EATING, SLEEPING, CONSOLING (ESC) NEONATAL ABSTINENCE SYNDROME (NAS) CARE TOOL

Instructional Manual

1st Edition

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AT DARTMOUTH

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Audience

Health care professionals (nurses, licensed nursing assistants, nurse practitioners, physicians, physician assistants, occupational and physical therapists, researchers, medical and nursing students) who assess and care for substance-exposed newborns (SENs) with neonatal abstinence syndrome (NAS) due to prenatal opioid exposure.

Objectives

After completion of this training program, health care professionals will be able to:

1) Assess the ability of a substance-exposed newborn to effectively eat, sleep, and console
2) Implement a step-wise approach to assessing infant consolability
3) Understand the purpose and indications of a team huddle for NAS management
4) Achieve high reliability with use of the ESC Care Tool

Description of the Program and Website Link

In this program, you will: 1) Review this instructional manual, 2) Review the ESC Care Tool with Definitions (***Appendix A***) and Newborn Care Diary (***Appendix B***), and 3) Watch an instructional video on the ESC Care Tool, review the case examples and then perform the quiz using ***Appendix A.*** We recommend that you complete the program in this order.

An internet-based copy of these ESC training materials and an instructional video will be available soon.

Neonatal Abstinence Syndrome

Neonatal Abstinence Syndrome (NAS) secondary to in-utero opioid exposure has increased 5-fold in the United States between 2000 and 2012 and now affects 5 per 1000 live births nationally.[1-2] NAS typically refers to an opioid withdrawal syndrome characterized by behavioral dysregulation that occurs within 2-3 days of birth for infants exposed chronically to opioids in-utero.[3] Signs and symptoms include altered sleep, high muscle tone, tremors, irritability, poor feeding, vomiting and diarrhea, sweating, tachypnea, fevers, and other autonomic nervous system disturbances.[3] All opioids can cause withdrawal symptoms, including methadone, buprenorphine (Subutex, Suboxone), and short-acting agents such as oxycodone, heroin, and fentanyl, but the severity of these symptoms vary greatly. All infants should be treated first with non-pharmacologic (non-pharm) care. Some infants may also receive replacement opioids. All opioid-exposed infants should be monitored in the hospital for 4-7 days for signs of withdrawal that may require pharmacologic treatment according to the American Academy of Pediatrics.[3] Without medication, symptoms typically resolve within 1-2 weeks. Withdrawal can also occur after in-utero exposure to non-opioid agents such as benzodiazepines, selective serotonin reuptake inhibitors (SSRIs), and nicotine. Prenatal exposure to cocaine can also cause infant symptoms of neurologic dysregulation.[4] The ESC Care Tool may be used to assess these infants, however pharmacologic treatment with replacement opioids for these substances in the absence of opioid exposure is not recommended.

ESC Rationale and Development

The most commonly used NAS assessment tool in the U.S., often modified by individual institutions, is called the Neonatal Abstinence Syndrome Score (NASS).[5-6] This tool, more commonly referred to as the Finnegan Scale, was developed in 1974. It contains a catalog of the most common neonatal opioid withdrawal symptoms with points assigned for each item based on its perceived severity. The Finnegan scale, or various modified versions of it, had an established inter-rater reliability coefficient of 0.82 when it was initially developed.[5] Typically, Finnegan scores consecutively $\geq$8 are used to initiate and titrate medication treatment. However, the rationale for using a score of 8 for medication initiation and titration has never been scientifically established or validated.

