

# Betsy Knappen, MSN, APRN, NNP-BC

Betsy Knappen is a Neonatal Nurse Practitioner at Children's Mercy Hospital. Betsy has been actively involved in developing Advent Health Shawnee Mission's Family Centered approach to treating infants with Neonatal Abstinence Syndrome. She served as Kansas State Perinatal Quality Collaborative Educator and QI Coordinator for the NAS Initiative working with 33 Birthing Centers to improve care for infants effected by NAS.



# “Eat, Sleep, Console” Model of Care, is it Best for You?

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# Research has proven that use of the Eat, Sleep, Console Care Tool decreases pharmacologic treatment in Neonatal Opioid Withdrawal

- A. True
- B. False

# What is ESC

- Eat, Sleep, Console Model is a comprehensive nonpharmacologic approach that assesses an infant's function on 3 key aspects:
  - Can the infant eat?
  - Can the infant sleep?
  - Can the infant console?

# What is ESC?

- NAS/NOWS Model of Care incorporates ESC behaviors with non-pharmacologic care interventions (NPI), clustering of care with staff and parent/care giver assessments
- Each assessment provides opportunity to reinforce NPI
  - **Affirms NPI are in place**
  - Provides avenue to educate on NPIs that need to be increased
- Pharmacologic treatment is initiated only when an infant is unable to eat, sleep console due to symptoms of NOWS after NPIs are maximized to full extend or other significant NOWS concerns present

# Quality Improvement Results

- Yale New Haven Children's Hospital (YNHCH) originally developed ESC as part of a multiple intervention QI initiative
  - Standardized nonpharmacologic care
  - Prenatal counseling of parents
  - Transfer of care of well-baby nursery to inpatient unit
  - Development of ESC
  - Rapid morphine weans
  - PRN morphine treatment
  - Parent caregiver focus
  - No direct admit to the NICU

# Quality Improvement Results

- YNCHC results:

LOS ↓ from 22.5 days to 5.9 days

Grossman M, Berkwitt A, Osborn Ret al., et al. An initiative to improve the quality of care of infants with neonatal abstinence syndrome. *Pediatrics*. 2017;139(6):e20163360.

# Quality Improvement Results

- ESC Care Tool was formally and iteratively improved through QI work of the Northern New England Perinatal Improvement Network (NNEPQIN) and the Massachusetts Perinatal-Neonatal Quality Improvement Network (MA PNQIN)
  - Standardize ESC assessments
  - Promote Parental presence and family engagement in care
  - Prioritize optimal nonpharmacologic care as first line therapy
  - Encourage pharmacologic tx if unable to eat, sleep, console once NPI maximized to full extend or other significant NOWS concerns present



# Quality Improvement Results

- MA PNQIN's collaborative initiated tool training workshops, 29 of 37 hospitals participated, 11 fully implemented ESC and submitted outcome data.
  - Centers involved also worked on other NOWS improvement actions
    - Breast feeding guidelines
    - Implementation of rooming in
    - Revised nonpharmacologic care bundles
    - Changes in medication protocols
    - Improved prenatal education
    - Peer recovery coach programs
    - Staff trauma informed care

