Queensland Clinical Guidelines

Translating evidence into best clinical practice

Maternity and Neonatal **Clinical Guideline**

Perinatal substance use: neonatal

Queensland Government

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Cultural acknowledgement

We acknowledge the Traditional Custodians of the land on which we work and pay our respect to the Aboriginal and Torres Strait Islander Elders past, present and emerging.

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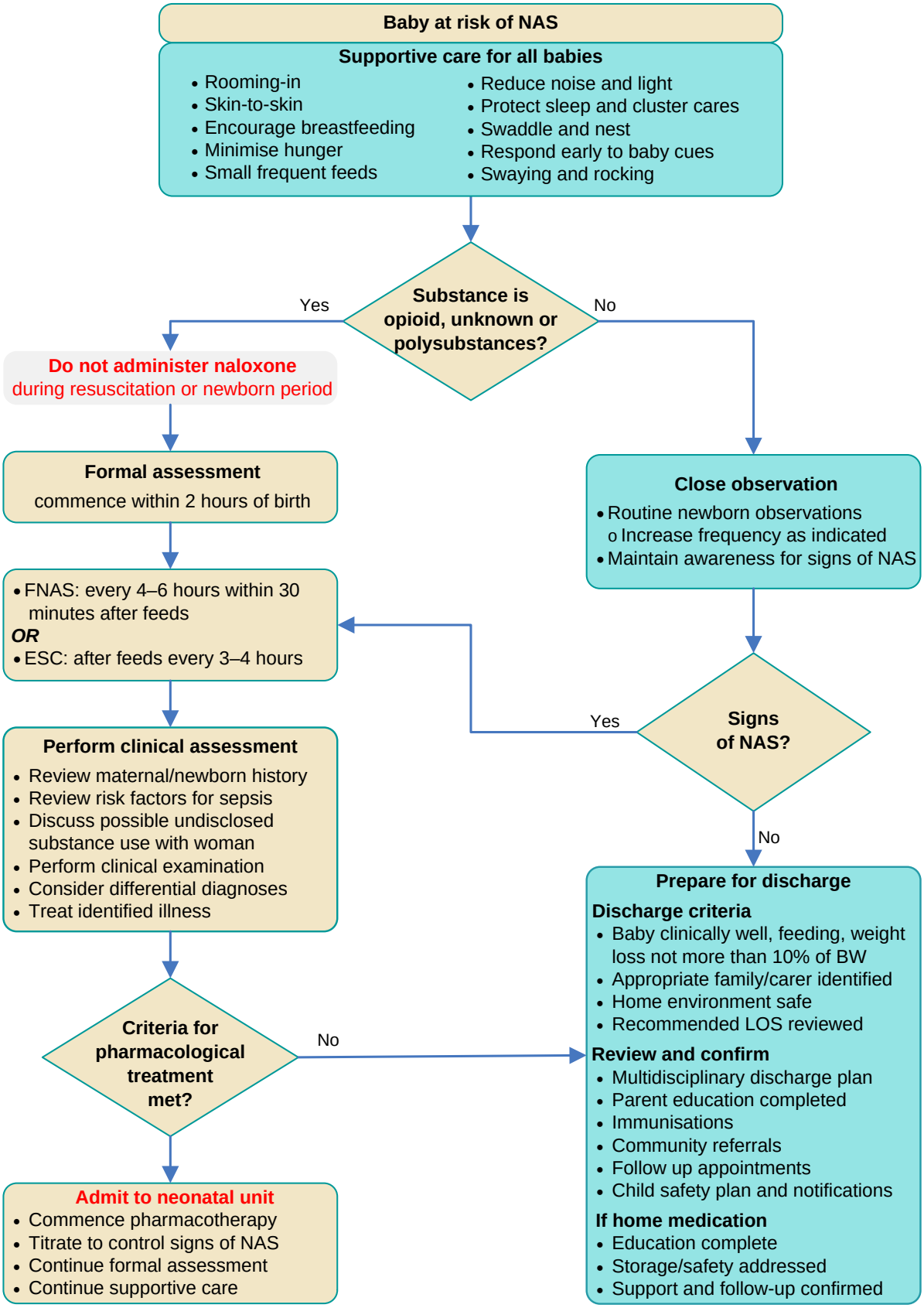
Flow Chart: Management of neonatal abstinence syndrome



BW: birth weight**, ESC:** eat, sleep, console protocol, **FNAS:** Finnegan neonatal abstinence score, **LOS:** length of stay**, NAS:** neonatal abstinence syndrome

Queensland Clinical Guideline: Perinatal substance use: neonatal F21.38-2-V3-R26

Table of Contents

List of Tables

Abbreviations

CNS	Central nervous system
GI	Gastrointestinal
GP	General practitioner
IV	Intravenous
NAS	Neonatal abstinence syndrome
NP	Nurse practitioner
SIDS	Sudden Infant Death Syndrome
SNRI	Serotonin noradrenaline reuptake inhibitors
SSRI	Selective serotonin reuptake inhibitors
SUDI	Sudden Unexplained Death of an Infant

Definitions

Multidisciplinary team	Membership is influenced by the needs of the parent/carer, the baby, availability of staff, and other local resourcing issues. May include a range of multidisciplinary professionals including, but not limited to, nurse/midwife, obstetrician, neonatologist/paediatrician, nurse practitioner, pharmacist, lactation consultant, other specialist practitioners (e.g. maternal fetal medicine specialist), general practitioner, social worker/counsellor and allied health workers from hospital and community services including government and non-government organisations.
Full team review	Within the *Eat, Sleep Console* method of assessment, includes as a minimum the parent/carer, main staff care providers (nurse or midwife, team leader), and medical officer or neonatal nurse practitioner. Other members of the multidisciplinary team (e.g. pharmacist) may be included as required.
Neonatal abstinence score (NAS)	In this guideline, NAS is used to describe the syndrome of withdrawal in babies exposed to opioids and other substances in-utero. Other terms/diagnosis which are included in the umbrella term 'NAS' • Neonatal opioid withdrawal syndrome (NOWS): clinical features specific to withdrawal from opioids • Poor neonatal adaption syndrome: clinical features specific to in-utero exposure to SSRI and SNRI and/or other anti-depressants. • Substance exposed newborn: baby exposed to substances in-utero that may cause signs of withdrawal postnatally
Neonatal unit	In this guideline used to mean any clinical area where specialised observation, monitoring, and baby care is provided
Parent/carer	In this guideline used to include the birth, adoptive or foster parents, primary caregivers or other family members involved in the care of the baby.
Perinatal substance use	Includes any drug, medicine or chemical matter or mixture whose use in pregnancy may give rise to immediate or future concern for the health and well-being of the woman and/or her baby.

1 Introduction

Neonatal abstinence syndrome (NAS) is a syndrome of substance withdrawal with non-specific signs in the baby following chronic in-utero exposure to a variety of substances including opioids, benzodiazepines, barbiturates, selective serotonin reuptake inhibitors (SSRI), serotonin noradrenaline reuptake inhibitors (SNRI), tricyclic antidepressants (TCA) alcohol and nicotine.[1] NAS is more common in neonates born to opioid dependent women.[2]

As polysubstance exposure during pregnancy becomes more prevalent[3], NAS is becoming an increasingly complex syndrome with less predictable time of onset, severity and response to pharmacologic therapy.[2] Maternal substance use that leads to transient withdrawal or toxicity in the neonatal period may have long term neurodevelopmental effects for the baby.[4-6]

Signs of withdrawal and/or the ability to adapt ex-utero, depend on the type of substance and the type of neurotransmitter that is affected.[7] Signs of NAS may also be due to withdrawal, toxicity or a combination of both.[8] In cases of residual toxicity (in contrast to withdrawal), further exposure to the withdrawn substance may have detrimental effects.[8]

Ideally, engagement with women and their families about NAS begins in the antenatal period. Refer to Queensland Clinical Guideline: *Perinatal substance use: maternal*[9]

1.1 Incidence in Queensland

Reporting and comparison of NAS is complicated by different definitions, screening, assessment and diagnostic tools used in different countries, and the variety and subtlety of clinical presentation.[10,11] At the time of publication, no Queensland Health data was approved for inclusion.