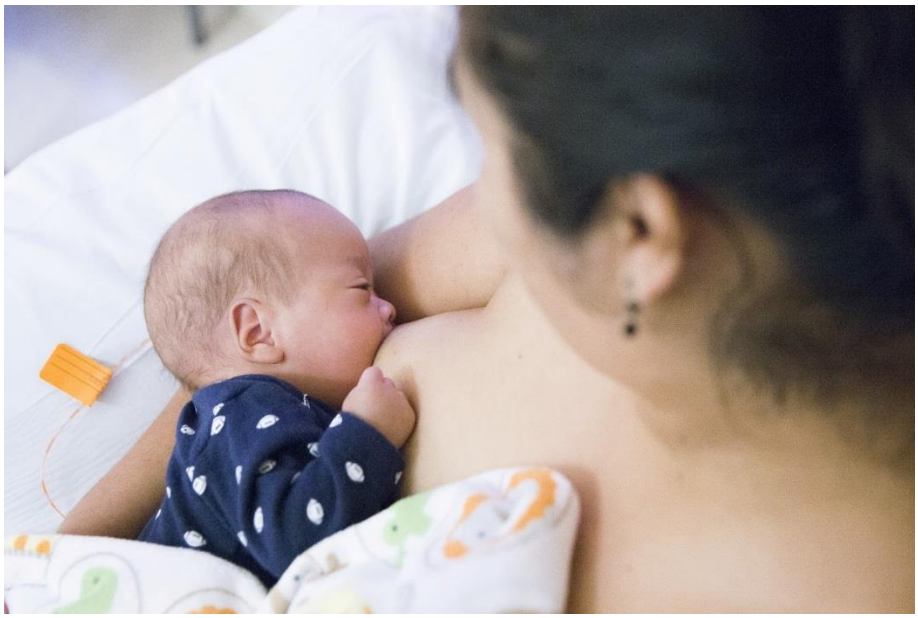
Recent studies have questioned the validity of the Finnegan score and have demonstrated that it has poor psychometric properties.[7] Newer research suggests that medication should not be titrated based on Finnegan score, but rather should be based on function-based assessments focused on how well the infant is eating, sleeping, and how comfortable the infant is.[8-10] Data suggests that using a function-based assessment tool could result in reduced medication treatment rates and improved outcomes.[9-10] While we believe the infant should still continue to be assessed for significant signs and symptoms of opioid withdrawal, the ESC method's sole principle is that the treatment of the infant (both non-pharm and pharmacologic treatment) should be based on infant function and comfort, rather than reducing signs and symptoms of withdrawal. The ESC Care Tool only documents items key to the functioning of the infant – specifically, the infant's ability to eat effectively, sleep, and be consoled within a reasonable amount of time. This method of assessing infants with NAS was developed by a collaborative effort between faculty at Yale, Children's Hospital at Dartmouth-Hitchcock, and Boston Medical Center.

Timing and Location of ESC Assessments

ESC care assessments should be performed every 3-4 hours at the time of other routine infant care, such as with feedings and vital signs. Assessments should be initiated within 4-6 hours of birth, and should continue for 4-7 days for infants exposed to long-acting opioids[3] (e.g., buprenorphine, methadone), and for a minimum of 48 hours for shorter acting opioids (e.g., oxycodone, codeine). For pharmacologically treated infants, ESC assessments should continue for 24-48 hours after stopping opioid replacement medications. Assessments should reflect the entire 3-4 hour interval since the last ESC assessment, and should incorporate input from all infant caregivers (mother/other parent, nurse, cuddler) who interacted with the infant during this time period. Infants should be assessed in their own room and do not need to be removed from their mother (or other parent/caregiver) if being held. We recommend that parents use the **Newborn Care Diary** to keep track of their infant's ESC behaviors and for staff to incorporate these observations into the ESC assessment. ESC assessments should be documented on the ESC flowsheet in the paper or electronic medical record.

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?"***

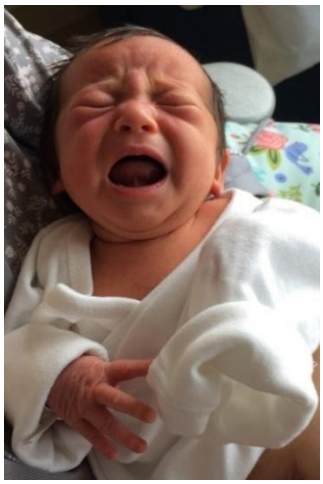
Normal sleep patterns for gestational and postnatal age should be taken into account. Sleep < 1 hour may be normal in the first few days after birth, particularly in breastfed infants who are cluster feeding (i.e., feeding frequently in a short period of time).

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.

<u>Consoling Support Interventions (CSIs)</u>

Providers should perform these consoling support interventions in the following order to assess the level of support required for the infant to console. Parents and other caregivers are not expected to follow a specific order when consoling their infant. This approach was adapted from the Newborn Behavioral Observations (NBO), Nugent *et al*.[11]

1) **Caregiver/provider begins by softly and slowly talking to the infant, using his/her voice to calm the baby.**

2) Caregiver/provider looks for hand to mouth movements and facilitates as needed by gently bringing the baby's uncovered hand to his/her mouth. Watch for signs of consoling (eye opening, stilling, calming, slowed breathing).