# Quality Improvement Results

- MA PNQIN's collaborative results

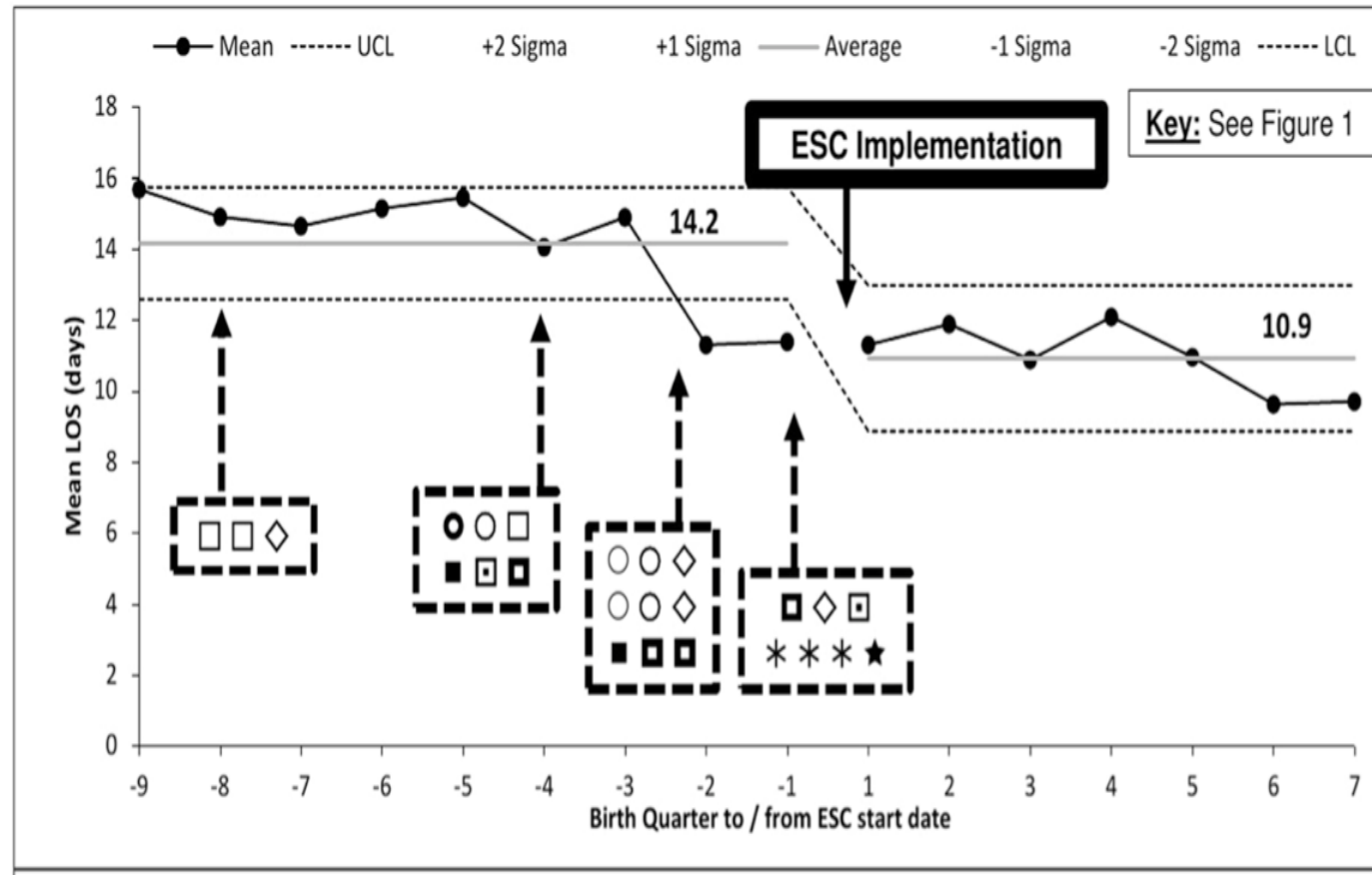
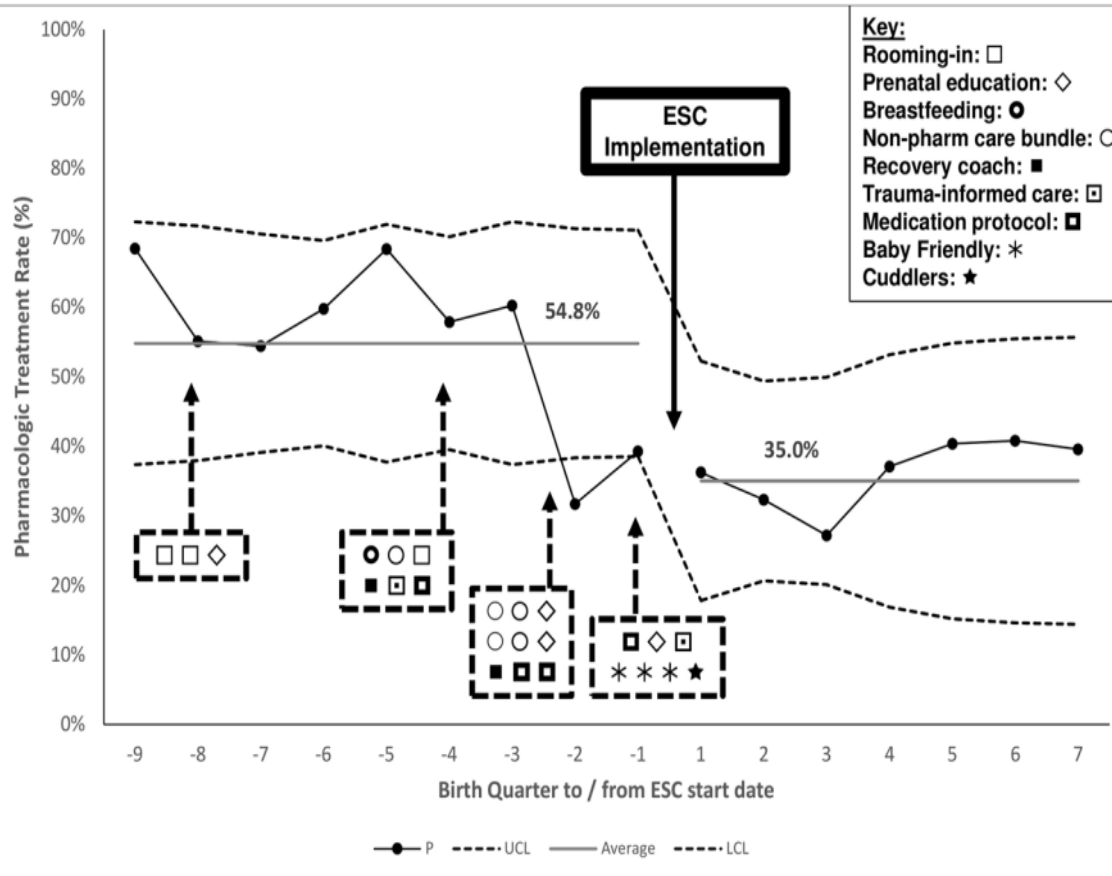
↓ Pharmacotherapy from 54.8% to 35%

