

# Special Considerations in Neonatal Mechanical Ventilation



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## KEYWORDS

- Neonatal • Mechanical ventilation • Interprofessional • Teamwork
- Patient-centered care

## KEY POINTS

- Front-line nursing staff have a key role in skilled management of mechanically ventilated neonates.
- Communication of assessments and observations regarding changes in patient status allow timely and appropriate care decisions to be made by the interprofessional team.
- Interprofessional teamwork is key to ensuring optimal management of ventilated neonates.
- Successful management of ventilated neonates requires a comprehensive approach to care, with a focus on the patient as a whole, rather than on a single organ system.
- Parental involvement in the neonatal intensive care unit is extremely important to patient outcomes, and front-line nurses provide critical supports to parents during each infant's stay in the neonatal intensive care unit.

## INTRODUCTION

Over the past decades many advances have been made in how care is provided to neonatal intensive care unit (NICU) patients. Neonatal nurses are among the most constant and consistent care providers that neonates encounter during the NICU stay and respiratory support remains a mainstay of neonatal intensive care. Mechanical ventilation has proved to be essential to the survival of most extremely premature neonates and will continue to play a key role in neonatal intensive care.<sup>1</sup> Although lifesaving, neonatal ventilation is associated with acute and chronic lung and airway complications, including but not limited to air leaks, atelectasis, infection, and bronchopulmonary dysplasia.<sup>1-3</sup>

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Antenatal steroids, surfactant treatment, and new strategies for neonatal respiratory care have dramatically changed the presentation, clinical course, and long-term outcomes for neonates with respiratory illness.<sup>4</sup> Focus has expanded from ensuring survival to reducing the incidence of chronic lung disease and neurodevelopmental impairment.<sup>5</sup> Unlike other organs, the neonatal lung completes a significant portion of its development at the end of gestation and postnatally.<sup>6,7</sup> The neonatal lung has the ability to repair but is also highly susceptible to lung injury. Neonates present with different pathophysiology compared with pediatric and adult populations. In addition, infants of different gestations may require different ventilation strategies based on their individual disease state.

Nursing care of ventilated infants shares many features with the care of any other age group of ventilated patients. The overarching goal of neonatal mechanical ventilation is to support adequate gas exchange with minimal adverse effects on the infant's lungs, hemodynamics, and brain.<sup>5,8</sup> The unique characteristics of infants pose additional challenges and opportunities for affecting health outcomes. In particular, the infant's state of rapid growth and development and the exquisitely close interdependence between their respiratory systems and all other body functions require a high level of assessment expertise to discern how to interpret subtle changes in an infant's condition. It is not a set of lungs that clinicians are treating, it is a critically ill infant, who is part of a family, and who requires mechanical ventilation for support. Expert nursing care of this fragile population requires close collaboration with medical staff, respiratory therapists, dietitians, and other members of the interprofessional team, and (perhaps most importantly) should include the infant's parents.<sup>9-14</sup>

Every infant receiving mechanical ventilation in a NICU receives care from a team dedicated to ensuring that the best possible outcome is achieved given the resources that are currently available. Survival and neurodevelopmental outcomes of premature babies depend on a multitude of variables. This article focuses on current best practices for the care of critically ill infants receiving mechanical ventilation.

## COMMUNICATION

Effective communication and teamwork among the care providers cannot be overlooked. In the pursuit of optimal health outcomes team members must go beyond cooperation. They must collaborate by coordinating their efforts and resources in order to achieve a mutually desired goal.

The essential characteristics of high-performing teams have been documented extensively in the patient safety literature, with effective teamwork being identified as a key determinant of quality care and patient safety.<sup>15-17</sup> The ability of a team to establish and maintain a shared mental model is vital for ensuring that resources are effectively coordinated. Leonard and Frankel<sup>15</sup> described the basic elements of teamwork and communication. These elements include effective organizational and clinical leadership behaviors, structured communication strategies, effective critical language, situational awareness, and perhaps most importantly psychological safety. Miller and colleagues<sup>16</sup> identified that effective health care team performance is highly dependent on nurses and their ability to successfully transfer critical information. Nurse-to-nurse communication and hand-off reports provide vital information for the oncoming caregiver to be aware of what is usual for each individual infant, which facilitates early and appropriate responses to subtle and/or rapid changes in the infants' clinical status.

For health care providers caring for mechanically ventilated patients, a significant communication challenge is navigating the vast and often industry-driven, proprietary

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