3) Caregiver/provider continues talking to infant while placing hand firmly but gently on baby's abdomen.

4) Caregiver/provider continues softly talking to baby while bringing baby's arms and legs to the center of body.

5) Caregiver/provider picks up infant, holds skin-to-skin or swaddled in blanket, and gently rocks or sways infant.

6) Caregiver/provider offers a finger or pacifier for infant to suck, or a feeding if infant showing hunger cues.

SOOTHING SUPPORT USED TO CONSOLE INFANT

Providers are asked to rate the consolabilty of the infant on a scale of 1 to 3.

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

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.[12] 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.

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.[6,9-10,12-13] 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.[9-10] Most studies report initiating pharmacologic therapy at a rate of 50-80% when using a numerical, score based-approach.[1,3,6]

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.[3,14] A recent clinical trial also suggests that buprenorphine is acceptable as a first-line agent.[15] 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.[3]

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

Use in Preterm Infants

For premature infants, the sleep and consoling items of the ESC Care Tool can still be used without modification. Given the feeding immaturity of premature infants, gestational and postnatal age-expected feeding patterns should be used as a baseline. If infant feeding ability and tolerance is significantly worse than expected for gestational age and felt due to NAS, or possibly due to NAS, indicate "Yes" for "Poor eating due to NAS".

Inter-rater Reliability

We recommend that sites perform regular inter-rater reliability checks (checking the reliability of ESC responses between two providers) when using this tool. We recommend using the **Eating, Sleeping, Consoling** (with **Soothing Support Used to Console Infant**), and **Team Huddle** items of the tool **for inter-rater reliability checks** (total of 5 items). This means that one provider will perform the ESC assessment while a second provider simultaneously performs an independent assessment while directly observing the patient encounter. You will then determine percent agreement between ESC items, with a goal of a **minimum of 80% in agreement**.[16] "Gold star" nurses should be identified at your institution who consistently demonstrate **100% inter-rater reliability** and can serve as a second nurse to assess the reliability of other providers on the unit on a regular basis. The ESC IRR Tool in ***Appendix C*** can be used to perform inter-rater reliability checks.

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YALE-NEW HAVEN CHILDREN'S HOSPITAL

BOSTON MEDICAL CENTER PEDIATRICS

CHaD Dartmouth-Hitchcock CHILDREN'S HOSPITAL AT DARTMOUTH

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				
EATING				
Poor eating due to NAS? Yes / No				
SLEEPING				
Sleep < 1 hr due to NAS? Yes / No				
CONSOLING				
Unable to console within 10 min due to NAS? Yes / No				
Soothing support used to console infant: Soothes with little support: 1 Soothes with some support: 2 Soothes with much support or does not soothe in 10 min: 3				
PARENTAL / CAREGIVER PRESENCE				
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				
MANAGEMENT DECISION				
Recommend a Team Huddle? Yes / No				
Management decision: Optimize non-pharm care: 1 Initiate medication treatment: 2 Other (please describe):				
NON-PHARM INTERVENTIONS				
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				

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.

Appendix B

Newborn Care Diary

Baby's Name: _____ Baby's Med Record #:_____ Date: _____

Time of baby's feeding (start to finish)	Breast feeding (total # minutes)	Bottle feeding (total # mL)	Time when baby fell asleep	Time when baby woke up	Did baby feed well? (If no, please describe)	Did baby sleep for an hour or more? (If no, please describe)	Did baby console in 10 min? (If no, please describe)	Check box for pee	Check box for poop (please describe)	Extra Comments / Care Provided
example *12:15 pm-12:40 pm*	*L – 15 min R – 10 min*		*10:00 am*	*12:00 pm*	*No*	*No*	*Woke hungry, hard to console until able to get latched on*	√	√	*Last feed was 4 hr ago - will do skin-to-skin time & offer feed sooner next time*
	L - R -	mL								
	L - R -	mL								
	L - R -	mL								
	L - R -	mL								
	L - R -	mL								
	L - R -	mL								
	L - R -	mL								
	L - R -	mL								
	L - R -	mL								

Appendix C

EATING, SLEEPING, CONSOLING (ESC) IRR 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.

