

**Evidence-Based Care Guideline**  
**Neonatal Abstinence Syndrome**  
(Care of the Substance Exposed Newborn)

**Purpose:**

- Prompt identification of infants at risk
- Systematic evaluation of infant responses
- Individualized plan of care within the care giving environment
- Supportive interventions for parents and infants
- Education for parents

**Introduction:**

Drug withdrawal refers to the characteristic signs and symptoms that appear when a drug causing physical dependence is suddenly discontinued or removed from the body. Neonatal withdrawal, or Neonatal Abstinence Syndrome (NAS) is defined as a constellation of behavioral and physiological signs and symptoms that are remarkably similar despite differences in the properties of the causative agent(s). NAS can occur as a result of maternal drug use during pregnancy or abrupt discontinuation of opioid analgesia after prolonged exposure in the neonatal intensive care unit. Maternal use of opiates, including heroin and methadone, are most commonly associated with NAS. Other substances that have been associated with symptoms of withdrawal include cocaine, methamphetamine, marijuana, barbiturates, diphenhydramine, chlordiazepoxide, phencyclidine, caffeine, and nicotine. Manifestations of NAS include tremor, irritability, hypertonicity, fever, poor sucking, vomiting, diarrhea, and seizures. Symptom onset and severity vary, depending on the type of substance, length and timing of exposure, and maturity of the infant. The modified Finnegan Neonatal Abstinence scoring system assists in the detection of withdrawal symptoms and charts the progression and response to therapeutic interventions. Non-pharmacologic and / or pharmacologic interventions have been shown to reduce symptoms in infants with NAS.

**This guideline provides evidence-based recommendations for the evaluation and management of neonates experiencing withdrawal. The goal is to promote early assessment, intervention, and consistent treatment of NAS.**

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### **Target Population:**

#### **Inclusion Criteria**

- Infants born to mothers with a positive drug screen or history of drug use
- Infants with a positive drug screen (Refer to clinical policy [CPOL-N00-D2507-FB/W Newborn Drug Screening](#)). [Meconium Lab Sample.htm](#)
- Infants experiencing withdrawal symptoms
- Infants being weaned from treatment from drugs that cause physiological dependence, such as fentanyl or morphine
- Infants for whom NAS scoring is ordered by the physician or physician designee

#### **Exclusion Criteria**

- There is limited data currently available in regards to NAS scoring on preterm (<32 wk) infants. Until further information is available, this guideline will be used for all infants greater than 32 weeks, and on an individual basis for infants less than 32 weeks gestation.

## **Guideline Recommendations:**

### **Assessment & Clinical Presentation:**

Infants may be suspected of experiencing withdrawal if they exhibit any of the following signs:

- **CNS Dysfunction**
  - High-Pitched Cry
  - Restlessness, with sleep duration less than 1-3 hours after feeding
  - Hyperactive Reflexes
  - Jitteriness
  - Tremors
  - Hypertonia
  - Myoclonic Jerks
  - Generalized Convulsions
  
- **Metabolic, Vasomotor, and Respiratory disturbances**
  - Sweating
  - Fever
  - Mottling
  - Frequent Yawning
  - Sneezing (>3 times per interval)
  - Nasal Flaring
  - Respiratory Rate greater than 60 breaths per minute without retractions
  - Apnea
  
- **GI Disturbances**
  - Excessive (frantic) sucking or rooting
  - Poor Feeding
  - Hyperphagia, usually associated with poor weight gain
  - Regurgitation or projectile vomiting
  - Loose or watery stools

**Onset of symptoms range from birth to the second week and beyond, but usually begin to appear within the first 24-48 hours of life.**

## Neonatal Abstinence Scoring

The decision to initiate Neonatal Abstinence Scoring can be based on observed symptoms, a positive maternal drug screen, or a neonatal drug screen (Refer to clinical policy [CPOL-N00-D2507-FB/W Newborn Drug Screening](#)). In cases of suspected or actual abuse or neglect, a referral should be made to Child Protective Services (Refer to administrative policy ADM-S00-S0276). [..\HDVCH policy & Procedures\Suspected Child Abuse and Neglect.pdf](#)

It is recommended that scoring start early if there is any indication or suspicion that the infant was exposed to drugs of abuse. ***A written order is not needed to initiate scoring.***

Abstinence scoring provides a semi-objective, quantitative measure of onset, severity and progression of withdrawal symptoms. Scores also help determine pharmacological management of withdrawal.

