

Aim

Global Aim: Improve respiratory outcomes in the Neonatal Intensive Care Unit
SMART Aim: Standardizing PPV in the resuscitation & delivery Rooms and Minimally Invasive Surfactant Administration

Background

➤ Neonatal Respiratory Challenges:

- ❖ Managing respiratory distress in neonates remains a critical component of NICU care, particularly in the resuscitation room. Ensuring effective ventilation while minimizing the risk of complications is essential for improving outcomes in this vulnerable population.

➤ Staged Introduction of Ventilation in the Resuscitation & T-Piece for PPV:

- ❖ At our center, we have introduced staged ventilation in the resuscitation room, using T-pieces to provide Positive Pressure Ventilation (PPV) as the standard of care. T-pieces allow for better control of pressures and oxygen delivery, improving consistency in respiratory support compared to traditional bag-mask ventilation.

➤ Minimally Invasive Surfactant Administration (MIST):

- ❖ Another significant practice change involves using Minimal Invasive Surfactant Therapy (MIST) to avoid intubation and mechanical ventilation. MIST aims to reduce the risks associated with invasive procedures, particularly in preterm neonates.

Methods:

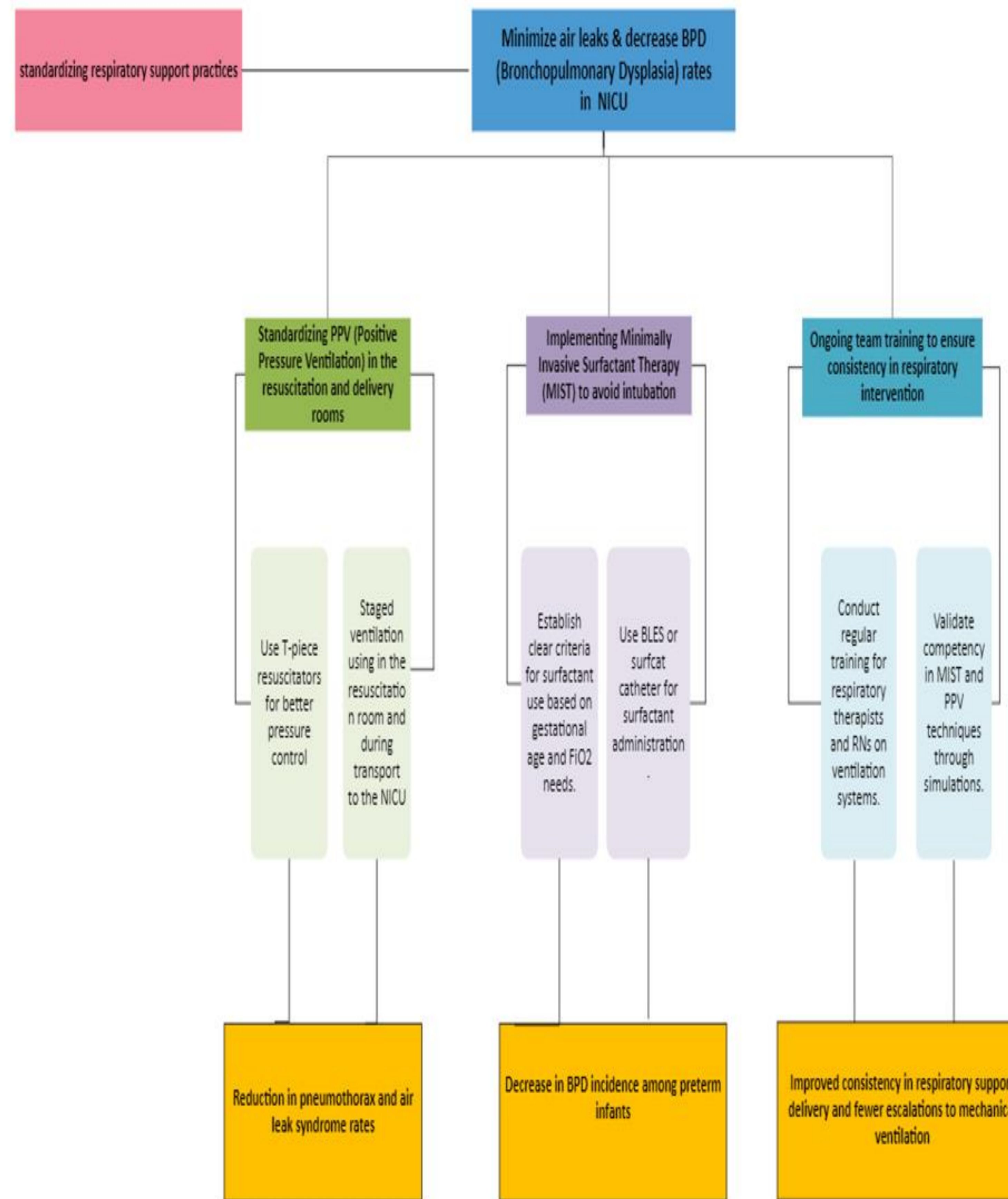
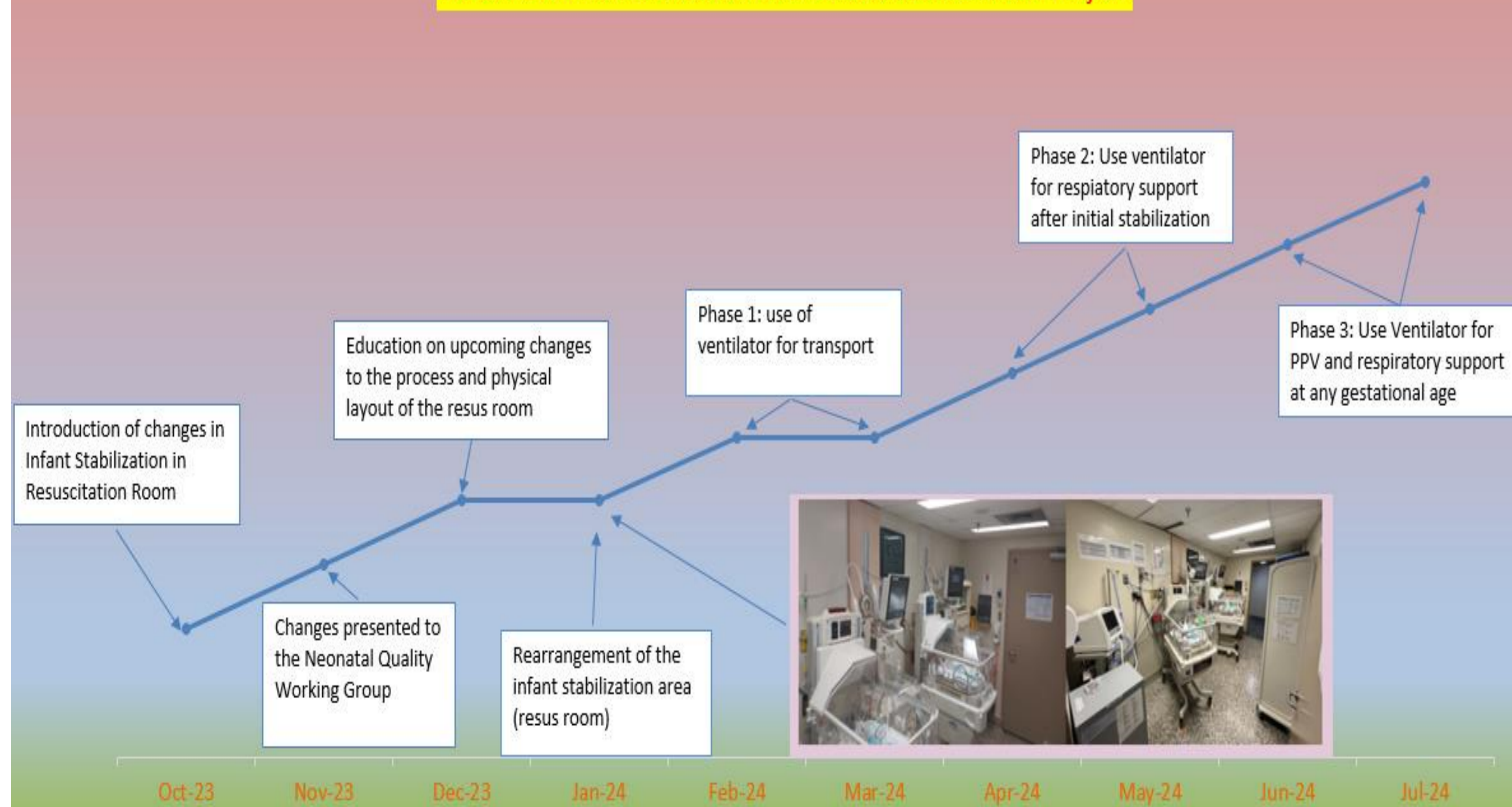
➤ Staged Ventilation:

