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?

Betsy Knappen MSN, APRN, NNP-BC
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 \( \downarrow \) from 22.5 days to 5.9 days

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

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/caregiver every 2-4 hours (using Newborn Care Diary), choosing care with infant’s moods and feelings. With each assessment, reinforce NPIs that parent/caregiver is implementing well (“+”), eliminate (“-”), reach parent in ways other NPIs can be increased further (“*”).
- If Yes for any ESC item or Yes for Counseling Support Needed: Perform a Formal Parent/Caregiver Huddle to formally review NPIs that can be optimized further to help with infant’s current ESC difficulties and continue to monitor infant closely.
- If Yes to any single ESC item (or 2 or more for Counseling Support Needed) despite maximal non-pharm care (or other significant concerns are present [e.g., sepsis, apnea]) Perform a Full Care Team Huddle with parent/caregiver, infant RN and physicians or associate provider to 1) consider all potential etiologies for symptoms; 2) re-assess if NPIs are maximized to fulfill extent possible in infant’s clinical setting; and 3) determine if Nonopioid Opioid Withdrawal Syndrome (NOWS)/Nonopioid Abstinence Syndrome (NAS) medication treatment is needed. Continue to maximize all NPIs and monitor infant closely.

**Perform assessment of ESC behaviors, signs of withdrawal, and NPIs for time period since last ESC assessment – note date/time:**

**NON/NAS RISK ASSESSMENT**

Any signs of withdrawal present? (e.g., hyperactivity, Moro, tremor/attentions, increased tone, excessive/tachycardic tucks) Yes = No

If Yes, is timing of withdrawal consistent with known opioid exposure? Yes = No

Are co-exposures present that may be contributing to signs of withdrawal? Yes = No

Are NPIs maximized to fulfill extent possible in infant’s clinical setting? Yes / No

**EATING**

Takes > 10 min to coordinate feeding or breastfeeds < 10 min or feeds < 10 ml. (or other age-appropriate duration/volume) due to NONS/NAS? Yes / No

Sleep = 1 hr due to NONS/NAS? Yes / No

**SLEEPING**

Takes > 10 min to console (or cannot stay consolated for at least 10 min) due to NONS/NAS? Yes / No

**Counseling Support Needed**

1: Able to console on own
2: Able to console within (and stay consolated for) 10 min with caregiver support
3: Takes > 10 min to console (or cannot stay consolated 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 fulfill extent possible, and determine if NONS/NAS medication treatment is needed? Yes / No

**Managment Decision**

a: Continue/Optimize NPIs
b: Initiate NONS/NAS Medication Treatment (e.g., if baby’s symptoms & timing of symptoms are consistent with mother’s prior opioid exposure and NPIs are maximized to fulfill extent possible in infant’s clinical setting; OR other significant NONS/NAS concerns are present [e.g., sepsis, apnea]) – please list medication(s) initiated

c: Continue NONS/NAS Medication Treatment

Other (please describe – e.g., Start 2nd 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**

1) Breastfeed Now, R = Breastfeed, E = Feed with Pacifier, NA = Not Applicable/Available

2) Reassuring (e.g., caring for infant in their own room with larger caregiver response to infant stimuli or hunger cues)

3) Parent/caregiver presence to help calm and care for infant

Skin-to-skin contact when caregiver fully available to help optimize 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 & feel content)

Non-nutritive suckling with infant’s hands, pacifier, adult caregiver’s washed or gloved finger

Quiet, low light environment to help limit overstimulation of infant (e.g., in volume down, quiet “white noise” machine or phone app)

Rhythmic movement (provided by parent/caregiver or infant calming device [e.g., “tugging” or infant string in presence of alert adult])

Additional help/support in room (e.g., other parent, family member, friend, cuddler, staff member, recovery coach, DCFY worker)

Limiting # of visitors and duration of visits to minimize disruptions in infant’s care environment & sleep

Chasting care & assessments with infant’s awake times (e.g., RN & infant provider perform assessment together after infant feeding)

Safe sleep/pad prevention (e.g., infant sleeps on back, safely swaddled, in own sleep space)

Parent/caregiver self-care & rest (e.g., identify/make another adult to care for infant in parent’s environment & sleep)

Optional Comments: (e.g., staff caring for/onset baby as parents not available or safely cared for baby)

Special note: Numbers above are not intended as a “score” but instead may indicate/categorize a need for increased intervention
DEFINITIONS

EATING

• Turns: 10 min to coordinate feeding or breastfeed; 10 min or feed - 10 ml (or other age-appropriate duration/volume) due to NPO/NAS/NA: Baby unable to coordinate feeding within 10 minutes of lying down or cannot feed or tolerate 10 ml by alternate feeding method (other age-appropriate duration/volume)

