



## NEONATAL ABSTINENCE SYNDROME (NAS) CLINICAL PRACTICE GUIDELINES

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## NEONATAL ABSTINENCE SYNDROME (NAS) CLINICAL PRACTICE GUIDELINES

### INTRODUCTION

The impact of drug addiction on a pregnant woman has profound effects, not only on her health and wellbeing but also that of her newborn baby. Neonatal Abstinence Syndrome (NAS) is a classification for neonatal withdrawal symptoms from maternal use of drugs of addiction. Maternal substance use during pregnancy is an important risk factor for negative pregnancy and neonatal outcomes. The infant at risk for NAS is also at increased risk for pre-term birth, low birth weight and intrauterine growth restriction. Substance use in pregnancy is a marker for social and environmental risks that contribute to mental, physical and developmental challenges for infants and children that may last a lifetime.

The Neonatal Abstinence Work Group focused primarily on NAS resulting from opioid dependence and does not address the management of NAS resulting from the use of selective serotonin reuptake inhibitors (SSRIs), benzodiazepines, barbiturates, ethanol, sedatives, and hypnotics. The Work Group's Recommendations, which have been approved by the PCMCH, address the psychosocial needs of opioid dependent women during the preconception, antenatal and postpartum/post discharge stages as well as the needs of the infants born to these women. They utilized research based on quality of the evidence and classification of the recommendations according to the Canadian Task Force on Preventive Health Care definitions listed in the Table below:

#### Levels of Evidence Defined

**Table 1. Key to evidence statements and grading of recommendations, using the ranking of the Canadian Task Force on Preventive Health Care<sup>i\*</sup>**

Quality of Evidence Assessment**		Classification of Recommendations***	
I	Evidence obtained from at least one properly randomized controlled trial	A.	There is good evidence to recommend the clinical preventive action
II-1	Evidence from well-designed controlled trials without randomization	B.	There is fair evidence to recommend the clinical preventive action
II-2	Evidence from well-designed cohort (prospective or retrospective) or cased-control studies, preferably from more than one centre or research group	C.	The existing evidence is conflicting and does not allow a recommendation for or against use of the clinical preventive action; however, other factors may influence decision-making
II-3	Evidence obtained from comparisons between times or places with or without the intervention. Dramatic results in uncontrolled experiments (such as the results of treatment with penicillin in the 1940s) could also be included in this category	D.	There is fair evidence to recommend against the clinical preventive action
		E.	There is good evidence to recommend against the clinical preventive action
III	Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees	L.	There is sufficient evidence (in quality or quantity) to make a recommendation; however, other factors may influence decision making
*Woolf SH, Battista RN, Angerson GM, Logan AG, Eel W. Canadian Task Force on Preventive Health Care. New grades for recommendations from the Canadian Task Force on Preventive Health Care. Can Med Assoc J 2003;169(3):207-8			
**The quality of evidence reported in these guidelines has been adapted from the Evaluation of Evidence criteria described in the Canadian Task Force on Preventive Health Care			
***Recommendations included in these guidelines have been adapted from the Classification of Recommendations criteria described in the Canadian Task Force on Preventive Health Care.			

## GLOSSARY OF TERMS

Abbreviations	Terminology
Antenatal, ante partum or prenatal	Period of pregnancy prior to giving birth
CNS	Central nervous system
CFSA	Child and Family Services Act
FAEE	Fatty acid ethyl ester
FAS	Fetal alcohol syndrome
FASD	Fetal alcohol spectrum disorder
Fetus	Unborn baby
Illicit substance	Substances and medications that are non-prescription and not obtained over-the-counter from a pharmacy.
In utero	Before birth; in the uterus
Methadone	Drug used to treat opioid addiction
MMT	Methadone Maintenance Treatment
NAS	Neonatal Abstinence Syndrome
Neonate	Birth to 28 day old infant
NICU	Neonatal intensive care unit (Level 3)
Opioid or opiate	Type of drug used to relieve pain. These addictive drugs are also called narcotics. Examples include: morphine, codeine, fentanyl, oxycodone, heroin, and hydromorphone. Opiates are naturally occurring narcotics whereas opioids include synthetic narcotics.
Polydrug exposure	Exposure to more than one addictive drug or substance
Postnatal or postpartum	The 6 week period following the birth of a baby
Preconception	Occurring prior to conception
SCN	Special care nursery (Level 2/2+)
Substance using mom	A pregnant woman dependent on methadone or other opioid drugs
T-CUP	Toronto Centre for Substance Use in Pregnancy at St. Joseph's Health Centre in Toronto

## Maternal Guidelines

TABLE 2 – NAS MATERNAL GUIDELINES: PRECONCEPTION, PRENATAL, INTRAPARTUM, POSTPARTUM, DISCHARGE PLANNING				
RECOMMENDATION		RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
Preconception	<div>1. Health care providers should routinely screen all women of childbearing age for use of medicinal and non-medicinal substances, including alcohol, opioids and other analgesics, selective serotonin reuptake inhibitors (SSRIs) and tobacco use.</div> <div>a) Routinely screen women for substance use.</div>	<div>Routine universal screening by primary health care providers is important to normalize conversation about this important and sensitive topic.</div> <div>A positive screen may indicate a risk for substance dependence; therefore, a more comprehensive evaluation by a specialist is recommended.</div> <div>Based on the literature, there is no optimal screening tool for substance use. Some options include Chasnoff’s 4P’s Plus<sup>ii</sup>, substance use risk profile and CAGE-AID<sup>iii</sup>.</div>	IIIB	<div>Screening opportunities may include: physicians, nurse practitioners, schools, Early Years centre, pain and methadone clinics, sexual health clinics, addiction services.</div> <div>Educational strategy to train providers about how to screen, raise public awareness about impact of substance abuse on pregnancy, fetus and neonate.</div> <div>Best Start Resource Centre (Health Nexus) materials are available to teach health care professionals how to ask questions about substance use. There is a video series about effective interviewing.</div> <div>Practitioners will require support to develop their comfort level to ask screening questions and to create a safe environment for women to report substance and alcohol use.</div>

TABLE 2 – NAS MATERNAL GUIDELINES: PRECONCEPTION, PRENATAL, INTRAPARTUM, POSTPARTUM, DISCHARGE PLANNING				
RECOMMENDATION		RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
Preconception	b) Follow the Society for Obstetricians and Gynecologists of Canada (SOGC) Alcohol Use and Pregnancy Consensus Clinical Guidelines <sup>iv</sup> to routinely screen for alcohol consumption.	<p>Pregnancy is a time when a woman is most willing to make lifestyle changes therefore assessment and counselling about substance use is important at this time.</p> <p>Often substance using women also consume alcohol.</p> <p>SOGC recommends Level 1 screening use questioning, motivational interviewing and supportive dialogue. If the woman does consume alcohol, then use Level II screening using standardized questionnaires such as the T-ACE or TWEAK tool.</p>		<p>Diagram A: Algorithm for Antenatal Assessment of Risk of NAS <i>see Diagram A on page 13</i></p> <p>Health care providers need to be trained in administering Level I and II screening methods for alcohol consumption.</p>
	2. Contraception counselling is essential to prevent unplanned pregnancy whenever a woman changes from short to long-acting opioids, i.e. methadone or Buprenorphine.	<p>Unplanned pregnancy is preventable.</p> <p>Short acting opioids suppress ovulation therefore contraception is important when switching to long acting opioids.</p>	III B	Educate practitioners, including nurses and physicians at methadone clinics, family physicians, obstetricians, sexual health clinics.
	3. Develop a written maternal and neonatal care plan to supplement the standard antenatal record.	A written care plan will support continuity of care and collaboration and eliminate gaps with other health care providers, for example addiction services.	IIIB	An example is the Prenatal Specialized Care Plan produced by St. Joseph's Health Centre in Toronto.
Prenatal				

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RECOMMENDATION		RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
Prenatal	<p>a) Prepare and educate the substance using woman and her partner in advance for their baby’s hospital experience and management of NAS.</p> <p>Every substance using woman, her partner and family should receive written material explaining NAS, hospital stay expectations, role of the parent, and resource contacts including the healthcare team.</p>	Overall goal is to link with hospital staff and initiate the therapeutic relationship, build trust and reduce anxiety for the parents about newborn care.	II-1 B	<p>Urban hospitals may provide antenatal consultations with a pediatric care resource team. An example is the program at St. Joseph’s Healthcare, Hamilton</p> <p>Many smaller hospitals do not have a formal pediatric care resource team however they can often provide hospital tours and written information. An example is a booklet produced by the Special Care Nursery at St. Joseph’s Healthcare (Hamilton) titled <i>Neonatal Abstinence Syndrome: A guide for caregivers with a newborn withdrawing from drugs and medication</i></p> <p>Refer women to Healthy Babies, Healthy Children program (Public Health).</p>

