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quality care collaborative

Neonatal Opioid Withdrawal Syndrome (NOWS) Toolkit

A CPQCC Quality Improvement Toolkit



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Acronyms

AAP: American Academy of Pediatrics
CPQCC: California Perinatal Quality Care Collaborative
ESC: Eat, Sleep, Console
HRIF: High-Risk Infant Follow-Up
MAT: Medication Assisted Treatment
MatEx: Maternal Substance Exposure Database
NAS: Neonatal Abstinence Syndrome
NICU: Neonatal Intensive Care Unit
NOWS: Neonatal Opioid Withdrawal Syndrome
OUD: Opioid Use Disorder
PCP: Primary Care Provider
POSC: Plan of Safe Care
SUD: Substance Use Disorder

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Background

The rate of Neonatal Opioid Withdrawal Syndrome (NOWS), also known as Neonatal Abstinence Syndrome (NAS), has been increasing over the past decade nationally. The national rate increased from 4.0 to 6.1 per 1,000 births between 2011 and 2019.¹ In California in particular, the rate of NAS increased from 1.3 to 2.7 per 1,000 births between 2011 and 2021.¹ The northeastern region of California has a much higher rate of NAS at 5.0 per 1,000 births in 2021.¹ Data on opioid use and exposure is also likely to be underreported due to inconsistent definitions of NAS/NOWS and variation in diagnosis codes.² With increasing numbers of families affected by *in utero* exposure to substances, it is imperative that healthcare staff be prepared to respond with high quality, compassionate care. While NAS includes infants who have been exposed to many different types of substances, including opioids, NOWS refers to infants who have been exposed to opioids alone or opioids in combination with other substances. This toolkit aims to equip healthcare staff to care for infants with NOWS efficiently in accordance with the most recent research and evidence-based practices. Many of the guidelines below, especially the non-pharmacologic treatments, may help with symptoms of withdrawal from other substances, but they are tailored for infants exposed to opioids. This document includes a) resources for staff and institutional preparation to lay a foundation of quality care, b) information on diagnosis and monitoring, c) management recommendations, and d) discharge resources. The authors encourage you to explore the list of references to deepen your knowledge on specific recommendations that may be of interest to you or your center. In particular, the Mother Baby Substance Exposure Toolkit³ is an excellent resource that offers recommendations across the perinatal spectrum.

In many newborn centers, infants demonstrating NOWS are admitted to the neonatal intensive care unit (NICU) and administered non-pharmacologic and/or pharmacologic treatment. We recognize that the NICU is not a silo and not the first place to interact with families of infants with NOWS. Obstetrics, Labor and Delivery, and Pediatric units have a significant role to play in improving outcomes for infants with NOWS, including universal screening in pregnancy, antenatal discussions around care expectations for the infant, lactation education, preserving the caregiver-infant dyad (previously described as the mother-infant dyad), and more. Each healthcare worker, regardless of the place in which they encounter a family of an infant with NOWS, has a responsibility to offer the best care. The authors urge all hospitals to consider evidence-based care practices for infants with NOWS across the perinatal spectrum.

The authors of this toolkit have ardently tried to use inclusive language such as “caregiver,” “lactation,” and “birthing person” in recognition that “maternal” and “mother” may not be appropriate for all populations. Where language such as “breastfeeding” or “maternal” have been used, this is to clarify the action (e.g., feeding at the breast, not using pumped milk in a bottle) or in reference to specific medical terms. The authors believe that all families and infants deserve quality, equitable, compassionate medical care.

WHAT

The aim of this document is to provide healthcare staff with a straightforward manual of care that they can use as a reference to manage infants with NOWS. This may be particularly useful when infants with NOWS are not commonly managed at their institution.

WHO

This toolkit is designed for California Perinatal Quality Care Collaborative (CPQCC) member NICUs that participate in the Maternal Substance Exposure (MatEx) database, but many of the recommendations are applicable to any birth hospital. Literature on the most appropriate gestational age for treatment recommendations of infants with NOWS varies from ≥ 34 weeks,⁴ ≥ 35 weeks,⁵ to ≥ 37 weeks⁶. The specific population best served by these guidelines will need to be determined by individual hospitals and counties.

HOW

Before sharing specific guidelines on diagnosis, monitoring, management, and discharge, we describe the institutional and staff preparation needed to begin this work. Not every recommendation will be applicable to each hospital, but the authors hope that this list can provide hospitals with both specific, actionable items as well as best practices that hospitals can work to achieve.

WHY

The authors hope that by providing easy to use evidence-based guidelines, the quality and equity of care for infants with NOWS will improve.

Preparation

This section offers specific actions to ensure that an institution and staff are prepared to provide quality care for infants with NOWS. While ideally these would happen in advance of patient care, we recognize that they happen concurrently in hospitals and recommend that administrators and managers read and revisit this section as needed to ensure the foundation for quality care exists for frontline staff across clinical disciplines to succeed. Under each sub-section, we have links to resources, where applicable, that might be useful. Please be sure to give credit to the hospitals, authors, and organizations who created the resources linked below if you use or share them. It may be helpful to work with staff to determine which training topics are most needed and to plan a schedule to ensure training on this topic is integrated into professional development throughout the year.

Institutional Preparation

Commit to a Culture of Family-Centered Care

Creating a culture of patient- or family-centered care requires a significant commitment from leadership and staff. It encourages trust, creates a supportive environment for caregivers, and improves infant clinical outcomes. Consider having a NICU parent peer support specialist or NICU parent volunteer, who has personal experience with a substance use disorder and is stable in recovery, to work directly with families of infants with NOWS. These individuals might connect with families and empower them in ways that others might not because of their shared experience.

Key Aspects of Family-Centered Care:

- A multidisciplinary approach to care that involves collaboration among providers across all hospital departments, as well as with prenatal and postpartum outpatient care⁷
- An understanding that caring for infants with NOWS and their caregivers requires more energy and time from staff, which increases workload. Education for and support from leadership is needed to actualize scheduling accommodations⁷
- Implementation of trauma informed care at both the organizational and clinical levels⁷
- Creation of institutional-level goals to improve care for families and infants affected by NOWS (e.g., in a year we want to be more caregiver/infant dyad friendly)

Resources:

[Partner with Mothers \(Handout; AAP\)](#)

[Ideal Medical Practice Model \(Article; AAFP\)](#)

[Mother-Baby Bonding Program \(NAS Parent Booklet, UCSD\)](#)

[Family-Centered Care \(Tip Sheet; CPQCC\)](#)

[NAS: Caring for your Newborn \(Brochure; Children's Hospital at Dartmouth-Hitchcock\)](#)

Create Consistency

Consistency of the care provided to patients directly affects clinical outcomes. Implementation of and adherence to standardized protocols have been shown to decrease length of treatment and hospital stay.⁷⁻⁹

Protocols and procedures may be especially helpful in the following areas:

- Reaching consensus among all departments and providers, including obstetrics, on breastfeeding policies to create consistent messaging and improve adherence
- Consider using Staff Preparation resources when onboarding, as part of a yearly training curriculum, and in ongoing communication from leadership

Drive Improvement Through Data

CPQCC launched the [Maternal Substance Exposure \(MatEx\) Database](#) in 2019 to better understand and improve quality of care for infants exposed to opioids and other substances.