↓ LOS from 14.2 days to 10.9 days

*The study noted LOS and pharmacologic treatment decreased an average 6 months prior to the implementation of the ESC tool.*

*Centers had reported making changes to prenatal education, rooming in, breast feeding and nonpharmacologic bundles in those months leading up to the transition to the ESC tool transition*

# Quality Improvement Results



Wachman EM, Houghton M, Melvin P, et al. A quality improvement initiative to implement the eat, sleep, console neonatal opioid withdrawal syndrome care tool in Massachusetts' PNQIN collaborative. *J Perinatol.* 2020;40(10):1560-1569.

# NNEPQIN Collaborative

- Currently involved in multiple center quality improvement initiative
- Data is almost complete with publication in near future

# ACT NOW Study

- Research study involving 30 sites
  - Compared Center's baseline NOWS care program utilizing the Finnegan or modification of Finnegan results to results post transition to ESC program
  - Results are average of all Center's data
    - Doesn't look at individual Center's results
  - Infants enrolled will be followed developmentally for 2 years post study
- Primarily study results
  - Transition to ESC decreased opioid treatment by 32.6%
  - Transition to ESC decreased LOS by 6.2 days

Young, L. et al. Eating, Sleeping, Consoling Versus Usual Care for Neonatal Opioid Withdrawal Syndrome – ESC NOW a Cluster Randomized Controlled Trial

# Thoughts for Implementation

- ESC Care Tool is very appealing
  - Functional based assessment
  - Reinforces nonpharmacologic interventions simultaneously
- Requires consistent staff education, user validation
  - To fully implement this tool new users must be educated on symptoms of NOWS
- Infant's ability to eat, sleep and console is based off the presence of symptoms of NOWS.

