**Blank Children's Hospital**

**SECTION**: OB, NICU, and Pediatrics **GUIDELINE:** 08

**TITLE**: Neonatal Abstinence Syndrome (NAS)

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Executive Director, Chief Nursing Officer

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**PURPOSE:** To provide a guideline for multidisciplinary assessment and management of the infant with neonatal abstinence syndrome.

**RATIONALE:**
Neonatal Abstinence Syndrome (NAS) is a clinical disorder that presents when intrauterine or extrauterine exposure to a drug or substance (prescribed or non-prescribed) stops. Clinical signs of withdrawal often present as physiologic and/or neurobehavioral dysregulation. Neurobehavioral dysregulation is defined as a disruption of the balance between behavior and the nervous system.

In-room care with the parent(s), skin to skin care, and decreased environmental stimulation are primary interventions. In cases where the infant continues to have moderate-severe signs of withdrawal despite optimizing non-pharmacologic interventions, pharmacologic strategies may be necessary.

**BACKGROUND AND GENERAL INFORMATION:**
1. Consider type of drug(s) causing withdrawal in the plan of care. See: Appendix C: Common Categories of Drugs/Names of Drugs Causing Neonatal Abstinence and Symptoms
2. Initiate the NAS bundle and ESC Care Tool for maternal use of all drugs listed in "length of stay: table (pg. 5) except for nicotine and SSRIs. Initiate if there are symptoms of withdrawal or risk factors indicating newborn may experience withdrawal.
3. Symptoms and timing of clinical presentation
   a. Clinical presentation and severity of symptoms may vary depending on maternal drug(s), dose, time of last dose, gestational age, maternal nutritional status, analgesia or anesthesia during labor, fetal accumulation of the drug(s), physiochemical properties of the drug(s), volume and distribution, half-life of the drug(s), fat composition of the infant, and health of infant
   b. Onset of neonatal withdrawal can range from just after birth to 2 weeks; most clinical symptoms will begin within the first 5 days.
   c. Depending on the drug(s), symptoms may be inconsistent, irregularly present and may last several weeks.

**CORE MEASURES OF CARE INCLUDE:**

1. Care is based on the principal of trauma-informed care, supports neurobehavioral organization, and is family-centered, age appropriate, developmentally supportive and neuroprotective.
2. Partnering with parents
   a. Parent provided care is considered a primary intervention (i.e., feeding, consoling, etc.)
   b. Parents as a part of the team are encouraged to provide input into team huddles/rounds on the care of their infant. If the parent does not have custody or custody termination is anticipated, clarify with DHS about degree of parent involvement.
   c. Provide education on withdrawal symptoms, the Eating, Sleeping and Consoling (ESC) Care Tool, model of care, calming measures, feeding support, and Newborn Care Diary
3. Healing environment is provided
   a. Environment is controlled – reduced light, noise, and visitors (no more than 2 at a time)
4. Position and handling
   a. Maximize skin to skin
   b. Swaddle: hands to face/midline; loose at hips (hip healthy).
5. Pain and stress reduction (see calming strategies in algorithm)
   a. Care is developmentally supportive age appropriate care:
      1) Infant's cues/behavior drive cares
      2) Cluster cares **and** provide imposed rest/pauses during cares; handling is gentle, slow and supports limbs/head, turn in increments
      3) Hand containment
      4) Non-nutritive sucking (i.e., pacifier)
   b. Promote skin integrity – infants have increased risk for breakdown (i.e., diaper area, elbows, knees, back of head), especially if irritable and diaper area due to possible GI involvement
      1) Apply Aquaphor with every diaper change beginning at birth for barrier protection. A provider order is not required. Document in EMR.
      2) For reddened and/or breakdown of diaper area, refer to: BCH Protocol # 06 Prevention/Management of Red, Irritated, and/or Denuded Skin Areas for Patients at Risk for Breakdown
   c. Procedural pain
      1) Use sucrose. Refer to: Blank Children's Hospital #81 Neonate & Infant: Use of Oral Sucrose for Procedural Pain Management
      2) Additional pain control strategies may be needed in methadone exposed infants due to altered pain perception.

