

Clinical Evidence Series

Oxygen saturation histogram monitoring to reduce death or retinopathy of prematurity: a quality improvement initiative



What's different

Histogram monitoring supplements pulse oximetry with time-distribution analysis of oxygen saturation, allowing clinicians to identify trends in oxygen exposure and adjust respiratory support based on aggregated readings.



Interpretation

Histogram-guided monitoring was associated with improved oxygenation targeting and reduced exposure to hypoxemia, suggesting that trend-based visualization may enhance consistency of oxygen management.



Key takeaways

Time in target saturation increased, hypoxemia decreased, and death or severe ROP decreased following implementation of histogram-guided monitoring.



Background

- Hypoxemia and hyperoxemia are associated with adverse outcomes in preterm infants, including mortality and retinopathy of prematurity (ROP)
- Maintaining target oxygen saturation ranges is challenging, with infants achieving goal saturations less than 50% of the time under routine care
- Histogram monitoring provides visualization of oxygen saturation exposure, supporting detection of clinically meaningful deviations that may not be apparent from individual readings



Study design and methods

- Single-center quality improvement initiative in a large regional NICU, including infants <29 weeks' gestation
- Multidisciplinary implementation of oxygen saturation histogram monitoring
- Histogram assessments performed during rounds and at regular bedside intervals, with guided interventions when trends deviated from target range



Objectives

Evaluate the impact of histogram-guided oxygen management on oxygen control and outcomes in preterm infants.



Results



Oxygenation control:

Time within target oxygen saturation range **increased** from 48.7% to 57.6% ($p < 0.0001$)



Hypoxemia reduction:

Time spent with oxygen saturation less than 90% **decreased** from 27.6% to 20.1% ($p < 0.0001$)



Clinical outcomes:

Death or severe ROP **decreased** from 32.1% to 18.0%