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## Foreword

To date thirty-two volumes have been published in the *Progress in Respiratory Research* Series. All but two have dealt with adult pulmonology. The two volumes dedicated to paediatric pulmonology were volume 17 on *Paediatric Respiratory Disease* published as far back as 1981, and volume 22 on *Lung Function in Children and Adolescents* published in 1987. Both these volumes have been very successful. In particular, the volume on lung function has been sold for many years. Since I took over as Editor-in-Chief of the series, I have had numerous and constant enquiries about a new book on paediatric lung function. These requests have finally led to the recruitment of two well-known paediatric pulmonologists who enthusiastically endorsed the idea of editing a new volume. And here it is: volume 33 of the series on *Paediatric Pulmonary Function Testing* edited by Prof. Jürg Hammer, Basel, Switzerland, and Prof. Ernst Eber, Graz, Austria.

True to the vision of the series, the book concentrates on recent advances in the field and authors have been encouraged to include the latest references of 2004 as well. Coupled with the known speed of production of the Publisher, S. Karger AG, the provided information is cutting edge and will guarantee an enduring success of the book. With the advent of many new testing techniques this volume is not just an updated version of previously described methods, but pretty revolutionary in its content. The editors were further able to unite a 'who's who' in the field with global representation of chapter authors. My congratulations to the editors as well as to all chapter authors for a great book!

*C.T. Bolliger*, Series Editor

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## Preface

Although attempts to measure pulmonary function have been made even in infants for over 100 years, objective methods to assess pulmonary function in the paediatric age group have been very limited until recently. Infants and preschool children are generally too young to understand and perform the manoeuvres necessary for conventional pulmonary function testing. The lack of cooperation and the size of the subjects in this age group demand miniaturization and special adjustments of both methods and apparatus. While some 40 years ago many of the methods developed for the assessment of pulmonary function in adults, such as plethysmography, were adapted for use in infants and children, new tests, such as passive respiratory mechanics and the rapid thoraco-abdominal compression technique, have been developed specifically for use in infants. Recent advances in technology and diagnostic tools have dramatically increased the armamentarium of paediatric pulmonologists to assess the respiratory system of their patients. Improved knowledge of molecular processes and innovations in the analysis of exhaled air have further amplified the possibilities to diagnose lung diseases and evaluate treatment effects by measuring novel biological markers in exhaled air or breath condensate.

It was the purpose of this book to bring together experts and researchers in paediatric pulmonary function testing to contribute their knowledge and expertise for a comprehensive overview of the most recent developments in this field.

The book is divided into four sections. The first section reviews the current lung function tests used in infants and toddlers, who are by nature unable to cooperate with any testing procedure. It describes the methodologies, provides normal values when available and advice for data interpretation by discussing the expected changes in the most



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Ernst Eber, Graz

common paediatric respiratory diseases. Some of these new techniques are now close to clinical application. Nevertheless, infant pulmonary function testing is not widely available yet and limited to a few but steadily growing number of experienced centres. Infant pulmonary function testing will provide objective measures in epidemiological and clinical studies, but it still has not found its place in the clinical management of the individual infant. Despite all advances, there are still considerable problems that prevent pulmonary function testing from playing the same diagnostic role in the management of infants with respiratory disorders as it does in older children or adults. These problems include the need for sedation, at least for some of the tests, and consequently the reservations against frequent or repetitive testing. Other issues are the acceptability of such investigations for the

parents, and the lack of appropriate reference data for growth and development.

The second section deals with the classic adult-type pulmonary function tests and their application in the semi-cooperative or even cooperative older child. It discusses age-related technical issues and the limitations of the methodological standards and guidelines of these tests which are usually established for adults. In addition, it describes their clinical usefulness in children and looks at the problem of reference data in this population.

The third section covers tests which assess the respiratory system beyond the usual measurements of pulmonary mechanics, lung volumes, and bronchial responsiveness. These include investigations such as the measurements of respiratory muscle function, work of breathing, diffusing capacity, and inflammatory markers in exhaled air and breath condensate.

The fourth part is devoted to the clinical usefulness of the described pulmonary function tests for the diagnosis and management of the most common paediatric respiratory disorders. This part is unique since the very few previous books on paediatric respiratory function testing have not included any discussions on the clinical value of pulmonary function testing in diagnosing and/or managing children with asthma, cystic fibrosis, neuromuscular disorders, after lung or bone marrow transplantation, or after neonatal lung disease. The book ends with the most important aspects of pulmonary function testing in neonatal and paediatric intensive care units, a very promising field where infant pulmonary function testing may eventually have a major impact on the clinical management of the individual and usually very ill patient.

Our vision for this issue was to provide those involved in treating infants and children with respiratory disorders with a practical, up-to-date textbook which reviews in detail the substantial technical and methodological progress that was accomplished in paediatric pulmonary function testing in the past. Further, it was our goal to discuss the recent advances in respiratory physiology and pathophysiology, and to review the diagnostic value of paediatric pulmonary function tests at the present time.

We hope that this book will further promote the development and application of paediatric pulmonary function tests to provide us with the necessary tools to treat children with respiratory disorders to the best of our knowledge.

We are grateful to S. Karger AG, Switzerland and to Chris Bolliger, Editor of the *Progress in Respiratory Research* series, for stimulating us to edit a comprehensive book on paediatric pulmonary function testing, which will doubtless emphasize the special and unique aspects of assessing infants and children with respiratory problems and draw attention to the fact that children are not simply 'small adults'.

We are thankful to all authors for accepting such a short production time (all chapters have been written in the first six months of 2004) and for their efforts to make this an updated state-of-the-art textbook on paediatric pulmonary function testing.

Finally, we would like to thank both our wives and children for their patience and tolerance with two very crazy and dedicated paediatric pulmonologists (and intensivists).

*Jürg Hammer, Ernst Eber,*  
Volume Editors

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