# Thoughts for Implementation on ESC

- Education must reinforce signs and symptoms of NOWS
  - NOWS symptoms may increase and become more severe leading to dysfunction in basic newborn abilities
  - While poor feeding, inconsolability, crying are considered “the concerning” symptoms, remember other NOWS symptoms can potentiate or cause these symptoms.
  - NOWS symptoms are a sign that infant is experiencing withdrawal, withdrawal has the potential to escalate
  - Recognition of NOWS symptoms allows for targeting of non-pharmacological measures

# Thoughts for Implementation of ESC

- ESC Care Tool implementation can be further improved by addressing:
  - Rooming In
  - Breast feeding and substance use policies
  - Prenatal education
  - Standardized staff education and interrater reliability
  - Standardized pharmacologic protocols



# Using the ESC Tool



EAT, SLEEP, CONSOLE (ESC) CARE TOOL ESC 3rd edition 1.30.20

- Review ESC behaviors, signs of withdrawal present, and Non-Pharm Care Interventions (NPIs) with parent(s)/caregiver every 2-4 hours...
If Yes for any ESC item or 3 for Consoling Support Needed: Perform a Formal Parent/Caregiver Huddle to formally review NPIs that can be optimized further...
If 2nd Yes in a row for any single ESC item (or 2nd '3' for Consoling Support Needed) despite maximal non-pharm care OR other significant concerns are present...
determine if Neonatal Opioid Withdrawal Syndrome (NOWS)/Neonatal Abstinence Syndrome (NAS) medication treatment is needed.

Table with multiple rows for assessment: NOWS/NAS RISK ASSESSMENT, EATING, SLEEPING, CONSOLING, CARE PLAN, PARENT/CAREGIVER PRESENCE SINCE LAST ASSESSMENT, NON-PHARM CARE INTERVENTIONS. Includes questions like 'Are signs of withdrawal present?', 'Takes > 10 min to coordinate feeding', 'Sleeps < 1 hr due to NOWS/NAS?', 'Consoling Support Needed', 'Management Decision', 'Parent/Caregiver Huddle Performed', 'Full Care Team Huddle Performed', 'Rooming-in', 'Skin-to-skin contact', etc.

\*Special note: Numbers above are not intended as a "score" but instead may indicate/identify a need for increased intervention.