• Special Note: Do not indicate Yes if poor eating is solely due to non-upper related factors (e.g., pneumonia, transitional gastrointestinal or constipation) in first 24 hours; inability to tolerate due to necrotizing enterocolitis (NEC) symptoms

SLIGHTING

• Sleeps: 1 hour due to NPO/NAS: Baby unable to sleep for at least one hour, after feeding well, due to upper related factors (e.g., respiratory distress, nasogastric feeding, vomiting)

• Special Note: Do not indicate Yes if sleep 1 hour is likely due to non-upper related factors (e.g., compression, factors that may be due to nasogastric feeding and physiologic clustering in first 4-6 days of life, interventions in sleep due to neonatal sepsis)

CONSULTING

• Turns: 10 min to consult (or cannot stay consulted for 10 min) due to NPO/NAS: Baby takes longer than 10 minutes to coordinate feeding or rate consulted for at least 10 minutes, due to upper related factors (e.g., vomiting, respiratory distress, respiratory failure, upper gastrointestinal bleeding)

• Special Note: Do not indicate Yes if infant’s difficulties consulting are due to non-upper related factors (e.g., caregiver non-compliance, infant hunger, or circumcision)

CONSULTING SUPPORT NEEDED

1. Able to consult on own. Able to consult on own without any caregiver support needed

2. Able to consult within (or stay consulted for) 10 min with caregiver support. Baby with absence of crying, grunting, or other signs of distress; unable to tolerate non-consulted consult

3. Turns: 10 min to consult (or cannot stay consulted for 10 min) despite caregiver’s best efforts. Baby with presence of crying, grunting, inspiratory/hyperventilation, or other signs of distress despite caregiver’s best efforts to implement recommended interventions (e.g., parent/caregiver presence, drive-along holding sedate baby, optimal feeding, non-sedating medication)

PARENT CAREGIVER PRESENCE SENSE LAST ASSESSMENT: Time (±1 hour) have increased movement that other caregiver has been together with infant in own room or in NICU

OPTIMAL FEEDING

• Baby feeding at early hunger status and infant without any hair placed on duration or volume of feeding. Feedings are now adequate at least every 2 hours, optimal 3-4 hours per day, to ensure baby does not become dehydrated or dehydrated with a high volume of feedings. A baby may require sleep for more than 3 hours for starvation of feeding difficulty or severe weight loss or postnatal use. If a formula is used, it should be introduced only after a baby is well fed. Infants with NPO/NAS may be apneic/hypopneic, highly at risk for development of feeding and may require intensive volume and serial evaluation of feeding. For more information, refer to your website for use

• Breastfeeding: Baby latching deeply with comfortable latch for mother, and smooth active sucking with baby with short time period needed. If feeding difficulties prevent baby from achieving optimal latch and position, make adjustments in breast position and/or infant position and/or patient and or infant’s position and or infant neck support. When breastfeeding is performed, ensure baby is comfortable and well fed to prevent possible complications or risk of respiratory distress

• Hand feeding: Baby effectively coordinating suck and suck from without any gagging or aspiration or stopping up. If feeding difficulties prevent baby from achieving optimal hand feeding rate, offer increased volume and serial evaluation of feeding. For more information, refer to your website for use

• Consult a feeding specialist (e.g., lactation, speech therapy) if any feeding difficulties occur

PLAN OF CARE

• Parent/Caregiver Huddle. RN bedside huddle with parent/caregiver to formally review NPOs that can be optimized ("Curtain"). Mother must be performed if infant receives 1st consult for TPN consult for NEC consult for no feeding consult for required consult

• Full Care Team Huddle. Formal huddle with parent/caregiver, infant NICU and philosophy or associate provider to consider other factors for systemic and development of NPO/NAS treatment in consultation. To be performed if infant receives 2nd consult for consultation consult for no feeding consult for required consultation

• NICU Care Team consult for required consultation consult for no feeding consult for required consultation
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

<table>
<thead>
<tr>
<th>NOWS/NAS ASSESSMENT</th>
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</thead>
<tbody>
<tr>
<td>Are signs of withdrawal present? (e.g., hyperactive moro, tremors/jitteriness, increased tone, excessive/disorganized suck)</td>
</tr>
<tr>
<td>If Yes, is timing of withdrawal consistent with known opioid exposure?</td>
</tr>
<tr>
<td>Are co-exposures present that may be contributing to signs of withdrawal?</td>
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<td>Are NPIs maximized to fullest extent possible in infant’s clinical setting?</td>
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## NAS/NOWS Symptoms