d. For pain/ stress discomfort assessment use the Eating, Sleeping and Consoling (ESC) Care Tool (see Appendix A: Application of NAS Model of Eating, Sleeping and Consoling (ESC) Care Tool
e. Consider using pharmacologic treatment as a PRN measure. Use only after non-pharmacologic interventions do not support the infant per the ESC tool (Refer to Appendix D: Blank Children's Hospital NAS Pharmacologic Treatment Algorithm)

6. Protect sleep
   a. Arrange cares when awake
   b. Avoid awakening for exams, labs, visitors, etc.
7. Optimize nutrition and feeding
   a. General feeding:
      1) If assistance in organizing suck/swallow/breathing is needed: offer non-nutritive sucking/pacifier for 2-3 minutes before feeding
      2) Observe for signs of feeding intolerance (i.e., loose stools, abdominal distention, emesis). If present:
         a) Consider smaller, more frequent feedings and/or if formula fed, consider switching to higher calorie formula to reduce feeding volume
         b) Per provider order, may consider lactose free formula (i.e., Similac Sensitive) if formula feeding
      3) Consider modified burping to reduce overstimulation and eliciting arching or Moro reflex – consider rubbing back (not up the spine) rather than patting
      4) Consider early referral to feeding specialist if demonstrates poor feeding
   b. Breastfeeding and use of breastmilk (See Appendix B: Breastfeeding and Use of Mother's Milk: Drug Specific Information)
      1) Assist mother to breastfeed/pump/hand express
      2) Refer to lactation consultant/support

## EATING, SLEEPING AND CONSOLING (ESC) CARE TOOL PROCEDURE:

1. Assessment is performed in the mother's/patient's room. The newborn nursery environment is not recommended due to high levels of stimulation (i.e., light and noise)
2. Infant can be held or skin to skin at the time of assessment
3. ESC Tool assessment frequency and duration of assessments:
   a. Initiate ESC Tool within 4 hours after birth or as soon as NAS is suspected.
   b. Continue ESC Tool after each feeding or at least every 3-4 hours until length of stay for NAS completed. See length of stay table next page.
4. Each assessment includes:
   a. Elements of the ESC Tool as witnessed, reported by parents and/or documented in the Newborn Care Diary or EMR since last assessment
   b. Input from any team member (parents, providers, nursing, lactation, patient care technician, audiologist, cuddler, etc.) that have cared for the infant since the last assessment
   c. Non-pharmacologic interventions provided
   d. Document all assessments, any other withdrawal behaviors, interventions, and communication in the EMR

5. ESC Tool for the preterm or critically ill infants
   a. Use tool without modification unless elements of tool do not apply (i.e., if patient is intubated or sedated, use NPASS or PIPP per standard of care)
   b. Feeding is interpreted as appropriate for gestational age and health status. If feeding ability and/or tolerance is significantly worse than expected for gestational age and felt due to NAS, indicate "Yes" for "poor feeding due to NAS"
6. Huddle Instructions – Any "yes" is considered an elevated score (Refer to APPENDIX A: Eating, Sleeping and Consoling (ESC) Care Tool
   a. With any "yes" on ESC Care Tool Assessment:
      1) Perform a ***Formal Parent/Caregiver & Nurse Huddle*** *and include/discuss:*
         a) Summary of the newborn's recent ESC course – current ESC, previous ESC, interventions provided and results of interventions
         b) Ways to optimize non-pharmacologic care interventions further including presence of a parent/caregiver
         c) Infant's response to Consoling Support Interventions (CSIs) and effectiveness of consoling interventions used. (refer to APPENDIX A: Eating, Sleeping and Consoling (ESC) Care Tool)
         d) Possible efforts to improve feeding (when needed)
         e) Current assessment of the infant's environment and ways to decrease stimulation in the infant's environment
   b. If infant continues to receive "yes" for any ESC item despite non-pharmacologic care interventions following the ***Formal Parent/Caregiver & Nurse Huddle***
      1) Proceed to ***Full Care Team Huddle*** (provider, nurse, parent/caregiver)
         a) Ideally, discussion with the provider will be at the bedside with the family
            i. If provider is unable to be present, discuss per phone
         b) Include in the huddle with the provider
            i. Summary of the newborn's recent ESC course – current ESC, previous ESC, interventions provided and results of interventions
            ii. Ways to optimize Non-Pharm Care Interventions further including presence of a parent/caregiver
            iii. Infant's response to and efficacy of Consoling Support Interventions (CSIs) implemented
            iv. Efforts to improve feeding (when needed)
            v. Assessment of the infant's environment
      2) If "Yes" score continues for any ESC item despite maximizing non-pharmacologic care interventions
         a) If non-pharmacological care is maximized to its fullest and the infant continues to have poor eating, sleeping, or consoling and symptoms/concerns are felt due to opioid withdrawal, then an opioid replacement medication should be considered.
            i. Pharmacologic intervention – see Appendix D - Blank Children's Hospital NAS Pharmacologic Treatment Algorithm
            ii. Staff/providers should continue to follow the infant closely, maximizing all non-pharmacologic care Interventions regardless of management decision.
            iii. Vital signs per unit routine