### Guidelines for scoring:

The Neonatal Abstinence Scale lists symptoms frequently observed in withdrawing infants. Each symptom and its associated degree of severity are assigned a score and the total abstinence score is determined by totaling the score assigned to each symptom over the scoring period.

- The first score should be performed approximately two hours after birth, upon admission to the nursery (baseline score) or when continuous narcotics are discontinued. This score reflects all infant behavior up to the first scoring interval time point.
- Following the baseline score all infants should be scored at least once per shift, except when high scores indicate more frequent scoring. Infants should be scored after feeding, before falling asleep.
  - Scores of  $\geq 3$  are indicative of withdrawal and demonstrate a need for non-pharmacological interventions and scoring q 3-4 hours
  - If the infant's score at any scoring interval is  $\geq 8$ , scoring is increased to every 2 hours and continued until 3 consecutive scores are less than 8.
  - Scores greater than or equal to 8 for 3 scoring intervals or more indicate the need for pharmacologic intervention.
  - If pharmacotherapy is required, the infant is scored at a minimum of 2 hour intervals, depending on whether or not the abstinence score is less than or greater than 8 throughout treatment. The physician should be notified of continued scoring above 8 so that adjustment can be made to the treatment plan.
  - Once the scores are consistently  $<8$  for 3 scoring intervals, scoring can be decreased to Q 3-4 hours.
  - Scoring can be discontinued when NAS score is  $\leq 3$  for 48 hours, and the infant is not receiving medication for withdrawal.

- Monitoring for over treatment should also be done. If the baby is not arousing for feedings or appears excessively sleepy, notify the physician for medication adjustment.
- The goal of care is to maintain scores less than 8.

### Guide to assessment and scoring

The neonatal abstinence syndrome scoring system was designed for term babies and may therefore need modification for preterm infants.

<b>Crying/ Agitated</b>	Chose the item that best describes the amount of time the infant was crying or agitated within the scoring period, i.e. every 2-4 hours. Note: the intubated infant may exhibit facial expressions indicative of crying, without audible sound.
<b>Sleep</b>	This is a scale of increasing severity and a term infant should receive only one score from the three levels of severity. Chose the item that best describes the amount of time the infant was sleeping within the scoring period.
<b>Moro reflex</b>	The Moro or startle reflex is a normal reflex of young infants and occurs when a sudden loud noise causes the child to stretch out the arms and flex the legs. Chose 'hyperactive moro' if the infant has some arm and/ or leg extension when touched or disturbed by loud noises. Chose 'markedly hyperactive Moro' if infant has marked arm and/or leg movement that is accompanied by crying, hyper alert state, or continued arm and/or leg tremors after being startled.
<b>Tremors/ Seizures Increased muscle tone</b>	Tremors are continuous movements, unrelated to environmental stimuli, and cannot be stopped with flexion of the limb. Undisturbed refers to the infant at rest.  In the newborn infant, seizures are most commonly focal or atypical. Unusual limb movements may accompany a seizure. In the upper limbs these often resemble "swimming" or "rowing". In the lower limbs, they resemble "pedalling" or "bicycling." Other subtle signs may include eye staring, rapid involuntary movements of the eyes, chewing, back arching, and fist clenching.  Chose 'increased muscle tone' if excessive or above-normal muscle tone or tension is observed - muscles become "stiff" or rigid and the infant shows marked resistance to passive movements, e.g. if the infant does not experience any head lag when being pulled to the sitting position; or if there is tight flexion of the infant's arms and legs (unable to slightly extend these when an attempt is made to extend and release the supine infant's arms and legs)
<b>Temperature</b>	Temperature should be taken per axilla. Mild pyrexia (37.5-38.4°C) is an early indication of heat produced by increased muscle tone and tremors.

