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### Implementing the Eat, Sleep, Console Approach for NAS Management: Review of Literature

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Implementing the Eat, Sleep, Console Approach for NAS Management:  
Review of Literature

BY

Amber D. Tilberg

A paper submitted in partial fulfillment of the requirements for the degree  
Doctor of Nursing Practice  
South Dakota State University  
2019

## Implementing the Eat, Sleep, Console Approach for NAS Management

This Doctor of Nursing Practice (DNP) Project is approved as a credible and independent investigation by a candidate for the DNP degree and is acceptable for meeting the project requirements for this degree. Acceptance of this DNP Project does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department.

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Cynthia Elverson, PhD, RN, NNP-BC      Date  
DNP Project Advisor

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## Abstract

**Introduction:** Neonatal Abstinence Syndrome (NAS) is a growing problem and poses significant burden on the healthcare system.

**Evidence summary:** Three emerging themes were recognized and further guided the development and execution of the proposed DNP project: 1) A need to improve NAS assessment practices that will decrease frustration, discrepancies, and inconsistent NAS scoring. Despite specific training, inaccuracy and inconsistency still exists among nurses using traditional scoring methods, leading to a longer hospital stay. 2) Family-centered care is vital for infants with NAS. Parent education, nurse to parent coaching, and rooming-in experiences build parental competence and confidence, nurture a trusting nurse-parent relationship, and foster the mother-infant dyad. 3) Focus should be placed on developing well-structured NAS treatment protocols. Clinical practice guidelines provide healthcare providers clear direction when caring for their patients. Standardized protocols safely reduce pharmacologic therapy, length of stay, and hospital cost related to NAS.

**Gaps:** The literature suggests there is no consensus related to best NAS management or NAS severity assessment tools. The long-term effects of Eat, Sleep, Console (ESC) remain unknown. Additionally, ESC has not yet been studied in the preterm population.

**Recommendations for practice:** ESC is a simplified approach to NAS and facilitates recommendations noted in the literature review.

### **Implementing the Eat, Sleep, Console Approach for NAS Management**

Neonatal Abstinence Syndrome (NAS) is characterized by a constellation of signs and symptoms in a newborn infant related to substance abuse or medication withdrawal. Most commonly, NAS occurs when pregnant women use or abuse addictive substances (Wiles, Isemann, Ward, Vinks, & Akinbi, 2014). Newborn infants with NAS experience metabolic instabilities, gastrointestinal system disorders, and central nervous system excitability. These system disturbances manifest as seizures, tremors, exaggerated reflex activity, inconsolable crying, temperature instability, poor feeding ability, excessive sucking, and gastrointestinal discomfort (Corr & Hollenbeak, 2017).

### **Significance of the Problem**

The growing epidemic of opioid use parallels a rise in NAS. In the United States, during the last 15 years, there has been a fivefold increase in newborn infants diagnosed with NAS. In 2003, \$61 million was spent on NAS treatment in the United States, compared to \$316 million in 2012 (Corr & Hollenbeak, 2017). The rising number and costs have challenged the healthcare environment to improve care related to NAS.

### **Development of the Clinical Question**

Historically, infants suspected to have NAS have been assessed with a withdrawal tool and scores guide treatment (Fox, Kavanagh, & Fielder, 2016). The Finnegan Neonatal Abstinence Scoring Tool (FNAST), developed by Finnegan in 1975, is recognized as the most commonly used assessment to determine the severity of withdrawal symptoms (D'Apolito, 2014). Although the FNAST has been reported as the most frequently utilized assessment, it may not be practiced correctly and may result in inaccurate and inconsistent assessments (Grossman, Osborn, & Berkwitt, 2017).

Proper utilization of the FNAST requires considerable training for reliable use, and even trained, experienced raters have difficulty judging some assessment items with a high degree of confidence (Jones & Fielder, 2015). Inaccurate FNAST scores complicate treatment decisions, often leading to unnecessary opioid treatment of infants with NAS and ultimately lengthened hospital stay (Grossman et al., 2017).

**The Eat, Sleep, Console approach.** Recently a new model called Eat, Sleep, Console (ESC) has been developed that focuses on nonpharmacological methods, increasing parental involvement, and less use of morphine for symptom management (Grisham et al., 2019). The ESC approach is a functional assessment examining the following three categories, as defined by Grossman (2017):

*Eat* – Poor eating due to NAS?

*Sleep* – Sleeping less than one hour due to NAS?

*Console* – Unable to console within 10 minutes due to NAS?

The Eat, Sleep, Console (ESC) approach to NAS management was developed by Grossman and a multidisciplinary team based on observations of newborn infants with NAS at Yale-New Haven Children's Hospital. In its pilot project the ESC approach decreased the average length of stay from 23 days to 6 days (Grossman et al., 2017). Unlike the FNAST, the ESC approach employs a more functional, objective, and less intrusive assessment. ESC assessments should be done after feedings, preferably while skin-to-skin or held and swaddled. The ESC behaviors should be reviewed with the parents every three to four hours. The ESC approach is also more easily understood by caregivers and parents. Evidence suggests that the ESC approach reduces pharmacologic

therapies leading to decreased length of stay (Grossman, Lipshaw, Osborn, & Berkwitt, 2018).

**PICOT question.** A literature review explored the following PICOT question:

(P) In nurses working in a Neonatal Intensive Care Unit (I) how will the implementation of a training program for the Eat, Sleep, Console method for care of infants with NAS (C) compared to current practice of care for infants with NAS (O) change self-reported attitudes towards caring for an infant with NAS, perception of own knowledge of care of infants with NAS, and perception of clinical practices of care by self and the NICU team regarding the care of infants with NAS (T) over a three-month period of time?

### **Evidence Summary**

To provide evidence-based practice suggestions, available literature was explored and further critiqued for quality. The following databases were used to acquire evidence related to Neonatal Abstinence Syndrome: Medline, CINAHL, and PubMED. Specific search terms were used to refine the articles: Neonatal Abstinence Syndrome (NAS) + Management, NAS + Treatment, NAS + Protocols, NAS + Eat, Sleep, Console, NAS + Nursing care, and NAS + Scoring tools. In an effort to utilize current literature, the search terms were limited to data published in 2014 through 2019. Literature was evaluated using the Johns Hopkins Nursing Evidence-Based Practice Model (Dearholt & Dang, 2012). Appendix A provides a table that identifies the ranking and strength of the evidence utilized to support this project.

### **Evidence Findings**

The literature review provided insight into many facets of NAS, including clinical presentation, symptom management, screening and scoring, nurse education, parent support, and care techniques. Three emerging themes were recognized supporting change that will serve to guide the development and execution of the proposed DNP project.

**A need to improve NAS assessment.** The FNAST is associated with nurse frustration, assessment discrepancies, and inconsistent scoring of NAS severity (Romisher, Hill, & Cong, 2018). Despite specific training, inaccuracy and inconsistency still exists among nurses using the FNAST (Lablant & Palmer, 2017), and the accuracy of scores using traditional FNAST methods post-training remained only 34.7% (Timpson, Killoran, Maranda, Picarillo, & Bloch-Salisbury, 2017).

The FNAST is lengthy, cataloging 21 signs of withdrawal, but the clinical relevance of certain symptoms is uncertain. For example, sneezing, frequent yawning, and nasal stuffiness are not signs specific to withdrawal, and in any other clinical setting would be insignificant (Schiff & Grossman, 2019). Standard practice is to initiate pharmacologic therapy for FNAST scores three times consecutively  $\geq 8$ , or twice consecutively  $\geq 12$ , however this practice is not supported by research. Chisamore, Labana, Blitz, and Ordean (2016) evaluated a cut off score of  $\geq 9$  three times consecutively to initiate pharmacologic treatment and found no significant change in length of stay.

**Family-centered care for the infant with NAS.** Nurses need to educate parents about assessment of withdrawal, as well as appropriate comfort strategies (Cleveland & Bonugli, 2014). The nurse must be willing to coach parents through ways to console the infant as clinical manifestations of NAS emerge (Desai, 2014). These approaches will



build on parental competence, nurture a trusting nurse-parent relationship, and provide opportunity for parental praise (Casper & Arbour, 2014; Grossman, Berkwitt, & Osborn, 2017).

Rooming in with family was central to achieving best outcomes (Holmes et al., 2016). A long length of stay, paired with a less-than-welcoming environment makes it easier for the mother not to visit, or participate in the care of their infant (Grisham et al., 2019). Rooming-in experiences foster the mother-infant dyad potentiating the bond between mother and infant. Breastfeeding has also been noted to improve NAS outcomes and decrease the need for pharmacologic intervention (Wachman et al., 2018). For the newborn to experience the best outcomes, the mother must also experience the best outcomes, and these interventions may help the mother and father develop confidence in parenting skills (Casper & Arbour, 2014).

There is a growing need for continued education for the NICU nurse in regards to interactions with the mother (Tobin, 2018). Unfortunately, neonatal professionals often lack education in the field of addiction. Cleveland and Bonugli (2014) noted that many mothers of infants with NAS fear judgement from nurses. However, the majority of nurses expressed the desire to work with the mother and rejected negative judgement of these women (Romisher, Hill, & Cong, 2018). Romisher et al. determined nurses were concerned about a lack of time the mother was able to spend with their infant, and that combining critically-ill infants with an infant with NAS, would not allow safe and adequate care for both NICU patients.

**Developing structured NAS protocols.** Focus should be placed on developing well-structured NAS treatment protocols. A need to modify or develop current clinical

practice guidelines stems from a lack of consistency in nursing interventions (Casper & Arbour, 2014). Inconsistencies were noted across institutions suggesting the need for standardization to provide quality care (Bagley, Wachman, Holland, & Brogly, 2014; Bogen, Whalen, Kair, Vining, & King, 2017). Reliable assessment and dependable communication surrounding a standardized morphine protocol implemented during quality improvement projects increased nurse confidence, and reduced the length of stay for infants with NAS (Asti, Magers, Keels, Wispe, & McClead, 2015; Cook, Dahms, & Meiers, 2017).

Standardized NAS protocols safely reduce pharmacologic therapy, LOS, and hospital cost (Holmes et al., 2016). Casper and Arbour (2014) recommend use of clear guidelines for pharmacologic treatment. The morphine dosage algorithm accompanying the ESC Care Tool uses weight-based dosing, versus symptom-dosing used by FNAST methods. Chisamore, Labana, Blitz, and Ordean (2016) reported that there were a significantly higher proportion of newborns in the symptom-only model that received morphine and, perhaps accordingly, also had a significantly longer LOS compared to those in the weight-based model.

**Quality improvement projects.** Multiple conclusions were identified from quality improvement (QI) projects including a need for standardized treatment protocols, improved communication between nurses and providers, minimizing variability in NAS scoring, and a need for increased parental involvement (Asti, Magers, Keels, Wispe, & McClead, 2015; Cook, Dahms, & Meiers, 2017). The key drivers initiated in the Eat, Sleep, Console QI project by Grossman et al. (2017) offered resolution to many of the treatment and practice difficulties surrounding NAS. Use of the ESC method decreased

the use of pharmacologic interventions, and promoted parental involvement; thus, post-implementation of ESC the average length of stay decreased from 22.4 days to 5.9 days. The average cost spent on a NAS admission decreased from \$44,824 to \$10,289 (Grossman et al., 2017).

### **Gaps in the Evidence**

Current literature suggests change is warranted, however there is no consensus regarding the best treatment strategies for NAS. Collectively there is a lack of level I and II evidence noted within the literature review. This is probable to the idea that randomized controlled trials or cohort studies are not carried out often in the neonatal population. The need for accurate and consistent NAS severity scoring is identified, however the superiority of the ESC method is based on limited number of studies. The long-term effects of treatment based on ESC remain unknown (Grossman et al., 2017). Moreover, the effectiveness of ESC has not yet been studied in the preterm population. Symptoms associated with prematurity overlap with symptoms often associated with opioid withdrawal, making assessments difficult with any method (Allococo et al., 2016).

### **Recommendations for Practice**

The literature review concludes a need for standardized NAS assessment and treatment protocols. NAS severity assessments must be consistent and accurate in order to guide treatment. Adequate and frequent education regarding NAS assessment and treatment protocols will improve nurse confidence, perception of care, and shorten LOS. Sufficient evidence supports the importance and magnitude of maternal involvement.

The ESC approach is an effective, simpler method for the management of infants that utilizes a functional assessment, limiting the subjective assessments applied in the FNAST that can lead to inconsistencies in scores. The ESC offers a standard treatment

plan that guides both nonpharmacologic and pharmacologic care meeting the need for a standardized protocol. Lastly, the ESC approach implements a treatment plan that is family-centered, fostering the family bond by recognizing the mother as the primary caregiver.

### **Conclusion**

Within this review of literature, the following emerging themes were noted: a need to improve NAS assessment, a need for family-centered care for the infant with NAS, and a need to develop structured protocols. This review of literature supports the implementation of the ESC approach for the treatment and management of NAS.