TABLE 2 – NAS MATERNAL GUIDELINES: PRECONCEPTION, PRENATAL, INTRAPARTUM, POSTPARTUM, DISCHARGE PLANNING				
RECOMMENDATION		RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
Prenatal	b) Methadone is the treatment of choice for opioid dependent women in pregnancy and should be offered to all women who are eligible.	Methadone dosing: keep the woman stable with no illicit use of opioids. Adjust dose as required.	II-1 B	The College of Physicians and Surgeons of Ontario has established program standards and clinical guidelines for Methadone treatment <sup>v</sup> .
	c) Methadone is best initiated as inpatient or outpatient with close monitoring	<p>Third trimester dosing adjustments to account for increased metabolism: higher and or split dosing.</p> <p>If methadone is not available to treat opioid dependence or the patient is very motivated to stop opioid use in pregnancy, other options need to be explored. However, the decision to use other opioids or to taper must be made on an individual basis.</p> <p>If the risk of relapse is low, then opioid tapering may be considered in the second trimester by no more than 10% reduction in dose per day. Clonidine should be avoided in pregnancy. Switching to an immediate release preparation at the end of the taper allows for finer titration but close monitoring such as weekly dispensing or in some cases daily dispensing is necessary. Monitoring for relapse is important. At times the taper needs to be halted temporarily because of increased stress or emergence of withdrawal. Women who use other drugs are not good candidates for opioid tapering.</p>	II-2 B	

TABLE 2 – NAS MATERNAL GUIDELINES: PRECONCEPTION, PRENATAL, INTRAPARTUM, POSTPARTUM, DISCHARGE PLANNING				
RECOMMENDATION		RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
Prenatal		<p>The only other opioid studied in pregnant women is buprenorphine (mono-product) available by special access through the manufacturer and Health Canada. No specific license is required to prescribe it but an online training program is recommended by Health Canada. It is associated with a milder withdrawal syndrome in neonates compared to methadone but women are also more likely to drop out of care. Using other opioids for maintenance may not be viewed as acceptable practice by regulators such as CPSO and Health Canada. Health Canada has the right to issue an exemption under Section 56 of the Controlled Drugs and Substances Act to use morphine to treat addiction.</p> <p>There are studies from Vienna where women maintained on single daily doses of morphine had acceptable outcomes. However, withdrawal in neonates was no different than compared to methadone<sup>vi, vii</sup></p>		
	d) Methadone may be tapered during pregnancy providing the woman is stable. Taper during the second trimester only and monitor closely for relapse to opioids or related drugs including alcohol. Avoid withdrawal.		II-2 B	



**TABLE 2 – NAS MATERNAL GUIDELINES: PRECONCEPTION, PRENATAL, INTRAPARTUM, POSTPARTUM, DISCHARGE PLANNING**

	RECOMMENDATION	RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
Intrapartum	e) Methadone dosing during labour (intrapartum) should keep the woman stable. The volume of methadone drink may be reduced. Avoid withdrawal.		II-2 B	
	f) Pain management during labour should include epidural anesthesia where available.		II-2B	
	g) Narcotic antagonists (Naloxone) are contraindicated for the opioid dependent woman or baby.	Naloxone will cause immediate and severe withdrawal symptoms.	III B	
Postpartum	h) Educate the mother, her partner and family care givers so they are prepared to effectively care for infant with NAS.	Integrate parents, caregivers or foster parents into the care of the infant while in hospital and involve them in discharge planning.	III B	This builds on the teaching involved in recommendation #3 a). The same printed materials can be used.  Develop specific training for family care givers of NAS babies.
	4. Create circumstances for success. Where possible, the goal is to position the family for success. When necessary, carefully assess social risk and anticipate needs. a) Involve the mother and her support person in all infant care unless contraindicated by child protection concerns. b) Implement a parental partnership contract to enhance communication with parents and support their involvement in the care of their infant, for example, rooming-in, feeding and handling.	Written and verbal communication is instrumental to gain commitment and enhance the relationship of the parents and the infant with NAS throughout the hospital stay. It is beneficial for the agreement to cover all aspects of infant care, including feeding, handling, skin-to-skin care, rooming-in and frequency of visits after mom is discharged.	III B	Expectations, terms & conditions will be described in a parental partnership contract.

TABLE 2 – NAS MATERNAL GUIDELINES: PRECONCEPTION, PRENATAL, INTRAPARTUM, POSTPARTUM, DISCHARGE PLANNING				
RECOMMENDATION		RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
Postpartum	<p>c) Anyone who has reasonable grounds to suspect that a child is or may be in need of protection must promptly report the suspicion and the information upon which it is based to a child protection agency (Child and Family Services Act Section 72. (1) ) Positive screening results as well as information received from or about the mother and observations of her may raise a suspicion that requires reporting. This applies to concerns in addition to maternal substance use.</p>	<p>We all share a responsibility to protect children from harm. Section 72 of the CFSA states that members of the public, including professionals who work with children, must promptly report any suspicion that a child is or may be in need of protection and the information on which their suspicion is based to a child protection agency.</p> <p>Children are almost always better off being raised by their family. There are times when families experience problems that compromise the safety and well being of children. Under these circumstances, child protection agencies can provide support to strengthen the family so they are able to parent their children safely. Children's aid societies can offer this support through a voluntary working relationship. However when this is not sufficient to address the concerns, intervention through a court order and/or substitute care may be required to achieve positive outcomes for children.</p>	III B	The professional's duty to report overrides the provisions of any other provincial statute, specifically, those provisions that would otherwise prevent disclosure by the professional or official. Solicitor client privilege is the only exception.

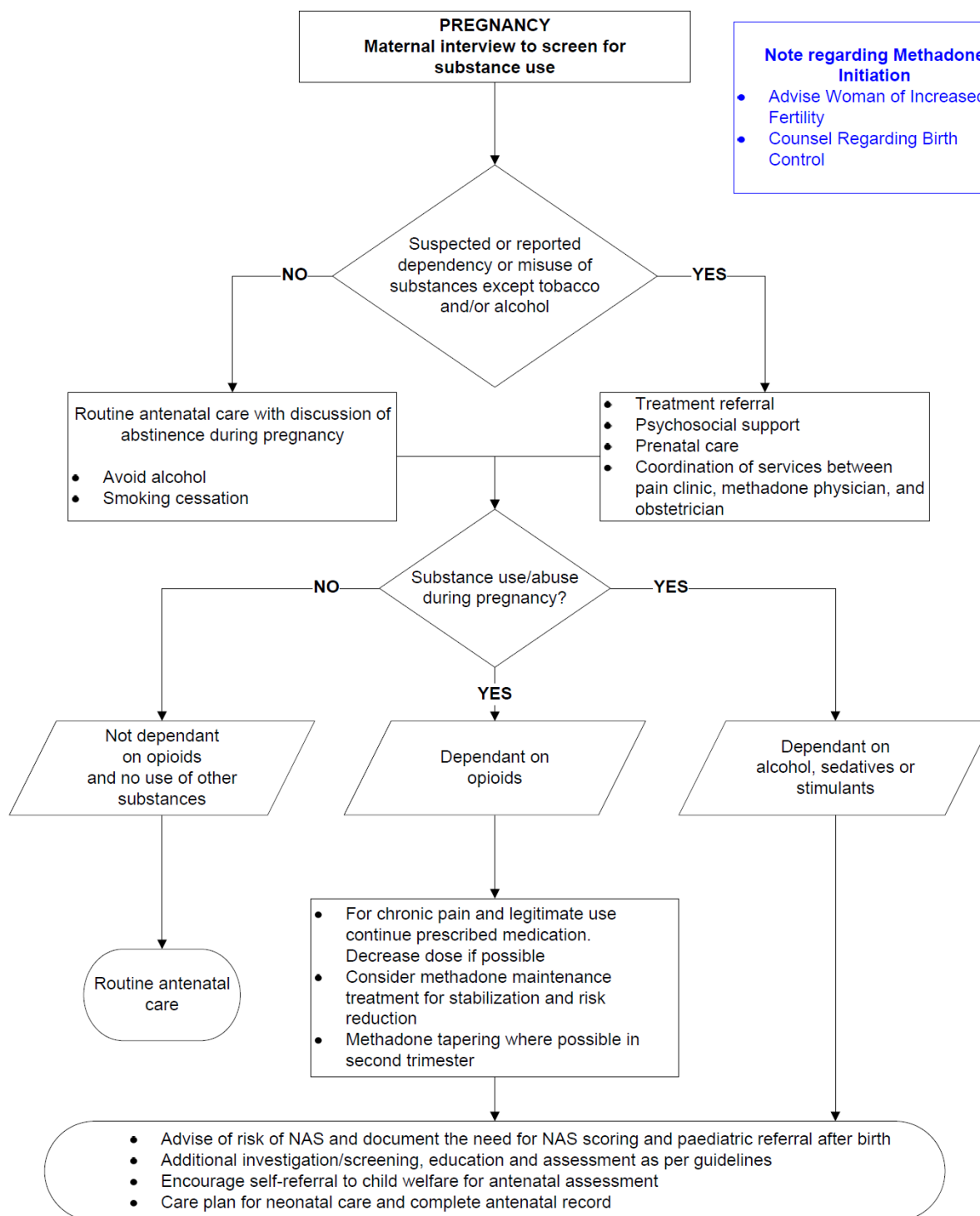
**TABLE 2 – NAS MATERNAL GUIDELINES: PRECONCEPTION, PRENATAL, INTRAPARTUM, POSTPARTUM, DISCHARGE PLANNING**