## DEFINITIONS

<p><b>EATING</b></p> <ul style="list-style-type: none"> <li>• Takes &gt; 10 min to coordinate feeding <i>or</i> breastfeeds &lt; 10 min <i>or</i> feeds &lt; 10 mL (or other age-appropriate duration/volume) due to NOWS/NAS?: Baby unable to coordinate feeding <i>within</i> 10 minutes of showing hunger <i>OR</i> sustain feeding for at least 10 minutes at breast or with 10 mL by alternate feeding method (or other age-appropriate duration/volume) due to opioid withdrawal symptoms (e.g., fussiness, tremors, uncoordinated suck, excessive rooting).</li> <li>• <i>Special Note:</i> Do not indicate Yes if poor eating is clearly due to non-opioid related factors (e.g., prematurity, transitional sleepiness or spittiness in first 24 hours, inability to latch due to infant/maternal anatomical factors).</li> </ul>
<p><b>SLEEPING</b></p> <ul style="list-style-type: none"> <li>• Sleeps &lt; 1 hour due to NOWS/NAS: Baby unable to sleep for <i>at least</i> one hour, after feeding well, due to opioid withdrawal symptoms (e.g., fussiness, restlessness, increased startle, tremors).</li> <li>• <i>Special Note:</i> Do not indicate Yes if sleep &lt; 1 hour is clearly due to non-opioid related factors (e.g., symptoms in first day likely due to nicotine or SSRI withdrawal, physiologic cluster feeding in first few days of life, interruptions in sleep for routine newborn testing).</li> </ul>
<p><b>CONSOLING</b></p> <ul style="list-style-type: none"> <li>• Takes &gt; 10 min to console (or cannot stay consoled for &gt; 10 min) due to NOWS/NAS: Baby takes longer than 10 minutes to console or cannot stay consoled for <i>at least</i> 10 minutes (due to opioid withdrawal symptoms) despite infant caregiver/provider best efforts to implement NPIs (e.g., skin-to-skin contact, safe swaddling, non-nutritive sucking when baby not hungry).</li> <li>• <i>Special Note:</i> Do not indicate Yes if infant's difficulties consoling are clearly due to non-opioid related factors (e.g., caregiver non-responsiveness to infant hunger cues, circumcision pain).</li> </ul>
<p><b>CONSOLING SUPPORT NEEDED</b></p> <ol style="list-style-type: none"> <li>1. Able to console on own: Able to console on own without any caregiver support needed.</li> <li>2. Able to console within (and stay consoled for) 10 min with caregiver support: Baby with absence of crying, grimacing, or other signs of distress while being held (or otherwise consoled) by a caregiver.</li> <li>3. Takes &gt; 10 min to console (or cannot stay consoled for &gt; 10 min) despite caregiver's best efforts: Baby with presence of crying, grimacing, squirming/tensing, or other signs of distress despite a caregiver's best efforts to implement recommended NPIs (e.g., parent/caregiver presence, skin-to-skin, holding, safe swaddling, optimal feeding, non-nutritive sucking when not hungry).</li> </ol>
<p><b>PARENT/CAREGIVER PRESENCE SINCE LAST ASSESSMENT:</b> Time (in hours) since last assessment that parent (or other caregiver) spent together with infant in own room or in Nursery.</p>
<p><b>OPTIMAL FEEDING:</b></p> <ul style="list-style-type: none"> <li>• Baby feeding at early hunger cues and until content without any limit placed on duration or volume of feeding. Feedings are encouraged at least every 3 hours, optimally 8-12 times per day, to ensure baby does not become too hungry or disorganized with feeding and to optimize nutritional intake. A baby may remain sleeping for more than 3 hours <i>for therapeutic rest</i> if feeding difficulties or excessive weight loss are <i>not</i> present. If a pacifier is used, it should be introduced only after a baby is well fed. As infants with NOWS may be hypermetabolic, closely follow daily weights and provide increased volume and/or caloric density of feedings, as needed, for more than expected weight loss and/or poor weight gain for age.</li> <li>• <b>Breastfeeding:</b> Baby latching deeply with comfortable latch for mother, and sustained active suckling for baby with only brief pauses now. If feeding difficulties present: a) assist directly with breastfeeding to help achieve more optimal latch and position, b) demonstrate hand expression and have mother express colostrum prior to and/or during feedings, and/or c) have baby feed on a clean or gloved adult finger first to organize suck prior to latching. As able based on infant's symptoms, consider withholding pacifiers until babies are breastfeeding well due to the potential to interfere with a good latch/suck. Consider use of nipple shield to facilitate palatal stimulation if infant requires assistance to maintain latch/suck.</li> <li>• <b>Bottle feeding:</b> Baby effectively coordinating suck and swallow without gagging or excessive spitting up. If feeding difficulties present: a) assess need for altered nipple shape/flow rate, b) instruct parent to provide chin support during feedings, and/or c) modify position of bottle and flow of milk to assist baby (e.g., modified side-lying position).</li> <li>• Consult a feeding specialist (e.g., lactation, speech therapy) if any feeding difficulties are present.</li> </ul>
<p><b>PLAN OF CARE</b></p> <ul style="list-style-type: none"> <li>• Parent/Caregiver Huddle: RN bedside huddle with parent/caregiver to formally review NPIs that can be optimized ("Increased") further. To be performed if infant receives Yes for any ESC item <i>or</i> 3 for Consoling Support Needed.</li> <li>• Full Care Team Huddle: Formal huddle with parent/caregiver, infant RN and physician or associate provider to consider other etiologies for symptoms and determine if NOWS medication treatment is needed. To be performed if infant receives 2<sup>nd</sup> consecutive Yes for any ESC item (or 3 for Consoling Support Needed) despite maximal non-pharm care <i>OR</i> other significant concerns are present.</li> </ul>

# Assessments

- Assessments are done with infant's waking and feedings
  - Assessment reflects time period from ESC assessment to ESC assessment (feeding to feeding)
  - Infant will be assessed on ESC behaviors of eating, sleeping and consoling. NOWS symptoms/severity will be evaluated and determined to be/not to be contributing to infant's inability to eat, sleep, console.
  - Assessment of NPIs to assure all are maximized

# Using the ESC Tool

- Are the S/S the neonate displaying DUE TO NOWS? YES/NO

NOWS/NAS ASSESSMENT
Are signs of withdrawal present? (e.g., hyperactive moro, tremors/jitteriness, increased tone, excessive/disorganized suck) Yes / No
If Yes, is timing of withdrawal consistent with known opioid exposure? Yes / No / Unsure
Are co-exposures present that may be contributing to signs of withdrawal? Yes / No / Unsure (please list co-exposures)
Are NPIs maximized to fullest extent possible in infant's clinical setting? Yes / No / Unsure

