MISSOURI NEONATAL ABSTINENCE SYNDROME COLLABORATIVE EVALUATION

IMPLEMENTATION OF THE EAT, SLEEP, CONSOLE MODEL OF CARE

MHA | MISSOURI PQC
Perinatal Quality Collaborative

Acknowledgments

Fourteen hospitals participated in the Missouri Neonatal Abstinence Syndrome Collaborative beginning November 2020 through December 2022. Project team leads, physician champions and transformation teams engaged in change management efforts to implement the Eat, Sleep, Console model of care. A special acknowledgment is extended to the following organizations that continued efforts to implement improved care delivery despite responding to the unprecedented COVID-19 pandemic.

Barnes-Jewish Hospital

Cox Medical Center Branson

CoxHealth

Mercy Hospital Jefferson

University of Missouri Women's and Children's

Mercy Hospital St. Louis

Mercy Hospital Washington

Parkland Health Center Farmington

Southeast Health Center

Ste. Genevieve County Memorial Hospital

SSM Health St. Mary's Hospital - St. Louis

University Health Hospital Kansas City

University Health Lakewood Medical Center

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Background and Evidence-Based Practice

In 2020, the Missouri Maternal-Child Learning and Action Network, facilitated by the Missouri Hospital Association, determined the need to support the implementation of evidence-based practice to both decrease the rate of neonatal abstinence syndrome and improve the care of the mother-infant dyad affected by substance use. A policy brief published by MHA in 2018 noted correlations between perpetuating opioid epidemic waves and increasing NAS diagnosis, with a 286% increase in NAS diagnosis over a 10-year period. This report found significant differences in length of stay and cost of care to treat NAS. The median length of stay for newborns with NAS is ten days longer, or six times the average hospital stay for other neonates in Missouri. Average hospital charges for NAS births are nearly $33,000 compared to less than $5,000 for other births in Missouri — a difference of 570%. These increases have been steeper in rural and tribal areas, and among infants enrolled in the Medicaid program.

Is it NAS or Neonatal Opioid Withdrawal Syndrome?

NAS or NOWS is a group of neurologic, gastrointestinal and musculoskeletal disturbances associated with withdrawal from opiates due to in utero exposure. NAS is generally referred to when polysubstance exposure in-utero is suspected or confirmed, while NOWS is specific to opiate exposure.

Several models to assess NAS/NOWS were developed in the 1970s. The Modified Finnegan Model has been used most frequently to assign the neonate a score based on physiologic signs and symptoms exhibited. Based on the score, the neonate is given pharmacologic treatment, typically morphine, to mitigate the signs and symptoms. However, recent studies have questioned the frequency of pharmacologic management in neonates with NAS/NOWS, the need to transfer to neonatal intensive care settings for management, and the inter-rater reliability of the Finnegan scoring tool. More recent models focusing on nonpharmacologic interventions to treat NAS are associated with lower use of medications, lower rates of NICU transfers, shorter lengths of stay, and avoidance of the inter-rater reliability issues inherent in the Finnegan scoring tool. The Eat, Sleep, Console Functional Assessment Model, developed by Grossman et al., espouses nonpharmacological methods as the first-line intervention to treat the withdrawal symptoms of NAS/NOWS. The ESC model espouses “mom as medicine” and focuses on keeping the mother-baby dyad together.

Using the ESC model, infants are assessed for the following essential functions:

- **Eating:** The baby can normally feed for his or her age.
- **Sleeping:** The baby can sleep for at least one undisturbed hour.
- **Consoling (being soothed):** The baby can be soothed within 10 minutes.

For infants unable to meet the ESC criteria, low-cost, nonpharmacologic interventions support the infant's needs while strengthening the mother-baby dyad bond and maternal confidence. Examples include skin-to-skin contact between the mother (or partner) and infant, breast or bottle feeding, use of a pacifier, changing infant positions, use of an infant swing, ensuring a low stimuli environment, and "shushing" the infant. Each of these interventions mimics the in-utero environment and helps calm an over-stimulated physical response. Infants not responding to ESC interventions can safely be given an as-needed dose of oral morphine while remaining in the postpartum unit with their mother and further monitored. If symptoms continue to escalate, however, transfer to a higher level of care is warranted.[ix]