3) NAS Management Decision - Document on Eating, Sleeping, and Consoling (ESC) Care Tool, options below:
   a) Continue/optimize non-pharmacologic care
   b) Initiate medication treatment
   c) Continue medication treatment
   d) Other (please describe in comment)

7. Location of care, length of stay and discharge
   a. Location of care
      1) OB:
         a) During initial newborn stay, the infant will stay with the mother.
         b) Rooming in is expected, except in cases where safety or medical necessity requires alternate care.
         c) May remain in OB after mother is discharged if space permits. May be transferred to pediatrics after mother is discharged as needed
      2) NICU: transferred from OB if patient requires increased level of care; direct admission to NICU per current model of care
   b. Transferring between units
      1) Complete all newborn screening (dried blood spot/metabolic screening, CCHD, car seat pulse oximetry, etc.), assessment of car seat (expiration date/ appropriateness) as indicated per unit routine and newborn education, prior to transferring to another unit. Communicate any need for screening and specific education that was not able to be completed prior to transfer that need to be completed to the receiving unit. If needed, OB staff may need to assist pediatrics with newborn routines/education after transfer to pediatrics.
   c. Length of stay

**MINIMUM LENGTH OF STAY: OPIOIDS**

| SHORT ACTING | LONG ACTING |
|---|---|
| *****Minimum of 3 day stay*** | *****Minimum of 5 to 7 days*** |
| Oxycodone, heroin, fentanyl, codeine, tramadol, | Methadone, buprenorphine (Subutex, Suboxone) |