RECOMMENDATION		RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
Discharge Planning	5. Discharge planning a) The primary care provider for the infant should be identified prior to discharge.	It is important to ensure there are no gaps in the care and monitoring of the infant with NAS and their family.	III B	Educate practitioners about the importance of ongoing care and monitoring.
	b) Provide professional home visitor (high risk Public Health Nurse) to continue to address risk factors and support once the baby is discharged home.	Address child development, risks associated with co-sleeping, SIDS, smoking, relapse prevention and shaken baby syndrome.	III B	
	c) Every baby exposed to opiates/methadone should have ongoing assessments by a clinical expert in assessing developmental milestones.		II-3 B	
	d) Develop links between the Children's Aid Society (CAS/CCAS) and the primary health care provider as a case management tool.	Managing the care of an infant with NAS can pose many challenges for foster parents. As a result, they depend on expert medical advice to carefully manage these infants in their home to ensure the best possible care is provided.  Management of these infants is specialized even for family doctors and pediatricians. Establishment of protocols of care with local neonatal specialists is optimal. Collaboration between foster parents and local medical providers with expertise and experience in neonatal abstinence is critical. Close follow up for associated medical and developmental complications must be arranged.	III B	When infants with NAS are in foster care, medical care ought to be available to the infant in the same community where the foster parent resides.

TABLE 2 – NAS MATERNAL GUIDELINES: PRECONCEPTION, PRENATAL, INTRAPARTUM, POSTPARTUM, DISCHARGE PLANNING				
RECOMMENDATION		RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
Discharge Planning	e) Ensure the substance abusing mother is linked to all the psychosocial, medical, addiction services and social services to make it safe for the baby to go home.		III B	
	f) Plan or prevent future pregnancies through education about risk of future pregnancy and NAS.	Thorough discharge planning provides an opportunity to decrease recurrence through education about birth control, tubal ligation, addictions services, referral to a methadone clinic, and public health.	III B	Education to reduce recurrence of NAS.
	g) Teach foster parents to recognize withdrawal symptoms in an asymptomatic infant at risk for NAS.	It is critical for a foster parent to recognize withdrawal symptoms in a symptomatic infant at risk for NAS to ensure that timely medical advice and intervention is sought.		Training of foster care personnel in scoring will be done by the hospital staff or another trained expert.

## DIAGRAM A – ALGORITHM FOR ANTENATAL ASSESSMENT OF RISK OF NEONATAL ABSTINENCE SYNDROME

### Antenatal Assessment of Risk of Neonatal Abstinence Syndrome (NAS)



## Neonatal Guidelines

**TABLE 3 – NAS NEONATAL GUIDELINES: NEWBORN SCREENING AND ASSESSMENT**

	RECOMMENDATION	RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
Screening	<p>6. Toxicology testing may be done on all known and suspected cases of NAS<sup>viii</sup>, defined as follows:</p> <ul style="list-style-type: none"> <li>• mothers identified by primary or obstetrical caregivers</li> <li>• mothers engaged in high-risk behaviour (i.e. taking street drugs)</li> <li>• mothers identified by child protection agencies or other community agencies</li> <li>• mothers who disclose illicit drug use in pregnancy</li> <li>• mothers who act in an intoxicated manner on admission or during office visits</li> <li>• mothers with a positive history of alcohol and/or drug use/abuse</li> <li>• mothers of newborns presenting with NAS symptoms</li> </ul>	<p>Screening in known and suspected cases of NAS is a highly effective way to identify drugs of abuse<sup>ix</sup>.</p> <p>Results are critical to guide treatment, diagnose polydrug use, determine long term follow-up needs and identify social risks and referrals.</p> <p>Toxicology testing should supplement maternal self-report; therefore, it may not be needed in cases of maternal disclosure of substance use.</p>	II-1	<p>Diagram B: Algorithm for Assessment and Care of Infants at Risk of NAS <i>see Diagram B on page 19</i></p> <p>Medical directive facilitates early sample collection by nurses.</p> <p>Training for practitioners that includes: physician order, importance of first sample for urine and meconium, collection method and storage of sample, consent requirements.</p> <p>There is no clear opinion regarding consent for testing.</p> <p>Support practitioners to develop a comfort level and confidence in discussing testing matters with women and their support person.</p>
	<p>7. Toxicology screening includes the following, but does not limit additional testing deemed necessary by the physician:</p> <ol style="list-style-type: none"> <li>Urine and meconium testing using first sample passed.</li> <li>Test urine for: cocaine (and its major metabolite benzoylecgonine), methamphetamine, amphetamine, canaboid, benzodiazepines, opioid narcotics and Oxycodone.</li> </ol>	<p>Urine testing detects recent exposure to drugs from the mother. The infant's first urine sample is best. A negative result should not be interpreted as lack of exposure because the drugs stay a short time in the urine.</p>	II-2	<p>Educate practitioners regarding testing methods and importance of collecting first urine and meconium samples after birth.</p> <p>Support practitioners to develop a comfort level and confidence in discussing testing matters with women and their support person.</p>

**TABLE 3 – NAS NEONATAL GUIDELINES: NEWBORN SCREENING AND ASSESSMENT**

	RECOMMENDATION	RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
Screening	<p>c) If the urine is positive do not repeat same tests on meconium. Test meconium only for fatty acid ethyl esters (FAEE).</p> <p>d) If urine is negative, test meconium for all substances listed in 2 b) and also for FAEE.</p>	<p>Meconium and neonatal hair tests are highly effective in identifying fetal exposure to drugs of abuse since the 2<sup>nd</sup> trimester.</p> <p>Meconium testing detects longitudinal drug and alcohol use. The infant's first meconium is best. Collect and store for later analysis when a physician's order is obtained.</p> <p>Meconium testing must specify the substances to be tested.</p> <p>The range of substances that meconium is tested for are important, not only to guide current treatment but also long term treatment, since not all long term effects may be known at the time of testing.</p> <p>Infants with NAS are at high risk for in-utero exposure to other drugs of abuse and also alcohol.</p> <p>Objective assessment and identification of infants at risk for Fetal Alcohol Spectrum Disorder (FASD) is very important for infants with NAS because women with drug addictions are substantially more likely to consume large amounts of alcohol which is associated with FASD. Meconium analysis of FAEE is a biomarker for heavy maternal drinking. Positive results put the child at high risk (40%) for FASD, a window of opportunity that should not be missed. Positive FAEE calls for neurocognitive follow-up of the child.</p>	II-2	

**TABLE 3 – NAS NEONATAL GUIDELINES: NEWBORN SCREENING AND ASSESSMENT**

	RECOMMENDATION	RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
	e) Hair testing, at the discretion of the physician, after 2 days postnatal if the opportunity to collect first urine and meconium samples has been missed.	Hair testing may be done up to 3 months of age, at which time neonatal hair sheds.	II-2	
	f) Positive test results for illicit substances require a duty to report to child protection services for further assessment.	The goal of screening is to achieve an accurate diagnosis for the purpose of treatment planning. Screening may create a conflict between maternal and neonatal interests. Professionals must report that a child is or may be in need of protection, even when the information is otherwise confidential or privileged. This duty applies although the information might be confidential, and overrides any provisions that would otherwise prohibit someone from making a disclosure (Child and Family Services Act (CFSA) 72. (1) and 72(7). ) The duty specifically prevails over any provision of the Personal Health Information Protection Act (PHIPA) CFSA s. 72(9)		A person who has a duty to report must report directly to a child protection agency. That person may not rely on anyone else to report on their behalf.
Screening	8. Initiate in-patient psychosocial screening upon suspicion of use or abuse of substances. This may include: social work, spiritual care, child protection services, etc.	Psychosocial screening may trigger involvement of child protection services.	II-2	Educate clinicians regarding referral process.



