Guideline

Drug and Alcohol - Neonatal Abstinence Syndrome (NAS)

Key Points

- Babies at risk of NAS should be referred for neonatal medical care after birth and assessed for NAS with the modified **Finnegan neonatal abstinence scoring system** (MR/1820). **Table 1**
- Babies at risk of NAS are born to women assessed as *dependent* (or intoxicated at delivery) on **opioids** (including women who have ceased use within 4 weeks of birth), **sedatives or stimulants.**
- Non-pharmacological, supportive care with the mother, whenever possible, is the first line of treatment for all babies exposed to maternal substance use in pregnancy
- Babies may be eligible for discharge after 96 hours observation if their daily peak Finnegan scores are less than 6 for the prior 48 hours and there are no unresolved medical or social issues requiring hospitalisation. **Appendix 1**
- Pharmacological treatment is commenced when the baby has been transferred to and assessed in NICU/ SCN with modified Finnegan's scoring averaging 8 or more for 3 consecutive scores, or averaging 11 or more for 2 consecutive scores
- Morphine is used for opioid withdrawal, with all dose changes calculated using **birth weight** (not current weight).
- Morphine is weaned by 10% of the **initial dose** (based on birth weight) **every 48 hours**, but if scores remain less than 4 the dose may be reduced every 24 hours
- Phenobarbital may be indicated as an additional therapy where the symptoms of NAS are not adequately suppressed by morphine treatment alone, or as first line treatment when maternal drugs used are unknown, are non-opioid drugs or when the mother was intoxicated with alcohol or non-opioid drugs at the time of birth
- Safe sleeping practices must occur in hospital

1. Purpose

This clinical guideline outlines the requirements for management and treatment of infants at risk of Neonatal Abstinence Syndrome (NAS) at the Women's.

Where processes differ between campuses, those that refer to the Sandringham campus are differentiated by pink text or have the heading **Sandringham campus.**

2. Definitions

Neonatal Abstinence Syndrome (NAS) is a syndrome of drug withdrawal observed in babies of women physically dependent [in the 4-6 weeks prior to birth] on drugs manifested by non-specific symptoms and signs in the baby that may include neurological excitability, gastrointestinal dysfunction, autonomic signs, poor feeding, sleep-wake abnormalities, vomiting, dehydration, poor weight gain, neuromuscular abnormalities and occasionally seizures.

WADS Women's Alcohol & Drug Service, The Royal Women's Hospital.

Withdrawal is the development of a substance-specific syndrome due to the cessation of (or reduction in) substance use that has been prolonged.

3. Responsibilities

Nursing/ midwifery, neonatal medical staff and the Women's Alcohol and Drug Service (WADS) team.

4. Guideline

Refer to Appendix 1 for the summary flow chart for Assessment and Care of babies at risk of NAS.

4.1 Resuscitation

In the event of respiratory depression in the baby of an opioid-dependent mother, normal resuscitation methods should be used, including thorough assessment and mechanical ventilation as required.

If there is a history of regular maternal opioid use during pregnancy, use of naloxone during resuscitation of the baby is contraindicated, because severe rapid onset seizures associated with withdrawal may be precipitated.

4.2 Differential diagnosis and investigations

Part of routine care for every baby is to observe the baby's feeding and behaviour. If a baby shows behaviour consistent with withdrawal (sleeping less than one hour undisturbed, feeding poorly and/or not consolable within 10 minutes) further assessment should be undertaken, including history of maternal use of both prescribed and non-prescribed substances, and referral should be made to a neonatal RMO/ paediatrician.

Onset of symptoms in babies varies depending on specific pharmacological properties, but is usually seen within the first few days of life. If **suspected or anticipated**:

- Refer baby to neonatal RMO/ paediatrician
- Use modified Finnegan assessment tool (MR/1820) to monitor baby
- Early postdischarge review before 4 weeks of age should be considered
- Consider referring the mother to a psychiatrist for advice about psychotropic medication use in the postnatal period, particularly where mother breastfeeding.

Clinical signs similar to those of NAS may be caused by concurrent illness, such as infection and hypoglycaemia.

Routine urine or meconium drug screening for illicit drugs is not recommended in mothers or babies, unless considered of diagnostic importance (e.g.: if the infant has signs of NAS and the drugs used by the mother are unknown).

4.3 Settings of care

To promote mother-baby bonding, babies at risk of NAS are cared for with the mother, unless contraindicated by medical condition or risk to safety of mother or baby.

