**ABO IMPROVEMENT IN MEDICAL PRACTICE ACTIVITY**

**(CLINICAL)**

**Topic**

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| **Title of Project**: | Using QI to Reduce Severe Retinopathy of Prematurity ROP in Infants in a Colorado NICU |

**Project Description**

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| Describe the quality gap or issued addressed by this activity. (Included in your response to this question should be a description of the resources that informed your decision to pursue this topic, a description of what the literature says about the issue you identified, and the rationale for choosing to address this clinical project | At the University of Colorado Memorial Hospital, there was a significant increase in severe ROP (stage 3 or treatment warranted), requiring surgical intervention, in the first half of 2017. Laser surgery for severe ROP increased by 59% from 2015 to 2016 and by 109% from 2016 to the first half of 2017. The goal of the project is to reduce the number of severe ROP cases by increasing nursing and parent education about the modifiable contributing factors to ROP. |
| **Background Information**: The month you pulled the baseline IRIS performance report and any additional information that me be pertinent: | In 2016, our NICU was ranked 16th in the Pediatric network for rate of severe ROP, with a rate of 4.0%. In 2017, the rate increased to 13.9% and our ranking moved to 2nd for the most severe ROP in the same group of high volume NICU's. Our goal of the project was to improve nursing education of ROP, improve compliance with Oxygen Saturation Alarm limits, decrease alarm fatigue, and improve overall health and weight gain with increased compliance with maternal breast milk feeding, which can overall help reduce the rate of severe ROP in the NICU. |
| **Project Setting**: (Please select from options below):* Group Practice
* Healthcare Network
* Hospital
* Multi-Specialty Group
* Solo Practice
* Surgical Center
* Other
 |  Hospital |
| **Study population**: (describe the type of patient for whom the care process will be improved, e.g., all patients in your practice, patients with diabetes, patients presenting for emergency care: | The infants who are at risk for ROP, premature birth at or before 31 weeks gestational age and/or birth weight less than 1500 grams. Approximate sample size includes all infants that meet this criterion born at our NICU, about 100 infants per year. |
| **Quality Indicators / Performance Measures**:It is important to carefully define outcome or performance measures that will be quantified at baseline (before the care process is changed) and at re-measurement (after you have implemented the proposed improvement) to quantify the impact of your care process change. There are two basic types of performance measures - process of care measures and outcomes of care measures. . Process of care measures (e.g. timely treatment of diabetic retinopathy) can influence outcome measure (e.g. decreased risk of severe vision loss); . Outcome measures can be linked to processes of care that can be improved. Generally, performance measures are expressed as rates, often as percentage rates. For example, if the intent of a project is to improve the quality of glaucoma care in your practice, you may choose to improve your rate of establishing a goal IOP in patients with newly diagnosed glaucoma, measured over a 3-month period. . The numerator of this process measure would be the number of newly diagnosed patients during this time who have a goal IOP recorded in the medical record.. The denominator would be the total number of patients diagnosed during that same time period. Continuous variables (e.g. the refracted spherical equivalent after cataract surgery) can often be simplified and transformed then into percentage rates by setting a quality threshold (within 0.5 diopters in the intended spherical equivalent) which, if attained, would qualify the patient to be in the numerator (e.g. number of patients within 0.5 diopters / total number of patients). It can be advantageous but not mandatory to have more than one quality measure in order to gauge the impact of your process change. In the example above, an additional outcome measure might be the percentage of patients in whom the goal IOP is attained within the first 6 months after diagnosis. If possible, measure quality indicators for at least 30 individual patients or data points during the baseline and again during the follow up period.  | **Measure Type:** Process**Measure Name:** ROP Patients**Numerator Statement:** The patients who developed severe ROP (Stage 3 or treatment warranted) prior to discharge from the NICU.**Denominator Statement:** The patients who underwent eye exams to screen for ROP, who met criteria in the NICU and then discharged. |
| We realize that this may not be feasible or appropriate for all projects. Please indicate at least one measure below; either a process or outcome measure: **Example Measure**:. **Measure Type**: Process Measure. **Measure Name**: Patient pain level during intravitreal injection. **Numerator Statement**: Number of patients in who pain levels decreased by 2 points on a 1-10 scale. **Denominator Statement**: 30 consecutive patients undergoing intravitreal injection. |  |
| **Project Interventions**:Quality improvement requires that you analyze your care delivery processes and identify changes, which if implemented, will improve care and outcomes. Generally, educational interventions are thought to be weak and demonstrate little impact. The introduction of tools, strategies or systematic approaches to care delivery is more powerful. A tool is a thing, for example a preoperative checklist, or written standardized process or protocol. Strategies include changes in procedures or policies like the introduction of a surgical time out before surgery is initiated. Systematic approaches to care delivery involve a comprehensive analysis of care process and the introduction of a combination of tools and strategies designed as a complete process. Please describe the changes to your care processes you intend to introduce: | The changes that were implemented in the project: * Posting Oxygen Saturation Target Algorithm at Bedside to help remind