The benefits of collecting data on all maternal substance exposures and utilizing the MatEx database include:

- Creating reports to identify areas for improvement
- Monitoring the effects of interventions
- Understanding current practices and assessing their effectiveness
- Learning from peer hospitals through webinars

CPQCC recommends that all MatEx Database participants identify key personnel to oversee data collection and entry and to review reports in order to best improve the quality of care in your unit.

Resources:

[Ways to Improve Care \(Infographic; APHR\)](#)



Resources:

[MatEx FAQs \(Handout; CPQCC\)](#)

[MatEx Definitions \(Manual; CPQCC\)](#)

[Using MatEx Data \(Webinar; CPQCC\)](#)

Develop and Maintain Resources for Families

Develop and maintain local resource lists, educational materials, and referral information so they are readily available for patient families.

- Understand and document local, state, and federal requirements related to child protective services
- Develop working relationships with local government agencies, organizations, and leaders. This can lead to staff education opportunities and improve communication with community stakeholders.

Refer families affected by NOWS and opioid or substance use disorder (OUD/SUD) to key resources:

- Federal, state, and local resources
- OUD/SUD treatment and recovery programs
- Early childhood intervention
- Home visiting programs
- Early Head Start

Create a list of local community resources that staff can share to provide better family-centered care. Consider [this list from CPQCC](#) that is tailored for families with a non-English language of preference but which may be appropriate for families with an infant with NOWS.

California Program Sites:

[California Home Visiting Program](#)

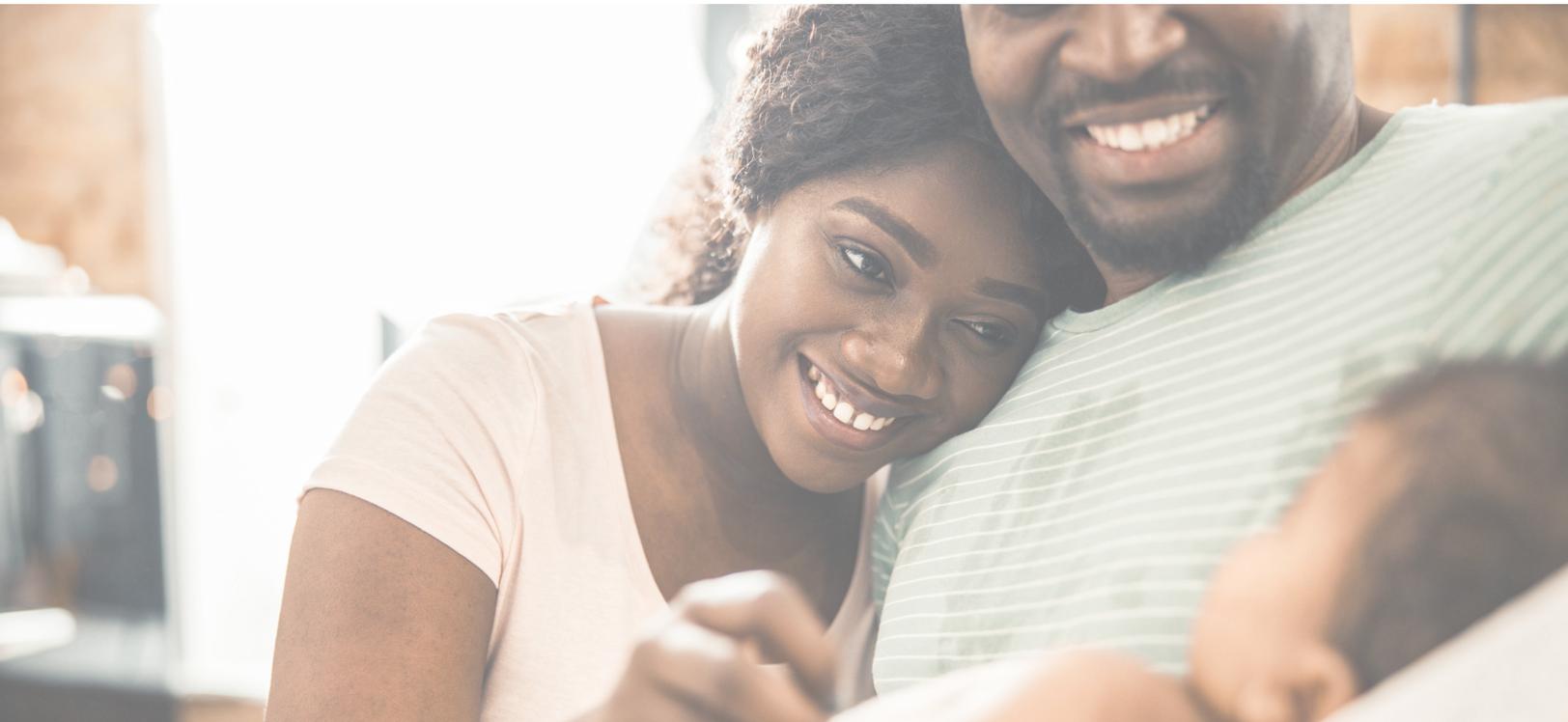
[California Head Start](#)

[CA WIC](#)

[CA BF Coalitions](#)

[First 5](#)

[Comprehensive Perinatal Services](#)



Staff Preparation

Opioid Use Disorder (OUD)

Educating health care staff on OUD is of utmost importance, as 2.7 million people ages 12 and older were estimated to have an OUD in 2020, and opioid overdose death rates have steadily increased since 1999.^{10,11} Ongoing staff training on OUD is vital for evidence-based support, prevention, and treatment of OUD.