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## Appendix A

Table 1  
Evidence Table

| Author, Year, Level, Quality  | Study Objective  | Design Intervention  | Sample, Setting  | Outcomes Measured   | Results   |
|---|--|----------------------|--|---|---|
| Allococo,<br>Melker, Rojas-<br>Miguez,<br>Bradley, Hahn,<br>and Wachman<br>(2016)<br><br>III, B | Describe and compare NAS manifestations in preterm versus term opioid-exposed infants. | Retrospective cohort | Preterm (Mdn 35 weeks) n= 45 with 6544 scores & Term (Mdn 39 weeks) n=49 with 7322 scores, Methadone-exposed infants born at a single tertiary care center from 2006 to 2010 | Modified FNAST scores were recorded every 3 to 4 hours from 5-7 days or until 48 hours of age after treatment was completed. NAS symptoms and scores were compared between preterm and term neonates. | Manifestations >10% in both PT and T:<br>Sleep disturbance<br>Tremors<br>Restlessness<br>Increased muscle tone<br>Fever<br>Nasal stuffiness<br>Tachypnea<br>Excessive Sucking<br>Poor feeding<br>Manifestations >10% in T: Sneezing, Loose stools<br>Manifestations >10% in PT: Hyperactive moro<br>Preterm neonates scored less frequently than term for many items including sleep disturbance, tremors, muscle tone, sweating, nasal stuffiness, and loose stools than full- |

|  |  |  |  |   |   |
|--|--|--|--|---|---|
|  |  |  |  |   | term controls. Manifestations likely differed due to maturity and exposure to psychiatric medications (SSRIs).  |
| Asti, Magers, Keels, Wispe, and McClead (2015) | Improve care and reduce the LOS for infants diagnosed with NAS   | Quality improvement project with before/after evaluation | n=92 infants ≥ 35 weeks, mean birth weight of 2985gms, and mean gestational age of 38weeks, 5 hospitals in Ohio from 2007-2012 | LOS was the primary outcome metric, monitored using statistical process control charts. Ln(x) transformation was used to calculate appropriate control limits determined from baseline data | Decreased LOS (from 36 days to 18 days) noted after implementation of standardized treatment protocol, improved communication between nurses and providers, minimization of variability in NAS scoring after two educational interventions, and increased collaboration with OBGYNs and addiction specialists |
| Bagley, Wachman, Holland, and Brogly (2014)    | To summarize available evidence on assessment scoring tools, and nonpharmacologic and pharmacologic interventions used | Systematic review  | n=368 articles identified through search terms   | Systematic search utilizing PubMed and Cochrane Database; Articles were categorized by 1) assessment of NAS, 2) nonpharmacologic management for NAS,  | Inconsistencies were noted across institutions suggesting the significance for standardization for providing quality care of infants with NAS   |

|   | in the management<br>of NAS   |                              |                                 | and 3) pharmacologic<br>management for NAS   |  |
|---|---|------------------------------|---------------------------------|--|--|
| Bogen,<br>Whalen, Kair,<br>Vining, and<br>King (2017)<br><br>III, C | To identify<br>practice variations<br>for newborns with<br>in-utero chronic<br>opioid exposure  | Non-experimental<br>study    | n=95<br>respondent<br>hospitals | Nursery site leaders<br>completed a survey about<br>the hospital's policies and<br>practices regarding the<br>care of infants diagnosed<br>with NAS  | Most hospitals included in<br>the study had policies in<br>place however practices<br>varied greatly and<br>characterized areas of<br>needed research  |
| Casper &<br>Arbour (2014)<br><br>IV, B                              | A thorough review<br>and analysis of the<br>literature and<br>interviews with<br>neonatal experts<br>guided the<br>development of<br>this clinical<br>practice guideline<br>for infants with<br>NAS in a NICU | Literature review            | N/A                             | Themes on NAS<br>screening methods,<br>evaluation of severity of<br>drug-withdrawal<br>symptoms with a scoring<br>tool, nonpharmacologic<br>nursing interventions,<br>nutrition, and the<br>facilitation of care of the<br>maternal-infant dyad<br>(rooming-in). | A clinical practice<br>guideline for nursing care<br>was developed.  |
| Chisamore,<br>Labana, Blitz,<br>& Ordean<br>(2016)<br><br>III, B    | Comparing LOS<br>and total<br>accumulative<br>morphine doses<br>across two<br>morphine delivery<br>protocols  | Retrospective chart<br>audit | N=172, from<br>2000-2014        | Categorical descriptive<br>variables were<br>summarized using counts<br>and percentages, and<br>group comparisons were<br>carried out using a chi-<br>square test  | The audit revealed that<br>there were a significantly<br>higher proportion of<br>newborns in the<br>symptom-only model that<br>received morphine and,<br>perhaps accordingly, also<br>had a significantly higher |

|   |  |                                     |  |   | LOS compared to those in the weight-based model   |
|---|--|-------------------------------------|--|---|---|
| Cleveland & Bonugli (2014)<br>III, B    | To describe the experiences of mother of the infants diagnosed with NAS in the NICU                                      | Qualitative description             | n=15<br>Hispanic, substance addicted mothers of infants diagnosed with NAS   | Data was collected through semistructured, individual, interviews and then analyzed   | Four themes emerged: 1) understanding addiction, 2) watching the infant withdraw, 3) judgement from nurses, and 4) trusting the nurses  |
| Cook, Dahms, and Meiers, (2017)<br>V, B | Implementation of a NAS Clinical Practice Guideline (CPG), and education of nurses compared to previous standard of care | Quality improvement                 | n=44<br>Registered Nurses participated in a pre/post survey;<br>n=3642 NAS assessment scores (38 infants over 6 months) reviewed;<br>Rural,<br>Midwest 38 bed NICU | Nurses' Knowledge and Confidence Survey (NKCS) was distributed pre-education/implementation and repeated post-implementation of the CPG (no time span after education provided) | No statistically significant difference in LOS, and NAS assessment scores post- implementation of NAS CPG, however there was a statistically significant increase in the nurses' confidence and perceived ability to care for infant with NAS post-implementation |
| Grossman, Berkwitt, Osborn, Xu,         | Quality improvement initiative to focus  | Quality Improvement (8 PDSA cycles) | Methadone exposed, $\geq$  | Statistical process control (SPC) charts were used to evaluate the impact of  | Key drivers: 1) Non-pharmacologic interventions, 2) ESC   |

|  |  |   |   |   |
|--|--|---|---|---|
| Esserman,<br>Shapiro, and<br>Bizzarro (2017)<br><br>V, A | on non-pharmacological care and reduce average LOS for infants with NAS by 50% | 35 wk,<br>n=287<br><br>Urban NICU,<br>2010-2015 | implemented interventions; the baseline and postimplementation infant data was compared with t-test and Chi square. Primary outcome measure was average LOS calculated from date of birth until date of discharge; secondary measures focused on cost, and pharmacologic and nonpharmacologic therapies | assessment (non-pharmacologic care if criteria met: breastfeeding or $\geq$ 1 oz/feed; sleeping $>$ 1 hr, consolable within 10 minutes. When these were not met, then initiated pharmacologic treatment, 3) Decreased use of pharmacologic treatment, 4) Communication among health care providers. Post-implementation of quality improvement initiative the average LOS decreased from 22.4 to 5.9 days; costs decreased from \$44824 to \$10289 spent on a NAS admission. Admissions to NICU decreased from 100% to 20% and more were rooming-in with parents. Increases in majority of breastmilk feeding at discharge from 20% to 45%. Morphine treatment decreased from 98% to 14%. |
|--|--|---|---|---|

|   |  |   |   |  |  |
|---|--|---|---|--|--|
| Grossman,<br>Lipshaw,<br>Osborn, and<br>Berkwitt<br>(2018)                              | Compare actual<br>treatment with<br>ESC approach to<br>predicted<br>treatment with<br>FNAST approach   | Retrospective<br>cohort comparison                      | Urban NICU<br><br>n=50 infants<br>≥ 35 wks<br>exposed to<br>opioids,<br>mean GA<br>38.8 wks   | Primary outcome was<br>assessed to measure the<br>use of morphine therapy<br>with the ESC approach vs<br>FNAST. A secondary<br>outcome compared the<br>proportion of days that<br>each approach<br>recommended/required<br>use of morphine.<br><br>Adverse events. | The ESC approach<br>exposed significantly<br>fewer infants to<br>pharmacologic therapy<br>(12%) to that if had used<br>the FNAST approach<br>(62%). Maximum wt loss<br>8.7% and wt loss at<br>discharge was 7.2%<br>(some regaining weight).<br>No adverse events. |
| Holmes,<br>Atwood,<br>Whalen,<br>Beliveau,<br>Jarvis, Matulis,<br>and Ralston<br>(2016) | To implement a<br>coordinated NAS<br>protocols for<br>scoring,<br>medications and<br>weaning, and calm<br>rooming-in<br>environment, to<br>improve quality of<br>care and decrease<br>both LOS and<br>hospital costs | Quality<br>improvement                                  | n= opioid-<br>exposed<br>infants per<br>year; n=54<br>baseline,<br>2012-2013;<br>n=61<br>intervention<br>year 1,<br>2013-2014;<br>n=48<br>intervention<br>year 2, 2014-<br>2015 | Categorical variables and<br>correlations were<br>evaluated to examine<br>interrater reliability<br>measures; hospital costs<br>were calculated by<br>multiplying hospital<br>charges by annualized<br>cost-to-charge ratios                                       | Standardized NAS<br>protocols safely reduce<br>pharmacologic therapy,<br>LOS, and hospital cost;<br>rooming in with family<br>was central to achieved<br>outcomes.   |
| Labant &<br>Palmer (2017)   | This study<br>examined if<br>simulation training   | Randomized<br>intervention study,<br>Quasi-experimental | n=26 nursing<br>students,<br>randomized   | The<br>simulation/experimental<br>group and  | There were no statistically<br>significant differences<br>noted between the groups   |

|                                 |   |  |  |   |   |
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| II, C                           | is a more effective teaching method than traditional didactic instruction for scoring NAS   |  | assignment to intervention (14) and control (12) | didactic/control group were asked to score the infant's NAS symptoms; the scores were compared  | in regards to scores due to the underpowered study with a small sample size, however the experimental group scores were more closely comparable to scores assessed by a nurse expert  |
| Romisher, Hill, and Cong (2018) | To explore attitudes and practice trends among nurses caring for infants with NAS, also aimed to identify gaps in knowledge about NAS | Descriptive Cross-sectional survey study | n=54 nurse participants                          | Using a researcher-developed survey questionnaire including 20 Likert-scale questions regarding three major themes surrounding NAS: Nurse attitudes towards care for infants with NAS, perceptions of knowledge, and perceptions of practice; a case study with 3 knowledge questions; and open ended comments about trends in NAS care, and concerns or barriers to care | Nurses expressed varying attitudes on the 20 item questionnaire, most correctly identified manifestations of NAS and chose nonpharmacologic treatments of swaddling and decreased stimulation. On the open ended comments they reported open unit environments, lack of parent involvement, and a lack of standardized or consistent care of infants with NAS as barriers/concerns. |
| III, B                          |   |  |  |   |   |
| Timpson, Killoran,              | Implementation of a single-center   | Non-experimental, adaptive design        | n=170 NICU and newborn                           | Post-training scores were closer to target than were  | Accuracy of scores: pretraining 18.8%, post   |

|   |  |   |   |   |  |
|---|--|---|---|---|--|
| Maranda,<br>Picarillo, and<br>Bloch-<br>Salisbury<br>(2017) | quality improvement initiative to improve accuracy and consistency of Finnegan scores among neonatal nurses. Test whether a single 30 minute session of watching a NAS infant video and scoring, then discussion, then rescore the infant video improved accuracy and consistency in assessment. | study as part of a quality improvement study that included reorganizing the order of items on the FNAST but keeping the items unchanged | nursery staff nurses participated in the single-session training program and completed the survey | pre-training scores; however follow-up scores a few years later without any intervening training reverted to pre-training levels; the largest score discrepancies were noted were among central nervous system symptomatology | training 34.7%. Consistency of scores among nurses: more variation pretraining and less variation post-training.   |
| Tobin (2018)  | EBP project was implemented to offer education to improve knowledge of NAS and skills for interacting with the mother  | Cross-sectional study design utilizing pretest and posttest survey data (quasi-experimental with a single group)                        | n=206 NICU nurse participants   | Researcher developed questionnaire: 5-point Likert-scale was used to collect pre/post test data on 10 knowledge questions; a Wilcoxon paired t-test resulted statistically significant ( $p<0.001$ ) increase in              | Knowledge pretest 87.3% and posttest 96.1% correct, open-ended skills questions 96% correct on posttest. Strengths mentioned: patience, compassion, respect. Weaknesses mentioned: judgmental attitudes, |

|                                |   |  |  |   |
|--------------------------------|---|--|--|---|
|                                |   | 2 hour education with lecture and role playing scenarios (learning objectives and content outline included)  | posttest knowledge scores compared with pretest scores, also included open ended questions | frustration. There is an educational need for NICU nurses to improve their knowledge and skills when caring for an infant with NAS and interacting with mothers with substance abuse disorders  |
| Wachman et al., 2018<br>III, B | Utilized stakeholder interviews and plan-do-study-act cycles. | Compared pre- and postintervention on NAS outcomes after implementation of an initiative that included a nonpharmacologic care bundle, function based assessments, use of an early version of ESC, and a switch to methadone for pharmacologic treatment | Opioid exposed infants $\geq$ 36 weeks N=240   | Decreases were found in pharmacologic treatment from 87% to 40.6%. Opioid treatment days decreased from 16.2 to 12.7 days; and adjunctive agent use decreased from 33.6% to 2.4%. Hospitalization length of stay from 17.4 to 11.3 days.<br><br>Provides evidence that supports models of care that promote parental engagement and other nonpharmacological care measures should be implemented in hospitals to improve NAS outcomes. Also implicates a need for current NAS assessment tools to be reevaluated and that function-based approaches should be considered. |

Key: NAS = Neonatal Abstinence Syndrome, NICU = Neonatal Intensive Care Unit, FNAST = Finnegan Neonatal Abstinence Scoring Tool, PT = preterm, T = term, GA = gestational age

Key: Johns Hopkins Nursing Evidence-Based Practice: Evidence Level and Quality

Level I= Experimental studies, Randomized controlled trials (RCT), Systematic review of RCTs, with or without meta-analysis

Level II = Quasi-experimental study, Systematic review of RCTs and quasi-experimental, with or without meta-analysis

Level III = Non-experimental study, Qualitative study

Level IV = Opinion of respected authorities and/or nationally recognized expert committees based on scientific evidence

Level V = Based on experiential and non-research evidence, Case reports

Quality A = High quality, Consistent and generalizable results, Sufficient sample size, Adequate control, Definitive conclusions

Quality B = Good quality, Reasonably consistent results, Sufficient sample size, Some control, Fairly definitive conclusions

Quality C = Low quality or major flaws, Little evidence with inconsistent results, Insufficient sample size for the study design

Implementing the Eat, Sleep, Console Approach for NAS Management:

Methodology

BY

Amber Tilberg

A paper submitted in partial fulfillment of the requirements for the degree

Doctor of Nursing Practice

South Dakota State University

2019



## Abstract

**Background:** A firm consensus wanes regarding best practice for Neonatal Abstinence Syndrome (NAS), however Eat, Sleep, Console (ESC) offers resolution to emerging themes identified in the review of literature.