1.2 Modulating factors

Factors that influence the likelihood of developing NAS, timing of onset, presentation and severity of signs are not completely understood and vary significantly among babies exposed to substances in-utero.[7,12]

Table 1. Modulating factors for NAS

Aspect	Consideration
Gestational age and gender	• Preterm babies have less severe NAS related to[13]: o Developmental immaturity of specific opiate receptors and neurotransmitter function o Reduced time exposed to opioids in-utero o Reduced fatty deposits of substances • Risk factors for increased severity o Term gestation/average birth weight[14] o Male gender associated with increased risk of NAS[15]
Epigenetics/ pharmacokinetics	• Pharmacogenomics[14] o OPRMI 118 AA or COMT 158 AA positive genotype associated with increased length of stay and likelihood of treatment[16] o Hypermethylation within the OPRM1 promoter is associated with more severe NAS, consistent with gene silencing[17] • Maternal and baby metabolism and excretion[18]
Maternal factors	• NAS more likely and/or more severe if[7]: o Continuous opioid use for more than 5–7 days before birth o Polysubstance use[7] o Combination of opioid with benzodiazepines[19] or SSRI[7] or tobacco[1] o Not breastfeeding[14]
Environmental influences	• Antenatal engagement with healthcare providers • Rooming-in practices decrease effects of NAS[20] • Assessment tools used to evaluate signs of NAS may influence treatment decisions • Staff and parent/carer engagement with non-pharmacological interventions • The most efficacious pharmacological treatment regimen is uncertain

1.3 Clinical standards

Table 2. Clinical standards

Aspect	Consideration
Routine/ standard care	• Refer to Queensland Clinical Guideline: *Standard care*[21] • Individualise care for the baby considering o History of maternal substance use (e.g. substance(s) used, dosage) o Severity of NAS and need for pharmacological interventions o Parent/carer circumstances and engagement with healthcare providers
Models of care	• Facilitate a team based approach across and between disciplines that commences antenatally and which extends beyond inpatient discharge • Support specialised maternity substance use programs that facilitate continuity of carer postpartum • Promote family-centred care by identifying locations where families affected by substance use can remain co-located o Aids mitigation of stressors by enhancing responsive and consistent care, and timely adjustment of care to meet baby's needs
Clinician education	• Support education about NAS and use of assessment tools to[22,23]: o Increase reliability and scoring consistency o Facilitate inter and intra-observer validation of scoring o Reduce variability in clinical decision-making • Support clinician development on non-judgemental communication and interactions with substance using families • Support knowledge acquisition about child protection responsibilities and professional capability requirements[24]

2 Initial newborn care

Table 3. Newborn care

Aspect	Consideration
Preparation for birth	• Use clinical judgement to assess and anticipate the need for resuscitation (e.g. recency and type of substance use, limited/no antenatal care) • Communicate with other members of the multidisciplinary team about the impending birth as required (e.g. if resuscitation is anticipated)
Resuscitation	• All usual resuscitation procedures are indicated o Refer to Queensland Clinical Guideline *Neonatal resuscitation*[25]
Opioid antagonist	• If maternal opioid or polysubstance exposure o Do not use opioid antagonist agents (naloxone or naltrexone)[26] o May precipitate severe rapid onset of seizures related to withdrawal
Rooming-in	• Support rooming-in unless there are clinical concerns requiring admission to a neonatal unit or a child safety order mandating separationt[27-29] o Associated with less need for pharmacological treatment[30], reduced length of stay[20] and improved breastfeeding rates[31]
Post-birth safety	• Consider potential effects of substance use on the parent/carer's ability to care for the baby[32] o Maternal somnolence[33] o Lack of adequate maternal sleep-wake cycling[33] o Risk of injury to baby including accidental smothering[33] o Increased maternal psychopathology including poor judgement, decreased reaction times, less self-control[33]

2.1 Clinical surveillance

Onset and duration of NAS varies by substance.[14] Use clinical judgement to inform decisions related to duration of clinical observations and surveillance.

Table 4. Clinical surveillance

In-utero exposure	Consideration
Any substance	• Perform routine newborn observations (e.g. using Neonatal Early Warning Tool) o Increase frequency of observations as clinically indicated o Refer to Section 6.3 Timing of discharge • Paediatric review daily (by teleconference with referral centre if required) if baby: o Shows signs of NAS o Commences morphine or phenobarbital o Is on maximum doses of medication and continues to show signs of NAS o Has signs of NAS where exclusion of alternative causes is not possible
Opioid substances or polysubstance	• Commence formal assessment for signs of NAS within 2 hours of birth using either Finnegan Neonatal Abstinence Score (FNAS) or the Eat, Sleep, Console (ESC) protocol • Refer to: o Appendix A: Finnegan Neonatal Abstinence Severity Score o Appendix C: Eat, Sleep Console assessment
Non-opioid substances	• Routine formal assessment for signs of NAS is not required unless/until: o Baby shows signs of NAS • Refer to: o Appendix A: Finnegan Neonatal Abstinence Severity Score o Appendix C: Eat, Sleep Console assessment

3 Assessment

Suspect NAS and investigate to determine diagnosis in any baby who displays signs of NAS.

3.1 Signs NAS

Clinical presentation can be non-specific and variable in intensity and duration. Additionally, similar signs can occur across all substance classes and this is compounded when there is maternal polysubstance use. There may also be no signs of withdrawal.

Table 5. Signs of NAS

Signs[7,34-36]	**Substances implicated**	**Neurotransmitter**[7,34,35]
• Sleeping problems	• Opioids • TCA • SSRI • SNRI • Methamphetamines • Alcohol*	• Decreased serotonin
• Poor feeding • Hypertonia • Jitteriness	• SSRI • SNRI	• Increased serotonin
• Hyperirritability	• Opioids • Methamphetamines • Inhalants • Nicotine* • Alcohol*	• Decreased dopamine
• Hyperphagia • Increased stress	• Opioids	• Increased corticotrophin
• Hyperthermia • Hypertension • Tachycardia • Tremors	• Opioids • SSRI • SNRI • Alcohol*	• Increased noradrenaline
• Sweating • Vomiting • Diarrhea • Yawning • Sneezing • Sleeping problems	• Opioids • TCA • SSRI • SNRI • Alcohol*	• Increased acetylcholine
• Jittery • Irritability	• Benzodiazepines • Barbiturate • Solvents • Caffeine	• Increased GABA (gamma aminobutyric acid)

*Multiple or unknown/uncertain neurotransmitter involvement[37]

3.2 Clinical assessment

Table 6. Clinical assessment

Aspect	Consideration
Clinical examination	• Review maternal and newborn history and relevant pathology • Conduct a full newborn examination to exclude differential diagnoses, even if known maternal substance use • Consider concurrent illness • Review risk factors for neonatal sepsis • Investigate as required to exclude infection or metabolic disturbances • Treat identified illness
Substance testing	• Routine testing not recommended[1] • Perform only where results will inform clinical management • If testing is indicated, discuss with parent/carer and gain consent prior to specimen collection • Pathology Queensland recommend: o Urine is the sample of choice o Plasma if urine unavailable o No validated method for screening meconium but testing may be possible if required

3.3 Differential diagnosis

NAS may be difficult to differentiate from other neonatal conditions. Consider other diagnosis because many babies with NAS are at elevated risk of infections and other comorbidities.

