

# Introduction

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Severe acute respiratory failure is one of the most frequent causes for patient admission to the intensive care unit (ICU). In the most severe conditions, invasive mechanical ventilation is required life support in these patients.

The polio epidemic that occurred in Denmark in 1952 demonstrated how careful airway management and the application of positive-pressure ventilation could dramatically reduce mortality in patients presenting with paralysis of the respiratory muscles. The focus on airway care and ventilator management encouraged the way forward for critical care facilities. Technological advances in the 1960s led to the development of sophisticated, physiological monitoring equipment. Later, further developments were introduced that included: improved understanding of mechanical ventilation pathophysiology in patients with severe-acute respiratory failure; the production of ventilators with improved technology, new ventilator modes that were aimed at improving patient outcomes; and since the early 1990s, the introduction of noninvasive ventilation (NIV) as a less invasive mode of ventilatory support in patients with intermediate severity of respiratory failure.

Mechanical ventilation is currently the life support technique most frequently used in critically ill patients who are admitted to the ICU, and an extensive body of literature has been published within this topic. The appropriate knowledge on mechanical indications and settings is mandatory in order to develop and implement protective ventilation strategies and avoid possible iatrogenic effects.

This *European Respiratory Monograph* is intended as an update on various aspects and novel developments that have occurred in recent years within the field of mechanical ventilation. Topics that have been included are conventional and innovative ventilator modalities, adjuvant therapies that include sedation and analgesia, modes of extracorporeal support, weaning from mechanical ventilation, ventilator strategies in different clinical conditions, complications of mechanical ventilation and prevention, and NIV.

As Guest Editors we invited international experts to write up-to-date reviews based on their expertise and long-time experiences within this field. We would like to take this opportunity to warmly thank all the contributors for their enthusiasm and hard work. We are also indebted to Professor Tobias Welte, Editor in Chief of the *European Respiratory Monograph*, as well as all those at the European Respiratory Society Publications Office for their excellent technical help with producing this fifty-fifth issue of the *European Respiratory Monograph*.