**Purpose:** The intended outcome of the DNP Project would change caregiver attitudes, self-perceived knowledge, and perceptions of care of clinical practices surrounding NAS to a level that is clinically important and statistically significant.

**Methods:** This DNP Project evaluated the ESC education in a rural, Midwestern state, Level III NICU. A pre-education survey was distributed to NICU nursing staff prior to attending an educational meeting about the ESC method and related Care Tool, and corresponding EPIC-computer documentation. A post-education survey was completed three months following the implementation of ESC.

**Conclusions:** Short-term results of this project demonstrated that ESC increased aspects of the NICU nurse's self-perceived knowledge, changed the nurse's attitude towards the mother, and improved perceptions of care and clinical practices.

**Implications for practice:** Implementing ESC as a policy and standard of practice will likely increase nurse confidence, and improve parent involvement in NAS management. The nurse practitioner will have an essential role in facilitating sustainability of the project.

*Keywords: Neonatal Abstinence Syndrome, Eat, Sleep, Console, neonatal withdrawal, NICU nurses*

## **Implementing the Eat, Sleep, Console Approach for NAS Management:**

### **Methodology**

Evidence-based quality improvement (EBQI) methodologies were used to fulfill this DNP Project, allowing opportunity to assess and compare current practices with best practice. EBQI fosters continued learning and improvement toward the highest quality of care (O'Mathuna, 2015). This DNP project will entail planned, systematic processes to establish the Eat, Sleep, Console (ESC) approach into practice in a reliable manner through education presented to NICU nurses. This paper includes a discussion of the project design, methodology, sample and setting. The evidence-based practice model, theoretical framework, and change theory are detailed. In addition, this paper includes evaluation of the educational presentation of ESC and implementation of the project with conclusions and implications for practice.

### **Background/Purpose**

A new approach to Neonatal Abstinence Syndrome (NAS), the ESC method by Grossman et al. (2017) complements or offers resolution to the emerging themes identified in the literature review: 1) a need to improve NAS assessment, 2) family-centered care for the infant with NAS, and 3) developing structured NAS protocols. This project aims to use collective efforts to change current practice surrounding NAS management and the implementation of standardized care using the ESC approach to NAS management, and to answer the clinical question:

(P) In nurses working in a Neonatal Intensive Care Unit, (I) how will the implementation of a training program for the Eat, Sleep, Console method for care of infants with NAS (C) compared to current practice of care for infants with NAS

(O) change self-reported attitudes towards caring for an infant with NAS, perception of own knowledge of care of infants with NAS, and perception of clinical practices of care by self and the NICU team regarding the care of infants with NAS (T) over a three-month period of time?

### **Gaps in the Evidence**

The significance of accurate and consistent NAS severity scoring is identified, however a superior method is not blatantly identified. Current literature suggests change is warranted, however great paucity exists regarding the best treatment strategies for NAS (Westgate & Gomez-Pomar, 2017). The long-term effects of treatment based on ESC remain unknown. The effectiveness of ESC has not yet been studied in the preterm population. Symptoms associated with prematurity overlap with symptoms often associated with opioid withdrawal, making assessments difficult (Allococo et al., 2016).

### **Recommendations for Practice - The ESC Method**

Pharmacological treatment and Finnegan scoring have been the mainstay in the treatment of NAS; however, the ESC approach uses a non-pharmacological focus. Instead of confusing and inconsistent FNAST scores, the Eat, Sleep, Console method, adapted from Grossman et al. (2017) offers simplicity and more objective measures, and outlines functional assessment of withdrawal symptoms by examining three categories:

Eat – Poor eating due to NAS?

Sleep – Sleeping less than one hour due to NAS?

Console – Unable to console within 10 minutes due to NAS?

If the infant continues with “yes” responses for any ESC item despite maximum non-pharmacological cares, the nurse should initiate a full care team huddle to determine if medication treatment is indicated (Grossman, Minear, Whalen, & Wachman, 2017).

## Methods

### Project Procedure

The DNP project was approved by the NICU nurse manager, the NICU medical director and partnering Neonatologists, and the agency’s Nursing Review Board. The nurse manager and unit nurse clinician served as stakeholders for this project.

**Development of the intervention.** A committee was developed to implement the project. Committee recruitment took place from inside the organization, inviting interested NICU nursing staff. The ESC approach was discussed among the committee, documentation practices were examined, and informational presentations and printed materials were prepared to present to NICU staff during nurse competency meetings. The committee was in agreeance to use the ESC Care Tool by Grossman, Minear, Whalen, and Wachman (2017). This education taught participating NICU staff nurses the importance of family-centered NAS management, the benefits of fostering the mother-infant dyad, and how to properly utilize the Eat, Sleep, Console (ESC) method.

The ESC Care Tool (Appendix E) was utilized as the evidence-based tool. The informational presentations were presented during the February 2019 NICU staff competency meetings, per the request of the NICU nurse manager. Example cases were reviewed during the meeting and staff were invited to participate in evaluating the example case using the ESC approach and navigating the ESC Care Tool in EPIC

computer documentation. Committee members were present during competency meetings in order to provide guidance to understand the ESC approach.

An online questionnaire was dispersed prior to implementation of the ESC approach to NAS management, and again at three months following implementation. The questionnaires were adapted with permission from Romisher, Hill, and Cong (2018) to investigate change in knowledge, attitudes, and perceptions of care-practices for infant with NAS pre-ESC and post-ESC implementation (Appendix G). Items were adapted with 6-point Likert scale response options using scores of 1) Very Strongly Agree, 2) Strongly Agree, 3) Agree, 4) Disagree, 5) Strongly Disagree, and 6) Very Strongly Disagree.

### **Sample and Setting**

**Sample.** All NICU nurses were invited to participate. Those who chose to participate in the project evaluation formed the convenience sample. The first sample consisted of any NICU staff nurse that wished to partake. The second sample included NICU staff nurses that attended the competency meeting to receive education on ESC.

**Setting.** This project was carried out in a level III NICU, that serves neighboring hospitals offering neonatal transports in a rural, Midwestern state. The NICU can accommodate up to 28 neonates, and with an average daily census of 16.

### **Evidence-Based Practice Process**

The nursing practice council at the organization strongly favors the Iowa Model of Evidence Based Practice to Promote Quality Care. Thus, the Iowa Model was utilized for this project. The Iowa Model is widely recognized for its ease of use, applicability across multidisciplinary teams, and focus on implementing change with a multiphase

change process with feedback loops (Dang et al., 2015). This model suited this DNP project by inviting committee critique of the evidence surrounding the project and, aid in the development of ESC education presentations. Use of the Iowa Model provided opportunity for project engagement across the nursing team while implementing ESC, and allowed progressive evaluation by the committee.

### **Jean Watson's Theory of Human Caring**

The Theory of Human Caring was utilized in this DNP project to reflect the importance of holistic health care practice in nursing care. This model emphasizes that a caring environment is one that offers the development of potential while allowing the patient to choose the best action for him or herself. Jean Watson (2003) noted the human being as “a valued person in and of him or herself to be cared for, respected, nurtured, understood and assisted”. Effective caring responses accept the patient as he or she is now, as well as what he or she may become, which is important when working with mothers with substance use. This aspect of Watson’s theory model is tremendously important when considering the mother of the infant suffering with NAS.

Watson’s model notes important curative factors that directly contribute to this DNP project protecting the mother-infant dyad. ESC encourages a caring environment where the mother is invited to care for the infant. Watson (2003) emphasizes that the strongest tool a nurse has is their mode of communication. The development of a helping-trust relationship, empathy, and warmth, will establish a strong nurse-mother relationship.

### **The Theory of Planned Behavior**

The Theory of Planned Behavior encompasses behavior predicted by intention, that in turn, is predicted by three base components: attitudes toward the behavior,

subjective norms, and perceived control (Ajzen, 2002). The assumption that these base components determine intentions has been demonstrated statistically in past research (Sussman & Gifford, 2018). This theory was utilized during this project in order to form the intention to change and ensuring genuine intention. It was anticipated that the NICU nurses would make sincere effort to utilize the principles within the ESC Care Tool in order to provide quality care to the infants experiencing withdrawal or NAS.

### **Ethical Considerations**

**Participant confidentiality and consent.** The nurse's participation in the evaluation of the project was voluntary and will remain confidential. Each survey included "Informed Consent" notifying the nurse that participation is completely voluntary, and confidential. The participant had the right to withdraw from the project at any time without recrimination from the agency, the DNP student, or the university. Consent to participate was implied by completion of the online questionnaires. Participants were asked to provide three digits from their five-digit employee badge identification number for survey pairing during data analysis.

**Institutional Review Board.** The chosen organization is Magnet Certified; therefore, a formal presentation was delivered to the Nursing Research Council where approval was granted (Appendix C). This DNP Project was submitted to the hosting organizations Institutional Review Board (IRB) and South Dakota State University's IRB. The project was determined not human subjects research and did not require further approval (Appendices A & B).

**Data security.** Survey results were collected, compiled and stored securely. Surveys were completed online, and results were exported from QuestionPro®.The ISP

data was deleted. The data files were stored and shared with the major advisor via password protected folder on Box.com which utilizes encryption in-transit and at rest through South Dakota State University secure servers. Data files will be retained for three years after the project ends and then destroyed by SDSU, per SDSU policy.

**CITI certification of the DNP Project coordinator.** The DNP student conducting and coordinating this project has completed the research ethics and compliance coursework requirement through the Collaborative Institutional Training Initiative (CITI). South Dakota State University is listed as the institutional affiliation. This certification will expire March 29, 2022.

## Conclusions

**Statistical testing.** Non-parametric testing suits this project related to small sample size, and ordinal level of measurement (Boston University of Public Health, 2017). The Wilcoxon signed-rank test measures the magnitude of the differences in scores in relation to pre-intervention/post-intervention change on the survey utilizing paired samples (Grove, Burns, & Gray, 2013b).

Each questionnaire asked for the nurse to input the first, third, and fifth digit of their employee identification number. Despite this request only eight paired codes could be identified in the data as many participants left this item blank. The small sample size dampened extrapolation of the results using paired non-parametric testing, thus bar graphs for the unmatched total pre- and post- samples were used in addition to the Wilcoxon signed-rank test.

**Clinical outcomes.** Pre- and post-implementation survey data was collected and analyzed to measure change in attitudes, perceived knowledge, and perceptions of care

for infants with NAS in three months' time. This DNP Project provided nurse education about ESC and further implemented the ESC method.

Demographic data (Appendix H) demonstrated primarily bachelor's degree prepared nurses ( $n = 70\%$ ), followed by associates degree prepared nurses ( $n = 20\%$ ), and master's degree prepared nurses ( $n = 10\%$ ). Demographic data reported 40% of the sample participants have 21+ years of NICU experience, 25% have 11-20 years of NICU experience, 10% have 5-10 years of NICU experience, 12% have 2-4 years of NICU experience, and 13% have 0-2 years of NICU experience. In both samples, over 60% of the nurse respondents reported caring for six or more infants with NAS in their careers.

Wilcoxon signed-rank tests identified change in five items using paired data (see Appendix J). The direction of change noted from these five items implies that the nurses agreed they feel more knowledgeable regarding the care of infants with NAS using the ESC method compared to the FNAST method, improved attitudes towards mothers of infants with NAS post-implementation of ESC, and improved perception of care practices demonstrated by increased confidence assigning scores post-implementation of ESC.

The bar graphs were utilized to visualize the questionnaire responses (Appendix I) applying all pre-ESC questionnaires ( $n = 45$ ) and post-ESC questionnaires ( $n = 31$ ). Notable change was identified in the key categories of attitude, knowledge, and perception of care regarding infants with NAS.

*Attitude.* A notable increase in disagree-type responses to item 11 (*I find dealing with mothers of infants with NAS to be stressful or upsetting*) implies that after the implementation of ESC, less NICU nurses found dealing with mothers of infants with NAS to be stressful or upsetting.

*Knowledge.* More nurses replied with agree-type responses and less nurses disagreed in the post-ESC sample to item 8 (*I feel that I have enough knowledge about addiction to appropriately deal with mothers of infants with NAS*). This suggests that after the implementation of ESC, more nurses felt they had enough knowledge about addiction to appropriately deal with mothers of infants with NAS.

*Perception of clinical practices.* The bar graph of items 15 (*I frequently use nonpharmacological interventions when caring for a baby with NAS*) suggests that the NICU nurses are using more non-pharmacological interventions when caring for an infant with NAS. The bar graph of item 17 (*I advocate for mothers of infants with NAS to breastfeed their infants*) displays increased agree-type and decreased disagree-type responses implying that nurses are more often advocating for the mothers of infants with NAS to breastfeed their infants.

Although the intent was to see remarkable change across all items but only partial change was noted, the Theory of Planned Behavior does provide some explanation to this phenomenon. The base components that are most likely to be influenced by intentions (in this case, implementing ESC) are the least likely to be relevant to actual attitude, or the personal evaluation of ESC. According to Sussman and Gifford (2018), perhaps the best explanation for this is that perceptions of one's self are the least susceptible to change.

### **Implications for practice**

This DNP Project holds potential for longstanding impacts on the organization. Implementing ESC as a policy and standard of practice will likely increase nurse confidence, improve parent involvement in NAS management, foster the mother-baby

dyad, and increase rates of breastfeeding further escalating the quality of healthcare.