# NAS/NOWS Symptoms

CNS Hyperexcitability	Autonomic Dysregulation	Gastrointestinal Disturbances
High-pitched crying/excessive	Fever	Excessive sucking
Sleeplessness	Sweating	Poor/disorganized feeding
Hyperactive moro	Yawning	Regurgitation
Undisturbed tremors	Mottling	Projectile vomiting
Increased muscle tone	Nasal stuffiness	Loose stools
Myoclonic jerks	Sneezing	Watery stools
Seizures	Tachypnea	

# Using the ESC Tool

NOWS/NAS ASSESSMENT	
Are signs of withdrawal present? (e.g., hyperactive state, tremors/jitteriness, increased tone, excessive/disorganized suck) Yes/No	
If Yes, is timing of withdrawal consistent with known opioid exposure? Yes/No/Unknown	
Are co-exposures present that may be contributing to signs of withdrawal? Yes/No/Unknown (please list co-exposures)	
Are NPIs maximized to fullest extent possible in infant's clinical setting? Yes/No/Unknown	
EATING	
Takes > 10 min to coordinate feeding or breastfeeding < 10 min or feeds < 10 mL (or other age-appropriate duration/volume) due to NOWS/NAS? Yes/No	
SLEEPING	
Sleeps < 1 hr due to NOWS/NAS? Yes/No	
CONSOLING	
Takes > 10 min to console (or cannot stay consoled for at least 10 min) due to NOWS/NAS? Yes/No	
<b>Consoling Support Needed</b> 1: Able to console on own 2: Able to console within (and stay consoled for) 10 min with caregiver support 3: Takes > 10 min to console (or cannot stay consoled for at least 10 min) despite caregiver's best efforts	
CARE PLAN	
Formal Parent Caregiver Huddle Performed to formally review NPIs to be increased further? Yes/No	
Full Care Team Huddle Performed to formally consider all possible etiologies for symptoms, re-assess if NPIs are maximized to fullest extent possible, and determine if NOWS/NAS medication treatment is needed? Yes/No	
<b>Management Decision</b> a: Continue Optimize NPIs b: Initiate NOWS/NAS Medication Treatment (e.g., if baby's symptoms & timing of symptoms are consistent with mother's particular opioid use/NPIs are maximized to fullest extent possible in infant's clinical setting, OR other significant NOWS/NAS concerns are present (e.g., seizures, apnea) - please list medication(s) initiated c: Continue NOWS/NAS Medication Treatment d: Other (please describe - e.g., Start 2 <sup>nd</sup> Pharmacologic Agent (indicate name); Wean or Discontinue Medication Treatment)	
PARENT/CAREGIVER PRESENCE SINCE LAST ASSESSMENT	
> 3 hours (includes if parent/caregiver present entire time), 2-3 hours, 1-2 hours, < 1 hour, 0 hours (no parent/caregiver present)	
NON-PHARM CARE INTERVENTIONS (I = Increase Non-; R = Random; E = Educate for Parent; NA = Not Available)	

# ESC Behaviors: Eating

- Takes > 10 minutes to coordinate feeding after showing hunger cues due to NOWS

OR

- Breastfeeds < 10 min due to NAS (or other age-appropriate duration)

OR

- Alternative Feeding < 10 ml due to NAS (or other age-appropriate volume)



# ESC Behaviors: Eating

- Do not indicate Yes to poor feeding if factors are non-opioid related
  - Prematurity
  - Transitional sleepiness
  - Spittiness in first 24 hours
  - Inability to latch due to infant/maternal anatomical factors

# ESC Behaviors: Eating

- Optimal Feeding
  - Baby feeding at early hunger cues and until content without any limit placed on duration or volume
  - Feedings are encouraged at least every 3 hours, optimally 8 to 12 times/day
  - Infant may remain sleeping past 3 hours if feeding difficulties or excessive weight loss are not present
  - Closely follow daily weights and provide increased volume or caloric density of feedings for more than expected weight loss

# ESC Behaviors: Eating

- Optimal Feeding

- Breastfeeding: Baby latches deeply and sustains active sucking with brief pauses only
  - If breastfeeding difficulties
    - Assist directly
    - Hand expression prior to and/or during feedings
    - Consult lactation
- Bottle feeding: Baby effectively coordinates suck and swallow without gagging or excessive spitting up
  - If bottle feeding difficulties
    - Assess need for altered nipple shape/flow rate
    - Chin support, alter position (side-lying)
    - Consult feeding specialist (speech therapy) if available in Center