**TABLE 3 – NAS NEONATAL GUIDELINES: NEWBORN SCREENING AND ASSESSMENT**

	RECOMMENDATION	RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
Scoring	<p>9. The Modified Finnegan Scoring Tool<sup>x</sup> should be used to assess suspected or known cases of NAS. Refer to Diagram C. <b>see Diagram C on pages 20-22</b></p> <p>a) Score known or suspicious cases of NAS based on the criteria listed in recommendation 1.</p> <p>b) Initiate scoring upon establishing suspicion and beginning testing.</p> <p>c) Score for minimum of 72 hours if score remains under the treatment threshold of 8. If the child does not reach treatment threshold within 72 hours they become eligible for discharge.</p> <p>d) In cases of methadone exposure, infant to be observed for 120 hours since onset of withdrawal may be delayed.</p> <p>e) Score with each care interaction, typically q 2-4 hrs. Initiate pharmacologic treatment if 3 consecutive scores are <math>\geq 8</math> or the average of two scores or two consecutive scores are <math>\geq 12</math>. Continue scoring during treatment and weaning. After treatment has been discontinued, scoring should continue for 48-72 hours.</p> <p>f) Mother- baby dyad care should be supported with rooming-in until the infant requires pharmacological treatment in the Special Care Nursery.</p>	<p>The purpose of using a scoring tool is to enable a systematic, objective, periodic and thorough evaluation of the infant to support their care needs and identify the need for pharmacologic therapy. The modified Finnegan Scoring Tool is designed to quantify the severity of NAS and to guide treatment in full term infants<sup>xi</sup>. It is universally used, captures all possible domains, has a robust cut-off for initiation of treatment and is sensitive and specific for follow-up. It is the most comprehensive of available scoring tools and is the most validated.</p> <p>The modified Finnegan Scoring Tool is user friendly with training in its use. Refer to Diagram C. <b>see to Diagram C on pages 20-22</b></p> <p>Withdrawal symptoms occur in up to 85% of methadone exposed infants<sup>xii</sup> however onset of symptoms may be later than with other opioids.</p>	II-1	<p>Clearly identify who is responsible for administering the Finnegan Tool.</p> <p>All mother-baby nurses will require training to effectively use the scoring tool so that disruption of mother baby dyad care will be minimized.</p> <ul style="list-style-type: none"> <li>• Infant must be awake and calm for testing to be done</li> <li>• If infant is sleeping, wait until they wake up</li> <li>• Observe infant undisturbed for approximately 1 minute, undress to continue observations then redress, swaddle and observe again for approximately 1 minute.</li> </ul> <p>Mother-baby nurses should be taught non-pharmacological treatment techniques.</p> <p>Consideration for workload on the mother baby unit will be required when the nurse is caring for an infant with NAS.</p> <p>Identify a resource person with extensive knowledge and experience to support questions and difficult cases on a consultation basis.</p>

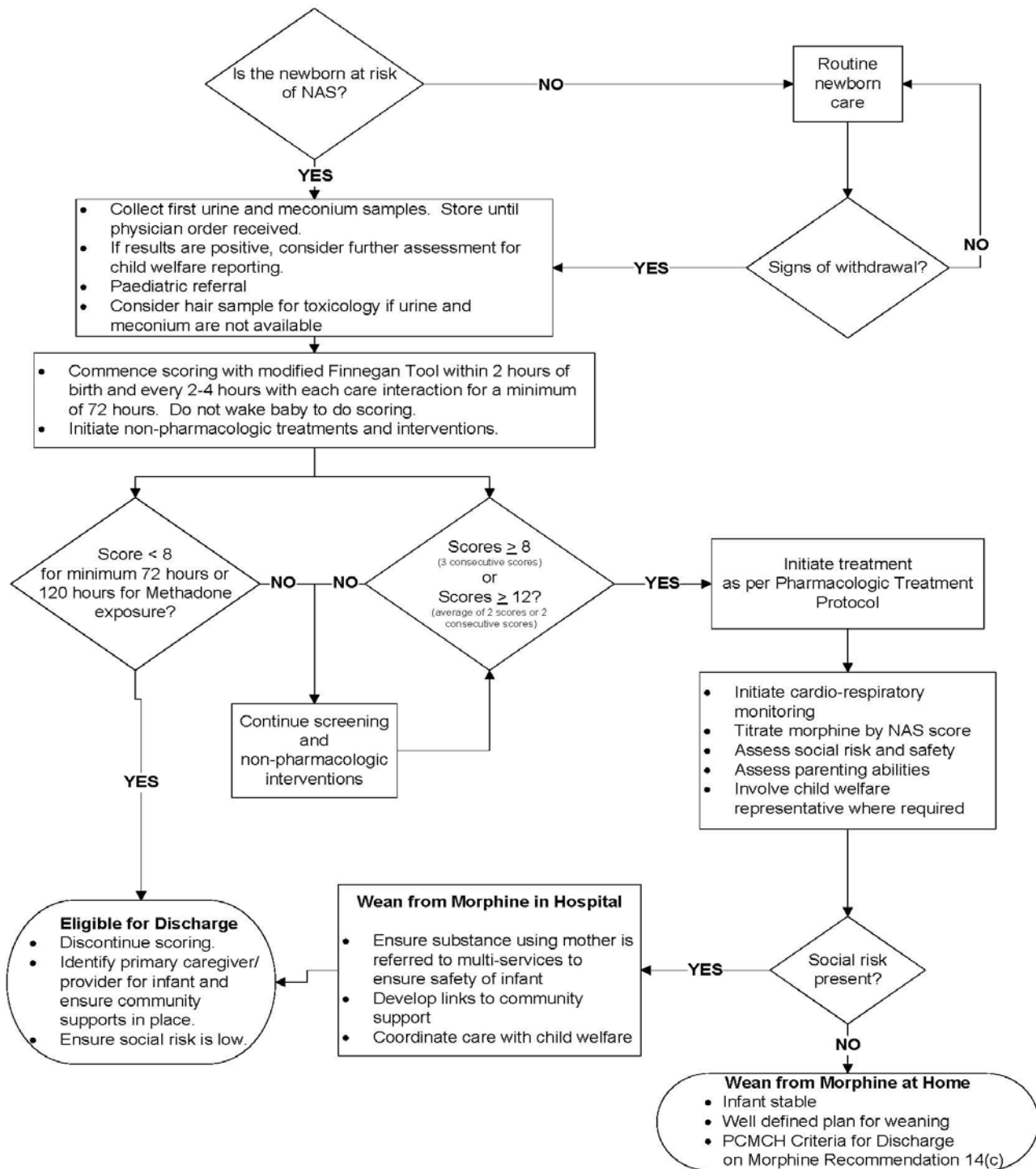
**TABLE 3 – NAS NEONATAL GUIDELINES: NEWBORN SCREENING AND ASSESSMENT**

	RECOMMENDATION	RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
	<p>g) If a methadone exposed infant does not withdraw in hospital, they will require referral for ongoing monitoring for NAS as an out-patient.</p> <p>h) The mother and caregivers should be educated about observing for signs of withdrawal after discharge.</p>			
	<p>10. Encourage participation of parents, family and care providers even when baby is in nursery.</p> <p>During the weaning process or when monitoring is discontinued, and when family or facility circumstances permit, all efforts should be made to promote care-by-parent opportunities.</p>	Pediatric units may be utilized, where available, to promote care-by-parent opportunities.		
	<p>11. If parents wish to discharge their infant against medical advice the child protection agency should be notified to complete a risk assessment.</p>	This action is not unique to the NAS population. However the risk to an infant with NAS may be considerably greater than in other clinical situations.	II-2	

## Diagram B

### Algorithm for Assessment and Care of Infants at Risk of Neonatal Abstinence Syndrome (NAS)

#### Assessment and Care for Newborns at Risk of Neonatal Abstinence Syndrome



## Diagram C: Sample Modified Finnegan Scoring System

### SAMPLE: Modified Finnegan Neonatal Abstinence Scoring System

DOB \_\_\_\_\_

Birth Weight \_\_\_\_\_ grams (x 10% = \_\_\_\_\_)

Today's Weight \_\_\_\_\_ grams

*Start new scoring sheet daily.*

Signs		Score									
Date:	Time:										
Excessive Cry	2										
Excessive cry (inconsolable)	3										
Sleeps <1 hour after feeding	3										
Sleeps 1-2 hours after feeding	2										
Sleeps 2-3 hours after feeding	1										
Hyperactive Moro Reflex	1										
Markedly hyperactive Moro reflex	2										
Mild tremors: disturbed	1										
Moderate/severe tremors: disturbed	2										
Mild tremors: undisturbed	1										
Moderate/severe tremors: undisturbed	2										
Increased muscle tone	1 - 2										
Excoriation: skin red, intact	1										
Excoriation: skin broken	2										
Generalized Seizure	8										
Hyperthermia: axilla temperature $\geq 37.3^{\circ}\text{C}$	1										
Frequent yawning ( $\geq 4$ / interval)	1										
Sweating	1										
Nasal stuffiness	1										
Sneezing ( $\geq 4$ / interval)	1										
Tachypnea (rate > 60/minute)	2										
Poor feeding	2										
Vomiting	2										
Loose Stools	2										
Weight loss / Failure to thrive	2										
Excessive irritability	1 - 3										
Total Score											
Initials of Scorer											

Name of Scorer	Initials	Signature/Title	Name of Scorer	Initials	Signature/Title

Adapted from: Jansson L, Velez M, Harrow C. (2009). The Opioid Exposed Newborn: Assessment and Pharmacologic Management. *J. Opioid Manag.* 2009; 5(1), 54