Table 7. Differential diagnosis

Specific NAS sign	Differential diagnosis[28]
Irritability	• Gastro-oesophageal reflux • Pain/discomfort • Sepsis • Brain injury
Fever	• Sepsis (especially herpes simplex virus) • Hyperthyroidism
Feeding problems	• Oromotor dysfunction • Anomalies (e.g. cleft palate, micrognathia, Pierre Robin sequence, genetic syndromes such as Prader Willi) • Polycythaemia • Immaturity, including late preterm birth • Jaundice • Brain injury • Sepsis
Jitteriness	• Hypoglycaemia • Hypocalcaemia • Immaturity • Injury of the nervous system
Myoclonic jerking	• Not uncommon in opioid-exposed infants and can be mistaken for seizure activity
Seizures (rare with NAS)	• Hypocalcaemia • Hypoglycaemia • Hypoxic-ischemic encephalopathy • Brain haemorrhage/stroke • Meningitis • Inborn errors of metabolism • Seizure disorders

3.4 Assessment tools

A variety of assessment tools and methods have been reviewed for usefulness in clinical practice, but high quality evidence remains limited.[18] Consistent use of a preferred assessment tool at the facility level promotes familiarity, and consistency of decision making and supports quality data collection and outcome reporting.

Tools for assessment of NAS aim to provide objective data about:

- Requirements for additional monitoring and care
- When to commence pharmacological treatment
- Whether a medication dose requires alteration
- Resolution of signs

3.4.1 Finnegan neonatal abstinence severity score

Table 8. Finnegan neonatal abstinence severity score

Aspect	Consideration
Context	• Most widely used[38,39] and the Australian standard for assessment of opioid withdrawal in term babies • Has been used (but not validated) to assess signs of non-opioid related NAS[8] o Benzodiazepines and alcohol o Neonatal stimulant intoxication o SSRI and SNRI[40]
Benefits and limitations	• Common in clinical practice in Australia • Requires initial and repetitive training to obtain inter-rater reliability • Assessment of some criteria (e.g. Moro reflex) requires baby to be disturbed which may inflate FNAS • Focuses on achieving a FNAS of less than eight • Not validated for preterm babies • May prompt earlier or later initiation and greater intensity of pharmacological treatments
Elements	• Assesses and allocates a FNAS to 21 signs of withdrawal across three main elements (systems) o Central nervous system o Gastrointestinal o Vasomotor and respiratory
Assessment protocol[41]	• Assess elements half to one hour after each feed o FNAS reflects behaviour since the previous assessment averaged over three to four hours • Make allowances for babies who are preterm or beyond the initial newborn period
Review indicated	• Consider pharmacological treatment and transfer to neonatal unit when o Two consecutive FNAS 12 or more or o Three consecutive FNAS 8 or more • Refer to: o Appendix A: Finnegan Neonatal Abstinence Severity Score o Appendix B: Finnegan Neonatal Abstinence Severity Score Description

3.4.2 Eat, sleep, console

Table 9. Eat, sleep, console

Aspect	Consideration
Context	• Eat, sleep, console (ESC) first described in 2017 as a quality improvement activity[42] • Aims to support the baby exposed to substances to achieve developmentally normal eating, sleeping, consoling and weight gain milestones[42]
Benefits and limitations	• Emphasises partnering with parent/carer and use of non-pharmacologic interventions[43] • Promotes parent/carer togetherness with parent/carer as the primary provider of responsive baby care[43] • Prompts the consideration of reasons other than NAS that may affect how baby is eating, sleeping, consoling and/or gaining weight • Reported to reduce (for babies experiencing NAS)[43,44] o Length of stay o Use of pharmacological treatment • Use not reported for non-opioid exposed babies • Not validated for preterm babies
Elements	• Response to the following questions (as 'yes' or 'no') o Does the baby have poor eating? o Did the baby sleep less than 1 hour after feeding? o Is the baby unable to be consoled within 10 minutes using non-pharmacological interventions?
Assessment protocol	• Assess elements after feeds every 3–4 hours • With parent/carer, review ESC elements • Assessment reflects behaviour since previous assessment • Actively consider other non-NAS related factors that may influence assessment
Review indicated	• If any question is answered 'YES' (and is attributed to NAS) o Team huddle: review and optimise supportive care with parent/carer • If despite optimisation of supportive care, any question continues to be answered 'YES' (and is attributed to NAS) o Full healthcare team (multidisciplinary as required) review o Consider morphine initiation and transfer to neonatal unit • Refer to: o Appendix C: Eat, Sleep Console assessment o Appendix D: Eat, Sleep Console descriptions

3.5 Specific substances and NAS

Table 10. Specific substances and NAS

In-utero exposure to:		Onset/duration of signs	Considerations/specific signs
Opioid	Heroin	• Within 24 hours[1,28]; up to 5–7 days[29] • Duration 8–10 days[14]	• 50–80% opioid exposed babies require pharmacologic treatment[4,8,29] • Onset of clinical signs reflect half-life of the opioid involved[1] • Opioid receptors are concentrated in the central nervous system (CNS) and gastrointestinal (GI) tract producing predominantly signs of CNS irritability and GI dysfunction[45] • Methadone: o No conclusive evidence of relationship between maternal methadone dose and NAS severity[33,46-48] o Associated with prolonged QT interval within first 2 days[8] • Buprenorphine: o Usually milder signs and less need for pharmacologic treatment[35]
	Methadone	• 24–72 hours[45] • Duration up to 30 days or more[14]	
	Buprenorphine	• 48–72 hours[28] • Duration up to 28 days or more[7]	
CNS depressants	Alcohol	• 3–12 hours[14]	• Higher incidence of abdominal distention and opisthotonos, increased likelihood of apnoea and convulsions[49]
	Barbiturates	• 4–7 days up to 10–14 days[45] • Median duration 3 months[8]	• Compared to opioids: less autonomic or GI distress, less jaundice, better Apgar scores[8]
	Benzodiazepines	• First hours up to 1 week • Duration may persist for weeks/months	• May result in 'floppy infant syndrome' associated with toxicity[50] • Late exposure associated with higher risk of respiratory problems[50] • If used in conjunction with opioids, risk of severe NAS increased[19] • NAS can be mild and transient to severe[51]
CNS Stimulants	SSRIs TCA	• First 48 hours[14,45] • Duration 2–6 days[14]	• NAS more likely to be mild than severe[40,52] • Timing and intensity of NAS influenced by maternal dose and duration of treatment[53] • Conflicting findings about the risk of pulmonary hypertension of the newborn (PPHN) in newborn baby[54]
	Amphetamines Methamphetamines	• 24 hours[55] • Duration 7–10 days	• Severity of NAS may be dose-related[55] • Requirement for pharmacological treatment rare[55] • Heavy maternal use associated with decreased arousal[55]
	Cocaine	• 24–48 hours[14]	• May have no signs
Other	Nicotine	• First 48 hours • SIDS/SUDI risk persists through infancy	• Few studies involving non-combustible nicotine-containing products[37] • Some reports of excitability, reactivity and hypertonia with smoking; may be dose related[36]
	Cannabinoids	• Usually no clinical signs[14,35]	• Higher incidence of tremors and altered visual responses[14] • May exhibit signs of nicotine toxicity[56]

4 Supportive care

Although there is limited good quality evidence to inform specific interventions[18,39], supportive care is considered the first line of treatment.[57] Promote and recommend supportive care interventions irrespective of the maternal substance used or the severity of NAS exhibited. Refer to Appendix E: Supportive care, Appendix F: Communicating with and comforting baby and Appendix G: Baby stability and stress signals