- OUD is “a pattern of opioid use characterized by tolerance, craving, inability to control use, and continued use despite adverse consequences.” It is a chronic disease that can be managed with ongoing treatment.¹²
- Treatment for pregnant persons with OUD includes medication assisted treatment (MAT), behavioral therapy, and counseling.¹²
- As with other addictions, OUD involves chemical changes in the brain, particularly to the “Reward System” that triggers the release of dopamine when an individual does something enjoyable. Taking opioids causes the brain to release large amounts of dopamine, making the brain require higher levels of dopamine simply to feel “normal.”¹³

Breastfeeding

- Breastfeeding has been shown to decrease withdrawal symptoms, decrease the need for pharmacologic treatment, and reduce length of stay in infants affected by NOWS, yet breastfeeding rates are low.¹⁴ One of several contributing factors to these low rates is a lack of knowledge among providers on the safety and contraindications of breastfeeding.¹⁴
- The American Academy of Pediatrics, Academy of Breastfeeding Medicine, and American College of Obstetricians and Gynecologists recommend and encourage breastfeeding for birthing persons on MAT as long as they are not HIV positive or using any illicit substances.^{14–18} The Department of Health and Human Services, in guidelines updated in 2023, recommends that birthing persons with HIV who are on antiretroviral therapy (ART) with a sustained undetectable viral load

Resources:

[Substance Use Disorder \(Course; PCSS\)](#)

[The Science of Addiction \(Guide; NIDA\)](#)

[Opioid Addiction \(Video; TEDEd\)](#)

[Your Brain on Opioids \(Video; Nat Geo\)](#)

Resources:

[NAS & BF \(Webinar; HMA\)](#)

[The Right to Mother's Milk \(Article; ILCA\)](#)

[Mother's own milk at discharge \(Article; CPQCC\)](#)

and who choose to breastfeed should be supported in this decision.¹⁹

- Birthing persons who are Hepatitis C virus (HCV) positive should interrupt breastfeeding if nipples are cracked or bleeding and express and discard their milk until the nipples are healed. These same precautions can be considered for birthing persons who are Hepatitis B virus (HBV) positive, although their infants receive Hepatitis B vaccine and Hepatitis B immune globulin to prevent transmission.^{20,21}
- Methadone and buprenorphine are secreted into breast milk in low concentrations.
- Ongoing support from lactation consultants and other staff trained in NOWS is important due to the unique challenges of infants with NOWS:⁴
 - Increased risk of feeding difficulties, which can hinder successful oral feeding
 - Symptoms of withdrawal, including fussiness and increased irritability, can interfere with coordination of the suck-swallow-breathe reflex for oral feeding
 - Withdrawal symptoms can make it harder to interpret feeding cues, which can further jeopardize successful breastfeeding



Neonatal Opioid Withdrawal Syndrome (NOWS)¹⁴

Understanding NOWS is critical for staff to be able to provide quality care for these infants. There is a wide range of timing, severity, and duration of NOWS, though symptoms usually begin a few days after birth.

- Most common clinical signs and symptoms
- Treatment, including non-pharmacologic management
- Key principles for successful care of infants with NOWS:
 - Inclusion of caregivers in the infant's treatment through kangaroo care, rooming-in, and breastfeeding
 - Empathetic and compassionate communication to support the caregiver-infant dyad
 - Evidence-based treatment
 - Consider having a NOWS Champion who is a subject matter expert and can be a resource to the care team²²

Resources:

[Recovery-Friendly Care \(Handout; AAP\)](#)

[Improve Care for NOWS \(Handout; CPQCC\)](#)

[How to Care for Baby \(Infographic; APHR\)](#)

[Opioid Use & Pregnancy \(Handout; AAP\)](#)

[Eat, Sleep, Console \(Webinar; CPQCC\)](#)

[ESC/NAS Training \(Slide deck; SCVMC\)](#)

Trauma-Informed Care

Trauma from events or circumstances that an individual experiences as physically or emotionally harmful or life threatening results in harmful, lasting effects on the individual's mental, physical, social, emotional, or spiritual health.²³

A trauma-informed approach to care begins with an understanding that life experiences have a profound impact on the health and well-being of an individual.

Key Principles:

- Assume that every patient has a history of traumatic stress
- Involve patients in treatment decision-making by empowering and giving patients a voice in the process
- Promote a sense of safety, trustworthiness, and transparency

Resources:

[Organization-Level Steps \(Handout; CHCS\)](#)

[Better Care Playbook Resources \(Webpage; CHCS\)](#)

[Trauma-Informed Care \(Video; AAP\)](#)

Stigma and Bias

Stigma and bias can have a significant impact on the treatment of individuals with OUD. It is important for clinical staff to recognize their own bias and to intentionally modify language when working with patients and caregivers affected by NOWS and OUD.

In addition to training and education of clinicians and hospital staff, institutions can help prevent stigma by:

- Using person-first language
- Treating all patients with dignity and compassion
- Considering the whole person and the social, economic, and environmental challenges they may face
- Ensuring all written materials (internal and external) do not contain language that defines individuals by their disorder, sensationalizes addiction, makes generalizations about those with addictions, etc.²⁴

Resources:

[Stigma & NAS \(Webinar; CPQCC\)](#)

[Stigma & Empathy \(Podcast Episode; AAP\)](#)

[Words Matter \(Handout; NIDA\)](#)

[Words Matter \(CME/CE Activity; NIDA\)](#)

“

Person-first language maintains the integrity of individuals as whole human beings by removing language that equates people to their condition or has negative connotations.

”

-NIDA

Diagnosis and Monitoring

Types of *In Utero* Exposures

This section summarizes general concepts regarding the various types of substance exposures infants can experience and some criteria to be considered for identification and diagnosis of infants with NOWS. Each hospital should customize protocols based on its regional patient demographics.

