

QUALITY PROBLEM

Home oxygen therapy (HOT) is a common requirement for infants being discharged from the Newborn Intensive Care Unit (NICU). Although bronchopulmonary dysplasia in former preterm infants accounts for a large portion of NICU graduates needing HOT, there are many neonatal conditions that necessitate ongoing oxygen therapy that are not exclusive to prematurity. In fact, late preterm and term infants account for 19% of those discharged from the NICU on HOT.

Our high-altitude location makes need for HOT more likely following NICU discharge secondary to decreased partial pressure and fractional percentage of oxygen in room air compared to sea level. Studies of healthy term and preterm infants born at similar altitude to Albuquerque have documented lower mean arterial oxygen saturations (SpO₂) in the first several days of life than in those born at sea level, with mean differences of 3-9%.

Optimal timing of weaning HOT is important. Oxygen administration can result in formation of reactive oxygen intermediates and peroxidation of lipid membranes which can be harmful to the developing lung. HOT has been associated with increased hospitalizations and respiratory exacerbations compared to respiratory illness propensity matched infants on room air. Prolonged home oxygen therapy can also adversely effect family quality of life. However, cessation of oxygen therapy too early can result in chronic hypoxia, poor growth, and impaired development.

Many primary care providers (PCPs) have not received training on HOT in infants and thus may not feel comfortable managing this issue. Unfortunately, subspecialists, such as pediatric pulmonologists, that can help are limited and can be difficult for families to access in our rural state.

SETTING AND TEAM

This QI project is being conducted in the University of New Mexico Hospital NICU, but with interventions that are also aimed at use in outpatient primary care clinics.

The QI team consists of Leah Enright (Neonatology Fellow) and Dawn Novak (Neonatologist), with assistance from Bennie McWilliams (Pediatric Pulmonologist), Laura Caffey (Pediatric Pulmonologist), Michael Kiernan (Pediatric Pulmonologist), Jon Love (Pediatric Cardiologist), Teresa Anderson (Pediatrician), and Jerry Larrabee (Pediatrician)

QI Framework

What are we trying to accomplish?

Assist pediatric PCP with management of HOT to decrease the need for subspecialty referrals and appointments for NICU graduates and optimize duration of HOT.

How will we know a change is an improvement?

Increased pediatric PCP comfort with managing HOT, decreased pediatric pulmonology referrals for management of low flow HOT ($\leq 1/8$ liter/min) in NICU graduates without significant cardiac disease, structural airway anomalies, or chronic lung diseases besides BPD (low-risk infants).

What change can we make that will result in improvement?

Provide an easy to use, evidence based, standardized protocol for weaning home oxygen in low-risk infants discharged on low flow HOT.

QI Project Aim

Increase number of PCPs who report feeling comfortable managing HOT in NICU graduates by 50% within 12 months of starting to provide weaning guidelines.

Decrease referrals to pediatric pulmonology for weaning of home oxygen therapy for low risk NICU graduates on low flow HOT by 50% within 12 months of starting to provide weaning guidelines

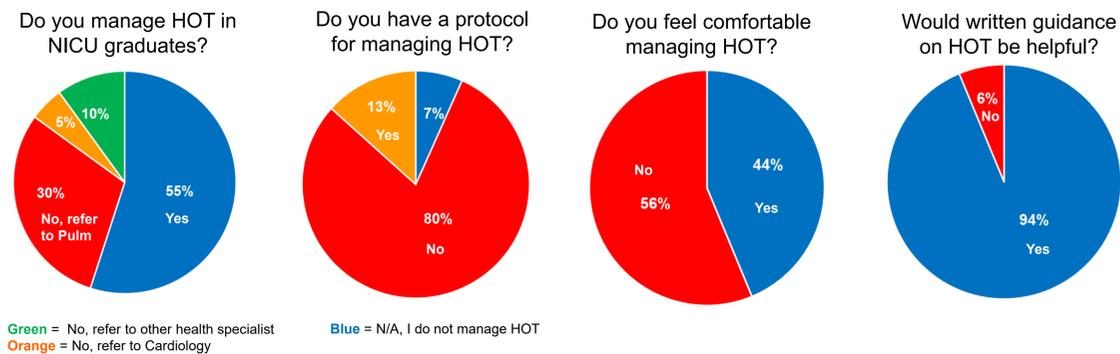
QI Project Measures

Outcome measures – Percentage of pediatric PCPs reporting comfort with management of HOT on a survey of these providers. Percentage of families of NICU graduates reporting that their child's PCP gave directions to decrease or stop the oxygen on a survey of this group

Process measures – Percentage of pediatric PCPs reporting awareness of HOT weaning guidelines and scores of appropriateness and ease of use in their office