Table 11. Non-pharmacological supportive care

Aspect	Consideration
Communicating with parent/carer	• Where possible, promote establishment of relationship antenatally • Partner with parent/carer in a non-judgmental manner[43] • Support and welcome involvement of parent/carer in care • Offer information about assessment of NAS, and recognising and responding to baby cues • Coach and model comfort strategies with parent/carer to: o Build parental/family competence o Nurture a trusting staff-family relationship • Refer to Queensland Clinical Guideline: *Standard care*[21]
Social integration	• Rooming-in enhances bonding and may reduce stigma[58] o Reduced length of treatment, reduced mean FNAS score[57] o Improved breastfeeding rates[58] • Facilitate early and regular skin to skin contact[59] o Reduces infant pain scores and improved sleep patterns o Decreases need for pharmacotherapy • Promote positive parent/carer-baby interactions (e.g. social reciprocity, visual tracking, singing[60])
Feeding	• Impaired feeding behaviours are common with NAS (e.g. excessive sucking, poor feeding, regurgitation and diarrhoea)[61] • Breastfeeding reduces need for pharmacotherapy • Small frequent feeds may improve digestion and increase feed tolerance[61] • Gavage feeds may be required for the baby with disorganised suck or who fails to engage in sufficient nutritive sucking[61] • Supplementary feeds may be required for adequate caloric intake and to support weight gain[61]
Soothing techniques	• Speaking calmly, softly and slowly to baby • Respond to baby cues o Provide position and comfort measures (e.g. swaying and rocking[62]) o Pacifier or dummy may decrease agitation and increase mother-baby eye contact[59] o Support 'hands to face' for self-soothing • Side-lying and prone positioning baby can improve containment and decrease irritability but supine positioning is preferred due to increased risk of sudden infant death syndrome(SIDS)/sudden unexplained death of an infant (SUDI) in NAS babies[60] • Swaddled bathing may reduce hypertonia and improve neurodevelopmental behaviours[60]
Environment	• Avoid overstimulation[57-59] o Limit exposure to lights and sound o Protect sleep and promote clustering of care[39] o Provide swaddling and holding • Bed type o Non-oscillating water bed (compared to standard bed) had lower FNAS scores and earlier and more consistent weight gain[63] o Mechanical rocking bed (compared to standard bed) had higher FNAS scores[64]
Complimentary therapies	• Limited evidence but no adverse events reported o Laser acupuncture as an adjunct to pharmacological therapy (compared to pharmacological only) reduced length of stay[59] o Baby massage reduces maternal stress and depressive symptoms and improves mothers' perceptions of baby calmness and comfort[60]

4.1 Feeding

Support the woman's choice of feeding method and provide routine postnatal guidance and education.

4.1.1 Optimal feeding

Table 12. Optimal feeding

Aspect	Optimal feeding
Principles	• Feeding is discussed in the antenatal period • Baby feeds when showing early hunger cues and until content • On demand without limiting duration or volume of feed • If required, lactation consultant or feeding specialist is consulted
If breastfeeding	• Latches deeply and comfortably for mother • Sustained active suckling with only brief pauses noted • If needed, expressed breast milk (EBM) offered on adult finger to organise suck prior to latch o Refer to Queensland Clinical Guideline: *Establishing breastfeeding*[65]
If formula feeding	• Effectively coordinates suck and swallow without gagging or excessive spitting up • If needed, modify chin support, flow of milk or teat • If needed, more frequent or increased calorie feeds are given

4.1.2 Breastfeeding

Table 13. Breastfeeding

Aspect	Consideration
Importance	• Well-known and substantial benefits from breastfeeding/human milk[32,33] o Reduces the incidence of NAS and duration of pharmacotherapy[31] o Analgesic for babies[66] o Beneficial for soothing agitated baby[67] o Decreased stress response and increased vagal tone in lactating women[33] • Offer information to mothers about the specific benefits of breastfeeding babies at risk of NAS • Refer to Queensland Clinical Guideline: *Establishing breastfeeding*[65]
Substances in breast milk	• Most substances can be found in breast milk with varying degrees of bioavailability[32] • Robust pharmacokinetic data on individual substance use and the effect on the baby from breast milk is lacking[32] • There is limited data to establish a 'safe' interval after substance use when breastfeeding can be re-established[32]
Risk minimisation strategies	• Individualise advice according to circumstances o Seek expert advice from the multidisciplinary team as required o Refer to Appendix H: Breastfeeding recommendations by substance • Strategies may include (according to substance and use frequency/dose) o Limit/decrease substance use o Express breastmilk prior to substance use and store for later feed o Express and discard breastmilk after substance use (duration dependent on substance) o Offer formula feeds during substance use o Smoke substance outside away from baby
Recommendation	• Encourage and support breastfeeding unless the risks clearly outweigh the benefits o Consider risks associated with maternal functioning and toxicities associated with the substance(s) used o Refer to Appendix H: Breastfeeding recommendations by substance • Advise gradual weaning[33] as abrupt cessation of breastfeeding may precipitate NAS[31]

5 Pharmacological therapy

Goals of pharmacologic therapy are to relieve discomfort, allow proper nutrition and development, and to foster parental/family bonding.[57] There is widespread support for the use of an opioid as a base therapy with adjunctive therapy if signs are not fully controlled. Few comparative studies have examined different regimens within a specific drug.

Table 14. Pharmacological management

Aspect	Considerations
Indications	• Despite optimisation of supportive care, signs of NAS not adequately controlled • Following formal assessment and supportive care as per protocols [refer Appendix A: Finnegan Neonatal Abstinence Severity Score and Appendix C: Eat, Sleep Console assessment] o ESC ▪ Any question answered 'YES' ▪ OR consoling score of 3 needed o FNAS[29]: ▪ Three (3) consecutive FNAS average eight (8) or more (e.g. 9 | 7 | 9) ▪ Two (2) consecutive FNAS of 12 or more
Care and monitoring	• Consult and discuss need for monitoring with parents/family • Admit baby to neonatal unit for close observation and monitoring (as per local protocols) o If co-location available, support access on an individual basis
Morphine	• Opioid of choice for treatment of opioid NAS[33,68,69] o Less likely to require treatment with second line agent[68,69] o Duration of treatment may be less[69] but evidence conflicting[68] • Titrate doses to clinical condition to control signs of NAS o Refer to Table 15. Morphine hydrochloride schedule
Phenobarbital	• Initial treatment for non-opioid NAS[14,33], including if substance: o Is unknown o Is a sedative such as benzodiazepine o Causes alcohol intoxication at birth o Is a SSRI or other anti-depressant o One of two or more (polysubstance use) • If signs of NAS not adequately suppressed on maximum morphine dose, may be used as adjunct to morphine[69] • Titrate doses to clinical condition to control signs of NAS o Refer to Table 16. Phenobarbital dosing and weaning schedule
Clonidine	• Has been used as monotherapy or as adjunct to morphine in the context of non-opioid NAS[70] • As an adjunct to standard opioid therapy reported to: o Decrease length of pharmacological therapy (compared to placebo)[71,72] o Decrease length of hospital stay[73] o Have a shorter duration of outpatient therapy after discharge compared to phenobarbital[74]
Methadone	• Conflicting evidence about duration of pharmacological treatment required compared with morphine[75,76]
Buprenorphine	• Insufficient data to recommend as standard of care for treating NAS[38] o Reported to have significant reduction in length of stay and length of treatment compared to morphine and other medications[34,38,77]

5.1 Morphine hydrochloride schedule

Refer to NeoMedQ morphine hydrochloride[78]

