

# Quality Improvement Initiative to Reduce Bronchopulmonary Dysplasia (BPD)

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## Background

Prompted by the high rate of bronchopulmonary dysplasia (BPD) in our neonatal intensive care unit (NICU) at Mount Sinai hospital a BPD task force was commissioned in 2019 & a Better Breathing Bundle (BBB) protocol was developed. Currently drafting the 4<sup>th</sup> iteration of the BPD prevention bundle.

## Key Strategies Employed to Date

- YEAR 1**
  - High frequency oscillation (HFO) as primary mode of invasive mechanical ventilation (IMV), lower MAP 7-9cmH<sub>2</sub>O at initiation
  - Extubation criteria and promotion of early extubation to NIPPV (primary non-invasive mode)
  - LISA implementation ≥ 24 weeks GA (introduction of Surfcath)
- YEAR 2**
  - Standardization of inhaled steroids, including initiation, assessment and weaning criteria for “high risk” infants
  - NIPPV strategy to avoid emergent intubation in resuscitation room
- YEAR 3**
  - Budesonide/surfactant mixture for “high risk” infants
  - Nasal injury prevention guideline update + education

## Process Outline & Preliminary Plans for Year 4

- After each iteration of the BPD prevention bundle, evaluation of overall outcomes & discussion of new items based on the 2 key principles avoidance of IMV & promotion of lung protection ventilation management
- Lung protection 24/7 awareness:** Bedside cards indicating date of IMV initiation to highlight on interdisciplinary rounds; promote daily discussions about extubation, IMV dependency
- First intention IMV strategy for infants born 22+0 – 23+6 weeks GA**
- Systematic use of invasive NAVA for infants with IMV dependency based on pre defined criteria**
- Standardization of PDA early diagnosis and treatment**

## Outcomes

- Baseline demographics unchanged, n=188 infants born < 29 wks GA; no change in incidence of NEC, IVH, NI or mortality

### Bronchopulmonary Dysplasia (BPD) and Mortality

	Baseline Y1	Baseline Y2	BBB Year 1	BBB Year 2	BBB Year 3
Baseline variables	2017	2018	2019	2020	2021
BPD or mortality, (%)	66 %	69%	66 %	58%	70%
BPD, (%)	62 %	64 %	62 %	52%	66%
BPD diagnosed at 36 weeks, (%) n/N (denominator = patients with data at 36 weeks)	82%	85%	76%	83%	83%

### Level 2 Transfer

	Total transfer to L-2 before 36 weeks GA	
	2020, n=108	2021, n=125
Nasal cannula (LF + HF)	22 (20%)	45 (36%)
CPAP	1 (1%)	12 (10%)

### BPD Severity Overall

	2020	2021
Mild (%) n/N	17 (9%)	22 (12%)
Moderate (%) n/N	47 (24%)	70 (37%)
Severe (%) n/N	21 (11%)	15 (8%)
N= total patients admitted that year		

- Last 2 years, 1 infant/year 22+0 - 23+6 weeks GA at birth surviving BPD free, previous BPD rate 100%
- During the pandemic, stable infant Level 2 transfers prior to 36 weeks GA increased from 21% to 46% in 2020 and 2021, respectively

- Overall BPD severity decreased, more infants with mild and moderate BPD, and moderate reduction of infants classified as severe BPD
- Other notable outcomes include a reduction in IMV and NIV days overall, and any episode of IMV during NICU stay.

Ventilation days per patient

