

Retinopathy of Prematurity and Oxygen Within Limits (OWL)

Nursing Interventions in Very Low Birth Weight Infant

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Background

1. Retinopathy of Prematurity (ROP) is a proliferative neo-vascular disorder of retinal development that can lead to impaired vision and blindness.
2. Risk factors for the development of ROP include: prematurity and exposure to supplemental oxygen.
3. AAP recommends ophthalmologic examination in infants
 - a. born ≤ 30 wks or with birth weight ≤ 1500 gms
 - b. infants with GA < 33 weeks with specific risk factors such as sepsis, extended use of mechanical ventilation with supplemental oxygen, iNO, and surgery.
4. Tight control of oxygen saturation leads to decreased incidence of severe ROP in very preterm infants.
5. Each NICU can establish screening criteria based on their experience.

Objectives

1. Educate staff on impact of oxygen exposure on ROP
2. Increase compliance with O₂ saturation limits for very low birth weight premature infants at risk for ROP.
3. Evaluate and improve percentage of time infants spend in desired O₂ saturation range.
4. Monitor alarm fatigue.

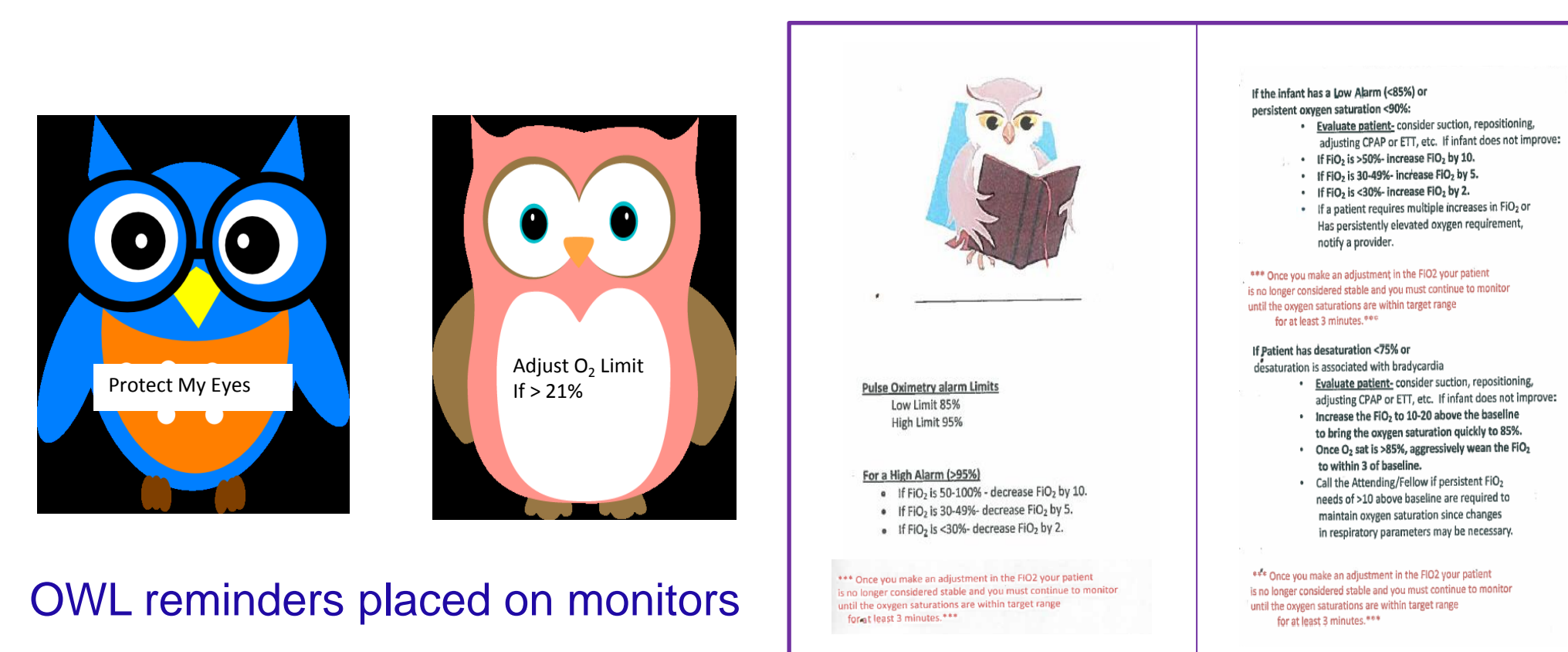
Problem

Minimal compliance with setting oxygen saturation alarm limits on monitor, initially set at 97%.