<b>Diaphoretic</b>	Score if sweating is spontaneous and is not due to excessive clothing or high room temperature.
<b>Yawning</b>	Score if more than 3 yawns observed within the scoring interval
<b>Emesis</b>	Small amounts of formula or milk lost during burping “wet burp” do not constitute emesis. Score if infant vomits during feeding or vomits a large amount with burping.
<b>Projectile Vomiting</b>	Score if vomiting is forceful
<b>Loose stools</b>	Partial liquid/ partial solid stool.
<b>Watery Stools</b>	No solid stool.
<b>Excessive Suck</b>	Score if sucking is hyperactive, increased rooting reflex, or repeated attempts to suck fists or thumbs are observed (more than that of an average hungry baby)
<b>Discoordinated Suck</b>	Premature infants should not be scored for discoordinated suck if tube feeding is expected at their gestation. Score if suck pattern is inconsistent (weak then strong), if there is maladaptive tongue positioning (thrusting), formula lost at the sides of the mouth, or if the infant gulps during feeds.
<b>Sneezing</b>	Score if the infant sneezes more than 3 times in the scoring period
<b>Nasal Stuffiness</b>	Score if there is nasal noise on breathing, not associated with illness.

It is important to consider that infants with signs and symptoms of NAS may have other conditions leading to abnormal behavior. The non-specific nature of the clinical features of NAS mean that some drug-exposed infants may have exaggerated scores when they are hungry, or may have other conditions such as neonatal sepsis, hypoglycemia, hypocalcemia or hyperthyroidism. For that reason, it is important to assess the infant and consider if symptoms are solely due to NAS and whether other investigations are warranted.

Preterm infants are thought to experience shorter, less severe symptoms of withdrawal. This is postulated to be due in part to the relative immaturity of the central nervous system, with a decreased ability to manifest signs that will score with the traditional assessment methods used.

Scoring in preterm infants needs to consider carefully whether the symptoms exhibited are due to the prematurity alone or to manifestations of drug withdrawal. It may be prudent to consider symptoms—such as irritability, diarrhea, sneezing and yawning—that are more specific to NAS and to place less importance on symptoms such as respiratory distress, tremulous movements and poor feeding.

## Supportive Therapy

Non-pharmacological interventions should always be used on admission and in conjunction with medication. These include, but are not limited to:

- Reducing Environmental Stimulation
  - Quiet room, dim lighting, low activity
  - Move infant away from telephone, sink, high-traffic areas
  - Use slow smooth movements and avoid talking at the bedside
  - Prepare everything prior to disturbing infant to minimize handling
  - Present one stimulus at a time (rocking, voice, music, etc)
  
- Ensure Adequate Nutrition
  - Encourage Breastfeeding
    - Intake of breastmilk has been shown to both reduce the severity of NAS and decrease the need for pharmacological treatment, regardless of gestational age or specific drug exposure.
      - Mothers taking methadone can breastfeed and should be encouraged to do so.
    - If the mother continues to use illicit substances or is HIV positive, the use of breast milk should be discussed with a physician prior to use.
  - Swaddling- helps infant to control their body and coordinate feeding.
    - Consider PT consult.
  - Assess coordination of suck/ swallow reflex- support chin and jaw if needed.
    - Offer pacifier or hands for non-nutritive sucking
    - Consider OT consult.
  - Feed on demand- Frequent small feeds with rest between sucking.
  - Burp frequently
  
- Protect the Skin
  - Frequent diaper changes using barrier cream to avoid damage from frequent loose stools
  - Consider pressure reducing devices
  - Ensure adequate hydration and maintain appropriate temperature.
  
- Respond to Infant's Cues
  - Structure infant's 24 hour day, avoid waking from deep sleep
  - Feed on demand at first signs of hunger - respond quickly to infant's cries to avoid a frantic cry state
  - Decrease stimulation at first signs of distress (yawn, sneeze, averting gaze, tremors)
    - Provide firm, calm touch to offer containment
    - Apply mittens, keep hands clean and provide for non- nutritive sucking

- Wrap or swaddle infant in a flexed position with arms close to the body
  - Hold infant firmly and close to the body
  - Rock slowly and rhythmically- sing or hum quietly
- Encourage Attachment
    - Promote breastfeeding and skin to skin contact
    - Encourage parents to provide as much care as possible
    - Provide education to parents about infant behaviors and interventions

## Pharmacologic Management

Infants with a NAS score of 8 or greater are recommended to receive pharmacological therapy.