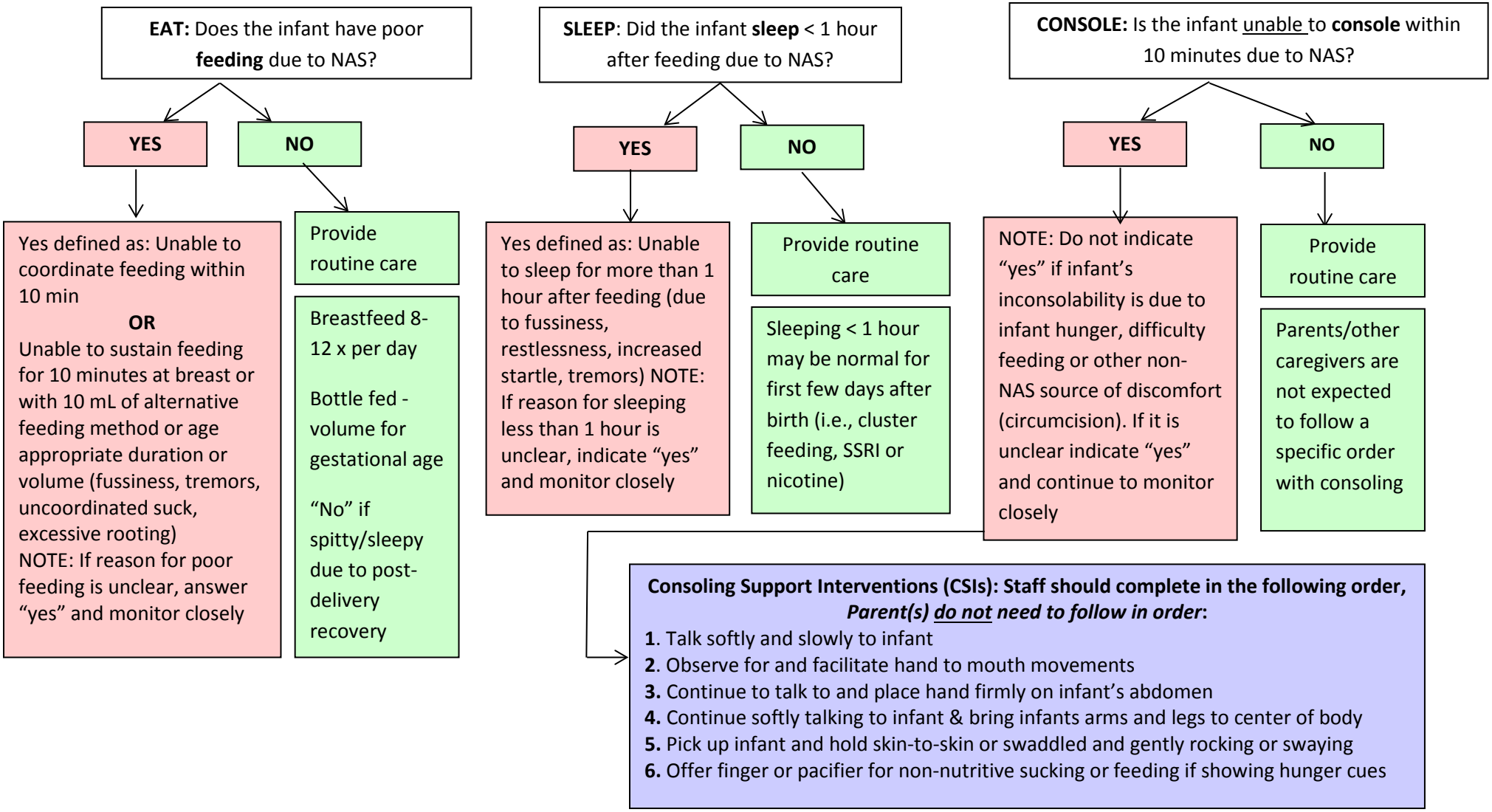
**MINIMUM LENGTH OF STAY: NON-OPIOIDS**

| SHORT ACTING | LONG ACTING |
|---|---|
| *****Minimum of 48 hour stay with stable scores and status*** | |
| Nicotine, alcohol, THC, amphetamines, cocaine, PCP, ecstasy, barbiturates | Benzodiazepines, serotonin reuptake inhibitors (SSRIs) |

   b. Discharge should occur per provider order once unit discharge criteria for length of stay and the following criteria have been met:
      1) Physiologically stable for a minimum of 24 hours
      2) Minimum observation period has been completed (per table above) – may be increased depending on maternal drug history or infant's symptoms
      3) Taking full oral feeds and gaining weight satisfactorily or weight loss within expected range.

4) Shows neurobehavioral recovery (can reach full alert state, responds appropriately to social stimuli and consoled with routine measures)
5) Weaning plan defined OR at least 48 hours since administration of last medication for NAS
6) Referrals made to appropriate community agencies, including STAR program, Powell CDC, House of Mercy, etc.
7) Parent education has been completed including medication administration, follow up appointments, and when to call the provider.

## APPENDIX A: Eating, Sleeping and Consoling (ESC) Care Tool



## APPENDIX B: Breastfeeding and Use of Mother's Milk: Drug Specific Information

**RESOURCES:**
http://toxnet.nlm.nih.gov/newtoxnet/lactmed.htm
http://e-lactancia.org/

**Guidelines for decision-making**:

1. Encourage the mother to breastfeed/provide breastmilk if the mother meets any of the following:
    a. Is engaged in a substance abuse treatment
    b. Plans to continue in a substance abuse treatment in post-partum period
    c. Abstained from drug use for 90 days prior to delivery
    d. Maintained negative urine toxicology during pregnancy
    e. Was engaged and compliant in prenatal care as evidenced by the prenatal record
2. Discuss with provider team risk vs. benefits of breastfeeding/provision of breastmilk (see table below):
    a. Not engaged in a substance abuse treatment program and does not plan to engage in a program after discharge
    b. Not been compliant with prenatal care
    c. Positive urine drug screen at delivery
    d. Relapsed in use of illicit drug(s) or in the misuse of a legal substance within 30 days prior to delivery
    e. Exhibits any behavioral or other indicators that the mother may be actively abusing substances
    f. Recent history of alcohol use/abuse
    g. Is using prescription medications considered incompatible with breastfeeding
    h. Not attained drug and/or alcohol sobriety beyond the inpatient setting, treatment center
    i. Does not have appropriate family and/or community support system
    j. Self-reported a desire to breastfeed/provide breast milk only to retain custody or maintain sobriety in the postpartum period