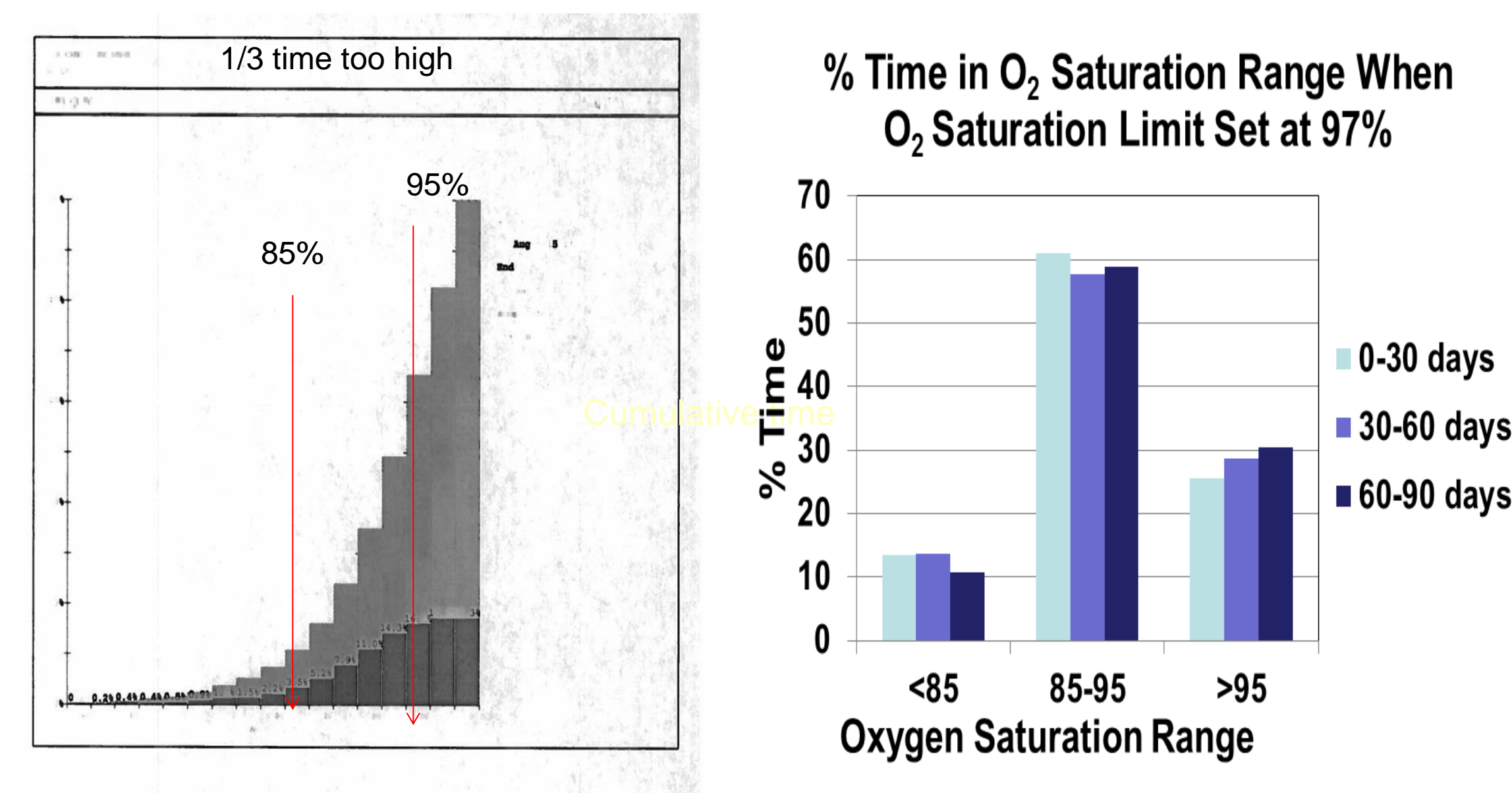
1. Significant rate of severe ROP requiring laser therapy based on VOX benchmark.
2. Concern over alarm fatigue and lack of response to alarms.

Implementation-Reinstate 2011 Guidelines

1. Re-educated staff to set limits on monitor 85-97%
2. Laminated signs at all bedsides, monitors, and ventilators
3. Monitored compliance
4. Determined percentage of time within desired range from printed histogram