Long-term results of ESC may influence NAS treatment outcomes by decreasing length of stay for NAS management, and lower hospital costs related to NAS.

Commentary collected from the questionnaires supplied qualitative data (Appendix K) that should be considered moving forward. The comments would indicate that the nursing team is in the early stages of change. Frequent education related to ESC should be provided to allow more opportunity to become comfortable with its processes, as admission related to NAS can be infrequent.

**Barriers.** Challenges were related to time and scheduling constraints, nurse availability, inconsistent patient census, and resistance towards change. Challenges arose specifically related to computer documentation and wording choices within the ESC flowsheet. There was hesitancy using the ESC method initially and was occasionally used in conjunction with the FNAST, this lead to confusion among NICU staff.

Additional challenges stemmed from the inability to have early contact with mothers, and further inability to extend the family-centered aspect of the ESC approach related to a pod-style unit without private rooms. It is important to remove barriers that may inhibit a mother's presence by providing meals, coordinating transportation, and providing breaks (Desai, 2014; Grossman, Berkwitt, & Osborn, 2017).

**Sustainability.** Thorough nurse education and annual ESC competency education will increase nurse confidence favoring sustainability of the DNP Project. Committee members offering on-site, real time assistance related to the application of ESC will improve implementation and sustainability by limiting hesitation to embark change. The addition of definitions and row information into the electronic chart documentation of the

ESC Care Tool within the existing Epic® medical chart will enhance ease of use and likewise favor sustainability.

The NICU has utilized trained volunteers to serve as *Cuddlers*, offering calm and supportive cares to keep irritable babies comfortable during withdrawal. The NICU staff also set forth optimizing nonpharmacological care using baby wearing, using fabric wraps and carriers as a method to keep infants consoled.

The ESC training was extended to all maternal-child float pool and pediatric staff in order to maintain consistency and fluency among all nurses providing care in the NICU. This project was carried forward by the nurse residency council to further the implementation of ESC as it aims to meet hospital goals to improve family-centered care.

### **Underserved population.**

The agency's NICU serves a predominantly rural population and Native American Indian Reservation population, providing the nearest intensive care to neonates within a 300-mile radius. The agency also serves as the primary medical care center for a local residential treatment program for pregnant women with substance abuse and addiction issues. Collaborative connections were established between the NICU staff and the nursing staff at the local residential treatment program in light of ESC. The importance of a mother's presence in the NICU was expressed and the exceptions were made in order to allow opportunity to foster this mother-infant dyad during recovery. These underserved populations intensify the need for this comprehensive ESC approach toward care of infants with NAS.

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## Appendix A

### University IRB Approval

The screenshot shows an email message in an Outlook inbox. The subject line is "Fw: HSR Official Determination for Amber Tilberg". The message is from SDSU IRB, sent on Tuesday, January 22, 2019, at 7:51 AM. The recipient is Tilberg, Amber Deanne - SDSU Student; SDSU IRB.抄送人包括Elverson, Cynthia; ambertilberg@gmail.com; ambertilberg@gmail.com。主题是关于HSR官方确定Amber Tilberg的决定。邮件内容如下：

Amber,  
SDSU will accept Regional Health's determination that your project is not human subjects research and doesn't require IRB approval.  
Dianne

Dianne Nagy, Ed.D.  
Research Integrity and Compliance Officer  
Division of Research and Economic Development  
Morrill Hall 200F, Box 2201  
Brookings, SD 57007

Phone: 605-688-5051

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## APPENDIX B

## FACILITY IRB APPROVAL



**RH IRB OFFICIAL**  
**HUMAN SUBJECTS RESEARCH DETERMINATION**

Federal regulations and Regional Health Institutional Review Board (RH IRB) policy requires **ALL** research projects involving **humans as subjects** (including involvement of humans in one or more of the categories of research exempted or waived under the federal regulations), **OR the use of identifiable protected health information** be reviewed and approved by an IRB **PRIOR** to initiation of any research related activities, including recruitment and screening activities. The RH IRB is the sole body designed to make official human subject research determinations at Regional Health.

This completed form is the official determination of the project information submitted to the RH IRB. Please keep this information for your records.

|                               |   |
|-------------------------------|---|
| <b>Name of Submitter</b>      | Amber Tilberg, RN<br>RCH NICU   |
| <b>Contact information</b>    | <a href="mailto:atilberg@regionalhealth.org">atilberg@regionalhealth.org</a> and phone number is (605) 755-8333   |
| <b>Title of the project</b>   | Implementing the Eat, Sleep, Console Approach for NAS Management:<br>Methodology  |
| <b>Date of the submission</b> | 11.20.2018  |
| <b>Summary of the project</b> | Evidence-based quality improvement (EBQI) methodologies will be used to fulfil this DNP Project. EBQI fosters continued learning and improvement toward the highest quality of care (O'Mathuna, 2015). Quality assurance and auditing will allow opportunity to assess and compare current practices with best practice. This DNP project will entail planned, systematic processes to establish the Eat, Sleep, Console (ESC) approach into practice in a reliable manner. |
| <b>Determination Date</b>     | 1.7.2019  |

|  |  |
|--|--|
|  <b>Regional Health</b>   |  |
| <b>RH IRB Determination:</b>   |  |
| <p><input type="checkbox"/> <b>INSUFFICIENT INFORMATION:</b> Additional information is needed to complete the assessment of this project.</p>  |  |
| <p><input checked="" type="checkbox"/> <b>WAIVED:</b> the proposed activity, as described, <b>DOES NOT</b> constitute Human Subjects Research. Submission of a Regional Health IRB research application is not required.</p> <p><b>Based on the RH IRB review of this project. It was determined this is an evidenced based, quality improvement effort. This project consists of: benefitting a specific patient group, staff and organization; improves quality and safety within RC Hospital NICU by applying evidence-based practice model and by evaluating changes in staff practice; addresses a specific unit/population within an organization; uses PICO approach, short timeline, small population size (60)</b></p>  |  |
| <p><input type="checkbox"/> <b>REQUIRED:</b> The proposed activity, as described, <b>DOES</b> constitute Human Subjects Research. The Protocol and all accompanying documentation will need to be submitted for IRB review and approval before starting the research at Regional Health. Submission of a Regional Health IRB application or an IRB Authorization agreement is required. Regional Health IRB approval or the IRB of Record approval must be obtained before the investigator begins their research.</p>   |  |
| <b>RH IRB Determination form completed by:</b>   |  |
|   |  |
| <span style="border-bottom: 1px dashed black; padding-bottom: 2px;">Regional Health IRB Research Compliance Specialist or designee</span>  | <span style="border-bottom: 1px dashed black; padding-bottom: 2px;">1.7.2019</span><br><span style="border-bottom: 1px dashed black; padding-bottom: 2px;">Date</span> |
| <p>Thank you for your project submission. If you have any questions or concerns please feel free to reach out to the RH IRB Office by calling 605-755-9028 or e-mailing <a href="mailto:RHIRB@regionalhealth.org">RHIRB@regionalhealth.org</a>.</p> <p>Please note if any protected health information (PHI) is being seen, collected or used it is important to ensure there are proper authorizations in place before considering taking any PHI out of the boundaries of Regional Health. It is everyone's responsibility to protect patient PHI.</p> <p>If you Suspect a Breach Information or Potential Identity Theft – report concerns to the Regional Health Privacy Officer by e-mailing your report to: <a href="mailto:ICorporateResponsibility@regionalhealth.org">ICorporateResponsibility@regionalhealth.org</a> or fax to 755-9036.</p> |  |

## Appendix C

### Facility Approval



Regional Health Rapid City Hospital  
Neonatal Intensive Care Unit  
353 Fairmont Boulevard  
Rapid City, South Dakota 57701  
605-755-8333

January 3, 2019

To whom it may concern,

I am writing this letter to confirm my agreement for Amber Tilberg BSN RN to perform her DNP student practice innovation project, *Eat, Sleep, Console*, in the Neonatal Intensive Care Unit at Rapid City Hospital.

Sincerely,

A handwritten signature in black ink that reads "Nan Fitzgerald".

Nan Fitzgerald MS RN IBCLC  
Nurse Manager, Neonatal Intensive Care Unit  
P: 605-755-8381  
F: 605-755-2210

regionalhealth.org

## Appendix D

### Permission to implement ESC Method

**From:** "Tilberg, Amber Deanne - SDSU Student"  
<amber.tilberg@jacks.sdsu.edu>  
**Date:** Wednesday, November 28, 2018 at 11:35 AM  
**To:** "Grossman, Matthew" <matthew.grossman@yale.edu>  
**Subject:** Seeking permission to use ESC

Hello Dr. Grossman,

My name is Amber Tilberg and I am a NICU nurse at Rapid City Regional Hospital, and also a DNP Neonatal Nurse Practitioner student at South Dakota State University. I am writing to ask permission to utilize the evidence published in your studies related to Eat, Sleep, Console.

Grossman, M. R., Berkwitt, A. K., Osborn, R. R., Xu, Y., Esserman, D. A., Shapiro, E. D., & Bizzarro, M. J. (2017). An initiative to improve the quality of care of infants with neonatal abstinence syndrome. *Pediatrics*, 139(6). doi:10.1542/peds.2016-3360.

Grossman, M., Lipshaw, M., Osborn, R., & Berkwitt, A. (2018). A novel approach to assessing infants with neonatal abstinence syndrome. *Hospital Pediatrics*, Hospital pediatrics, 20 December 2017.

Grossman, M., Minear, S., Whalen, B., & Wachman, E. (2017). *Eating, sleeping, consoling (ESC) neonatal abstinence syndrome care tool: Instruction manual*. Boston, MA: Boston University School of Medicine. Retrieved from <http://files.constantcontact.com/dfa00fff501/ce6dfaf8-dc7c-4999-bfb2-fca3ac875c86.pdf>.

Grossman, M., Osborn, R., & Berkwitt, A. (2017). Neonatal abstinence syndrome: Time for a reappraisal. *Hospital Pediatrics*, 7(2), 115-116.

I would like to implement the Eat, Sleep, Console method in our NICU in Rapid City, SD as part of an evidence-based quality improvement project. I look forward to hearing from you, as I am anxious and excited to move forward with this project in order to provide improved care for our patients with NAS.

Thank you very much for your time and attention.

Sincerely,

Amber Tilberg

NICU RN at Rapid City Regional Hospital

DNP NNP Candidate at South Dakota State University

Grossman, Matthew <[matthew.grossman@yale.edu](mailto:matthew.grossman@yale.edu)>

Yesterday, 10:34 AM

Tilberg, Amber Deanne - SDSU Student  
Inbox

Amber,

Absolutely – no need for permission to use any of the stuff published by me other than the instruction manual. If you want to use that you will have to get permission from Bonny Whalen at Dartmouth.

Bonny L. Whalen [Bonny.L.Whalen@hitchcock.org](mailto:Bonny.L.Whalen@hitchcock.org)

Good luck with the implementation and please let me know if I can help.

Matt

Matthew Grossman, M.D.  
Associate Professor of Pediatrics  
Interim Chief, Section of Pediatric Hospital Medicine  
Vice Chair for Quality, Dept of Pediatrics  
Yale School of Medicine  
Quality and Safety Officer  
Yale-New Haven Children's Hospital

---

January 20, 2019

To be noted:

I made two attempts to contact Dr. Whalen via email and voicemail, with no reply.

Upon further exploration the ESC Care Tool and documentation spreadsheet was readily available within the EPIC library. I did not inquire further permission from Dr. Whalen.

## APPENDIX E

### DNP Project Tools



#### Eating

The first component of the ESC Care Tool is infant feeding: “*Does the infant have poor eating due to NAS – Yes / No?*”



Adequate eating depends on the **gestational** and **postnatal age** of the infant. “Eating well” is generally defined as breastfeeding 8-12 times per day with effective latch and milk transfer, or bottle feeding an expected volume for age when showing hunger cues.

**Poor eating due to NAS:** Baby is unable to coordinate feeding within 10 minutes of showing hunger *AND/OR* is unable to sustain feeding for 10 minutes at breast or with 10 cc of finger- or bottle-feeding due to NAS symptoms (e.g., fussiness, tremors, uncoordinated or excessive suck).

**Special Note:** Do not indicate “Yes” for poor eating if it is clearly due to non-NAS related factors (e.g., prematurity, transitional sleepiness or spittiness in the first 24 hours of life, or inability to latch due to infant / maternal anatomical factors). If it is not clear if the poor eating is due to NAS, indicate “Yes” on the flowsheet and continue to monitor the infant closely while optimizing all non-pharm interventions.

**OPTIMAL FEEDING:**

- **Baby feeding when showing early feeding cues and until content** without any limit placed on duration or volume of feeding.
- **Breastfeeding:** Baby latching deeply with comfortable latch for mother, and sustained active suckling with only brief pauses noted. Assist directly with breastfeeding to achieve more optimal latch/position and request lactation consultation if any concerns present.
- **Bottle feeding:** Baby effectively coordinating suck and swallow without gagging or excessive spitting up; modify position of bottle or flow of nipple if any concerns present.



## Sleeping

The second component of the ESC Care Tool is infant sleep: ***“Did the infant sleep less than 1 hour after feeding due to NAS – Yes / No?”***

Normal sleep patterns for gestational and postnatal age should be taken into account. Sleep < 1 hour may be normal in the first few days after birth, particularly in breastfed infants who are cluster feeding (i.e., feeding frequently in a short period of time).



**Sleep < 1 hour due to NAS:** Baby unable to sleep for more than a one hour stretch after feeding due to NAS symptoms (e.g., fussiness, restlessness, increased startle, tremors).