and education staff on goals and parameters to be set based on each individual patient. This helped improve O2 saturation limit compliance and therefore help decrease the incidence of severe ROP.* Staff education on ROP, which included a mandatory pre-recorded lecture on ROP, a recorded family interview about the effect of ROP on patients, and education video on the eye exam. This helped increase knowledge and understanding of ROP, the patient/individual impact of ROP and improve compliance. Communication with nursing staff and parents about the next ROP exam was monitored and audited as well.
* Mother's Milk project, with evidence that human milk has a protective factor for ROP, which involves a lactation specialist to help

improve education and use of human milk with infants who meet criteria.* Using Blended Oxygen Low Flow Nasal Cannula, to decrease exposure to 100% oxygen, which can increase the risk of ROP. The at-risk patients were identified and switched to this source of supplemental oxygen to help prevent the progression to severe ROP.
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| **Project Team**:(include roles for yourself and all members of your team):List the individuals who will be involved in your quality improvement project (i.e., solo project, partners in practice, office staff, OR personnel, anesthesiologists) and the roles they will contribute. | Pediatric Ophthalmologist, Advisor: Role: Ophthalmology Advisor, ROP examiner and Surgeon who also treated all treatment warranted ROP; Created ROP power point lecture that became required online education for the nursing staff, created ROP examination videos for nursing staff and parents to help improve understanding of the ROP exam, reduce stigma with the ROP examination.Clinical Nursing Specialist in the NICU: Role: oversees entire project and meetings, audits alarm monitors on patients who qualify for ROP examinations, collects and processes data to show any changes in quality improvement project.Clinical Nursing Specialist, Nursing Educator NICU: Role: advisor to project, nursing educator to implement project design and complianceNeonatologist: Role: advisor to project, help with implementation and compliance with project, collect data on ROP incidence and improvements in quality of careNeonatologist: Role: advisor to project, help with implementation and compliance with projectNeonatal Nurse Practitioner: Role: advisor to project, help with implementation and compliance with project |
|  Will any other ophthalmologists be requesting MOC credit for participation in this SD-PIM? | N/A |

**Project Outcomes/Results**

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| **Project Summary** | In the following sections, please prepare a brief summary of the project highlighting the data collected, effectiveness of your measurement approach, interventions, and the overall impact of the project. |
| **Baseline Data**:Quantify each of the quality indicators / performance measures described above for the baseline period (before interventions for improvement were introduced). Report the numerator, denominator and the calculated percentage rate for each measure. | Numerator for Outcome: Discharged patient with Laser eye surgery, excluding babies transferred from another facility for laser eye surgery. Each Patient is counted once only.Denominator: Discharged patients born under 31 weeks GA or birth weight equal or less than 1500 g, excluding babies transferred from another facility for laser eye surgery, each patient is counted once only.Also, with weekly audits of pulse-ox alarm limits in compliance with physician orders and with posting alarm limit guidelines at the bedside; weekly audits of oxygen saturation within target range; and weekly audits of nursing communication to the next ROP exam.These measures were balanced with the mortality rate of patients in the denominator. Results of Quality Improvement Project, to reduce Severe ROP, December 2018RESULT:* Outcome: Severe ROP

13.9%(2017)â‰¤ 9.8%15.6%* Process: Pulse-Ox Alarm Limits Reliability

83%(2017)â‰¥ 90%90%* Process: 24-hour O2 Saturations within O2 Target Range

36%(5/17/18)TBDNot feasible to continue to monitor* Process: Next Eye Exam Date on Communication Board

21%(5/17/18)â‰¥ 90%96%* Balancing: Mortality Rate

5.6%(2017)â‰¤ 5.6%10.4% |
| **Follow-up Data**:Quantify each of the quality indicators / performance measures described above for the re-measurement period (the period following implementation of the interventions for improvement). | These are the run charts of the follow up data after the changes were implemented: See Hard copy for copies of run charts. |

**Project Impact**

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| Compare the baseline data to the re-measurement / follow-up data and quantify the impact of the process of care changes (your project interventions). The project hopefully resulted in improvement; however, some projects may result in a diminution in quality. If a lack of improvement or reduction in quality occurred, suggest other strategies that might be more effective. | The following is the resulting data comparing 2016 (before project was started) to the years during the project and the years after the interventions were implemented: (also see the initial chart in Baseline data to show initial comparison)* Discharged Patients born <31 wks GA or born <1500 g

2016201720182019 (8/5/2019)* Laser Eye Surgery

21081* Laser Eye Surgery Rate

2.0%9.3%8.3%1.2%* Stage 3 ROP

2363* Stage 3 ROP Rate

2.0%2.8%6.3%3.7%* Severe ROP (Stage 3 or treatment warranted)

415154* Severe ROP Rate

4.0%13.9%15.6%4.9% |
|  | * Number of Deaths

86103* Mortality Rate

7.8%5.6%10.4%3.7%* Number of Deaths after first ROP exam

2220* Adjusted mortality rate (after first ROP exam)

2.0%1.9%2.1%0.0%Even though the rate of severe ROP did increase in 2018, the rate of patients reaching treatment warranted ROP decreased. It is continuing to decline into 2019, so the changes we made in education, alarm limit compliance, and endorsing maternal milk for feeding are continuing to have an impact on our patient population. |

**Project Reflection**

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| Did you feel the project was worthwhile, effective? |  YES |
| How might you have performed the project differently? | N/A |
| Please offer suggestions for other ophthalmologists undertaking a similar project. | N/A |