If babies are separated from their mother, efforts should be made to maximise parental involvement in care including assessment and care of NAS. Documentation of parental involvement in care may be required by child protection services.

Safe sleeping practices must occur in hospital.

4.4 Breastfeeding

Support the mother's choice to breastfeed unless there is substantial evidence or reasonable consensus that the drug taken by the woman will be harmful to the infant or there is risk of disease transmission. Contraindications to breastfeeding include:

- Intoxication with alcohol or other drugs
- HIV positive mother
- Hepatitis C positive mother who has cracked and/or bleeding nipples.

Breastfeeding may be contraindicated for intermittent periods, including after drug or alcohol use. All women who breastfeed should be advised on how and when to express; and store or discard breast milk; and to develop a safety plan for feeding the baby. Further information is available in Drug and Alcohol: Breastfeeding in women using illicit substances and alcohol.

4.5 Artificial formula feeding

Artificial formula feeding may be the primary source of nutrition for the infant or provided in conjunction with breastfeeding.

Women with ongoing or intermittent substance use need to have a 'safety' or backup plan for the times when they are under the influence of substances. This safety plan should be discussed with women prior to their discharge from the acute setting. Safety plans should include:

- mother's ability/plans to have baby cared for and fed by another appropriate person if she is substance affected

- formula preparation, storage and equipment cleaning.

4.6 Assessment of withdrawal

Babies at risk of NAS should be referred for neonatal medical care after birth. All other babies born to mothers under WADS care should receive routine postnatal care, including referral for neonatal medical review if indicated (Refer to 'Babies in maternity requiring neonatal medical care').

Babies at risk of NAS are born to women assessed as *dependent* (or intoxicated at delivery) on **opioids** (including women who have ceased use within 4 weeks of birth), **sedatives or stimulants.** These babies should be assessed for NAS with the modified **Finnegan neonatal abstinence scoring system** and documented in the patient record using MR/1820:

- commencing within 2 hours of birth
- repeated every 3-4 hours (30-60 minutes after feeds)
- for a minimum of 4 days.

Babies may be eligible for discharge after 96 hours observation if:

- daily peak Finnegan scores are less than 6 for the prior 48 hours
- no unresolved medical or social issues requiring hospitalisation are present (see **Discharge section**).

Babies of women dependent on **cannabis** may have delayed onset of withdrawal, and should be referred for early postnatal review before one month of age with a suitably qualified clinician, GP or paediatrician, but do not require assessment with the modified Finnegan tool after birth.

Babies of women dependent on **alcohol, sedatives or stimulants** may develop symptoms (sleeping less than one hour undisturbed, feeding poorly and/or not consolable within 10 minutes) in the first 7 days, thus requiring assessment in hospital. Although not validated for use in this group of babies, the symptoms observed are similar to those of opiate dependent mothers and the modified Finnegan scoring tool should be used in the absence of another validated tool. Maternal dependence on these substances may also cause delayed onset of infant withdrawal and babies should be referred for early assessment before one month of age with a suitably qualified clinician, GP or paediatrician.

Assess baby for signs of withdrawal half- to one hour after each feed. The infant will be more settled at this time and a more accurate assessment can be obtained. Scoring interval is inclusive of the time since the last score was taken. The mother is involved in the assessment process, as she will be aware of infant's symptoms of withdrawal. Infants who exhibit signs of withdrawal will generate scores from criteria in each of the three sections of the scoring chart (central nervous system, gastrointestinal, autonomic). Table 1 indicates how to assess elements of the modified Finnegan abstinence severity scale tool.

Table 1: Guide to scoring modified Finnegan abstinence severity scale

High pitched cry	Score 2 if high-pitched at its peak, 3 if high-pitched throughout
Tremors	This is a scale of increasing severity and a baby should only receive one score from the four levels of severity. Undisturbed refers to the baby being asleep or at rest in the cot.
Increased muscle tone	Score if the baby has generalised muscle tone greater than the upper limit of normal.
Excoriation	Score only when excoriations first appear, increase or appear in a new area.
Yawning and sneezing	Score if occurs more than 3 to 4 times in 30 minutes.
Nasal flaring/respiratory rate	Score only if present without other evidence of lung or airways disease.

Excessive sucking	Score if more than that of an average hungry baby.
Poor feeding	Score if baby is very slow to feed or takes inadequate amounts.
Regurgitation	Score only if occurring more frequently than would be expected in a newborn baby.