**Special Note:** Do not indicate “Yes” if sleep < 1 hour is clearly due to non-NAS related factors (e.g., physiologic cluster feeding, interruptions in sleep for routine newborn testing, symptoms in first day likely due to nicotine or SSRI withdrawal). If it is not clear if sleep < 1 hour is due to NAS, indicate “Yes” on the flowsheet and continue to monitor the infant closely while optimizing all non-pharm interventions.

## Consoling

The final symptom component of the ESC Care Tool is infant consoling: ***“Is the infant unable to be consoled within 10 minutes due to NAS – Yes/No?”***



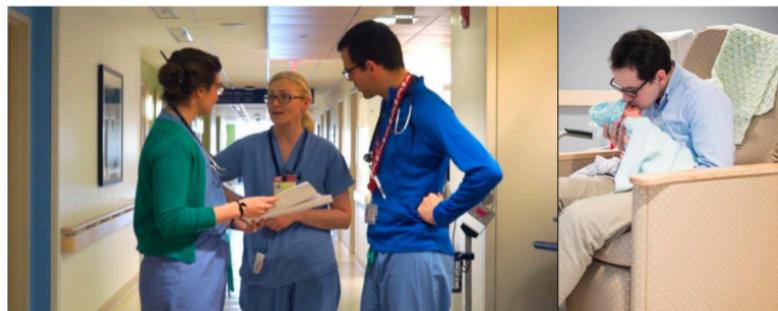
**Unable to console within 10 minutes due to NAS:** Baby unable to be consoled within 10 minutes by infant caregiver effectively providing recommended Consoling Support Interventions.

**Special Note:** Do not indicate “Yes” if infant’s inconsolability is due to infant hunger, difficulty feeding or other non-NAS source of discomfort (e.g., circumcision pain) or non-opioid withdrawal. If it is not clear if the inability to console within 10 minutes is due to NAS, please indicate “Yes” and continue to monitor the infant closely while optimizing all non-pharm interventions.



### The Team Huddle

A Team Huddle is recommended if the infant has a “Yes” response to any ESC item *OR* if the infant consistently receives “3s” for “Soothing Support Used to Console Infant”. Just one “Yes” is sufficient to consider a Team Huddle. The Team Huddle, *at minimum*, should include the baby’s mother/parent if possible and bedside nurse. If the infant scores “Yes” on any ESC item more than once **despite optimal non-pharm care OR** other significant concerns are present, the Team Huddle should include the mother/parent if possible, the bedside nurse, *AND* physician or associate provider. Include social worker as needed to facilitate parental presence / engagement.



The Team Huddle should include discussion of 1) ways to further **optimize non-pharm care** including ensuring the presence of a caregiver, 2) infant’s response to and efficacy of Consoling Support Interventions implemented, 3) efforts to improve feeding (when needed), and 4) assessment of the infant’s environment. All efforts should be made to encourage the parent or other caregiver to be present *at all times* to provide comfort measures for the infant. **If non-pharm care has been optimized and infant continues to have poor eating, sleeping, or consoling, then medication treatment should be considered.**

### Parental / Caregiver Presence

We recommend documentation on the ESC flowsheet of the presence of a parent (biological or foster) or other caregiver (e.g., family support person) at the bedside when assessments are performed every 3-4 hours.<sup>12</sup> Parental presence documentation should reflect time since the last ESC assessment. The ESC Care Tool includes a code from 0-4 with increasing code number indicating greater parental / caregiver presence.



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## DEFINITIONS

### EATING

- **Poor eating due to NAS:** Baby is unable to coordinate feeding within 10 minutes of showing hunger *AND/OR* is unable to sustain feeding for 10 minutes at breast or with 10 cc of finger- or bottle-feeding due to NAS symptoms (e.g., fussiness, tremors, uncoordinated or excessive suck).
- **Special Note:** Do not indicate “Yes” for poor eating if it is clearly due to non-NAS related factors (e.g., prematurity, transitional sleepiness or spittiness in the first 24 hours of life, or inability to latch due to infant / maternal anatomical factors). If it is not clear if the poor eating is due to NAS, indicate “Yes” on the flowsheet and continue to monitor the infant closely while optimizing all non-pharm interventions.

### SLEEPING

- **Sleep < 1 hour due to NAS:** Baby unable to sleep for more than a one hour stretch after feeding due to NAS symptoms (e.g., fussiness, restlessness, increased startle, tremors).
- **Special Note:** Do not indicate “Yes” if sleep < 1 hour is clearly due to non-NAS related factors (e.g., physiologic cluster feeding, interruptions in sleep for routine newborn testing, symptoms in first day likely due to nicotine or SSRI withdrawal). If it is not clear if sleep < 1 hour is due to NAS, indicate “Yes” on the flowsheet and continue to monitor the infant closely while optimizing all non-pharm interventions.

### CONSOLING

- **Unable to console within 10 minutes due to NAS:** Baby unable to be consoled within 10 minutes by infant caregiver effectively providing recommended Consoling Support Interventions.
- **Special Note:** Do not indicate “Yes” if infant’s inconsolability is due to infant hunger, difficulty feeding or other non-NAS source of discomfort (e.g., circumcision pain). If it is not clear if the inability to console within 10 minutes is due to NAS, please indicate “Yes” and continue to monitor the infant closely while optimizing all non-pharm interventions.

#### Consoling Support Interventions (CSIs)

- Caregiver begins softly and slowly talking to infant and uses his/her voice to calm infant.
- Caregiver looks for hand-to-mouth movements and facilitates by gently bringing infant’s hand to mouth.
- Caregiver continues talking to infant and places caregiver’s hand firmly but gently on infant’s abdomen.
- Caregiver continues softly talking to infant bringing baby’s arms and legs to the center of body.
- Picks up infant, holds skin-to-skin or swaddled in blanket, and gently rocks or sways infant.
- Offers a finger or pacifier for infant to suck, or a feeding if infant showing hunger cues.

### SOOTHING SUPPORT USED TO CONSOLE INFANT

1. **Soothes with little support:** Consistently self-soothes or is easily soothed with one of first 4 CSIs above.
2. **Soothes with some support:** Soothes fairly easily with skin-to-skin contact, being held clothed or swaddled, rocking or swaying, sucking on finger or pacifier, or feeding.
3. **Soothes with much support or does not soothe in 10 minutes:** Has difficulty responding to all caregiver efforts to help infant stop crying *OR* does not soothe within 10 minutes; never self-soothes.

### PARENTAL / CAREGIVER PRESENCE

- Time since last assessment that parent (or other caregiver) has spent in room with infant.

### OPTIMAL FEEDING:

- **Baby feeding at early feeding cues until content** without any limit placed on duration or volume of feeding.
- **Breastfeeding:** Baby latching deeply with comfortable latch for mother, and sustained active suckling for baby with only brief pauses noted. Assist directly with breastfeeding to achieve more optimal latch/position and request lactation consultation if any concerns present.
- **Bottle feeding:** Baby effectively coordinating suck and swallow without gagging or excessive spitting up; modify position of bottle or flow of nipple if any concerns present. Consult feeding specialist if feeding difficulties continue.

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## Non-pharmacologic Care

First-line treatment for infants with NAS is non-pharm care which significantly reduces an infant's likelihood of needing pharmacologic treatment and reduces pharmacologic treatment duration when initiated.<sup>6,9-10,12-13</sup> We encourage a consistent institutional approach to non-pharm care focusing on the parent as the primary caregiver. Non-pharm care interventions that should be reviewed with families prenatally and in the newborn setting, in addition to the Consoling Support Interventions noted above, include the following. It is recommended that these interventions first be optimized, and documented in the medical record, prior to considering pharmacologic treatment.

- Rooming-in with parent throughout the hospital stay
- Ensuring parental presence at the bedside as often as possible during the hospital stay
- Encouraging skin-to-skin contact
- Encouraging holding / gentle rocking / swaying by a caregiver or cuddler
- Swaddling / flexed positioning
- Ensuring optimal feeding quality including encouraging breastfeeding for mothers without concerns for continued concerning substance use or other medical contraindication (e.g., HIV)
- Non-nutritive sucking with pacifier or finger (ensuring baby is well fed first)
- Ensuring a quiet environment with low light stimulation in the room
- Limiting visitors to one at a time (and to those that will be quiet / supportive)
- Providing uninterrupted periods of sleep / clustering infant's care

## Pharmacologic Management

Pharmacologic treatment should be considered for opioid-exposed newborns if the infant continues to have "Yes" responses to ESC items that are thought to be **due to NAS** after a **team huddle and maximal optimization of non-pharm care**. In our institutions' experience, only 10-40% of infants with prenatal opioid exposure will require pharmacologic treatment using the ESC method for NAS assessment with most infants initiating pharmacologic therapy between day 3-4 of life for methadone and buprenorphine-exposed infants.<sup>9-10</sup> Most studies report initiating pharmacologic therapy at a rate of 50-80% when using a numerical, score based-approach.<sup>1,3,6</sup>

There are several acceptable options for first-line pharmacologic treatment of NAS. The American Academy of Pediatrics recommends morphine or methadone as first-line treatment.<sup>3,14</sup> A recent clinical trial also suggests that buprenorphine is acceptable as a first-line agent.<sup>15</sup> Currently, no medications are FDA approved for use for NAS and there is no universally accepted medical protocol. We recommend that institutions select a regimen and establish consistency between patients and providers. Second-line pharmacologic agents can include phenobarbital or clonidine but should be used infrequently.<sup>3</sup>

Two sample medication treatment algorithms utilizing the ESC Care Tool to titrate medication are included in **Appendix D**.



## Appendix A

### EATING, SLEEPING, CONSOLING (ESC) CARE TOOL

- Assess infant **after feedings**, preferably while **skin-to-skin or held swaddled** by mother/caregiver.
- Review baby's ESC behaviors **since last assessment 3-4 hours ago** using **Newborn Care Diary** with parents.
- If infant with "Yes" for any ESC item or receiving "3s" for "Soothing Support Used to Console Infant", perform **team huddle** with mother/parent & RN to **determine non-pharm interventions that can be optimized further**.
- If infant **continues with "Yes"** for any ESC item or "3s" for "Soothing Support" despite **optimal non-pharm care** and **symptoms felt likely due to NAS**, perform **full team huddle** with mother/parent, RN, and Infant Provider to determine if medication treatment is needed.

*See back of sheet for definition of items.*

| TIME   |  |  |  |  |
|--|--|--|--|--|
| <b>EATING</b>  |  |  |  |  |
| Poor eating due to NAS? Yes / No                         |  |  |  |  |
| <b>SLEEPING</b>  |  |  |  |  |
| Sleep < 1 hr due to NAS? Yes / No                        |  |  |  |  |
| <b>CONSOLING</b>   |  |  |  |  |
| Unable to console within 10 min due to NAS? Yes / No     |  |  |  |  |
| Soothing support used to console infant:                 |  |  |  |  |
| Sothes with little support: 1                            |  |  |  |  |
| Sothes with some support: 2                              |  |  |  |  |
| Sothes with much support or does not soothe in 10 min: 3 |  |  |  |  |
| <b>PARENTAL / CAREGIVER PRESENCE</b>                     |  |  |  |  |
| Parental / caregiver presence since last assessment:     |  |  |  |  |
| No parent present: 0                                     |  |  |  |  |
| 1 - 59 minutes: 1  |  |  |  |  |
| 1 hr – 1 hr 59 min: 2                                    |  |  |  |  |
| 2 hr – 2 hr 59 min: 3                                    |  |  |  |  |
| 3 hr+: 4   |  |  |  |  |
| <b>MANAGEMENT DECISION</b>                               |  |  |  |  |
| Recommend a Team Huddle? Yes / No                        |  |  |  |  |
| Management decision:                                     |  |  |  |  |
| Optimize non-pharm care: 1                               |  |  |  |  |
| Initiate medication treatment: 2                         |  |  |  |  |
| Other (please describe):                                 |  |  |  |  |
| <b>NON-PHARM INTERVENTIONS</b>                           |  |  |  |  |
| Rooming-in: Increased / Reinforced                       |  |  |  |  |
| Parental presence: Increased / Reinforced                |  |  |  |  |
| Skin-to-skin contact: Increased / Reinforced             |  |  |  |  |
| Holding by caregiver/cuddler: Increased / Reinforced     |  |  |  |  |
| Swaddling: Increased / Reinforced                        |  |  |  |  |
| Optimal feeding: Increased / Reinforced                  |  |  |  |  |
| Non-nutritive sucking: Increased / Reinforced            |  |  |  |  |
| Quiet environment: Increased / Reinforced                |  |  |  |  |
| Limit visitors: Increased / Reinforced                   |  |  |  |  |
| Clustering care: Increased / Reinforced                  |  |  |  |  |

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## Children's Hospital at Dartmouth-Hitchcock NAS Management Algorithm

- Assess infant after feedings preferably while skin-to-skin or held swaddled by mother/caregiver.
- Review ESC behaviors, which have occurred since last assessment, using Newborn Care Diary with parents.
- **Optimal non-pharm care:** Breastfeeding (if no medical contraindication), rooming-in, parental presence, skin-to-skin, holding, swaddling, ad lib feeding (at least every 3 hours), quiet environment, limiting visitors.
- If "Yes" to any ESC item or "3s" for "Soothing Support Used to Console Infant" (i.e., difficulty responding to all caregiver soothing efforts OR does not soothe within 10 minutes), perform team huddle with mother/parent & RN to determine non-pharm interventions that can be optimized.
- If continues with "Yes" for any ESC item or "3s" for "Soothing Support" despite optimal non-pharm care, perform full team huddle with mother/parent, RN and Infant Provider.

**Morphine Initiation:** Consider initiating oral Morphine after full team huddle if:  
 • Continues with "Yes" to any ESC item or "3s" for "Soothing Support" AND  
 • Non-pharm care optimized to greatest extent AND  
 • Non-NAS causes excluded (e.g., cluster feeding, SSRI or nicotine withdrawal in first 24 hours)

Starting dose of Neonatal Morphine oral solution:  
 • 0.04 mg/kg/dose PO every 3 hours (use birthweight for dosing).