While reducing harm and sequelae to the infant exposed to substances in utero is critical, efforts must start by improving the care given to birthing people at risk for and diagnosed with substance and/or opioid use disorder. Historically, mothers with SUD/OUD have been shamed, blamed and removed from participating in caring for their newborn. Fear of separation from the infant, loss of custodial rights and potential punitive outcomes through the justice system, create a significant barrier for mothers to self-disclose substance use. Creating safe, nonjudgmental and non-stigmatized health care settings is a key first step a provider can take to increase early entry into recovery pathways. Maternal screening for SUD through validated verbal screening tools and appropriate, patient-informed biological screening assesses the risk and severity of substance use and/or a diagnosis of OUD/SUD. Counseling to assess readiness for treatment based on the severity of illness and increasing access and referral to recovery treatment services completes the evidence-based practice of screening, brief intervention, and referral to treatment (SBIRT). Ongoing education regarding NAS/NOWS, care coordination and discharge follow-up are necessary to achieve larger reductions in the diagnosis and severity of NAS/NOWS and improved mother-baby dyad outcomes.

Missouri Neonatal Abstinence Syndrome Collaborative

The MO NAS Collaborative was designed to build on a previous quality improvement initiative completed at a single-facility site in Missouri to implement the ESC Model. Fourteen hospitals with birthing and nursery units participated in the QI collaborative (Figure 1). Recognizing that addressing the complexities of root causes, clinical care needs and ongoing health concerns of the mother-baby dyad affected by SUD, collaborative participants agreed to the following assumptions.

Collaborative Assumptions

- This is a voluntary quality and safety improvement initiative.
- Evidence guides our practice and data drives the QI strategy.
- An opportunity exists to improve the assessment of maternal opioid and substance use, whether due to taking an opioid prescription as ordered, prescription abuse, illicit substance abuse, and/or alcohol abuse.
- Decreased cost of care is a by-product expectation.
- Barriers exist to implementation — this work is complex and full of "gray areas."
- Implementation is complicated further by stigma, a lack of training on equity-centered trauma-informed care, and the role of adverse childhood events as a root cause of SUD and other mental health diagnoses.
- This work is worth the effort to improve the lives of mothers, infants and the family unit.
- The over-arching philosophy is that every mom and baby counts.

Participant Strength Weaknesses Opportunities Threats (SWOT) Analysis Themes

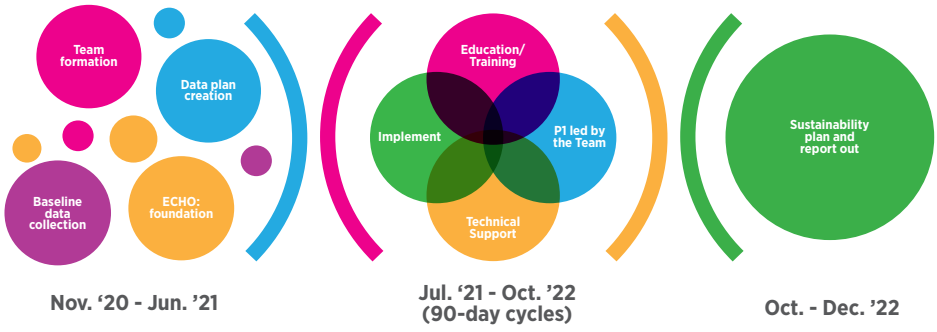
Participants completed individual SWOT analyses during the initial phase of work. Strengths were identified as engaged, multidisciplinary teams ready to implement ESC and organizational support of the project. Weaknesses reported were a lack of treatment and resources; data collection and tracking capability; time to implement new practices, policy changes and electronic health records modifications; a lack of provider and staff education on ESC and EBP for NAS care; and unit-to-unit/transfer collaboration. Opportunities existed to standardize education regarding universal verbal screening and EBP standards, including the mother in safe plans of care, recognizing community resource partners and reducing stigma/implicit bias. Finally, threats included existing bias that would be challenging to mitigate, the ability to obtain and track data to effect process change, low volumes of NAS-diagnosed infants in some settings and facility space restrictions to support longer-term rooming-in needs.

Project SMART Goals

- Increase the rate of nonpharmacologic interventions as the first-line NAS/NOWS treatment to **85%**.
- Increase the rate of maternal patients receiving the SBIRT process to **75%**.
- Train **90%** of facility-identified maternal-child staff on stigma/implicit bias reduction.

