

Prevention of BPD vs. Management of Established Severe BPD

Ventilator Strategies and Goals

Prevention of bronchopulmonary dysplasia (BPD) is a primary focus of treatment when an infant is born preterm. An infant who needs ventilator support does best with low tidal volumes and short inspiratory times in the first days of life. If severe BPD occurs, however, ventilator strategies and settings must change dramatically.

The BPD Collaborative has published a review of best practices for the interdisciplinary care of children with severe BPD, and included recommendations for ventilator and gas exchange strategies. The chart below is a guide, adapted from those recommendations and current clinical practice at Nationwide Children's.

Prevention of BPD (Acute Lung Disease)

Strategies to prevent acute lung injury

- Low tidal volumes (3-5 mL/kg)
- Short inspiratory times (0.2-0.3 seconds)
- Increased PEEP for lung recruitment without overdistension

Strategies for gas exchange

- Adjust FiO₂ to target SpO₂ (range: 88%-93%)
- Permissive hypercapnia

Management of Severe BPD (Established Lung Injury)

Strategies for gas exchange

- Larger tidal volumes (10-12 mL/kg)
- Longer inspiratory times (≥ 0.6 s)
- Adjust FiO₂ to target higher SpO₂ (92%-96%)
- Permissive hypercapnia to facilitate weaning
- Slower rates allow for better emptying, especially with larger tidal volumes (10-20 bpm)

Other considerations:

- Complex roles for PEEP with dynamic airway collapse
- Interactive effects of ventilator strategies
- Changes in rate, tidal volume, inspiratory and expiratory times, and pressure support are highly interdependent
- Overdistension can increase agitation and paradoxically worsen ventilation

Abman SH, Collaco JM, Shepherd EG, Keszler M, Cuevas-Guaman M, Welty SE, Truong WE, McGrath-Morrow SA, Moore PE, Rhein LM, Kirpalani H, Zhang H, Gratny LL, Lynch SK, Currijs J, Stonestreet BS, McKinney RL, Dysart KC, Gien J, Baker CD, Donohue PK, Austin E, Fike C, Nelin LD. Interdisciplinary care of children with severe bronchopulmonary dysplasia. *The Journal of Pediatrics*. 2017 Feb; 181:12-28.

To learn more, visit [NationwideChildrens.org/BPD-Collaborative](https://www.nationwidechildrens.org/BPD-Collaborative)