<table>
<thead>
<tr>
<th>CNS Hyperexcitability</th>
<th>Autonomic Dysregulation</th>
<th>Gastrointestinal Disturbances</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-pitched crying/excessive</td>
<td>Fever</td>
<td>Excessive sucking</td>
</tr>
<tr>
<td>Sleeplessness</td>
<td>Sweating</td>
<td>Poor/disorganized feeding</td>
</tr>
<tr>
<td>Hyperactive moro</td>
<td>Yawning</td>
<td>Regurgitation</td>
</tr>
<tr>
<td>Undisturbed tremors</td>
<td>Mottling</td>
<td>Projectile vomiting</td>
</tr>
<tr>
<td>Increased muscle tone</td>
<td>Nasal stuffiness</td>
<td>Loose stools</td>
</tr>
<tr>
<td>Myoclonic jerks</td>
<td>Sneezing</td>
<td>Watery stools</td>
</tr>
<tr>
<td>Seizures</td>
<td>Tachypnea</td>
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</table>
Using the ESC Tool

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<tr>
<th>EATING</th>
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<tbody>
<tr>
<td>Tolerated &gt; 10 min to coordinate feeding or breastfeeds &lt; 10 min or feeds &lt; 10 mL (or other age-appropriate duration/volume) due to NOWS/NAS?</td>
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<tr>
<th>SLEEPING</th>
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<tbody>
<tr>
<td>Sleeps &lt; 1 hr due to NOWS/NAS?</td>
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<th>CONSOLING</th>
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<tbody>
<tr>
<td>Takes &gt; 10 min to console, or cannot stay consolized for at least 10 min</td>
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<tr>
<td>Counseling Support Needed</td>
</tr>
<tr>
<td>2: Able to console within (and stay console for) 10 min with caregiver support</td>
</tr>
<tr>
<td>b) Takes &gt; 10 min to console, or cannot stay consolized for at least 10 min despite caregiver’s best efforts</td>
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<tr>
<th>CARE PLAN</th>
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<tbody>
<tr>
<td>Formal Parent Caregiver Helped Perform to formally review NPIs to be increased further?</td>
</tr>
<tr>
<td>Full Care Team Helped Perform to formally consider all possible etiologies for symptoms, reassess if NPIs are maximized to fullest extent possible, and determine if NOWS/NAS medication treatment is needed?</td>
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<tr>
<th>MANAGEMENT DECISION</th>
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</thead>
<tbody>
<tr>
<td>a) Continue/optimise NPI:</td>
</tr>
<tr>
<td>b) Initiate NOWS/NAS Medication Treatment (e.g., if baby’s symptoms &amp; timing of symptoms are consistent with mother’s particular opioid and NPIs are maximized to fullest extent possible in infant’s clinical setting, all other significant NOWS/NAS concerns are present (e.g., oozing, apnea) – please list medication(s)) initiated</td>
</tr>
<tr>
<td>c) Continue/optimise NPI:</td>
</tr>
<tr>
<td>d) Other (please describe – e.g. Start 7th Pharmacological Agent (indicating name) Year or Discontinue Medication Treatment)</td>
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<th>PARENT/CAREGIVER PRESENCE SINCE LAST ASSESSMENT</th>
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<td>&gt; 3 hours (includes if parent caregiver present entire time), 2-3 hours, 1-2 hours, &lt; 1 hour, 0 hours (no parent caregiver present)</td>
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| NON-PHARMACOLOGIC INTERVENTIONS | Increase Noise | Reduce Noise | Educate the Future | NA (Not Applicable) | Available |

23
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 indicated 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 care-giver best effort to implement NPIs
### Using the ESC Tool

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<tr>
<th><strong>NON-PHARM CARE INTERVENTIONS</strong></th>
<th><strong>(I = Increase Now, R = Reinforce, E = Educate for Future, NA = Not Applicable/Available)</strong></th>
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<td>Rooming-in (i.e., caring for infant in their own room with earlier caregiver response to infant stress or hunger cues)</td>
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<td>Parent/caregiver presence to help calm and care for infant</td>
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<td>Rhythmic movement provided by parent/caregiver or infant calming device (e.g., “jiggling” or infant swing in presence of alert adult)</td>
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<td>Additional help/support in room (e.g., other parent, family member, friend, cuddler, staff member, recovery coach, DCYP worker)</td>
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<td>Limiting # of visitors &amp; duration of visit(s) to minimize disruptions in infant’s care environment &amp; sleep</td>
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<tr>
<td>Clustering care &amp; assessments with infant’s awake times (e.g., RN &amp; infant provider perform assessment together after infant feedings)</td>
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<td>Safe sleep/fall prevention (e.g., infant sleeps on back, safely swaddled, in own sleep space)</td>
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<tr>
<td>Parent/caregiver self-care &amp; rest (e.g., identifying another adult to care for infant so parent can rest or take a walk/break)</td>
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<tr>
<td>Optional Comments: (e.g., staff caring for/consoling baby as parents not available or able to safely care for baby)</td>
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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:**
  - Preformed 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:**
  - Preformed when an infant receives a 2nd 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


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