Symptoms of NAS in **preterm babies (34 – 37 weeks gestation)** are similar to those of term babies. The modified Finnegan tool should be used for assessment of NAS, with modifications in the sleeping and feeding sections to allow for variations in behaviour due to prematurity as there is no alternative validated tool.

- Many premature babies require tube feeding. Babies should not be scored for poor feeding if tube feeding is expected at the gestation
- A baby on 3 hourly feeds can sleep at most 2 1/2 hours. Scoring should be:
    - 1 if a baby sleeps less than 2 hours
    - 2 if sleeps less than 1 hour
    - 3 if does not sleep between feeds.

In older infants sleeping patterns should be considered when interpreting the NAS score (infants greater than 6 weeks of age spend more time awake during the day). It may be appropriate to discontinue NAS scoring and base decisions to wean treatment on general behaviour.

4.7 Supportive care

Non-pharmacological care is the first line of treatment for all babies exposed to maternal substance use in pregnancy. This includes supportive care interventions such as:

- a quiet setting
- breastfeeding
- use of a pacifier (if parents give consent)
- small frequent feeds
- cuddling
- swaddling
- close skin contact
- carrying in a sling.

Pain relief for procedures should be provided based on need as for any baby.

Feeding and gastrointestinal disturbances are common in babies withdrawing from maternal substance use. If a baby is losing weight with breastfeeding alone, consideration should be given to the use of supplemental expressed breast milk or formula until adequate milk supply is established. Use of lactose free formula should be according to indication.

4.8 Pharmacological treatment

Once the modified Finnegan score averages 8 or more for 3 consecutive scores, or averages 11 or more for 2 consecutive scores, transfer baby to NICU/ SCN for:

- further assessment and scoring by a neonatal RN experienced in using the modified Finnegan's scoring tool
- pharmacological treatment as per protocol.

Pharmacological treatment dose changes should be calculated using **birth weight** not current weight.

4.9 Morphine Treatment

Morphine hydrochloride (1000microgram/mL) should be administered orally for NAS caused by opioid withdrawal.

Commencing treatment commits the infant to several weeks in the neonatal unit (or a prolonged period of tapering of treatment in the Infant Home Based Withdrawal (IHBW) program, if appropriate). The scores on which the treatment is based should be checked and confirmed in NICU/ SCN.

Table 2: Recommended Morphine Treatment Regime

Score	Morphine Dose
3 consecutive scores average 8 or more	125 micrograms/kg/dose 6-hourly or 85 micrograms/kg/dose 4-hourly*
2 consecutive scores average 11 or more (consider higher dosage)	125-175 micrograms/kg/dose 6-hourly or 85-120 micrograms/kg/dose 4-hourly*

*If NAS symptoms are not assessed as controlled with 6-hourly oral morphine, change dose frequency to 4-hourly (keeping the **same total daily dose**) in the first instance before increasing the dosing amount.
Oral doses should be rounded to the nearest 10 micrograms (for ease of measuring doses)

If dose reduction is not possible due to elevated scores

- increase morphine dose by 30 microgram/kg/dose until scores controlled

  Higher doses of morphine may be used up to a maximum of 1200 micrograms/kg/day (200micrograms/kg/dose 4 hourly, 300 micrograms/kg/dose 6hourly).

- and/ or prescribing a second therapeutic agent.

  When polysubstance exposure has occurred, initially adding a second therapeutic agent before increasing the morphine dose above the usual prescribing range is preferred.

Respiratory monitoring babies receiving morphine treatment

Babies receiving morphine should be closely monitored for respiratory and cardiac depression including use of an apnoea monitor whilst commencing and stabilising on treatment as morphine is a respiratory depressant. Overdosing may result in excessive sedation, respiratory depression, abdominal distension, constipation and (rarely) urinary retention.

Apnoea monitoring can be discontinued when the baby is non-sedated with weaning morphine therapy.

4.10 Weaning morphine therapy

Once NAS symptoms have been assessed as controlled (three consecutive scores less than 8) the morphine dose should reduce by 10% of the initial dosage prescribed (**based on birth weight**, not current weight) throughout the weaning process (i.e. the morphine decreases by a constant amount throughout weaning based on birth weight).

If dose reduction is not possible due to elevated scores consider increasing morphine dose by 30 microgram/kg/dose and/ or prescribing a second therapeutic agent.