Treatment choice is primarily based on selecting a drug from the same class as the drug causing the withdrawal symptoms. However, many infants exhibiting signs of NAS have been exposed to more than one drug, and it is frequently difficult to isolate symptoms to one particular compound.

### Begin pharmacologic treatment with morphine, given orally:

1. Initial dosage of morphine sulfate is 0.05 mg/kg/dose, given orally every 3-4 hours.
  - a. If symptoms are questionable or inconsistent, a prn order for morphine may be ordered
  - b. Nursing should continue to score infant and assess need for dose escalation or discontinuation
2. The dose can be increased by 20% of the initial dosage every 8-12 hours until signs of withdrawal are controlled and NAS scores are less than 8.
  - a. Alternatively, dose may be increased by 0.025mg/kg/dose every 8 to 12 hours.
3. Doses should be titrated to effect, with the normal maximum dose of 0.20 mg/kg per dose.
4. Infants requiring more than 0.20 mg/kg per dose may require a secondary medication strategy.
5. If vomiting occurs within 10 minutes of administration, the dose may be repeated.
  - a. If vomiting occurs 10-30 minutes after administration, half the dose may be given.
  - b. If vomiting occurs more than 30 minutes after dosage, wait until the next scheduled dose.
6. When symptoms are controlled, continue the dose for 48-72 hours
7. Weaning:
  - a. When stable, decrease the dose by 10% every day, as tolerated.
  - b. Alternative strategies include decreasing dosing frequency or decreasing dose by 0.01 mg per dose
  - c. If NAS scores increase during this time, consider increasing the dose back to the last dose when scores were controlled and hold the weaning process for 24 hours.
  - d. Reassess weaning daily.
8. May discontinue morphine when the dose is 0.02mg/kg/dose and NAS scores have been less than or equal to 8 for 24 hours.
9. Continue monitoring NAS scoring for 24 hours after discontinuation.
10. Some studies suggest that opiate therapy plus clonidine as adjunctive therapy may shorten the course of pharmacotherapy for NAS
  - a. Oral dosing of 1mcg/ kg every 4-6 hours may facilitate symptom control and reduce length of treatment in moderate to severe NAS.

## Methadone

1. Dosage of 0.05-2.0 mg/kg may be given IV or PO every 12-24 hours.
    - a. Adjust as needed per NAS scores
  2. When scores are consistently < 8, weaning can start.
    - a. 10-20% reduction per week over 4-6 weeks is recommended
- All doses for withdrawal management are calculated on birth weight, not current weight.
  - Length of treatment will vary depending on the type(s) of drug exposure and severity of symptoms.
  - Indications that control has been achieved are: consistent scores <8, rhythmic sleep/wake cycles, and optimal weight gain.
  - Symptoms of over treatment include lethargy, inability to awaken for feedings, and significant constipation.
  - Infants requiring sustained pharmacologic management for more than 7 days may be considered candidates for outpatient management with methadone.

## **Iatrogenic Neonatal Abstinence Syndrome**

Prolonged exposure to opioids for sedation or analgesia can lead to tolerance, dependence, and consequently, withdrawal, if the medication is discontinued abruptly.

Gradual weaning is recommended for infants who receive opioid and/or benzodiazepines around the clock or as a continuous infusion for more than 3 days.

Weaning should start when the infant is stable and the source of pain is eliminated.

- The process of discontinuing an opioid used for more than 3 days begins with a reduction of the total daily dose by approximately 10% every day.
- Tapering may be conducted more rapidly or slowly, depending on the patient's condition.
- If the patient exhibits symptoms of withdrawal, the dose is increased to the previous amount at which the patient was comfortable and the weaning process is put on hold for 24 hours.