The collaborative included three separate phases (Figure 1). During the initial phase, team formation, baseline data collection and foundational education were completed. Developing the transformation team to support engagement and ensure the ability to sustain implementation efforts was a critical first step. In phase two, intensive technical support and education were delivered, and facility-based teams stepped through implementing the ESC model and project tasks. In October 2022, teams evolved into the sustainability phase, where they identified remaining actions, refined processes to achieve highly reliable processes and streamlined reporting to essential data metrics. Teams submitted final progress reports highlighting their achievements and recapping their efforts to share with local teams and leadership.

Figure 1: *MO NAS Collaborative Timeline*



Collaborative Actions

Collaborative participants received intensive technical support, education, training and resources to support implementing the new care model from MHA staff. A virtual kick-off meeting was held in November 2020, with bi-monthly office hours and ECHO calls continuing throughout the timeline to support knowledge acquisition, identify ongoing barriers and resource needs, and review project-level data. Participants received a project workbook, access to a web-based data portal, process improvement science tools, and access to staff and subject matter experts. Sites were further supported through quarterly individual coaching calls by an MHA staff member.

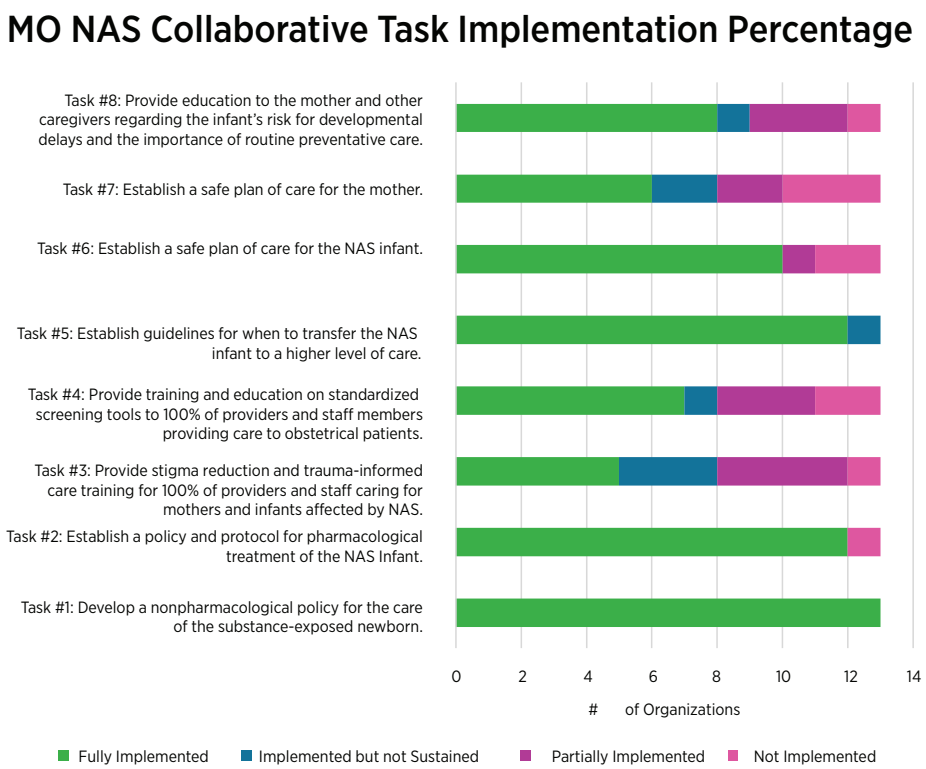
Collaborative Outcomes

The transfer rate of NAS-diagnosed infants or infants at risk for withdrawal was reduced by 23.9% (30.1% to 22.9%).	↓ 23.9% (30.1% to 22.9%)
The rate of NAS-diagnosed infants or infants at risk for withdrawal receiving nonpharmacologic treatment as a first-line intervention increased by 17.9% (84.1% to 99.1%).	↑ 17.9% (84.1% to 99.1%)
The rate of NAS-diagnosed infants or infants at risk for withdrawal receiving pharmacologic treatment was reduced by 13.1% (30.8% to 26.8%).	↓ 13.1% (30.8% to 26.8%)
The rate of maternal patients screened for OUD/SUD during prenatal care increased by 47.9% (66.9% to 99%), and upon birth admission increased by 67.3% (57.5% to 96.2%).	↑ 47.9% (66.9% to 99%) ↑ 67.3% (57.5% to 96.2%)
Participants increased the rate of NAS-diagnosed infants receiving a safe plan of care by 36.8% (71.2% to 97.4%) and the rate of maternal patients receiving a safe plan of care by 144.4% (37% to 90.5%) (supports care coordination and SDOH mitigation).	↑ 36.8% (71.2% to 97.4%) ↑ 144.4% (37% to 90.5%)

