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Editors

Respiratory Outcomes in Preterm Infants

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Preface

Premature birth has lifelong consequences for respiratory health. These consequences have long been recognized for the extreme premature infants, especially the early life morbidities associated with bronchopulmonary dysplasia (BPD) in very low birthweight (VLBW) infants. Additionally, a growing body of data indicates lifelong sequelae of prematurity in moderately preterm and late-preterm infants (32–37 weeks gestation). Lung parenchyma, vasculature, and airways are affected. With at least one in ten people in the United States born preterm, the long-lasting sequelae of prematurity may impact persons of all ages. This book is intended for physicians and nurses caring for these patients. We take an evidence-based approach, highlighting both what is known and where further research is needed.

The chapters are written by neonatologists, pediatric and adult pulmonologists, and otolaryngologists with expertise in the care of patients born preterm. This range of authors highlights the variety of known or latent effects of prematurity on the respiratory system throughout the life span. The chapters present complementary perspectives, from bench research to population-based studies. We address the anatomy, physiology, epidemiology, and public health consequences of the respiratory sequelae of prematurity. We summarize proven strategies for prevention and treatment, as well as highlight key knowledge gaps.

In Chap. 1, Drs. Mcgrath-Morrow and Collaco provide an overview of the clinical problems facing the preterm respiratory system. The next two chapters tackle the problem of wheezing in persons born prematurely, highlighting epidemiologic data and risk factors (Dr. Vrijlandt) and pathophysiology based on airway and neuronal development pre- and postnatally (Drs. Martin and Raffay). Chapters 4 and 5 address the problem of BPD. Dr. Keller reviews the utility and limitations of different clinical and research definitions of BPD. Drs. Bancalari and Wu then go on to describe normal lung development and the structural and functional derangements seen with prematurity, with a focus on BPD. In Chap. 6, Drs. Davis, Ren, and Cristea address the different testing modalities available to assess airway and lung disease from infancy to adolescence. Chapter 7 provides a key resource for caregivers of adolescent of adolescent and adult patients; Drs. Bush and Bolton review the long-term sequelae of prematurity that may impact the lung and respiratory system,

even into the geriatric years and highlight potential relationship to COPD. Public health aspects of prematurity are addressed in Chaps. 8 and 9. Dr. Lorch reviews the public health impact of prematurity and Dr. McEvoy addresses primary prevention strategies for prematurity-associated respiratory diseases. Chapter 10, written by Drs. Redline and Ross, reviews the myriad changes in sleep associated with prematurity, as experienced throughout different life stages. In Chap. 11, Drake, Fleischman, and McClain address aspects of large airway abnormalities from the ENT perspective with emphasis on the sequelae of prematurity. Dr. Abman reviews the pathophysiology and therapies for BPD-associated pulmonary hypertension in Chap. 12. Finally, Drs. Sanchez, Wozniak, and Moallem review the role of infection in augmenting pulmonary pathology in preterm infants, as well as the subsequent vulnerability of preterm infants to infection.

The care of patients born preterm requires an awareness of how prematurity may impact respiratory health throughout the lifetime. Whether the patient is an infant with BPD dependent on home oxygen, a young child with wheezing, or an adult with early symptoms of COPD, their care will be enhanced by understanding the pathophysiology and prognosis of prematurity-related diseases. This book serves as a valuable compendium for those caring for patients or engaging in research, as well as a call for future research to better understand how prematurity can impact pulmonary health and how these processes can best be treated and prevented.

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