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Purpose/Introduction:

Pulse oximetry used in the neonatal period helps monitor and reduce the risks of hypoxaemia and hyperoxaemia. Southend University Hospital is part of the East of England Neonatal Operational Network and follows the guidelines: Saturation targeting the infant admitted to the Neonatal Unit. (Registration No: NEO-ODN-2019-6)

This audit aimed to review the current practice of prescribing oxygen and monitoring the oxygen saturation in the neonatal unit at Southend University Hospital, a Level 2 unit with 18 cots (2ITU, 3 HDU, 13 SCBU). The unit takes care of infants born at or above a gestation of 27 weeks. In our unit, we use Philips Intelliview MP70 Neonatal or Intelliview MP5 Neonatal monitors for functional pulse oximetry and Philips M1193A reusable Neonatal Hand/Foot SpO2 Sensors to record the percentage oxygenation of the haemoglobin.

The aim of auditing the oxygen prescribing and saturation monitoring on the unit was to make the improvements should the standard fall below those set out in the guideline.

Our improvement journey- steps we took

Idea
Audit oxygen prescription and improve compliance to current guidelines

1st audit cycle:
3rd September 2019 and 2nd December 2019.

Implementation of the changes

2nd audit cycle: 23rd May 2020 and 25th June 2020

Methods

- ❖ Our audit was performed between September and December 2019, 6 months after disseminating the guideline within the neonatal department.
- ❖ We performed spot checks of the prescriptions for oxygen and the saturation alarm limits set for all infants on the unit to assess compliance with the following 4 standards:
 - 100% of infants receiving oxygen should have oxygen prescribed in a drug chart with a specified saturation target range.
 - 100% of infants receiving oxygen should be on continuous pulse oximetry.
 - 100% of continuous pulse oximetry should have appropriate set saturation alarm limits.
 - 100% of infants requiring deviation from the recommendations should have this documented by a clinician in their notes.

The first audit cycle:

- 13 spot checks of the unit,
- 104 cases - infants with ongoing admission, who were, therefore, audited several times using their most current drug chart and pulse oximetry.
- 78 of these cases were preterm (or had a birth weight less than 1.5Kg)
- 23 cases were born at term
- 1 had a corrected gestation above 37 weeks at the time of audit.
- 2 cases of established or risk of PPHN
- No infants with suspected or confirmed cyanotic heart disease.

❖ Following the initial results, the following changes were implemented:

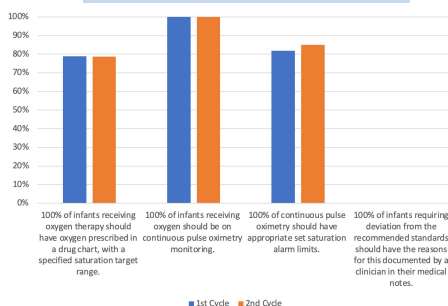
- Departmental teaching regarding the content of the guidelines
- Introduction of the stickers into the oxygen section of the drug charts
- This was to be acknowledged and validated twice daily by the nursing staff.
- Poster with recommended oxygen saturation targets for prescription and monitoring alarm limits displayed on the unit and in the doctors' office.

The second audit cycle:

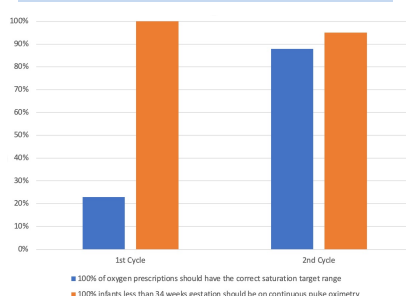
- ❖ Conducted four months after completing the implementation of our improvements.
 - 14 spot checks of the unit
 - 94 cases were audited.
 - 80 cases were preterm
 - 11 cases were term
 - 3 had a corrected gestation above 37 weeks.
 - No cases of established or risk of PPHN or cyanotic heart disease during this cycle.

- ❖ 4 months after making improvements, the overall rate of accurate oxygen prescribing rose from **22.9% to 87.9%** and all cases with a correct prescription were associated with a sticker.
- ❖ The unit remained consistent in monitoring 100% of infants receiving oxygen. However, the rate of infants below 34 weeks gestation on continuous pulse oximetry fell to 95%.
- ❖ The rate of correctly set saturation alarm limits rose from 81.9% to 85%.
- ❖ Notably, it was term infants and those on-air who frequently had incorrect settings. There remained no cases in which deviation from the guidelines was justified in the notes.

Unit performance of guideline standards



Unit performance of guideline recommendations



Oxygen prescription sticker for titration of FiO2

Oxygen Prescription: Titrate FiO ₂ to selected target range	
Preterm (<37 weeks or <1.5kg):.....	91-95% <input type="checkbox"/>
Term (≥37 weeks).....	≥95% <input type="checkbox"/>
Preterm, corrected gestation ≥37 weeks:...	≥93% <input type="checkbox"/>
Risk of /established PPHN:.....	>95% <input type="checkbox"/>
Other:.....	% to % <input type="checkbox"/>
Signed: _____	Date: _____

Conclusion

- Changes implemented following the first cycle neither improved the rate at which infants on oxygen had a prescription nor the accuracy of the alarm limits set for continuous pulse oximetry.
- There was, however, an increase in the accuracy of the saturation target ranges prescribed and this demonstrates the utility of the stickers implemented in the drug charts. There was also consistent monitoring of all infants on oxygen with pulse oximetry.
- More changes are required for the unit to achieve the standards set by NHS East of England such as ensuring all drug charts have a sticker, augmenting the information provided by the stickers and providing space for a prescriber to document clinical justification for any deviation from the recommended saturation target range.
- We suggest further departmental teaching regarding this, the need for revalidation of a sticker twice daily and the saturation monitoring of particular infants such as those younger than 34 weeks and term infants on air.