DATE/TIME:	**RN**	**"Gold Star" Rater**
EATING		
Poor eating due to NAS? Yes / No		
SLEEPING		
Sleep < 1 hr due to NAS? Yes / No		
CONSOLING		
Unable to console within 10 min due to NAS? Yes / No		
Soothing support used to console infant: Soothes with little support: 1 Soothes with some support: 2 Soothes with much support or does not soothe in 10 min: 3		
MANAGEMENT DECISION		
Recommend a Team Huddle? Yes / No		
RELIABLITY PERCENTAGE	**%**	

Determining Inter-rater Reliability Percentage: Calculate the percent agreement between the RN and the Gold Star rater on the 5 items above. For example, if 5 out of the 5 items are in agreement = 100% reliability, and if 4 out of the 5 items are in agreement = 80% reliability.

*Hospitals may also use additional items from the full ESC Care Tool (**Appendix A**) to determine IRR, if desired.*

Appendix D

Sample ESC-based Pharmacologic Treatment Regimens

Boston Medical Center NAS Pharmacologic Treatment Algorithm

- Begin **ESC assessments** within **4 hours** of birth. Infants may be assessed on the mother skin-to-skin.
- Infants should be assessed every **3-4 hours** with routine feeds / cares.
- **NAS Bundle of Care:** Encourage breastfeeding (if eligible), skin-to-skin with parents, parental presence at the bedside, feeding on demand, swaddling, decreased noise and light stimulation

Consider initiation of Level 1 Neonatal Methadone 1mg/ml oral solution after a team huddle if:

- Infant with **any 1 "Yes"** responses to ESC: 1) **E** = Poor feeding due to NAS, 2) **S** = Sleep < 1 hour due to NAS, OR 3) C = Console (Unable to Console within 10 minutes) AND:
- Non-pharmacologic care has been optimized first
- Evaluated for non-NAS causes of symptoms

Level	Starting dose of Neonatal Methadone 1mg/ml oral solution
1	**0.2 mg/kg/day** PO divided q8 hours = 0.067 mg/kg/dose
2	**0.4 mg/kg/day** PO divided q8 hours = 0.133 mg/kg/dose
3	**0.6 mg/kg/day** PO divided q8 hours = 0.200 mg/kg/dose
4	**0.8 mg/kg/day** PO divided q8 hours = 0.267 mg/kg/dose

Increase oral methadone to next level if:

- Continues to have **"Yes"** to **ESC** due to NAS despite optimal non-pharmacologic care
- Methadone can be increased **1 time per day** (q16 hours)

Consider adding a secondary agent if:

- Level 4 methadone and persistent **ESC** "Yes" due to NAS, OR
- Stalled weaning for 2-3 days particularly with polypharmacy, after first attempting methadone re-stabilization.

Consider **weaning** if: **ESC** scores primarily **"No"** while being maintained on the same dose for 24 hours.

Methadone Weaning:

- Wean by **10%** of maximum dose in **mg/kg/day** once daily as tolerated.
- **Discontinue** methadone when dose is **20%** of maximum dose.
- For **Level 4**, consider weaning down to **10%** of maximum dose.
- Infants should be monitored for **48 hours** off methadone before discharge home.
- Wean methadone before weaning secondary agents

Failed Weans:
If after a wean, persistent **ESC** "Yes" due to NAS, then:
Option 1: Consider **increasing methadone dose** by 10%.
Option 2: Attempt to **hold current dose** for up to 24 hrs, particularly towards the end of the weaning process.
Option 3: If on "off dose" of 20%, consider weaning down to **10%** of max dose.
Option 4: Consider **adding secondary agent** if <50% through wean.

- Use **Phenobarbital** if polypharmacy, benzodiazepine, or illicit drug exposed:
  * 20mg/kg initial load, followed by 5mg/kg/day maintenance
  * Wean by 20% weekly
- Use **Clonidine** if SSRI and/or opioid only exposed:
  * 1 mcg/kg PO q4 hours
  * Wean by extending the dosing interval from q4hr to q8hr to q12hr, then off

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- 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.