

## BACKGROUND

- Neonatal Opioid Withdrawal Syndrome (NOWS): prenatal opioid exposure causing postnatal infant withdrawal
- Improved infant outcomes demonstrated with Eat, Sleep, Console (ESC)<sup>1</sup> model's emphasis on non-pharmacologic care<sup>2-4</sup>

## AIM STATEMENT

- Improve quality of care for infants at risk of NOWS in nurseries across the Froedtert Health system with the goal of reducing average LOS and total morphine exposure by 30% in one year.

## METHODS

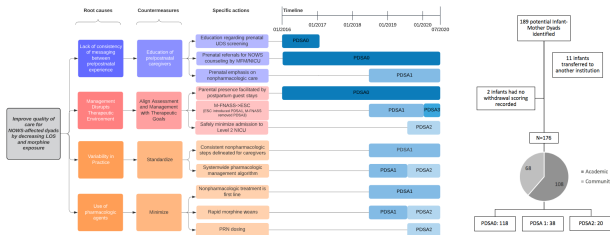


Figure 1. A) Key driver diagram with PDSA timeline B) Patient inclusion and exclusion criteria

- PDSA cycles implemented across three Froedtert nurseries. Outcomes tracked on process control charts
- Process Measures: cumulative # doses and highest dose received per infant per hospitalization, incidence of dose escalation, incidence of polypharmacy
- Balancing Measures: adverse medication related events, transfers to higher level of care, 30-day readmission for NOWS, inappropriately early discharge (<3 days)

## RESULTS

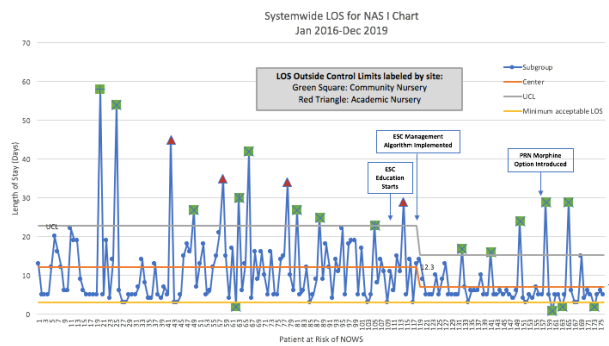


Figure 2. Upon ESC implementation, average LOS significantly decreased but variability persisted. Most outliers occurred at community rather than academic sites of care.

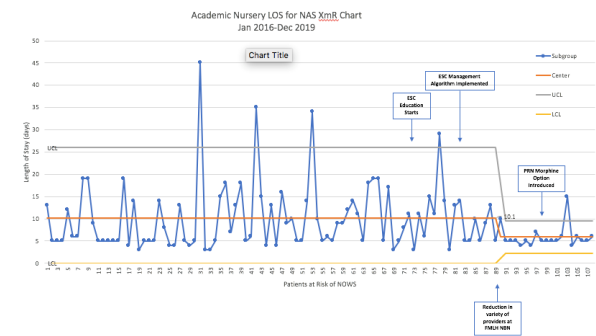


Figure 3. ESC implementation demonstrated delayed special cause variation in academic nurseries; however, decreased variability temporarily correlated with decreased variety in providers.

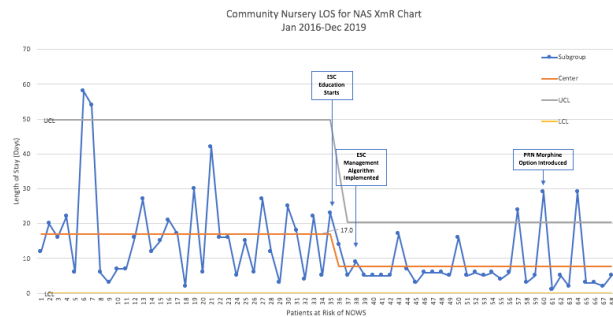


Figure 4. ESC education resulted in special cause variation in LOS in community nursery sites.

## CONCLUSION

- Aim statement achieved systemwide**
  - Systemwide LOS 12.3→7.2 days
  - Academic LOS 10.1→5.9 days
  - Community LOS 17.0→7.8 days
  - % treated pharmacologically 53%→27%
- Balancing measures were rare and did not increase
- Site-specific analysis provides insight to systemwide variability and opportunities for improvement
  - Community hospitals showed a more rapid and variable response to implementation even though infant-mother dyad demographics did not differ between sites

## SPECULATION

- Other potential factors affecting outcomes:
  - Variety of provider experience and background
  - Nursing compliance with new scoring and protocol
  - Family education regarding ESC and their role
- Next Steps:
  - Better define site-specific factors to enhance ESC outcome sustainability
  - Further standardize pharmacologic management through systemwide NOWS order set (proposed PDSA4)

## REFERENCES

<sup>1</sup>Grossman MR, Berkwitz AK, Osborn RR, et al. An Initiative to Improve the Quality of Care of Infants With Neonatal Abstinence Syndrome. *Pediatrics*. 2017;139(6).  
<sup>2</sup>Blount T, Painter A, Freeman E, Grossman M, Sutton AG. Reduction in Length of Stay and Morphine Use for NAS With the "Eat, Sleep, Console" Method. *Hosp Pediatr*. 2019;9(8):615-623.  
<sup>3</sup>Grossman MR, Lipshaw MJ, Osborn RR, Berkwitz AK. A Novel Approach to Assessing Infants With Neonatal Abstinence Syndrome. *Hosp Pediatr*. 2018;8(1):1-6.  
<sup>4</sup>Parlaman J, Deodhar P, Sanders V, Jerome J, McDaniel C. Improving Care for Infants With Neonatal Abstinence Syndrome: A Multicenter, Community Hospital-Based Study. *Hosp Pediatr*. 2019;9(8):608-614.