## Diagram C continued: Modified Finnegan Scoring Tool Guideline

<b>GUIDE TO USING THE MODIFIED FINNEGAN NEONATAL ABSTINENCE SCORING SYSTEM</b> <i>Jansson L, Velez M, Harrow C. (2009). The Opioid Exposed Newborn: Assessment and Pharmacologic Management. J. Opioid Manag. 2009; 5(1), 54</i>	
<b>Instructions</b> <ul style="list-style-type: none"> <li>Designed for use with full term opioid exposed newborns</li> <li>Initiate scoring at 2 hours of age and repeat every 2-4 hours prior to a feeding. Do not wake baby to do scoring.</li> <li>Total scores for each interval at bottom of column</li> <li>Calculate &amp; record 90% of birth weight to use as a reference for weight loss</li> <li>Initiate pharmacologic treatment when the average of 3 scores is <math>\geq 8</math> or the average of 2 scores, or 2 consecutive scores is <math>\geq 12</math></li> <li>Score for minimum of 72 hours, 120 hours for methadone exposure. Continue scoring during treatment and weaning.</li> <li>Discontinue scoring 48-72 hours after treatment discontinued.</li> </ul>	
<b>Excessive Cry</b> <ul style="list-style-type: none"> <li>Cry is usually high pitched</li> <li><b>Score 2:</b> Infant cries often and is difficult to console</li> <li><b>Score 3:</b> Infant is inconsolable, even with a pacifier, swaddling or rocking</li> </ul>	<b>Generalized Seizure</b> <ul style="list-style-type: none"> <li>Seizure activity requires notification of the paediatrician immediately</li> <li><b>Score 8:</b> The incidence of seizures as a symptom of NAS is low, but if present</li> </ul>
<b>Sleeping</b> <ul style="list-style-type: none"> <li>Use the longest continuous sleeping time between feedings and scoring periods</li> <li><b>Score 0:</b> Sleeps more than 3 hours continuously</li> <li><b>Score 1:</b> Sleeps 2-3 hours continuously</li> <li><b>Score 2:</b> Sleeps 1-2 hours continuously</li> <li><b>Score 3:</b> Sleeps less than 1 hour continuously</li> </ul>	<b>Hyperthermia</b> <ul style="list-style-type: none"> <li>If hyperthermia is present, rule out infection</li> <li><b>Score 1:</b> Axilla temperature of <math>37.3^{\circ}\text{C}</math> or higher</li> </ul>
<b>Moro Reflex</b> <ul style="list-style-type: none"> <li>Avoid doing while infant is irritable or crying to insure that the jitteriness, if present, is due to withdrawal, not agitation</li> <li><b>Score 1:</b> Hyperactive Moro Reflex: hyperactive response with excessive abduction at shoulder and extension at elbow with or without tremors</li> <li><b>Score 2:</b> Markedly Hyperactive Moro Reflex: Above response plus marked adduction flexion at elbow with arms crossing to the midline</li> </ul>	<b>Yawning</b> <ul style="list-style-type: none"> <li><b>Score 1:</b> Yawning 4 times or more in a scoring interval</li> </ul>
<b>Tremors</b> <ul style="list-style-type: none"> <li>Involuntary movements that are rhythmical and of equal amplitude.</li> <li>Myoclonic jerks are not tremors</li> <li>Undisturbed tremors occur in the absence of stimulation</li> <li>Disturbed tremors occur with stimulation, i.e. unwrapping a swaddled infant</li> <li><b>Score 1:</b> Mild tremors involve hands or feet only &amp; occur frequently in fussy or crying states and occasionally in quiet alert states</li> <li><b>Score 2:</b> Moderate - severe tremors involve arms or legs and occur consistently and repeatedly in all states</li> </ul>	<b>Sweating</b> <ul style="list-style-type: none"> <li><b>Score 1:</b> Dampness of the infant's forehead or upper lip providing the infant is not over dressed</li> </ul>
<b>Increased Muscle Tone</b> <ul style="list-style-type: none"> <li>Elicit by passively extending and releasing the infant's arms and legs to assess recoil</li> <li>Assess infant at rest and with gentle handling, in quiet alert and mildly fussy states</li> <li>Infants experiencing NAS may have fluctuating tone</li> <li><b>Score 1:</b> Increased tone with handling or increased resistance to extension or flexion of limbs with head lag on pull to sit</li> <li><b>Score 2:</b> Increased tone without handling or increased resistance to straightening or bending limbs with or without head lag</li> </ul>	<b>Nasal Stuffiness</b> <ul style="list-style-type: none"> <li><b>Score 1:</b> Nasal noise with breathing, not associated with illness</li> </ul>
<b>Excoriation</b> <ul style="list-style-type: none"> <li>Results from excessive and uncontrolled movements, such as tremors, rubbing. Diaper area excoriation is not included</li> <li>Score as long as the excoriation is present</li> <li><b>Score 1:</b> Skin is red, but intact or healing</li> <li><b>Score 2:</b> Skin is broken</li> </ul>	<b>Sneezing</b> <ul style="list-style-type: none"> <li><b>Score 1:</b> Sneezing 4 times or more in a scoring interval</li> </ul>
	<b>Tachypnea</b> <ul style="list-style-type: none"> <li><b>Score 2:</b> Respiratory rate greater than 60 breaths per minute at rest and not fussy or crying</li> <li>Rule out other medical conditions</li> </ul>
	<b>Poor Feeding</b> <ul style="list-style-type: none"> <li><b>Score 2:</b> Uncoordinated suck/swallow resulting in: <ul style="list-style-type: none"> <li>inefficient suck</li> <li>inefficient sucking pattern: short bursts with weak suck despite excessive sucking prior to feeding</li> <li>maladaptive tongue position: tongue thrusting, tongue above nipple, formula loss at sides of mouth</li> <li>gulping or clicking noise with sucking</li> <li>takes frequent breaks from feeding to breathe, burp or spit up</li> </ul> </li> </ul>
	<b>Vomiting</b> <ul style="list-style-type: none"> <li><b>Score 2:</b> Vomits a whole feed, or two or more times during a feed, not associated with burping</li> </ul>
	<b>Loose Stools</b> <ul style="list-style-type: none"> <li><b>Score 2:</b> <math>\frac{1}{2}</math> liquid <math>\frac{1}{2}</math> solid stool or liquid stool with or without a water ring on diaper</li> </ul>
	<b>Weight Loss / Failure to Thrive</b> <ul style="list-style-type: none"> <li>Use work space at top of form. Weight infant once a day</li> <li><b>Score 2:</b> <ul style="list-style-type: none"> <li>Current weight loss is greater than 10% of birth weight</li> <li>Failure to regain birth weight by 10 days of age</li> <li>Daily weight gain of less than 20 gms/day after birth weight regained</li> </ul> </li> </ul>
	<b>Irritability</b> <ul style="list-style-type: none"> <li>Infant is irritable or fussy, particularly with light touch or handling despite attempts to console, but may not cry excessively or at all.</li> <li>Observe for grimacing, sensitive to touch, light or sound, gaze aversion, etc. with or without crying.</li> <li><b>Score 2:</b> Displays 2-3 signs of irritability and is consoled only with intervention after time</li> <li><b>Score 3:</b> No amount of consoling reduces the symptoms of irritability</li> </ul>

## Diagram D: Sample Modified Finnegan Scoring System

### SAMPLE: Modified Neonatal Abstinence Scoring System from:

American Academy of Pediatrics, Committee on Drugs. Neonatal Drug Withdrawal Policy. Pediatrics. 2012 129(2):e540-560 <http://pediatrics.aappublications.org/content/101/6/1079.full.html>

NEONATAL ABSTINENCE SCORING SYSTEM													
SYSTEM	SIGNS AND SYMPTOMS	SCORE	AM					PM					COMMENTS
CENTRAL NERVOUS SYSTEM DISTURBANCES	Continuous High Pitched (or other) Cry	2											Daily Weight:
	Continuous High Pitched (or other) Cry	3											
	Sleeps <1 Hour After Feeding	3											
	Sleeps <2 Hours After Feeding	2											
	Sleeps <3 Hours After Feeding	1											
	Hyperactive Moro Reflex	2											
	Markedly Hyperactive Moro Reflex	3											
	Mild Tremors Disturbed	1											
	Moderate-Severe Tremors Disturbed	2											
	Mild Tremors Undisturbed	3											
	Moderate-Severe Tremors Undisturbed	4											
	Increased Muscle Tone	2											
	Excoriation (Specific Area)	1											
	Myoclonic Jerks	3											
	Generalized Convulsions	5											
METABOLIC/VASOMOTOR/RESPIRATORY DISTURBANCES	Sweating	1											
	Fever 100.4~101°F (38~38.3°C)	1											
	Fever > 101°F (38.3°C)	2											
	Frequent Yawning (>3-4 times/interval)	1											
	Mottling	1											
	Nasal Stuffiness	1											
	Sneezing (>3-4 times/interval)	1											
	Nasal Flaring	2											
	Respiratory Rate >60/min	1											
	Respiratory Rate > 60/min with Retractions	2											
GASTRO-INTESTINAL DISTURBANCES	Excessive Sucking	1											
	Poor Feeding	2											
	Regurgitation	2											
	Projectile Vomiting	3											
	Loose Stools	2											
	Watery Stools	3											
TOTAL SCORE													
INITIALS OF SCORER													

**FIGURE 1**

Modified Finnegan's Neonatal Abstinence Scoring Tool. Adapted from ref 101.