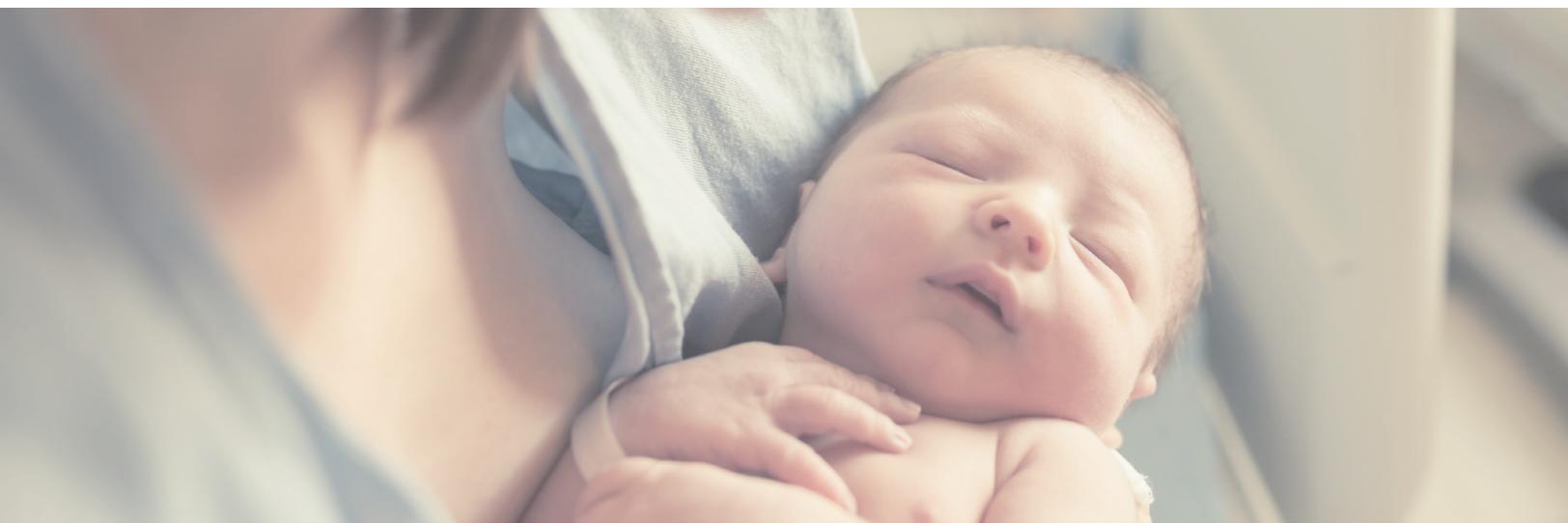
Types of Opioids

- Short-acting opioids (intermediate or sustained release): codeine, fentanyl, heroin, hydrocodone, hydromorphone, meperidine, morphine, oxycodone, tramadol
- Long-acting opioids (maintenance): buprenorphine, methadone
- For immediate release prescription opioids, higher cumulative exposure may increase the risk of NOWS. Current literature has not identified a relationship between *in utero* methadone or buprenorphine dose and risk or severity of NOWS.²⁵
- Recent literature suggests that buprenorphine when compared to methadone leads to more favorable neonatal outcomes.²⁶

Polysubstance Use

Polysubstance use occurs frequently and can complicate the diagnosis of NOWS. Exposures include any of the following:

- Stimulants: methamphetamine, cocaine
- Cannabinoids: marijuana
- Hallucinogens: PCP, MDMA, LSD
- Sedatives: benzodiazepines, barbiturates
- Selective serotonin reuptake inhibitors (SSRIs)
- Alcohol
- Nicotine



Identification and Diagnosis

Hospitals should have a written protocol for newborn screening which includes consideration of pregnant person history and testing and newborn criteria to determine newborn toxicology testing. By following the protocol, a hospital can identify newborns with intrauterine drug exposure and diagnose NOWS in symptomatic newborns.

Pregnant Person History

- ACOG recommends universal screening of a pregnant person with a validated verbal or written screening tool to standardize and to minimize bias.¹² This screen helps determine if toxicology testing is indicated.
- A stable rehabilitation treatment program usually includes regular toxicology testing.
- Toxicology testing of a pregnant person may be adequate for newborn diagnosis, but in some cases newborn toxicology testing is required by outside agencies, e.g., CPS.



Newborn Testing Criteria

Each institution will develop a protocol with testing criteria based on factors most pertinent to the regional population and demographics. Objectivity is important, as patient outcomes are affected by stigma and bias. Following are some factors to consider:

Pregnant Person Risk Factors:

- Inadequate prenatal care
- Multiple changes in medical providers
- Patient reported drug use history
- Positive toxicology testing in current pregnancy
- Enrolled in drug treatment program
- Sexually transmitted disease (STD) history (Hepatitis B, Hepatitis C, syphilis, HIV)
- Untreated depression or mental illness
- Signs of withdrawal or intoxication on admission
- Placental abruption
- Unexplained IUGR in fetus
- History of incarceration or law enforcement encounters
- History of child abuse, neglect, court-ordered child placement
- Unplanned delivery outside of hospital

Newborn Signs and Symptoms:

Diagnosis of NOWS is based on a constellation of these non-specific criteria determined to be beyond the scope of normal behavior:

- High-pitched, excessive crying
- Difficult to console
- Poor state control
- Disturbed sleep
- Tremors/jitteriness
- Increased muscle tone
- Generalized seizure
- Sweating
- Excessive sneezing or yawning
- Poor feeding
- Loose and/or watery stools

Newborn Toxicology Testing

Multiple testing modalities are available and vary in detection window, reporting time, accuracy, and cost depending on the laboratory doing the testing. Many hospitals utilize urine toxicology tests for a fast reporting time combined with meconium or umbilical cord toxicology tests which have longer reporting times but provide longer detection windows and higher sensitivity.²⁵

- For opioid exposure, routine opioid testing panels may only detect morphine, codeine, and heroin metabolites. Synthetic opioids such as methadone, oxycodone, fentanyl, buprenorphine, etc. may require more specific testing.³ As of January 2023, a new California law (SB-864) requires that hospitals “include testing for fentanyl if conducting a urine drug screening to assist in diagnosing a patient's condition.”²⁷
- Providers should be aware of false-positive drug testing from common medications taken by a pregnant person including antihistamines, antidepressants, antibiotics, decongestants, analgesics, antipsychotics, and over-the-counter products.³ Positive testing can also occur from medications prescribed and given during labor, which needs to be differentiated from substances taken prior to labor.

Modes of Newborn Testing (Table)²⁸⁻³⁰

Type	Detection Window	Result Time	Collection	Accuracy
Urine	Short (days)	Fast (hours)	Can be faulty	False negative risk
Meconium	Long (12-16 wks gestation)	Slow (days)	May be delayed	High sensitivity/specificity; confirm positive results
Umbilical cord	Long (20 wks gestation)	Variable	Easy	High sensitivity; variable correlation with meconium
Hair	Long (20 wks gestation until 3 mo after birth)	Slow (days); not widely available	May be limited specimen	False negative risk

Monitoring

Assessment Tools

Assessment tools to evaluate for NOWS consist of the traditional Finnegan-based scoring systems and the newer function-based scoring systems.

- Finnegan Neonatal Abstinence Scoring System and modifications including MOTHER (Maternal Opioid Treatment: Human Experimental Research)
 - Standardized tools based on a variety of clinical signs and symptoms
 - Numerical score is derived and guides management
- Functional scoring
 - Based on infant functions
 - Most common example is ESC (Eat, Sleep, Console)
 - Eat at least 1 oz or breastfeed well
 - Sleep at least 1 hour
 - Able to be consoled
 - Infant's ability to meet functional criteria guides management
- Account for comorbidities when using any assessment tool
 - Consider other etiologies for infant's symptoms
 - Evaluate for infection and neurological disorders as indicated²⁵

Duration of Monitoring (based on opioid type)²⁵

The duration of monitoring for signs and symptoms of NOWS with an assessment tool is based on type of opioid exposure. Minimum recommended monitoring periods are as follows:²⁵

- Immediate-release: 3 days
- Sustained-release and buprenorphine: 4-7 days
- Methadone: 5-7 days



Management

This section discusses general concepts and suggested approaches to both non-pharmacologic and pharmacologic treatment of infants with NOWS. Hospitals should have a written protocol that is specific to their institution and takes into account available resources for management of infants at risk of or diagnosed with NOWS which includes both non-pharmacologic and, if needed, pharmacologic methods of treatment.

