diseases are introduced that commonly require PFT and the pathologies associated with the various pulmonary disorders. The chapter also explains patient preparation for PFT.

Chapter 2 discusses spirometry—the most commonly performed PFT. Spirometry coaching techniques and reproducibility criteria are given. The chapter also discusses the differences between obstructive and restrictive disorders, and case studies are used to illustrate those differences.

Chapter 3 discusses the various ways of measuring total lung capacity. To measure total lung capacity you must first measure the functional residual capacity, using either the closed-circuit method, open-circuit

method, or body plethysmography. The chapter addresses acceptability criteria for the various measurement strategies, pathophysiology, and interpretation of the results. This chapter also discusses gas distribution tests and variables, such as the single-breath nitrogen washout, closing volume, and closing capacity.

In Chapter 4 Ruppel discusses measurement of ventilation and its components. Techniques are described for estimating dead space, alveolar ventilation, and ventilatory responses to carbon dioxide and oxygen.

Chapter 5 describes measurement of diffusion capacity in the lungs. The majority of the chapter deals with the most common method of measuring diffusing capacity, which is the single-breath or breath-hold technique. As in the previous chapters, recommendations, interpretations, and case studies are provided.

Chapter 6 explores arterial blood gas analysis. The technical aspects of obtaining blood samples are discussed in detail. Two noninvasive methods of assessing gas exchange are also discussed: pulse oximetry and capnography. Shunt measurements, which estimate the severity of ventilation-perfusion imbalance in the lung, are also addressed.

Chapter 7, which introduces cardiopulmonary exercise testing, is the combined effort between Ruppel and Carl Mottram of the Mayo Clinic. This chapter addresses appropriate exercise protocols, the recognition of the anaerobic threshold, normal physiologic changes that occur during exercise, and evaluation of exercise flow-volume loops. This of course is geared toward the PFT technician and does not go into enough detail for physicians and their interpretations.

Chapter 8, which is new to this edition, is on infant and pediatric PFT. Spirometry, lung volumes, diffusion capacities, blood gases, pulmonary mechanics, and challenge tests are all discussed, with attention to how these measurements differ for pediatric patients. This chapter suggest techniques for approaching young children for testing, modifications to the testing protocol for standard pulmonary test, the effects of sedation on physiologic variables and pulmonary testing with infants, and strategies for interpretation.

Chapter 9 deals with specialized test regimens and uses tests covered in the previous chapters. These regimens include bronchoprovocation testing (methacholine, histamines, and antigenic agents), exercise-induced bronchospasm, preoperative testing, and disability testing. Metabolic measurements are also addressed in this chapter, including indirect calorimetry as a means of assessing the patient's nutritional status.

In Chapter 10 Ruppel describes PFT equipment, including volume-displacement and flow-sensing spirometers, peak flow meters, breathing valves, pulmonary gas analyzers, blood gas electrodes, oximeters, body plethysmographs, and computerized PFT systems. The advantages and disadvantages of the various pieces of equipment are also discussed.

Chapter 11, the final chapter, addresses quality assurance and related issues. The general concepts discussed include equipment standards for spirometers and blood gas analyzers. This chapter also explains quality control for PFT and blood gas analysis equipment. Commonly encountered problems with various types of equipment are listed in the troubleshooting guide. Also included is a section on infection control and safety issues.

Having read many books on PFT, I found this book interesting and well organized. Many textbooks of this nature can be dry and on the boring side, but this book presents its information in a way that holds the reader's interest and anticipates questions, giving the reader an opportunity to find the answer in the same area of the book. Each chapter's objectives are clearly stated, and Ruppel uses the same chapter format throughout the book, which makes it easy to find information. Scattered throughout the chapters are "PF Tips," which Ruppel uses to present short, informative points on the current topic. I think readers will really appreciate his interesting tips on quality control, patient cooperation, and performance. He also includes many easy-to-read-and-understand tables and illustrations. Each chapter ends with self-assessment questions and case studies that illustrate the important points stated in the chapter objectives. This book is well designed for the respiratory student, pulmonary technician, or someone setting up a PFT laboratory.

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Tuberculosis, 2nd edition. William N Rom MD MPH and Stuart M Garay MD, editors. Foreword by Barry R Bloom PhD. Philadelphia: Lippincott Williams & Wilkins/ Wolters Kluwer. 2004. Hard cover, illustrated, 944 pages, $159.95.

Only a century ago, tuberculosis (TB) was one of the leading causes of death in the United States. Even now, one third of the world's population is infected with *Mycobacterium tuberculosis*, and approximately 2 million people die of TB worldwide yearly. We know how to diagnose and treat it, but its current epidemiology makes TB one of the most important pathogens in the world today.

The second edition of **Tuberculosis**, edited by Rom and Garay, is a comprehensive, multi-author, hard-cover textbook that has 944 pages, 6 sections, and 60 chapters. It is most suitable for pulmonologists, infectious disease specialists, and public health practitioners involved in the field of mycobacterial diseases, although the book also contains chapters useful to basic scientists whose research includes mycobacteria and their immunology. Each chapter is well referenced and most contain many tables and figures that highlight important points in the text.

The first section covers basic TB epidemiology and current use of molecular epidemiology. In the first edition there were 2 fascinating chapters on TB history and the sanatorium movement, as well as several chapters on TB transmission and applied molecular epidemiology. Unfortunately, those chapters were removed when the editors reduced the number of chapters.

Section II covers current knowledge of the genomics and microbiology of *M. tuberculosis*. The chapters on genomics (the newly sequenced genome of *M. tuberculosis*) present only a brief description of selected features, so that clinicians (including me) who do not have updated knowledge on genomics can pick up the key points on the basic biology of *M. tuberculosis*. Interestingly, there is a genetic comparison of different strains of Bacille Calmette-Guérin (BCG, an attenuated strain of *M. bovis* used in preparation of BCG vaccine) and *M. tuberculosis*.

Section III covers host response and immunology. The section consists of 11 chapters and discusses new developments in and understanding of host immune response.