Finnegan LP. Neonatal abstinence. In: Nelson NM, ed. Current Therapy in Neonatal-Perinatal Medicine. 2<sup>nd</sup> ed. Toronto, Ontario: BC Decker Inc; 1990

TABLE 4 – NAS NEONATAL GUIDELINES: TREATMENT RECOMMENDATIONS				
	RECOMMENDATION	RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
Non-pharmacological Interventions	<p>12. Non-pharmacological interventions should be utilized first, prior to pharmacological interventions.</p> <p>a) Swaddling may be beneficial to lessen arousals and prolong sleep.</p>	<p>In RCTs<sup>xiii,xiv,xv</sup> of healthy infants, swaddling has been shown to decrease startles, lessen arousals and prolong sleep. In excessively crying infants with cerebral injury, swaddling decreases significantly the amount of crying compared with massage. It has also been shown to decrease the pain response to painful procedures and does not show any influence on breastfeeding parameters such as number and duration of feeds, amount of milk ingested or total duration of breastfeeding time. No RCT has specifically looked at swaddling in the treatment of infants with NAS but it has been suggested that it may be used as an effective strategy to support infants with NAS.</p> <p>Safe sleeping guidelines do not recommend swaddling for healthy infants at home, however infants with NAS in hospital may benefit from swaddling.</p>	<b>Level III B</b>	Practitioners in both the SCN/NICU and mother-baby unit should be educated in non-pharmacological treatment techniques.

TABLE 4 – NAS NEONATAL GUIDELINES: TREATMENT RECOMMENDATIONS				
	RECOMMENDATION	RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
Non-pharmacological Interventions	b) Breastfeeding is preferable and safe for methadone-maintained mothers. In the absence of contraindications, breastfeeding is recommended.	<p>Breast milk is optimal for infant nourishment and provides many significant and well known advantages to the baby-mother dyad. Breastfeeding promotes positive early attachment experiences and decreases maternal stress responses. It would therefore stand to reason that methadone exposed infants and their mothers would benefit in particular from this practice, assuming absence of absolute contraindications (social, medical, infections etc.) and documented safety concerns, both short and long term.</p> <p>A consistent supply of breast milk is important for the methadone exposed baby. When a mother on methadone chooses to breastfeed, special effort should be made to support lactation so that fluctuations in substance levels can be minimized in the infant. This support may include specialized lactation support and provision of pumping equipment and supplies at discharge.</p> <p>Some studies<sup>xvi, xvii, xviii</sup> indicate that breast milk intake in methadone cases is associated with reduced NAS scores/severity, delayed onset of NAS and decreased need for pharmacologic treatment. Short term safety has been confirmed in the small number of studied patients but long term developmental questions have not been adequately answered.</p>	Level II-2 B	<p>Specialized breastfeeding support, for example a lactation consultant, may not be available at all hospitals. Therefore nurses may require additional education to meet the needs of the breastfeeding mother of the infant with NAS.</p> <p>Pumping equipment and supplies need to be accessible and affordable for the mother.</p>



TABLE 4 – NAS NEONATAL GUIDELINES: TREATMENT RECOMMENDATIONS				
	RECOMMENDATION	RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
Non-pharmacological Interventions	c) Breastfeeding is not recommended for women using illicit drugs until sobriety is reached. These women should pump and discard their breast milk to establish and maintain their milk supply.	Occasional use of the following substances may be of concern and mothers who use these substances in short episodes should avoid breastfeeding temporarily during this time. Substances causing concern <sup>xix</sup> include ecstasy, crystal meth, amphetamines, cocaine and related stimulants, alcohol, opioids, benzodiazepines and cannabis.  Mothers who choose not to cease their use of these substances or who are unable to do so should seek individual advice on the risks and benefits of breastfeeding depending on their individual circumstances.		Pumping equipment and supplies need to be accessible and affordable for the mother.
	d) The baby's environment should be modified to reduce sensory stimulation, including limiting visitors, minimizing overhead lighting, decreasing noise, using gentle handling, kangaroo care etc.	Care of infants with NAS in NICU/SCNs is generally provided in space that has been adapted or modified to decrease sensory stimulation. Promotion of cuddling, overall gentle handling, skin to skin contact (Kangaroo care) and use of infant slings have all been promoted as ways of improving behavioural adaptation of infants with NAS. There is very little support based on well designed studies specifically looking at this population. However, given the current state of knowledge with regards to neonatal physiology and adaptive behaviours, it would seem appropriate to continue to promote the implementation of these supportive measures <sup>xx,xxi,xxii,xxiii</sup>	Level III B	

TABLE 4 – NAS NEONATAL GUIDELINES: TREATMENT RECOMMENDATIONS				
	RECOMMENDATION	RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
Non-pharmacological Interventions	e) Soothing behaviours, positional support and frequent, hypercaloric, smaller volume feedings are beneficial and should be considered in the treatment of neonates with NAS both in hospital and the home environment.	<p>Use of pacifiers, hands-to-mouth, self clinging and other self soothing behaviours should be used in the management of neonates with NAS and their beneficial implication taught to care providers. Minimization of excessive handling, respect of neonates sleep state and using techniques to minimize stimulation will help with regulation of the transition between neonatal behavioural states. Specific holding/constraining techniques, proper positioning and usage of gentle firm pressure, and gentle vertical rocking can all support the neonates self-regulation. Rocking beds or mechanical swings should be used with caution as there is evidence that, for some neonates, this may in fact be over-stimulating during the acute period of withdrawal and may not be appropriate<sup>xxiv, xxv</sup>.</p> <p>Frequent, smaller volume, hypercaloric feeds are generally recommended for those infants who have feeding difficulties due to regulatory control issues and/or poor weight gain due to excessive caloric expenditure, gastroesophageal reflux and diarrhea. Dietician support is part of the multidisciplinary approach to care of the neonate with NAS.</p>	Level III B	

TABLE 4 – NAS NEONATAL GUIDELINES: TREATMENT RECOMMENDATIONS				
	RECOMMENDATION	RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
Pharmacological Treatments	13. Medications should be considered for the treatment of NAS when supportive measures fail to adequately ameliorate the signs of withdrawal.		III B	
	a) When pharmacologic treatment is necessary the baby with NAS should be admitted to the SCN/NICU or paediatric unit where cardio-respiratory monitoring is available.	Cardio-respiratory monitoring includes heart rate and respiratory rate and excludes ECG and oxygen saturation.	III	Local variations may dictate the location of infant for monitoring. Level I centres should consider transfer to Level II.
	b) Parental interaction should be encouraged and observed to assess social risk and safety issues.	Position family for success and identify when risks exist so that optimal outcome is achieved for the infant.		
	c) Discharge planning must include careful assessment of social risk and anticipate the need for CAS involvement prior to discharge.	Treatment modality may impact the social risk.		

TABLE 4 – NAS NEONATAL GUIDELINES: TREATMENT RECOMMENDATIONS				
	RECOMMENDATION	RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
Pharmacological Treatments	<p>14. Morphine should be considered the first line pharmacologic treatment of NAS when supportive measures fail to adequately ameliorate the signs of withdrawal. Dosing guidelines are described in Table 5. <i>see Table 5 on page 32</i></p> <p>a) Morphine is indicated when three consecutive scores are greater than or equal to 8 on the Finnegan Scoring tool or when the average of two scores or the scores for two consecutive intervals is greater than or equal to 12.</p>	<p>Morphine is the most commonly used medication for the treatment of opiate withdrawal. Although there is evidence to support symptom dosing, generally accepted standards are for weight and symptom management.</p> <p>Other drugs that contain morphine include diluted tincture of opium (DTO) and paregoric. Neither are recommended for use today since both contain alcohol and paregoric also contains camphor and benzoic acid.</p> <p>Methadone is not currently recommended for use in newborns due to its long half-life. It is used by some hospitals in the US to treat neonatal opioid withdrawal with length of stays similar to those for morphine-treated infants being reported<sup>xxvi, xxvii</sup> however published experience is lacking compared with that for morphine.</p>	III B	Dosing guidelines are included in Table 5. <i>see Table 5 on page 32</i>
	<p>b) Cardio-respiratory monitoring is required for all infants started on morphine and continued for 4 days and/or until the dose is reduced. Further monitoring should then be at the discretion of the physician in charge.</p>	<p>Cardio-respiratory monitoring includes heart rate and respiratory rate and excludes ECG and oxygen saturation.</p> <p>Little has been written or investigated with respect to cardio-respiratory monitoring for infants with NAS being weaned on morphine. However the expert panel recommends that this is the most prudent approach.</p>	III	Local variations may dictate the location of infant for monitoring. Level I centres should consider transfer to Level II.