# ESC Behaviors: Eating

- Special Instruction

- If you are ever unsure if baby's eating difficulties are due to NOWS vs. a non-NOWs etiology (or both), it is recommended to indicate a "Yes" if the following are present:
  - ✓ Eating difficulties meet the ESC Care Tool Eating criteria (e.g., taking > 10 min to coordinate latch onto breast)
  - ✓ Signs/symptoms of withdrawal present (e.g., excessive rooting, uncoordinated suck, disturbed tremors)
  - ✓ Timing is consistent with known opioid exposure (e.g., 3-day old term newborn born to mom on methadone MAT)

# ESC Behaviors: Sleeping

- Sleeps < 1 hour due to NOWS
  - Infant is unable to sleep for at least one hour, after feeding well due to NOWS symptoms (fussiness, restlessness, increased startle, tremors)
  - Do not indicate Yes to poor sleep if related to non-opioid factors:
    - Symptoms of nicotine/SSRI withdrawal
    - Physiologic cluster feeding in initial few days of life
    - Interruptions in sleep for routine newborn testing

# ESC Behaviors: Consoling

- Unable to Console
  - Takes > 10 min to console or cannot stay consoled for > 10 min due to NOWS despite infant caregiver/provider best efforts to implement NPIs
  - Do not indicate Yes to inability to console if infant's difficulty consoling is related to non-opioid factors:
    - Caregiver non-responsiveness to hunger cues
    - Circumcision pain
    - Other

# ESC Behaviors: Consoling

- Consoling Support Scale

1. Able to console on own
2. Able to console within (and stay consoled for) 10 min with support
3. Takes > 10 min (or cannot stay consoled for >10 min) despite caregiver best effort to implement NPIs

# Using the ESC Tool

PARENT/CAREGIVER PRESENCE SINCE LAST ASSESSMENT	
> 3 hours (includes if parent/caregiver present entire time), 2-3 hours, 1-2 hours, < 1 hour, 0 hours (no parent/caregiver present)	
NON-PHARM CARE INTERVENTIONS ( I = Increase Now, R = Reinforce, E = Educate for Future, NA = Not Applicable/Available)	
Rooming-in (i.e., caring for infant in their own room with earlier caregiver response to infant stress or hunger cues)	
Parent/caregiver presence to help calm and care for infant	
Skin-to-skin contact when caregiver fully awake/alert to help organize infant feeding behaviors, calming & sleep	
Holding by parent/caregiver/cuddler to help calm infant & aid in sleep (with caregiver fully awake/alert)	
Safe & effective swaddling (e.g., extremities swaddled in flexed position, blanket snug, no extra blanket around baby's face)	
Optimal feeding (e.g., baby offered feedings when showing hunger cues & fed till content)	
Non-nutritive sucking with infant's hand, pacifier, adult caregiver's washed or gloved finger	
Quiet, low light environment to help limit overstimulation of infant (e.g., tv volume down, quiet "white noise" machine or phone app)	
Rhythmic movement provided by parent/caregiver or infant calming device (e.g., "jiggling" or infant swing in presence of alert adult)	
Additional help/support in room (e.g., other parent, family member, friend, cuddler, staff member, recovery coach, DCYF worker)	
Limiting # of visitors & duration of visit(s) to minimize disruptions in infant's care environment & sleep	
Clustering care & assessments with infant's awake times (e.g., RN & infant provider perform assessment together after infant feedings)	
Safe sleep/fall prevention (e.g., infant sleeps on back, safely swaddled, in own sleep space)	
Parent/caregiver self-care & rest (e.g., identifying another adult to care for infant so parent can rest or take a walk/break)	
Optional Comments: (e.g., staff caring for/consoling baby as parents not available or able to safely care for baby)	