Weaning morphine treatment – on 6-hourly dosing:

- Reduce by 10% of the **initial dose** (**based on birth weight**) every 48 hours (i.e. 12.5-17.5 micrograms/kg/dose).
  - This dose reduction should be documented in the 'Medical Information' section of the regular medicines on the Neonatal Medicines Chart (MR/1952) with each morphine order. e.g. if initial dose is 400mcg q6h for a 3200g baby, subsequent weans, as tolerated, would be 40mcg/dose.
- If scores rebound (>= 8) increase to previous dose and consider performing further dose reductions every 72 hours
- If scores remain less than 4 consider dose reduction every 24 hours
- When daily dosage is 30micrograms/kg/dose, morphine may be discontinued
- Continue assessment of NAS for a further 48 hours

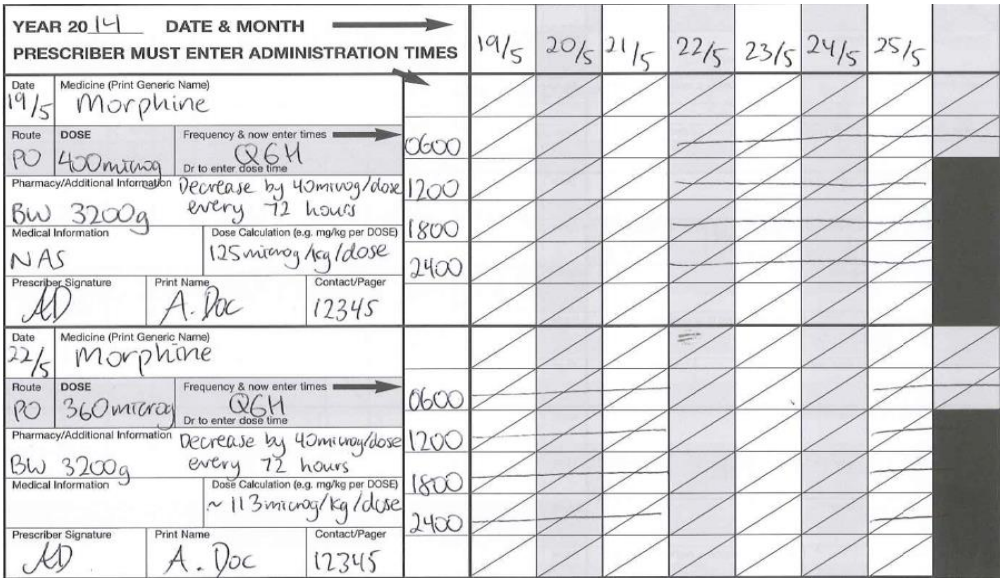
Weaning morphine treatment – on 4-hourly dosing:

- Reduce by 10% of the **initial dose** (**based on birth weight**) every 48 hours (i.e. 8.5-12 micrograms/kg/dose)
- If scores rebound (>= 8) increase to previous dose and consider performing further dose reductions every 72 hours
- If scores remain less than 4 consider dose reduction every 24 hours
- When on 35 micrograms/kg/dose, change dose frequency from 4-hourly to 6-hourly (i.e. 35 micrograms/kg/dose 6-hourly)
- Discontinue treatment after 48 hours
- Continue assessment of NAS for a further 48 hours

Infants who complete weaning of morphine treatment through the Infant Home Based Withdrawal (IHBW) program are prescribed 6-hourly dosing.

An infant may be converted from 4-hourly dosing to 6-hourly dosing at **any** stage of the weaning process. Inconverting the dosing frequency from 4-hourly to 6-hourly, **the same total daily dose** of morphine is maintained (in consequence, the amount of morphine administered per dose will increase).

Correct prescribing of oral morphine for NAS



See Neonatal Pharmacopoeia for further information about Morphine use and administration.

4.11 Vomiting

To reduce the risk of the baby vomiting the morphine dose:

- give medication before a feed
- ensure the baby is not being overfed.

Table 3: Vomiting

If baby vomits		Action
Within 10 minutes of morphine dose	→	Redose
10-30 minutes after dose	→	Give half dose
>30 minutes after dose	→	Wait until next scheduled dose

4.12 Phenobarbital Treatment

Phenobarbital may be indicated as an additional therapy where the symptoms of NAS are not adequately suppressed by morphine treatment alone, particularly where there has been concurrent use of opioid and non-opioid drugs in pregnancy.

Phenobarbital should be used as the **first line treatment** if babies with signs of NAS reach threshold for treatment, and:

- maternal drugs used are unknown
- maternal drugs used are non-opioid drugs
- the mother was intoxicated with alcohol or non-opioid drugs at the time of birth.

If used as a first line treatment, a loading dose is likely to achieve more rapid control of symptoms.