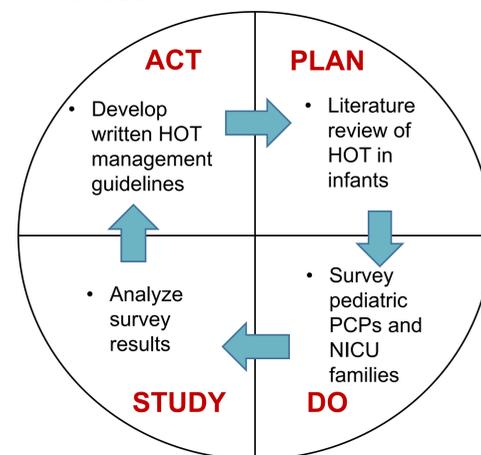
Balancing measures – Changes in average reported duration of HOT use and change in percentage of families reporting that their child needed to be restarted on HOT

SELECTION OF CHANGES TO TEST

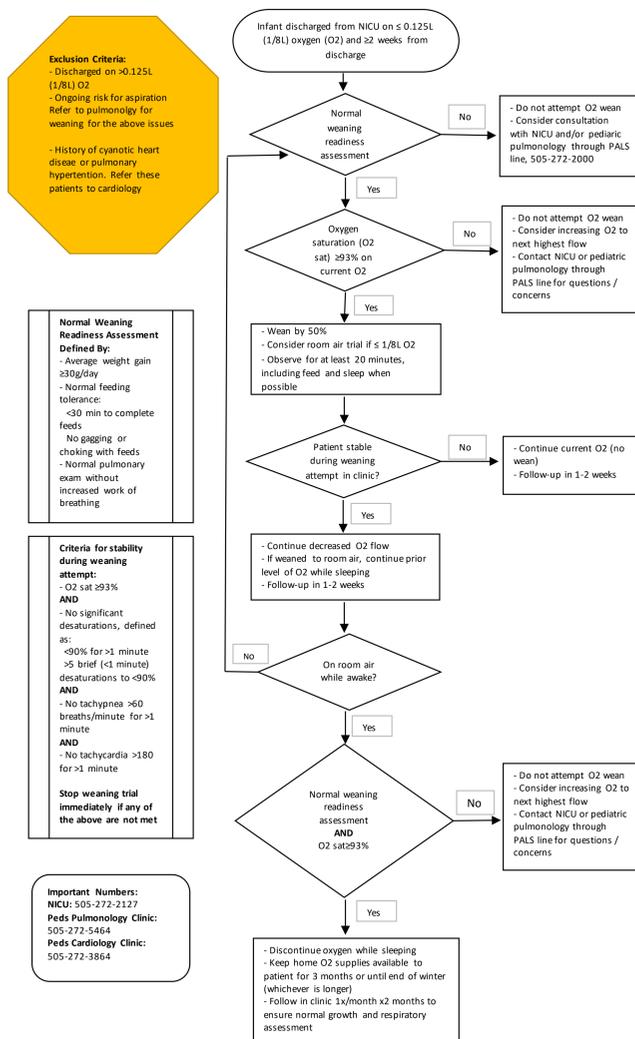
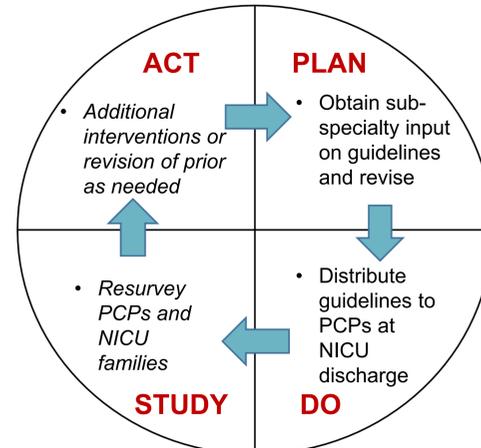


PDSAs

CYCLE 1



CYCLE 2



SUMMARY

Management of HOT in NICU graduates can be challenging and clear guidelines are not readily available. In fact, a survey of pediatric pulmonologists at 20 leading U.S. hospitals found that only 8% of respondents endorsed using a standardized protocol for weaning HOT in former preterm infants.

The majority of pediatric PCPs in New Mexico surveyed report that they do manage HOT in NICU graduates, do not follow a protocol, do not feel comfortable with managing HOT, and would find a written protocol helpful.

Based on available evidence and international professional societies' consensus statements on HOT in infants, we have created a written guideline and flowchart for managing HOT in NICU graduates. We hope this will make the process of caring for these infants easier for their families and pediatric PCPs around the state.

NEXT STEPS

- Develop a standardized method for distributing HOT weaning guidelines with the discharge summary for any NICU graduate discharged on HOT
- Assess the impact of these guidelines by surveying pediatric PCPs and families of NICU graduates 3 months after distribution is initiated
- Assess impact of guidelines on pediatric pulmonology referral rates for low risk NICU graduates discharged on low flow HOT

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