Improving Compliance with Pulse Oximetry Alarm Limits

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Introduction

Maintaining pulse oximetry within a specific target range has been shown to reduce the risk of BPD and ROP\(^1\).\(^2\). Alarm limits provide a wider range so that the tighter oximetry targets can be achieved with a minimum of false or nuisance alarms. Compliance with maintaining alarm limits, thereby allowing for increased likelihood of achieving the target range, is inversely proportional to the incidence of BPD (Figure 1).

Aim

To achieve greater than 90% compliance with our guideline to set the alarm limits (low alarm: 85% and high alarm: 96%) within the 2015 calendar year.

Methods

A multi-disciplinary team developed this project based on the literature that hyperoxia can be harmful to the lungs and eyes of preterm infants. Key drivers of change were judicious use of supplemental oxygen, setting alarm limits, alarm responses, and compliance with setting alarm limits. The targeted pulse oximetry range was 88-94%, and the alarm limits were 85-96%. We conducted regular audits of the pulse oximetry alarm limit settings, whether alarm limit orders were placed and whether the orders were accurate (compliance with the guideline). PDSA cycle 1: alarm limits were displayed at the bedside of all eligible infants on “Oxygen With Love” (OWL) cards to remind all staff of the guidelines. PDSA cycle 2: Respiratory Therapists could modify the physician orders to reflect the policy and improve order accuracy.

Results

Figure 1. Correlation between compliance with the 85% alarm limit order and prevention of hyperoxic events.

Figure 2. The percentage of patients whose upper limit was set at 96% (compliance with the alarm limit guideline) improved after the implementation of the Oxygen With Love (OWL) reminder cards at each eligible patient’s bedside.

Figure 3. Run chart showing that compliance with placing the OWL reminder cards at each eligible patient’s bedside has not changed since implementation in September 2013. Blue arrows indicate when the OWL initiative (PDSA cycle 1) and RT modification of orders (PDSA cycle 2) began.

Figure 4. Compliance with setting the upper limit at 96% in eligible patients has shown a recent improvement with less variability (October 2014 through May 2015). Arrows indicate when the OWL initiative (PDSA cycle 1) and RT modification of orders (PDSA cycle 2) began.

Figure 5. Order accuracy has been consistently lower than order placement in eligible patients, with a slight improvement over time. The PDSA cycle 2 allowing order modification by Respiratory Therapists in April 2015 led to improved order accuracy.

Discussion

Maintaining saturations within a specified target is difficult to achieve\(^1\).\(^2\). It is also difficult to maintain alarm limits due to nuisance alarms. With the implementation of order modification by NICU RRT staff in April 2015, we have achieved 97.5% order accuracy. Whether this is sustainable remains to be determined. We have found that providing visual reminders, staff education and teamwork can lead to improvement in compliance with setting pulse oximetry alarm limits that will reduce the exposure of preterm infants to hyperoxic events.

References