Non-pharmacologic Management

Non-pharmacologic Bundle of Care

Initiate non-pharmacologic care at birth for all infants at risk of or diagnosed with NOWS. This bundle of care should prioritize the caregiver-infant dyad and respect and empower the birthing person and caregivers.

- Rooming-in when possible
- Emphasize swaddling, kangaroo care, cuddlers, pacifiers, low lighting, minimal stimulation,³ diaper dermatitis care
- Cluster nursing care and provider exams to minimize stimulation

Breastfeeding

Breastfeeding can be an important component of non-pharmacologic care and facilitate bonding of the birthing person and infant. It should be encouraged when the birthing person is in a stable rehabilitation or medication-assisted treatment (MAT) program.

- Decreases infant's symptoms of NOWS
- Studies have shown decreased length of stay and decreased need for pharmacotherapy³
- Involve lactation consultant early
- Contraindicated if birthing person has active substance use or relapse within 30 days. Consider avoiding breastfeeding if relapse within 30-90 days.
- Contraindicated if birthing person who is HIV positive is not on antiretroviral therapy (ART) and/or does not have a suppressed viral load. Achieving and maintaining viral suppression through ART during pregnancy and postpartum decreases breastfeeding transmission risk to less than 1%, but not zero. Birthing persons who are HIV positive and on ART with a sustained undetectable viral load and who choose to breastfeed should be counseled and supported in this decision. Breastfeeding should be discontinued if birthing person develops cracked or bleeding nipples.¹⁹

- Consider avoiding breastfeeding if Hepatitis C virus (HCV) positive with cracked or bleeding nipples, and express and discard milk until nipples are healed. If Hepatitis B virus (HBV) positive, the infant will receive Hepatitis B vaccine and Hepatitis B Immune Globulin (HBIG) within 12 hours of birth to prevent transmission, but avoiding breastfeeding with cracked or bleeding nipples can still be considered.^{20,21,31}
- Supplementation with donor human milk or formula should be considered if breast milk supply alone does not provide adequate weight gain. Higher-calorie formula may be indicated for persistent poor weight gain despite adequate feeding volumes.

Pharmacologic Management

Prioritize Functional Assessment

- Assessment of an infant's ability to function should guide pharmacologic treatment decisions in place of or in conjunction with standardized withdrawal scoring tools (e.g., Finnegan); see "Monitoring" above.
- If functional assessment criteria (such as Eat, Sleep, Console) are met, continue non-pharmacologic management.

Initiation of PRN Pharmacotherapy

- Initiate pharmacotherapy with an opioid when an infant meets a threshold of withdrawal not adequately managed by non-pharmacologic means. This threshold will differ by institution based on available resources. A standardized treatment protocol decreases length of treatment.³² NOWS treatment protocol examples from several CPQCC hospitals are included at the end of this toolkit.
- Monitor pulse oximetry during pharmacologic management.
- Consider morphine prn dosing rather than scheduled dosing³
 - PRN dosing as often as every 3 hours minimizes pharmacotherapy exposure compared to scheduled dosing.
 - Morphine is most commonly used for prn dosing.
 - PRN dosing protocol will vary by institution. An example would be to start with morphine 0.05 mg/kg po prn as often as every 3 hours and consider increasing dose by 0.01 mg/kg until effective.³³
- Methadone prn dosing has limited data, with one study of morphine versus methadone prn dosing showing similar hospital outcomes.³⁴
- Consider transition to scheduled dosing if infant receives frequent prn doses

Scheduled Dose Pharmacotherapy

Scheduled dosing with morphine or methadone are both in common use. Scheduled dosing protocol will vary by institution.

- Scheduled morphine dosing may be similar to prn dosing protocol except giving doses on an every 3 hour schedule.
- Scheduled methadone dosing may start at 0.05-0.1 mg/kg every 6 hours with weaning of both dose and time interval.³⁵
- Some studies of methadone or buprenorphine show evidence for decreased length of stay and length of treatment compared to morphine.³⁶⁻³⁸
- Limited buprenorphine research has shown decreased length of treatment but increased need for adjunctive therapy compared to methadone.³⁷
- Beware of preparations with high alcohol.²⁵
- Consider Clonidine instead of Phenobarbital for adjunctive therapy.^{3,39}
- Naloxone is contraindicated due to risk of rapid withdrawal and seizures.²⁵

Weaning and Discontinuation of Pharmacotherapy

Once a stabilization dose is reached, gradual weaning should be guided by an institution's protocol. A standardized weaning protocol decreases length of treatment.³²

- Weaning protocol will vary by institution. An example using morphine would be to wean by 10-20% of the maximum morphine dose given if functional assessment criteria are met in the prior 24 hours.⁴⁰
- After discontinuation of pharmacotherapy, continue to monitor infant for withdrawal. Criteria for discharge is based on a minimum period without symptoms as follows:
 - Stable off morphine for 24-48 hours
 - Stable off methadone for 48-72 hours
- Discharging an infant on opioids is not recommended. However, if this is standard practice at a hospital, ensure the outpatient provider is experienced with close structured follow-up of infants with NOWS.



Discharge

This section provides guidance on the actions that hospital staff and clinicians should take to ensure families have a smooth transition from the hospital to home. Teams should have clear criteria for infant discharge readiness and protocols that ensure caregivers have the support, resources, and knowledge needed to meet their infant's needs. Please be sure to give credit to the hospitals, authors, and organizations who created the resources linked below if you use or share them.

Patient Discharge

Ensure Discharge Readiness

Preparing the transition to home begins well before discharge and involves assessing family needs, providing education on what to expect, connecting with relevant resources, and coordinating care with other members of the healthcare team.

Though specific criteria may vary from unit to unit, key elements of discharge planning and preparation include:

- Set expectations with caregivers and families on discharge requirements and protocols
- Follow pharmacotherapy weaning protocol, if applicable
- Confirm stable weight and adequate oral intake
- Educate family about NOWS
- Ensure a safe home environment, including minimizing smoking and a sleep space separate from parents' bed
- Address concerns that arise from social worker's evaluation which may include referral to child protective services
- While NOWS is not currently a [CCS HRIF-eligible criterion](#) on its own, some infants may meet CCS HRIF criteria in other categories due to clinical findings or diagnoses. Some NICUs, in coordination with their HRIF teams, have also decided to refer to clinical follow up regardless of CCS HRIF-eligible status.

Resources:

[Planning Mother-Infant Dyad Discharge \(Handout; AAP\)](#)

[NICU Discharge Prep & Planning \(Article; J Perinat\)](#)

[Example: Methadone Weaning Protocol for infants with NAS \(Article; J Pediatr\)](#)

Utilize Discharge Checklists

Maternal and infant discharge checklists can be used to ensure adherence to consistent discharge procedures. They can improve communication, warm handoff rates, and shared decision making. They build partnership to community resources that the family can access after leaving the hospital.

- Refer to the discharge guidelines and recommendations article to develop your own protocol; although it addresses NICUs, many of the recommendations are also applicable to the well-baby unit.

