



Ohio Perinatal Quality Collaborative
Neonatal Abstinence Syndrome Project



The Ohio Perinatal Quality Collaborative (OPQC) uses improvement science methods to reduce preterm births and improve perinatal and preterm newborn outcomes in Ohio as quickly as possible. Neonatal Abstinence Syndrome (NAS) is a drug withdrawal syndrome that may occur in opioid-exposed newborns shortly after birth¹. Symptoms typically occur 48-72 hours after birth and may include seizures, tremors, poor feeding, gastrointestinal distress, and high-pitched crying. NAS is a significant public health issue, and many newborns with NAS are either unidentified, under, or over-treated.

In 2015, it was reported that one baby suffering the effects of NAS is born every 25 minutes². The NAS epidemic is steadily increasing, overwhelming social service systems and public payers. Treating newborns impacted by NAS was associated with nearly \$100 million in healthcare expenses and almost 25,000 days in Ohio hospitals in 2013, according to data from the Ohio Hospital Association. Prior to 2011, OPQC estimates up to 50% of neonates with NAS in Ohio were not receiving optimal care, despite evidence-informed data for identification and treatment of these infants. Thus, there is substantial opportunity for improvement.

Building upon the progress of a pilot study at 6 centers of the Ohio Children's Hospital Association (OCHA)³, the aim of the OPQC NAS Project was to increase the identification of and compassionate withdrawal treatment for full-term infants born with NAS, thereby reducing the length of stay (LOS) for these infants. The project works with 54 sites including 26 Level 3 NICUs, 26 Level 2 Special Care Nurseries and 2 Level 1 Newborn Nurseries.

- *Phase 1 (January 2014 – June 2015):*

In the first phase of the NAS Project, 52 OPQC site teams participated in adapting the Ohio Children's Hospital Association (OCHA) care bundles, emphasizing compassionate care of infants and mothers, and standardizing both identification of affected infants and use of non-pharmacologic and pharmacologic care practices.

- *Phase 2: Orchestrated Testing (October 2015 – December 2016)*

Although hospitals standardized care in Phase 1, some variation in accepted practices remained across the collaborative, particularly in the components of the non-pharmacologic bundle. Project sites used Orchestrated Testing (OT) to learn from the accepted variation in practices across centers to identify the specific combination of factors (or practices) that yielded the greatest improvements in outcome. Sites self-selected into groups defined by the site's practice related to formula type used in non-breastfed infants, while breast milk and breast feeding were encouraged for appropriate infants in all groups. Results suggest that use of 22 kcal/oz feeds could be beneficial in non-breastfed babies with NAS⁴. To confirm these findings, OPQC encouraged participating sites to adopt 22 kcal/oz formula as part of the nonpharmacologic care bundle and will monitor improvement in LOS over time.

- *Phase 3: Sustain (January 2017 – June 2018)*

Results from orchestrated testing are being used to improve OPQC's standardized care protocols. The original recommended protocol from the Ohio Children's Hospital Association pilot project has been updated to reflect OPQC's findings and clinical evidence. OPQC faculty believe that greater improvements in outcomes can be achieved across the state as more Ohio NICUs incorporate the improved standardized care protocols. During the Sustain Phase, the 54 participating sites will continue to collect data and participate in collaborative learning opportunities.

OPQC employs the Institute for Healthcare Improvement (IHI) Breakthrough Series Model (BTS). This method is based on improvement science as well as adult learning theory. It was designed to overcome barriers and to accelerate translation of evidence into practice by engaging multiple teams to learn from each other and from recognized experts to make improvements. Specifically, the BTS promotes use of rapid Plan-Do-Study-Act (PDSA) cycles, in which teams are taught to address problems as they arise by testing interventions in small steps to achieve desired change. OPQC brought NAS project teams together in both face-to-face sessions and webinars to review individual and aggregate data and learn from teams that have been successful at improving outcomes.

¹ Hudak ML, Tan RC, Committee on Drugs, et al. Pediatrics. 2012;129:e540-60

² Patrick SW, Davis MM, Lehmann CU, Cooper WO. Increasing evidence and geographic distribution of neonatal abstinence syndrome: United States 2009 to 2012. J Perinatol. 2015;35(8):650-655.

³ Hall, E., et al. Implementation of a Neonatal Abstinence Syndrome Weaning Protocol: A Multicenter Cohort Study. Pediatrics, 2015; 136(4): e803-e810.

⁴ Kaplan H., et al. Quality Improvement with Orchestrated Testing to Identify Best Formula Feeding for Neonatal Abstinence Syndrome (NAS). Poster session presented at: Pediatric Academic Societies 2017 Meeting; 2017 May 6-9; San Francisco, CA