Table 15. Morphine hydrochloride schedule

Total daily dose (oral)	Equivalent 6 hourly dose (oral)	Equivalent 4 hourly dose (oral)
• Commence at 0.5 mg/kg/day in 4 divided doses (6 hourly)	0.125 mg/kg 6 hourly	—
• If signs not controlled on 0.5 mg/kg/day o Increase total daily dose to 0.7 mg/kg/day	0.175 mg/kg 6 hourly	0.12 mg/kg 4 hourly
• If signs not controlled on 0.7 mg/kg/day o Increase total daily dose to 0.9 mg/kg/day	0.225 mg/kg 6 hourly	0.15 mg/kg 4 hourly
• If signs not controlled on 0.9 mg/kg/day o Increase total daily dose to 1 mg/kg/day	0.25 mg/kg 6 hourly	0.16 mg/kg 4 hourly
• If signs not controlled on 1 mg/kg/day o Consider adding phenobarbital	—	—
Clinical surveillance		
• Assess baby for signs of NAS using a structured assessment tool o FNAS every 4–6 hours after feeds o ESC every 3–4 hours after feeds • Paediatrician/nurse practitioner review o Prior to commencing medication o Daily or more frequently until signs of NAS controlled o On maximum dose and still showing signs of NAS • Monitoring o At initiation of morphine, commence cardio-respiratory and/or continuous oxygen saturation monitoring o If morphine dosage 0.7 mg/kg/day or more, commence cardio-respiratory or oxygen saturation o When dose is less than 0.5 mg/kg/day and if nursed in accordance with SIDS guidelines[79], respiratory monitoring can be ceased		
Titration		
• Titrate doses to control signs of NAS • May require reduction in dosing interval to 4 hourly or increase in total daily dose		
Vomiting baby		
• Reduce the risk of baby vomiting morphine dose by: o Giving the dose before a feed o Ensuring the baby is not overfed • If large vomit within 15 minutes of receiving the dose, repeat dose once only		
Weaning		
• Commence weaning when signs of NAS controlled for 48–72 hours as evidenced by o FNAS consistently less than 8 or o ESC questions consistently answered 'NO' • Modify rate of weaning according to clinical response • Do not reduce dose by more than 0.1 mg/kg/day within 48 hours of a prior reduction, unless there are other indications (e.g. over-sedated baby)		
From 4 hourly dosing	• Reduce total daily dose by 0.1–0.2 mg/kg/day no more than every 48 hours until 0.2 mg/kg/day *then* • Maintain same total daily dose and reduce frequency to every 6 hours	
From 6 hourly dosing	• Reduce total daily dose by 0.1–0.2 mg/kg/day no more than every 48 hours	
Discontinue	• When total daily dose is 0.1–0.12 mg/kg/day based on birth weight or current weight whichever is greater • Continue assessments for 72 hours after ceasing morphine	

5.2 Phenobarbital schedule

Refer to NeoMedQ phenobarbital (phenobarbitone)[80]

Table 16. Phenobarbital dosing and weaning schedule

Total daily dose (mg/kg/day IV or oral)	**Oral or IV**
Loading dose	10–15 mg/kg once
Maintenance (start 12 hours after loading)	**Equivalent 12 hourly dose**
• Commence at 5 mg/kg/day oral or IV in two divided doses	2.5 mg/kg every 12 hours
• If signs not controlled on 5 mg/kg/day o Increase to 8 mg/kg/day oral or IV in two divided doses	4 mg/kg every 12 hours
• If signs not controlled on 8 mg/kg/day o Increase to 10 mg/kg/day oral or IV in two divided doses	5 mg/kg every 12 hours
Clinical surveillance	
• Assess baby for signs of NAS using a structured assessment tool o FNAS every 4–6 hours after feeds o ESC every 3–4 hours after feeds • Paediatrician/nurse practitioner review o Prior to commencing medication o Daily or more frequently until signs of NAS controlled o On maximum dosage and signs of NAS not controlled • Monitoring o Cardiorespiratory monitor when phenobarbital 10 mg/kg/day or more	
Titration	
• Loading dose more likely to achieve rapid control of signs of NAS • Titrate doses to control signs of NAS • IV only if oral feeds not tolerated • If NAS signs not controlled on maximum dose reconsider diagnosis	
Vomiting baby	
• Reduce the risk of baby vomiting phenobarbital dose by: o Giving the dose before a feed o Ensuring the baby is not overfed • If large vomit within 15 minutes of receiving the dose, repeat dose once only	
Weaning	
• Commence weaning when signs of NAS controlled for 72 hours as evidenced by o FNAS consistently less than 8 or o ESC questions consistently answered ‘NO’ • Do not reduce dose by more than 10 to 20% within 72 hours of a prior reduction (and only following regular clinical review of signs of NAS)	

6 Discharge planning

Although appropriate management of NAS is crucial, the long-term outcomes for babies who experience NAS, rely heavily on the recovery, stability and mental health of the parent/carer and the quality of the home environment.[81,82] Refer to Queensland Clinical Guideline *Perinatal substance use: maternal*[9]

Table 17. Discharge preparation

Aspect	Consideration
Child protection/ safety assessment	• Develop a 'plan of supportive care' for the baby in case of failure to engage with community services by parent/carer after discharge[1] • Undertake a child safety assessment in accordance with duty of care responsibilities o Undertake a duty of care report to Department of Communities, Child Safety and Disability Services where a reasonable suspicion that the child has suffered, is suffering or is at unacceptable risk of suffering significant harm where there is no parent/carer able and willing to protect the child from harm[27]
Parent/carer preparation	• Involve members of the multidisciplinary team to facilitate post-discharge care as required o Include primary and local service providers in planning (e.g. general practitioner (GP), community child health services) • Provide routine neonatal education to parent/carer, including o Cardiopulmonary resuscitation o Risk of environmental tobacco smoke o Safe infant sleeping practices and risk of SIDS/SUDI o Include education about assessment of NAS and medication administration (where appropriate)
Immunisations	• All routine vaccinations are indicated as per the National Immunisation Program Schedule for Queensland[83] o Refer to The Australian Immunisation Handbook[84]

6.1 Home medications

Table 18. Home medications

Aspect	Considerations
Criteria	• Comprehensive psychosocial assessment and risk assessment completed regarding safety of baby (e.g. home environment, parent/carer abilities) • Term healthy baby with primary reason for hospitalisation NAS • Baby is feeding well and gaining weight • Baby stable on medication and has tolerated a dose reduction with no increase in signs in the preceding 72 hours • Dose of morphine (if used) less than 0.5 mg/kg/day • Dose of phenobarbital (if used) less than 5 mg/kg/day • Parent/carer able to administer medication • Support and follow up arranged including emergency contacts • Pharmacy capacity to dispense medication
Medication specific parent/carer information	• Instructions for administration o Action if baby vomits following dose administration • Signs of toxicity and actions required • Storage and safety including o Distinctively labelled child proof bottle o Use of locked box for storage of medication o 24 hour contact number for any concerns
Support services	• Develop local protocols to support home medication use • Develop outpatient discharge plan with multidisciplinary team • Arrange outpatient/follow-up appointments • Prescribe and dispense medication in single dose prepared syringes for time limited period (i.e. next paediatric clinic or GP appointment)

6.2 Discharge criteria

Table 19. Discharge criteria

Aspect	Considerations
Discharge criteria	• Baby is[1]: o Clinically stable[1] (vital signs with normal limits) o Feeding well and gaining weight[1,85] o Demonstrating neurobehavioural recovery (can reach full alert state, responds to social stimuli and can be consoled with appropriate measures)[56] • Home environment is considered safe • Care will be provided by responsible adults • If home medication, refer to Table 18. Home medications for criteria • Parent/carer education provided[1] • Follow-up plan initiated[1]
Delay discharge if:	• Discharge criteria not met • Weight loss greater than 10% of birth weight • Ongoing signs of NAS • Commencement of pharmacological therapy • Court order preventing discharge