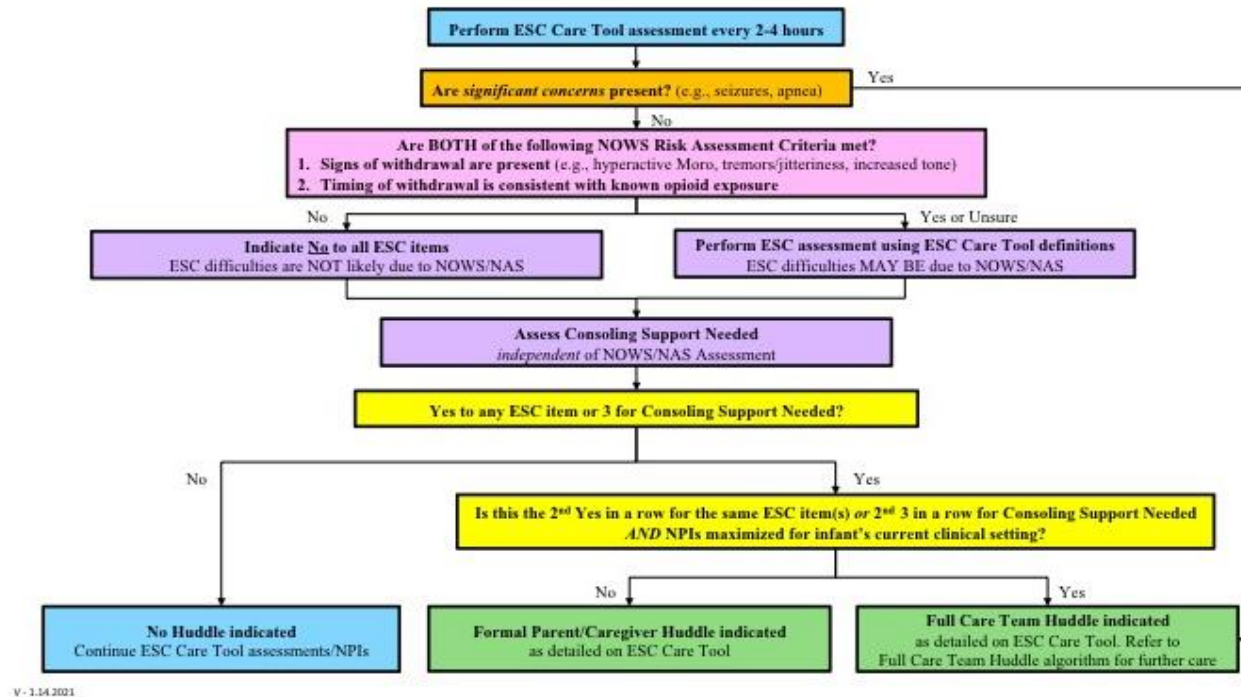
# Non-pharmacologic Interventions (NPIs)

- Rooming-in
- Parent/caregiver presence
- Holding by parent/caregiver/cuddler
- Skin to skin
- Safe swaddling
- Optimal feeding
- Quiet, low light environment
- Non-nutritive sucking
- Rhythmic movement
- Visitor limitation
- Clustering care
- Additional help
- **Parent/caregiver self-care**

# ESC Plan of Care

- **Parent/Caregiver Huddle:**
  - Performed when infant receives Yes to any ESC item or 3 on consoling support.
  - RN bedside huddle with parent/caregiver to formally review NPIs that can be increased.
- **Full Care Team Huddle:**
  - Performed when an infant receives a 2<sup>nd</sup> consecutive Yes for the same ESC item
  - Any significant event: apnea, seizure, lethargy
  - Formal huddle with parent/caregiver, infant's RN and physician or associate provider to consider etiologies of symptoms and determine need of pharmacological treatment.

# ESC Algorithm



\*\*Full Care Huddle for any significant event: apnea, seizure, lethargy

# References

1. Grossman M, Berkwitt A, Osborn Ret al., et al. An initiative to improve the quality of care of infants with neonatal abstinence syndrome. *Pediatrics*. 2017;139(6):e20163360.
2. Wachman EM, Houghton M, Melvin P, et al. A quality improvement initiative to implement the eat, sleep, console neonatal opioid withdrawal syndrome care tool in Massachusetts' PNQIN collaborative. *J Perinatol*. 2020;40(10):1560-1569.
3. Young, L. et al. Eating, Sleeping, Consoling Versus Usual Care for Neonatal Opioid Withdrawal Syndrome – ESC NOW a Cluster Randomized Controlled Trial