- A three-phase approach to tailoring respiratory support in resuscitation.
- Goal: Transition to T-piece Resuscitator during transport.
- Includes: PPV initiation, gradual adjustments, and team training.

➤ MIST:

- Non-invasive surfactant delivery (BLES/surf-catheter).
- Includes: FiO₂ > 40% criteria, administration technique, and staff training.

Timeline of Infant's Stabilization in Resuscitation Room Project



MIST Results

Average Gestational age at MIST (Weeks)	31.44
Average Age at MIST (hours)	9.37
Intubation Rate after MIST	28.57%
Catheter Placement Difficulty	9.52%
BLES Catheter used	85.71%
Apnea/Desaturation Rate During MIST	38.10%

Discussion

➤ Clinical Impact of T-Piece PPV:

The adoption of T-piece systems for PPV has improved oxygenation and reduced pneumothorax and air leaks by providing precise PIP and PEEP control, enabling gentler ventilation.

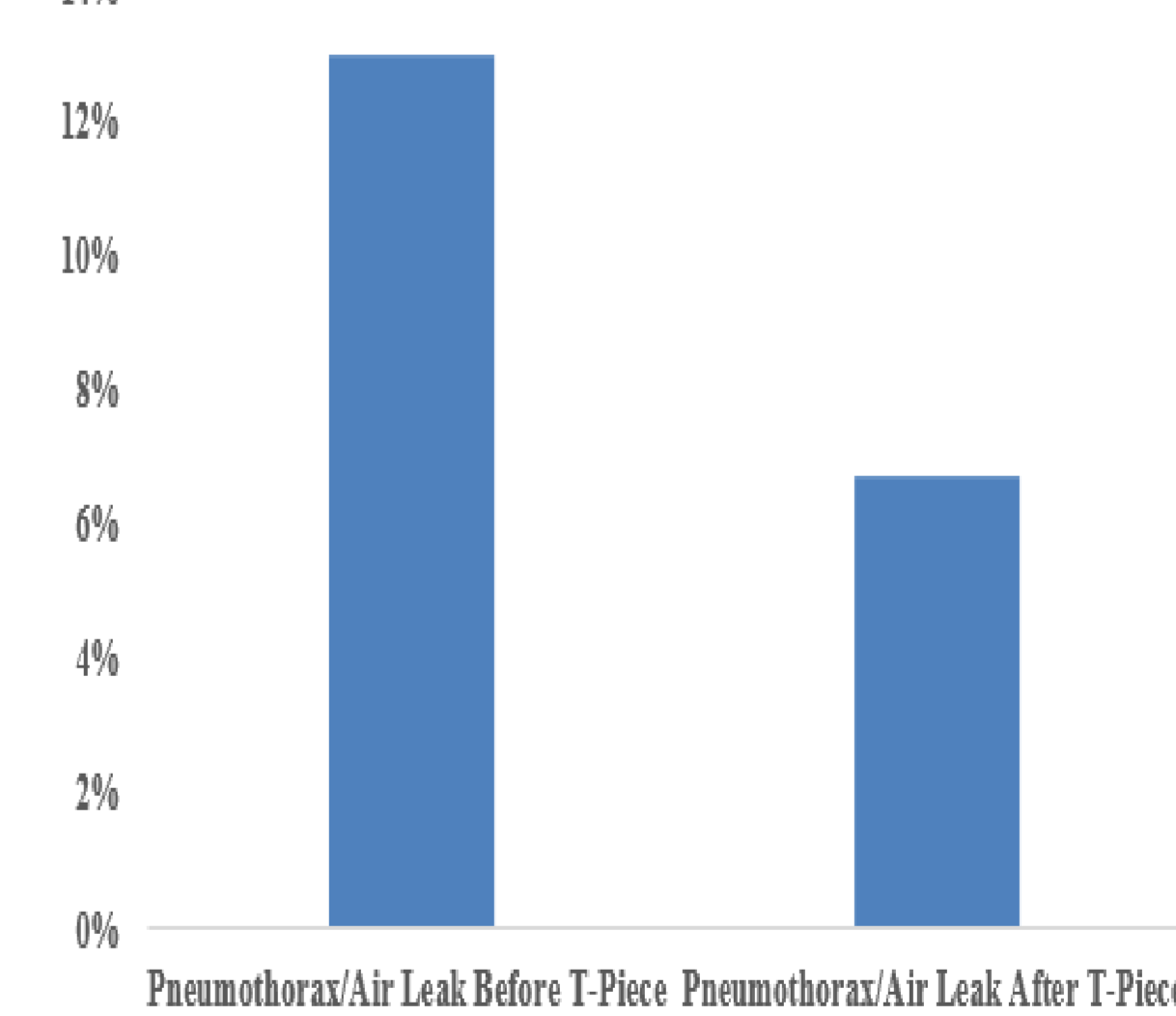
➤ Reduction in Pneumothorax and Air Leaks:

Preliminary data show a decrease in pneumothorax rates. The reduction in pneumothorax rates after introducing the T-piece is approximately 48.5%, suggesting that T-pieces and reduced invasive ventilation protect fragile lungs and prevent barotrauma and volume-trauma.

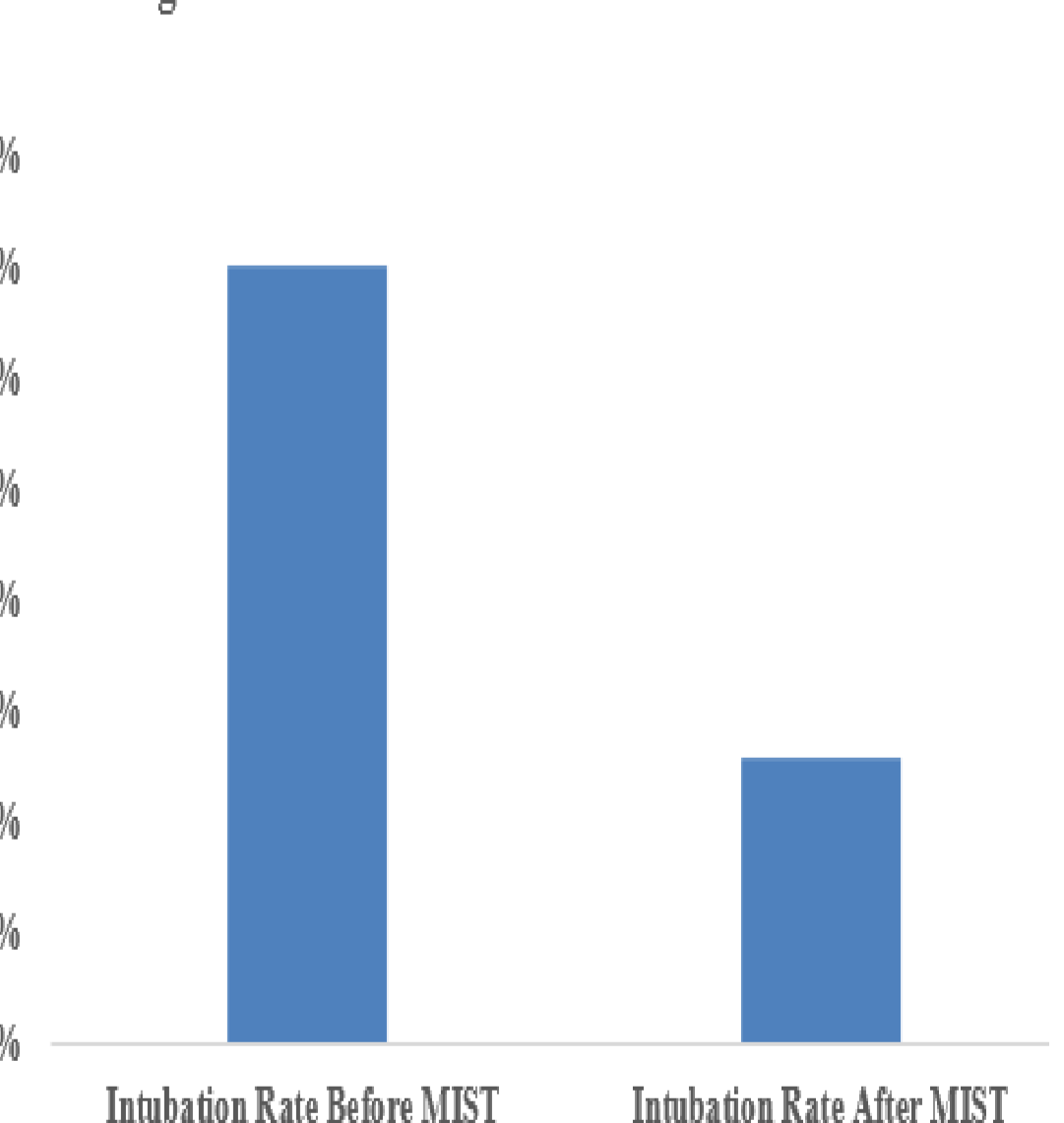
➤ Impact of MIST:

MIST results in intubation reduction of 13.42%, preserving spontaneous breathing and reducing mechanical ventilation-related injuries, contributing to fewer air leaks and improved neonatal outcomes.

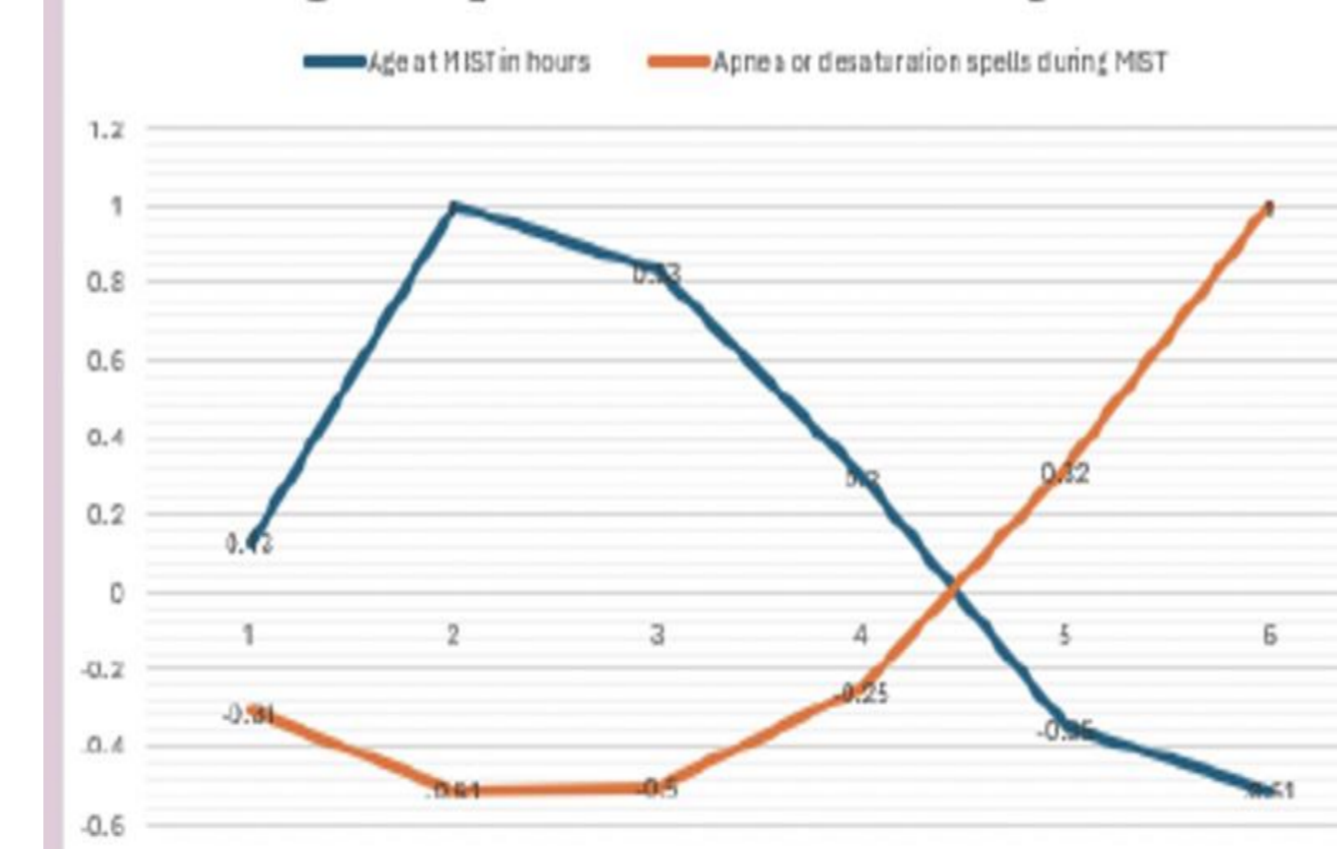
Impact of T-Piece Ventilation on Pneumothorax/Air Leak Incidence Rate