6.3 Timing of discharge

Table 20. Timing of discharge

Aspect	Considerations
Duration of stay	• Appropriate duration of in-hospital observation is influenced by type and degree of antenatal exposure to substances • Onset of NAS is variable, and discharge before onset of signs and/or treatment initiated may place baby and parent/carer at risk for adverse outcomes • Individually assess length of stay requirements based on: o Antenatal history of substance use, o Readiness for discharge [refer to Section 6.2 Discharge criteria] o Maternal and family circumstances and engagement with follow-up plan o Suggested length of stay by substance
Opioid or polysubstance exposure	• Recommended length of stay for opioid exposure[1] o Immediate release (IR) opioids (e.g. IR oxycodone) 3 days o Buprenorphine and sustained release opioids 4–7 days o Methadone 5–7 days
Non-opioid exposure	• Suggested length of stay for non-opioid exposure[53] o Discourage early discharge o Recommend 24–48 hours

6.4 Follow up and support

There are limitations in the quality of evidence about shorter and longer term outcomes following in-utero exposure to substances.[86,87] There are few prospective studies, and small sample sizes make it difficult to adjust for the many confounding variables that impact child development.[86,87] These and other methodological limitations limit the generalisability of results.

Table 21. Follow up

Aspect	Consideration
Context	• Early family intervention can help prevent some developmental problems (e.g. treatment of addiction during pregnancy, prenatal care and psychosocial support, enrolment in early intervention programs)
Review intervals	• If baby: o Required monitoring and or medication, arrange review one week after discharge from hospital o Discharged home on medication, arrange paediatric/nurse practitioner review weekly until medication ceased • Recommend to parents/carers regular follow-up for standardised developmental screening and testing in early childhood (e.g. regular follow-up at developmental clinics)
Child health services	• Refer parent/carer to available services for parenting and other ongoing information and advice • Refer to relevant community health services (e.g. child health, perinatal and infant mental health services)
Early intervention programs	• Support parent/carer with ways to promote all aspects of baby's development • Optimise developmental outcomes by early interventions addressing: o Specific problem areas o Caregiver's level of stress, mental health functioning and continued substance use o Parent/carer interactions[88]
Longer term follow-up	• Refer for assessment dependent on: o Cumulative risk factors o Domain of developmental difficulty o Quality of the care-giving environment • Ophthalmological: for myopia and strabismus o Higher rates of strabismus at two years of age than the general population • Follow-up for growth, neurodevelopment, emotional and behavioural problems for at least 12–24 months[5,89] o Children treated for NAS have lower developmental scores at two years of age than the general population[5] • Intervention programs for speech and language, occupational and behavioural issues are beneficial[88] • Refer baby and parent/carer to infant mental health or child and youth mental health service when: o Significant psychosocial complexity and intensive parent/carer-baby relationship support is required o Baby is at risk of non-organic failure to thrive and emotional neglect

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Appendix A: Finnegan Neonatal Abstinence Severity Score

- Assess babies at risk of narcotic withdrawal for signs of withdrawal 30 to 60 minutes after each feed
- Do not disturb the baby when assessing signs
- The FNAS reflects the behaviour since the previous assessment
- Babies who display signs of withdrawal will have signs from each of the three sections—CNS, gastrointestinal and respiratory/vasomotor disturbance—on the scoring chart
- Choose one FS only for each sign
- Make allowances for babies who are preterm or beyond the initial newborn period

	Date:	**Time**								
	Sign of NAS	**Score**								
Central nervous system	Excessive high pitched cry Continuous high pitched cry	**2** **3**								
	Sleeps < 1 hour after feeding Sleeps < 2 hours after feeding Sleeps < 3 hours after feeding	**3** **2** **1**								
	Hyperactive Moro reflex Markedly hyperactive Moro reflex	**2** **3**								
	Mild tremors disturbed Moderate–severe tremors disturbed Mild tremors undisturbed Moderate–severe tremors undisturbed	**1** **2** **3** **4**								
	Increased muscle tone	**2**								
	Excoriation	**1**								
	Myoclonic jerks	**3**								
	Generalised convulsions	**5**								
Gastrointestinal	Excessive sucking	**1**								
	Poor feeding	**2**								
	Regurgitation Projectile vomiting	**2** **3**								
	Loose stools Watery stools	**2** **3**								
Respiratory/vasomotor	Sweating	**1**								
	Fever 37.3 to 38.3 °C Fever 38.4 °C and above	**1** **2**								
	Frequent yawning > 3–4 in half hour	**1**								
	Mottling	**1**								
	Nasal stuffiness	**1**								
	Sneezing > 3–4 in half hour	**1**								
	Nasal flaring	**2**								
	Respiratory rate > 60/minute Respiratory rate > 60/minute and retractions	**1** **2**								
	TOTAL SCORE									
	SCORER'S INITIALS									

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Appendix B: Finnegan Neonatal Abstinence Severity Score Description

	Sign	Description
Central nervous system	Excessive high pitched cry	• Baby cries intermittently or continuously for **up to 5 minutes** despite caregiver intervention • Baby is unable to decrease crying within a 15 second period using self-consoling measures
	Continuous high pitched cry	• Baby cries intermittently or continuously for greater than 5 minutes despite caregiver intervention • NB: Since a baby's cry may vary in pitch, this should not be scored if high pitched crying is not accompanied by other signs described above
	Sleep	• Longest period baby sleeps within the entire scoring interval including light and deep sleep • Light—irregular breathing, brief opening of eyes at intervals, some sucking movements • Deep—regular breathing, eyes closed, no spontaneous activity
	Hyperactive Moro reflex*	• Baby exhibits pronounced jitteriness of the hands during or at the end of the test for Moro reflex
	Markedly hyperactive Moro reflex*	• Baby exhibits jitteriness and repetitive jerks of the hands and arms during or at the end of the test for the Moro reflex
	Mild tremors when disturbed**	• Baby exhibits observable tremors of the hands or feet when being handled
	Moderate to severe tremors when disturbed**	• Baby exhibits observable tremors of the arm(s) or leg(s) with or without tremors of the hands or feet when being handled
	Mild tremors when undisturbed**	• Baby exhibits observable tremors of the hands or feet whilst undisturbed
	Moderate to severe tremors when undisturbed**	• Baby exhibits observable tremors of the arm/s or leg/s with or without tremors of the hands or feet whilst undisturbed
	Increased muscle tone when the baby is awake and not crying	• Baby has tight flexion of the arms and legs that is unable to slightly extend the arms or legs
	Excoriation	• First appearance or increase on baby's chin, knees, cheeks, elbow, toes or nose due to friction burn not nappy area excoriation from loose stools
	Myoclonic jerks	• Baby exhibits twitching movements of the muscles of the face or extremities or jerking movements of the arms or legs
	Generalised convulsions	• Baby has generalised activity involving tonic (rigid) extensions of all limbs (or may be limited to one limb only), or manifested by tonic flexion of all limbs; or generalised jitteriness of extremities that do not stop when the limbs are flexed or held • Features of subtle seizures may be present including eye staring, rapid eye movements, chewing, fist clenching, back arching and cycling motion of limbs with or without autonomic changes
Gastrointestinal	Excessive sucking	• Baby shows increased >3 times rooting while displaying rapid swiping movements of hand across mouth prior to or after a feed
	Poor feeding	• Baby either demonstrates excessive sucking prior to a feed, yet sucks infrequently during feeding, taking small amounts and/or demonstrates an uncoordinated sucking reflex or continuously gulps the milk and stops frequently to breathe
	Regurgitation	• Baby regurgitates not associated with burping 2 or more times during a feed
	Projectile vomiting	• Baby has ≥1 projectile vomiting episode occurring during or immediately after a feed
	Loose stools	• Scored if stool which may or may not be explosive is curdy or seedy in appearance • A liquid stool, without a water ring on the nappy should also be scored as loose
	Watery stools	• Baby has soft, mushy or hard stools that are accompanied by a water ring on the nappy
Respiratory/vasomotor	Sweating	• Baby has perspiration on forehead, upper lip or back of neck • Do not score if sweating is due to overheating for example from cuddling or swaddling
	Fever	• Baby has a temperature as per score sheet
	Frequent yawning	• Baby yawns > 3 times within scoring interval
	Mottling	• Baby has mottling on chest, trunk, arms or legs
	Nasal stuffiness	• Baby has noisy respirations due to the presence of exudate, with or without a runny nose
	Sneezing	• Baby sneezes >3 times in the scoring interval occurring as individual episodes or may occur serially
	Nasal flaring	• Baby has this at any time during the scoring interval • Score only if present without other evidence of lung or airway disease
	Respiratory rate	• Baby must not be crying when this is assessed