TABLE 4 – NAS NEONATAL GUIDELINES: TREATMENT RECOMMENDATIONS				
	RECOMMENDATION	RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
Pharmacological Treatments	<p>c) Discharging the infant home on morphine should only be undertaken if the clinical team is confident that the social risk is low, the infant is stable and that there is a clear and comprehensive plan for weaning the infant and a designated supervisor of that plan who will follow the infant with, at minimum, a weekly visit. Following consultation with the clinical team, the final decision to discharge an infant on pharmacologic treatment is at the discretion of the physician. When assessing a family for discharge prior to weaning the following criteria should be met:</p> <ul style="list-style-type: none"> <li>• Stable supportive home environment</li> <li>• Satisfactory psychosocial assessment documented</li> <li>• No identified risk to planned neonatal follow-up</li> <li>• Primary care provider familiar with NAS and medication weaning for post discharge care</li> <li>• A clearly identified plan for weaning</li> </ul>	<p>Infants may be discharged to a variety of arrangements including home with the mother, kinship care or foster care.</p> <p>The primary factors in determining whether or not to discharge prior to weaning from morphine are:</p> <ul style="list-style-type: none"> <li>• The safety of the infant</li> <li>• The most supportive environment for the care provider</li> </ul>	III	

TABLE 4 – NAS NEONATAL GUIDELINES: TREATMENT RECOMMENDATIONS				
	RECOMMENDATION	RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
	<ul style="list-style-type: none"> <li>Identified physician familiar with NAS and medication weaning for post discharge care who will follow the infant as often as necessary but no less frequently than weekly until withdrawal is complete</li> <li>An ability to monitor the appropriateness of timing of prescription renewals (maximum 7 day prescriptions only, no early renewals)</li> <li>Dedicated care provider competence in measuring and administering the medication</li> <li>Care provider education about symptoms of NAS and the need to contact the physician if symptoms increase</li> <li>Care provider education regarding avoidance of co-sleeping</li> <li>Post-discharge follow-up with Public Health, CAS, addiction services or identified community support worker as required</li> <li>Pre-discharge case conference to identify and document the discharge plan</li> </ul>			

TABLE 4 – NAS NEONATAL GUIDELINES: TREATMENT RECOMMENDATIONS				
	RECOMMENDATION	RATIONALE	QUALITY OF EVIDENCE & CLASSIFICATION OF RECOMMENDATIONS	IMPLEMENTATION CONSIDERATIONS
Pharmacological Treatments	d) Phenobarbital or clonidine may be considered as an adjunct therapy to morphine in patients whose symptoms are not well controlled with morphine alone. Dosing guidelines are listed in Table 5. <i>see Table 5 on page 32</i>	<p>The use of morphine in combination with phenobarbital has been reported in the treatment of infants whose symptoms are not well-controlled with morphine alone but strong evidence of its efficacy is lacking<sup>xxviii</sup>.</p> <p>A recently updated Cochrane Review<sup>xxix</sup> concludes that where a sedative is used, it should be phenobarbital in preference to diazepam particularly when there has been polydrug abuse.</p> <p>Clonidine has been explored as a possible therapeutic option in combination with morphine. One small randomized controlled trial demonstrated that clonidine in addition to standard opioid therapy reduced the duration of pharmacotherapy for neonatal abstinence<sup>xxx</sup>, but evidence is currently insufficient to support its widespread use.</p> <p>Using barbiturates to treat NAS is not generally recommended unless there is a mixed withdrawal syndrome. However, it may be acceptable in the absence of other preparations or expertise to prepare dilute solutions of morphine sulfate.</p>	<p>I B</p> <p>II-1 1</p> <p>I B</p>	Dosing guidelines are included in Appendix D. <i>see Table 5 on page 32</i>

**Table 5: NAS Pharmacologic Treatment Protocol: Dosing guidelines**

<h2>Morphine</h2> <p>Morphine is indicated when three consecutive scores are <math>\geq 8</math> according to the Modified Finnegan Scoring System or when the average of two scores or the score for two consecutive intervals is <math>\geq 12</math>.</p> <p>If the scores remain <math>\geq 8</math> for 3 consecutive scores or <math>\geq 12</math> on 2 occasions, the morphine dose is increased to the next range ie by 0.16 mg/kg/day. If 0.80 mg/kg/day fails to control signs of withdrawal, morphine may be increased to 0.96 to 1.0 mg/kg/day. Clonidine (see below) should be considered at this point.</p> <h3>Weaning</h3> <p>Weaning is initiated when scores are <math>&lt;8</math> for 24 to 48 hours and ordinarily occurs by 10% of the total daily dose with each wean occurring no more frequently than every 48 hours to 72 hours. When the total daily dose is <math>&lt;0.2</math>mg/kg/day, consideration may be given to weaning every 24 hours at the discretion of the physician.</p> <p>An alternate approach used by some centres is to wean by 0.05mg/kg/day every 48 to 96 hours as tolerated.</p> <p>In both approaches, morphine is discontinued when scores are stable for 48 to 72 hours on a dose of 0.05 to 0.1 mg/kg/day.</p>	<h3>Dosing guidelines</h3> <table><thead><tr><th>Score</th><th>Oral Morphine Dose</th></tr></thead><tbody><tr><td>8-10</td><td>0.32 mg/kg/day divided q4-6h</td></tr><tr><td>11-13</td><td>0.48 mg/kg/day divided q4-6h</td></tr><tr><td>14-16</td><td>0.64 mg/kg/day divided q4-6h</td></tr><tr><td>17+</td><td>0.80 mg/kg/day divided q4-6h</td></tr></tbody></table>	Score	Oral Morphine Dose	8-10	0.32 mg/kg/day divided q4-6h	11-13	0.48 mg/kg/day divided q4-6h	14-16	0.64 mg/kg/day divided q4-6h	17+	0.80 mg/kg/day divided q4-6h
Score	Oral Morphine Dose										
8-10	0.32 mg/kg/day divided q4-6h										
11-13	0.48 mg/kg/day divided q4-6h										
14-16	0.64 mg/kg/day divided q4-6h										
17+	0.80 mg/kg/day divided q4-6h										
<h2>Phenobarbital</h2> <p>Phenobarbital may be used in combination with morphine in infants exposed to polydrug abuse (sedatives, alcohol or barbiturates in addition to opiates).</p> <p>Phenobarbital 10 mg/kg is given every 12 hours for 3 doses, then 5 mg/kg/day is continued as a maintenance dose. The doses of morphine used in combination with phenobarbital are lower than those given when morphine is used alone:</p>	<h3>Dosing guidelines</h3> <table><thead><tr><th>Score</th><th>Oral Morphine Dose in combination with Phenobarbital</th></tr></thead><tbody><tr><td>8-10</td><td>0.16 mg/kg/day divided q4-6h</td></tr><tr><td>11-13</td><td>0.32 mg/kg/day divided q4-6h</td></tr><tr><td>14-16</td><td>0.48 mg/kg/day divided q4-6h</td></tr><tr><td>17 or &gt;</td><td>0.62 mg/kg/day divided q4-6h</td></tr></tbody></table>	Score	Oral Morphine Dose in combination with Phenobarbital	8-10	0.16 mg/kg/day divided q4-6h	11-13	0.32 mg/kg/day divided q4-6h	14-16	0.48 mg/kg/day divided q4-6h	17 or >	0.62 mg/kg/day divided q4-6h
Score	Oral Morphine Dose in combination with Phenobarbital										
8-10	0.16 mg/kg/day divided q4-6h										
11-13	0.32 mg/kg/day divided q4-6h										
14-16	0.48 mg/kg/day divided q4-6h										
17 or >	0.62 mg/kg/day divided q4-6h										
<h2>Clonidine</h2> <p>Clonidine has been explored as a possible therapeutic option in combination with morphine. There is Level 1 evidence from one small randomized controlled trial demonstrating that clonidine in addition to standard opioid therapy reduces the duration of pharmacotherapy for neonatal abstinence<sup>1</sup>. Therefore clonidine may be considered as an adjunct to morphine when high doses (see above) fail to control withdrawal symptoms.</p> <p>Some studies gradually increased doses over 1 to 2 days to begin therapy, and tapered doses by 0.25 mcg/kg every 6 hours to discontinue (or by 25% of the total daily dose every other day).</p>	<h3>Dosing guidelines*</h3> <ul style="list-style-type: none"><li>• 0.5 -1 mcg/kg, given orally every 4-6 hours</li><li>• Much higher doses (0.5 to 3 mcg/kg/h) have been used as a continuous infusion<sup>2</sup></li></ul> <p>*Adequate clinical trials to establish an efficacious and safe dose still are required</p>										

<sup>1</sup> Agthe AG, et al., Clonidine as an adjunct therapy to opioids for neonatal abstinence syndrome: A randomized, controlled trial. Pediatrics, 2009; 123:e849-56

<sup>2</sup> Esmaeili A Keinhorst AK, Schuster T, Schlosser R, Bastanier C. Treatment of neonatal abstinence syndrome with clonidine and chloral hydrate. Acta Paediatrica (2009) Oct, 1-6 (on line)