Table 4: Recommended phenobarbital treatment regime

Score	Dose
All scores	**Loading dose:** 10-15mg/kg/dose orally or intravenously, if not tolerating oral intake
	Then (maintenance doses) 12 to 24 hours later:
Average 8 or more for 3 consecutive scores	3mg/kg/dose 12-hourly (based on birth weight)
Average 11 or more for 2 consecutive scores (consider higher dosage)	3-4 mg/kg/dose 12-hourly (based on birth weight)

Assays of phenobarbital levels should be performed if indicated by clinical condition.Weaning phenobarbital treatment:

Once NAS symptoms have been assessed as controlled (scores less than 8) for 48 hours,if only phenobarbital is prescribed, discharge from hospital may occur after one successful dose reduction.

When both morphine and phenobarbital dosing are prescribed, wean morphine dose first. Phenobarbital weaning may then occur as an outpatient through the WADS paediatric clinic. If all medicines require weaning before discharge, the phenobarbital dose should be reduced by 2mg per dose every 4th day or longer depending on neonatal medical assessment of clinical condition until less than 1mg/kg/dose.

4.13 Other treatments

Some infants with NAS symptoms are incompletely responsive to treatment with morphine and/or phenobarbital. Consider alternative causes of symptoms other than withdrawal. Symptomatic management of the particular uncontrolled symptoms should be undertaken only in consultation with the WADS paediatrician.

Other pharmacological treatments that may be useful include:

Clonidine 0.5 -1 microgram/kg/dose orally 6-hourly based on weight at commencement of treatment (may be increased to 1 microgram/kg/dose 4-hourly in infants > 35 weeks GA). Adverse effects include hypotension, rebound hypertension if clonidine is not tapered off over more than a week, AV-block and bradycardia. Wean dosage by 25% of the initial dose every 5 days.

Chloral hydrate 8 mg/kg/dose orally 8-hourly based on weight at commencement of treatment (one paper reports use of 30-50mg/kg/dose orally with dose frequency increased up to 3 times per day in conjunction with clonidine). Monitor for sedation and respiratory depression.

4.14 Infant Home Based Withdrawal

Refer to ‘Drug and Alcohol – Infant Home Based Withdrawal’.

4.15 Discharge

Babies of women dependent on alcohol or drugs are at an increased risk of harm or neglect.

Discharge preparation includes assessment of health (need for medical treatment, risk of withdrawal, feeding ability) and welfare (parentcraft ability of primary carer, adequacy of home environment).

Babies should not be discharged and child protection authorities should be notified if:

- neglect or abuse of the baby or siblings is suspected
- home violence is suspected.

Babies of women dependent on alcohol or drugs should continue to have long term comprehensive care after discharge. A care management meeting may be held to ensure referrals and supports are in place and respective roles and responsibilities are clearly understood. The care manager should follow-up women after discharge to ensure they are engaged with community services.

Child protection services may be involved at any stage before or after the birth. If involved, they assume responsibility for organising appropriate community support.

4.16 Follow-up for babies of mothers with prolonged QTc interval

Women maintained on methadone therapy may have ECG monitoring performed during pregnancy care to assess development of prologation of QTc interval.

If a woman is known to have prolonged QTc interval this will be noted on the maternal Alert Sheet. Her infant will have ECG performed on Day 4 and referral made for review in Cardiology Department at the Royal Children's Hospital if an abnormality is reported. If possible symptoms occur (dusky spells, unresponsiveness) ECG should be performed earlier.

4.17 Follow-up for babies at risk of vertical transmission of Blood Born Virus (BBV) (Hepatitis B, Hepatitis C and Human Immunodeficiency Virus)

If a baby is at risk of blood borne virus (HIV, HBV, HCV) transmission, refer to the 'Human Immunodeficiency Virus (HIV) - Maternal and Neonatal Care, 'Neonates born to women with Hepatitis B and C infection: Management and follow-up'.

The WADS paediatric clinic provides follow-up for infants born to women who have had a positive HCV antibody test in pregnancy.

5. Evaluation, monitoring and reporting of compliance to this guideline

Compliance to this guideline will be monitored, evaluated and reported through incidents reported to VHIMS.

6. References

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7. Legislation/Regulations related to this guideline or procedure

Not applicable.

8. Appendices

Appendix 1: Assessment and care for babies at risk of Neonatal Abstinence Syndrome

Guideline

Drug and Alcohol - Neonatal Abstinence Syndrome (NAS)

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Appendix 1

Assessment and care for babies at risk of Neonatal Abstinence Syndrome

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