## Drug Specific Guide for Breastfeeding/Use of Breastmilk

| Substance | Concentration breast milk | Encourage breastfeeding or breastmilk | Effects Infant | Other considerations |
|---|---|---|---|---|
| **Methadone and Buprenorphine** | Low | Yes, If on stable prescribed dose<br><br>No if mother's dosing needs are rapidly increasing or illicit use | • Reduces severity NAS<br>• Less likely to require intervention dosing<br>• May see developmental impact especially when combined with environmental risk | • Decision is based on dose of methadone mother is on |
| **Other Opioids** | Low | Yes, if low-dose prescription and is other than codeine<br><br>No, if not low dose or is codeine | • Codeine is metabolized to morphine and can result in high serum levels of morphine | • Maternal codeine use has been associated with respiratory depression in the newborn<br>• FDA issued a warning against breastfeeding/use of breastmilk with maternal use of any codeine product |
| **Non-Opioids** | Varies | No, if tramadol or if illicit use (see below for marijuana, alcohol and tobacco). Otherwise consult lactation. | • Depend on usage and substance(s) | • FDA issued a warning against breastfeeding/use of breastmilk with maternal use of tramadol |
| **Marijuana** | Levels in breastmilk can be up to 8 times higher than maternal plasma levels. | Caution. There is not enough evidence to know if the benefits of breastfeeding outweigh risks of marijuana exposure to the infant. Discuss with provider before making recommendation. | • Exposure during critical periods of brain development can induce long-lasting neurobehavioral alterations; even low to moderate doses during development can lead to problems with cognitive function and emotional behaviors<br>• Associated with 2 fold increase in SIDS. | • Stored in brain and adipose tissue.<br>• Counsel moms on individual basis and encourage cessation of marijuana use |

| Substance | Concentration breast milk | Encourage breastfeeding or breastmilk | Effects Infant | Other considerations |
|---|---|---|---|---|
| **Alcohol** | Human milk levels parallel maternal blood alcohol levels | With limits.<br>Limit alcohol intake to equivalent of 8 oz. wine or 2 beers.<br>Discard all milk pumped/expressed within 90-120 min of ingestion. Should not breastfeed within 90-120 min of last ingestion. | | • Interferes with milk ejection reflex and may reduce milk production |
| **Tobacco** | Transfers to human milk | Yes with vigorous cessation of nicotine use. | Second-hand smoke increases the risk of health problems in infants and children (i.e., respiratory and/or ear infections, SIDS, asthma) | |

## APPENDIX C: Common Drug Categories/Names Causing Neonatal Abstinence and Symptoms

| **Common Drug Categories/Names Causing Neonatal Abstinence** | | |
|---|---|---|
| **Opioids** | **Synthetic Narcotics** | **SSRIs** |
| Morphine | methadone | citalopram (Celexa) |
| Codeine | hydrocodone (Vicodin) | escitalopram (Lexapro) |
| Opium | buprenorphine (Subutex) | fluoxetine (Prozac) |
| Hydromorphone | fentanyl (Sublimaze) | paroxetine (Paxil) |
| **Semisynthetic Opioids** | meperidine (Demerol) | sertraline (Zoloft) |
| Heroin | tramadol (Ultram) | fluvoxamine (Luvox) |
| Oxycodone (Percodan, Percocet, OxyContin) | | vilazodone (Viibroyd) |
| | **CNS Stimulants** | **Hallucinogens** |
| | Amphetamines | LSD |
| | Cocaine | Nitrites |
| | Methamphetamines | Solvents and aerosols |
| | Nicotine | Inhalants |
| | | Mescaline |
| | | MDA |

| **Common Clinical Signs of NAS** | | |
|---|---|---|
| **Neurologic** | **Gastrointestinal** | **Autonomic** |
| Excessive or high-pitched crying | Excessive sucking | Sweating |
| Short and/or irregular sleep patterns | Poor feeding | Low-grade fever |
| Tremors or irritability | Vomiting | Nasal stuffiness |
| Skin breakdown (face/ knees) | Loose stools and/or diarrhea | Tachypnea |
| Increased muscle tone | Poor weight gain | Mottling of skin |
| Myoclonic jerks | | |
| Seizures | | |
| Frequent sneezing and/or yawning | | |