## TABLE 6: SUMMARY OF RECOMMENDATIONS

**TABLE 6: SUMMARY OF RECOMMENDATIONS**

### **MATERNAL RECOMMENDATIONS**

1. Health care providers should routinely screen all women of childbearing age for use of medicinal and non-medicinal substances, including alcohol, opioids and other analgesics, selective serotonin reuptake inhibitors (SSRIs) and tobacco use. *see Diagram A on p13*
  - a) Routinely screen women for substance use
  - b) Follow the Society for Obstetricians and Gynecologists of Canada (SOGC) Alcohol Use and Pregnancy Consensus Clinical Guidelines<sup>xxxi</sup> to routinely screen for alcohol consumption.
2. Contraception counselling is essential to prevent unplanned pregnancy whenever a woman changes from short to long-acting opioids, i.e. methadone or Buprenorphine.
3. Development of a written care plan for maternal and neonatal care to supplement the standard antenatal record.
  - a) Prepare and educate the substance using woman and her partner in advance for their baby's hospital experience and management of NAS. Every substance using woman, her partner and family should receive written material explaining NAS, hospital stay expectations, role of the parent, and resource contacts including the healthcare team.
  - b) Methadone is the treatment of choice for opioid dependent women in pregnancy and should be offered to all women who are eligible for methadone.
  - c) Methadone is best initiated as an inpatient or outpatient with close monitoring
  - d) Methadone tapering during pregnancy may be done providing the woman is stable. Taper during the second trimester only and monitor closely for relapse to opioids or related drugs including alcohol. Avoid withdrawal.
  - e) Methadone dosing during labour (intrapartum) should keep the woman stable. The volume of methadone drink may be reduced. Avoid withdrawal.
  - f) Pain management during labour should include epidural anesthesia where available.
  - g) Narcotic antagonists (Naloxone) are contraindicated for the opioid dependent woman or baby.
  - h) Educate the mother, her partner and family care givers so they are prepared to effectively care for the infant with NAS.
4. Create circumstances for success. Where possible, the goal is to position the family for success. When necessary, carefully assess social risk and anticipate needs.
  - a) Involve the mother and her support person in all infant care unless contraindicated by child protection concerns.
  - b) Implement a parental partnership contract to enhance communication with parents and support their involvement in the care of their infant in, for example, rooming-in, feeding and handling.
  - c) Anyone who has reasonable grounds to suspect that a child is or may be in need of protection must promptly report the suspicion and the information upon which it is based to a child protection agency (Child and Family Services Act Section 72. (1)). Positive screening results as well as information received from or about the mother and observations of her may raise a suspicion that requires reporting. This applies to concerns in addition to maternal substance use.

**TABLE 6: SUMMARY OF RECOMMENDATIONS**

**MATERNAL RECOMMENDATIONS**

5. Discharge planning
  - a) The primary care provider for the infant should be identified prior to discharge.
  - b) Provide professional home visitor (high risk Public Health Nurse) to continue to address risk factors and support once the baby is discharged home.
  - c) Every baby exposed to opiates/methadone should have ongoing assessments by a clinician expert in assessing developmental milestones.
  - d) Develop links between the Children's Aid Society (CAS/CCAS) and the primary health care provider as a case management tool.
  - e) Ensure the substance abusing mom is linked to all the psychosocial, medical, addiction services and social services to make it safe for the baby to go home.
  - f) Plan or prevent future pregnancies through education about risk of future pregnancy and NAS.
  - g) Teach foster parents to recognize withdrawal symptoms in an asymptomatic infant at risk for NAS.

**TABLE 6: SUMMARY OF RECOMMENDATIONS**

**NEONATAL RECOMMENDATIONS**

6. Toxicology testing *see Diagram B on p 19* may be done on all known and suspected cases of NAS<sup>xxxii</sup>, defined as follows:
  - mothers identified by primary or obstetrical caregivers
  - mothers engaged in high-risk behaviour (i.e. taking street drugs)
  - mothers identified by child protection agencies or other community agencies
  - mothers who disclose illicit drug use in pregnancy
  - mothers who act in an intoxicated manner on admission or during office visits
  - mothers with a positive history of alcohol and/or drug use/abuse
  - mothers of newborns presenting with NAS symptoms
7. Toxicology screening may include the following but does not limit additional testing deemed necessary by the physician:
  - a) Urine and meconium testing using first sample passed.
  - b) Test urine for: cocaine (and its major metabolite benzoylecgonine), methamphetamine, amphetamine, canaboid, benzodiazepines, opioid narcotics and Oxycodone.
  - c) If the urine is positive do not repeat same tests on meconium. Test meconium only for FAEE.
  - d) If urine is negative, test meconium for all substances listed in 2 b) and also for FAEE.
  - e) Hair testing, at the discretion of the physician, after 2 days postnatal if the opportunity to collect first urine and meconium samples has been missed.
  - f) Positive test results for illicit substances require a duty to report to child protection services for further assessment.
8. Initiate in-patient psychosocial screening upon suspicion of use or abuse of substances. This may include social work, spiritual care, child protection services, etc.

**TABLE 6: SUMMARY OF RECOMMENDATIONS**

**NEONATAL RECOMMENDATIONS**

9. The Modified Finnegan Scoring Tool<sup>xxxiii</sup> should be used to assess suspected or known cases of NAS.  
*see Diagram C & D on pages 20, 21, 22*
  - a) Score known or suspicious cases of NAS based on the criteria listed in recommendation 1.
  - b) Initiate scoring upon establishing suspicion and beginning testing.
  - c) Score for minimum of 72 hours if the score remains under the treatment threshold of 8. If the child does not reach treatment threshold within 72 hours they become eligible for discharge.
  - d) In cases of methadone exposure, the infant is to be observed for 120 hours since onset of withdrawal may be delayed.
  - e) Score with each care interaction, typically q 2-4 hrs. Initiate pharmacologic treatment if 3 consecutive scores are  $\geq 8$  or the average of two scores or two consecutive scores are  $\geq 12$ . Continue scoring during treatment and weaning. After the end of treatment scoring should continue for 48-72 hours.
  - f) Mother- baby dyad care should be supported with rooming-in until the infant requires pharmacological treatment in the SCN.
  - g) If a methadone exposed infant does not withdraw in hospital they will require referral for ongoing monitoring for NAS as an outpatient.
  - h) The mother and caregivers should be educated about observing for signs of withdrawal after discharge.
10. Encourage participation of parents, family and care providers even when baby is in nursery.  
During the weaning process or when monitoring is discontinued, and when family or facility circumstances permit, all efforts should be made to promote care-by-parent opportunities.
11. If parents wish to discharge their infant against medical advice, a child protection agency should be notified to complete a risk assessment.
12. Non-pharmacological interventions should be utilized first, prior to pharmacological interventions.
  - a) Swaddling is beneficial to lessen arousals and prolong sleep.
  - b) Breastfeeding is preferable and safe for methadone-maintained mothers. In the absence of contraindications, breastfeeding is recommended.
  - c) Breastfeeding is not recommended for illicit drug using women until sobriety is reached. These women should pump and discard their breast milk to establish and maintain their milk supply.
  - d) The baby's environment should be modified to reduce sensory stimulation, including minimizing visitors, minimizing overhead lighting, decreasing noise, using gentle handling, kangaroo care etc.
  - e) Soothing behaviours, positional support and frequent, hypercaloric, smaller volume feedings are beneficial and should be considered in the treatment of neonates with NAS both in hospital and the home environment.

**TABLE 6: SUMMARY OF RECOMMENDATIONS**

**NEONATAL RECOMMENDATIONS**

13. Medications should be considered for the treatment of NAS when supportive measures fail to adequately ameliorate the signs of withdrawal.
  - a) When pharmacologic treatment is necessary the baby with NAS should be admitted to the SCN/NICU or paediatric unit where cardio-respiratory monitoring is available.
  - b) During the weaning phase of treatment parental interaction should be encouraged and observed to assess social risk and safety issues.
  - c) Discharge planning must include careful assessment of social risk and anticipate the need for CAS involvement prior to discharge.
14. Morphine should be considered the first line pharmacologic treatment for NAS when supportive measures fail to adequately ameliorate the signs of withdrawal. *see Table 5 on p 32*
  - a) Morphine is indicated when 3 consecutive scores are greater than or equal to 8 on the Finnegan Scoring tool or when the average of two scores or the scores for two consecutive intervals is greater than or equal to 12.
  - b) Cardio-respiratory monitoring is required for all infants started on morphine and continued for 4 days and/or until the dose is reduced. Further monitoring should then be at the discretion of the physician in charge.
  - c) Discharging the infant home on morphine should only be undertaken if the clinical team is confident that the social risk is low, the infant is stable and that there is a clear and comprehensive plan for weaning the infant and a designated supervisor of that plan who will follow the infant with, at minimum, a weekly visit. Following consultation with the clinical team, the final decision to discharge an infant on pharmacologic treatment is at the discretion of the physician.
 

When assessing a family for discharge prior to weaning the following criteria should be met:

    - Stable supportive home environment
    - Satisfactory psychosocial assessment documented
    - No identified risk to planned neonatal follow-up
    - Primary care provider familiar with NAS and medication weaning for post discharge care
    - A clearly identified plan for weaning
    - Identified physician familiar with NAS and medication weaning for post discharge care who will follow the infant as often as necessary but no less frequently than weekly until withdrawal is complete.
    - An ability to monitor the appropriateness of timing of prescription renewals (maximum 7 day prescriptions only, no early renewals)
    - Dedicated care provider competence in measuring and administering the medication
    - Care provider education about symptoms of NAS and the need to contact the physician if symptoms increase
    - Care provider education regarding avoidance of co-sleeping
    - Post-discharge follow-up with Public Health, CAS, addiction services or identified community support worker as required
    - Pre-discharge case conference to identify and document the discharge plan
  - d) Phenobarbital or clonidine may be considered as adjunct therapy to morphine in patients whose symptoms are not well controlled with morphine alone.

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