Resources:

[Discharge Plan \(Handout; ILPQC\)](#)

[SAMHSA Clinical Guidance \(Guide: Discharge Planning checklist p.93-94\)](#)

[Plans of Safe Care \(POSC\) FAQ \(Handout; AAP\)](#)

[Newborn Plan of Safe Care \(Handout; Vermont\)](#)

[Newborn Discharge Checklist \(Page 3; MBSEI Toolkit\)](#)

Connect with the Primary Care Provider (PCP)

Before the infant leaves the hospital, connect with the primary care provider (PCP) to discuss:

- Plan of safe care (POSC)
- Follow-up appointment scheduled within 24-72 hours of discharge
- Any social concerns related to parents or environment
- Eligibility for California's High Risk Infant Follow-Up Program

Consider a warm handoff, which is verbal communication between two members of the health care team. Warm handoffs allow for improved communication and engagement of patients, caregivers, and their families.

Resources:

[Warm Handoffs \(Webpage; AHRQ\)](#)

[POSC Resource Library \(Webpage: Addiction Free CA\)](#)

Provide Family Resources

Updated written materials should be readily available to families. Parents and caregivers will receive a large amount of information before leaving the hospital, and having information at an appropriate literacy level for later reference can provide empowerment and confidence.

Information provided in these materials should include:

- Community resources and programs
- Educational materials (what to expect)
- Peer or treatment group information, if available
- When and how to contact PCP or public health nurse

Resources:

[NAS \(Family Guide; OPOC\)](#)

[Newborn Withdrawal \(Guide; IPQIC\)](#)

[SUD Treatment Facility Locator \(Webpage; US DHHS\)](#)

[NAS Family Toolkit \(Guide; PADH\)](#)

[NAS: What you need to know \(Handout; ILPQC/IDPH\)](#)



Additional Resources

This section offers both a list of comprehensive NOWS resources and examples of NOWS treatment protocols from CPQCC hospitals. The educational resources include training videos, templates, toolkits, and extended reading. These will be useful as units develop NOWS protocols, policies, and training opportunities for staff.

The treatment protocol examples shared below were developed by individual CPQCC member hospitals. We understand that every hospital works with a different set of resources and constraints. As such, some of the tools presented may not be directly applicable to your hospital setting. The tools and guidelines presented here should be adapted to fit your local needs. The authors hope the protocol examples will provide a starting point and template for units as they create their own policies and algorithms.

Comprehensive NOWS Education and Websites

[Mother Baby Substance Exposure Toolkit](#)

- Includes best practices for outpatient settings, labor and delivery units, and the nursery/NICU

[Mothers and Newborns Affected by Opioids: Neonatal; Illinois Perinatal Quality Collaborative](#)

- Includes toolkit, QI information, clinical quickstart guide, webinar recordings, and more

[Neonatal Abstinence Syndrome Resources; National Center on Substance Abuse and Child Welfare](#)

- Includes policy and practice resources, videos, trainings, state/local examples, and more

[Eat, Sleep, Console \(ESC\); Common Spirit](#)

- Includes how to implement and operationalize ESC

[ESC NAS Care Tool; Boston Medical Center & Dr. Matt Grossman](#)

- Includes photos of care strategies and tools

[NOWS: Share Your Knowledge Campaign; AAP](#)

[Pregnancy and Substance Use: A Harm Reduction Toolkit; Academy of Perinatal Harm Reduction](#)

[Reducing Stigma Education Tools \(ReSET\); Dell Medical School at the University of Texas at Austin](#)

[Opioid Safety Toolkit for Leadership and Change Management; California Health Care Foundation](#)

NOWS Treatment Protocol Examples

University of California San Diego

UC San Diego Health
Women and Infants Services



Eat, Sleep, Console (ESC) Tool: Neonatal Abstinence Syndrome Assessment

- With every VS/assessment: review with parents infant's behaviors since last assessment if applicable

Time				
Eat				
Poor eating due to NAS?	Yes/No	Yes/No	Yes/No	Yes/No
Sleep				
Sleeping < 1 hour due to NAS?	Yes/No	Yes/No	Yes/No	Yes/No
Console				
Unable to console with 10 mins due to NAS?	Yes/No	Yes/No	Yes/No	Yes/No

- If infant with "Yes" for any ESC item determine additional non-pharmacological interventions that can be optimized and reassess infant in 1 hour
- If infant continues with "yes" for any ESC item notify provider

Prenatal

UC San Diego Health

ESC-Based Pharmacologic Treatment Regimens: Morphine Pathway

- Assess infant after feedings, preferably while skin-to-skin or held swaddled by mother/caregiver.
- Review ESC behaviors, which have occurred since last assessment.
- Optimal non-pharm care: Breastfeeding (if no medical contraindication), rooming-in, parental presence, skin-to-skin, holding, swaddling, ab lib feeding (at least every 3 hours), quiet environment, limited visitors.
- If "Yes" to ESC item perform team huddle (i.e. Provider, RN) to determine non-pharm interventions that can be optimized. Include mother/parent when present.
- If continues with "Yes" for any ESC item despite optimal non-pharm care, repeat team huddle.

Morphine Initiation: After team huddle if pt. continues with "Yes" to any ESC item, non-pharm care optimized to greatest extent, and non-NAS causes excluded, Consider initiating PRN oral morphine.

Start dose: 40 mcg/kg PO every 3 hours PRN. Use birthweight for dosing.

If infant receives greater than 4 PRN doses, DC PRN order and switch to scheduled doses. (40 mcg / kg PO every 3 hours)

Morphine Escalation: Consider increasing oral morphine after team huddle if continues with "Yes" to any ESC item, non-pharm care optimized to greatest extent, and non-NAS causes excluded.

Increase Dose:

- Give bolus dose of 20mcg/kg once and increase baseline dose by 20mcg/kg/dose
 - Example: Baseline dose=40 mcg/kg. New dose=60 mcg/kg
- Recommended maximum dose=120 mcg/kg every 3 hours

Morphine Weaning: Consider weaning if primarily "No" responses for ESC while on same dose for 24 hours and non-pharm care optimized.

Wean Dose:

- Wean morphine maintenance dose by 10% of maximum dose.
- If initial wean tolerated, wean up to 20% of maintenance dose daily.

Discontinue:

- When dose is less than or equal to:
 - A) 20mcg/kg **OR** B) No longer possible to measure for infant less than 2.5kg.
 - Monitor for at least 24-hours off morphine before discharge home.