**Morphine Escalation:** Consider increase in morphine after full team huddle if:  
 • Continues with "Yes" to any ESC item or "3s" for "Soothing Support" AND  
 • Non-pharm care optimized to greatest extent AND  
 • Non-NAS causes excluded

To increase oral morphine dose:  
 • Give bolus dose of 0.02 mg/kg once and increase baseline dose by 0.02 mg/kg/dose (e.g., baseline dose = 0.04 mg/kg/dose; new dose = 0.06 mg/kg /dose). Recommended maximum dose = 0.12 mg/kg/dose every 3 hours.

Consider adding secondary agent (e.g., clonidine, phenobarbital) if "Yes" responses to ESC due to NAS AND non-pharm care optimized AND:  
 • morphine dose maximized OR  
 • unable to wean by day 7 of treatment OR  
 • concern for polysubstance withdrawal (particularly if benzodiazepine co-exposure)

**Morphine Weaning:** Consider weaning if primarily "No" responses for ESC while on same dose for 24 hours and non-pharm care optimized.  
 • Wean morphine maintenance dose by 10% of maximum dose.  
 • If initial wean tolerated, wean up to 20% of maintenance dose daily.  
 • Discontinue morphine when dose is less than or equal to:  
 a) 0.02 mg/kg/dose OR  
 b) dose no longer possible to measure for infant less than 2.5 kg  
 • Monitor for at least 24 hours off morphine before discharge home.

**Failed Weaning:** If after weaning or discontinuation of morphine, infant has persistent "Yes" responses to ESC due to NAS and non-pharm care optimized to greatest extent:  
 a) Restart last effective (or discontinuation) dose of morphine and maintain dose for minimum of 24 hours OR  
 • Attempt to hold current dose for up to 24 hours, particularly towards end of weaning process or after morphine discontinuation.



## Appendix F

### Permission to use Survey Questionnaire

#### Seeking permission to use survey instrument

Tilberg, Amber Deanne - SDSU Student

To: [xiaomei.cong@uconn.edu](mailto:xiaomei.cong@uconn.edu)

Hello Dr. Cong,

I am writing you to request permission to use the survey instruments utilized by your team in the published article *Neonatal Abstinence Syndrome: Exploring Nurses' Attitudes, Knowledge, and Practice*.

I am a DNP Neonatal Nurse Practitioner Student at South Dakota State University and I will be completing a DNP project this spring. I have chosen to implement an evidence-based quality improvement project using the Eat, Sleep, Console (ESC) method instead of current Finnegan methods. I would like to use the survey tools in your article in order to assess the NICU nurses response to the implementation of ESC, and if using another approach to management of NAS would improve nurse attitudes, knowledge, practice related to the care of infants with NAS in our NICU.

I do not plan to modify the survey tools.

I look forward to hearing from you. I am available by email or phone.

[amber.tilberg@jacks.sdsstate.edu](mailto:amber.tilberg@jacks.sdsstate.edu), 605.484.4992

Sincerely,

Amber D. Tilberg

NICU RN, Rapid City Regional Hospital

DNP NNP Candidate - SDSU Graduate College of Nursing

Dear Amber,

I am glad to know that you are interested in using our survey in your project. Please feel free to utilize the survey tool. I am looking forward to hearing your study results. Please let me know if you need further help.

Xiaomei

*Xiaomei Cong, PhD, RN, FAAN*

*Associate Professor*

*Director, Center for Advancement in Managing Pain (CAMP)*

*University of Connecticut School of Nursing*

*Tel: 860-486-2694*

<http://painresearch.uconn.edu/>

[www.nursing.uconn.edu](http://www.nursing.uconn.edu)

## APPENDIX G

### Survey Questionnaires

#### Eat, Sleep, Console - DNP Project

Hello:

You are invited to participate in this survey.

In this survey, approximately 60 NICU and Maternal Child Float Pool nurses will be asked to complete a survey that asks questions about the participants' knowledge regarding care of infants with NAS, attitudes regarding care of infants with NAS, and perceptions of care related to NAS. It will take approximately 10 minutes to complete the questionnaire.

Your participation in this study is completely voluntary. There are no foreseeable risks associated with this project. However, if you feel uncomfortable answering any questions, you can withdraw from the survey at any point. It is very important for us to learn your opinions. Completion of the survey is assumed consent to participate.

Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. Your information will be coded using only the first, third, and fifth digits of your employee ID badge number and will remain confidential. If you have questions at any time about the survey or the procedures, you may contact Amber Tilberg at 605-484-4992 or by email at amber.tilberg@jacks.sdbstate.edu.

Thank you very much for your time and support. Please start with the survey now by clicking on the **Next** button below.

In order to survey change, pre-education and post-education surveys will be paired.

For this purpose, please enter the first, third, and fifth numerical digit from your employee ID badge.

In order to survey change, pre-education and post-education surveys will be paired.

For this purpose, please enter the first, third, and fifth numerical digit from your employee ID badge.

How long have you worked as a NICU nurse or Maternal Child Float Pool nurse?

- 0-2 years
  - 2-4 years
  - 5-10 years
  - 11-20 years
  - 21+ years
- 

What is your highest level of education?

- Doctorate
  - Masters
  - Bachelors
  - Associates
- 

How many infants with NAS or suspected drug withdrawal have you cared for?

- None
  - 1 - 2
  - 3 - 5
  - 6 or more
- 

I feel that I have enough knowledge about NAS to provide adequate care for affected infants.



I know how to appropriately document the care I provide to an infant with NAS.



I have received adequate training on the use of assessment tools used to care for infants with NAS.

|                        |                       |                       |                       |                       |                           |
|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------------|
| Very Strongly<br>Agree | Strongly Agree        | Agree                 | Disagree              | Strongly<br>Disagree  | Very Strongly<br>Disagree |
| <input type="radio"/>  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>     |

I feel that I am knowledgeable enough about commonly used drugs in treating NAS to safely administer them.

|                        |                       |                       |                       |                       |                           |
|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------------|
| Very Strongly<br>Agree | Strongly Agree        | Agree                 | Disagree              | Strongly<br>Disagree  | Very Strongly<br>Disagree |
| <input type="radio"/>  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>     |

I feel that I have enough knowledge about addiction to appropriately deal with mothers of infants with NAS.

|                        |                       |                       |                       |                       |                           |
|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------------|
| Very Strongly<br>Agree | Strongly Agree        | Agree                 | Disagree              | Strongly<br>Disagree  | Very Strongly<br>Disagree |
| <input type="radio"/>  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>     |

I believe that infants with NAS should be cared for in a critical care environment such as a NICU.

|                        |                       |                       |                       |                       |                           |
|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------------|
| Very Strongly<br>Agree | Strongly Agree        | Agree                 | Disagree              | Strongly<br>Disagree  | Very Strongly<br>Disagree |
| <input type="radio"/>  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>     |

I frequently blame the mothers of an infant with NAS for the infant's health problems.

|                        |                       |                       |                       |                       |                           |
|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------------|
| Very Strongly<br>Agree | Strongly Agree        | Agree                 | Disagree              | Strongly<br>Disagree  | Very Strongly<br>Disagree |
| <input type="radio"/>  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>     |

I find dealing with mothers of infants with NAS to be stressful or upsetting.

|                        |                       |                       |                       |                       |                           |
|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------------|
| Very Strongly<br>Agree | Strongly Agree        | Agree                 | Disagree              | Strongly<br>Disagree  | Very Strongly<br>Disagree |
| <input type="radio"/>  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>     |

When interacting with a mother of an infant with NAS, I consider the potential circumstances surrounding her drug use.

| Very Strongly Agree   | Strongly Agree        | Agree                 | Disagree              | Strongly Disagree     | Very Strongly Disagree |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| <input type="radio"/>  |

I find it frustrating when the mother of an infant with NAS is infrequently present to provide care for her infant.

| Very Strongly Agree   | Strongly Agree        | Agree                 | Disagree              | Strongly Disagree     | Very Strongly Disagree |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| <input type="radio"/>  |

I believe that I am responsible for caring for the mother of an infant with NAS as well as the infant.

| Very Strongly Agree   | Strongly Agree        | Agree                 | Disagree              | Strongly Disagree     | Very Strongly Disagree |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| <input type="radio"/>  |

I frequently use nonpharmacological interventions when caring for a baby with NAS.

| Very Strongly Agree   | Strongly Agree        | Agree                 | Disagree              | Strongly Disagree     | Very Strongly Disagree |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| <input type="radio"/>  |

The score I assign to an infant with NAS is accurate and objective.

| Very Strongly Agree   | Strongly Agree        | Agree                 | Disagree              | Strongly Disagree     | Very Strongly Disagree |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| <input type="radio"/>  |

I advocate for mothers of infants with NAS to breastfeed their infants.

| Very Strongly Agree   | Strongly Agree        | Agree                 | Disagree              | Strongly Disagree     | Very Strongly Disagree |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| <input type="radio"/>  |

I believe my unit has developed adequate practice protocols in care for infants with NAS and their families.

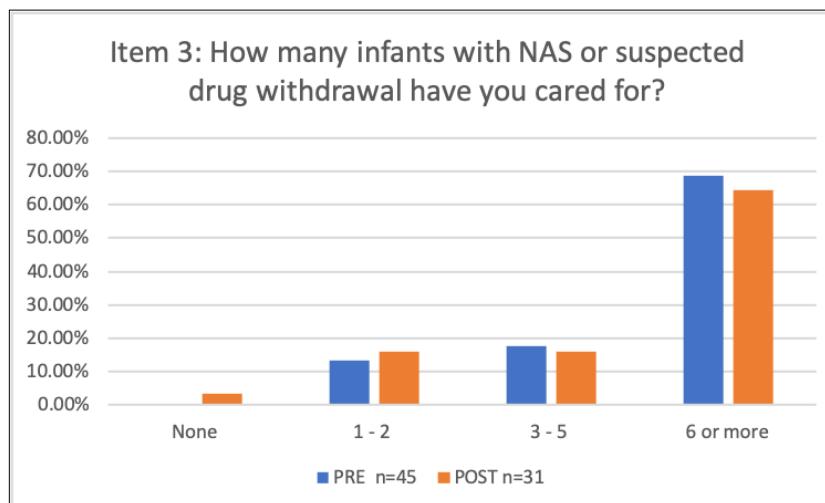
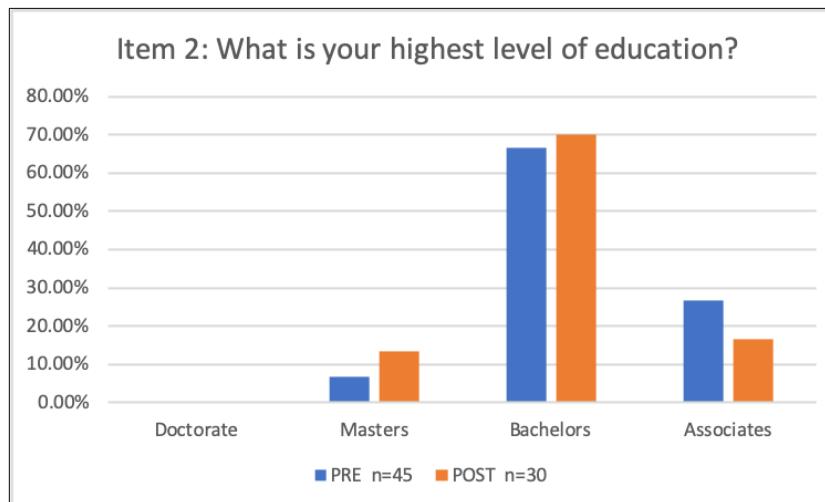
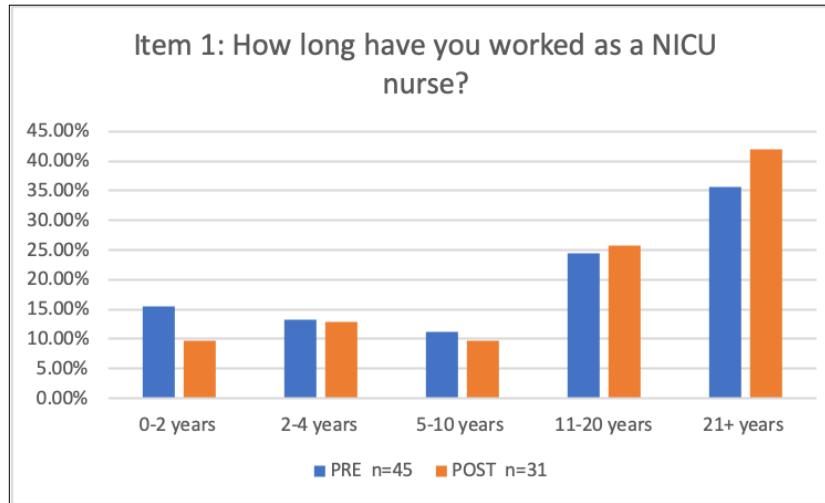
| Very Strongly Agree   | Strongly Agree        | Agree                 | Disagree              | Strongly Disagree     | Very Strongly Disagree |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| <input type="radio"/>  |

I feel that my unit has created an appropriate environment/facility to care for infants with NAS and families.

| Very Strongly Agree   | Strongly Agree        | Agree                 | Disagree              | Strongly Disagree     | Very Strongly Disagree |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| <input type="radio"/>  |