The collaborative also measured breastfeeding rates for NAS-diagnosed infants and noted no significant change (0.7%). Breastfeeding for this population may be limited depending on the types of substances used and the timing of the last use to minimize exposure risk to the neonate. Breast pumping to establish a milk supply was encouraged when feasible, and if the mother was interested in breastfeeding and recovery treatment options. Also, while the rate of maternal OUD/SUD screening increased, counseling rates for medication and/or behavioral health treatment and referrals to severity-indicated treatment decreased. Participants across the cohort continued to find difficulty in locating substance use and behavioral health resources that serve perinatal populations. The collaborative identified a wealth of social and community-based resource programs that could be referred to for patient support, however, knowledge and coordination of these resources were found to be an ongoing need in most communities. Finally, access to inpatient and residential treatment options that are affordable, reimbursable by public insurance and include childcare options are extremely limited in Missouri.

Thirteen of the 14 organizations provided data on the percentage of tasks implemented across each of the eight tasks included in the collaborative. Most organizations identified the implementation of each task at some level of sustainability. More than 50% had achieved full implementation, either sustained or working toward sustainment of the process. Barriers to implementation included the COVID-19 pandemic response priority, staff time and resources, and clinician buy-in to change clinical care processes (Figure 2).

Figure 2: *MO NAS Collaborative Task Implementation Percentage, survey results from collaborative participants, completed April 2023*



Role and Impact of the Mothers, Infants and NAS ECHO

Partnering with the Missouri Telehealth Network's Mothers, Infants and NAS ECHO was critical to ensuring robust education was delivered to participants in a multidisciplinary environment. The ECHO, which meets bi-monthly, provided didactic presentations, case study reviews, and the opportunity for questions and discussion by a diverse group of stakeholders in Missouri. Over the timeframe of the collaborative, more than 300 unique participants joined the ECHO calls. Self-efficacy ratings across six questions increased by an average of 2.48 points from a low of 4 to a high of 7.9 out of 10 in 2022.

The following are examples of education topics covered in the ECHO during year one of the collaborative.

- Resource Mapping
- Social Worker Bundle
- Mothers Self-Care Moving Forward — Plan for Discharge
- Intrapartum and Postpartum Pain Management for Women With OUD
- Your Screening Tool for Mother
- Doing ESC Without a Parent
- Semi-permanent Neurodevelopmental Sequelae
- Long-term Neurodevelopmental Sequelae
- Prenatal Consults
- Outpatient Follow-up and Management of the NAS Infant
- Optimizing Care in Foster Care Settings
- Human Behaviors and Assumptions: Empathy, Kindness, Phenomenology
- Challenges for No Prenatal Care
- Toxicology Testing
- Substance Use Disorder in 4th Trimester
- Safe Administration of Morphine

BJH focused on changing its assessment model from Finnegan to ESC. Key gaps identified were implementing the ESC model to decrease NICU transfers and LOS, and focusing on training providers and staff on stigma-free care. They formed the MO NAS Collaborative team and worked with subject matter experts from Washington University and the MTN Mothers, Infants, and NAS ECHO team to develop an ESC algorithm and complete training. They engaged a group of nurse champions within the units to support the implementation and Plan-Do-Study-Act cycles, and collaborated with the IT department to integrate documentation into the EHR. As a result, BJH decreased the rate of pharmacologic treatment for NOWS-diagnosed infants from 83.3% to 33.3% and decreased the NICU LOS from 30 to 15 days. Although the LOS in the Newborn Assessment Center increased with ESC, most still are discharged within ten days without intensive care services.