Secondary Agent: (Example: Clonidine)
Consider adding if "Yes" to any ESC item, non-pharm care optimized to greatest extent, and non-NAS causes excluded **AND:**

- Morphine dose maximized **OR**
- Unable to wean by day 7 of treatment **OR**
- Concern for polysubstance withdrawal (particularly if benzodiazepine co-exposure)

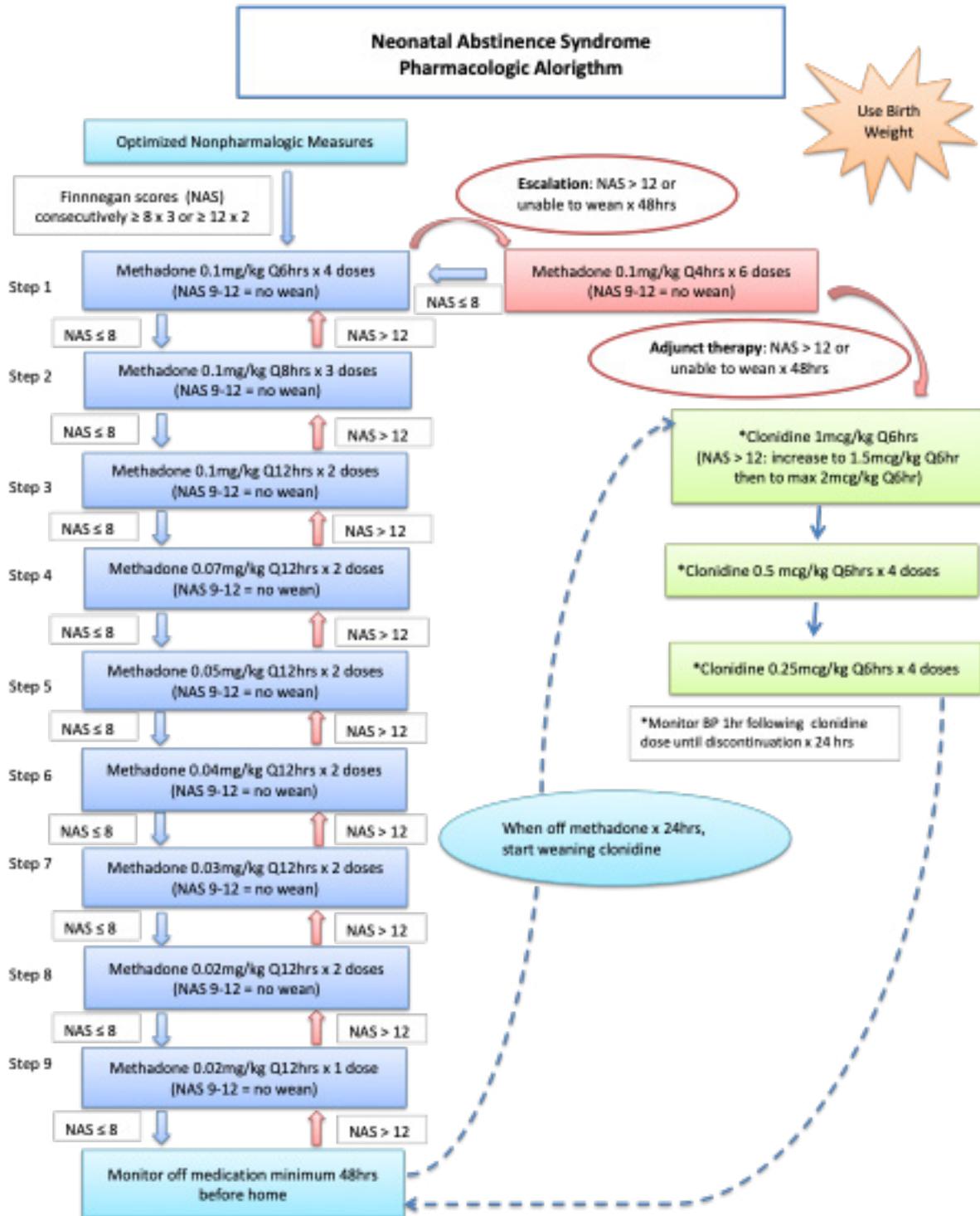
UC San Diego Health

Women and Infants Services

Secondary/Adjunct Agents

- If infant continues to have primarily “no” responses on maximal morphine and if unable to wean for 48 hours, consider initiation of clonidine adjunct at 1 mcg/kg PO q 6 hours (do not weight adjust). Do not use phenobarbital.
- If infant continues to have primarily “no” responses and at 1mcg/kg/dose q 6hours then may increase dose to 1.5 mcg/kg/dose q 6 hours. (Max dose 6 mcg/kg/day).
- Monitor blood pressure 1 hour following dose every 6 hours while on clonidine and for 24 hours after discontinuation.

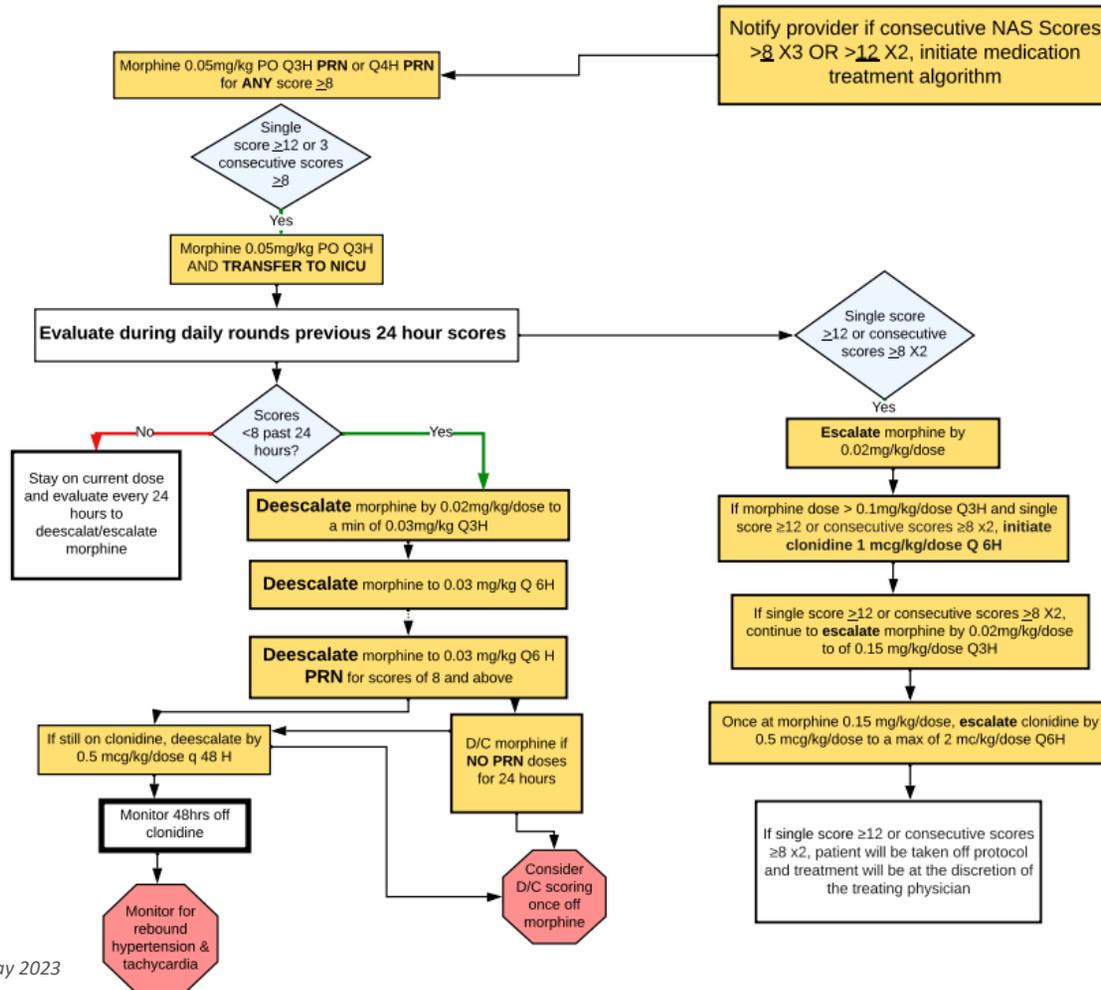
Steps for weaning	Clonidine dose	Dosing interval	Number of doses.
1	1 mcg/kg/dose PO	Q 6 h	Until off morphine (opioid) and responses are mostly “yes” for 24 hours
2	0.5 mcg/kg/dose PO	Q 6 h	4
3	0.25 mcg/kg/dose PO	Q 6 h	4