5 Month Evaluation

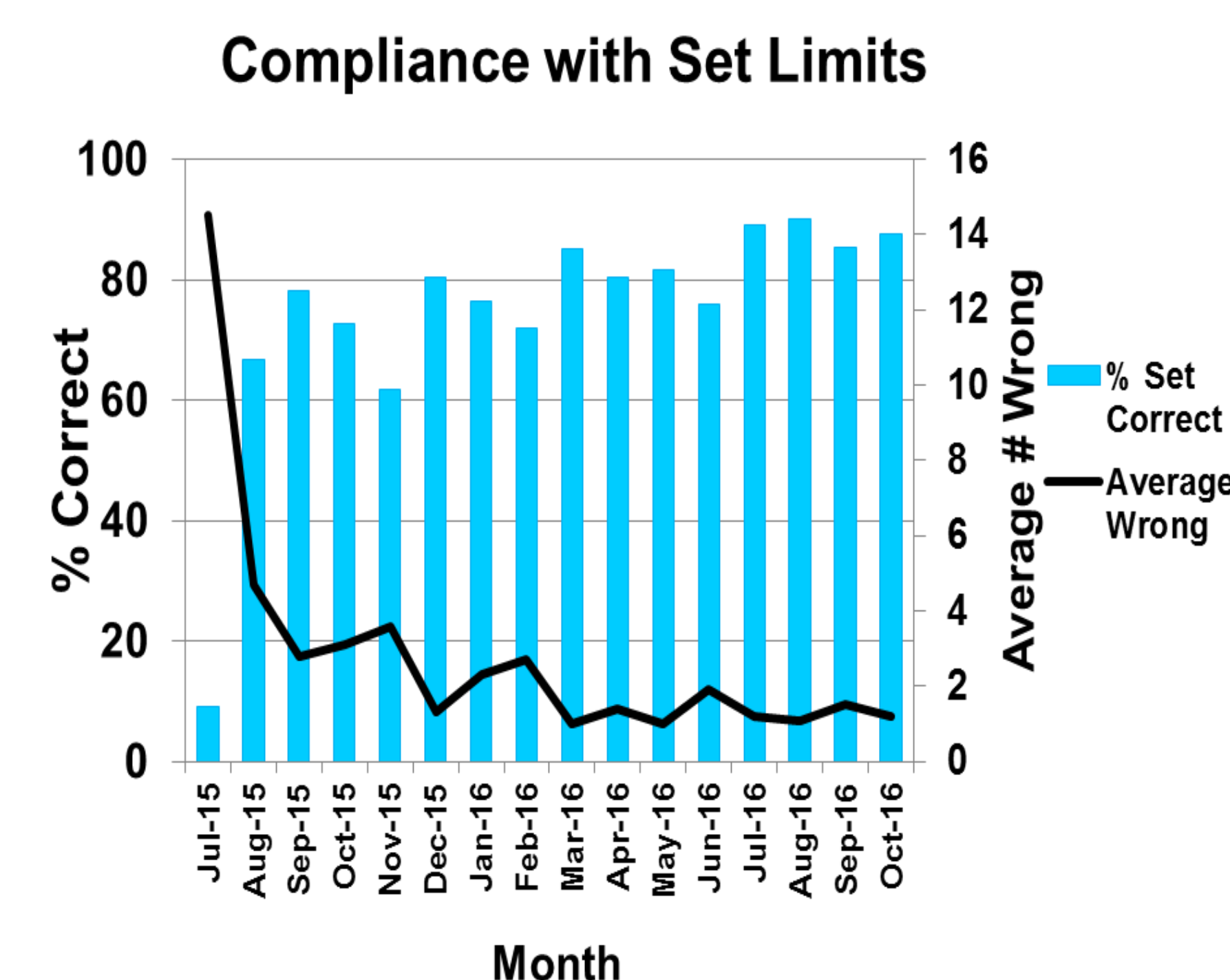


Infants were in the appropriate oxygen sat range (85-95%) for ~ 60% of the time regardless of postnatal age. Oxygen saturations were too high (>95%) for 1/3 of the time.

Revised Guideline Methods

1. Reviewed literature on recommendations for oxygen saturation goals and educate nursing staff.
2. Discuss histograms results with nursing personnel. Changed oxygen saturation limits to 85-95% (12/10/15).
3. Continued to monitor compliance.
4. Avea ventilator has increase supplemental O₂/suction button which increases supplemental O₂ by 20% above baseline (ie 25% FiO₂ to 45% for 2 minutes) and then abruptly returns to baseline level of supplemental oxygen.
5. Discourage use of this button unless emergency and changed setting to 5% above baseline (ie, 25% to 30%)

Results



When the sat limit was set at 95%, infants born had decreased time with supplemental oxygen and a trend toward decreased length of stay.

	N	Severe ROP	Days to RA	GA @ DC
Limit 97%				
≤ 26 wks	11	36%	88	40.2
27-28 wks	3	0	44	37.5
> 28 wks	21	0	21	36
Limit 95%				
≤ 26 wks	25	42%	81	39.8
27-28 wks	25	0	38	36.4
> 28 wks.	46	0	12	36.4

1. Saturation limit reduced to 95% on December 10, 2015.
2. Compliance was initially poor (<10%) and improved over time to consistently great than 80% by July, 2016.
3. The average daily number of erroneously set upper saturation limit decreased from 14 to < 2/day.

Preliminary results for 7 infants born when saturation limits were consistently set at 95% (July, 2016), the incidence of severe ROP was 2/7 or 29%. These 7 infants were younger (24.9 weeks) compared to infants born between December, 2015, and July, 2016, (25.2) and were at higher risk of developing severe ROP. This is encouraging and a marked improvement over previous results.



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