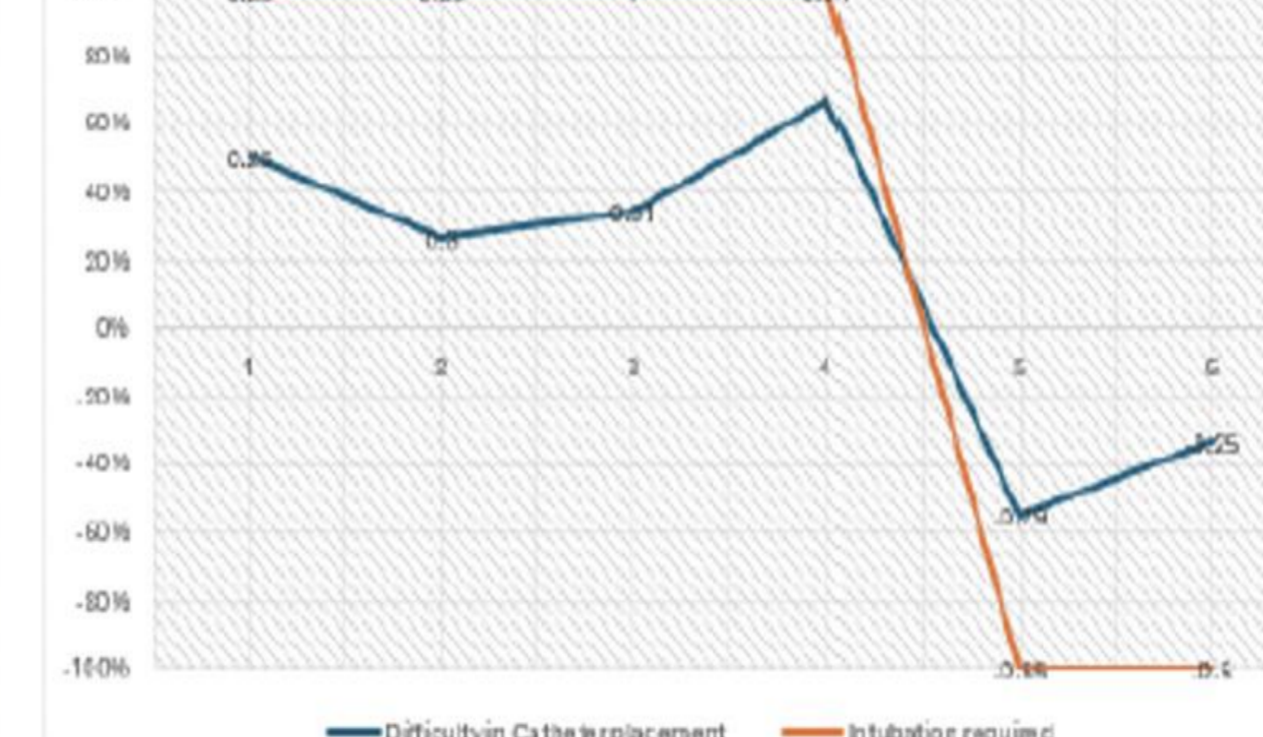
Change in Intubation Rate Before and After MIST



