

The Health Care Improvement Foundation
2016 Delaware Valley Patient Safety and Quality Award
Entry Form

1. Hospital Name

Thomas Jefferson University Hospital

2. Title Of Initiative

Evaluation of effectiveness of a neonatal morphine weaning protocol for the treatment of Neonatal Abstinence Syndrome and its effect on length of stay

3. Abstract (Please limit this description to 250 words)

Our organization is on a journey to High Reliability, and part of that process is to standardize the care that we provide our patients. Neonatal abstinence syndrome (NAS) describes a group of conditions that are a result of fetal exposure to illicit or prescription drugs of abuse. NAS is most commonly caused by intrauterine exposure to opioids, however, NAS can also be observed in infants who have been exposed during the prenatal period to non-opioids, such as benzodiazepines. The incidence of NAS in the United States has increased significantly in recent years, due in part to the current opiate crisis, and has contributed significantly to hospital days in neonatal patients (1). Length of stay (LOS) for infants with NAS at our Institution was compared to a national benchmark of comparator hospitals which showed that our LOS was longer (37.09 vs 23.5 days) than the national average. We identified gaps in our current practice by identifying missed opportunities to wean pharmacologic treatment based on Modified Finnegan scores. We subsequently standardized care by developing an algorithmic protocol for the pharmacologic treatment of NAS, which defines specific interventions based on these scores. A comparison of pre-protocol performance to post-protocol showed significant decreases in missed opportunities to wean (18.21 vs. 5.98), length of treatment for NAS (35.89 vs. 22.74 days), and length of stay (41.66 vs. 30.14 days). Reductions in these parameters have lasting benefits to the patient, family, and the health system as a whole.

4. What were the goals of your initiative?

Historically our institution managed NAS based on a Modified Finnegan Scale, but the treatment course was based heavily on clinical judgement. Neonatal morphine solution (NMS) was initiated at a standard starting dose and then weaned as considered appropriate by the medical team until a cessation dose was reached. Comparison of LOS of infants treated for NAS at our facility to similar hospitals in a comparator group showed that our LOS was considerably higher. In June 2015, a protocol-driven NAS pharmacologic algorithm was introduced (Figure 1). The goals of this algorithm were to decrease both LOS, resulting in lower healthcare costs; and decrease length of treatment (LOT), resulting in less opioid exposure for the infant. We also looked at missed opportunities to wean (MOTW), defined as a 24-hour average Modified Finnegan score < 8, with no corresponding NMS dose reduction. Our goal was to reduce such missed

opportunities in the algorithm treated infants as compared to the pre-algorithm group knowing that this reduction would lead to both a decreased LOS and a decreased LOT.

5. What were your initiative's baseline data and the results of your initiative?

The results of the analysis of the pre-protocol and post-protocol groups showed a statistically significant decrease in missed opportunities to wean, length of treatment, and length of stay. Missed opportunities to wean decreased from 18.21 to 5.98 ($p=0.000$), length of treatment decreased from 35.89 to 22.74 days ($p=0.000$) and length of stay decreased from 41.66 to 30.14 days ($p=0.003$).

The decrease in the number of MOTW suggests strong adherence to the protocol. The decrease in the length of therapy suggests better control of NAS symptoms and a decreased exposure of the infant to opioid therapy. The decreased length of stay may be associated with a reduction in healthcare expenditures, decreased risk of hospital-acquired neonatal morbidity, and shortened period of separation of the parent from the infant.

A comparison of the LOS between the comparator group and our institution showed that in CY13Q1, our LOS, in days, was 37.09 vs. 23.5 for the comparator group. In CY15Q4, after implementation of the algorithm, our LOS had dropped to 22.44 vs. 20.56 days for the comparator group.

6. Appendices (i.e., tables and graphs)

2016 HCIF Pt Safety Award Neonatal Abstinence Syndrome Figures.docx

7. Describe the interventions that were instrumental in achieving the results for your initiative.

A multidisciplinary group including neonatologists, pediatricians, nurse practitioners, medical residents, neonatal and pediatric nursing, pharmacy, and administration developed the NAS pharmacologic algorithm. This was based on primary literature evaluation and our institution's anecdotal experience. The algorithm was approved by the Women and Children Subcommittee of the Pharmacy & Therapeutics Committee, the Pharmacy & Therapeutics Subcommittee, and the Medical Executive Committee. In July 2015, the algorithm was implemented. The algorithm gives clear recommendations for titrating/weaning the NMS dose a set amount every 12-24 hours based on the infant's Modified Finnegan score (a quantitative, scaled scoring system used to measure severity of the disease). In addition, the algorithm provides recommendations for adjunctive therapy (i.e. phenobarbital, clonidine) when appropriate. Prior to implementation, attending physicians, residents, nurses, and pharmacists were educated to the new protocol. We also moved from dispensing the NMS in a bulk bottle, which presented a number of logistical problems for the nursing staff, to batched 1 mL oral syringes containing NMS. This reduced the chance of a significant overdose that was present with the bulk bottle, and improved accountability. The P&T Committee also gave authority to pharmacists to retime orders in the prescriber order entry system if dose

decreases/increases were not timed appropriately in relation to the previous dose received to decrease the risk of medication error.

8. How can this initiative be replicated through the region? (Please limit this description to 100 words.)

The initiative can be easily implemented at other institutions that treat infants suffering with NAS. Our organization would certainly be willing to share our algorithm with interested parties. Implementation would require the organization to evaluate the algorithm in terms of the clinical comfort of their staff with our guidelines and make any adjustments. There is no cost to implementation as far as technology or supplies.

9. Explain how the initiative demonstrates innovation (Please limit this description to 100 words.)

The American Academy of Pediatrics recommends an algorithmic approach for the management of NAS, but there is currently no uniformly accepted standardized regimen (2). Our algorithm is innovative in that it is tailored to our organization's operations and standard practices, provides more rapid weaning of the NMS, more specifics as to routine dosing and rescue dosing of drugs, and more aggressive up titration when required based on the Modified Finnegan scale. Our data demonstrated strong adherence to the newly implemented protocol and significantly decreased incidence of MOTW, LOS, and LOT which proves the effectiveness of a protocol-driven NAS management approach.

10. How does this initiative demonstrate collaboration with other providers within the continuum of care? (Please limit this description to 100 words.)

The development and approval of the NAS pharmacologic algorithm was truly a multidisciplinary effort, with involvement of neonatologists, pediatricians, nurse practitioners, medical residents, neonatal and pediatric nursing, pharmacy, and administration. The divisions of Neonatology and Pediatrics were included in the process as infants are often transitioned from our Intensive Care Nursery to the Pediatrics unit as appropriate for their clinical status. Subsequent to this effort and its success, this group is presently working to develop a protocol for the non-pharmacologic management of NAS which is anticipated to contribute to improved outcomes for these patients and the Institution.

11. Explain ways in which senior leadership exhibited commitment to the initiative (Please limit this description to 100 words.)

Leadership at our Institution is pushing to standardize care in our quest to High Reliability. As this protocol met the criteria for standardizing care, Hospital Administration was highly supportive of the effort. The Vice President/Chief of Pharmacy and the Vice President, Medicine/Cardiac/Specialty Services were involved in the Committees that approved the algorithm and that reviewed the results (the Medication Quality Subcommittee of P&T). The VP of Clinical Support Services is the lead of the Women and Children Service line and fully supports the outcome of this algorithm in enhancing patient safety.