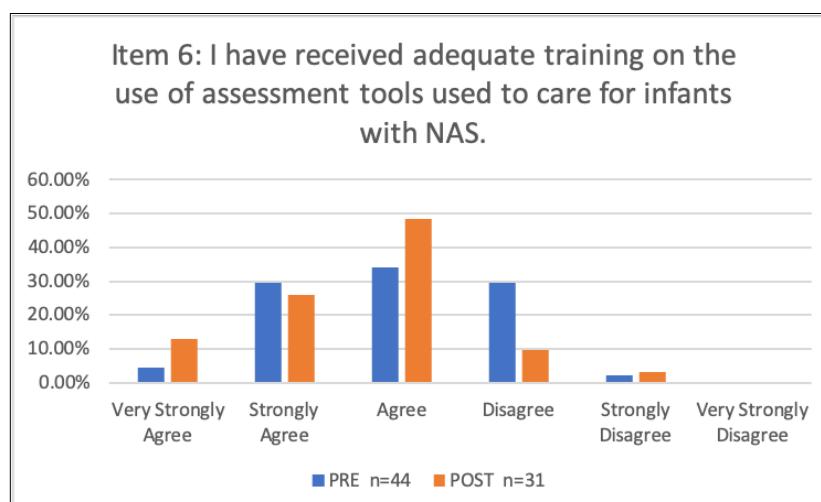
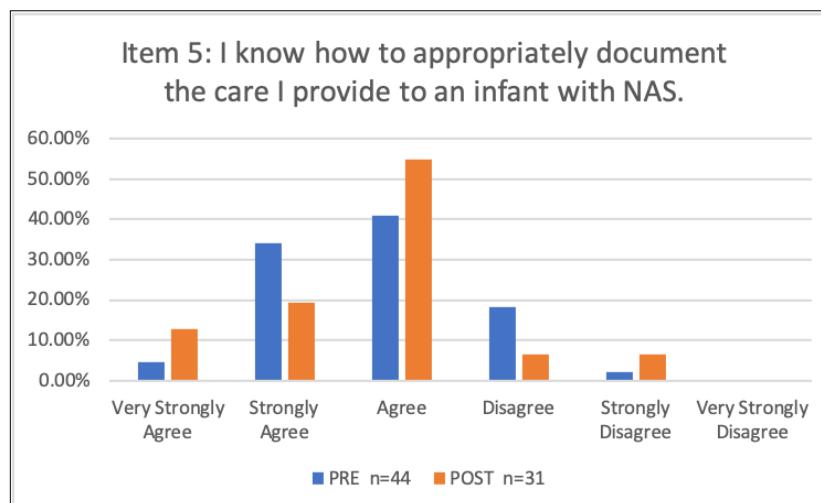
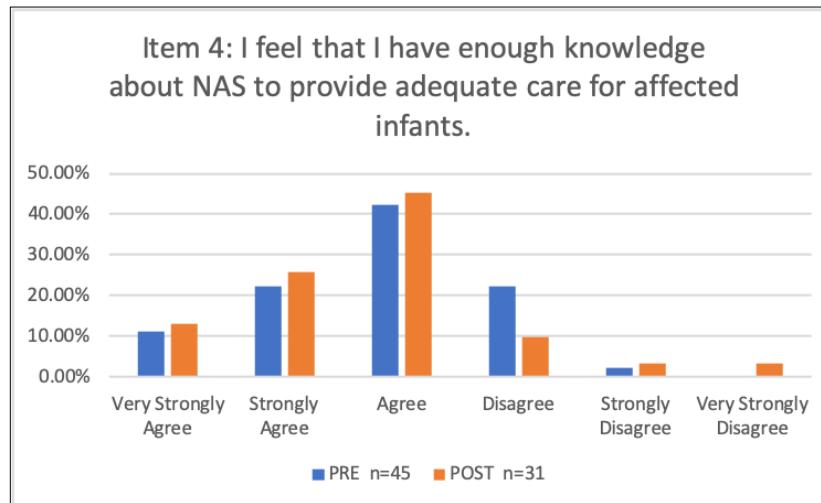
## APPENDIX H

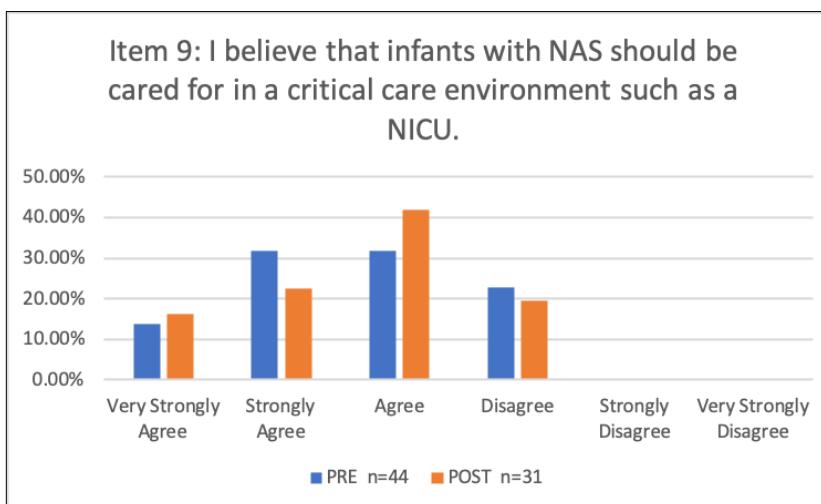
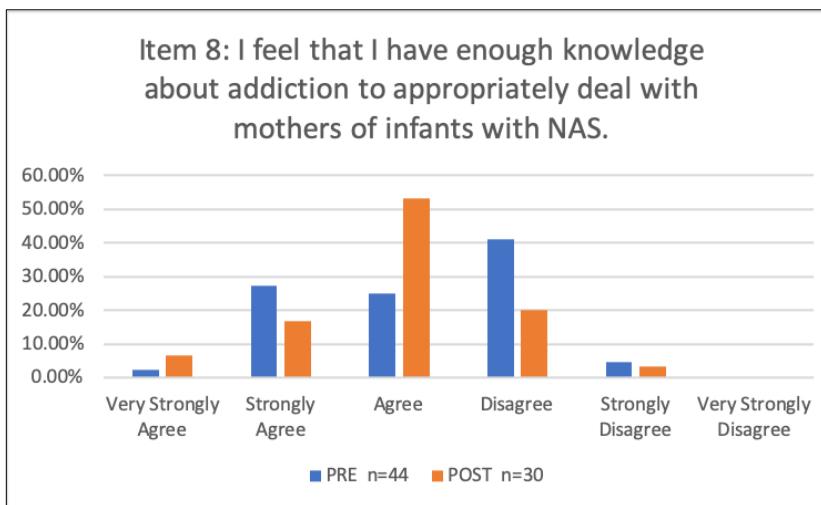
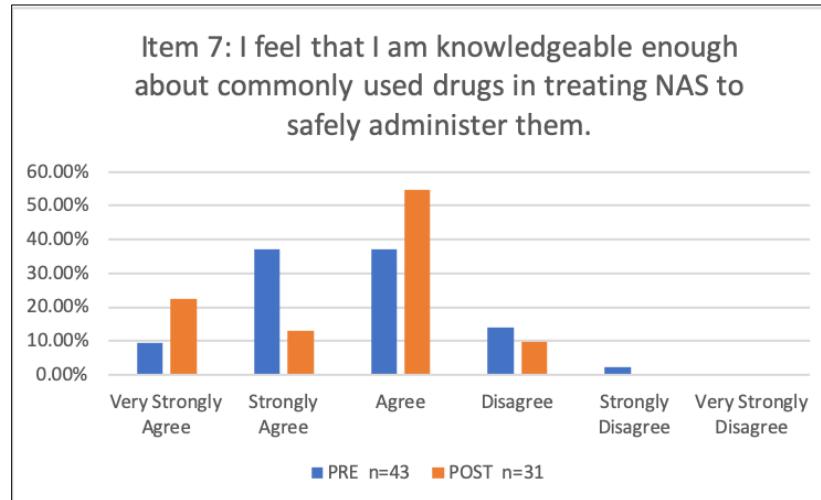
### DEMOGRAPHIC DATA

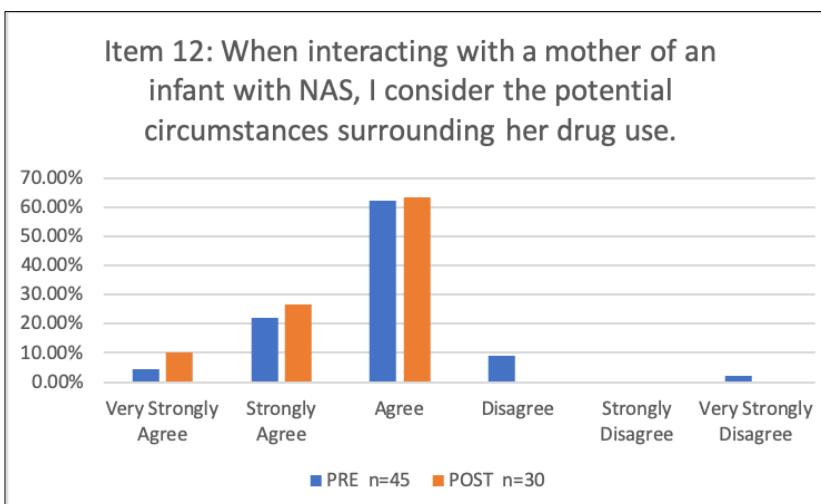
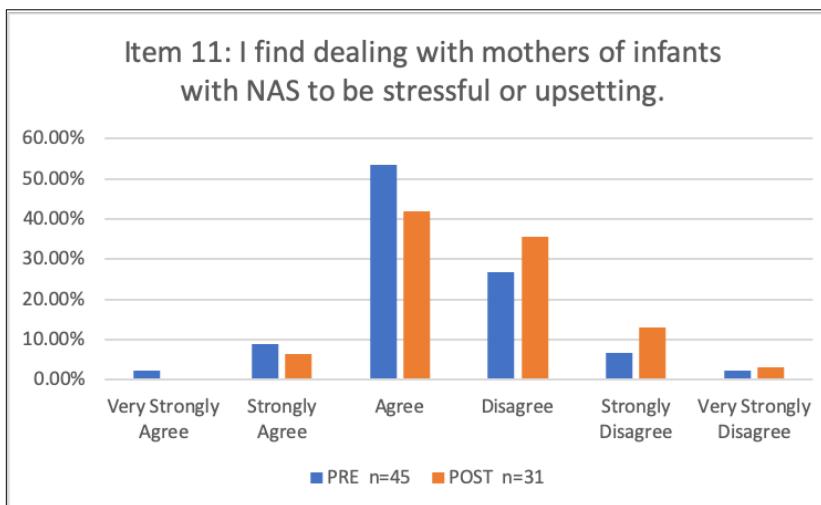
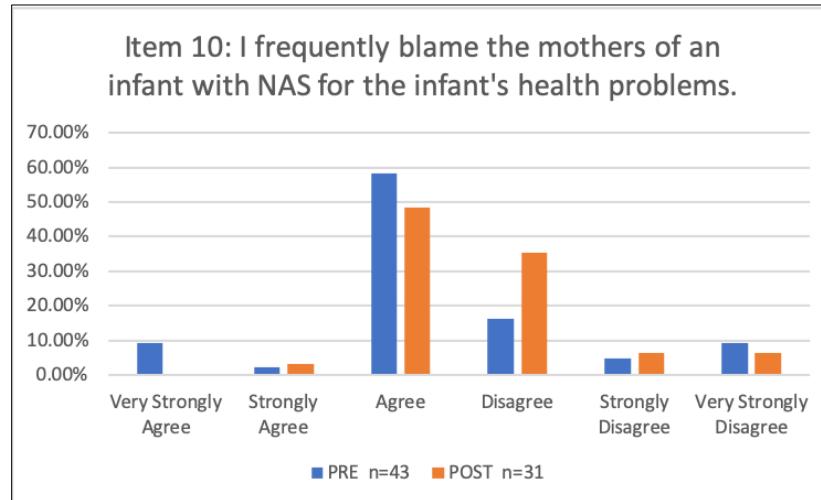


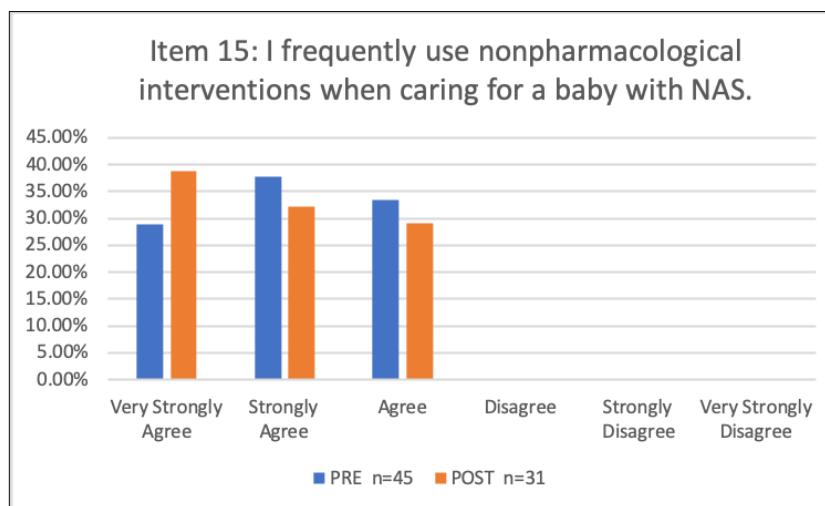
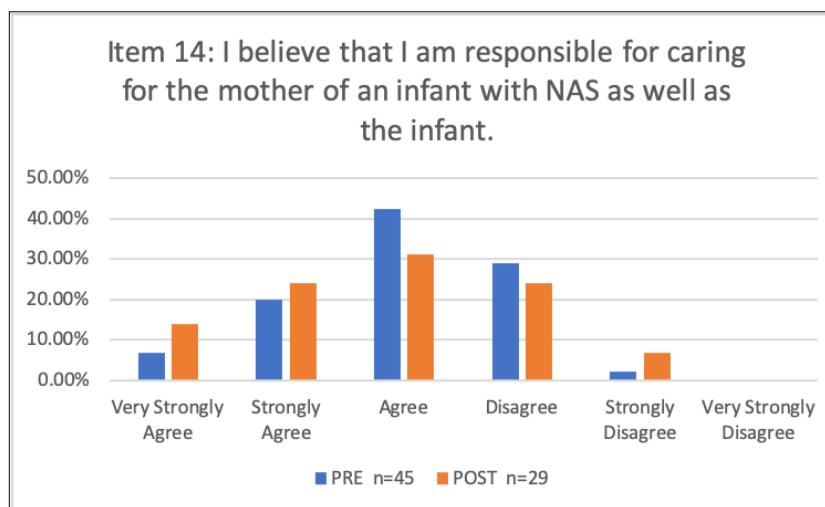
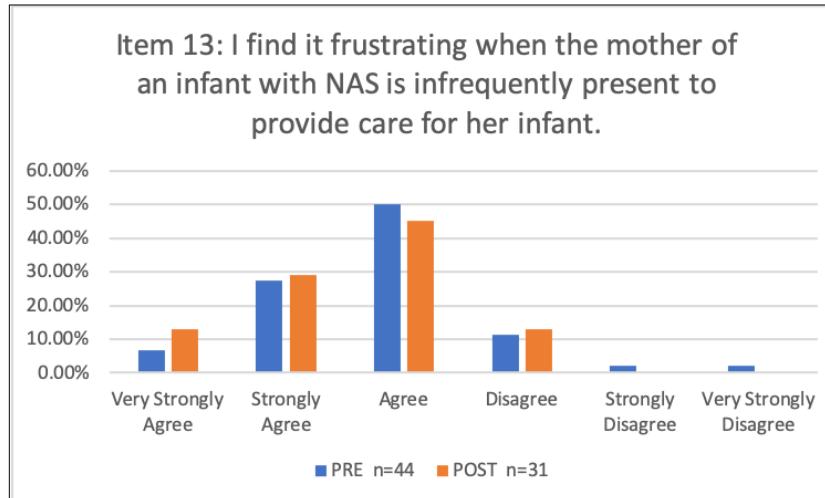
## APPENDIX I