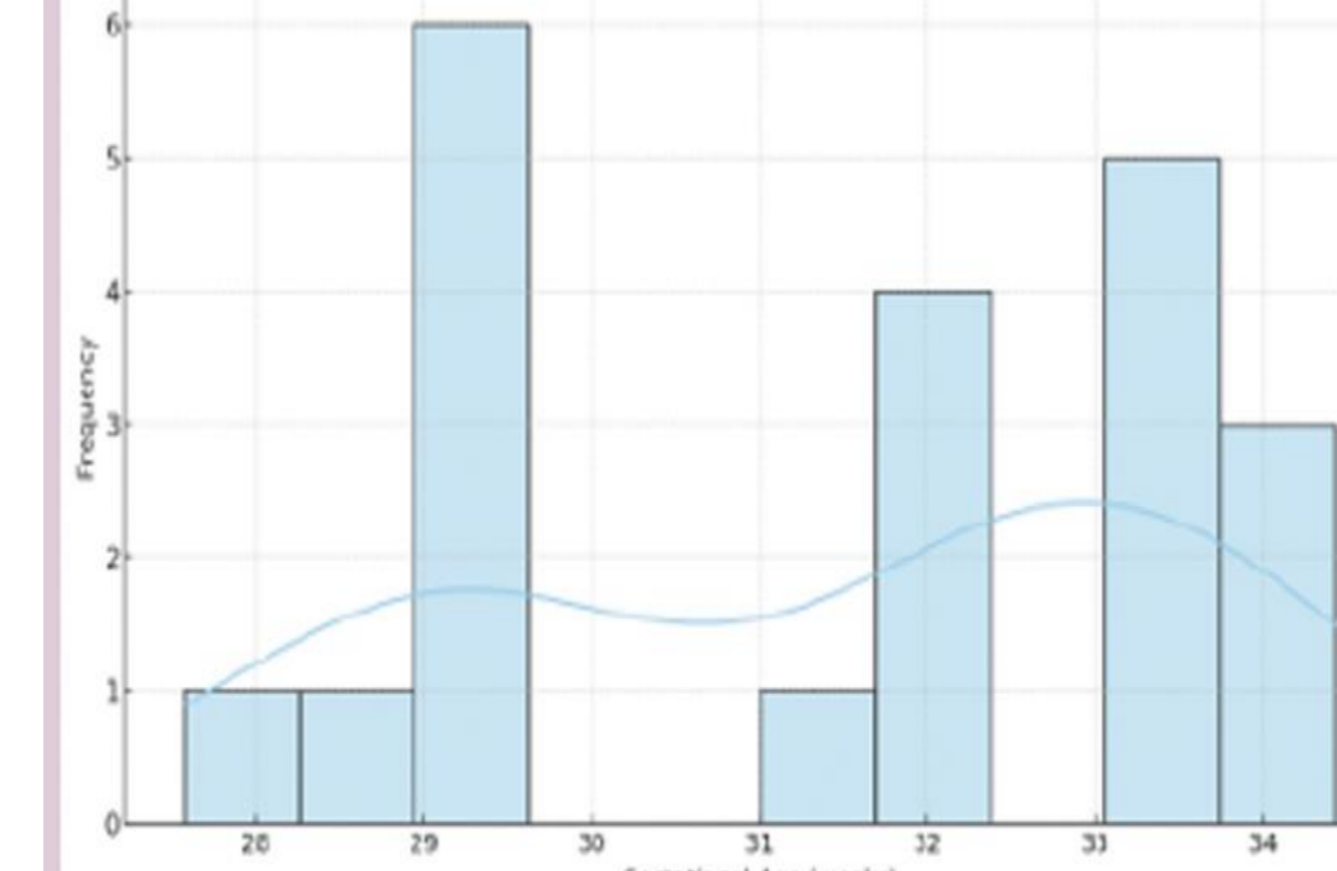
Age & Apnea/Desaturation during MIST



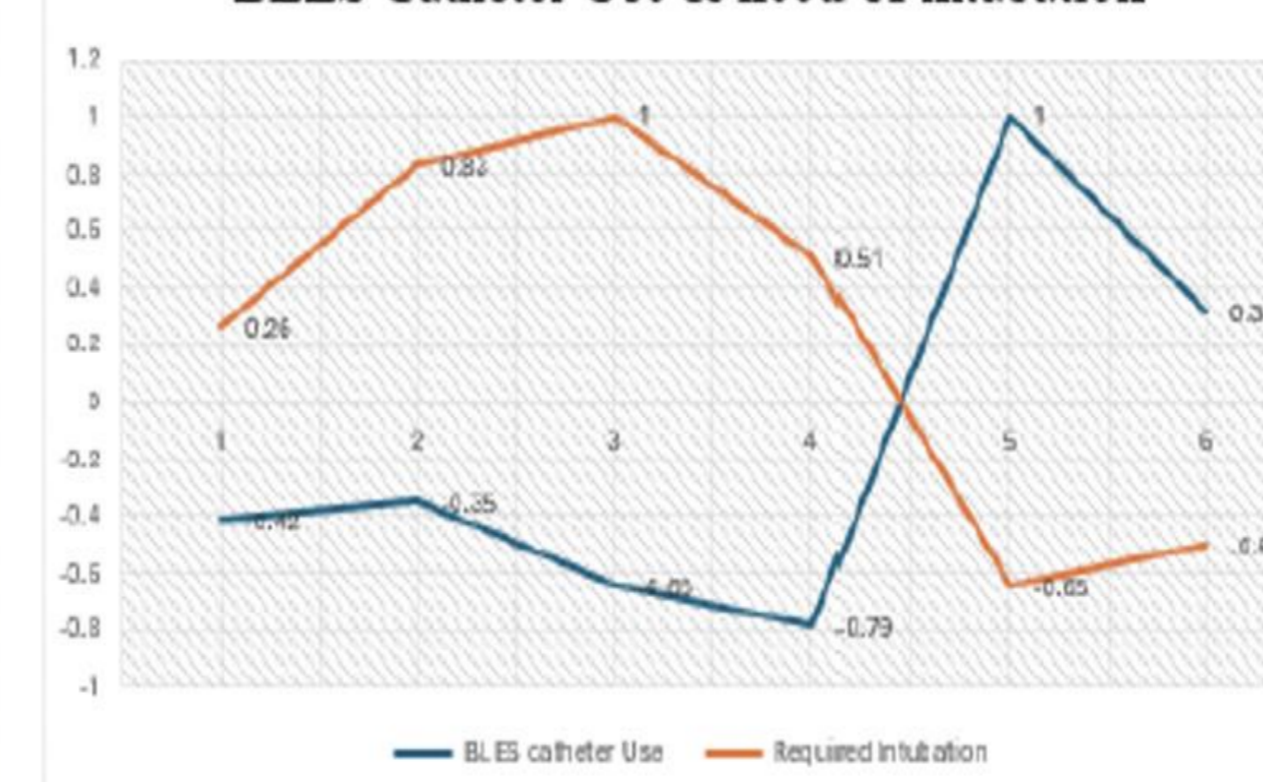
Difficulty in Catheter Placement & Need for Intubation



Distribution of Gestational Age



BLES Catheter Use & need of intubation



Future Plan

- challenges remain in training staff to consistently use T-pieces and MIST techniques effectively.
- Ongoing evaluation and refinements in protocols are necessary to ensure sustained improvements and to overcome initial barriers, such as equipment availability and team confidence in the new techniques