## Parent Education

- Upon admission parent(s) caregiver will be oriented to the unit and the infant's health care team.
- If mother is planning to breastfeed, she will meet with the Lactation consultant and in conjunction with the physician or physician designee, it will be decided whether it is safe for the baby to receive breastmilk.
- Parents and caregivers will be informed and educated about the risks, assessments and treatments of NAS.
- RNs will implement non-pharmacological treatments, teach and model to parent(s)/ caregiver.
- Parents and caregivers will be instructed on the use of the NAS scoring tool and be encouraged to participate in scoring.
- Safe sleep practices should be reinforced frequently, especially if the mother is receiving sedating medications, including methadone.
- Prior to discharge, parents and caregivers will be informed of the benefits and availability of community support services. In addition, the importance of primary and neurodevelopmental follow-up will be emphasized.

## Documentation

- Nursing will document NAS scores on the Neonatal Abstinence Weaning form located in ad Hoc charting.

Neonatal Abstinence Weaning Flow Sheet		
Drug/Dose History (prenatal drug exposure, neonatal opioid or benzodiazepine)		
<div style="border: 1px solid black; height: 40px;"></div>		
Drug Weaning Grid		
NAWFS Drug Weaning From	NAWFS Maximal Dose Of Drug	NAWFS Length Of Time On Drug
<Alpha>		

<b>Crying</b> <input type="radio"/> Crying/agitated 25 - 50% of interval <input type="radio"/> Crying/agitated >50% of interval	<b>Sleep</b> <input type="radio"/> Sleeps > 75% of interval <input type="radio"/> Sleeps 26-75% of interval <input type="radio"/> Sleeps < 25% of interval	<b>Moro Reflex</b> <input type="radio"/> Hyperactive Moro <input type="radio"/> Markedly hyperactive Moro	Right click in any box to see how that box is scored.
<b>Muscle Tone</b> <input type="checkbox"/> Mild tremors, disturbed <input type="checkbox"/> Increased muscle tone <input type="checkbox"/> Moderate/severe tremors, disturbed <input type="checkbox"/> Tremors, undisturbed <input type="checkbox"/> Seizures	<b>Metabolic</b> <input type="checkbox"/> Diaphoretic <input type="checkbox"/> Frequent yawning (>3-4/interval) <input type="checkbox"/> Temperature 37.5 - 38.4 <input type="checkbox"/> Temperature > 38.4	<b>GI</b> <input type="checkbox"/> Excessive suck <input type="checkbox"/> Discoordinated suck <input type="checkbox"/> Emesis <input type="checkbox"/> Projectile vomiting <input type="checkbox"/> Loose stools <input type="checkbox"/> Watery stools	
<b>Respiratory</b> <input type="checkbox"/> Sneezing <input type="checkbox"/> Nasal stuffiness	<b>Total Score</b> <div style="border: 1px solid black; width: 100px; height: 20px;"></div>	Right click on Total Score to get score guidelines.	

## Criteria for Discharge

The length of hospitalization in infants with Neonatal Abstinence Syndrome varies, depending on the drug, withdrawal symptoms and social factors.

The infant may be safely discharged home if NAS scores remain less than 8 for 1-2 days and the following criteria are met:

- Infant is physiologically stable
- Taking oral feeds and gaining weight
- Infant shows neurobehavioral recovery (can reach full alert state, responds to social stimuli and can be consoled with routine measures)
  - NAS scores <8 for 24-48 hours, either off medication, or on home dose
- All newborn assessments/ procedures have been completed (vaccination, hearing tests, newborn screen)
- Medical social work has completed a comprehensive psychological assessment and a safe discharge plan has been developed in coordination with appropriate community agencies.
- Referrals to appropriate community support agencies have been initiated
- Parent/ caregiver education is complete, including demonstration of ability to calm infant, understanding of increased risk for SIDS, and importance of timely follow-up care.

## Recommended Follow-Up Care

- **A follow-up appointment within one week of discharge should be made with the infant's primary care provider prior to discharge.**
- Appropriate community support to promote a safe, nurturing environment for the baby should be organized prior to discharge.
- Appropriate neurodevelopmental follow-up for the infant secondary to high-risk perinatal drug exposure should be considered.
- If appropriate, a substance abuse treatment program referral for the infant's parent(s) should be initiated during the hospital stay.

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