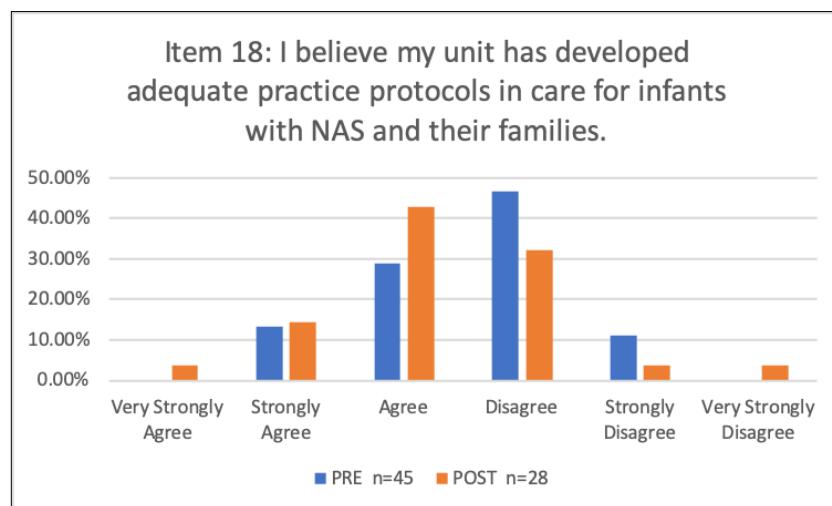
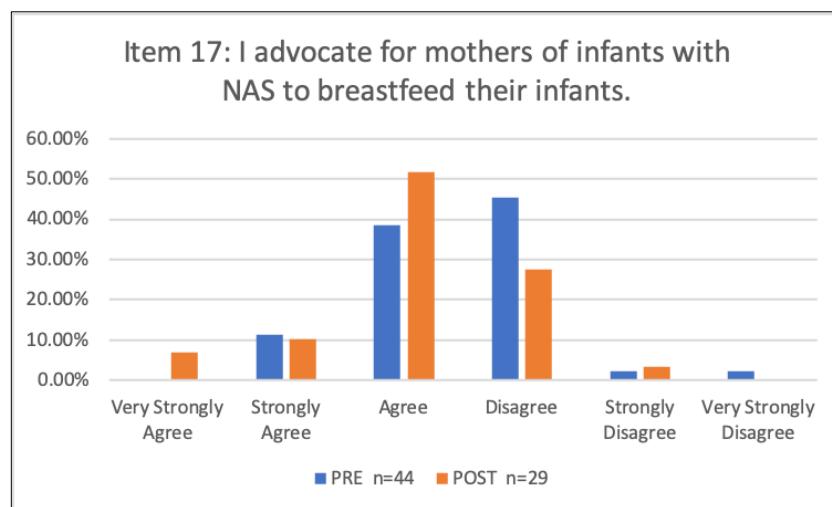
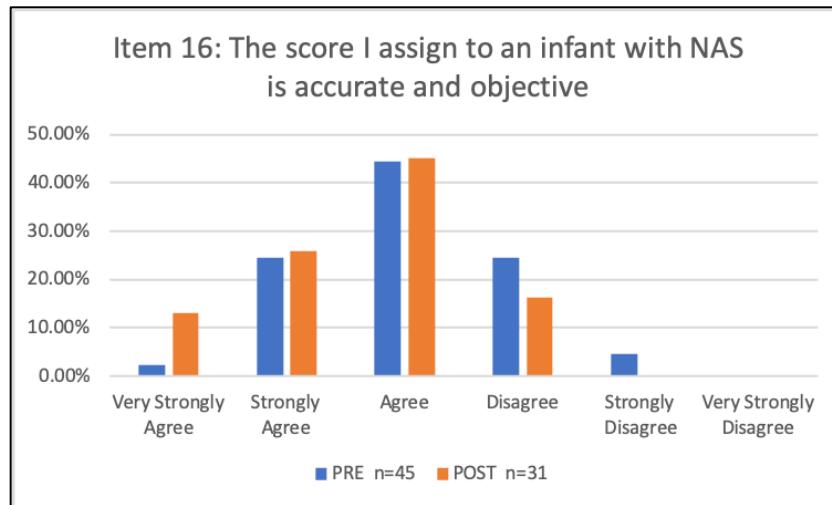
### PRE- AND POST-ESC SURVEY DATA

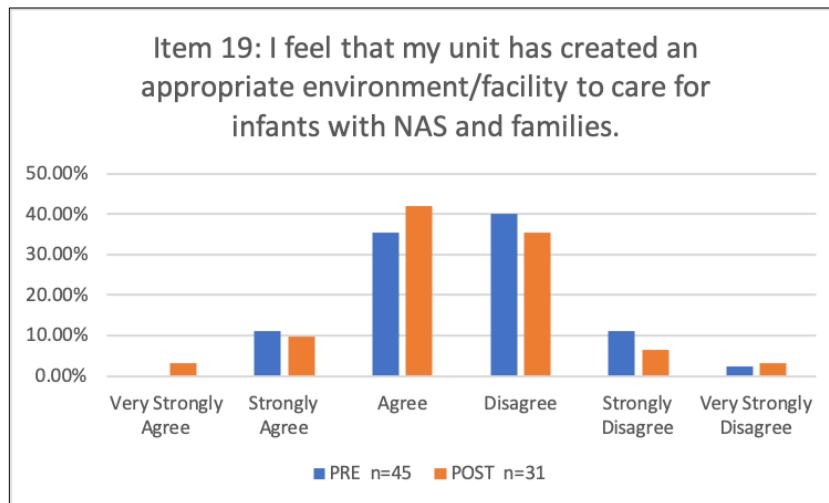












## APPENDIX J

Table 2.

*Paired pre- and post-ESC implementation survey data with Wilcoxon signed-rank test*

| Item |      | n | Percentiles |      |      | Z      | p value      |
|------|------|---|-------------|------|------|--------|--------------|
|      |      |   | 25th        | 50th | 75th |        |              |
| 4    | Pre  | 8 | 3.00        | 3.00 | 4.00 | -2.271 | <b>0.023</b> |
|      | Post | 8 | 1.00        | 2.00 | 2.75 |        |              |
| 5    | Pre  | 8 | 2.25        | 3.00 | 3.75 | -2.121 | <b>0.034</b> |
|      | Post | 8 | 1.25        | 2.00 | 3.00 |        |              |
| 6    | Pre  | 8 | 2.25        | 3.50 | 4.00 | -2.165 | <b>0.030</b> |
|      | Post | 8 | 1.25        | 2.00 | 2.75 |        |              |
| 7    | Pre  | 8 | 3.00        | 3.00 | 3.00 | -1.633 | 0.102        |
|      | Post | 8 | 1.00        | 3.00 | 3.00 |        |              |
| 8    | Pre  | 7 | 3.00        | 4.00 | 4.00 | -1.890 | 0.059        |
|      | Post | 8 | 2.00        | 3.00 | 3.00 |        |              |
| 9    | Pre  | 8 | 2.25        | 3.00 | 3.75 | 0.000  | 1.000        |
|      | Post | 8 | 2.25        | 3.00 | 3.75 |        |              |
| 10   | Pre  | 8 | 3.00        | 3.00 | 3.00 | -2.000 | <b>0.046</b> |
|      | Post | 8 | 3.00        | 3.50 | 4.00 |        |              |
| 11   | Pre  | 8 | 3.00        | 3.00 | 4.00 | -0.707 | 0.480        |
|      | Post | 8 | 3.00        | 4.00 | 4.00 |        |              |
| 12   | Pre  | 8 | 2.00        | 3.00 | 3.75 | -1.633 | 0.102        |
|      | Post | 7 | 2.00        | 3.00 | 3.00 |        |              |
| 13   | Pre  | 8 | 2.00        | 3.00 | 3.75 | -0.577 | 0.564        |
|      | Post | 8 | 2.25        | 3.00 | 3.00 |        |              |
| 14   | Pre  | 8 | 3.00        | 4.00 | 4.00 | -1.857 | 0.063        |
|      | Post | 7 | 1.00        | 3.00 | 4.00 |        |              |
| 15   | Pre  | 8 | 1.00        | 1.50 | 2.00 | 0.000  | 1.000        |
|      | Post | 8 | 1.00        | 1.00 | 2.75 |        |              |
| 16   | Pre  | 8 | 2.25        | 4.00 | 4.75 | -2.060 | <b>0.039</b> |
|      | Post | 8 | 1.25        | 2.50 | 3.75 |        |              |
| 17   | Pre  | 8 | 3.00        | 4.00 | 4.75 | -1.667 | 0.096        |
|      | Post | 8 | 2.25        | 3.50 | 4.00 |        |              |
| 18   | Pre  | 8 | 3.25        | 4.00 | 5.00 | -1.414 | 0.157        |
|      | Post | 7 | 3.00        | 3.00 | 4.00 |        |              |
| 19   | Pre  | 8 | 3.25        | 4.00 | 5.00 | -1.897 | 0.058        |
|      | Post | 8 | 2.25        | 3.00 | 4.00 |        |              |

*Note.* Statistically significant p values (two-tailed) are bolded.

## APPENDIX K

### COLLECTED QUALITATIVE DATA

Table 3.

Collected qualitative data

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Please enter comments about what you LIKE about ESC?

“I like the concept, don't know if it is possible with the way our unit is staffed. It is very disheartening having to listen to the infant screaming while you are taking care of others.”

“It is designed to bring the mother in to help care for her infant and improve bonding. It is less dependent on using medication as treatment.”

“Hopefully much shorter length of stay and hopefully promote better bonding with the birth parents.”

“I like that it gives all things needed and or used to help the infant cope with symptoms.”

“Not based on a subjective number.”

“That it includes the family/mother.”

“Used to always having a number added up for you for a score. As long as the Infant gets what he or she needs is all that matters.”

“I still don't like using the Finnegan and feel it is very subjective. I wish there was another tool to use if we were to incorporate 2 different ones. Eat sleep console seems more straightforward? I don't have enough experience with it yet to be able to really evaluate it since I haven't used it yet.”

“Was not involved in the care of an NAS infant during this period. Unsure if providers utilized the protocols. The theory is solid and Finnegan scores for things normal infants do and medicates based on a number not how able to console infant through other means.”

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Table 4.

Collected qualitative data

Please enter comments about what you DISLIKE about ESC?

“I dislike that it doesn't go over the symptoms of NAS. Sometimes its infrequent that we get these children and it's a good reminder what to watch for.”

“When you are assigned 2 other patients it is still frustrating to give them the acute attention they need. it would be super if they had their own quiet space without admits going on and bright lights and noise!”

“Unable to utilize prior to feeding, disrupts the treatment plan by providers using Finnegan at start.”

“If the mother is not here to care for her baby it sometimes needs to be a one on one assignment because the nurse will not be able to leave the bedside long enough to care for other babies.”

“But there are often instances where the mother can't be here.

“Not knowledgeable enough about drugs and how they present in breast milk to be teaching mothers about BF, especially if they are still using the drugs.”

“It's hard to console an infant when the mother is often not present, and the nurse doesn't not have time (busy with other infants). MOBs need to be present to care for their babes.”

“Does not work very well for premature infants.”

“Finnegan scoring seems to be more tangible because that is what we are used to, but I'm afraid we will just stick to what we know.”

“That we had great education on it but it was at least a couple months before we were able to use it and unsure how to use it. May need a small re-education.”

“Need more education, a handout on this we can look at as we don't care for them often. Maybe a care team of nurses that are trained to take care of these babies.”

“That some people didn't use it.”

“Harder for new staff to pin down what withdrawal looks like without scoring symptoms.”

“It seems to be geared toward parents who room in - our facility isn't well set up to accommodate/monitor parents who are rooming in long term, and our parents are not typically the ones who will commit to/are capable of long-term rooming in with their NAS infants. I think that, so far, the physicians, NNPs, and nurses are not on the same page with the ESC model.”

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