

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^{i,ii,iii} 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>	<p>Level III B</p>	<p>Practitioners in both the SCN/NICU and mother-baby unit should be educated in non-pharmacological treatment techniques.</p>

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Non-pharmacological Interventions	<p>b) Breastfeeding is preferable and safe for methadone-maintained mothers. In the absence of contraindications, breastfeeding is recommended.</p>	<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^{iv,v,vi} 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>

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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 ^{vii} 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 ^{viii,ix,x,xi}	Level III B	

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Non-pharmacological Interventions	<p>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>	<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^{xii,xiii}.</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	

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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.		

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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 <i>NAS Pharmacologic Treatment Protocol: Dosing Guidelines</i></p> <p>15.</p> <p>16. Morphine is indicated when the average of three scores is 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^{xiv, xv} however published experience is lacking compared with that for morphine.</p>	III B	Dosing guidelines are included in <i>NAS Pharmacologic Treatment Protocol: Dosing Guidelines</i>
	<p>a) 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.

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Pharmacological Treatments	<p>b) Discharging the infant home on morphine is not recommended however, in exceptional circumstances, an infant may be discharged on morphine at the discretion of the physician in consultation with the health care team and only in the absence of social risk factors. Under these circumstances the following criteria should be met:</p> <ul style="list-style-type: none"> • Stable supportive home environment • Satisfactory psychosocial assessment • No identified risk for lack of neonatal follow-up • Identified physician familiar with NAS and medication weaning for post discharge care • A clearly identified plan for weaning • An ability to monitor the appropriateness of timing of prescription renewals (no early renewals) • Parental education around symptoms of NAS and the need to contact physician if symptoms increase • Post-discharge follow-up with Public Health, CAS, addiction services, etc. 	<p>In the majority of cases risk factors are present and weaning in hospital is important.</p>	<p>III</p>	

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Pharmacological Treatments	<p>c) 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 NAS Pharmacologic Treatment Protocol: Dosing Guidelines</p>	<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^{xvi}.</p> <p>A recently updated Cochrane Review^{xvii} 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^{xviii}, 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 II-1 1 I B</p>	<p>Dosing guidelines are included in NAS Pharmacologic Treatment Protocol: Dosing Guidelines</p>

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