## **APPENDIX D**: **Blank Children's Hospital NAS Pharmacologic Treatment Algorithm**

Page 1 of 3: Initiate care at Lutheran, Methodist Downtown, Methodist West, and

- Initiate Neonatal Abstinence Syndrome (NAS) panel
- 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 Care Bundle: encourage breastfeeding (if eligible), skin to skin with parents, parent presence at the bedside, feeding on demand, swaddling, decreased noise and light stimulation

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Consider as needed (PRN) dose of morphine (0.03 mg/kg/dose) after a team huddle or discussion with on call physician if:

- Infant with two consecutive "Yes" responses to ESC (E= poor feeding due to NAS, S=Sleep <1 hour due to NAS, C= unable to Console infant with 10 minutes
- Non-pharmacologic care has been optimized first
- Evaluated for non NAS causes of symptoms

↓

Call on call physician when any additional as needed doses of morphine are given

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If more than 2 PRN doses of morphine are given in a 48-hour period consider:

- Oral methadone dosing OR consider transfer
- More PRN morphine doses
- Transfer to higher level of care (Lutheran, Methodist West, Outside Facility)

**APPENDIX D**: **Blank Children's Hospital NAS Pharmacologic Treatment Algorithm**
Page 2 of 3: Continue care at Methodist Downtown/General Pediatric Unit

# Medication Initiation

## Morphine PRN

If Morphine Doses given >12 hours apart could consider additional morphine doses

If Morphine doses given <12 hours apart could consider q8h dosing of Methadone

## Scheduled Methadone

| Level oral solution | Starting dose of Methadone 1mg/ml |
|---|---|
| 1 | 0.05 mg/kg/dose q8h |
| 2 | 0.1 mg/kg/dose q8h |
| 3 | 0.15 mg/kg/dose q8h |
| 4 | 0.2 mg/kg/dose q8h |

*** Notify pharmacy by phone if medications are started

Increase oral methadone to the 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

- Use **phenobarbital** if polypharmacy, benzodiazepine, or illicit exposure
  - 10-15mg/kg initial load, followed by 5mg/kg/day maintenance
  - Wean per Pediatric Pharmacy
- Use **clonidine** if SSRI and / opioid only exposed
  - 0.5-1mcg/kg PO q4-6 hours
  - Wean per Pediatric Pharmacy

**Appendix D: Blank Children's Hospital NAS Pharmacologic Treatment Algorithm**

Page 3 of 3: Continue care at Methodist Downtown/Blank General Pediatric

# Medication Weaning

- Consider weaning if: ESC scores primarily "No" while being maintained on the same dose for 24 hours.
- Please consult to Pediatric Pharmacy for weaning
  - If at Methodist West will need to call Pediatric Pharmacists

**Failed Weans:**

- If after a wean, persistent ESC "Yes" due to NAS then consider:
  - Option 1: Attempt to hold current dose for up to 24-48 hours if withdrawal is tolerable and not severe (before going up on the dose)
  - Option 2: Consider increasing methadone dose by 10-20%.
    - If the patient has been recently weaned to a different frequency, consider going back to the previous frequency and weaning down on that frequency for a longer time period. (Ex: was on q8h, weaned to q12h – withdrawal – go back to q8h)
  - Option 3: Consider adding a secondary agent (clonidine) if <50% through the wean

**Methadone Weaning**

- As per Pediatric Pharmacy
  - Infants should be monitored for 48 hours off of methadone before discharge home
  - Wean methadone before weaning secondary agents

**Consider adding a secondary agent if:**

- Stalled weaning for 2-3 days particularly with poly pharmacy, after first attempting methadone destabilization

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- Use **phenobarbital** if polypharmacy, benzodiazepine, or illicit exposure
  - 10-15mg/kg initial load, followed by 5mg/kg/day maintenance
- Use **clonidine** if SSRI and / opioid only exposed
  - 0.5-1mcg/kg PO q4-6 hours
- Wean per Pediatric Pharmacy

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