

# Improvement of nutritional support of VLBW infants

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## Introduction

Postnatal growth failure of VLBW infants is so common that it occurs in >90% of some NICU populations<sup>1</sup>. Poor growth in the NICU is predictive of suboptimal growth and neurodevelopmental outcomes following discharge<sup>2</sup>. Studies showing variability amongst NICU's suggest that nutritional practices in the NICU are important determinants of growth velocity<sup>3</sup>.

## Aim

We initiated a QI project to optimize parenteral (TPN) and enteral nutrition provided for VLBW infants with the goal of discharging fewer than 50% of such infants weighing < 10<sup>th</sup> percentile for gestation.

## Setting

PSHCH is a regional level 4 NICU serving central PA, with outborn infants accounting for 40% of annual admissions.

## Methods

Value compass methods determined a web of causation (key drivers) and identified potentially better practices (process measures) which included:

- **Colostrum as first feeding**
- **Increased use of breast milk**
- **Standardized use of trophic feedings**
- **Earlier fortification of enteral feedings**
- **More rapid initiation of "starter" TPN**
- **More aggressive and standardized advancement of TPN**

Pre-implementation data were collected 2008-2009 and post-implementation data were collected 2009-2010 & 2010-2011.

## RESULTS

### Process measures:

Improvement of several process measures during this time period were realized:

- Earlier use of "starter" TPN (figure 1)
- More rapid advancement of amino acids and lipids (figures 2A & 2B)
- Percentage of inborn infants receiving any mother's milk during hospitalization increased to 81% in 2012 (goal >80%)

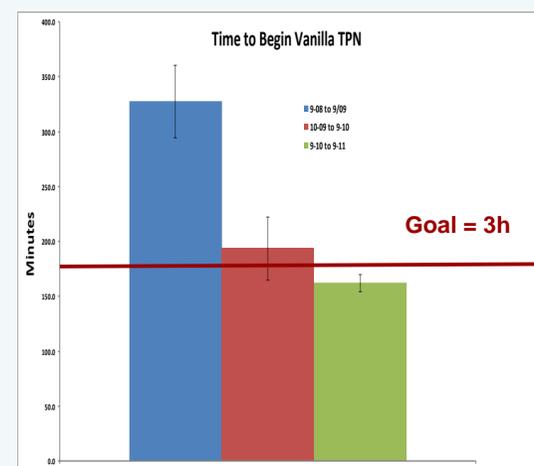


Figure 1 demonstrates reduction in time to initiate vanilla TPN

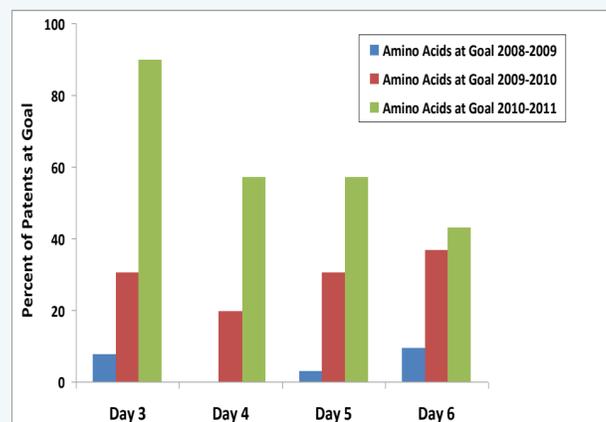


Figure 2A demonstrates improved adherence to amino acid advancement guidelines over time

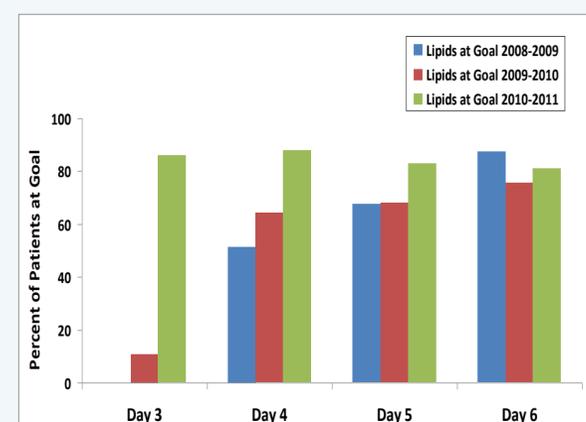
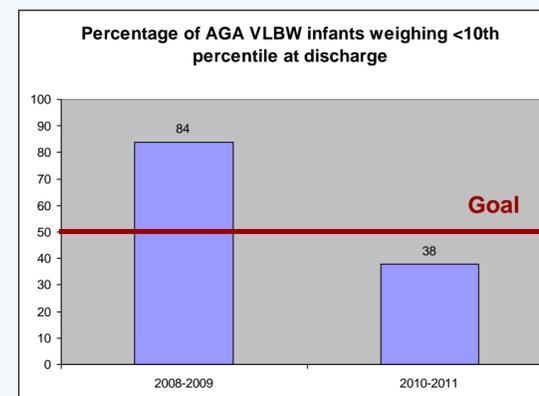


Figure 2B demonstrates improved adherence to intralipid advancement guidelines over time

### Outcome measure:

The percentage of AGA VLBW infants who were discharged with weight below 10<sup>th</sup> percentile for corrected gestation fell below our target goal of 50%



## Discussion

Significant variation of nutritional practices and suboptimal growth of VLBW infants were recognized in our NICU. A multi-disciplinary team created and implemented a bundled set of nutritional guidelines which has led to standardization and process improvements. This was associated with fewer subsequent cases of postnatal growth failure. While we achieved our primary goal and have developed a culture of heightened expectations, much remains to be done and barriers to progress persist. Ongoing challenges include uneven knowledge and attitude regarding nutrition amongst staff, disagreement about best practices, time required to collect and disseminate data, and failure to sustain all progress. Keys to success include evidence-based support of practices, standardized & written guidelines, review of process metrics and enthusiasm of subgroup champions. A primary lesson learned is that postnatal growth failure is not an inevitable consequence of life in the NICU for VLBW infants, but a true team approach is needed for its eradication.

## References

1. Lemons JA et al for NICHD Neonatal Research Network; Very Low Birth Weight Outcomes from the National Institute of Child Health and Human Development Neonatal Research Network, January 1995 Through December 1996. *Pediatrics* 2001; 107(1-8).
2. Ehrenkranz RA et al; Growth in the Neonatal Intensive Care Unit Influences Neurodevelopmental and Growth Outcomes of Extremely Low Birth Weight Infants. *Pediatrics* 2006; 117(1253-1261).
3. Cooke RJ, Ainsworth SB, Fenton AC; Postnatal Growth Retardation: a Universal Problem in Preterm Infants. *Arch Dis Child* 2004; 89 (F428-F430)