*Moro reflex: Do not perform when the baby is crying or irritable
**Mild tremors when undisturbed observe for at least 2 undisturbed periods of 60 seconds
Adapted from: D'Apolito K. A scoring system for assessing neonatal abstinence syndrome. Instruction Manual. 1994.

Appendix C: Eat, Sleep Console assessment

Date Time										
ESC ASSESSMENT (due to NAS)										
Poor eating? (Y or N)										
Sleeping less than 1 hour? (Y or N)										
Unable to console within 10 minutes? (Y or N)										
Consoling support needed (1, 2 or 3) 1. Able to console on own 2. Able to console with caregiver support within 10 minutes 3. Unable to console with caregiver support within 10 minutes										
CARE PLAN										
Recommend parent/carer and staff huddle (Y or N)										
Recommend full team review (Y or N)										
Management decision 1. Optimise supportive care 2. Initiate medication treatment 3. Continue medication treatment 4. Other										
Presence of caregiver 0. No caregiver present 1. Less than 1 hour 2. 1–2 hours 3. 2–3 hours 4. More than 3 hours										
SUPPORTIVE CARE (check all reviewed as increase (I) or reinforce (R)										
Rooming in										
Caregiver presence										
Holding by caregiver										
Safe swaddling										
Optimal feeding at early hungry cues										
Quiet low light environment										
Non-nutritive sucking/pacifier										
Limiting visitors										
Clustering care										
Safe sleep/fall prevention										
Caregiver self-care and rest										

Appendix D: Eat, Sleep Console descriptions

	Aspect (due to NAS)	Description
EAT	Poor eating	• Unable to coordinate feeding within 10 minutes of showing hunger OR • Unable to sustain feeding for at least 10 minutes at breast OR • Less than o 10 mL volume/feed on day 1–2 o 30 mL volume/feed on day 3 or after
	Poor eating due to NAS	• Answer YES if due to substance withdrawal signs (e.g. fussiness, tremors, uncoordinated suck, excessive rooting)
	Poor eating due to other reasons	• Answer NO if due to other non-NAS related factors (e.g. prematurity, transitional sleep in first 24 hours, inability to latch due to infant/maternal anatomical factors)
	Not sure	• Answer YES if it is not clear if due to substance withdrawal signs and continue to monitor
SLEEP	Poor sleeping	• Sleeps less than 1 hour after feeding
	Poor sleeping due to NAS	• Answer YES if due to substance withdrawal signs (e.g. fussiness, tremors, increased startle, restlessness)
	Poor sleeping due to other reasons	• Answer NO if due to other non-NAS related factors (e.g. signs in first day likely due to physiologic cluster feeding, sleep interrupted for care/tests)
	Not sure	• Answer YES if it is not clear if due to substance withdrawal signs and continue to monitor
CONSOLE	Unable to console within 10 minutes?	• Unable to be consoled within 10 minutes despite supportive (non-pharmacologic) and consoling interventions
	Unable to console due to NAS	• Answer YES if due to substance withdrawal signs
	Unable to console due to other reasons	• Answer NO if inconsolability is due to non-NAS related factors (e.g. parent/carer non-responsiveness to hunger cues, pain)
	Not sure	• Answer YES if it is not clear if due to substance withdrawal signs and continue to monitor
	Consoling support score	Assigns consoling score according to level of support required 1. Able to console on own without any caregiver support needed 2. Able to console with caregiver support within 10 minutes 3. Unable to console within 10 minutes despite effective use of consoling interventions
	Consoling interventions by caregiver	• Begin softly and slowly talking to infant using voice to calm baby • Look for hand to mouth movements and facilitate by gently bringing hand to mouth • Continue softly talking and place hand firmly but gently on baby's abdomen • Continue softly talking and bring baby's arms and legs to the centre of body • Pick up baby, hold skin to skin or swaddled in blanket and gently rock or sway baby • Offers finger or pacifier for baby to suck or a feeding if showing hunger cues • Parent/carer offers consoling interventions that they feel are best at time (e.g. feeds if hunger cues) • Care providers introduce in the order above to assess level of support needed to console baby over time
PLAN OF CARE	Parent/carer and staff huddle	• Bedside huddle with parent/carer and main healthcare provider (nurse or midwife) to optimise (increase of reinforce) supportive interventions • Initiated if o 'YES' to any ESC question, or o Consoling support score of 3
	Full care team review	• Bedside huddle with parent/carer, main staff care providers (nurse or midwife, team leader), and medical officer or neonatal nurse practitioner • Initiated after parent/carer and staff huddle and if o Continuation of YES to any element or o Continuation of consoling support score of 3 • Review and discuss possible initiation of pharmacologic treatment
	Family presence	• Time since last assessment that parent/carer, spent with baby (own room or neonatal unit)

Appendix E: Supportive care

	Sign	Suggested supportive measure
Central nervous system	Excessive or high pitched crying	• Soothe baby with swaddling • Talk quietly/sing/hum • Hold baby firmly to body and rock gently • Use a baby sling • Reduce environmental stimuli o Slow movements o Dimmed lighting o Remove from noise exposure
	Sleeplessness	• Reduce environmental stimuli • Minimise handling, swaddle baby, rock gently • Encourage skin to skin cuddles with parent/carer
	Excoriation (chin, knees, elbow, toes, nose)	• Apply protective skin barriers to affected areas to protect skin and prevent damage
	Myoclonic jerks, tremors, jitteriness, irritability	• Minimise handling—be prepared prior to disturbing baby • Use slow movements, reduce lighting, reduce noise levels, soft music, massage and relaxation baths
	Agitation resulting in scratching of the skin	• Keep hands clean and apply mittens
Gastrointestinal	Excessive sucking	• Keep hands clean and use mittens to minimise sucking of the fists • Offer pacifier
	Poor feeding (infrequent/uncoordinated suck)	• Feed on demand o Frequent small feeds with rest between sucking • Reduce environmental stimuli during feeding • Assess coordination of suck/swallow reflex—support cheeks and jaw if necessary o Refer to midwife or lactation consultant as required • Monitor weight loss closely during withdrawal as feeding disturbances are common o If caloric intake appears insufficient with breastfeeding alone supplement with expressed breast milk or formula until adequate caloric intake is achieved • Assess hydration o If insufficient fluid intake review by medical staff
	Regurgitation/vomiting	• Wind or burp baby regularly when stops sucking and at end of feed • Do not overfeed
	Peri-anal excoriation due to loose stools/diarrhoea	• Prevent skin excoriation using a petroleum based ointment • Change nappy with every feed and use barrier creams • Expose baby's buttocks to air to dry
	Pain	• Provide usual pain relief as for any baby
Respiratory/vasomotor	Sweating	• Clean skin regularly, use dry and clean clothing
	Fever	• Ensure adequate hydration • Reduce environmental temperature and nurse in open cot • Dress in light clothing using lightweight, soft natural fibre fabric to swaddle or nurse skin to skin with mother
	Nasal stuffiness/excessive nasal secretions	• Use gentle suction if nasal secretions present
	Nasal flaring/tachypnoea	• Review by medical staff if cyanosis or mottling present • Avoid swaddling to allow close monitoring of respiratory rate and effort • Nurse supine unless receiving cardiorespiratory monitoring in the neonatal unit