CoxHealth Springfield and Branson identified similar gaps as other organizations — they needed to evolve to the ESC model, navigate pharmacologic treatment, when necessary, outside of the NICU, and address stigma and bias related to maternal SUD. CoxHealth Branson had a critical head start in this effort as the recipient of Skaggs Foundation funding and a recipient of the Healthier Mothers, Healthier Babies project through a Preferred Family Healthcare grant. Through this funding, an outpatient social worker was hired to assist maternal patients suffering from depression, SUD and social determinants of health. The team also began a monthly high-risk delivery meeting, which included OB/GYNS, pediatricians, staff, labor and delivery nurse manager and an inpatient social worker. This team collaborated to ensure a strong care plan was in place for patients with medical and/or social concerns and those on MAT and served to plan for anticipated outcomes. The success of this program spread and soon became a systemwide initiative for CoxHealth. At CoxHealth Springfield, the rate of NAS-diagnosed infants or infants at risk for withdrawal receiving pharmacologic treatment decreased from 41% in 2020 to 18% in 2022. Of more than 3,400 annual births, only 11 infants were transferred to a NICU for NAS/NOWS in 2022, compared to 34 in 2020. For CoxHealth Branson, as a rural facility, the transfer rate of NAS-diagnosed infants or infants at risk for withdrawal was 55% in 2020. At the end of the collaboration, their transfer rate had dropped to only 8% using the ESC model of care. The team adopted a philosophy of "Always, One More Time" to ensure SUD treatment options continued to be offered through discharge and postpartum care.

As a system-connected rural-based health center, Parkland Health Center has a small but mighty birthing unit, and a team passionate about preserving the mother-baby dyad. PHC developed a multidisciplinary team that included the Women and Infants Unit clinical nurse manager, the chief nursing officer, two staff nurses, a patient care tech, a physician, a social worker and a pharmacist. Another benefit to PHC was the presence of providers willing to prescribe MAT for maternal patients and provide this care as part of routine pregnancy services. Throughout the program, PHC sustained a 100% rate of screening maternal patients in the birth unit. They completed the implementation of the ESC model and reduced their NICU transfer rate from 100% to 29% as they began pharmacologic management in the unit. Of significance, PHC increased breastfeeding rates of mothers with SUD who were eligible to breastfeed and provided breast milk to more than 90% of NAS-diagnosed newborns. PHC credits the MTN Mothers, Infants, and NAS ECHO with invaluable shared learning among organizations and helping to catapult their system to start a NAS collaboration between sister hospitals within the system.

Making a Difference — One Patient at a Time

CoxHealth Branson Women's Center
Healthier Mothers, Healthier Babies Program

KD was one of the first women to receive services through the Women's Center Healthier Mothers, Healthier Babies program. In early 2019, KD presented to CoxHealth Branson Women's Center pregnant, wearing a green jumpsuit and shackles and facing 15 years in prison. Today, she's helping other moms recover from addiction.

When she arrived at the Women's Center, she was given hope, guidance and resources to help turn her life around. HMHB staff mentored her, monitored her pregnancy and helped her end her last addiction — smoking.

"I'm not the same person," KD said. "I wouldn't be where I am if the social worker at Cox Branson had not handed me the flyer about Preferred Family Services."

KD participated in the Healthier Mothers, Healthier Babies program supported through a grant via Preferred Family Services' Pregnant and Postpartum Women's Services, which helped her stay sober and become stable.

Today, KD, who is raising her two youngest children, is a certified peer support specialist, working in the same program that helped her. Now, she's helping other women turn their lives around and live healthier lives for their children.

Effect of the COVID-19 Pandemic

It would be difficult to ignore the impact of the COVID-19 pandemic on the ability to maintain progress during the MO NAS Collaborative effort. Initiated in late 2020, participants were still in Phase 1 of the project when the COVID response within hospitals began. As a result, most organizations had to halt or severely limit their focus on this collaborative due to the need to focus all resources on caring for patients and navigating the unknown. Three additional issues arose during the pandemic that impacted implementation. Prenatal care visit access changed significantly in the first year of the pandemic, with visits minimized and often managed through virtual platforms to support social distancing needs. This impacted the ability to implement maternal health screening earlier in prenatal care and to further educate mothers with SUD on the care needs of an infant diagnosed with NAS/NOWS. This was compounded by rising opioid and substance use, and overdose deaths widely noted during the pandemic attributed to isolation and growing mental health concerns. Finally, access to recovery treatment and social services fell substantially during the initial year of the pandemic due to site closures and the focus on social distancing to mitigate viral spread. By the fall of 2021, participants could re-engage in the effort more robustly and a decision was made to extend the collaborative timeline through 2022. From January through October of 2022, participants made significant strides with implementing the ESC model, education and resource mapping to identify community-level partners.

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