Introduction & Background

Inhaled NO (iNO) is a selective pulmonary vasodilator indicated for management of hypoxic respiratory failure secondary to persistent pulmonary hypertension (PPHN) in the NICU. iNO use has improved survival for infants with PPHN and decreased the need for ECMO support. The cost of using iNO is significant, and studies have shown that it does not improve outcomes in infants less than 34 weeks (1). Therefore, it is important to utilize iNO for appropriate indications, ensuring response to therapy, and initiating timely weaning to manage cost. Other centers have published work showing that an iNO stewardship program can significantly decrease the number of hours and cost associated with iNO utilization (2).

Aim

1. To decrease the average number of hours of iNO therapy per patient per month at NCH NICU from a mean of 170 hours to less than 120 hours (30% decrease) by Dec 2018.

2. To decrease the percentage of patients with length of iNO treatment > 120 hours from a median of 40% to < 25% by Dec 2018.

Methods

The Model for Improvement and principles of high reliability were used to drive change.

1. Team of neonatologists and respiratory therapists reviewed the literature and developed iNO guidelines for initiation, management and weaning.

   - Practices changes included:
     - Non-responder pathway
     - Weaning based on physiologic readiness
     - RT guided automatic weaning
     - Consultation with pulmonary hypertension specialist if unable to wean by goal
     - Planning for weaning at the initiation of iNO

2. PDSA cycles of testing, learning and adapting

3. Utilization of tools to improve guideline use – orders, visual reminders at bedside, templates, discussion at daily safety huddles

4. Displayed data and provided feedback and learning

Prediction: By standardizing our actions and engaging all members of the care team, we will be able to decrease iNO use in our NICU.

Results

We were able to be successful in this project because we:

- Engaged key stakeholders
- Included representative members of the care team
- Leveraged the expertise of our RTs and nurses to drive earlier and automatic weaning of iNO
- Gained buy in and standardized practice for the majority of patients
- Used principles of reliability to support our interventions

Conclusions

- Our team has seen a trend towards improvement in all of our aims.
- We plan to spread the interventions of this project to other areas of our hospital that use iNO, as well as another level III NICU where our providers provide care.
- We will monitor data monthly for increase in iNO use and address barriers as they arise

Lessons Learned

- Use of Inhaled Nitric Oxide in Preterm Infants; Praveen Kumar, Committee on Fetus and Newborn; Pediatrics, Jan 2014, Vol 133, Issue 1
- Impact of Stewardship on Inhaled Nitric Oxide Utilization in a Neonatal ICU; Hospital Pediatrics; October 2016

References:

1. Use of Inhaled Nitric Oxide in Preterm Infants; Praveen Kumar, Committee on Fetus and Newborn; Pediatrics, Jan 2014, Vol 133, Issue 1
2. Impact of Stewardship on Inhaled Nitric Oxide Utilization in a Neonatal ICU; Hospital Pediatrics; October 2016