Adapted from: Commonwealth of Australia. National clinical guidelines for the management of drug use during pregnancy, birth and the early development years of the newborn. 2006.
Verklan M, Walden M. Core curriculum for Neontal Intensive Care Nursing. St. Louis Missouri: Saunders; 2015.
D'Apolito KC. Assessing neonates for neonatal abstinence: are you reliable? J Perinat Neonatal Nursing. 2014; 28(3):220-31.

Appendix F: Communicating with and comforting baby

Aspect	Consideration
Touching and holding	• Prepare baby for touch with a soft voice • Hold baby in such a way that supports their arms and legs tucked close to their body and hands close to their face • Use warm wraps • Touch baby in a variety of ways including: o Gentle steady pressure o Rhythmic stroking • When moving your hands away from baby, do so gently and slowly without abrupt movements • Burp baby as needed doing so gently without vigorous patting on their back
Positioning	• Support baby's position with their arms and legs close to their body • Repositioning should be performed with slow gentle movements and without sudden changes
Communicating with baby	• Babies communicate from birth • At first their communication signs are quick and hard to see—look for: o A quick look for a few seconds o A sudden stillness o Some other little movement o Talk or sing to baby in a soft voice o Share eye contact and let baby look at your face
Prolonged crying	• Hold baby closely wrapped in a sheet or light blanket/wrap • Avoid loud noises, bright lights and excessive handling • Gentle rubbing or rocking and humming
Sleeplessness	• Allow baby to sleep (don't wake unnecessarily) • Check nappy is clean • Clean with water only and use zinc cream at each change
Excessive sucking	• Offer dummy/pacifier if not hungry/due feeding
Vomiting	• Hold baby in upright position and burp after each feed
Poor feeding	• Offer small frequent feeds from the breast or slow flow teat • Feed in quiet, calm surrounding with minimal noise and disturbance
Trembling	• Wrap baby in sheet or light blanket/wrap
Fever	• Avoid too many blankets or clothes on baby • Natural fibre/cotton clothes and wraps are suitable

Adapted from: Commonwealth of Australia. National clinical guidelines for the management of drug use during pregnancy, birth and the early development years of the newborn. 2006.
Nelson M. Neonatal abstinence syndrome: The nurse's role. International Journal of Childbirth Education. 2013; 28(1):28-42.
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Appendix G: Baby stability and stress signals

	Autonomic system	Motoric system	State system
Baby stability signals	• Able to regulate colour and respiration • Reduction of tremors twitches, visceral signals	• Smooth, well-modulated posture and tone • Synchronous smooth movements with: o Hand/foot clasping o Grasping o Hand to mouth activity o Suck/suck searching o Hand holding/tucking	• Clear robust sleep states • Rhythmic robust crying • Self-quieting • Focused shiny eyed alertness with intent or animated facial expression • 'Ooh' face, cooing, attentional smiling
Baby stress signals	• Respiratory pauses, tachypnoea, gasping • Colour changes: o Dusky, pale, mottled, cyanotic • Tremors, startles, twitches • Yawning • Gagging, spitting up • Hiccoughing • Straining • Sneezing, coughing • Sighing	• Flaccidity o Trunk, extremities, face • Hypertonicity with hyperextension of: o Legs, arms, trunk • Finger splays • Facial grimace • Hand on face, fisting • Fetal tuck • Frantic diffuse activity	• Diffuse sleep-wake states • Fussing or irritability • Staring or gaze averting • Panic or worried alertness • Glassy eyed alertness • Rapid state oscillation • Irritability • Diffuse arousal

Reference: Blackburn ST, Vandenberg KA. Assessment and Management of Neonatal Neuro-behavioural Development. In: Kenner C, Lott JW, Flandermeyer AA. *Comprehensive Neonatal Nursing: A physiological Perspective* 3rd ed. USA: Elsevier Science; 1998.

Appendix H: Breastfeeding recommendations by substance

Substance	Breastfeeding (BF) consideration
Opioid/opiate	• May provide milder withdrawal signs • May reduce requirement for pharmacological treatment **Recommendation** • Encourage BF unless other contraindication
Benzodiazepines	• Short acting (e.g. temazepam) unlikely to affect baby if short term use • Long acting, (e.g. clonazepam) may cause apnoea and sedation **Recommendation** • Assess BF decisions on an individual basis • Avoid BF immediately after taking short acting benzodiazepines • Avoid long-acting benzodiazepines
Amphetamines	• Effect on neurological development not well studied • Dosages for *medical* indications unlikely to cause adverse effects • Excretion in breast milk may be dose-dependent **Recommendation** • Discourage use when BF • After individual use, avoid BF for 24–48 hours
Cocaine	• Serious adverse reactions reported **Recommendation** • If regular use, BF not recommended • After individual dose, avoid BF for 24 hours
Alcohol	• More than two standard drinks per day linked to decreased lactation, decreased feeding and arousal, and psychomotor development **Recommendation** • Limit alcohol to two standard drinks in a day • Avoid consumption immediately before feeding • If excessive use, consider expressing breast milk in advance • If chronic alcohol use avoid BF
Codeine	• Dose-response relationship between maternal use and neonatal toxicity • Associated with neonatal bradycardia, apnoea, cyanosis, drowsiness and death **Recommendation** • Contraindicated for BF women
Cannabis	• The psychoactive component (tetrahydrocannabinol (THC)) is excreted in breast milk • May have negative neurodevelopmental outcomes but unclear if risks related to antenatal exposure, BF or multiple substance use • Smoke exposure may increase risk of SUDI **Recommendation** • Discourage use when BF • Avoid other co-exposures such as alcohol and tobacco • Avoid BF within 1 hour of inhaled use (to reduce risk of exposure to highest concentration of THC in breast milk)
SSRI/SNRI	• Minimal amounts found in breast milk • Fluoxetine higher concentrations in breast milk than other SSRI • Sertraline generally the preferred antidepressant during BF **Recommendation** • Encourage BF
Tobacco	• Exposure to environmental smoke increases risk of respiratory allergy and SUDI **Recommendation** • Encourage BF • Support smoking cessation strategies (e.g. nicotine patch/gum) • Advise to avoid infant exposure to second-hand smoke

References: Reece-Stremtan S, Marinelli KA. ABM clinical protocol #21: guidelines for breastfeeding and substance use or substance use disorder, revised 2015. Breastfeed Medicine 2015;10(3):135-41.
Drugs and Lactation Database (LactMed). In. [Internet]: Bethesda (MD): National Library of Medicine (US); 2006- [cited 2021 January 22]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK501922.
Ordean A, Kim G. Cannabis Use During Lactation: Literature Review and Clinical Recommendations. Journal of Obstetrics and Gynaecology Canada. Journal d'Obstétrique et Gynécologie du Canada 2020;42(10):1248-53.
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