Reference:

McPherson C. Pharmacotherapy for Neonatal Abstinence Syndrome: Choosing the Right Opioid or No Opioid at All. Neonatal Netw. 2016;35(5):314-20.

Neonatal Abstinence Syndrome (NAS)/Neonatal Opioid Withdrawal Syndrome (NOWS) Management Algorithm



- Maternal Risk Factors**
- Positive urine drug screen
 - History of drug use in pregnancy
 - Medium-High NIDA screen
 - Placental abruption
 - Scant or lack of prenatal care
 - Admission from justice center

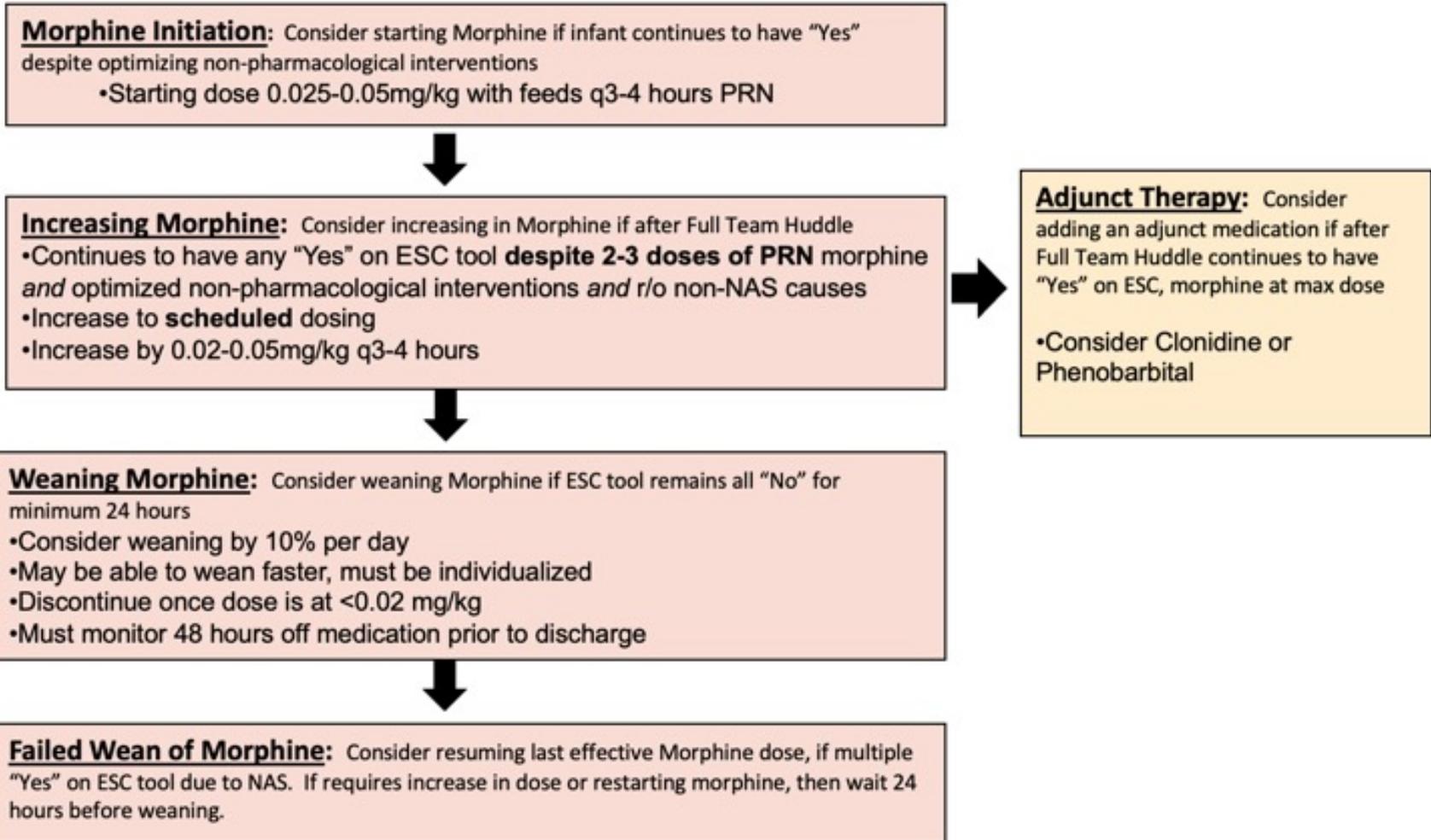
- Newborn Confirmatory Testing**
- Umbilical cord tissue (preferred)
 - UDS Pain w/ reflex to confirmation (if MOM UDS+)
 - Meconium drug screen (if cord tissue not obtained)

- Maximize non-pharmacologic interventions**
- Eat, Sleep and Console**
- Encourage parental engagement
 - Hold/rock infant as much as possible
 - Skin to skin time
 - Encourage breastfeeding if mother in a rehab program
 - Staff engagement/cares
 - Hold infant "on demand" whenever crying or fussy
 - Provide pacifier
 - Cluster cares
 - Swaddle with soft, thin blanket
 - Start diaper barrier cream prophylactically
 - Environment
 - Quiet care space
 - Soft music
 - Infant rockers with motion
 - Avoid unnecessary stimulation



May 2023

SCVMC Morphine Protocol





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